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 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.
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 (-115 typical)
100 kHz offset -112 (-115 typical)
1 MHz offset 0 dB (typical)
10 MHz offset (-135 typical)

RESIDUAL FM
<100 x N Hz p-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 1 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 Hz 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

<table>
<thead>
<tr>
<th>RBW 1 Hz, VBW 1 Hz, preamp OFF</th>
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<tbody>
<tr>
<td>100 kHz to 10 MHz</td>
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<tr>
<td>10 MHz to 2 GHz</td>
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<tr>
<td>2 GHz to 2.9 GHz</td>
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<tr>
<td>2.9 GHz to 3 GHz</td>
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<tr>
<td>3 GHz to 13.2 GHz</td>
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<tr>
<td>13.2 GHz to 18 GHz</td>
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<tr>
<td>18 GHz to 26.5 GHz</td>
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<tr>
<td>20-30°C</td>
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<tr>
<td>0-55°C</td>
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<tr>
<td>-135</td>
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<td>-140</td>
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<tr>
<td>-142 typical</td>
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<tr>
<td>-141, -145 typical</td>
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<tr>
<td>-139, -141 typical</td>
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<td>-138, -145 typical</td>
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<td>-138, -142 typical</td>
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<td>-139, -138 typical</td>
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<tr>
<td>-135, -139 typical</td>
</tr>
<tr>
<td>-138, -135 typical</td>
</tr>
</tbody>
</table>

**IMMUNITY TO INTERFERENCE**

Residual Responses -90 dBm (0 dB RF attenuation, 50 Ω termination)

Other Input Related Spurious [dBc]

**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

<table>
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<tr>
<th>Frequency Range</th>
<th>20-30°C</th>
<th>0-55°C</th>
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<tbody>
<tr>
<td>1 MHz to 3.0 GHz</td>
<td>±0.5 dB</td>
<td>±1.0 dB</td>
</tr>
<tr>
<td>3.0 GHz to 8 GHz</td>
<td>±1.0 dB</td>
<td>±3.0 dB</td>
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<tr>
<td>8 GHz to 13.2 GHz</td>
<td>±1.5 dB</td>
<td>±4.0 dB</td>
</tr>
<tr>
<td>13.2 GHz to 22 GHz</td>
<td>±2.0 dB</td>
<td>±5.0 dB</td>
</tr>
<tr>
<td>22 GHz to 26.5 GHz</td>
<td>±2.5 dB</td>
<td>±5.0 dB</td>
</tr>
<tr>
<td>1 MHz to 3.0 GHz Preamp ON</td>
<td>±1.0 dB</td>
<td></td>
</tr>
</tbody>
</table>

**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

Digitizer ADC 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 100 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
Frequency: 10 MHz
Required level: -5 to +15 dBm nominal

GPIB
Type: Rear
Command set: IEEE 488.2, 24-pin female
Interface functions: SCPI 1997.0

Serial Interface
Type: Rear
Serial Interface: RS - 232 - C (COM), 9-pin D-SUB female

LAN Interface
Type: Rear
LAN Interface: 10 / 100 / 1000 Base T, Connector RJ 45

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

Monitor Output (VGA)
Type: Rear
Monitor Output: 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
EN 55022
EN 55024
EN 61000 - 3 - 2
EN 61000 - 3 - 3

SAFETY
EN 61010 - 1 (2nd Edition)

AC POWER SUPPLY
100 V AC to 240 V AC
(Limit 90 V AC to 264 V AC)
50 Hz to 60 Hz

Power Consumption
140 Watt max

DIMENSIONS
(W x H x D) [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

(W x H x D) [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
kg
3251 3252 3253 3254
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 5 MHz 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, <-30 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

---

**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

**Display Average Noise Level (DANL) (dBm)**
- 0 dB RF attenuation, 50 termination, zero span, sweep time 100 msec, RBW 1 kHz, VSB 10 Hz, Average detector, trace average 10, normalize 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

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**SOFTWARE OPTIONS**

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<td>WLAN (802.11a,b,g)</td>
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<td>4 single/all carriers- data or pilot</td>
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For the very latest specifications visit [www.aeroflex.com](http://www.aeroflex.com)
### Versions, Options and Accessories

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<td>3251/1</td>
<td>Spectrum Analyzer (1 kHz ~ 3 GHz) incl. 3 GHz Tracking Gen</td>
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<td>3252/0</td>
<td>Spectrum Analyzer (1 kHz ~ 8 GHz)</td>
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<td>3252/2</td>
<td>Spectrum Analyzer (1 kHz ~ 8 GHz) incl. 8 GHz Tracking Gen</td>
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<tr>
<td>3253/0</td>
<td>Spectrum Analyzer (1 kHz ~ 13.2 GHz)</td>
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<td>Spectrum Analyzer (1 kHz ~ 26.5 GHz)</td>
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<td>Spectrum Analyzer (1 kHz ~ 26.5 GHz) incl. 3 GHz Tracking Gen</td>
</tr>
<tr>
<td>3254/2</td>
<td>Spectrum Analyzer (1 kHz ~ 26.5 GHz) incl. 8 GHz Tracking Gen</td>
</tr>
</tbody>
</table>

### Hardware
- Opt.03 High Stability Oscillator
- Opt.05 Pre-Selector (A, B band)

### Software
- Opt.08 GSM/EDGE Measurement Suite
- Opt.09 UMTS UL Measurement Suite
- Opt.10 CDMA2000/1xEVDO Measurement Suite
- Opt.11 WLAN Measurement Suite
- Opt.12 WiMAX Measurement Suite
- Opt.13 EMI Measurement Suite

### Supplied Accessories
- Operating Manual on CD-ROM
- Mains lead
- R5-232 lead
- N-type/PC 3.5 Adaptors (3254 only)

### Optional Accessories
- 80027 Soft Carrying Case
- 80039 Connector and Cable Assembly
- 80040 Hard Carrying Case
- 80041 Rack Mounting Kit
- 47090/006 Service Manual