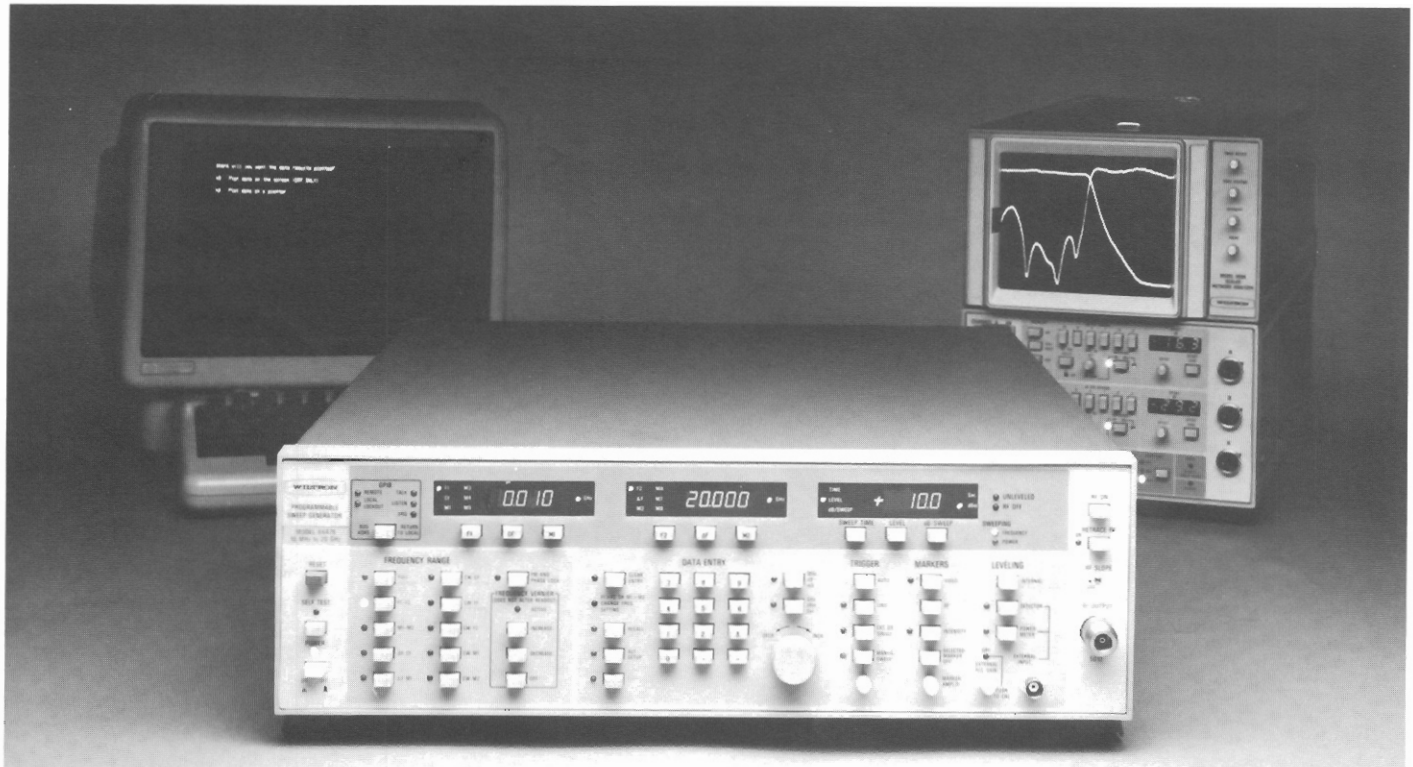
WILTRON

6600B Series Sweep Generators 10 MHz to 60 GHz

May 1986



High Power: 40 mW Leveled, from 10 MHz to 20 GHz

Wide Range: 10 MHz to 40 GHz Sweep from a Single Connector

Clean Signal: Subharmonic-Free Signals from Fundamental Oscillators

