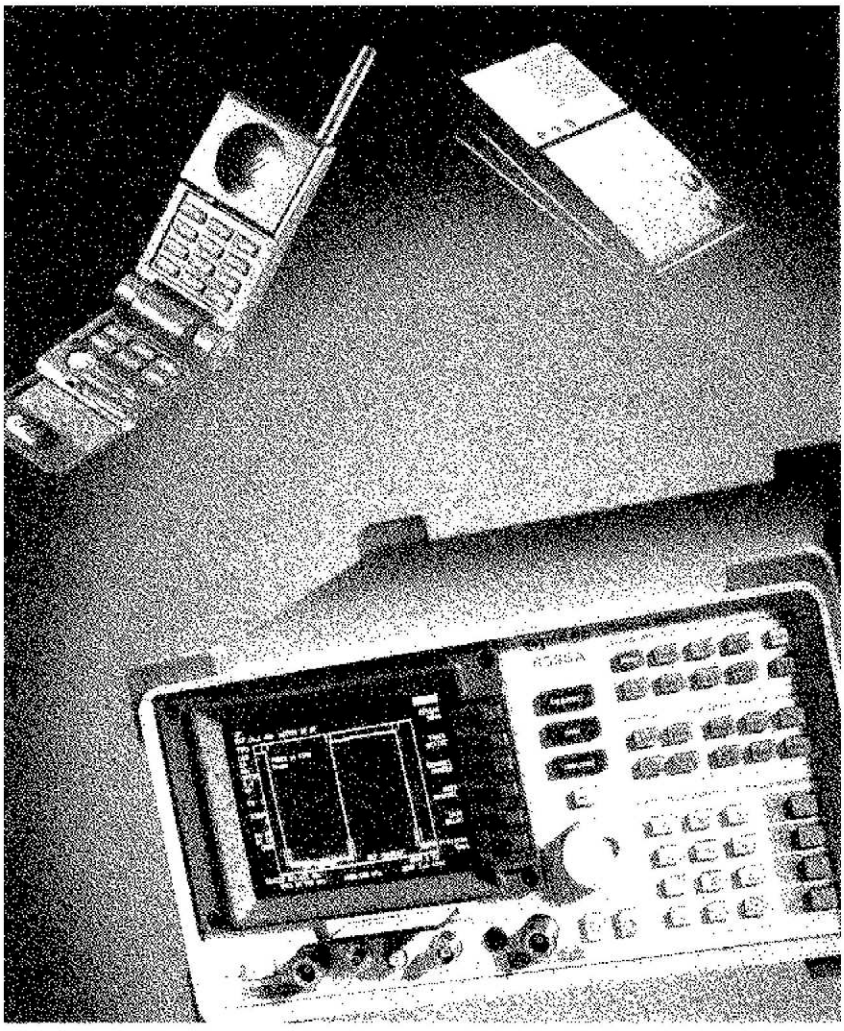
HP 85717A CT2-CAI Measurements Personality for the HP 8590 Series Spectrum Analyzers

Simplifying I-ETS 300-131 and MPT 1375 RF transmitter test for cordless telephones



Imagine replacing your rack of test equipment with an inexpensive, powerful spectrum analyzer. Now you can! The HP 85717A CT2-CAI measurements personality enhances the HP 8590 series of spectrum analyzers, providing RF transmitter measurements for testing cordless telephone handsets and bases.

Ideal for manufacturing or field use, measurements can be made on completed handsets and base units.

Measurement displays and results have been optimized for fast retrieval of pertinent information. PASS/FAIL messages speed go/no-go testing. Numerical and graphical results can be sent to an external printer or plotter with the push of a button. Real-time interactive displays are useful for troubleshooting.

The rapid programming speed of the HP 8590 series of spectrum analyzers, coupled with the flexibility of the HP 85717A's remote commands make this system well-suited for automated testing. Documented remote commands and programming examples let you modify the limits and parameters of the personality to match your test requirements.

