Agilent 83751A/B and 83752A/B Synthesized Sweepers

2 to 20 GHz, 10 MHz to 20 GHz

Data Sheet

Agilent Technologies

Specifications

Specifications describe warranted instrument performance over the 0 to 55 °C temperature range unless otherwise noted. Specifications apply after the peak function has been performed. Supplemental characteristics (indicated by italics) are intended to provide information useful in applying the instrument, but are not warranted parameters.

Frequency

Range

83751A/B: 2 GHz to 20 GHz
83752A/B: 10 MHz to 20 GHz

Timebase stability

Standard 10 MHz time base: ±10 ppm
High stability time base (Option IE5):
accuracy = calibration ± aging rate
± temperature effects ± line voltage effects
Aging rate: 5 x 10^{-10}/day, 1 x 10^{-7}/year
With temperature: 1 x 10^{-10}/°C
With line voltage: 5 x 10^{-10} for 10% change

CW mode

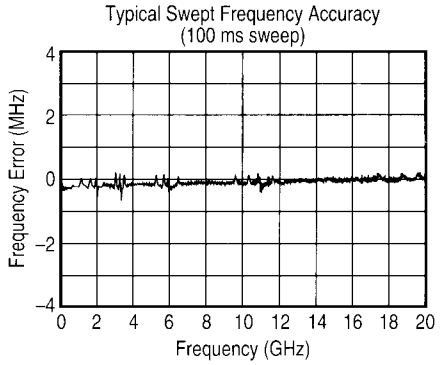
Resolution: 1 Hz
Accuracy: same as time base
Switching time: *70 ms max*

Stepped sweep mode

Resolution: settable 1 Hz, display 1 kHz
Accuracy: same as timebase
Minimum step size: same as resolution
Number of points: 2 to 1601
Switching time/point[1]: *7 ms + 8 ms/GHz step*
Dwell time/point: 1 ms to 1 s

Ramp (analog, phase locked) sweep mode

Resolution: 1 kHz
Accuracy (25 ±5 °C):
For 100 ms sweeps the greater of: ±.01% of span ±time base or ±75 kHz ±time base
At other sweep speeds: [±.001% of span]/[sweep time (s)] ±time base



Sweep time: 10 ms to 100 s; 400 MHz/ms max

Markers

10 independent continuously variable markers
Display modes: z-axis intensity
or RF amplitude pulse

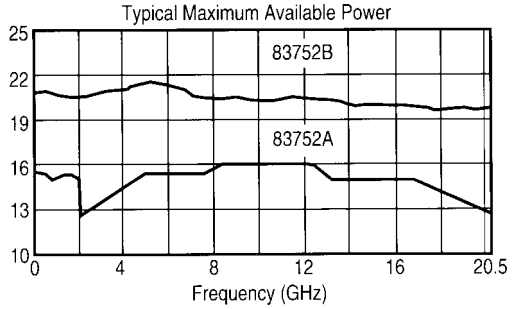
Sweep functions

Start/stop, center frequency/span, marker, ramp, stepped, manual, alternate and power sweep
Marker sweep: sweeps between markers one and two
Alternate sweep: alternates successive sweeps between current front panel setting and stored setup

RF output[2]

Maximum leveled power[3] (25 ±5 °C)

83751A, 83752A: +10 dBm
83751B, 83752B:
<2 GHz +16 dBm
>2 GHz +17 dBm
With option 1E1 (step attenuator): reduce by 1 dB



Minimum settable power

83751A, 83752A: -15 dBm
With option 1E1: -85 dBm
83751B, 83752B: -10 dBm
With option 1E1: -80 dBm

[1] Up to 50 ms switching times can occur when crossing the 2 GHz band switch point.
[2] With type N connector (option 1ED), performance is typical above 18 GHZ
[3] Power typically degrades <2.5 db over 0 to 55 °C

Resolution
Settable: 0.01 dB
Display: 0.1 dB

Accuracy and flatness[4]

Power level	Accuracy (25 ±5 °C)	Flatness[5]
83751A, 83752A		
>-10 dBm	±1.0 dB	±0.7 dB
>-80 dBm	±1.5 dB	±1.2 dB
83751B, 83752		
>-75 dBm	±1.5 dB	±1.3 dB

Power sweep
±25 dB/sweep
Usable from minimum to maximum leveled power, within any one attenuator setting

Power slope
0 to ±2 dB/GHz, up to power sweep limit

External leveling
External detector:
Range: -0.2 mV to -0.5 V
Bandwidth (sweep speed and modulation mode dependent): 10 or 100 kHz, nominal
External power meter: 1 Hz bandwidth, nominal
External mm-wave module: 83550 series compatible with option 1EE

User flatness (level) correction
Number of points: 2 to 801 points/table
Number of tables: up to 9
Entry modes[6]: power meter, GPIB
Source match *< 1.7:1 SWR, (internally leveled)*

