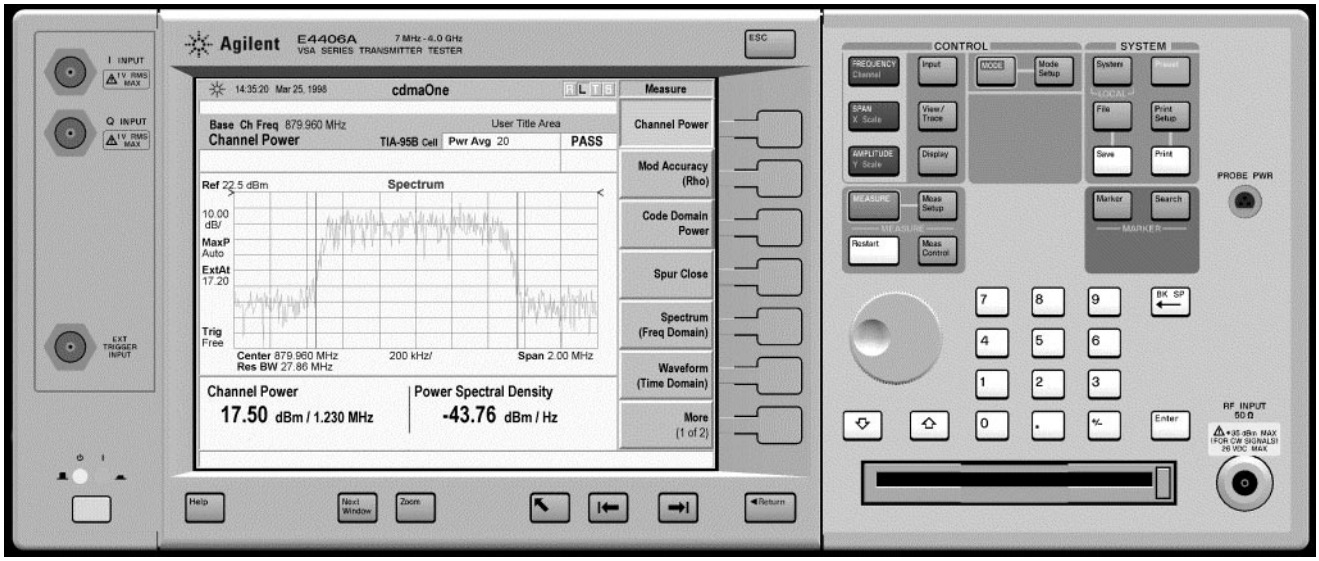
Agilent E4406A
VSA Series
Data Sheet



The Agilent Technologies E4406A vector signal analyzer (VSA) is a full-featured transmitter tester designed to meet the test needs of wireless equipment developers and manufacturers. For wireless base station and mobile transmitters and their components, the easy-to-use E4406A provides the best combination of speed and accuracy for a wide range of digital modulation analysis capability. And, with multiformat capability (GSM, cdmaOne, NADC, PDC, W-CDMA and cdma2000) the E4406A is the ideal, flexible choice for your production line.

Easily configure one-button measurements with the simple, straight-forward menu structure and view them on the large, high-resolution color display. With built-in, standards-compliant tests and state-of-the-art digital IF technology, engineers can be confident that test results are accurate. And, when combined with the Agilent ESG-D series of RF digital signal generators, the E4406A VSA provides a powerful, transmit-receive test solution for wireless-equipment manufacturers.

