

2910

Excellent Performance

- 400MHz to 2.5GHz frequency range
- -125dBm to +13dBm output power range
- +0.05dB relative amplitude accuracy (linearity)
- +0.05dB amplitude repeatability

High Speed

- <1.3ms typical frequency switching time with list mode
- <1.6ms amplitude switching time
- 3ms nominal waveform switching time via SCPI command
- Instant waveform switching time with ARB Sequence mode

Flexible

- 40MHz bandwidth, 100Msa Arbitrary Waveform Generator option
- >400MHz modulation bandwidth using external I-Q inputs
- Flexible analog modulation option: AM, FM, FM, pulse, AWG noise and 2-tone option
- Flexible digital modulation option: ASK, FSK, PSK, and QAM
- Standards options: GSM, EDGE, W-CDMA, cdmaOne, cdma2000, and GPS
- Advanced PC connectivity: GPIB, USB, LAN, and LXI Class-C

Applications

- Mobile handset production test
- Handset R&D and design verification
- Testing mobile communications infrastructure
- RFIC testing
- Wireless connectivity testing (WLAN, WiMax™, Bluetooth®)
- Research and education in mobile communications

RF Vector Signal Generator Version 2.0



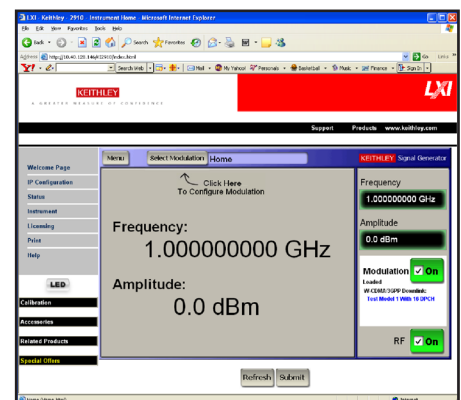
The Model 2910 V2.0 RF Vector Signal Generator is a mid-performance test instrument for R&D and production testing of modern RF communications equipment and devices. Its next-generation instrument platform uses state-of-the-art RF and digital signal processing technology to deliver RF test signals with high accuracy, repeatability, and speed yet in a small package and at a price point that makes it the logical choice for many test applications. It has an intuitive Windows® CE user interface and advanced connectivity to PC-based software and is LXI Class-C compliant.

Innovative Architecture

The Model 2910 V2.0 uses a Software-Defined Radio (SDR) architecture that can generate virtually any signal without changing hardware, enabling high flexibility in R&D and production environments and reducing capital equipment costs. Not only does this allow signals to be created for current requirements, but the instrument can be utilized over longer time periods as new signals emerge, compared to traditional architectures.

Signal waveforms are downloaded into the arbitrary waveform generator (ARB) memory and processed by the high-speed digital signal processor (DSP), an approach that defines the RF signal through software by I-Q data of the waveform. Multiple waveforms can be stored in the large ARB memory. The DSP can rapidly switch between waveforms and process them.

A 40MHz signal bandwidth, memory compression, and excellent signal integrity are achieved using a digital up/down converter (DUC/DDC) and 100MHz fixed-frequency dual digital-to-analog converter



The Model 2910 V2.0 LXI webpage interface lets you monitor and control the instrument from any Internet connection worldwide.

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Ordering Information

- 2910-F** RF Vector Signal Generator, front-panel RF output, for bench use*
- 2910-R** RF Vector Signal Generator, rear-panel RF output, for bench use*
- 2910-FRK** RF Vector Signal Generator, front-panel RF output, for rack installation**
- 2910-RRK** RF Vector Signal Generator, rear-panel RF output, for rack installation**

* Configurations for bench use include handle and front & rear bumpers, but exclude rack mount kit.

