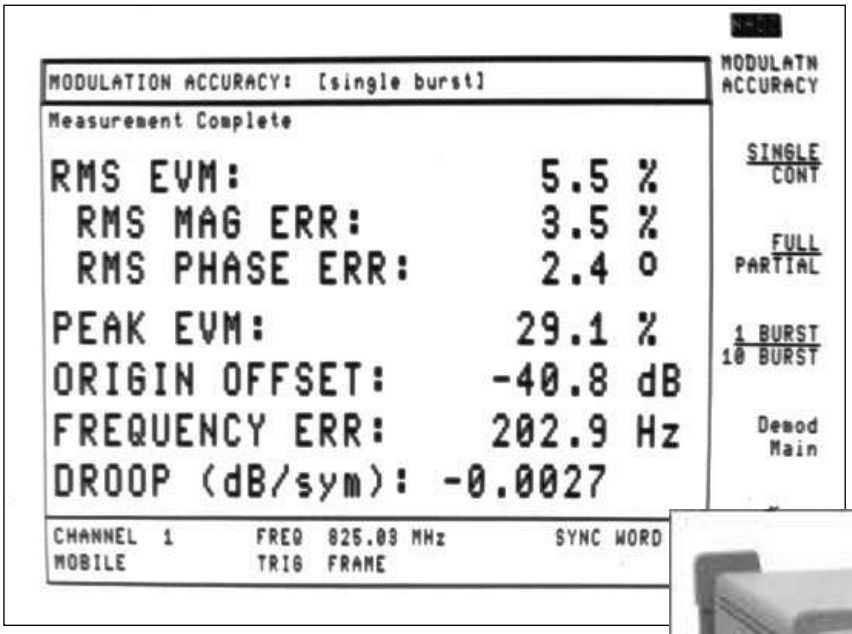
HEWLETT PACKARD
Expanding Possibilities

Portable NADC-TDMA Transmitter Tester

Product Overview

HP 85718B NADC-TDMA Measurements Personality and Options 151 & 160 for the HP 8590 E-Series Spectrum Analyzers

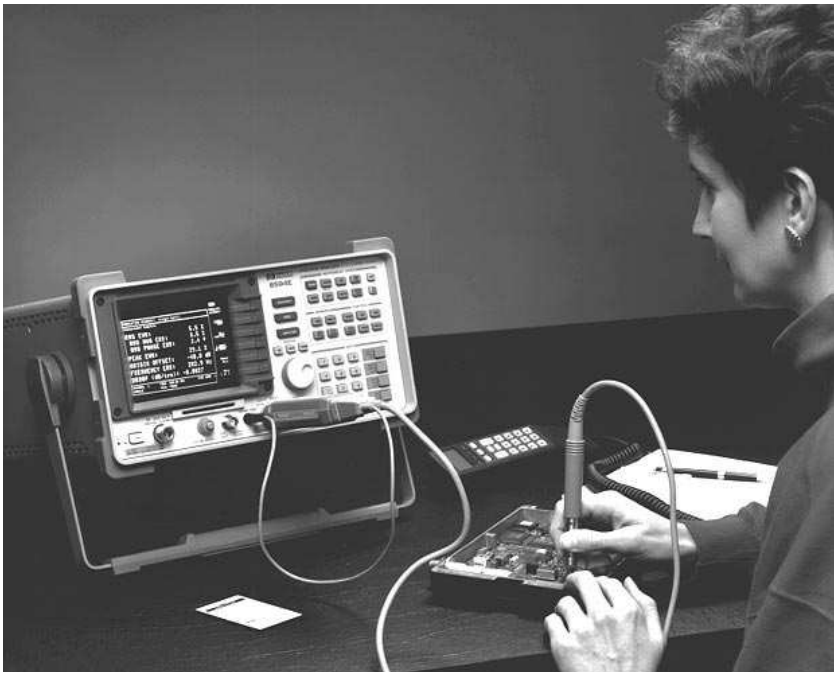


Modulation Accuracy Measurements at a Surprisingly Affordable Price

Custom Transmitter Testing — One Package, One Low Price!

The explosion in cellular communication demands that you turn to today's new digital technology. How will you keep pace with the systems and growing customer needs?