Agilent Technologies
Innovating the HP Way

Frequency

Frequency range (RF input) 7 MHz to 314 MHz and 329 MHz to 4 GHz

Frequency setting resolution 1 Hz

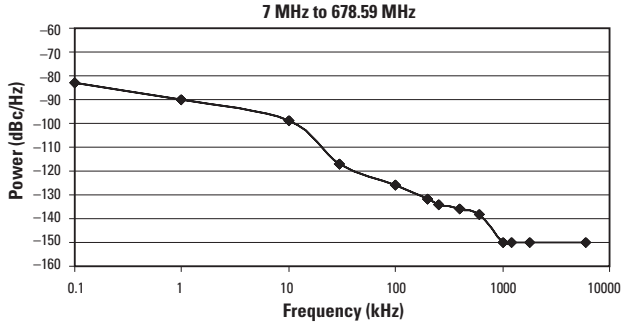
Frequency reference

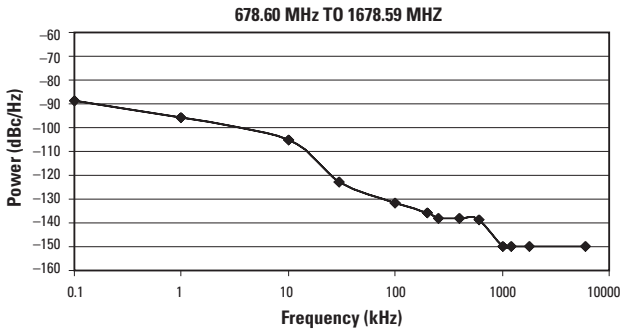
Accuracy	±[(time since last adjustment aging + rate) + temperature stability + calibration accuracy]
Initial calibration accuracy	±5 10^{-8}
Settability	±2 10^{-9}
Aging rate	
During any 24 hours	±5 10^{-10}, typically following 24-hour warm-up
Per year	±1 10^{-7}, typically
Temperature stability	±5 10^{-8} variation from frequency at +25° C over the temperature range of 0 to +55° C
Warm-up time	1 hour, typically

Residual responses

50Ω Input terminated, 0 dB input attenuation

20 MHz to 2 GHz	–85 dBm
2 GHz to 4 GHz	–80 dBm





Noise sidebands (typically)

Amplitude

The following amplitude specifications apply for all measurements unless otherwise noted within the measurement specification.

RF input

Maximum measurement power	+30 dBm (1W)
Maximum safe dc voltage	±26 Vdc
Maximum safe input power	+35 dBm (3.16W)

Input attenuator

Range	0 to +40 dB
Step size	1 dB steps
Accuracy at 50 MHz	±0.3 dB relative to 10 dB attenuation

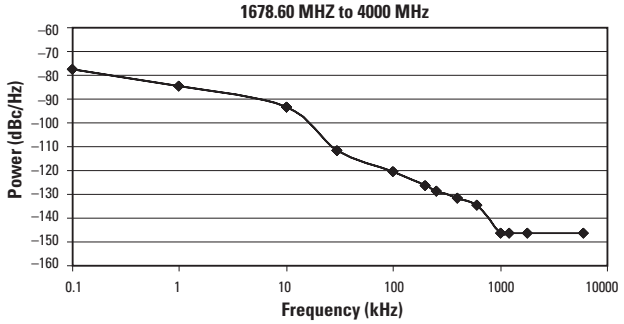
First LO emission from RF input (–23 dBm-input attenuation), typically $f_{emission}$ = center frequency ±321.4 MHz

Third-order intermodulation distortion

(with pre-filter applied)
For separation >= 5 MHz, Freq >= 800 MHz
+24 dBm third order intercept, characteristic

External loss correction

–50 to 100 dB



Absolute power measurement accuracy

Input power	–2 dBm to –28 dBm + attenuation, +18° C to +30° C
810 to 960 MHz	±0.5 dB
1710 to 2205 MHz, 1 to 28 dB attenuation	±0.5 dB
1710 to 2205 MHz, 29 to 40 dB attenuation	±0.55 dB
1428 to 1503 MHz	±0.6 dB

Input power 10 dB input attenuation 400 MHz to 2 GHz	+8 dBm to –18 dBm, +18° C to +30° C ±0.75 dB

Input power	(–2 dBm to –28 dBm) + attenuation
0 to 20 dB input attenuation	
7 MHz to 1 GHz	±1.1 dB
1 GHz to 2 GHz	±1.2 dB
2 GHz to 4 GHz	±2.0 dB

Amplitude linearity (relative to –2 dBm power at mixer)

–2 to –78 dBm at mixer	±0.25 dB, ±0.15 dB, typically

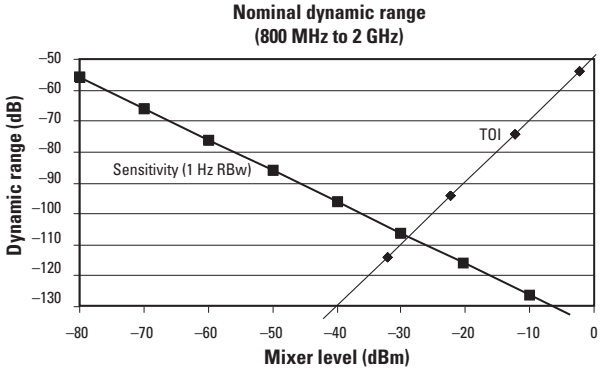
Amplitude linearity (relative to –12 dBm power at mixer)