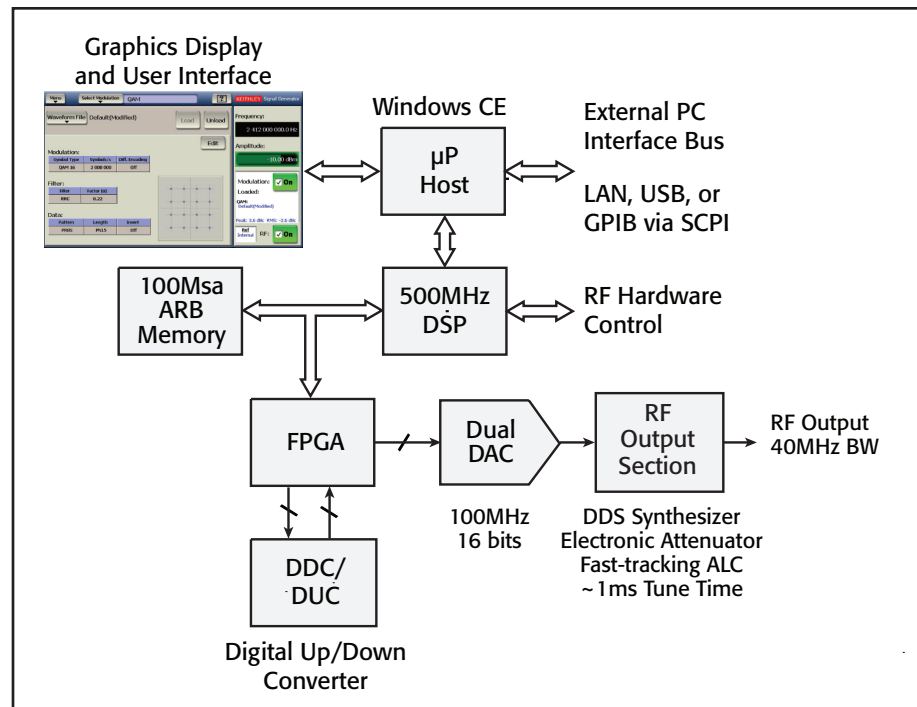
** Configurations for rack installation include rack mount kit, but exclude handle and bumpers.

Options

- 2910-LPN** Low Phase Noise
- 2910-ARB** 100 Mega-Sample Arbitrary Waveform Generator
- 2910-ALG** Flexible Analog Modulation Signal Generation Personality
- 2910-DIG** Flexible Digital Modulation Signal Generation Personality
- 2910-GSM*** GSM, GPRS & EDGE Signal Generation Personality
- 2910-CDMA2000*** cdma2000 & IS-95A Signal Generation Personality
- 2910-WCDMA*** W-CDMA FDD Signal Generation Personality
- 2910-GPS*** Global Positioning System Signal Generation Personality

*Requires 2910-ARB option

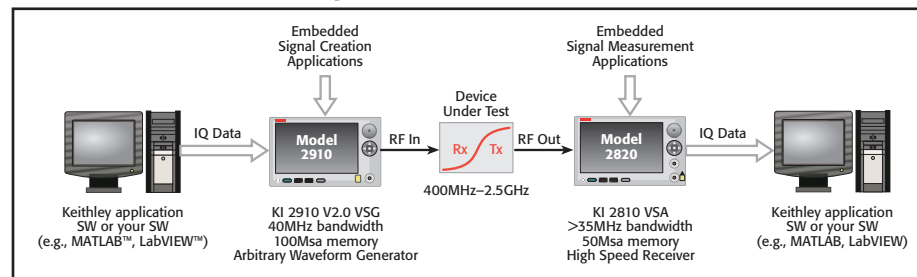
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This block diagram of the Model 2910 V2.0 shows the key components of its Software-Defined Radio architecture. These components are optimized to achieve excellent accuracy and high test speeds, while reducing instrument cost and size.

(DAC) with optimized anti-alias filtering. Fast triggering and high speed signal routing are accomplished with the field-programmable gate array (FPGA).

Three Powerful Modes of Operation



The Model 2910 V2.0 RF Vector Signal Generator and Model 2810 RF Vector Signal Analyzer are highly versatile. You can use applications embedded in the instruments or download, upload I-Q waveform data directly to a PC.

- 1. General Purpose** – The Model 2910 V2.0 can generate CW signals and sweep the frequency and amplitude of RF signals. The Model 2910-ALG Flexible Analog modulation option provides traditional signals, such as AM, FM, PM, pulse, AWG noise, and even 2-tones. The new Model 2910-DIG Flexible Digital Modulation option generates signals with ASK, FSK, PSK, and QAM symbol types.
- 2. Embedded Radio-Specific Capability** – The Model 2910 V2.0 has software measurement options for testing cellular standards such as GSM, EDGE, W-CDMA FDD, cdmaOne, and cdma2000. The new Model 2910-GPS option simulates the coded L1 signal of a global positioning system satellite with