Power Sweep: 15 dB Range Plus Optional 70 dB Attenuator

Eight Markers: RF, Video, or Intensity Modulated

Light Weight: 16 kg (35.4 lb) Maximum

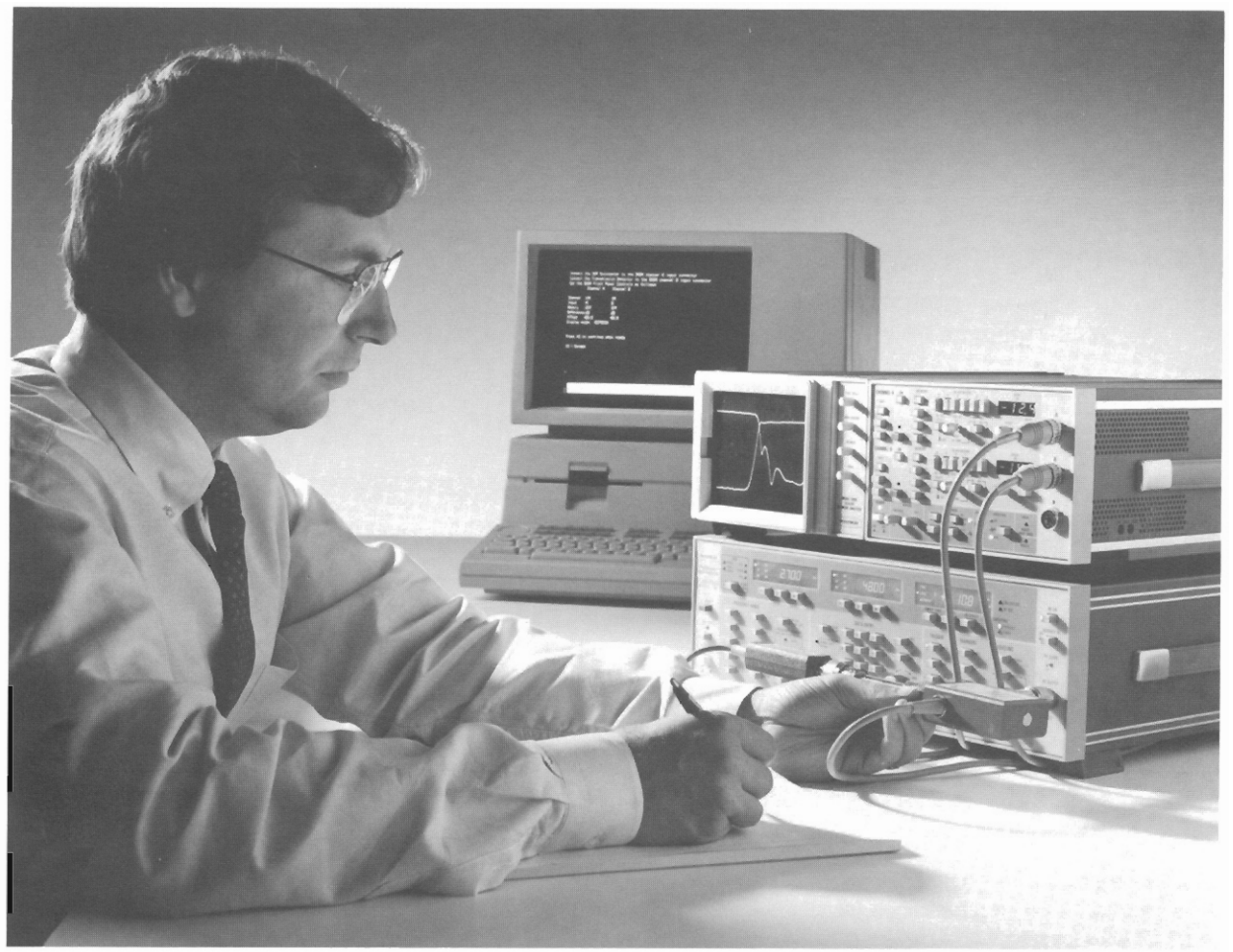
New Instruments Make Vital Contribution to Measurement Accuracy and Convenience