–12 to –62 dBm at mixer	±0.15 dB, ±0.10 dB, typically

Displayed average noise level

Input terminated in 50Ω, 0 dB attenuation, 1 kHz RBW, 10 kHz span, +24 dB ADC gain

7 MHz to 20 MHz	–90 dBm
20 MHz to 2 GHz	–106 dBm
2 GHz to 3 GHz	–103 dBm
3 GHz to 4 GHz	–98 dBm



Waveform measurement

Sweep time range	
RBW 7.5 MHz	10 µs to 200 ms
RBW 1 MHz	10 µs to 400 ms
RBW 100 kHz	10 µs to 2s
RBW 10 kHz	10 µs to 20s
Time record length	2 to >900k points, typically
Resolution bandwidth	
Gaussian filter	10 Hz to 7.5 MHz 1, 1.5, 2, 3, 5, 7.5, 10 sequence
Flat filter	
user-definable	10 Hz to 6.6 MHz or arbitrary
Averaging	
Average number	1 to 10,000
Average mode	Exponential, repeat
Average type	Power average (RMS), log-power average (video), maximum, minimum
Displays	RF envelope and I/Q waveform
Markers	Normal, delta, band power

Spectrum measurement

Span range	10 Hz to 10 MHz
Capture time	66 ns to 40s, typically
Resolution BW range overall	100 MHz to 1 MHz
	1, 1.5, 2, 3, 5, 7.5, 10 sequence or arbitrary user-definable actual range depends on span
FFT window	Flat top; (high amplitude accuracy); Uniform Hanning; Hamming; Gaussian; Blackman; Blackman-Harris; Kaiser-Bessel 70, 90, 110
Averaging	
Average number	1 to 10,000
Average mode	Exponential, repeat
Average type	Power average (RMS), log-power average (video), maximum, minimum, voltage average
Displays	Spectrum and I/Q waveform
Markers	Normal, delta, band power, noise

Trigger

Trigger sources	Free run (immediate), video (IF envelope), RF burst (wideband), external front, external rear, frame,
Delay range	–500 ms to +500 ms
Delay accuracy	±33 ns
Delay resolution	66 ns
Trigger slope	Positive, negative
Holdoff range	0 to 500 ms
Holdoff resolution	1 µs

RF burst trigger

Peak carrier power range at RF input	+30 dBm to –40 dBm
Trigger level range	0 to –25 dB relative to signal peak
Bandwidth	>15 MHz, typically

Video (IF envelope)

Trigger range	+30 dBm to noise floor

GSM specifications (Option BAH)

Transmit power measurement

The transmit power measurement determines the average power for an RF signal burst at or above a user specified threshold value. The threshold value may be absolute, or relative to the peak value of the signal.

Range at RF input	+30 dBm (1W) to –60 dBm

Absolute power accuracy for in-band signal (excluding mismatch error) 10 dB or 20 dB attenuator, +18° C to +30° C

	+30 to –40 dBm
	±0.6 dB
	±0.4 dB, typically

Relative power accuracy (same channel, different transmit power, input attenuator fixed)

Input level change	0 to –76 dB
	±0.25 dB
	±0.1 dB, typically

Power versus time measurement

Power versus time measures the average power during the "useful part" of the GSM burst and verifies that the power ramp is within the GSM mask. The specified GSM masks for both base transceiver stations and mobile stations are provided. Power versus time also lets you view the rise, fall, and "useful part" of the burst. The timings are referenced to the transmitter from bit 13 to 14 of the training sequence (midamble).

Range at RF Input	+30 dBm (1W) to –60 dBm

Power ramp relative accuracy (referenced to mean RF transmitted carrier power.)

0 to +6 dB	±0.25 dB
0 to 70 dB	±0.20 dB

Time resolution	0.2 µs
Burst to mask uncertainty	±0.2 bit (approx. ±0.7 µs)
Maximum record length	50 slots (29 ms)

Phase and frequency error measurement

Phase and frequency error measures the modulation quality of a GSM transmitter. Phase and frequency error can be displayed both numerically and or graphically. A binary representation of the demodulated data bits is also available.