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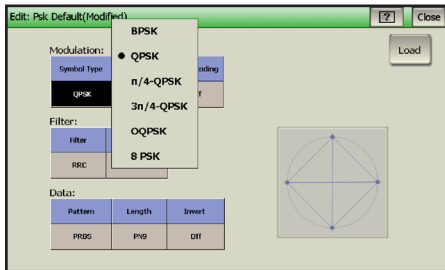
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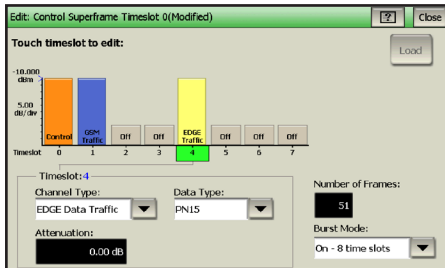
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Accessories Supplied

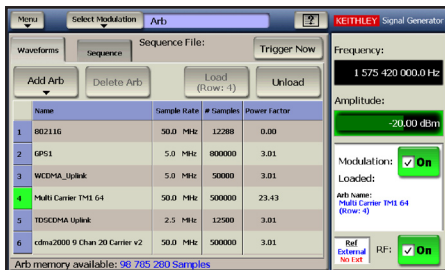
AC power cable, printed Quick Start Guide, CD-ROM containing 2910 VSG System Help, utility programs, and PDF files (also available online at www.keithley.com).



Model 2910-DIG Flexible Digital Modulation option allows you to control the modulation format, symbol type, filter, data pattern, and data length.



The waveform edit menu of the Model 2910-GSM option allows you to select the channel type and data type for each time slot.



The Model 2910-ARB Arbitrary Waveform Generator option has 100Msa memory so you can store large waveforms or multiple waveforms with up to 40MHz signal bandwidth.

RF Vector Signal Generator Version 2.0

a variety of data types, including an external user-file with up to 37,504 bits (12.5 minutes) of navigation data. This expands the scope of the Model 2910 to test mobile devices with integrated GPS functionality.

New waveform generation and analysis tools are continually under development and will be made available in the future as software upgrades.

3. User Defined Capability – The Model 2910-ARB option provides a 40MHz bandwidth arbitrary waveform generator option to download custom I-Q data files into the signal generator through GPIB, USB, or LAN interfaces. Waveform creation of virtually any signal is possible with PC-based software, such as MATLAB® and LabVIEW™.

High Accuracy and Repeatability

The Model 2910 V2.0 RF output circuitry is simple yet designed for high performance

- Absolute amplitude accuracy is typically ± 0.3 dB from -110 dBm to $+13$ dBm.
- Relative amplitude accuracy (linearity) is ± 0.05 dB.
- Amplitude repeatability is ± 0.05 dB, typically ± 0.01 dB.
- Temperature stability is 0.015 dB per $^{\circ}\text{C}$.

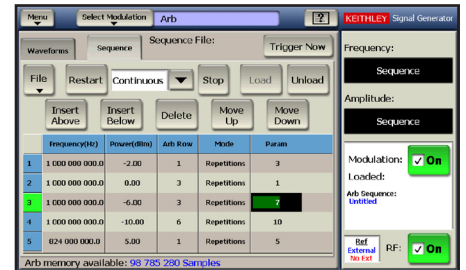
High measurement accuracy and repeatability provide confidence in product quality. Measurement guard bands in production test are minimized, increasing product yields.

Ultra-fast Measurement Speed

The Model 2910 V2.0 provides high speed measurements without compromising measurement accuracy. The high speed DSP controls the instrument hardware and runs measurement programs such as list mode, sweep mode, and

ARB Sequencing. Flexible trigger and sync capabilities further enhance measurement speed.

Switching between waveforms in ARB memory takes 3ms via GPIB and is instantaneous when using the ARB Sequence mode. Here, the waveform sampler moves from the last point of an ARB waveform to the first point of the next waveform in one clock cycle. The ARB waveforms can be played in any sequence, providing added flexibility for accelerating measurements.



With the new Model 2910 V2.0 ARB sequence feature, you can sequence through ARB waveforms in any order or pattern.

The RF circuitry was also optimized for speed without compromising accuracy. The RF output section uses a patent-pending Direct Digital Synthesis (DDS) synthesizer design to switch frequencies in about 1msec using list or sweep modes and 3msec using a remote SCPI command via GPIB.

The amplitude switching time is less than 2ms using list or sweep modes and has been programmed to overlap the frequency tune time when both are changed. Fast amplitude switching is accomplished using fast-tracking automatic level control (ALC) circuitry and an electronic attenuator. This has the added benefit of high measurement repeatability over millions of cycles in production environments, unlike mechanical attenuators that slowly degrade after a few thousand cycles and are slow.

