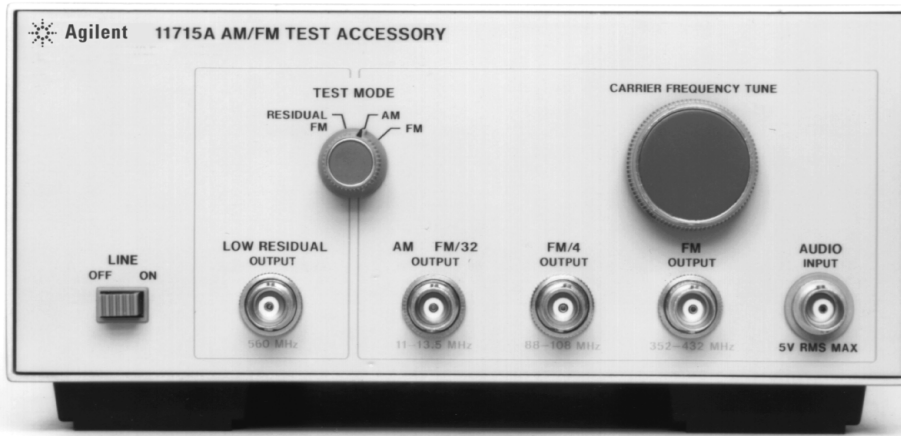




Agilent 11715A

AM/FM Test Source

Technical Specifications



Superior AM & FM
Performance in
a Specialized
RF Source

Description

The Agilent Technologies Model 11715A AM/FM Test Source is a tunable voltage-controlled oscillator combined with modulators to form a source of calibration-quality amplitude and frequency modulated signals. It is designed primarily to verify the demodulation performance of the Agilent 8901A Modulation Analyzer, but its excellent signal qualities can benefit many other demanding applications.

The front panel provides four separate RF outputs with both fixed and variable carrier frequencies and an input for a modulation source. The fixed output is a crystal-derived 560 MHz carrier with low residual FM. The other three output ports cover 11 to 13.5 MHz, 88 to 108 MHz, and 352 to 432 MHz. Frequency modulation is possible on all three ranges, and amplitude modulation is available on the 11 to 13.5 MHz range.

Frequency Modulation

Maximum deviation is greater than 400 kHz peak with distortion less than 0.025%. As a function of modulating frequency, deviation is constant within $\pm 0.1\%$ up to 100 kHz rates and typically within $\pm 2.5\%$ up to 10 MHz rates due to the wideband dc-coupled design. Two other critical parameters, residual FM and incidental AM, are both minimized in the design.

Amplitude Modulation

AM up to 99% is available on the 11 to 13.5 MHz range with excellent flatness. Even at 95% AM, distortion is less than 0.1% for 20 Hz to 100 kHz modulation rates. As a function of modulating input voltage, modulation depth linearity varies less than $\pm 0.2\%$ up to 99% AM. Residual AM is less than 0.01% rms in a 50 Hz to 3 kHz post-detection bandwidth.



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Applications

General Use

Many other applications requiring wideband, low-distortion modulation can utilize the 11715A. For example, precise test signals for the 88 to 108 MHz commercial FM broadcast band can be generated by combining the 11715A with a suitable stereo modulator and an 8901A Modulation Analyzer. Typical left-to-right channel separation is 60 dB, and distortion and incidental AM are very low. With the 8901A to monitor the level, frequency, and modulation of the 11715A's output, the 11715A performs as a highly accurate stereo test generator.

8901A Tests

A primary application of the 11715A is to verify and adjust the demodulation performance of the 8901A Modulation Analyzer. The 8901A is a precision calibrated receiver designed to accurately demodulate and measure amplitude, frequency, or phase modulated RF carriers. 8901A demodulation specifications include accuracy, flatness, bandwidth, range, distortion, residual noise, and incidental modulation. The AM and FM accuracy specifications can be verified with a precise optional built-in calibrator; however, the calibrator operates on only one carrier frequency, at a fixed modulation rate, and with a single AM depth or FM deviation. The other specifications must be verified with an RF source that has variable carrier frequency and modulation parameters.

Although RF signal generators have calibrated frequency, modulation, and output level characteristics, they are generally unsuited for 8901A tests because the circuitry required to ensure calibration can also degrade or restrict modulation parameters such as flatness and linearity. For this reason, the 11715A contains no circuitry to compromise performance—no output leveling or control, no frequency stabilization, and no modulation metering or control. The resultant modulation characteristics make the 11715A an ideal choice for exacting tests and adjustments on the 8901A.

11715A Specifications

SPECIFICATIONS describe the instrument's warranted performance. *Supplemental Characteristics* are intended to provide information useful in applying the instrument by giving typical, but non-warranted, performance parameters.