If your job is to design, manufacture, install or maintain North American Dual-mode Cellular (NADC) time-division multiple-access (TDMA) equipment, HP presents the additional measurement capability of the HP 8590 E-series spectrum analyzers. This dedicated tool for NADC-TDMA transmitters includes all of the spectrum analysis capability you've grown to rely on from Hewlett-Packard in this dynamic marketplace.



Modulation Accuracy Measurements
Measure the quality of your digital transmitter with modulation accuracy metrics such as error vector magnitude (EVM) and frequency error. The HP 8590 E-series analyzers along with the HP 85718B NADC-TDMA measurements personality now adds modulation accuracy measurements to power, timing and frequency measurements—all for a very low price!

Quick, Easy, One-Button Measurements
Perform transmitter tests simply and efficiently with the push of a button from easy-to-follow screen menus. The NADC-TDMA transmitter tester does the work for you. It automatically sets the controls and performs the calculations required to test to TIA/EIA-627 [IS-54-B], TIA/EIA-628 [IS-55-A], and TIA/EIA-629 [IS-56-A][1].

High-Speed Production Testing . . .
Reduce costs with increased test throughput and improved accuracy. Since all of the NADC-TDMA measurements are programmable, each is executed with a single command. We've written the code for you.

. . .With Reliable Accuracy
Measure transmitters with near-power-meter accuracy. Option 050 provides absolute amplitude accuracy to within ±0.7 dB.

Product Development and Production Troubleshooting
Evaluate your design and thoroughly troubleshoot failures. Measurements can be run continuously, allowing real-time equipment adjustments and troubleshooting (e.g. EVM is updated every half-second). Waveform and graphical results add key visual information to numerical results.

1. Electronics Industry Association and Telecommunications Industry Association interim standards.

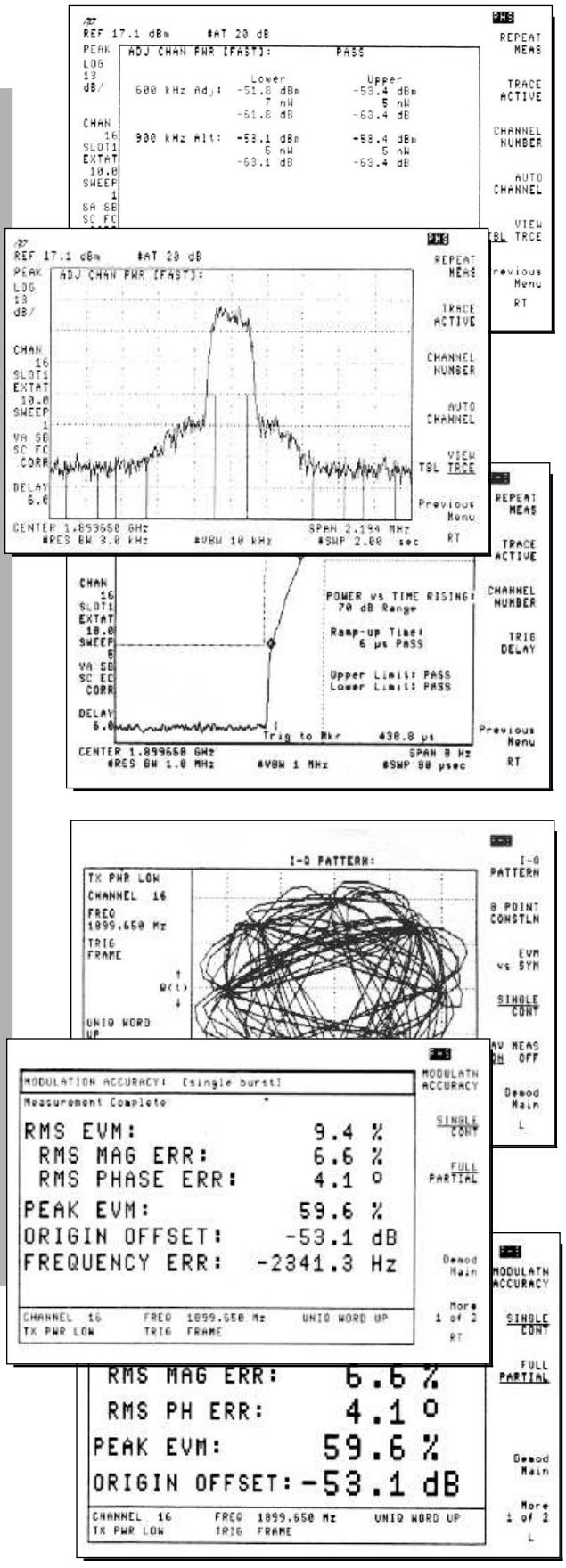
Complete Transmitter Measurements at the Press of a Button!