The 6600B Sweep Generators combine the latest microwave and microprocessor technology to produce a general-purpose swept signal source that makes the most accurate microwave measurements—in automated or manual systems. From a selection of 40 models, you chose the exact combination of capabilities you need: wideband sweep, narrowband sweep, and high power. All models feature exceptional source match, signal purity, frequency accuracy, resolution, and output flatness to improve the accuracy of your microwave measurements.

Innovative Design Philosophy Advances Sweeper Performance

In designing the 6600B Series, Wiltron recognized that the great majority of a sweeper's cost is in the microwave components. Rather than mount these components in a plug-in, Wiltron engineers made each model a stand-alone, self-contained instrument. Every model is optimized to avoid the pick-up, interference, and over-heating that can plague plug-in sweeper designs. Each microwave module achieves the highest possible performance level, giving the 6600B distinct advantages over other sweepers.

Accurate Measurements and Simple Operation Are Just the Beginning



Versatile Sweep Modes and Eight Markers Ensure Meaningful Displays

The 6600B Series has five sweep modes, as well as five CW frequencies and eight markers, to enhance your network analyzer display of test data. With a single keystroke, you switch from broadband sweep (Full Range, F1 to F2, or M1 to M2) to narrow-band symmetrical sweep about center frequency CF or marker M1. The CW frequencies are also selected directly without use of a shift key or having to remember frequencies stored in memory, both required by a major competitor. The exceptional attention given to all aspects of front panel layout make the 6600B a pleasure to use.

Power Sweep Tests Active Devices

In addition to the versatile frequency sweep modes, the 6600B has a power sweep with which the output is swept over a 15 dB range. Furthermore, with addition of the Option 2 Attenuator, the 15 dB power sweep can be offset in 10 dB steps over a 70 dB range. Amplifier and semiconductor characteristics, such as gain compression and saturation, can be measured rapidly over a continuously variable input power range. In the Alternate Stored Setup mode, a set of power sweep and a set of frequency sweep parameters stored in memory can be recalled to provide a "simultaneous" two-trace display of test device power *and* frequency characteristics.

Alternate Stored-Setup Sweep Slashes Test Times

In some applications, test times can be cut in half by simultaneously displaying two traces of characteristics over different frequency and/or power ranges. For example, with a simultaneous display of amplifier reflection and output power, you can adjust the amplifier for optimum balance of the two without changing the test setup. Similarly, the broadband rejection characteristics and the narrow passband response of a filter can be observed simultaneously. The time saved in avoiding sequential tests with two sets of test parameters is substantial.

Nine Stored Setups By-Pass Set Up Procedures

Because the 6600B has memory for nine independent test setups, operation of the Alternate Stored Setup mode is as simple as recalling the test parameters from memory. Set up time is virtually eliminated.

