Test Equipment Solutions Ltd specialise in the second user sale, rental and distribution of quality test & measurement (T&M) equipment. We stock all major equipment types such as spectrum analyzers, signal generators, oscilloscopes, power meters, logic analysers etc from all the major suppliers such as Agilent, Tektronix, Anritsu and Rohde & Schwarz.

We are focused at the professional end of the marketplace, primarily working with customers for whom high performance, quality and service are key, whilst realising the cost savings that second user equipment offers. As such, we fully test & refurbish equipment in our in-house, traceable Lab. Items are supplied with manuals, accessories and typically a full no-quibble 2 year warranty. Our staff have extensive backgrounds in T&M, totalling over 150 years of combined experience, which enables us to deliver industry-leading service and support. We endeavour to be customer focused in every way right down to the detail, such as offering free delivery on sales, covering the cost of warranty returns BOTH ways (plus supplying a loan unit, if available) and supplying a free business tool with every order.

As well as the headline benefit of cost saving, second user offers shorter lead times, higher reliability and multivendor solutions. Rental, of course, is ideal for shorter term needs and offers fast delivery, flexibility, try-before-you-buy, zero capital expenditure, lower risk and off balance sheet accounting. Both second user and rental improve the key business measure of Return On Capital Employed.

We are based near Heathrow Airport in the UK from where we supply test equipment worldwide. Our facility incorporates Sales, Support, Admin, Logistics and our own in-house Lab.

All products supplied by Test Equipment Solutions include:
- No-quibble parts & labour warranty (we provide transport for UK mainland addresses).
- Free loan equipment during warranty repair, if available.
- Full electrical, mechanical and safety refurbishment in our in-house Lab.
- Certificate of Conformance (calibration available on request).
- Manuals and accessories required for normal operation.
- Free insured delivery to your UK mainland address (sales).
- Support from our team of seasoned Test & Measurement engineers.
- ISO9001 quality assurance.

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Spectrum Analyzers

100 Hz to 8 GHz

R3265A/3265AP/3365A Series offers a large–sized CRT screen in a portable unit and a wide frequency range, allowing measurements from 100 Hz to 8 GHz in a single sweep. Due to a newly developed high purity synthesizer, the series also provides excellent spectral purity of –110 dBc/Hz at 2.6 GHz (10 kHz offset frequency).

This unit performs especially well in measuring the spurious emission intensity of new mobile communications equipment, the bandwidth of occupied frequencies and signal leakage from adjacent channels. In the low–noise mode, the series has a high–input sensitivity of –145 dBm (1 MHz to 3.6 GHz), so it can easily measure low level signals.

The R3265A Series is provided with a BASIC controller as a standard feature. This feature allows measured data or set conditions to be stored and the free construction of automatic measurement systems without the need for external controllers.

A preselector for low frequencies has been added to the R3265A, enabling the unit to realize a dynamic range of 100 dB and higher for carrier waves of 250 MHz and higher. The R3365A has a built–in tracking generator and is ideal for measuring frequency characteristics when setting up or maintaining digital radio base stations.

**Selection Guide**

<table>
<thead>
<tr>
<th></th>
<th>R3265A</th>
<th>R3365A</th>
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</thead>
<tbody>
<tr>
<td>Frequency measuring range</td>
<td>100 Hz to 8 GHz</td>
<td></td>
</tr>
<tr>
<td>Tracking generator</td>
<td>– Internal preselector from 500 Hz</td>
<td>–</td>
</tr>
<tr>
<td>Preselector</td>
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</table>

**Resolution Bandwidths of 10 Hz to 3 MHz**

For frequency resolution, the R3265A Series incorporates a narrow–band (10 Hz) IF bandwidth filter that can separate nearby signals from the wide IF bandwidth filter (3 MHz) which improve the measurement sensitivity to a pulsed RF signal. The series can thus be used for a wide variety of measurements.

The narrow–band IF bandwidth filter also incorporates a digital IF filter, thus enabling both nearby signal characteristic measurements with high selectivity as well as high-speed measurements.

**Gated Sweep Function**

The R3265A Series includes a burst signal (TDMA and video signals) analysis function as a standard feature. When combined with the high-speed sweep function, this function can be used to monitor the transmission power in an arbitrary one-time slot of a TDMA signal or to analyze the noise in one horizontal line of a TV signal.
Spectrum Analyzers

For Research and Development of the Next Generation of Mobile Communication Systems

R3265A/3365A

- **High-Speed Sweep of 5 µs/div**
  The R3265A Series uses a high-speed digitizer to perform high-speed sweeps of 5 µs/div during zero span. This data can also be averaged using an averaging function. This function is ideally suited for monitoring the mean transmission power and duration of Time Division Multiple Access (TDMA) signals that are used in the Global System Mobile (GSM) digital car telephone system in Europe and in the next-generation of car telephone systems in Japan and the U.S.A. An arbitrary range can be expanded using a delayed sweep function.

