Test Equipment Solutions Datasheet

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/3365A

- High-Input Sensitivity: –145 dBm
- High-Speed Sweep of 5 µs/div and Digital Read output
- Gated Sweep Function
- Memory Card Function
- BASIC Controller Function
- Variety of I/O Interfaces
  GPIB, Serial I/O (RS232C), Modulation Accuracy Interface

R3265A/3365A Spectrum Analyzers

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>R3265AP/3365A</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>–</td>
<td>–</td>
</tr>
<tr>
<td>Preselector</td>
<td>–</td>
<td>– (–)</td>
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</table>

‘–‘: Internal preselector from 500 Hz

- 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

<table>
<thead>
<tr>
<th>R3265A/3365A</th>
<th>100 Hz to 3.6 GHz</th>
<th>3.5 to 7.5 GHz</th>
<th>7.5 to 8 GHz</th>
</tr>
</thead>
</table>

Proselector: 3.5 GHz to 8 GHz using YIG tuned proselector
Frequency readout accuracy (Start, Stop, CF, Marker): ± (freq readout x freq reference accuracy + span x span accuracy + 0.15 x RBW + 10 Hz)
Span accuracy: ± 3% (span > 2 MHz), ± 5% (span ≤ 2 MHz)

Count frequency marker:
Resolution: 1 Hz to 1 kHz
Count accuracy (SN ≥ 25 dB): ± (marker freq x freq reference accuracy + 5 Hz + 1 LSD)
Delta marker count accuracy: ± (delta marker freq x freq reference accuracy + 10 Hz + 2 LSD)
Frequency reference accuracy: ± 2 × 10⁻⁶/day, ± 1 × 10⁻⁵/year, ± 5 x 10⁻⁷/day (Opt. 21)
Frequency stability:
Residual FM (zero span): < 3 Hz/0.1 s
Drift (after warm up 1 hr.): < 2.5 kHz × sweep time (minute) (50 kHz < span ≤ 2 MHz)
< 60 kHz × sweep time (minute) (span ≤ 10 kHz)

Spectral purity:

<table>
<thead>
<tr>
<th>Offset</th>
<th>&lt; 2.5 kHz</th>
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<td>1 kHz</td>
<td>&lt; 500 dBc</td>
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Frequency span:
Lin span: Range: 200 Hz to 8 GHz, zero span
Accuracy: ± 3% (span > 2 MHz), ± 5% (span ≤ 2 MHz)
Log span: Range: 1 kHz to 8 GHz, 1, 2, 3 decades selected
Accuracy: ± (10% x stop freq x 1%) ± 0.025 dB

Resolution bandwidth (3dB):
Range: 10 Hz to 3 MHz, 1, 3, 10 sequence
Accuracy: ± 3% 100 Hz to 1 MHz, ± 25% 30 Hz, ± 30% 10 Hz, ± 50% 10 Hz to 100 Hz (digital IF)
Bandwidth (6 dB): 200 Hz, 9 kHz, 12 kHz, 14 kHz (Accuracy 10%)

Conformed to CISPR standard
Video bandwidth range: 1 Hz to 3 MHz, ± 3 kHz, ± 10 kHz

Amplitude:
Amplitude range: ±30 dBm to average display noise level
Display range: 10 kHz to 3 MHz, 0.5 db/div
Log: 10, 5, 2, 1, 2.5, 0.2, 0.1 dB/div
Linear: 10% of reference level/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:

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<tr>
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<td>200 MHz to 8 MHz</td>
<td>±1.55 dB (&lt;150 kHz)</td>
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<tr>
<td>10 MHz to 1.8 GHz</td>
<td>±1.55 dB (&lt;150 kHz)</td>
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Displayed average noise level: 10 Hz RBW [digital IF], 0 dB input attenu, 20 times avg.