Range at RF Input	+30 dBm to –40 dBm

Phase error (phase trajectory)

Range	–180° to +180°
Resolution	±0.01°
Peak measurement accuracy	±2°
RMS measurement accuracy	±1.0°
	±0.5°, typically

Frequency error

Initial frequency error range	±200 kHz
Accuracy	±5 Hz

I/Q offset

Range	80 dBc to–10 dBc
Accuracy	±0.5 dB

Burst sync time uncertainty	±0.1 bit (approximately ±0.4 µs)
Displays	I/Q error quad view, phase error versus bit phase error with frequency versus bit, RF envelope versus bit numeric summary, I/Q measured polar vector, and data bits

Output RF spectrum measurement

The output RF spectrum measurements determine the spectral energy emitted into the adjacent channels. The measurements are divided into two types spectrum due to 0.3 GMSK modulation and noise, and spectrum due to switching transients (burst ramping). A single offset can be examined with a corresponding trace or up to 15 offsets can be measured with a tabular data display

Range at RF input

Offsets 1800 kHz, 30 kHz RBW	+30 dBm to –5 dBm
Offsets >1800 kHz, 100 kHz RBW	+30 dBm to +10 dBm

Relative accuracy

0 to –76 dB	±0.25 dB	±0.1 dB typically
–76 to –86 dB	±0.70 dB	±0.4 dB typically

Spectrum due to modulation displayed dynamic range

100 kHz offset	30 dB	35 dB, typically
200 kHz offset	60 dB	65 dB, typically
250 kHz offset	60 dB	65 dB, typically
400 kHz offset	70 dB	75 dB, typically
600 kHz offset	80 dB	85 dB, typically
1200 kHz offset	80 dB	85 dB, typically
1.8 to 6 MHz offset	82 dB	87 dB, typically (100 kHz RBW)

Spectrum due to switching transient displayed dynamic range

400 kHz offset	62 dB	65 dB, typically
600 kHz offset	80 dB	85 dB, typically
1200 kHz offset	80 dB	90 dB, typically
1800 kHz offset	85 dB	90 dB, typically

Trigger

Trigger sources	Free run (immediate), video (IF envelope), RF burst (wideband), external front, external rear, frame
Delay range	–500 ms to +500 ms
Delay accuracy	±33 ns
Delay resolution	66 ns
Trigger slope	Positive, negative
Holdoff range	0 to 500 ms
Holdoff resolution	1 µs

RF burst trigger

Peak carrier power range at RF Input	–30 dBm to –40 dBm
Trigger level range	0 to –25 dB relative to signal peak
Bandwidth	>15 MHz, typically

Video (IF envelope)

Trigger range	+30 dBm to noise floor

Burst sync

Source	Training sequence, RF amplitude, external rear, none. Actual available choices dependent on measurement.
Training sequence code	GSM defined 0 to 7 auto (search) or manual
Burst type	Normal (TCH and CCH), Sync (SCH), Access (RACH)
Down band GSM	400 to 500 MHz

GSM in-band is defined as the following frequency ranges:

GSM 900, P-GSM & E-GSM	
Mobile transmit	880 to 915 MHz
Base station transmit	925 to 960 MHz
DCS1800	
Mobile Transmit	1710 to 1785 MHz
Base station transmit	1805 to 1880 MHz
PCS1900	
Mobile transmit	1850 to 1910 MHz
Base station transmit	1930 to 1990 MHz

cdmaOne specifications (Option BAC)

Channel power measurement

The channel power measurement measures the total RMS power in a user-specified bandwidth. The following specifications apply for the default bandwidth of 1.23 MHz.

Range at RF input	+30 dBm to –80 dBm
Channel bandwidth range	1 kHz to 10 MHz (default is 1.23 MHz)

Absolute power accuracy for in-band signal (excluding mismatch error), 18° C to 30° C

+30 to –28 dBm at RF Input	±0.6 dB	±0.4 dB, typically
–28 to –50 dBm at RF Input	±0.8 dB	±0.7 dB, typically
–50 to –80 dBm at RF Input	±1.0 dB	±0.9 dB, typically

Relative power accuracy (same channel, different transmit power, input attenuator fixed) Input level change

0 to –76 dB	±0.2 dB	±0.1 dB, typically

Code domain measurement (base station)

Code domain measures the power, timing, and phase, of each of the 64 Walsh channels in an cdmaOne base-station transmitter. Code-domain power is measured for each Walsh channel relative to the total power inside the 1.23 MHz channel. Code-domain phase is the measured phase error for each Walsh channel relative to the pilot channel. Code-domain timing is the measured timing error for each Walsh channel relative to the pilot channel. Time offset, frequency error, and carrier feedthrough are also measured.