Measurements include:

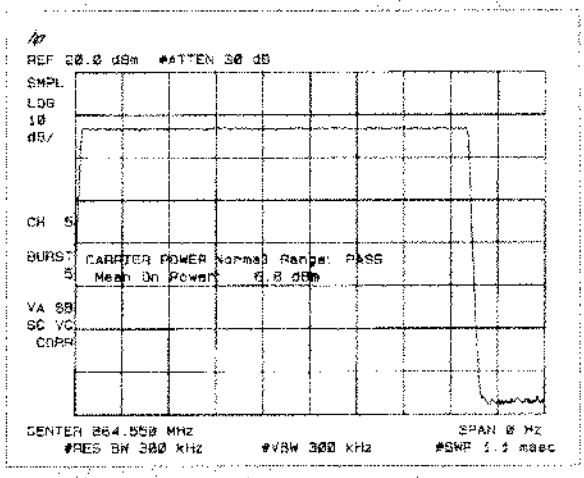
Mean carrier power
Carrier-off power
Adjacent channel power
Out-of-band power
Spurious emissions
Intermodulation attenuation
Frequency error and deviation

Just Push a Key to Make a CT2 Measurement

Transmitter Carrier Power

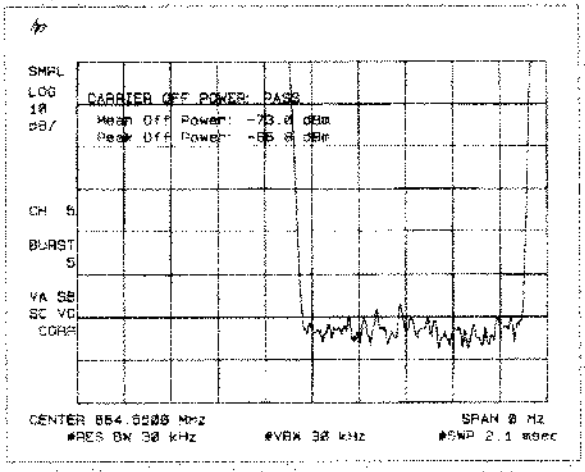
MPT 1375 2.3 & 4.1
I-ETS 300-131 4.5.1 & 9.3.1

Bursted or continuous carriers can be measured with the HP 85717A personality. Examine the average power of the continuous carriers, or measure the mean carrier power of the on-portion of the burst envelope. Pass/fail results with a numerical readout makes testing faster and easier.



Transmitter Carrier Off Power

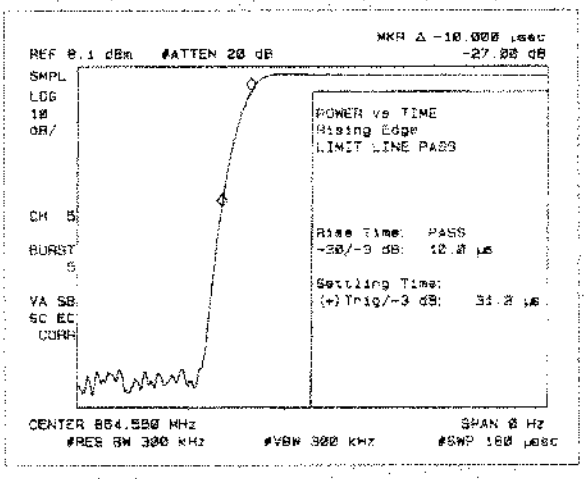
Off-state power is as critical as on-state power. Both the peak and mean power of the off-portion of the burst envelope can be examined.



Power vs. Time

MPT 1375 2.6
I-ETS 300-131 4.5.4 & 9.5.6

Timing with the TDD format of CT2-CAI is crucial. Four different display formats provide the analysis power necessary to characterize the ramping of the burst. Choose from full-TDD frame, full burst, rising-edge, or falling- edge formats. Limit lines, pass/fail messages, and rise/fall time results facilitate testing. An external TTL frame trigger is required.