- **Measurement of Occupied Bandwidths and Adjacent-Channel Leakage Power**
  By calculating the measured spectrum data, the R3265A Series can easily measure the occupied bandwidth of a radio transmission characteristic and the leakage power of an adjacent channel. A carrier frequency is also displayed when the occupied bandwidth is measured. The leakage power from an adjacent channel can be measured in a dynamic range of 70 dB (typical value) due to the excellent signal purity of the series.

- **Power Sweep Function Ideal For Measuring Amplifier Linearity and Saturation Point (R3365A Only)**
  The R3365A has a Power Sweep Function which sweeps the output level. This function has been made possible through a newly developed attenuator in the tracking generator output section which used a semiconductor switch. The level sweep with a 30 dB/0.1 dB step sweep range provides high precision measurements of amplifier input/output characteristics.

- **Full Range of Digital Radio Evaluation Functions**
  In addition to its functions for doing burst signal analysis and measuring occupied bandwidth and adjacent channel leakage power, the R3265A Series has added a total power and average power measurement function and a quasi–analog display function. A built–in digital modulation analysis interface is also included, so that modulation accuracy can be easily measured just by connecting the R3541A/B Digital Modulation Analysis Unit (sold separately).
## Spectrum Analyzers

### 100 Hz to 8 GHz

**R3265A/3365A (Continued from previous page)**

### Specifications

#### Frequency

- **Frequency range:** 100 Hz to 8 GHz
- **Frequency band**
  - R3265A/3365A:
    - 100 Hz to 3.6 GHz
    - 3.5 to 7.5 GHz
    - 7.4 to 8 GHz

- **Preselector:**
  - 3.5 GHz to 8 GHz using YIG tuned preselector
  - Frequency readout accuracy: ±3% (span > 2 MHz), ±5% (span ≤ 2 MHz)
  - Count frequency marker:
    - Resolution: 1 Hz to 1 kHz
    - Accuracy: (SN ≥ 25 dB): ±(marker freq × freq reference accuracy + 5 Hz + 1 LSD)
  - Delta marker count accuracy: ±(delta marker freq × freq reference accuracy + 10 Hz + 2 LSD)
  - Frequency reference accuracy: ±2 × 10⁻⁶/day, ±1 × 10⁻⁶/year, ±5 × 10⁻⁷/day (Opt. 21)
  - Frequency stability:
    - Residual FM (zero span): <60 Hz
    - Drift (after warm up 1 hr): ±60 Hz

#### Spectral purity:

<table>
<thead>
<tr>
<th>Offset</th>
<th>≤ ±2.6 GHz</th>
<th>&gt; ±2.6 GHz</th>
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</thead>
<tbody>
<tr>
<td>1 kHz</td>
<td>&lt;500 kHz</td>
<td>&lt;500 kHz</td>
</tr>
<tr>
<td>10 kHz</td>
<td>&lt;100 kHz</td>
<td>&lt;100 kHz</td>
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<td>100 kHz</td>
<td>&lt;50 kHz</td>
<td>&lt;100 kHz</td>
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</tbody>
</table>

- **Frequency span:**
  - Lin span: Range: 200 Hz to 8 GHz, zero span
  - Accuracy: ±1% (span > 2 MHz), ±5% (span ≤ 2 MHz)
  - Log span: Range: 1 kHz to 1 GHz, 1, 2, 3 decades selected
  - Accuracy: ±(10% × stop freq × 1%)
  - Resolution bandwidth (3dB): Range: 10 Hz to 3 MHz, 1, 3, 10 sequence
  - Accuracy: ±13% 100 Hz to 1 MHz, ±25% 30 Hz (25°C ± 10°C), 3 MHz ±50% 10 Hz to 100 Hz (digital IF)
  - Bandwidth (6 dB): 200 Hz, 9 kHz, 120 kHz, 1 MHz (Accuracy 10%)

- **Conformed to CISPR standard**
- **Video bandwidth range:** 1 Hz to 3 MHz, 1, 3, 10 sequence

#### Amplitude

- **Amplitude range:** ±30 dBm to average display noise level
- **Display range:** 10 × 10 division graticule
  - Log: 10, 5, 2, 1.5, 0.2, 0.1 dB/div
  - Linear: 0.01% of reference level/div
  - QP log: 40 dB/div
  - Input attenuator range: 0 to 70 dB (10 dB step)

#### Dynamic Range

- **Maximum dynamic range:**
  - Distortion characteristic for 1 dB gain compression to noise level:

#### Frequency response referenced to CAL signal (10 dB input atten):

<table>
<thead>
<tr>
<th>Frequency range</th>
<th>R3265A/3365A</th>
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</thead>
<tbody>
<tr>
<td>1 MHz</td>
<td>&lt;50 dBm</td>
</tr>
<tr>
<td>10 kHz</td>
<td>&lt;70 dBm</td>
</tr>
<tr>
<td>10 MHz</td>
<td>&lt;70 dBm</td>
</tr>
<tr>
<td>10 MHz to 3.6 GHz</td>
<td>&lt;70 dBm</td>
</tr>
<tr>
<td>10 kHz to 3.6 GHz</td>
<td>&lt;70 dBm</td>
</tr>
</tbody>
</table>