Range at RF input	+30 dBm to –30 dBm
Measurement interval range	0.25 ms to 30 ms

Code domain power (measurement interval 1.25 ms)

Display dynamic range	50 dB
Accuracy	±0.3 dB (Walsh channel power within 20 dB of total power)
Resolution	0.01 dB

Other reported power parameters	Average active traffic, maximum inactive traffic, average inactive traffic
Frequency error accuracy	±10 Hz (excludes frequency reference)

Pilot time offset (from even second signal to start of PN sequence)

Range	–13.33 ms to +13.33 ms
Accuracy	±250 ns
Resolution	10 ns

Code domain timing (pilot to code-channel time tolerance)

Range	±200 ns
Accuracy	±10 ns
Resolution	0.1 ns

Code domain phase (pilot to code-channel phase tolerance)

Range	±200 mrad
Accuracy	±20 mrad
Resolution	0.1 mrad

Displays	Power graph and metrics power graph and 4 markers power, timing, and phase graphs

Modulation accuracy (rho) measurement
Rho is a measure of the performance of a cdmaOne transmitter's modulation circuitry. Rho can be measured for a base station only when a pilot is the only active channel. Rho can be measured for a reverse channel offset-QPSK signal when the data is all zeros going into the short code spreading. Error vector magnitude, time offset, frequency error, and carrier feedthrough are also measured and reported.

Power range at RF input	+30 dBm to –40 dBm
Measurement interval range	0.25 ms to 30 ms

Rho (waveform quality) (usable range 0.5 to 1.0)

Range	0.9 to 1.0
Accuracy	±0.005
Resolution	0.0001

Frequency error (frequency error excludes instrument time base error)

Input frequency error range	±900 Hz
Accuracy	±10 Hz
Resolution	0.1 Hz

Pilot time offset (from even second signal to start of PN sequence)

Range	–13.33 ms to +13.33 ms
Accuracy	±250 ns
Resolution	10 ns

EVM

Floor	2.5%	1.8%, typically
Accuracy	±0.5%	
Resolution	0.1%	

Carrier feedthrough

Accuracy	±2.0 dB
Resolution	0.1 dB

Magnitude error

Accuracy	±1.8%
Resolution	±0.01%

Phase error

Accuracy	±1.0 degrees
Resolution	0.1 degrees

Displays	Metric summary, magnitude error versus chips, phase error versus chips, EVM versus chips, I/Q measured polar graph

Adjacent channel power ratio measurement
The adjacent channel power ratio (ACPR) measurement measures up to five pairs of offset channels and relates them to the carrier power. The measurement result is a ratio of the channel power to the power in each offset. The results can be displayed as a ratio to the total power in each bandwidth, or as a ratio of the power spectral density.

Power range at RF input	+30 to –20 dBm

Dynamic range (referenced to average power of carrier in 1.23 MHz BW)

Offset frequency	Integ BW	Dynamic range
750 kHz	30 kHz	–82 dBc
885 kHz	30 kHz	–82 dBc
1.25625 MHz	2.5 kHz	–86 dBc
1.98 MHz	30 kHz	–85 dBc
2.75 MHz	1 MHz	–56 dBc

Relative accuracy	±0.9 dB
Resolution	0.01 dB

Spurious close measurement (at transmitter maximum power)
Spurious close measures the spurious emissions in the transmit band relative to the channel power in the selected channel. The unit under test is typically set for the maximum output power.

Carrier power range at RF input	+30 dBm to –30 dBm
Minimum spurious emission power sensitivity at RF input	–70 dBm (30 kHz RBW)
Absolute accuracy for in-band signal	±1.0 dB
Relative accuracy	±1.0 dB
Resolution	0.01 dB

Demod sync

Even second input	Level and impedance same as external trigger
PN offset range	0 to 511 x 64[chips]

cdmaOne in-band is defined as the following frequency ranges:

IS-95	
Mobile Transmit	824 to 849 MHz
Base Station Transmit	869 to 894 MHz
ANSI-J-STD-008	
Mobile Transmit	1850 to 1910 MHz
Base Station Transmit	1930 to 1990 MHz

NADC (Option BAE)

ACPR measurement

The adjacent channel power ratio (ACPR) measurement measures up to five pairs of offset channels and relates them to the carrier power. The measurement result is a ratio of the channel power to the power in each offset. The results can be displayed as a ratio to the total power in each bandwidth, or as a ratio of the power spectral density.