Front Panel Key Secures Test Parameters

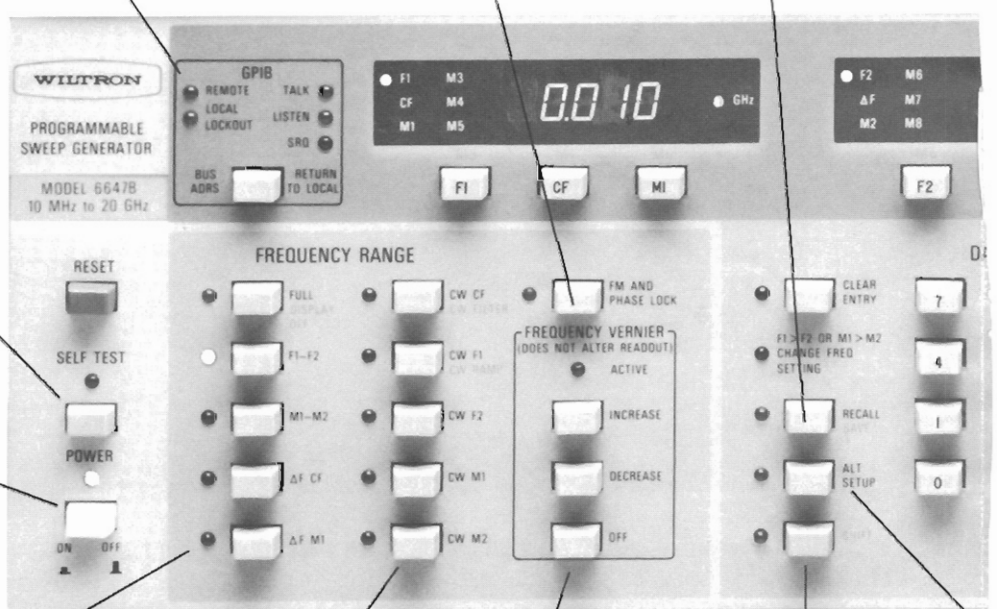
When test parameters must be kept secret, an instruction to blank the digital displays is stored with the other test setup information by simply pressing the security key. Also, the secure information can be easily cleared to reduce protection problems.

Performance-Packed Front Panel Is Easy to Learn, a Pleasu

Nine test setups can be stc recalled, substantially reduci set up time.

CW accuracy can be held to ±10 Hz or better by phase locking to an external frequency counter.

Complete **GPIB (IEEE-488) programmability** and dedicated interfaces ensure compatibility with all controllers and network analyzers.



Self-Test is performed each time the instrument is turned on. Pushbutton selection of self-test does not change instrument settings.

Nonvolatile memory holds controls and readings at previous settings for up to 10 years, even when power is removed.

Five sweep modes including two narrow-band symmetrical sweeps provide a just-right broadband and narrow-band sweep for every application.

Five preset CW frequency modes eliminate the need for the stored registers required by other sweepers.

Frequency Vernier makes **precise adjustment of CW** or center of ΔF sweep frequency as it is monitored by an external counter.

Shift function enables additional features: Ramp During CW, Filter During CW, **Front Panel Security** External Sweep Trigger, and **Pow Sweep**.

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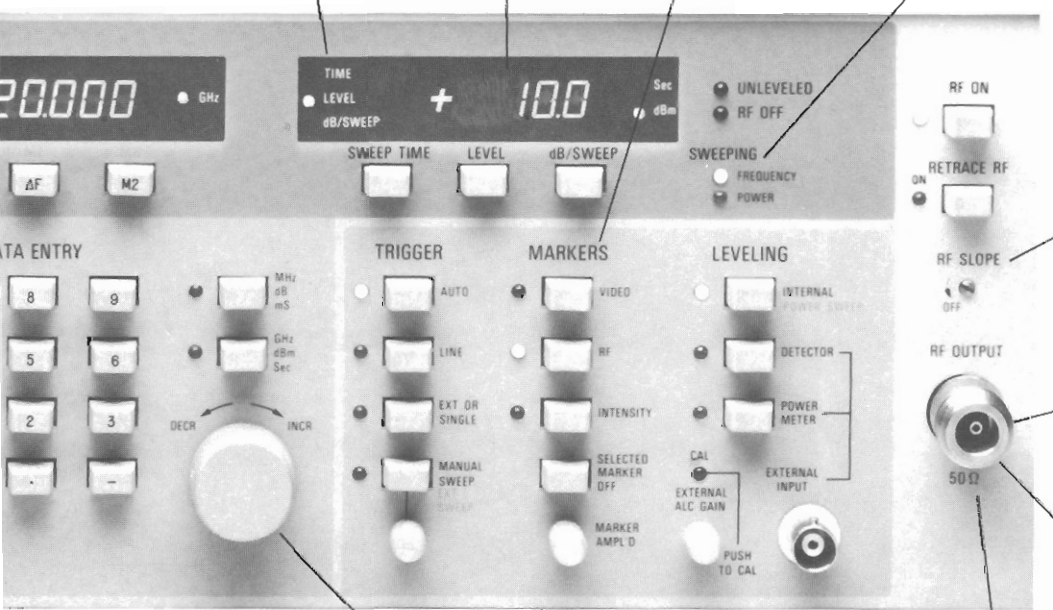
Digital displays may be automatically blanked to **secure test setup information.**

