Spectrum Analyzers

3250 Series 1 kHz to 26.5 GHz Spectrum Analyzers

AEROFLEX
A passion for performance.

The NEW 3250 Series compact, digital spectrum analyzers...

Performance and Accuracy

- Powerful RF performance, phase noise -115 dBc/Hz, DANL -145 dBm/Hz
- Vector analyzer with 30 MHz I/Q demodulation bandwidth
- Measurement personality options including GSM/EDGE, UMTS, CDMA2000/1xEVDO, WLAN and WiMAX
- Remote control via LAN, GPIB, RS-232C
- S/W extension based on Windows® XP
- 7" wide touch panel display
- Standard removable hard disk
- Optional battery and DC input
- Optional 3 GHz and 8 GHz tracking generator
- Optional EMI receiver and preselectors
- Portability based on light and compact design

The 3250 Series has been developed to provide market leading performance at a low cost. The innovative compact design of the 3250 spectrum analyzer employs the latest digital processing and RF technology, providing accomplished accuracy, stability and measurement speed.

To support the constantly evolving wireless communication market, the 3250 incorporates a standard 30 MHz bandwidth digitizer and digital modulation analysis S/W. The instrument has been optimized for various mobile and wireless communication measurements such as GSM/EDGE, UMTS, WiMAX and WiBRO.

With its powerful RF performance and advanced applications the 3250 Series is ideally suited for RF development, design analysis and testing. All models have a Windows® XP operating system, remote control capabilities via LAN, GPIB and RS-232C as well as a 7" touch panel screen, ensuring ease of operation and exceptional connectivity. The internal web server allows remote control from a web browser or tablet PC.

Optional measurement personality libraries for leading wireless communication technologies provide the 3250 Series exceptional measurement and demodulation capability for development and manufacturing engineers to optimize designs, improve throughput or examine signals.

Optional EMI Receiver and preselectors add comprehensive pre-compliance testing capability.

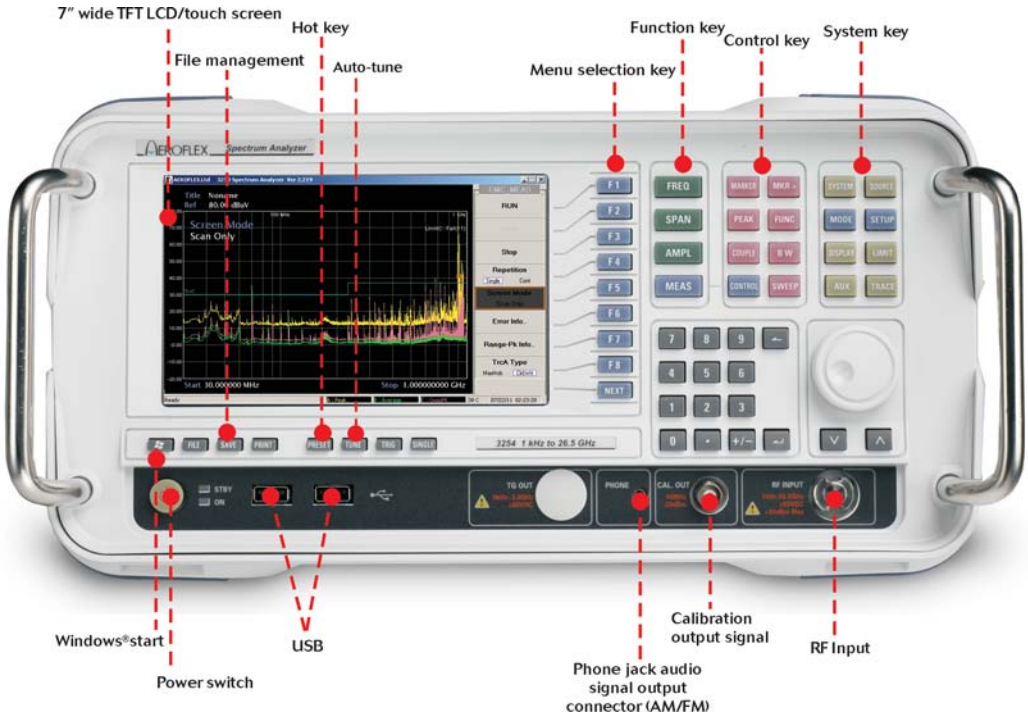
Optional Tracking Generators

Tracking generator options are available for all frequency models. The tracking generator has a specified frequency range of 9 kHz to 3 GHz or 8 GHz and a level range from 0 dBm down to -30 dB. The tracking generator can be used to make high dynamic range measurements on components and devices, particularly filters. A normalize function is available to allow the markers to display relative flatness/frequency response.