Power range at RF input +27 to –20 dBm

Dynamic range (referenced to average power of carrier in 32.8 kHz BW)

Offset frequency	Integ BW	Dynamic range
30 kHz	32.8 kHz	–35 dBc (Typ.)
60 kHz	32.8 kHz	–55 dBc
90 kHz	32.8 kHz	–70 dBc

Relative Accuracy ±1.0 dB

EVM measurement

EVM measurement measures the modulation quality of pi/4QPSK modulated signal providing you with IQ constellation diagram, error vector magnitude (EVM) in RMS and peak as well as each chip of magnitude error, phase error and EVM.

Range at RF input +27 to –20 dBm

EVM

Range	0 to 25 %
Floor	1.0 %
Accuracy	±0.6 %

I/Q origin offset

Range	–10 to –50 dBc

NADC in-band is defined as the following frequency ranges:

800 MHz Band	
Mobile transmit	824 to 849 MHz
Base station transmit	869 to 894 MHz
PCS Band	
Mobile transmit	1850 to 1910 MHz
Base station transmit	1930 to 1990 MHz

PDC (Option BAE)

ACPR measurement

The adjacent channel power ratio (ACPR) measurement measures up to five pairs of offset channels and relates them to the carrier power. The measurement result is a ratio of the channel power to the power in each offset. The results can be displayed as a ratio to the total power in each bandwidth, or as a ratio of the power spectral density.

Power range at RF input +27 to –20 dBm

Dynamic range (referenced to average power of carrier in 21.0 kHz BW)

Offset frequency	Integ BW	Dynamic range
50 kHz	21.0 kHz	–55 dBc
100 kHz	21.0 kHz	–70 dBc

Relative Accuracy ±1.0 dB

EVM measurement

EVM measurement measures the modulation quality of pi/4QPSK modulated signal providing you with IQ constellation diagram, error vector magnitude (EVM) in RMS and peak as well as each chip of magnitude error, phase error and EVM.

Range at RF input +27 to –20 dBm

EVM

Range	0 to 25 %
Floor	1.0 %
Accuracy	±0.6 %

I/Q origin offset

Range	–10 to –50 dBc

OBW measurement

Occupied bandwidth (OBW) measurement measures the frequency bandwidth corresponding to 99% of the total transmitted power.

Range at RF input +30 to –40 dBm

Frequency

Accuracy	0.4 kHz

PDC in-band is defined as the following frequency ranges:

800 MHz Band #1	
Mobile transmit	940 to 958 MHz
Base station transmit	810 to 828 MHz
800 MHz Band #2	
Mobile transmit	925 to 940 MHz
Base station transmit	870 to 885 MHz
800 MHz Band #3	
Mobile transmit	893 to 895 MHz
Base station transmit	838 to 840 MHz
1500 MHz Band	
Mobile transmit	1477 to 1501 MHz
Base station transmit	1429 to 1453 MHz

W-CDMA (Option BAF)

Channel power measurement

The channel power measurement measures the total RMS power in a user-specified bandwidth. The following specifications apply for the default bandwidth of 4.096 MHz for the 1998 Trial System and ARIB 1.0–1.2, 3.84 MHz for 3GPP.

Range at RF input +30 dBm to –80 dBm

Absolute power accuracy for in-band signal (excluding mismatch error), 18° C to 30° C

+30 to –28 dBm at RF Input	±0.6 dB
–28 to –50 dBm at RF Input	±0.8 dB
–50 to –80 dBm at RF Input	±1.0 dB

ACPR measurement

The adjacent channel power ratio (ACPR) measurement measures up to five pairs of offset channels and relates them to the carrier power. The measurement result is a ratio of the channel power to the power in each offset. The results can be displayed as a ratio to the total power in each bandwidth, or as a ration of the power spectral density. Simulated spectrum analyzer mode is for those who are accustomed to spectrum analyzers.