ACCESSORIES AVAILABLE

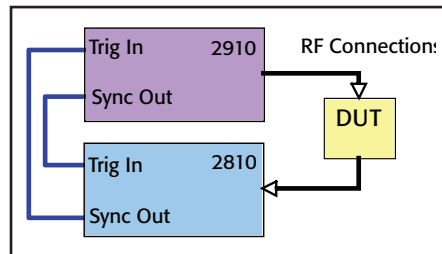
- 2910-RMK Rack Mount Kit, hardware for two instruments
- 2910-BENCH-KIT Bench-Top Kit, handle and front-rear bumpers
- 2910-DCBLOCK External RF-DC Block module
- 2910-ADAPTER-KIT Cable and Adapter Accessory Kit

CABLES/ADAPTERS

- 7007-1 Shielded IEEE-488 Cable, 1m (3.3 ft)
- 7007-2 Shielded IEEE-488 Cable, 2m (6.6 ft)

OTHER

- KPCI-488LP IEEE-488 Interface/Controller for the PCI Bus
- KPXI-488 IEEE-488 Interface Board for the PXI Bus
- KUSB-488A IEEE-488 USB-to-GPIB Interface Adapter



Trigger input and sync output connections on the Model 2910 V2.0 allow you to synchronize with other test instruments, such as the Keithley Model 2810 RF Vector Signal Analyzer, for high speed measurement applications.

Signal generator for mobile communications testing

RF/MICROWAVE

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Modes of Operation

STANDARD MODE: CW signal generator.

OPTIONAL MODES:

- Analog modulation, digital modulation.
- GSM/GPRS/EDGE, cdmaOne/cdma2000, W-CDMA, GPS (all require ARB option).
- Arbitrary waveform modulation (ARB).

Note: All items are specifications unless otherwise noted.

Frequency

FREQUENCY RANGE¹: 400MHz to 2.5GHz.

FREQUENCY SETTING RESOLUTION: 0.1Hz.

FREQUENCY ACCURACY: Same as frequency reference + synthesizer resolution term².

FREQUENCY SWITCHING TIME³: ≤1.6ms (modulation off).
 ≤1.8ms (modulation on).
 ≤3.0ms (characteristic)⁴.

FREQUENCY NOTES

1. Over range operation provided: 325MHz to 2.7GHz. Performance below 400MHz and above 2.5GHz is not specified.
2. Synthesizer resolution term: ≤5μHz.
3. To within 0.1 ppm of final value. List Mode or Sweep mode. Free Run or external hardware trigger. ALC Off. Modulation On or Off.
4. To within 0.1 ppm of final value. Via remote command after receipt of end-of-operation indicator (EOI). ALC Off. Modulation On or Off.

Internal Frequency Reference

AGING RATE: ≤1ppm per year.

TEMPERATURE STABILITY: ≤0.2ppm¹.

INTERNAL FREQUENCY NOTES

1. Total variation from 0°C to 50°C ambient temperature range.

Frequency Reference Output

IMPEDANCE: 50Ω (characteristic), AC coupled.

REF OUTPUT SIGNAL: 10MHz, +7dBm ±3dB (characteristic).

External Frequency Reference Input

FREQUENCY: 1 to 20MHz¹.

AMPLITUDE: Lock range: 0 to +15dBm².

IMPEDANCE: 50Ω (characteristic).

EXTERNAL FREQUENCY REFERENCE INPUT NOTES

1. On 10Hz boundaries Freq = 1MHz + n * 10Hz. Reference accuracy: ≤±1ppm. Sine or square wave inputs are acceptable.
2. For optimum phase noise, dBm < P_{in} < +10dBm.

Spectral Purity

SSB PHASE NOISE (dBc/Hz, 20kHz offset, Carrier Frequency 1.0GHz):
 ≤ -117 (≤ -124 characteristic).

HARMONICS¹: Fundamental Frequency, F < 550MHz: ≤ -30dBc.
 F ≥ 550MHz: ≤ -40dBc.

NON-HARMONIC SPURIOUS²: Fundamental Frequency, 400MHz ≤ F < 2.5GHz:
 < -55dBc (< -60dBc characteristic).