FM OUTPUT

Frequency range

AM FM ÷ 32 output: 11 to 13.5 MHz
FM ÷ 4 output: 88 to 108 MHz
FM output: 352 to 432 MHz

Peak deviation

11 to 13.5 MHz carrier: >12.5 kHz
88 to 108 MHz carrier: >100 kHz
352 to 432 MHz carrier: >400 kHz

Distortion

<0.025% THD (<-72 dB) for

Carrier frequency	Peak deviation	Modulation rate
12.5 MHz	12.5 kHz	<10 kHz
100 MHz	100 kHz	<100 kHz
400 MHz	400 kHz	<100 kHz

Flatness

dc to 100 kHz rates: $\pm 0.1\%$
dc to 200 kHz rates: $\pm 0.25\%$

Incidental AM (100 MHz carrier, <50 kHz peak deviation, 1 kHz rate, 50 Hz to 3 kHz bandwidth): <0.08%

Supplemental Characteristics

Frequency range

AM FM ÷ 32 output: 10.3 to 14.7 MHz
FM ÷ 4 output: 83 to 118 MHz
FM output: 330 to 470 MHz

Output level (all are 50 ohm impedance)

11 to 13.5 MHz: $-20 \text{ dBm} \pm 1 \text{ dB}$
88 to 108 MHz: $-1.5 \text{ dBm} \pm 3 \text{ dB}$
352 to 432 MHz: $-1.5 \text{ dBm} \pm 3 \text{ dB}$

Modulation flatness (dc to 10 MHz rates): $\pm 2.5\%$

Residual FM (50 Hz to 15 kHz bandwidth)

12.5 MHz: <1 Hz rms
100 MHz: <8 Hz rms
400 MHz: <32 Hz rms

Stereo separation (88 to 108 MHz carrier, 75 kHz peak deviation, 1 kHz rate): >60 dB

Audio input sensitivity (dc coupled, 50 ohm impedance)

11 to 13.5 MHz: $(2.3 \pm 0.5 \text{ kHz peak deviation})/0.1 \text{ Vpeak}$
88 to 108 MHz: $(18.5 \pm 4 \text{ kHz peak deviation})/0.1 \text{ Vpeak}$
352 to 432 MHz: $(74 \pm 16 \text{ kHz peak deviation})/0.1 \text{ Vpeak}$

AM OUTPUT

Frequency range (AM FM ÷ 32 output): 11 to 13.5 MHz

Depth: to 99%

Distortion

50% AM, 20 Hz to 100 kHz rates: <0.05% THD (<-66 dB)
95% AM, 20 Hz to 100 kHz rates: <0.1% THD (<-60 dB)

Flatness

50 Hz to 50 kHz rates: $\pm 0.1\%$
20 Hz to 100 kHz rates: $\pm 0.25\%$

Incidental \emptyset M (12.5 MHz carrier, 50% AM, 1 kHz rate, 50 Hz to 3 kHz bandwidth): <0.008 radian peak

Linearity

$\leq 95\%$ AM: $\pm 0.1\%$
 $\leq 99\%$ AM: $\pm 0.2\%$

Residual AM (50 Hz to 3 kHz bandwidth): <0.01% rms

Supplemental Characteristics

Frequency range: 10.3 to 14.7 MHz

Output level (50 ohm impedance): $-20 \text{ dBm} \pm 1 \text{ dB}$

Flatness (20 Hz to 10 MHz rates): $\pm 2.5\%$

Audio input sensitivity (ac coupled, 50 ohm impedance):
 $(23\% \pm 5\% \text{ AM})/0.1 \text{ Vpeak}$

LOW RESIDUAL OUTPUT

Residual FM (50 Hz to 3 kHz bandwidth): <3 Hz rms

Supplemental Characteristics

Frequency: 560 MHz ± 50 kHz

Output level (50 ohm impedance): $> -20 \text{ dBm}$

GENERAL

Line voltage

48 to 440 Hz: 100 to 120 Vac (+5%, -10%)
48 to 66 Hz: 220 to 240 Vac (+5%, -10%)

Power dissipation: 40 VA maximum

Conducted and radiated electromagnetic interference:

Conducted and radiated interference is within the requirements of methods CE03 and RE02 of MIL STD 461A, VDE 0871 (Level B), and CISPR publication 11.

Conducted and radiated electromagnetic susceptibility:

Meets the requirements of methods CS01, CS02, and RS03 (1 volt/meter) of MIL STD 461A dated 1968.

Weight: net 4.4 kg (9.5 lb.); shipping 6.5 kg (14 lb.)

Dimensions: 102 mm H x 212 mm W x 444 mm D
(4.0 x 8.4 x 17.5 in.)

Temperature

Operating: 0 to 55°C
Storage: -55 to 75°C

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