Eight Markers make easy identification of swept frequencies, center frequency of ΔF sweep, and M1 and M2 CW frequencies or sweep limits.

Optional step attenuator provides **82 dB control range** in 0.1 dB steps from 10 MHz to 26.5 GHz.

Power Sweep varies output over 15 dB range per sweep for testing gain and power characteristics of active devices.



Slope control compensates for losses that vary with frequency to provide flat output at test point.

Low spurious content (< −60 dBc above 2 GHz) improves accuracy of microwave measurements.

Wiltron super-flat leveling components hold variations in output power to **less than ±0.6 dB from 10 MHz to 20 GHz.**

As an alternate to the keypad, the tuning knob offers **continuous control of all test parameters.**

K Connector™ output is available to cover **10 MHz to 40 GHz**—compatible with SMA and APC*-3.5 connectors.

Alternate Stored Setup mode provides "simultaneous" dual-trace display of two different sets of frequency and/or power sweep parameters.

Fundamental Oscillators Generate Clean Signals

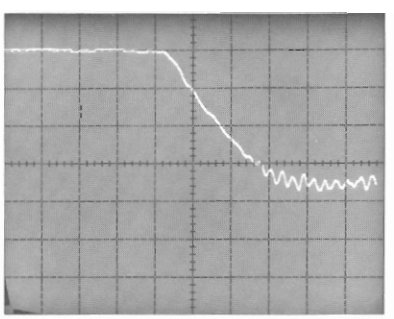
The 6600B Series uses fundamental oscillators over the 2 to 26.5 GHz range because they deliver the purest, most accurate signals. Four aspects of their performance contribute to accurate measurements:

1) Harmonic Content. The troublesome subharmonics of multiplier-type sweep generators don't exist.
2) Residual FM. Without a multiplier, residual FM is not degraded by the multiplication factor. Residual FM in CW or narrow-band mode is less than 10 kHz peak up to 20 GHz.
3) Frequency Accuracy. CW accuracy is ±10 MHz over the full 10 MHz to 20 GHz range.
4) Output Flatness. Since there is no tracking filter required to take out unwanted multiplier responses, the output level does not vary with sweep speed.

Low Harmonics Help Ensure Accurate Measurements

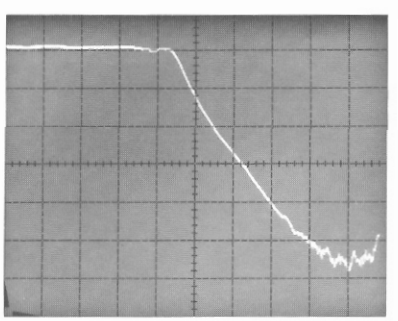
Harmonic content can cause large errors in the measurement of reflection and transmission. The photographs below show test results when a competitor's multiplier-type sweeper (A) and a Wiltron fundamental oscillator sweeper (B) are used to make the same measurement. Photograph (A) shows the effect of multiplier subharmonics from a 2–7 GHz oscillator on test results above 7 GHz. With a clean signal from its fundamental oscillator, the Wiltron 6659B shows in (B) a 20 dB improvement in dynamic range. This is the direct result of the 40 dB (typically 55 dB above 4 GHz) harmonic suppression of the 6659B, a vast improvement over the 25 dB specification of the sweeper shown in (A). Spurious signals are better than −60 dB for all models between 2 and 60 GHz—one more reason why the 6600B is the preferred signal source for precise microwave measurements.