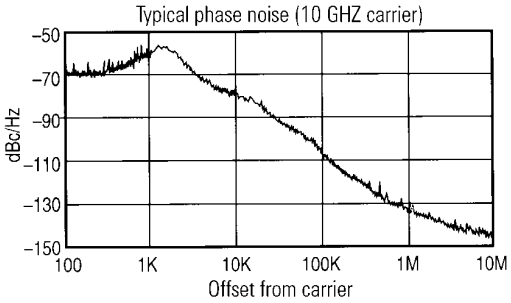
Spectral purity

Harmonics (at max leveled power)
83751A, 83752A:
10 MHz to 1.5 GHz: -30 dBc
1.5 to 20 GHz: -45 dBc
83751B, 83752B: -20 dBc

Subharmonics
None

Non-harmonic spurious[4,7]
-50 dBc

Single-sideband phase noise



Residual FM (0.05 to 15 kHz bandwidth)[8]
1 kHz RMS in CW mode

Modulation

Pulse
On/off ratio: *60 dB*
Rise/fall times:
0.5 to 2 GHz: 15 ns
2 to 20 GHz: 100 ns rise, 50 ns fall
Minimum leveled width[9]: *2 µs*
Internal pulse generator:
Width range: 1 µs to 65 µs
Period range: 2 µs to 65 µs
Resolution: 1 µs
Internal square wave:
1.0 kHz and 27.8 kHz (scalar mode)

AM
Sensitivity: 1 dB/V
Bandwidth (3 dB): >100 kHz, usable to 1 MHz
Depth for 8375XA: 20 dB; (+10 dBm to -10 dBm)
Depth for 8375XB: 22 dB; (+17 dBm to –5 dBm)
Input impedance: 3.5 kohms

FM
AC/Locked mode:
Rates: 50 kHz to 10 MHz
Maximum deviation: same as unlocked mode up to 25 x rate
DC/Unlocked mode:
Rates: *DC to 10 MHz*
Maximum deviation:
DC to 100 Hz rates: ± 75 MHz
100 Hz to 1 MHz rates: ±7 MHz
1 MHz to 2 MHz rates: ±5 MHz
2 MHz to 10 MHz rates: ±1 MHz
Sensitivity: *-6 or -20 MHz/V*
Input impedance: *1 kohm*

[4] Specifications apply for coupled attenuator mode and ALC level >-10 dBm (83751A/83752A), >-5 dBm (83751B/83752B)
[5] Below 50 MHz, flatness is specified over 25 ±5 °C range
[6] Compatible with Agilent 437B, 438A, and 70100 power meters
[7] Specifications apply for frequencies >500 kHz from carrier, and at levels <+5 dBm below 2 GHz
[8] Residual FM is typically <10 kHz in unlocked FM mode
[9] For frequencies >500 MHz in CW mode, or >2 GHz in swept mode

General

Compatibility

83751/83752 sweepers are compatible with 8757A/C/D/E scalar analyzers, and 8970B noise figure meters.

Programming

83751/83752 sweepers are fully compatible with the Standard Commands for Programmable Instruments (SCPI) language. SCPI complies with IEEE 488.2-1987. Agilent 8350 mnemonics have also been implemented to provide compatibility with ATE systems that include an 8350B sweeper.

Two-tone (master/slave) measurements

Two 83751/83752 sweepers can synchronously track each other over swept or stepped frequencies at any fixed or swept frequency offset. To implement, the 10 MHz reference oscillators and sweep interface connectors need to be attached.

Environmental

Operating temperature range: 0 to 55 °C
EMC: Conducted and radiated interference comply with:
EN55011 class A/CISPR-11 Class A
EN50082-1-1991

IEC 801-2/1991	4 kV CD, 8 kV AD
IEC 801-3/1984	3 V/m (26-500 MHz)
IEC 801-4/1988	500 V

Warm-up time

Operation: Requires 30 minutes warm-up time from cold start at 0 to 55 °C. Internal temperature equilibrium reached after 2 hour warm-up at stable ambient temperatures.
Frequency reference (option 1E5 only)**:** Reference time base is kept at operating temperature with the instrument connected to AC power. Instruments disconnected from AC power for more than 24 hours require 30 days to achieve time base aging specification. Instruments disconnected from AC power less than 24 hours require 24 hours to achieve time base aging specification.

Power requirements

90-132 VAC (50-60 or 400 Hz), or 198-264 VAC (50-60 Hz); 400 VA maximum. Optimum voltage range automatically selected.

Dimensions

133H x 425W x 483D mm (5.25 x 16.75 x 19 inches); excluding front and rear panel protrusions

Weight

Net: 16 kg (35 lb)
Shipping: 23 kg (49 lb)

Inputs and outputs

RF output

Nominal output impedance 50 ohms. (Precision 3.5 mm male connector on front panel; optional type N or rear panel connectors are available).