Power, Frequency and Timing Measurements

- Automatic Tuning by Channel Number
- Carrier Power
- Carrier-off Power
- Channel Power
- Occupied Bandwidth
- Adjacent and Alternate Channel Power Leakage
- Attack and Release Time
- Intermodulation Spurious
- Power Steps
- Combiner Tuning
- Tx and Rx Frequency-Band Monitoring

Modulation Accuracy Measurements

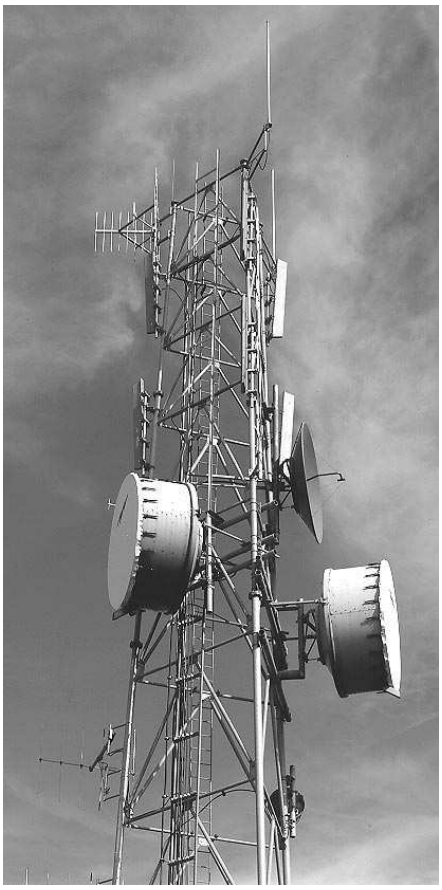
- RMS Error Vector Magnitude (EVM)
- RMS Magnitude Error
- RMS Phase Error
- Peak EVM
- Carrier Frequency Error
- Amplitude Droop
- I-Q Origin Offset



Install and Troubleshoot Cell Sites Faster!

Installers and Service Providers
From commissioning to troubleshooting your system, the HP 8590E-series spectrum analyzer with NADC-TDMA personality is the perfect complement to a service monitor. Check for harmonics, intermodulation distortion and spurious signals easily and reliably. Combiner tuning is effortless with convenient front panel controls.

The HP 8590 E-series is the most popular spectrum analyzer among engineers and technicians in the field.
Use it for all of your cell site needs—from installing and commissioning transceivers to aligning and certifying microwave links. It's all there because these analyzers are available up to 26.5 GHz!



Test and Troubleshoot Mobiles and Portables Quickly and Inexpensively!

Equipment and Component Manufacturers
Design and manufacture mobiles and portables fast and accurately. Complete transmitter measurements give you additional assurance in delivering a quality product to your customer.
We designed the NADC-TDMA personality and HP 8590 E-series to be flexible, fast and accurate. These tools satisfy the needs of manual testing as well as those of high-speed production.

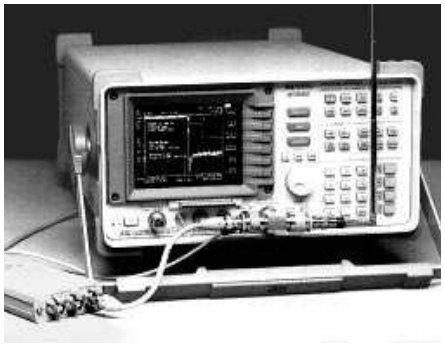
Service Providers
With the NADC-TDMA personality and the HP 8590 E-series, you can now evaluate dual-mode phones with the same comprehensive testing the manufacturers use.