(A)



10 dB/div

(B)



10 dB/div

(A) Subharmonics of multiplied frequencies in competitor's instrument give erroneous indication of response outside filter passband. (B) Clean signals from fundamental oscillators of 6600B Sweep Generator show that actual response of the filter is 20 dB better than measured in (A).

Harmonics can also introduce significant uncertainty when measuring power levels. For example, with the Wiltron specified harmonic level of < -40 dBc, the measurement uncertainty due to detection of harmonics is less than ±0.2 dB*. In contrast, multiplier-type sweepers with a specification of < -25 dBc can have as much as ±0.7 dB uncertainty.

ROM Improves Frequency Accuracy

The accuracy with which frequencies can be selected is especially important when measuring devices with rapidly changing frequency characteristics. By using ROM to correct for the residual nonlinearities of YIG-tuned oscillators, Wiltron holds accuracy to ±10 MHz from 10 MHz to 20 GHz. In addition, there is no degradation of accuracy when tuning from one band to the next, as is the case with multiplier techniques.

Frequency Vernier Has 100 kHz Resolution

The FREQUENCY VERNIER controls can be used to increase frequency accuracy in the CW and ΔF modes. While monitoring the output with a counter, you simply tune with the continuous control knob until the desired frequency is obtained. Subsequent requests for this frequency will produce the same frequency, including the correction.

Phase Lock Provides Maximum Resolution

When resolution greater than 100 kHz is required, the 6600B can be phase locked to an external source. When phase locked to a frequency counter, accuracies of ±10 Hz or better can be achieved. Here is one more way the 6600B Series improves measurement accuracy and meets the needs of applications which formerly required a signal generator or synthesizer at about twice the price of a sweeper.

Exceptional Source Match Improves Measurement Accuracy

A poor source impedance match can introduce significant errors in test results. Energy reflected from the mismatch causes uncertainty in return loss and transmission measurements. This error is minimized by the exceptionally good source match of the 6600B. In the 6637B, for example, source SWR is 1.2 from 2 to 8 GHz and 1.4 from 8 to 20 GHz. These values compare very favorably to the 1.9 SWR above 2 GHz specified for a competitor's unit. When a 10 dB return loss measurement is made on the competitor's unit, the uncertainty is 1.7 dB*. In contrast, the 6600B sweeper with a source match of 1.2 SWR holds uncertainty to 0.5, an improvement of 1.2 dB.

Powerful Microprocessors Provide Complete Programmability

Every measurement parameter can be controlled over GPIB (IEEE-488/IEC-625) by descriptive commands that make the 6600B compatible with every computer or controller. In addition, special interfaces are included to ensure compatibility with every available network analyzer. With complete programmability, the 6600B works smoothly in interactive, real-time systems. Parallel poll, serial poll, service request (SRQ), and group execute trigger provide programming flexibility to achieve optimum test sequencing, timing, and control. A local lock-out command protects the system against errors that might be inadvertently introduced by operating the front-panel controls.

*Uncertainty determined using method described in Wiltron *Technical Review* No. 13, "An Easy-To-Follow Method for Determining the Accuracy of Microwave Attenuation, Gain, and Insertion Loss Measurements" by Edward Daw.