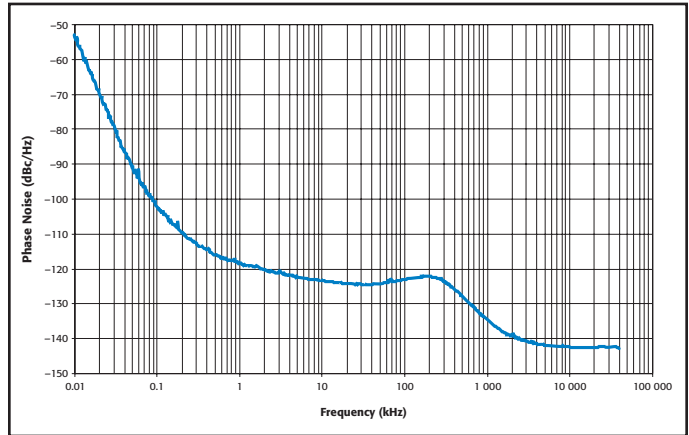
SPECTRAL PURITY NOTES

1. P_{out} ≤ +4dBm.
2. Offset from carrier >10kHz, P_{out} = 0dBm and Modulation Off.

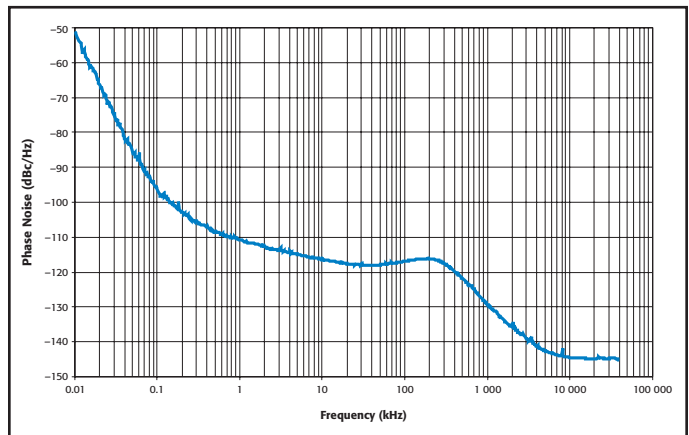
2910-LPN Low Phase Noise Option

SSB PHASE NOISE, dBc/Hz, 20kHz OFFSET:

Carrier Frequency	Specification	Characteristic
1.0GHz	≤ -120	≤ -124
2.0GHz	≤ -113	≤ -117



Option 2910-LPN: Characteristic Single Side Band Phase Noise, Carrier Frequency = 1GHz



Option 2910-LPN: Characteristic Single Side Band Phase Noise, Carrier Frequency = 2GHz

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Amplitude¹

AMPLITUDE LEVEL RANGE (CW): -125 to +13dBm.

AMPLITUDE LEVEL RANGE (GSM): -125 to +6dBm.

AMPLITUDE LEVEL RANGE (EDGE): -125 to +6dBm.

AMPLITUDE LEVEL RANGE (cdma2000)²: -125 to +3dBm.

AMPLITUDE LEVEL RANGE (W-CDMA)³: -125 to +4dBm.

AMPLITUDE SETTING RESOLUTION: 0.01 dB.

ABSOLUTE AMPLITUDE LEVEL ACCURACY (CW), dB:

Amplitude Setting	Specification	Typical
+13 ≥ amplitude ≥ -75 dBm	≤ ±0.5	≤ ±0.3
-75 > amplitude ≥ -110 dBm	≤ ±0.6	≤ ±0.3
-110 > amplitude ≥ -120 dBm	≤ ±1.0	≤ ±0.6
-120 > amplitude ≥ -125 dBm	≤ ±1.0 (characteristic)	

POWER CHANGE OVER TEMPERATURE 0° to 50°C (characteristic): 0.015dB/°C.

RELATIVE AMPLITUDE ACCURACY (linearity)⁴: ≤ +0.05dB.

AMPLITUDE REPEATABILITY⁵: < +0.05dB.

AMPLITUDE SWITCHING TIME⁶:

List or Sweep Mode⁷: ≤ 1.6ms (Modulation Off), ≤ 1.8ms (Modulation On).

Via remote command, after receipt of end-of-operation indicator (EOI)⁸: ≤ 3.0ms.

ALC On⁹: < 2.6ms (Mod Off), < 4.1ms (Mod On).

VSWR, RF_{out} PORT: <1.35:1 (<1.25:1 typical).

REVERSE POWER PROTECTION¹⁰: +35dBm or 10VDC.

AMPLITUDE NOTES

- Specifications apply when in auto-coupled mode unless otherwise stated.
- +3dBm max for Pilot only. +0.5dBm max for Forward 9 channel.
- +4dBm max for CPICH only. -1.0dBm max for Test Model 1 with 16 DPCH.
- 110dBm < P_{out} < +2dBm, Modulation Off.
- 110dBm < P_{out} < +2dBm, ALC mode = fast, Modulation Off.
- To within ±0.05dB of final value (to within ±0.15dB for power changes that cross P_{max} - 11dB). For P_{max} see amplitude level range values for each modulation.
- Free Run or ALC trigger, ALC off.
- ALC Off, Modulation On or Off.
- ALC mode = Auto (Sample and Hold mode for Modulation On. Fast mode, Modulation Off)
- Up to 50VDC with optional external DC block Keithley part number 2910-DCBLOCK.