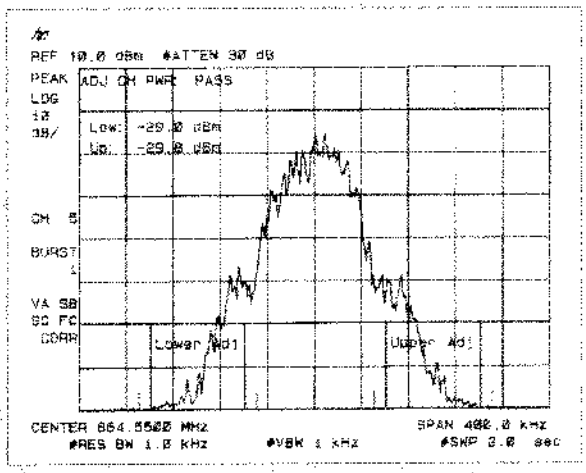


Adjacent Channel Power

MPT 1375 4.2
I-ETS 300-131 4.5.5 & 9.3.2

Whether you're testing the cordless fixed part (CFP) or the cordless portable part (CPP), the adjacent channel power measurement is an integral part of RF testing. Numerical results of the mean power levels of both the upper and lower adjacent channels are displayed.

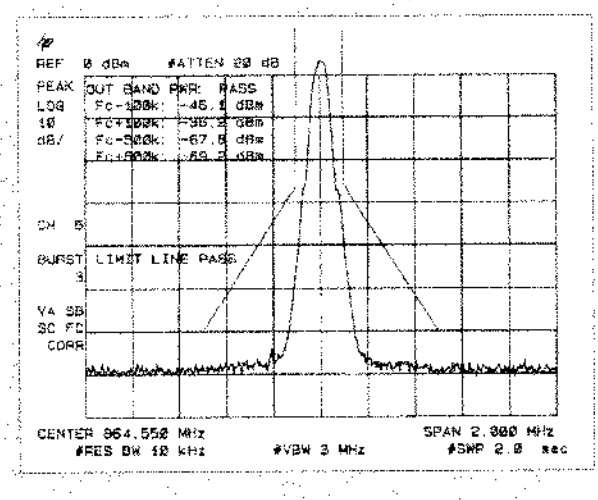
A gated method is also available that lets you measure the adjacent channel power due exclusively to modulation.



Out-of-Band Power

MPT 1375 4.3
I-ETS 300-131 4.5.6 & 9.3.3

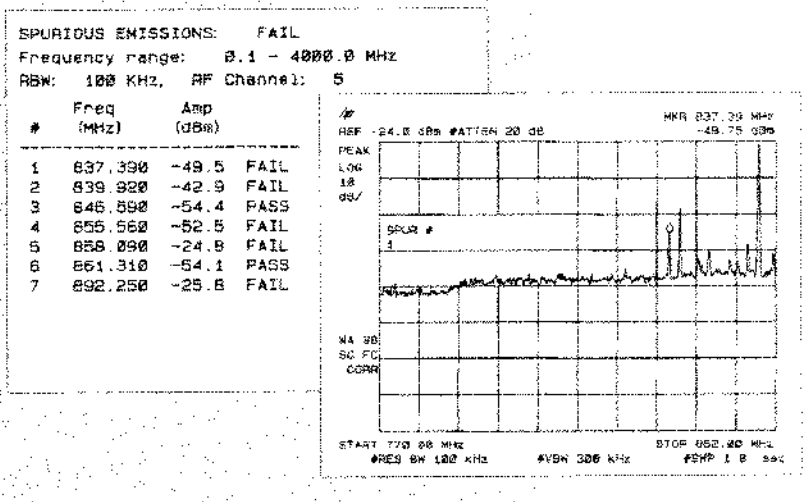
The measurement of out-of-band power arising from transmitter transients examines the spectrum due to bursting. By using peak detection, transient effects are captured for further analysis. Numerical results at I-ETS and MPT- specified offsets are displayed.