Power range at RF input +30 to –20 dBm

Dynamic range (referenced to average power of carrier in 4.096 MHz BW)

Offset frequency	Integ BW	Dynamic range
5 MHz	4.096 MHz	–68 dBc (Typ.)
10 MHz	4.096 MHz	–72 dBc (Typ.)

Power statistics CCDF measurement

The complementary-cumulative distribution function (CCDF) traces provide you with how much time the waveform spends at or above a given power level. The percent of time the signal spends at or above the level defines the probability for that particular power level.

Range Maximum at RF input	+30 dBm (average)
	+40 dBm (peak)
Range Minimum at RF input	–40 dBm (average)

Code domain measurement

The code domain measurement provides a tremendous amount of information about the in-channel characteristics of the W-CDMA signal. Code domain power (CDP) view directly informs the user of the active channels with their individual channel powers. The CDP view also leads you to symbol rate analysis such as symbol rate EVM and symbol power vs. time.

Range at RF input	+30 to –40 dBm
Accuracy	±0.3 dB (spread channel power is within 20 dB of total power)

Symbol power vs. time

Range at RF input	+30 to –40 dBm
Accuracy	±0.3 dB (spread channel power is within 20 dB of total power) averaged power over a slot

Symbol error vector magnitude

Range at RF input +30 to –20 dBm

QPSK EVM measurement

The QPSK EVM measurement measures the modulation quality of QPSK modulated signal. This measurement provides an IQ constellation diagram, error vector magnitude (EVM) in RMS and peak as well as magnitude error versus chip, phase error versus chip, and EVM versus chip.

Range at RF input +30 to –20 dBm

EVM

Range	0 to 25 %
Floor	3.0 %
Accuracy	±1.0%

I/Q origin offset

Range	–10 to –50 dBc

Frequency error

Range	±500 Hz
Accuracy	±10 Hz

Modulation accuracy measurement

Rho is a measure of the performance of a W-CDMA transmitter's modulation circuitry. Rho can be measured for a base station only when a Perch is the only active channel.

Range at RF input +30 to –40 dBm

Rho

Range	0.9 to 1.0
Accuracy	±0.005

cdma2000 (Option B78)

Channel power measurement

The channel power measurement measures the total RMS power in a user-specified bandwidth. The following specifications apply for the default bandwidth of 1.23 MHz for SR1 and 3.69 MHz for SR3)

Range at RF input	+30 dBm to –80 dBm

Absolute power accuracy for in-band signal (excluding mismatch error), 18° C to 30° C

+30 to –28 dBm at RF Input	±0.6 dB
–28 to –50 dBm at RF Input	±0.8 dB
–50 to –80 dBm at RF Input	±1.0 dB

ACPR measurement

The adjacent channel power ratio (ACPR) measurement measures up to five pairs of offset channels and relates them to the carrier power. The measurement result is a ratio of the channel power to the power in each offset. The results can be displayed as a ratio to the total power in each bandwidth, or as a ratio of the power spectral density. Simulated spectrum analyzer mode is for those who are accustomed to spectrum analyzers.

SR1

Power range at RF input	+30 to –20 dBm

Dynamic range (referenced to average power of carrier in 1.25 MHz BW)

Offset frequency	Integ BW	Dynamic range
750 kHz (BTS)	30 kHz	–82 dBc
885 kHz (MS)	30 kHz	–82 dBc
1.98 MHz	30 kHz	–85 dBc

Relative Accuracy	±0.9 dB

Power statistics CCDF measurement

The complementary-cumulative distribution function (CCDF) traces provide you with how much time the waveform spends at or above a given power level. The percent of time the signal spends at or above the level defines the probability for that particular power level.

Range maximum at RF input	+30 dBm (average) +40 dBm (peak)
Range minimum at RF input	–40 dBm (average)

QPSK EVM measurement for SR1

The QPSK EVM measurement measures the modulation quality of QPSK modulated signal. This measurement provides an I/Q constellation diagram, error vector magnitude (EVM) in RMS and peak, as well as magnitude error versus chip, phase error versus chip, and EVM versus chip.

Range at RF input	+30 to –20 dBm

EVM	
Range	0 to 25 %
Floor	1.5 %
Accuracy	±1.0%
I/Q origin offset	
Range	–10 to –50 dBc
Frequency Error	
Range	±500 Hz
Accuracy	±10 Hz

Modulation accuracy measurement

Rho is a measure of the performance of a cdma2000 transmitter's modulation circuitry. Rho can be measured for a base station only when a pilot is the only active channel.