Easy to Use in Your Application

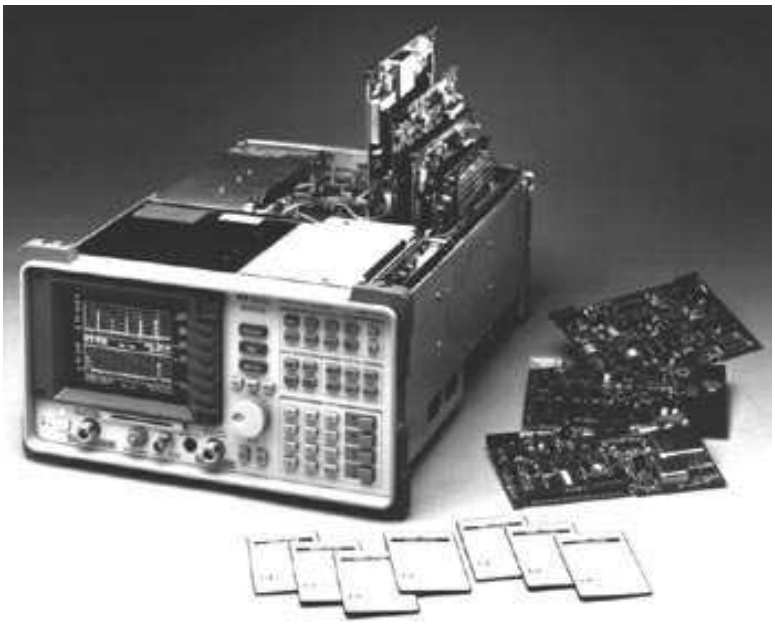
Quick to Get Started
Set-up is easy. Just enter the RF channel number you want to measure. Or, take advantage of the automatic channel and time slot feature and let the analyzer find the signal. You can even define your own unique channel. All you need to provide is a signal to measure.

Synchronized Measurements
To make NADC-TDMA mobile measurements, the spectrum analyzer requires a TTL trigger once per TDMA frame. With the HP 8590 E-series digital demodulation hardware, a frame trigger is generated directly from your test signal.

Or, use the HP 85902A burst carrier trigger accessory. This accessory converts the burst RF signal into a TTL frame trigger for input into the the spectrum analyzer.



Mobile measurements are possible with the HP 85902A burst carrier trigger accessory.

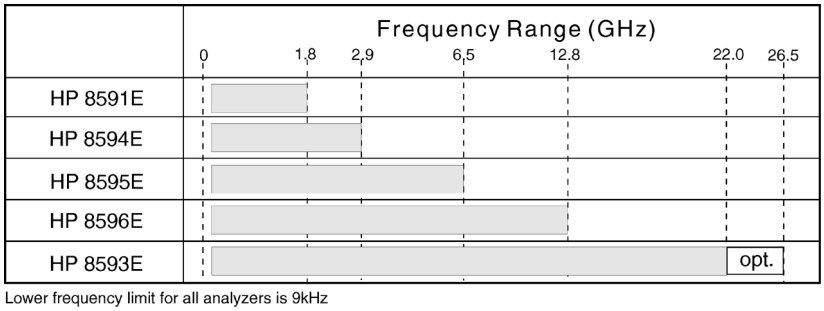


The HP 8590E-series portable spectrum analyzer family offers a multitude of hardware option cards and customized personality software.

A Multi-purpose Tool
The HP 85718B NADC-TDMA measurements personality belongs to a large family of software and option cards for the HP 8590 E-series.
For more cell-site RF testing, the HP 85713A digital radio personality and the HP 11770A link measurements personality add the capability to characterize microwave links.

The optional tracking generator is ideal for tuning filters and duplexers from 300 kHz to 2.9 GHz. And the HP 8590 E-series is a flexible platform. So if NADC-TDMA is your concern today, but PDC, PHP, GSM, DCS1800, CT2-CAI, DECT, or even CDMA is in your future, you can upgrade the HP 8590 E-series to meet your needs.
Just call us!

Fit an Analyzer to Your Needs
Offering high quality spectrum analysis with customized measurements, the HP 8590 E-series provides the right combination of power and portability. Select an analyzer with the frequency range you need.



Lower frequency limit for all analyzers is 9kHz

Specifications

Specifications describe the instrument's warranted performance. Characteristics provide information about non-warranted instrument performance in the form of nominal values. See the HP 8590 E-series literature for complete spectrum analyzer specifications.

For mobile station transmitters, 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 NADC-TDMA frame. Trigger signal is required for power vs. time, and adjacent channel power. If an external trigger signal is unavailable, the trigger signal can be generated by using Options 151 and 161 or the HP 85902A.