Spurious Emissions

MPT 1375 5.1
I-ETS 300-131 4.7.2 & 9.4.1

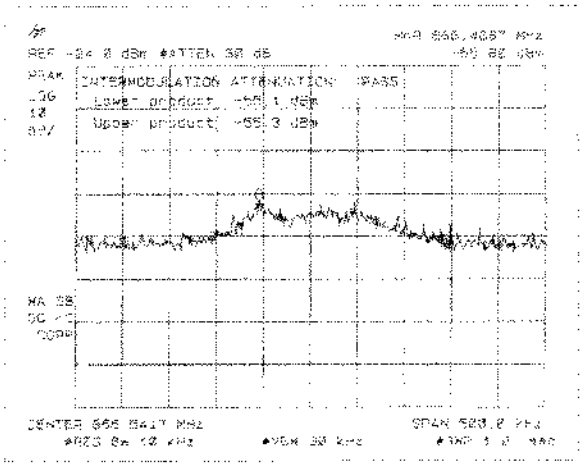
An automatic spur-search routine searches the specified frequency range for signals that exceed specified limits. The frequency range for the spurious test can be easily adjusted. Identified spurs are listed in a table. Closer examination is easy — just select a spur from the table, and the analyzer adjusts its setting and displays the spur onscreen.



Intermodulation Attenuation

MPT 1375 4.4
I-ETS 300-131 4.5.7 & 9.3.4

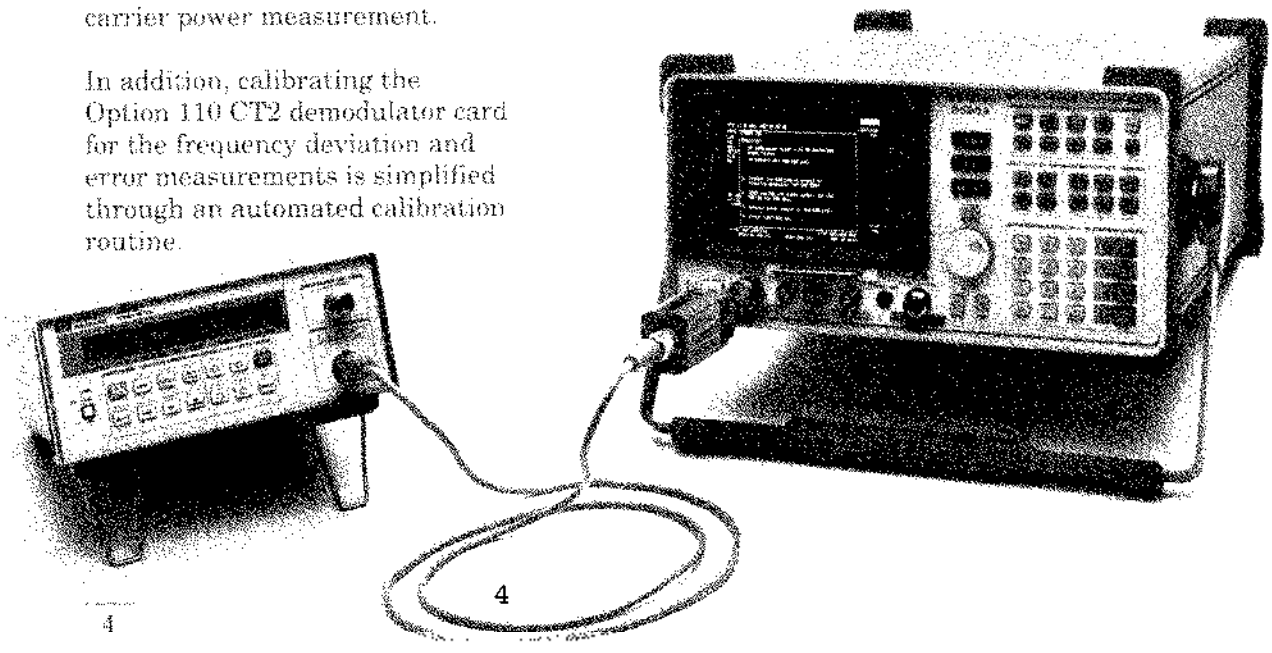
Examine and view the third-order intermodulation products of the radio using the wide second-order dynamic range of the HP 8590 series spectrum analyzers. The numeric values of the third-order product power levels, as well as PASS/FAIL messages, are displayed upon completion of the measurement.