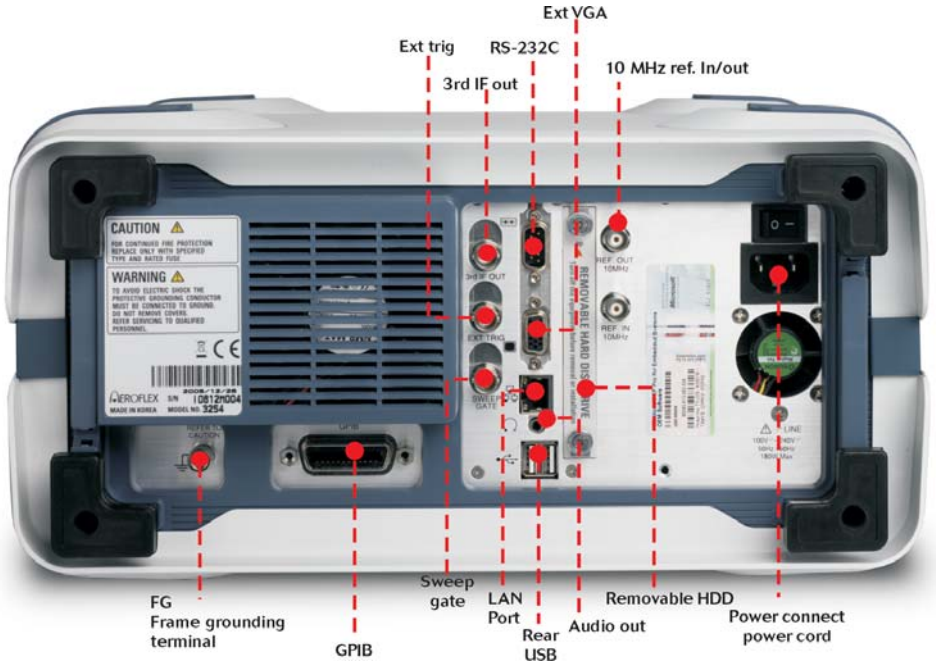
3251	1 kHz to 3 GHz
3252	1 kHz to 8 GHz
3253	1 kHz to 13.2 GHz
3254	1 kHz to 26.5 GHz

For the very latest specifications visit **www.aeroflex.com**

Compact Ergonomic Design



Front of 3250 Series



Back of 3250 Series

SPECIFICATION

FREQUENCY

FREQUENCY RANGE

1 kHz ~ 3 GHz/ 8 GHz/13.2 GHz/ 26.5 GHz

Resolution

1 Hz

FREQUENCY REFERENCE PPM

Temperature Drift	±1/ ±0.01(option)
Aging per year*	±1/ ±0.01(option)

* Horizontal resolution is span/(sweep points-1)

FREQUENCY READOUT

Marker resolution depending on span (1 Hz minimum)

Accuracy ±(marker frequency x reference error+ 3% span + 5% RBW)

FREQUENCY COUNTER

Resolution	1 Hz/10 Hz/100 Hz /1 kHz
Accuracy	±(reference frequency accuracy x marker frequency) ±(counter resolution +1 LSB)
Sensitivity	-45 dBm @ 13.2 GHz > f > 2 MHz, span < 3 MHz -40 dBm @ 26.5 GHz > f > 13.2 GHz, span < 3 MHz

FREQUENCY SPAN

Range	0 Hz, 10 Hz~3 GHz /8 GHz/13.2 GHz/26.5 GHz
Resolution	1 Hz
Accuracy	±1%

SWEEP

Zero Span	1 us to 2000 sec, ±0.5%
Span ≥10 Hz	10 ms to 2000 sec, ±0.5% nominal
Sweep Points	3 to 8192 (span=0 Hz) 101 to 8192 (span≥10 Hz)