General

Maximum Safe Input Level	Total power must not exceed +30 dBm or 1 watt
Internal Frequency Reference Option 004	±1x10^{-7}/year (aging only)
Channel Number Tuning	Channel 1 to 1023
Defined Channel X Frequency	Any frequency within the range of the spectrum analyzer

Mean RF Transmitter Carrier Power

Carrier Power Range[1]	+53 dBm to -20 dB (at transmitter) (200 W to 0.01 mW)	
Absolute Carrier Power Accuracy		
with Option 050	0 °C to 55 °C	20 °C to 30 °C
+25 dBm to +15 dBm[2]	±1.3 dB	±1.0 dB
+15 dBm to -15 dBm[2]	±1.0 dB	±0.7 dB
without Option 050	0° C to 55 °C	
+25 dBm to -35 dBm[2]	±4.3 dB (±2.0 dB typical)	

Transmitted Power vs Time (Mobile station)

Carrier Power Range[1]	+38 dBm to -20 dBm
Display Range	0 dB to -110 dB or 0 dB to -70 dB
Vertical Scale per Division	1 dB to 15 dB in 1 dB steps
Relative Amplitude Accuracy	
for 0 to -70 dB from ref. level	±1.0 dB, ±0.7 dB (typical)
for 0 to -110 dB from ref. level	±2.2 dB, ±1.2 dB (typical)
Time Resolution	
Frame	100 μs
Burst	20 μs
Rising edge	1.6 μs
Falling edge	1.6 μs
Attack and Release Time Accuracy	±4.5 μs (characteristic)
Burst Width Time Accuracy	±45 μs (characteristic)
Absolute Time Error, with Respect to External Trigger	
Frame Display	±110 μs (characteristic)
Burst Display	±25 μs (characteristic)
Rising and Falling Edge Displays	±6 μs (characteristic)

Adjacent Channel Power

Numerical Entries Displayed in Table	
Base and mobile	Power ratio for adjacent, first and second alternate channel. Absolute power for second alternate channels.
Mobile	Results for both modulation (time-gated) and transients (total).
Power Ratio Accuracy	
Adjacent Channels	±1.1 dB (characteristic)
First and Second Alternate Channels	±1.6 dB (characteristic)
Absolute Power Accuracy for Second Alternate Channel	
with Option 050	±1.8 dB (characteristic)
without Option 050	±4.5 dB (characteristic)

Amplitude accuracy does not include effects of misalignment of the transmitter-carrier frequency and the actual spectrum analyzer center frequency nor filter rejection error of the analyzer square root-raised cosine filter approximation.

Occupied Bandwidth

Frequency Accuracy of	
Occupied Bandwidth	±300 Hz (characteristic)
Delta Frequency	± (700 Hz) + (Frequency reference error) x (Carrier frequency) (characteristic)

Power Step

Relative Carrier Power Amplitude Accuracy for 0 to -50 dB from ref. level	±0.4 dB/4dB with maximum of ±0.8 dB

Intermodulation Spurious (Base station)

Total Carrier Power Range	+53 dBm[1] to 0 dBm
Analyzer Third Order Distortion Relative to Carriers[3]	< -67 dB (characteristic)
Relative Amplitude Accuracy for 0 to -60 dB from ref. level	+2.0 dB to –3.0 dB (characteristic)

1. CAUTION: Use sufficient external attenuation to limit power at spectrum analyzer input to absolute maximum of +30 dBm (1 watt).
2. At the spectrum analyzer input.
3. With two carriers with greater than or equal to 600 kHz separation, and external attenuation (dB) = mean carrier power (dBm) input attenuation (dB) + 25 dB, where input attenuation is equal to 10, 20, 30 or 40 dB.

Modulation Accuracy Specifications

General

Minimum Input Power –20 dBm

Frequency Error Accuracy

HP 8593E, HP8594E, HP 8595E, HP 8596E	±[18 Hz + (frequency reference accuracy x carrier frequency)]
HP 8591E	±[20 Hz + (frequency reference accuracy x carrier frequency)]

I-Q Origin Offset

I-Q Origin Offset Accuracy ±0.5 dB for origin offset values greater than -40 dB

Error Vector Magnitude Accuracy For HP 8593E, HP 8594E, HP 8595E, and HP 8596E only

	20 ° - 30 °C		0 ° - 55 °C	
RMS EVM Measurement Uncertainty[1]	**Averaged** [2]	**Single**	**Averaged** [2]	**Single**
	+0.75% - 2.0%	+0.75% - 3.0%	+0.75% - 3.0%	+0.75% - 4.5%

RMS EVM Measurement Repeatability (20 ° - 30 °C) ±0.5% averaged
±1.5% single

Minimum Measurable Value (20 ° - 30 °C)

RMS EVM[1]	+1.5%
RMS magnitude	0.5%
RMS phase[1]	0.8°

[1] Can be improved using a calibrated π/4 DQPSK source with known EVM. Please consult the HP 85718B User's Guide for more information.