Calibration

Absolute amplitude accuracy can be enhanced in the CT2-CAI frequency band by using the HP 437B power meter and the HP 8481A or HP 8482A power sensors. A calibration routine for transfering the accuracy of the power meter to the spectrum analyzer is included in the personality. Using the spectrum analyzer's internal tracking generator (Option 010) or an HP 8657A RF signal generator as a source, this calibration routine allows for an absolute root-sum-square (RSS) uncertainty of ±0.8 dBm in the transmitter carrier power measurement.

In addition, calibrating the Option 110 CT2 demodulator card for the frequency deviation and error measurements is simplified through an automated calibration routine.



4

Frequency Error

and

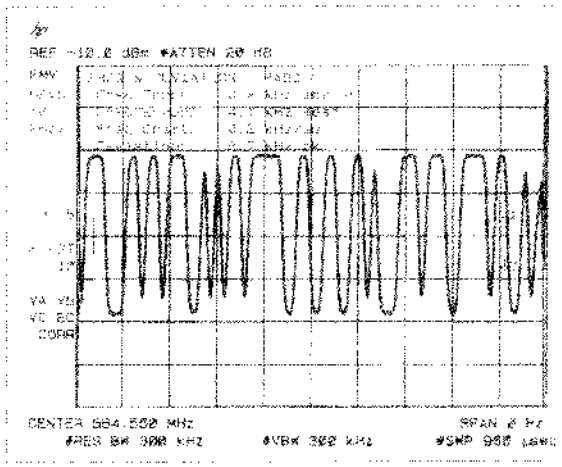
Peak Frequency Deviation

MPT 1375 2.1 & 2.2
I-ETS 300-131 4.2, 4.5.2, & 9.5.5.1

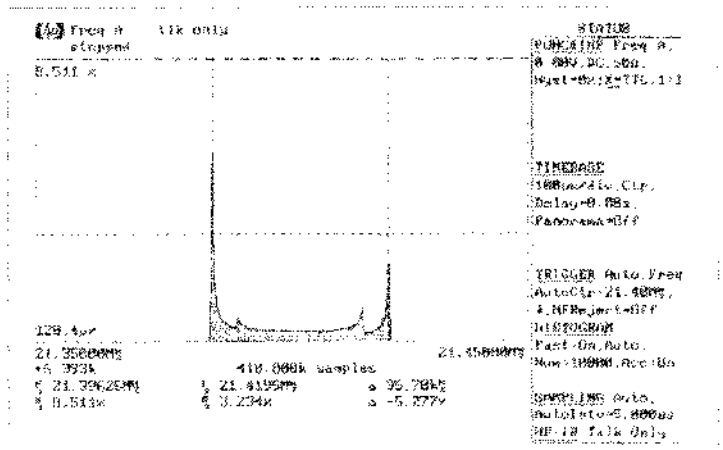
Frequency-error, and peak-frequency-deviation measurements on the BFSK signal are easily performed. These measurements require the Option 110 CT2 demodulator card.

For improved accuracy and flexibility of the frequency error and frequency deviation measurements, the HP 53310A modulation domain analyzer can be used. The spectrum analyzer, via HP-IB without an external controller, can control the operation of the HP 53310A. In addition to setting measurement states, the spectrum analyzer can then display measurement results on its CRT, facilitating automated testing.

In addition, histogram information and frequency-versus-time information can be obtained with the HP 53310A.