TRIGGER

Source	External, video, free run, burst	
Offset	Span ≥10 Hz	1 µs to 500 ms
	Span = 0 Hz	-150 ms to +500 ms

SPECTRAL PURITY

Phase Noise [dBc/Hz] @ F=1 GHz

1 kHz offset	-92 (-95 typical)
10 kHz offset	-112 (-118 typical)
100 kHz offset	-112 (-115 typical)
1 MHz offset	(-134 typical)
10 MHz offset	(-138 typical)

RESIDUAL FM

<100 x N Hzp-p in 1 sec N : LO Harmonic order

Frequency	Band	N
0 Hz ~ 3 GHz	0	1
2.9 GHz ~ 6.4 GHz	1	1
6.3 GHz ~ 13.2 GHz	2	2
13.1 GHz ~ 26.5 GHz	3	4

RESOLUTION BANDWIDTHS

3 dB bandwidths 30 Hz to 5 MHz (1-2-3-5 Sequence)

Bandwidth Accuracy

	20-30°C	0-55°C
500 Hz~500 kHz Filter	±3%	±5%
1 MHz~5 MHz Filter	±10%	±12%

Shape Factor -60 dB: -3 dB

<5 (@ 500 Hz~5 MHz)

Bandwidth Switching Uncertainty

±0.05 dB nominal @ 5 kHz RBW reference, CF=100 MHz

VBW

3 dB Bandwidths

1 Hz to 3 MHz, none (1-2-3-5 sequence)

FFT FILTERS

3 dB Bandwidths	1 Hz to 300 Hz (1-2-3-5 sequence)
Bandwidth Accuracy	<1%, Nominal
Shape Factor (-60 dB: -3 dB)	<4.5, Nominal

AMPLITUDE

DISPLAY RANGE

DANL to + 30 dBm

MAXIMUM INPUT LEVEL

DC (AC coupled)	±50 VDC
CW RF Power	+30 dBm
Peak Power	+50 dBm, 5 µs pulse width; 0.5% duty cycle
Preamp on	+20 dBm

RF Input Attenuator

Range	0 to 55 dB
Steps	5 dB
Switching Accuracy	±0.5 dB @ 100 MHz ±0.5 dB @ <13.2 GHz ±0.8 dB @ 13.2 GHz ~ 26.5 GHz

1 dB CP [dBm]

0 dB RF attenuation	-10 dBm @ 10 MHz to 3 GHz 0 dBm @ 3 GHz to 26.5 GHz
Preamp on	-32 dBm @ 1 GHz

THIRD-ORDER INTERMODULATION DISTORTION (TOI) [dBm]

Two –30 dBm tones at input mixer with tone separation > 100 kHz
+8 dBm @ 10 MHz to 200 MHz

+12 dBm (15 typical) @ 200 MHz to 26.5 GHz

SECOND HARMONIC INTERCEPT (SHI)

+40 dBm typical @ ~ 1.5 GHz, -30 dBm input
+80 dBm @ 1.5 GHz to 26.5 GHz, -30 dBm input

DISPLAYED AVERAGE NOISE LEVEL (DANL) [dBm/Hz]

0 dB RF attenuation, 50 Ω termination

RBW 1 Hz, VBW 1 Hz, preamp OFF

	20-30°C	0-55°C
100 kHz to 10 MHz	-135	-132
10 MHz to 2 GHz	-143, -145 typical	-140, -142 typical
2 GHz to 13.2 GHz	-141, -145 typical	-138, -142 typical
13.2 GHz to 18 GHz	-138, -142 typical	-135, -139 typical
18 GHz to 26.5 GHz	-133, -138 typical	-130, -135 typical

IMMUNITY TO INTERFERENCE

Residual Responses	-90 dBm (0 dB RF attenuation, 50 W termination)
Other Input Related Spurious [dBc]	-55 @ -30 dBm input

DISPLAY RANGE

Log Scale	0.1 to 1 dB / div in 0.1 dB steps 1 to 20 dB / div in 1 dB steps
Linear Scale	10 Divisions
Units of Level Axis	dBm, dBmV, dBµV, V, W (log level display) mV, µV, dBmV (linear level display)