6600B Specifications

	MODEL	FREQUENCY RANGE (GHz)	OUTPUT POWER (25°C ±5°)		POWER LEVEL ACCURACY			LEVELED POWER VARIATION		SOURCE	
			INTERNALLY LEVELED MAXIMUM (mW)	WITH OPT. 2, 70 dB ATTENUATOR (mW)	LEVELED (dB)	WITH OPT. 2, 70 dB ATTENUATOR ADD: (dB)	ATTENUATOR ACCURACY PER STEP (dB)	WITH FREQUENCY (dB)	WITH FREQUENCY OPT. 2, 70 dB ATTENUATOR (dB)	LEVELED	
Multiband	6669B 6668B	.01-40	>4 (≤26.5 GHz) >1 (>26.5 GHz) >10 (<18 GHz) >4 (18-26.5 GHz) >4 (>26.5 GHz) [1]	N/A	±2 ±1.5 N/A (>26.5 GHz)	N/A	N/A	±1.5 ±1 N/A (>26.5 GHz) [1]	N/A	1.5 (≤18 GHz) 1.7 (>18 GHz) 2 (>26.5 GHz) 1.5 (≤18 GHz) 1.7 (18-26.5 GHz) (>26.5 GHz) [1]	
	6659B	.01-26.5	>10 (≤18 GHz) >5 (>18 GHz)	>5 (≤18 GHz) >1.6 (>18 GHz)	±1.5	±2	±0.7	±1.0	±1.5	1.5 (≤18 GHz) 1.7 (>18 GHz)	
	6647B 6647B-40	.01-20	>10 >40	>6.6 >26.3	±1	±1.5	±0.4	±0.6	±1.5	1.4 (<2 GHz) 1.2 (2-8 GHz) 1.4 (>8 GHz)	
	6645B 6645B-40	.01-18	>10 >40	>6.6 >26.3	±1	±1.5	±0.4	±0.6	±1.5	1.4 (<2 GHz) 1.2 (2-8 GHz) 1.4 (>8 GHz)	
	6663B 6662B	2-40	>4 (≤26.5 GHz) >1 (>26.5 GHz) >10 (<18 GHz) >4 (18-26.5 GHz) >4 (26.5-40 GHz) [1]	N/A	±2 ±1.5 N/A (>26.5 GHz)	N/A	N/A	±1.5 ±1 (<26.5 GHz)	N/A	1.5 (≤18 GHz) 1.7 (>18 GHz) 2 (>26.5 GHz) 1.5 (≤18 GHz) 1.7 (18-26.5 GHz) (26.5-40 GHz) [1]	
	6653B	2-26.5	>10 (≤18 GHz) >4 (>18 GHz)	>5 (≤18 GHz) >1.6 (>18 GHz)	±1.5	±2	±0.7	±1.0	±1.5	1.5 (≤18 GHz) 1.7 (>18 GHz)	
	6637B 6637B-40	2-20	>10 >40	>6.6 >26.3	±1	±1.5	±0.4	±0.5	±1.5	1.2 (2-8 GHz) 1.4 (>8 GHz)	
	6635B 6635B-40	2-18	>10 >40	>6.6 >26.3	±1	±1.5	±0.4	±0.5	±1.5	1.2 (2-8 GHz) 1.4 (>8 GHz)	
	6621B 6621B-40	2-12.4	>10 >40	>7.4 >29.5	±1	±1.5	±0.4	±0.5	±1.4	1.2 (2-8 GHz) 1.4 (>8 GHz)	
	6617B 6617B-40	.01-8	>10 >40	>7.9 >31.6	±0.9	±1	±0.4	±0.5	±1	1.4 (<2 GHz) 1.2 (2-8 GHz)	
	6619B 6619B-40	2-8	>10 >40	>7.9 >31.6	±1	±1.5	±0.4	±0.4	±0.9	1.2	
	6629B 6629B-40	8-20	>10 >40	>6.6 >26.3	±1	±1.5	±0.4	±0.5	±1.5	1.4	
	6660B	12.4-40	>4 (≤26.5 GHz) >1 (>26.5 GHz)	N/A	±2	N/A	N/A	±1.5	N/A	1.5 (≤18 GHz) 1.7 (>18 GHz) 2 (>26.5 GHz)	
Single-band	6609B 6609B-50	.01-2	>20 >50	>17.8 >44.5	±0.6	±0.8	±0.3	±0.3	±0.8	1.3	
	6610B	1-2	>20	>17.8	±1	±1.5	±0.4	±0.3	±0.5	1.3	
	6616B	1.7-4.3	>10	>7.8	±1	±1.5	±0.4	±0.4	±0.7	1.2	
	6620B	3.6-6.5	>20	>15.6	±1	±1.5	±0.4	±0.3 dB (±0.03 dB/30 MHz)	±0.8	1.2	
	6624B	4-8	>10	>7.8	±1	±1.5	±0.4	±0.4	±0.9	1.2	
	6627B	5.9-9.0	>10	>7.8	±1	±1.5	±0.4	±0.3	±0.8	1.4	
	6628B 6628B-50	8-12.4	>10 >50	>7.4 >37.2	±1	±1.5	±0.4	±0.4	±0.9	1.4	
	6630B 6630B-50	12.4-20	>10 >50	>6.6 >33.9	±1	±1.5	±0.4	±0.5	±1	1.4	
	6631B	10-15.5	>10	>7	±1	±1.5	±0.4	±0.4	±0.9	1.4	
	6632B	17-22	>5	>3.2	±1	±3	±0.7	±0.8	±2.3	1.7	
	6636B	18-26.5	>3.1	>1.2	±2	±3	±0.7	±1	±2.5	1.7	
	6640B 6640B-5	26.5-40	>1 [1] >5 [1]	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
	6672B	40-60	>1 [1]	N/A	N/A	N/A	N/A	N/A	N/A	N/A	