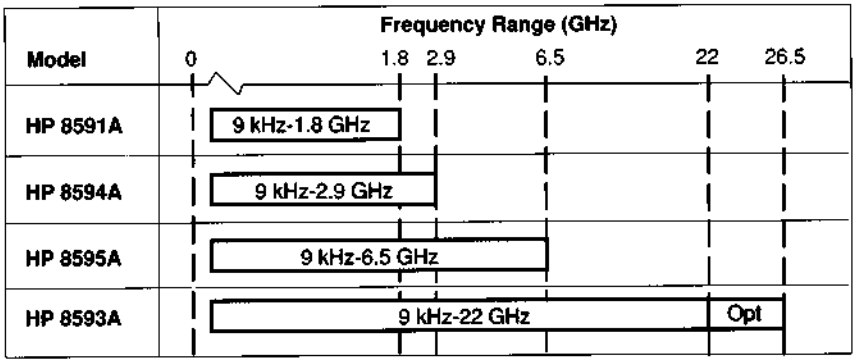
Use internal demodulator of the HP 8590 series spectrum analyzer to perform frequency deviation measurements.



Use the HP 53310A modulation domain analyzer for in-depth modulation analysis.

HP 53310A

Quality Spectrum Analyzers



Fit an Analyzer to Your Needs

Offering high-quality spectrum analysis with dedicated CT2 measurements, HP 8590 series portable spectrum analyzers offer the right frequency coverage to meet your needs.

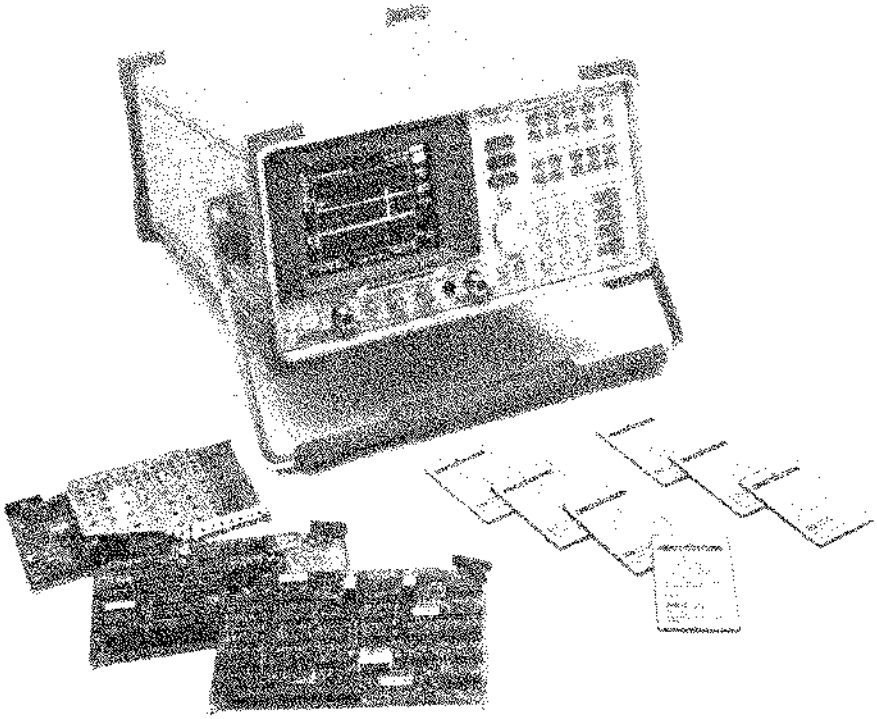
Powerful Yet Portable

HP 8590 series analyzers offer a marker-counter frequency accuracy of ±218 Hz at 900 MHz with Option 004, precision frequency reference. A 10-MHz external reference can also be used for improved frequency stability.

Advanced firmware provides trace math, limit-line testing, fast Fourier transform, and storage of up to 50 traces and states. Adjustable markers let you select any signal; its amplitude and frequency are automatically measured and displayed.

Use the built-in clock-calendar to time-and-date stamp your active CRT traces.

Sturdy and reliable, each analyzer is slightly larger than the size of a briefcase, weighs 16 kg, and has a tilt-bail handle.