[2] Averaged measurement specifications require 10 or more averages.

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Ordering Information

Recommended Configurations:
HP 8594E, HP 8595E, HP 8596E, or HP 8593E
Portable Spectrum Analyzer[1]

For NADC-TDMA mobile and portable stations:

Option BD2	North American Digital Cellular
	This option includes:
Option 004	Precision frequency reference[2]
Option 050	Improved amplitude accuracy for NADC bands
Option 105	Time-gated spectrum analysis
Option 151	Fast ADC & digital demodulator[3]
Option 160	PDC/PHS/NADC/CDMA firmware for Option 151[3]
HP 85718B	NADC-TDMA measurement personality
If modulation accuracy measurements are not needed[4]	
Option 101	Fast time domain sweeps[4]
HP 85902A	Burst carrier trigger[4]

For NADC-TDMA base stations:

Option 004	Precision frequency reference[2]
Option 050	Improved amplitude accuracy for NADC bands
Option 151	Fast ADC & digital demodulator[3]
Option 160	PDC/PHS/NADC/CDMA firmware for Option 151[3]
HP 85718B	NADC-TDMA measurements personality

Related spectrum analyzer options:

Option 021	HP-IB interface
Option 023	RS-232 interface
Option 010	Built-in tracking generator
Option 040	Front panel protective cover
Option 042	Protective soft carrying case

Note: Retrofit kits are available for ALL of the listed HP 8590E-series options.

Related products:

HP 11770A	Link measurements personality
HP 85712D	EMC measurements personality
HP 85713A	Digital radio measurements personality
HP 85714A	Scalar measurements personality
HP 85715B	GSM900 transmitter measurements personality
HP 85717A	CT2-CAI measurements personality
HP 85719A	Noise figure measurements personality
HP 85720A	JDC-TDMA measurements personality
HP 85722B	DCS1800 transmitter measurements personality
HP 85723A	DECT measurements personality
HP 778D	Dual directional coupler
HP 8498A	Option 030 fixed 30 dB attenuator
HP 11667A	Power splitter dc-18 GHz
HP 87405A	Preamplifier 0.01-3 GHz, 22 dB gain
HP 85901A	Portable AC power source
HP C1405A	Option ABA keyboard
Mini-circuits labs. ZFSC-2-5 power splitter 10-1500 MHz	

1. The HP 85718B is supported on the HP 8590 E-series with firmware datecode 93.05.06 or later. The HP 8591E is also recommended where modulation accuracy measurements are NOT needed.
2. Required unless 10 MHz external reference is available.
3. If modulation accuracy measurements are NOT needed, Options 151 and 161 may be omitted.
4. If Options 151 and 161 are not ordered, Option 101 and the HP 85902A are required for proper operation of HP 85718B on NADC-TDMA mobile station power versus time and gated adjacent channel power measurements.

For more information about Hewlett-Packard test and measurement products, applications, services, and for a current sales office listing, visit our web site, http://www.hp.com/go/tmdir. You can also contact one of the following centers and ask for a test and measurement sales representative.

United States:
Hewlett-Packard Company
Test and Measurement Call Center
P.O. Box 4026
Englewood, CO 80155-4026
1 800 452 4844

Canada:
Hewlett-Packard Canada Ltd.
5150 Spectrum Way
Mississauga, Ontario L4W 5G1
(905) 206 4725

Europe:
Hewlett-Packard
European Marketing Centre
P.O. Box 999
1180 AZ Amstelveen
The Netherlands
(31 20) 547 9900

Japan:
Hewlett-Packard Japan Ltd.
Measurement Assistance Center
9-1, Takakura-Cho, Hachioji-Shi,
Tokyo 192, Japan
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Printed in U.S.A. 7/98
5962-6217E