Gain compression (1 dB):

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<tr>
<td>1 MHz</td>
<td>± 50 dBm</td>
</tr>
<tr>
<td>10 MHz to 3.6 GHz</td>
<td>±145.1 × 10⁻⁶ dBm</td>
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<tr>
<td>10 MHz to 3.6 GHz (logcal/lin)</td>
<td>±145.1 × 10⁻⁶ dBm</td>
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<tr>
<td>5.5 to 8 GHz</td>
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Gain accuracy:
Gain compression (1 dB):
SNR: 20 divisions

Spectral purity:

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Frequency band

Gain accuracy:
Gain compression (1 dB):
SNR: 20 divisions

Spectral purity:
Spectrum Analyzers

For Research and Development of the Next Generation Mobile Communication Systems

R3265A/3365A

**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**
- **Spectrum demod**: Modulation type: AM and FM
- **Audio output**: Speaker and phone jack with volume control
- **Marker pause time**: 100 ms to 1000 s

**Inputs/Outputs**
- **RF Input**: Connector type: N type female, Impedance: 50 Ω (nominal)
- **Impedance**: Between LOW and TTL level, DC coupled
- **Impedance (AC coupled)**: BNC female, rear panel
- **Trigger level**: ± 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)
- **Power supply**: Automatically selects 100 or 220 VAC

**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**: ± 3.0 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)

**Audio output**: Speaker and phone jack with volume control

**Accessory**
- **Input cable**: MC-91, Connector UG-99/U
- **Connector**: 3DW-P2
- **Converter**: JUG-201A-U
- **Input cable**: R9833, HP7470A, HP7475A, HP7440A, HP7550A

**Designated Sweep**
- **Trigger signal source**: External trigger signal, VIDEO trigger, TV–V trigger (onset or fall slope can be selected)
- **Delay time**: 200 ns to 1.5 s with a resolution of 100 ns
- **Sweep time**: 50 µs to 1000 s (the resolution is the same as that set in the sweep time.)

**Gated Sweep**
- **Frequency domain analysis**: External trigger input (TTL level), Gate input (TTL level)
- **Trigger level variable at IF DET monitor**: Span 7 MHz max.
- **Usable input pulse width**: 100 µs min.
- **Through or lowpass filter selectable**

**Time domain analysis**: External trigger input (TTL level), Gate input (TTL level)
- **Trigger level variable at IF DET monitor**: Usable input pulse width 100 µs min.
- **Through or lowpass filter selectable**
- **Gate position**: 300 ns to 100 ms with resolution of 100 ns
- **Gate width**: 1 µs to 1.5 s with a resolution of 100 ns

**Outputs**
- **Power output**: +15V, –15V 150 mA max, each
- **Connector**: Subminiature Monophonic jack, front panel
- **Marker**: Subminiature Monophonic jack, front panel
- **Input cable**: MC-91, Connector UG-99/U
- **Converter**: JUG-201A-U
- **Input cable**: R9833, HP7470A, HP7475A, HP7440A, HP7550A

**Accessories**
- **Input cable**: MC-91, Connector UG-99/U
- **Connector**: 3DW-P2
- **Converter**: JUG-201A-U
- **Input cable**: R9833, HP7470A, HP7475A, HP7440A, HP7550A

**Options**
- **Option 07**: Interface for R3553 Preselector
- **Option 10**: Level calibration
- **Option 21**: ± 10⁻⁹/day crystal

**PCN-M503-IC**
- **GSM-BS measurement software**
- **Execution environment**: R3265A/3271A, R3365A/3371A

**PCN-M513-IC**
- **GSM-BS measurement software**
- **Execution environment**: R3265A/3271A, R3365A/3371A

**PCN-M513-IC**
- **GSM-BS measurement software**
- **Execution environment**: R3265A/3271A, R3365A/3371A

*1: Execution environment: R3265A/3271A, R3365A/3371A
*2: Execution environment: R3265A/3271A, R3365A/3371A
*3: Execution environment: R3265A/3271A, R3365A/3371A

*1, *2, *3: Please contact office for details

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**General Specifications**
- **Operating conditions**
- **Operating temperature**: 0 to 50°C
- **Storage temperature**: −20 to 60°C
- **Humidity**: 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 230V
- **Power consumption**: Max. 400 VA
- **Frequency**: 48 to 66 Hz

**Mass**: 22 kg (nominal, excluding options, front cover and accessories)

**Dimensions**: 377 (H) x 353 (W) x 450 (D) mm
(excluding handle, feet and front cover)

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**Accessories**

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**Features**

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