Sweep and List Modes

FREQUENCY SWEEP: Start Freq., Stop Freq., Number of Steps, and Dwell Time.

AMPLITUDE SWEEP: Start Power, Stop Power, Number of Steps, and Dwell Time.

DWELL TIME RANGE: 0 to 1 second.

DWELL TIME RESOLUTION: 0.1ms.

ARBITRARY LIST: List of Frequency, Amplitude, and Dwell Time sets. Maximum number of sets = 1000.

External Modulation

EXTERNAL I-Q INPUTS (Maximum modulation bandwidth¹): >200MHz per input.

- 3dB bandwidth. Inputs applied directly to I-Q modulator. Optimal drive voltage is ± 0.8V. I-Q AC and DC amplitude and phase skew and offsets to be provided by user.

2910-ARB Arbitrary Waveform Generator

WAVEFORM MEMORY: 100 megasamples in 400 MB of memory.

MAXIMUM MODULATION BANDWIDTH, INTERNAL MODULATION GENERATION (<1dB flatness): 40MHz (characteristic).

DSP SAMPLE RATES:

39.0625, 50, 78.125, 125, 156.25, 250, 312.5, 500, 625kHz.
1.25, 1.5625, 2.5, 5, 6.25, 10, 12.5, 25, 50MHz.

MINIMUM SEGMENT LENGTH: 100 samples¹.

MAXIMUM SEGMENT LENGTH: 100 megasamples.

MAXIMUM NUMBER OF SEGMENTS: 1,000.

- For sampling rates (F_s) ≤ 10MS/s. 1000 samples minimum for F_s > 10MS/s.

2910-ALG Analog Modulation Personality¹

AMPLITUDE MODULATION

MODULATION FREQUENCY RANGE: 1Hz to 100kHz.

MODULATION FREQUENCY RESOLUTION: 1Hz.

MODULATION DEPTH RANGE: 0 to 100%.

MODULATION WAVEFORM: Internal sine wave, triangle wave, or up/down ramp.

AM DISTORTION: <1.0% (characteristic).

FREQUENCY MODULATION

MODULATION FREQUENCY RANGE: 1Hz to 100kHz.

MODULATION FREQUENCY RESOLUTION: 1Hz.

MODULATION DEVIATION RANGE: 0Hz to 1MHz.

MODULATION WAVEFORM: Internal sine wave, triangle wave, or up/down ramp.

FM DISTORTION: <1.5% (characteristic).

PHASE MODULATION

MODULATION FREQUENCY RANGE: 1Hz to 100kHz.

MODULATION FREQUENCY RESOLUTION: 1Hz.

MODULATION DEVIATION RANGE: 0 to 100 radians.

MODULATION WAVEFORM: Internal sine wave.

ΦM DISTORTION: <1.5% (characteristic).

PULSE MODULATION

PULSE REPETITION RATE RANGE: 1Hz to 100kHz.

PULSE REPETITION RATE RESOLUTION: 1Hz.

MINIMUM PULSE WIDTH: 1.2μs.

ON-OFF RATIO²: Pulse width <5μs: >50dB.

Pulse width ≥5μs: >100dB.

RISE/FALL TIME (10% to 90%): Pulse width <5μs: <600ns.

Pulse width ≥5μs: <2μs.

TWO-TONE

TWO-TONE CW FREQUENCY SEPARATION RANGE: 2Hz to 2MHz.

TWO-TONE CW 3rd ORDER INTERMODULATION³: < -54dBc (characteristic).

TWO-TONE CW CARRIER FEED-THROUGH: < -65dBc (characteristic).

NOISE MODULATION

NOISE BANDWIDTH RANGE⁴: 1kHz to 2 MHz.

2910-ALG ANALOG MODULATION PERSONALITY NOTES

- All Analog Modulation frequency ranges and pulse repetition rates can be increased up to 20 times by storing the waveforms and up-sampling if option 2810-ARB is installed.
- Valid when Pulse Modulation is the only active modulation type.
- Relative to power of fundamental tones at P_{out} = 0 dBm.
- 6dB double-sided.