REFERENCE LEVEL

Logarithmic Range	-170 dBm to +30 dBm, 0.1 dB steps
Linear Range	7.07 nV to 7.07 V in 1% steps
Accuracy	0 dB

TRACES

Number	3 traces
Trace Detectors	Normal, peak, sample, negative peak, log power average, RMS average, and voltage average
Trace Functions	Clear/write, max hold, min hold, view, blank, average

FREQUENCY RESPONSE

10 dB input attenuation, preselector centering applied

	20-30°C	0-55°C
1 MHz to 3.0 GHz	±0.5 dB	±1.0 dB
3.0 GHz to 8 GHz	±1.0 dB	±3.0 dB
3 GHz to 13.2 GHz	±1.5 dB	±4.0 dB
13.2 GHz to 22 GHz	±2.0 dB	±5.0 dB
22 GHz to 26.5 GHz	±2.5 dB	±5.0 dB
1 MHz to 3.0 GHz	Preamp ON	±1.0 dB

DISPLAY LINEARITY [dB]

Linear and Log Switching Error	0
Log Scale Switching Error	0
Linearity	±0.1 total @ input mixer level ≤-20 dBm ±0.13 total @ -20 dBm <mixer level ≤-10 dBm

VECTOR ANALYSIS

Maximum digitizer analysis bandwidth	30 MHz
DigitizerADC Resolution	14 bits
Dynamic Range	85 dB
Residual FM	<1% (nominal)
Capture Memory	128 Mbytes (32 Msamples)
Modulation Formats PSK	8, 16, 32, 64
	BPSK, QPSK, OQPSK
	Differential, shifted
QAM	4, 8, 16, 32, 64, 128, 256
Maximum Symbol Rate	13 MHz
Filters	Raised cos
	Root raised cos

AM/FM DEMODULATION

Input Power Range	-60 dBm to +30 dBm, preamp OFF
	-80 dBm to +30 dBm, preamp ON
Modulation Rate Range	1 Hz to 10 kHz @ RBW 10 kHz to 100 kHz
	1 Hz to 30 kHz @ RBW 200 kHz to 500 kHz
Peak FM Deviation	200 Hz - 500 kHz
FM Deviation Accuracy	±5%
AM Depth Range	5% - 99%
AM Depth Accuracy	±5%
Audio Output Port	Loudspeaker, phone jack

INPUTS AND OUTPUTS

RF INPUT

Type Front	APC 2.92 mm, 50 Ω (26.5 GHz)

VSWR>10 dB input attenuation
<1.5 nominal @10 MHz to 3 GHz
<1.8 nominal @ 3 GHz to 13.2 GHz
<2.0 nominal @ 13.2 GHz to 26.5 GHz

3RD IF OUTPUT

Type	Rear	BNC female, 50 W
Frequency		21.4 MHz
Bandwidth		16 MHz Max, different as prefilter
Level		+2 dBm nominal, at top of screen

Audio Output

Type	Front	Phone jack

Ext Trigger Input

Type	Rear	BNC female, 10 kΩ nominal
Trigger level		TTL nominal

Sweep Gate Output

Type	Rear	BNC female
Trigger level		TTL nominal

Reference Frequency Output

Type	Rear	BNC female, the same as reference input port
Frequency		10 MHz
Level		+5 dBm, nominal

Reference Frequency Input

Type	Rear	BNC female, the same as reference output port
Frequency		10 MHz
Required level		-5 to +15 dBm nominal

GPIB

Type	*Rear*	*IEEE 488.2, 24 - pin female*
Command set		*SCPI 1997.0*
Interface functions		*SH1, AH1, T6, L4, SR1, RL1, PP0, DC1, E2, LE0, TE0*

Serial Interface

	Rear	*RS - 232 - C (COM), 9 - pin D - SUB female*

LAN Interface

	Rear	*10 / 100 / 1000 Base T, Connector RJ 45*

USB

Front/Rear USB 2.0, Front: 2 EA, Rear: 2 EA
Supports mouse, keyboard and printer.