Flexibilty for the Future

A built-in card cage allows you to configure a variety of circuit-board options that add measurement capability. Circuit-card options are retrofittable, so the options you need are always available. Circuit-cards include the following options, as well as others:

Option 101, fast time-domain sweep, allows zero-span sweep rates to 20 µs.

Option 105, time-gated spectrum analysis, provides a 1 µs to 65 µs gate with 1 µs resolution. Time-gating allows spectral displays of burst signals.

But hardware versatility isn't all it takes to keep up with rapidly changing technology; firmware flexibility is equally important. A downloadable program (DLP) can give you this flexibility. DLPs are stored on a memory card and loaded into the memory of the spectrum analyzer. They can be simple functions that repeat frequently used sequences of manual button presses, or they can be elaborate tests, such as the CT2-CAI personality, that take front-panel inputs, set up instrument states, make decisions, perform calculations, and display numerical and graphical results. HP is continually developing these application-specific tests and functions.

Specifications

Specifications describe the instrument's fully warranted performance. Specifications are derived with an external loss of 3 dB. Characteristics provide information about non-warranted instrument performance in the form of nominal values. Characteristics are denoted in italics.

A positive or negative TTL transition is required to synchronize the measurement system with the transmitter under test. The synchronization signal must occur once per TDD frame, and is required for the power vs. time, frequency error (internal), and frequency deviation (internal) measurement.

General

Maximum Safe Input Level: Total power must not exceed +30 dBm or 1 watt.

Internal Freq Reference:
Option 004 ±1 x 10^{-7}/year (aging only)

Power Calibration

Power Cal Uncertainty: ±0.7 dB, ±0.3 dB RSS

Carrier Power

Range +13 dBm to -47 dBm

Absolute Amplitude Accuracy
Without Power Cal: ±4.5 dB, ±2.0 dB RSS
With Power Cal: ±1.7 dB, ±0.8 dB RSS
Relative Amplitude Accuracy
0 to -60 dB from Fixed Ref Lvl: ±0.75 dB

Carrier-Off Power

Range *-10 to -70 dBm*
Absolute Amplitude Accuracy
Without Power Cal: ±4.7 dB, ±2.0 dB RSS
With Power Cal: ±2.6 dB, ±1.0 dB RSS
Relative Amplitude Accuracy
0 to -60 dB from Fixed Ref Lvl: ±0.75 dB

Adjacent Channel Power

Integration bandwidth: 80 kHz ±3%
Range of Spectrum Before Integration: *+13 dBm to -67 dBm*
Absolute Amplitude Accuracy
Without Power Cal: ±4.7 dB, ±2.0 dB RSS
With Power Cal: ±1.9 dB, ±0.9 dB RSS
Relative Amplitude Accuracy
0 to -60 dB from Fixed Ref. Lvl: ±0.75 dB

Out-of-Band Power

Range: *0 dBm to -65 dBm*
Absolute Amplitude Accuracy
Without Power Cal: ±4.8 dB, ±2.0 dB RSS
With Power Cal: ±2.9 dB, ±1.2 dB RSS
Relative Amplitude Accuracy
0 to -70 dB from Fixed Ref Lvl: ±1.0 dB

Power vs. Time

Dynamic Range for +10 dBm carrier: *67 dB*
Vertical Scale per division: 1 dB to 10 dB in 1 dB steps
Relative Amplitude Accuracy
0 to -70 dB from Fixed Ref Lvl: ±1.0 dB

Time Resolution:

Test	Displayed Time Resolution
Frame	6 µs
Burst	3 µs
Rising Edge	0.4 µs
Falling Edge	0.4 µs

Time Error, absolute with respect to external trigger:
(RBW = 300 kHz, VBW = 300 kHz) ± (3µs + *time resolution*), ± *(1.5 µs + time resolution) RSS*

Time Error, relative:
(RBW = 300 kHz, VBW = 300 kHz) ±*(1.3* µs + *time resolution)*, ± *(1.0* µs + *time resolution) RSS*

Time Accuracy: *±0.02% of sweeptime*
(ST < 20 ms)