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2910-DIG General-Purpose Digital Modulation Personality

COMMON PARAMETERS

SYMBOL RATE:

- Symbol Rate Resolution: 1Sps (Symbols per second).
- Minimum Symbol Rate: 500Sps.
- Maximum Symbol Rate: 2MSps for NRZ, Gaussian and Wideband. 12.5MSps for RC and RRC.

FILTERS: Filter Types: NRZ, RC, RRC, Gaussian, and Wideband.

FILTER FACTOR: RC, RRC: 0.2 – 1.0. Gaussian: 0.1 – 2.0.

SYMBOL FORMAT: Differential Encoding: On/Off.

SEQUENCE FORMAT: Output Inversion: On/Off.

DATA PATTERN: PRBS: PN5, PN9, PN11, PN15. Count: Radix. Alternating 0,1: 1 – 16.

Modulation Format	Modulation Type	Parameter	Specification
ASK	OOK (ASK2), ASK 4, SASK2, SASK4	See Common Parameters	See Common Specs
FSK	FSK 2	Freq. separation resolution Freq. separation range (Hz)	1 Hz 0 to 2 × symbol rate in Sps
PSK	BPSK, QPSK, QPSK- $\pi/4$, QPSK- $3\pi/4$, OQPSK, 8PSK	See Common Parameters	See Common Specs
QAM	QAM 16, QAM 32, QAM 64, QAM 128, QAM 256	See Common Parameters	See Common Specs

2910-WCDMA W-CDMA Modulation Personality¹

W-CDMA PARAMETER²:

- EVM: <1.2% RMS (typical), <1.0% RMS (characteristic).
- ACP³: Adjacent: <-64dBc (typical), <-66dBc (characteristic).
Alternate: <-69dBc (typical), <-70dBc (characteristic).

- Requires 2910-ARB option.
- 0dBm at 1.8 to 2.2GHz.
- CPICH only. Adjacent spacing 5MHz offset. Alternate spacing 10MHz offset.

2910-CDMA2000 cdmaOne and cdma2000 Modulation Personality¹

cdma2000/cdmaOne PARAMETER²:

- RHO³: >0.9995 (typical), >0.9998 (characteristic).
- ACP⁴: Adjacent 750kHz: <-70dBc (<-72dBc characteristic).
Adjacent 885kHz: <-74dBc (<-76dBc characteristic).
Alternate: <-82dBc (<-84dBc characteristic).

- Requires 2910-ARB option.
- 0dBm at 1.8 to 2.2GHz.
- Pilot only.
- Pilot only. Adjacent spacing 750kHz offset. Alternate spacing 1.98MHz offset. Carrier frequency range of 800 to 900MHz and 1.8 to 1.9GHz.

2910-GSM GSM/EDGE Modulation Personality¹

PHASE ERROR FOR GSM: <0.20° RMS (typical), <0.15° RMS (characteristic).

EVM FOR EDGE: <0.50% RMS (typical), <0.30% RMS (characteristic).

ORFS FOR GSM (characteristic):

Frequency Offset, kHz	Carrier Frequency, F _c	
	1 GHz P _{out} = 0 dBm	400 MHz to 2.5 GHz -10 dBm ≤ P _{out} ≤ +6 dBm
200	<-36 dBc	<-35 dBc
400	<-69 dBc	<-65 dBc
600	<-76 dBc	<-69 dBc

ORFS FOR EDGE (characteristic):

Frequency Offset, kHz	Carrier Frequency, F _c	
	1 GHz P _{out} = 0 dBm	400 MHz to 2.5 GHz -10 dBm ≤ P _{out} ≤ +6 dBm
200	<-36 dBc	<-37 dBc
400	<-69 dBc	<-63 dBc
600	<-76 dBc	<-69 dBc

- Requires 2910-ARB option.

2910-GPS GPS Modulation Personality¹

CARRIER FREQUENCY: 400MHz – 2.5GHz. Button provided to set carrier frequency to L1 (1575.42MHz).

C/A CODE ID RANGE: 1 to 37, default value = 1.

DATA PATTERN:

- Selectable: PN9, PN15, all ones, all zeros, square 1-bit [01] and square 2-bit [0011].
- User Defined: Pattern from a file, length range of 1 to 37,504 bits.
- Default pattern = PN9.

DOPPLER SHIFT RANGE: -10kHz to +10kHz, default value = 0Hz.

- Requires 2910-ARB option.

TRIGGER AND SYNCHRONIZATION INPUTS AND OUTPUTS

TRIGGER MODES: Free Run.

- Trigger steps in Sweep or List mode.
- Trigger a sweep or list.
- Trigger start of ARB waveform.

TRIGGER DELAY RANGE: 0 to 1 second.