Monitor Output (VGA)

	Rear	*15-pin mini D-SUB*

Cal. Out

Frequency	*Front*	*40 MHz*
Level		*-20 dBm + 1.0*

GENERAL SPECIFICATIONS

DISPLAY

Size

7" Wide color TFT LCD (Touch Screen)

Resolution

800 x 480 pixels

MASS MEMORY

Hard Disk, Removable, 80 GB

ENVIRONMENTAL CONDITIONS

MIL - PRF - 28800 F, Class 3

Temperature

Operating	*0°C to + 50°C*
Permissible	*0°C to + 55°C*
Storage	*-40°C to + 71°C*

Permissible temperature has slightly wider range as compared to the normal operating temperature. We guarantee the specification of the equipment when operating within the Operating Temperature range. We guarantee that the equipment is functional when operating within the Permissible Temperature.

Humidity

5% to 95% (5 ~ 75% above 30°C, 5 ~ 45% above 40°C)

Altitude

up to 4600 metres

MECHANICAL RESISTANCE

MIL-PRF-28800F, Class 3

Vibration, Random

5 Hz to 500 Hz

Vibration, Sinusoidal

5 Hz to 55 Hz

Shock

30 G, Half-sine shock

EMC

EN 61326-1 : 2006
EN 55022 : 2006
EN 55024 : 1998 + A1 + A2
EN 61000 - 3 - 2 : 2000 + A2
EN 61000 - 3 - 3 : 2000 + A1 + A2

SAFETY

EN 61010 - 1 : 2001 (2nd Edition)

POWER SUPPLY

Steady State Voltage

100 VAC to 240 VAC

Frequency

50/60 Hz

Power Consumption

120 Watt max

DIMENSIONS

(WxHxD) [mm]

373 (W) x 194 (H) x 401 (D) without handles and feet down
384 (W) x 203 (H) x 437 (D) with handles and feet down

(WxHxD) [inches]

14.7 (W) x 7.6 (H) x 15.8 (D) without handles and feet down
15.1 (W) x 8 (H) x 17.2 (D) with handles and feet down

WEIGHT

Model

	3251	*3252*	*3253*	*3254*
[kg]	*11.0*	*12.8*	*13.0*	*13.4*

RECOMMENDED CALIBRATION INTERVAL

1 - year

STANDARD WARRANTY

2 - year

3 GHz TRACKING GENERATOR- 325X/1

Frequency Range

9 kHz to 3 GHz

Output Level

–30 dBm to 0 dBm

Output Level Resolution

0.1 dB

Absolute Level Accuracy

±2.0 dB

Flatness [dB] at -10 dBm

9 kHz to 100 kHz,	±4.0, Before Normalization
100 kHz to 3 GHz	±2.5 Before Normalization
9 kHz to 3 GHz	±1.0 After Normalization

Spurious

Harmonics, <-15 dBc from 100 kHz to 3 GHz

Non harmonics, <-30 dBc

Leakage

-90 dBm

VSWR

<1.5 @ 0 dBm Output Level

Connector

N female, 50 Ω

8 GHz TRACKING GENERATOR- 325X/2

Frequency Range

100 kHz to 8 GHz

Output Level

0 dBm to -20 dBm (in 0.5 dB steps)

Attenuator Steps

0.5 dB

Absolute Level Accuracy

100 kHz to 3 GHz	±3 dB
3 GHz to 8 GHz	±4.5 dB

Flatness [dB] @ -10 dBm

100 kHz to 3 GHz	±3 dB, before normalization
3 GHz to 8 GHz	±4.5 dB, before normalization
100 kHz to 8 GHz	±1.0 dB, after normalization

Spurious

Harmonics, <-15 dBc

Non-harmonics, <-20 dBc

Leakage at TG output level 0 dBm

100 kHz to 3 GHz	-90 dBm
3 GHz to 8 GHz	-80 dBm

VSWR

100 kHz to 3 GHz	<1.5:1 @-10 dBm output level
3 GHz to 8 GHz	<2:1 all output levels

Connector

N Female, 50 Ω

PRE-SELECTOR- OPTION 5

When selected, all specifications remain the same except for the following:

Frequency Range- AC Coupled

9 kHz to 30 MHz

Preselection

7 preselection filters

9 kHz to 150 kHz, fixed LPF

150 kHz to 600 kHz, fixed BPF

600 kHz to 1.2 MHz, fixed BPF

1.2 MHz to 2.5 MHz, fixed BPF

2.5 MHz to 5 MHz, fixed BPF

5 MHz to 10 MHz, fixed BPF

10 MHz to 30 MHz, fixed BPF

Third order intercept point (IP3) (dBm)