Range at RF input	+30 to –40 dBm
Rho	
Range	0.9 to 1.0
Accuracy	±0.005

General characteristics

Temperature range

Operating	0° C to +55° C
Non-operating	–40° C to +71° C

EMI compatibility Conducted and radiated emission is in compliance with CISPR Pub. 11/1990 Group 1 Class A.

Radiated Immunity When tested at 3 V/m according to IEC 801-3/1984, the displayed average noise level will be within specifications over the full immunity test frequency range of 27 to 500 MHz, except that at immunity test frequencies of 278.6 MHz ± selected resolution bandwidth and 321.4 MHz ± selected resolution bandwidth, the displayed average noise level may be up to –90 dBm. When the analyzer-tuned frequency is identical to the immunity test signal frequency there may be signals of up to ±90 dBm displayed on the screen.

Electrostatic discharge In accordance with IEC 801-2/1991, an air discharge of up to 8 kV, or a contact discharge of up to 4 kV, will not cause any change of instrument state or measurement data. However, discharges to center pins of front or rear panel connectors might cause damage to the associated circuitry.

Power requirements

Voltage, frequency	90 to 132 V rms, 47 to 440 Hz 195 to 250 V rms, 47 to 66 Hz
Power consumption, ON	<350 W
Power consumption, standby	<20 W

Weight

Net	19 kg (42 lb), typically
Shipping	39 kg (86 lb), typically

Dimensions 177 mm H x 426 mm W x 432 mm D (7.0 in H x 16.8 in W x 17 in D)

Front panel

RF INPUT

Connector	Type N female	
Impedance	50Ω, nominally	
VSWR, 20 MHz to 2 GHz	1.4 : 1	1.2 : 1, typically
VSWR 2 GHz to 4 GHz	1.9 : 1	1.4 : 1, typically

PROBE PWR

Voltage/current	+15 Vdc, ±7% at 150 mA maximum –12.6 Vdc ±10% at 150 mA maximum

EXT TRIGGER INPUT

Connector	BNC female
Impedance	>10 kΩ, nominally
Trigger level	–5 V to +5 V

Rear panel

10 MHz OUT

Connector	BNC female
Impedance	50Ω, nominally
Output amplitude	0 dBm, typically

EXT REF IN

Connector	BNC female
Impedance	50Ω, nominal
Input amplitude range	–5 to +10 dBm, typically
Maximum dc level	±28 V dc
Frequency	1 MHz to 30 MHz, selectable
Frequency lock range	$\pm 5\ 10^{-6}$ of the specified external reference input frequency

Note: instrument noise sidebands and spurious responses might be affected by the quality of the external reference used.

TRIGGER IN

Connector	BNC female
Impedance	>10 kΩ, nominally
Trigger level	–5 V to +5 V

TRIGGER 1 OUT and TRIGGER 2 OUT

Connector	BNC female
Impedance	>10 kΩ, nominally
Trigger level	0 V to +5 V (no load)

MONITOR output

Connector	VGA compatible, 15-pin mini D-SUB
Format	VGA (31.5 kHz horizontal, 60 Hz vertical sync rates, noninterlaced)
Resolution	640 x 480

PARALLEL Interface
Allows printing to compatible printers

GPIB Interface
Allows communication with compatible devices

Agilent VSA-series Transmitter Tester Product and Application Information

General Information

Agilent VSA-Series Transmitter Tester, brochure
Literature number 5966-4762E
Self Guided Demo for the VSA-Series Transmitter Tester
Literature number 5966-2808E

Solutions Brochures

CDMA Solutions from Agilent Technologies
Literature number 5966-3058E
GSM Solutions from Agilent Technologies
Literature number 5968-1550E

Application Notes

Digital Modulation in Communications Systems–
An Introduction
Literature number 5965-7160E
Understanding CDMA Measurements for Base Stations
and Their Components
Literature number 5968-0953E
Understanding GSM Transmitter Measurements for Base
Transceiver Stations and Mobile Stations
Literature number 5966-2833E
Performing cdma2000 Measurements Today
Literature number 5968-5858E

See Agilent's VSA internet page for the latest VSA news, product and support information, application literature, firmware upgrades, and more at:
www.agilent.com/find/vsa

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