#### Additional uncertainty due to band switching: ±0.5 dB

- **Frequency response referenced to CAL signal (10 dB input atten):** ±3 dB, 100 Hz to 8 GHz
- **Calibrator accuracy:** ±10 dBm ±0.3 dB
- **IF gain uncertainty:** After automatic calibration
  - ±0.5 dB (0 to –50 dBm), ±0.7 dB (0 to –80 dBm)
- **Scale fidelity (After automatic calibration):**
  - Log: ±0.2 /10 dB, ±1.5 /90 dB
  - Linear: ±1% of reference level
  - QP mode log: ±1.0 /50 dB, ±2.0 /40 dB (25°C ± 10°C)
  - Input attenuator switching accuracy: referenced to 10 dB, 20 to 70 dB switching: ±0.1 /10 dB step, 2.0 dB max, 0 to 1 GHz

#### Resolution bandwidth switching uncertainty:

- At reference RBW: 300 kHz, after automatic calibration
  - ±0.3 dB
  - 100 Hz to 3 MHz
  - ±1 dB
  - 30 Hz
  - ±1.5 dB
  - 10 to 100 Hz (digital IF)

- **Pulse digitization uncertainty:** (pulse response mode PRF > 700/ sweep time) Peak to Peak
  - Log: ±1.2 dB (RBW ≤ 1 MHz), ±3 dB (RBW: 3 MHz)
  - Linear: 4% of ref level (RBW ≤ 1 MHz), 12% of ref level (RBW: 3 MHz)
SWEEP
Sweep time:
SPAN = 0: 50 μs to 1000 s and manual sweep
SPAN ≥ 200 Hz: 20 ms to 1000 s and manual sweep
Accuracy: ± 3%
Sweep trigger: Free run, line, single, video, TV-H, TV-V, external

Demodulation
Modulation type: AM and FM
Audio output: Speaker and phone jack with volume control
Marker pause time: 100 ms to 100 s

Inputs/Outputs
RF Input:
Connector type: N type female
Impedance: 50 Ω (nominal)
VSWR (input attenu ≥ 10 dB, at set frequency):
< 1.5 : 1 for 5.3 GHz (nominal)
< 2.0 : 1 for >3.6 GHz (nominal)
LO emission level (average):
< −40 dBm (typical valve), 10 dB input attenu, 0 to 26.5 GHz
Video output:
Connector: BNC female, rear panel
Impedance (AC coupled): 75Ω (nominal)
Amplitude: Approx. 1 Vp-p (Composite video signal), 75Ω termination
External trigger input:
Connector: BNC female, rear panel
Impedance 10 kΩ (nominal), DC-coupled
Trigger level TTL level
Gate input:
Connector: BNC female, rear panel
Impedance 10 kΩ (nominal), DC-coupled
Sweep stop Between LOW and TTL level
Sweep Between HIGH and TTL level
Probe power: 4 pin connector front panel
Voltage: +15V, –15V
Current: 150 mA max. each
Phone output: Demodulated audio
Connector: Subminiature Monophonic jack, front panel
Power output: 0.2 watt, 8Ω (nominal)

Tracking Generator (R3365A)
Frequency range: 100 kHz to 3.6 GHz
Output level: -3 to −30 dBm in 0.1 dB steps
Output level flatness: ± 0.8 dB (100 kHz to 3.6 GHz)
Output level accuracy: ± 0.5 dB (25 MHz, −10 dBm output, 25°C ± 10°C)
Vernier accuracy: ± 0.5 dB (25 MHz, −10 dBm output, 25°C ± 10°C)
Output spurious:
Harmonic: −15 dBc max.
Non-harmonic: −25 dBc max. (with 3 dBm output)
Dynamic range: >110 dBm (1 MHz to 3 GHz)
>100 dBm (3 to 3.6 GHz)
Power sweep range: 30 dB (0.1 dB steps)

General Specifications
Operating conditions:
Operating temperature: 0 to 50°C
Storage temperature: −20 to 60°C
Humidity: Ki:1 85% max.
Power supply: Automatically selects 100 or 220 VAC
100 VAC:
Voltage: 90 to 132V
Frequency: 48 to 440 Hz
220 VAC:
Voltage: 198 to 234V
Power consumption: Max. 400 VA
Frequency: 48 to 66 Hz
Mass: 22 kg (nominal, excluding options, front cover and accessories)
Dimensions: 177 (H) x 353 (W) x 450 (D) mm
(excluding handle, feet and front cover)

Accessories

Options
Option 07: Interface for R3553 Preselector
Option 10: Level calibration
Option 21: ± 5 x 10^−9/day crystal

PR326503-IC: GSM-MS measurement software
Execution environment: R3265A/3271A, R3365A/3371A
PR326513-IC: GSM-BS measurement software
Execution environment: R3265A/3271A, R3365A/3371A
PR326553-IC: DECT measurement software
Execution environment: R3265A/3271A, R3365A/3371A
PR326541-IC: PCN-MS measurement software
Execution environment: R3265A/3271A, R3365A/3371A
*1, *2, *3: Please contact office for details