Two - 30 dBm tones at input mixer with tone separation >100 kHz

Preselector OFF, preamp OFF

+8 @ 10 MHz to 200 MHz

+12, +15 typical @ 200 MHz, to 8 GHz

Preselector ON, preamp OFF

+8 @ 10 MHz to 30 MHz

Preselector ON, preamp ON

-10 typical @ <100 MHz

-10, -8 typical @ 100 MHz to 1 GHz

-8, -5 typical @ 1 GHz to 3 GHz

Second order intercept point (IP2) (dBm) -30 dBm input

Preselector OFF, preamp OFF

+40 typical @ 10 MHz to 4 GHz

Preselector ON, preamp OFF

+40 typical @ 10 MHz to 4 GHz

Preselector ON, preamp ON

+25 typical @ 10 MHz to 1.5 GHz

Displayed Average Noise Level (DANL) (dBm)

0 dB RF attenuation, 50 termination, zero span, sweep time 100 msec, RBW 1 kHz, VBW 10 Hz, Average detector, trace average 10, nomalize to RBW 1 Hz

Preselector OFF, preamp OFF

-130 @ 9 kHz to 1 MHz

-140, -150 typical @ 1 MHz to 10 MHz

-145, -149 typical @ 10 MHz to 1 GHz

-143, -147 typical @ 1 GHz to 1.5 GHz

-141, -145 typical @ 1.5 GHz to 2.5 GHz

-139, -142 typical @ 2.5 GHz to 3 GHz

-142, -147 typical @ 3 GHz to 6.4 GHz

-140, -145 typical @ 6.4 GHz to 8 GHz

Preselector ON. preamp OFF

-130 @ 9 kHz to 1 MHz

-142, -147 typical @ 1 MHz to 30 MHz

Preselector ON, preamp ON

-140 @ 9 kHz to 1 MHz

-158, -165 typical @ 1 MHz to 30 MHz

-162, -165 typical @ 30 MHz to 1 GHz

-160, -163 typical @ 1 GHz to 1.5 GHz

-157, -160 typical @ 1.5 GHz to 2.3 GHz

-155, -158 typical @ 2.3 GHz to 3 GHz

Frequency Response

10 dB input attenuation, preselector centering applied, reference to 100 MHz

Preselector OFF, preamp OFF

±0.5 dB @ 9 kHz to 3.0 GHz

±1.0 dB @ 3.0 GHz to 8 GHz

Preselector OFF, preamp ON

±0.7 dB @ 9 kHz to 3.0 GHz

Preselector ON, preamp ON

±1.0 dB @ 9 kHz to 1.0 GHz

±1.5 dB @ 1 GHz to 3.0 GHz

SOFTWARE OPTIONS

	2G Cellular	3G Cellular		Wireless Data	
Measurement Function	GSM/EDGE	UMTS (ULS) HSUPA	cdma2000r 1xEV-DO	WLAN (802.11a,b,g)	WIMAX (802.16e OFDMA)
3250 option	8	9	10	11	12
Power	✓	✓	✓	✓	✓
Power Template				✓ (ramp time 802.11b)	✓
Occupied BW		✓		✓ (802.11a,g only)	✓
Code Domain Power		✓	✓		
Peak Code Domain Error		✓	✓ (RC3, 4)		
Magnitude Error		✓	✓		
Phase Error	✓ (GSM)	✓	✓		
IQ Skew		✓		✓	✓
Gain Imbalance		✓		✓	✓
EVM	✓ (EDGE)	✓ (QPSK & composite)	✓ (QPSK & composite)	✓ single/all carriers- data or pilot	✓ single/all carriers- data or pilot
Constellation Error				✓ (a only)	✓
Rho			✓ (composite)		
Symbol/Chip Timing				✓	✓
Carrier Suppression (Origin Offset)	✓ (EDGE)		✓ (QPSK)		
Frequency Error	✓	✓	✓	✓	✓
Spectral Emissions	✓ (ORFS)		✓ (Spectral Mask)	✓ (Spectral Mask)	✓ (Spectral mask)
Spectral Flatness				✓ (a, g only)	✓
Adjacent Channel Power		✓ (ACLR)	✓ (ACPR)	✓ (ACP)	
CCDF		✓	✓	✓	✓
BER	✓ (GSM)	✓			

VERSIONS, OPTIONS AND ACCESSORIES

When ordering please quote the full ordering number information.