External ALC input

Used for external leveling with negative detector or power meter. Nominal input impedance 100 kohms, damage level ±15 volts. (BNC female, front panel)

Sweep output

Supplies a voltage proportional to the sweep ranging from 0 volts at start of sweep to +10 volts at end of sweep, regardless of sweep width. Nominal output impedance 100 ohms. Typical accuracy: ±0.05%, ±5 mV into high impedance load. When used with 8757D scalar analyzer in ramp-sweep mode, the rear-panel output is a 0 to 10 volt pulse similar to trigger output. (BNC female, front and rear panel)

Trigger output

Outputs a 1 µs wide negative-going TTL pulse at 1601 points evenly spaced across an analog sweep, or at each point in step sweep mode. When used with 8757D scalar analyzers, the number of pulses per sweep (in analog sweep mode) is determined by the number of 8757 trace points. (BNC female, rear panel)

Trigger input

Activated on TTL rising edge. Used to externally initiate an analog sweep or to advance to the next point in step sweep mode. Damage level +10, -4 volts. (BNCfemale, rear panel)

Pulse input/output

TTL low turns RF off. When using internal pulse generator, the modulating signal is available at this connector. Nominal input 1 kohm pull-up to +5 volts. Damage level +10, -5 volts. (BNC female, rear panel)

AM input
Nominal input impedance 3.5 kohms. See modulation specifications. Damage level ±15 volts. (BNC female, rear panel)

FM input
Nominal input impedance 1 kohm. See modulation specifications. Damage level ±15 volts. (BNC female, rear panel)

10 MHz reference output
Nominal signal level 0 dBm, and output impedance 50 ohms. Accuracy determined by time base used. (BNC female, rear panel)

10 MHz reference input
Accepts a -5 to 10 dBm signal from an external time base reference which is within ±10 ppm of 10 MHz or any sub-multiple down to 1 MHz. Nominal input impedance 50 ohms. (BNC female, rear panel)

Stop-sweep in/out
Sweep will stop when grounded externally. TTL high while sweeping, TTL low when source stops sweeping. Damage level +10, -4 volts. (BNC female, rear panel)

Z-axis blanking
Supplies positive rectangular pulse (approximately +5 volts into 2 kohms) during the retrace and band switch points of the RF output. Also supplies a negative pulse (-5 volts) when the RF is at a marker frequency (BNC female, rear panel).

Volts/GHz output
Supplies a voltage proportional to output frequency, which can be configured to any desired sensitivity and offset within ±12 volts. Default setting is 0.5 volts/GHz. Minimum load impedance 2 kohms. Typical accuracy ±0.1% ±10 mV. (BNC female, rear panel)

Source module interface
Provides bias, flatness correction, and leveling connections to the 83550 series mm-wave source modules. (Option 1EE; rear panel connector)

Auxiliary interface
Provides special control signals. (25-pin D subminiature receptacle, rear panel)

Interface bus (GPIB)
GPIB operates in accordance to IEEE-488.1-1987 and IEEE-488.2-1987 interface standards. Rear panel switch allows setting of the default GPIB address and programming language, which can be modified from the front panel.

Ordering Information

Models	Frequency range
83751A	2 to 20 GHz
83751B	2 to 20 GHz (high power)
83752A	10 MHz to 20 GHz
83752B	10 MHz to 20 GHz (high power)

To add options to a model, use the following ordering scheme:

Example	
Model #	83752B
Model #-option #	83752B-1E1
Model #-option #	83752B-1E4

Options

Model #–1E1	Step attenuator
Model #–1E4	Rear panel RF output
Model #–1E5	High stability time base
Model #–1EE	mm-wave module source interface

Inputs/Outputs

Model #–1ED	Type-N RF output connector
Model #–1EF	3.5mm RF output connector

Documentation

Model #-UK6 with test data	Commercial calibration certificate
Model #-0B1	Manual set
Model #-AB0	Chinese localization - Taiwan
Model #-AB1	Korean localization
Model #-AB2	Chinese localization - China
Model #-ABD	German localization
Model #-ABF	French localization
Model #-ABJ	Japanese localization
Model #-0B0	Delete manuals

Accessories

Model #–1CH	Front handle kit
Model #–1CM	Rack mount flange kit
Model #–1CP	Rack mount flange kit with handles
Model #–1CR	Rack slide kit

Warranty and Service

Standard warranty is 12 months.
For warranty and service of 5 years, specify 60 months (quantity = 60)

R51B	Return to Agilent warranty and service plan (months)

Calibration

For 3 years, specify 36 months of the appropriate calibration plan.
For 5 years, specify 60 months.

R-50C-001	Standard calibration plan (months)
R-50C-002 (months)	Standards compliant calibration plan

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