TRIGGER SOURCE: SCPI or front panel trigger.

- Rising edge of external TTL input.
- Falling edge of external TTL input.
- 50ns minimum input pulse width required (characteristic).

SYNC OUTPUT MODES: Generate a sync pulse:

- Off (never).
- On ARB waveform wrap.
- At end of each step in List or Sweep modes.
- At beginning of each sweep or list.
- At end of each sweep or list.

SYNC OUTPUT POLARITY SELECT: Rising or falling edge.

SYNC OUTPUT: TTL level. 200ns minimum pulse width (characteristic).

EVEN SECOND CLOCK INPUT: External even second clock (TTL).

EVEN SECOND CLOCK OUTPUT: External even second clock (TTL).

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GENERAL SPECIFICATIONS

POWER: 100VAC to 240VAC; 50, 60Hz (automatically detected); 120VA max.
CE EMC COMPLIANCE: EU Directive 89/336/EEC; EN 61326-1.
CE SAFETY COMPLIANCE: CE; EU Directive 73/23/EEC, EN 61010-1.
CALIBRATION: 1 year.
ENVIRONMENT (for indoor use only):
 18° to 28°C specified operating, unless otherwise noted.
 0° to 50°C operating survival, non-specified operation.
 -25° to 65°C. non-operating (AC power off) storage.
Altitude: 2000 meters above sea level maximum specified operating.
Cooling: Forced air top, bottom and side intakes and rear exhaust. For proper cooling in a rack, use Keithley Model 2910-RMK Rack Mount Kit.
DIGITAL INPUTS/OUTPUTS: 4 bits, TTL-compatible.
INTERFACES:
 IEEE-488.1 compliant. Supports IEEE-488.2 common commands and status model topology.
LAN: 10/100BT Ethernet, RJ45, LXI Class C, no auto MDIX.
IVI-COM.
USB: USB full speed.
RF Out: Type N connector.
MECHANICAL VIBRATION AND SHOCK:
 MIL-PRF-2880 CL3 random vibration, 3 axes.
 Sine-Sweep test for resonances, 3 axes.
 MIL-STD-810F 516.5 paragraph 4.5.7 procedure VI bench drop.
DIMENSIONS, WEIGHT:
Height: 133mm (5.25"), 3U.
Width: 213mm (8.4"), half-rack.
Depth: 464mm (18.25").
Weight: 7.82kg (17.25 lb).
WARRANTY: 3 years.

SPECIFICATION NOTES

Specifications describe the instrument's warranted performance. Typical and characteristic values are not warranted, but provide additional information regarding performance of the Model 2910 and are provided to assist in application of the Model 2910.

Specifications (warranted performance):

Specification values are performance that is warranted. All units are warranted to meet these performance specifications under the following conditions:

- Ambient operating temperature of 18°C to 28°C, unless otherwise noted.
- After a warm-up time of 30 minutes and self calibration at ambient temperature.

Typical (mean + 3 standard deviations):

Typical values are performance that units will meet under the following conditions:

- Ambient operating temperature of 23°C, unless otherwise noted.
- After a warm-up time of 30 minutes and self calibration at ambient temperature.

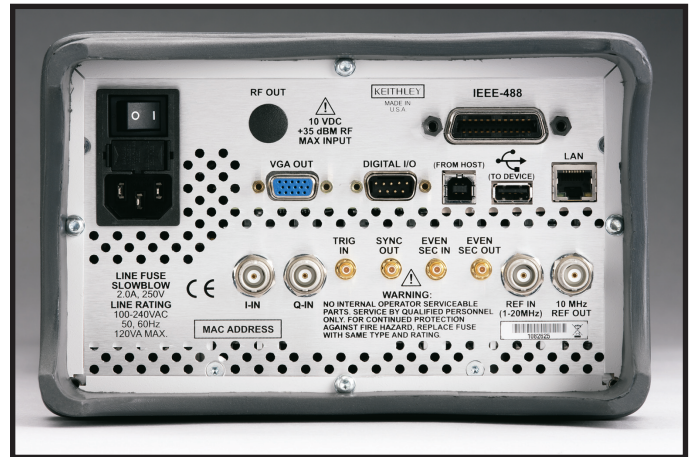
This performance is not warranted.

Characteristic (mean or expected value):

Characteristic values are nominal performance that units are expected to have under the following conditions:

- Ambient operating temperature of 23°C, unless otherwise noted.
- After a warm-up time of 30 minutes and self calibration at ambient temperature.

This performance is not warranted.



Model 2910 rear panel

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