Ordering Numbers	Versions
Standard units	
3251/0	Spectrum Analyzer (1 kHz ~ 3 GHz)
3251/1	Spectrum Analyzer (1 kHz ~ 3 GHz) incl. 3 GHz Tracking Gen
3252/0	Spectrum Analyzer (1 kHz ~ 8 GHz)
3252/1	Spectrum Analyzer (1 kHz ~ 8 GHz) incl. 3 GHz Tracking Gen
3252/2	Spectrum Analyzer (1 kHz ~ 8 GHz) incl. 8 GHz Tracking Gen
3253/0	Spectrum Analyzer (1 kHz ~ 13.2 GHz)
3253/1	Spectrum Analyzer (1 kHz ~ 13.2 GHz) incl. 3 GHz Tracking Gen
3253/2	Spectrum Analyzer (1 kHz ~ 13.2 GHz) incl. 8 GHz Tracking Gen
3254/0	Spectrum Analyzer (1 kHz ~ 26.5 GHz)
3254/1	Spectrum Analyzer (1 kHz ~ 26.5 GHz) incl. 3 GHz Tracking Gen
3254/2	Spectrum Analyzer (1 kHz ~ 26.5 GHz) incl. 8 GHz Tracking Gen

Hardware

Opt.03	High Stability Oscillator (80029)
Opt.05	Pre-Selector (A, B band) (80030) (Not available with opt. 06)
Opt.06	AC/DC Power Supply (80025) (Not available with opt. 05)

Software

Opt.08	GSM/EDGE Measurement Suite (80031)
Opt.09	UMTS UL Measurement Suite (80032)
Opt.10	CDMA2000/1xEVDO Measurement Suite (80033)
Opt.11	WLAN Measurement Suite (80034)
Opt.12	WiMAX Measurement Suite (80035)
Opt.13	EMI Measurement Suite (80036)

Supplied Accessories

Operating Manual on CD-ROM

Mains lead

R5-232 lead

N-type/PC 3.5 Adaptors (3254 only)

DC block

Optional Accessories

80027	Soft Carrying Case
80026	DC Battery Pack
80039	Connector and Cable Assembly
80040	Hard Carrying Case
80041	Rack Mounting Kit
47090/006	Service Manual

CHINA Beijing
Tel: [+86] (10) 6539 1166
Fax: [+86] (10) 6539 1778

CHINA Shanghai
Tel: [+86] (21) 5109 5128
Fax: [+86] (21) 5150 6112

CHINA Shenzhen
Tel: [+86] (755) 3301 9358
Fax: [+86] (755) 3301 9356

FINLAND
Tel: [+358] (9) 2709 5541
Fax: [+358] (9) 804 2441

FRANCE
Tel: [+33] 1 60 79 96 00
Fax: [+33] 1 60 77 69 22

GERMANY
Tel: [+49] 89 99641 0
Fax: [+49] 89 99641 160

HONG KONG
Tel: [+852] 2832 7988
Fax: [+852] 2834 5364

INDIA
Tel: [+91] 80 [4] 115 4501
Fax: [+91] 80 [4] 115 4502

JAPAN
Tel: [+81] (3) 3500 5591
Fax: [+81] (3) 3500 5592

KOREA
Tel: [+82] (2) 3424 2719
Fax: [+82] (2) 3424 8620

SCANDINAVIA
Tel: [+45] 9614 0045
Fax: [+45] 9614 0047

SINGAPORE
Tel: [+65] 6873 0991
Fax: [+65] 6873 0992

UK Stevenage
Tel: [+44] (0) 1438 742200
Fax: [+44] (0) 1438 727601
Freephone: 0800 282388

USA
Tel: [+1] (316) 522 4981
Fax: [+1] (316) 522 1360
Toll Free: 800 835 2352

AEROFLEX
A passion for performance.

www.aeroflex.com

info-test@aeroflex.com

Our passion for performance is defined by three attributes represented by these three icons: solution-minded, performance-driven and customer-focused.

Part No. 46891/352, Issue 5, 09/11