Spurious Emissions

Spurious Frequency Range:
HP 8591A 100 kHz to 1.8 GHz
HP 8595A, HP 8593A 100 kHz to 4 GHz
HP 8594A 100 kHz to 2 9 GHz
Displayed Average Noise Level
Active w/+13 dBm, RBW = 100 kHz *-55 dBm*
Idle with no carrier, RBW = 100 kHz *-67 dBm*
Idle with no carrier, RBW = 1 kHz *-87 dBm*
Absolute Amplitude Accuracy: ±4.9 dB, ± 2.3 dB RSS
Relative Amplitude Accuracy
0 to -60 dB from Fixed Ref Lvl: ±0.75 dB

Intermodulation Attenuation

Displayed Average Noise Level
RBW = 10 kHz *-60 dBm*
Absolute Amplitude Accuracy
Without Power Cal: ±4.5 dB, ± 2.0 dB RSS
With Power Cal: ±2.6 dB, ±1.0 dB RSS
Relative Amplitude Accuracy
0 to -60 dB from Fixed Ref Lvl: ±0.75 dB

Frequency Error and Peak Frequency Deviation

(with Option 110)

Total Range from Nominal Carrier Frequency: -60 kHz to +60 kHz
Resolution: *0.5 kHz*
Frequency Accuracy: ±1.0 kHz +(freq ref error) x (carrier freq)[1]
Frequency Temperature Drift: *±1.0 kHz per °C*
FM Deviation Accuracy (dc): ±1.5 kHz[1]
FM Discriminator 3-dB Bandwidth: *dc to 70 kHz*
(at 20 kHz peak deviation)

[1]After frequency/deviation calibration when ambient temperature at measurement is the same as calibration temperature.

Ordering Information

Recommended Configuration
HP 8591A, 8594A, 8595A or 8593A Portable Spectrum Analyzer[1]
Option 004 Precision Frequency Reference[2]
Option 101 Fast Time-Domain Sweep Card[3]
Option 105 Time-Gated Spectrum Analysis Card[3]
Option 021 HP-IB Interface
HP 85717A CT2-CAI Measurements Personality

For Frequency Error and Frequency Deviation Measurements (select one, or both)
Option 110 CT2 Demodulator Card[4]
HP 53310A Modulation Domain Analyzer

For Enhanced Amplitude Accuracy (in CT2-CAI frequency band)
Option 010 Internal Tracking Generator (100 kHz to 2.9 GHz)[5]
HP 437B Power Meter
HP 8481A or **8482A** Power Sensor
HP 8491A/B **Option 006** 6-dB fixed attenuator

Related Spectrum Analyzer Options
Option 040 Front Panel Protective Cover

Related Products
HP 8657A **Option H42** CT2 signal source
HP 2225A HP ThinkJet Printer
HP 3630A **Option 002** HP PaintJet Color Printer with HP-IB Interface
HP C1405A **Option ABA** Keyboard
HP 85901A Portable AC Power Source

Other HP 8590 Series Measurement Personalities
HP 85711A CATV Measurements Personality
HP 85712C EMC Measurements Personality
HP 85713A Digital Radio Measurements Personality
HP 85714A Scalar Measurements Personality
HP 85715A GSM Measurements Personality
HP 85716A CATV Monitor Personality

For more information on the HP 8590 series of spectrum analyzers, refer to product brochure (literature number 5952-4843) and ordering guide (literature number 5954-9145).

For more information on the HP 53310A modulation domain analyzer, refer to product brochure (literature number 5091-0235).

[1]Firmware date code of 26.10.90 or later required.
[2]Required unless an accurate 10-MHz external reference is provided.
[3]Required for proper operation of the HP 85717A CT2-CAI measurements personality. Serial prefix of 3121K or later required on Option 105.
[4]Option 103 quasi-peak adapter card and Option 102 AM/FM demodulator card not supported with Option 110.
[5]HP 8657A & HP 8656A RF signal generators also supported.

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Data Subject to Change

Printed in U.S.A. 11/91
5091-2986E