1 External leveling only. 2 Excluding 5% band edges where specification is >20 dBc. 3 Measured in 30 Hz-15 kHz bandwidth. 4 Subharmonics. 5 USA prices subject to change without notice.

SWR (50 Ω)		SIGNAL PURITY			FREQUENCY ACCURACY (25°C)		FREQUENCY STABILITY			PRICE 5	MODEL
	WITH OPT. 2, 70 dB ATTENUATOR	HARMONICS (dBc)	NON-HARMONICS (dBc)	RESIDUAL FM 3 (kHz pk)	CW MODE (MHz)	SWEEP MODE ≤ 50 MHz (MHz)	WITH TEMPERATURE (MHz/°C)	WITH 10 dB POWER LEVEL CHANGE (kHz)	WITH 3:1 LOAD SWR (kHz)		
	N/A	< −30 (< 2 GHz) < −40 (2-26.5 GHz) < −20 (> 26.5 GHz) 4	< −40 (≤ 2 GHz) < −60 (> 2 GHz)	< 7 (< 8 GHz) < 10 (8-18 GHz) < 15 (18-26.5 GHz) < 20 (> 26.5 GHz)	±20	±30	±1 (≤ 26.5 GHz) ±2 (> 26.5 GHz)	±500 (≤ 26.5 GHz) ±1000 (> 26.5 GHz)	±300	$39,000 $37,500	6669B 6668B
	1.7 (≤ 12.4 GHz) 2 (> 12.4 GHz)	< −30 (≤ 2 GHz) < −40 (> 2 GHz)	< −40 (≤ 2 GHz) < −60 (> 2 GHz)	< 7 (< 8 GHz) < 10 (8-18 GHz) < 15 (> 18 GHz)	±20	±30	±1 (≤ 2 GHz) ±0.5 (> 2 GHz)	±100	±500	$28,000	6659B
	1.5 (< 8 GHz) 1.6 (8-12.4 GHz) 1.8 (> 12.4 GHz)	< −30 (≤ 2 GHz) < −40 (> 2 GHz) < −20 (≤ 2 GHz) < −25 (> 2 GHz)	< −40 (≤ 2 GHz) < −60 (> 2 GHz)	< 7 (≤ 8 GHz) < 10 (> 8 GHz)	±10	±15	±1 (≤ 2 GHz) ±0.5 (> 2 GHz)	±100 ±500	±500 ±300	$23,500 $27,500	6647B 6647B-40
	1.5 (< 8 GHz) 1.6 (8-12.4 GHz) 1.8 (> 12.4 GHz)	< −30 (≤ 2 GHz) < −40 (> 2 GHz) < −20 (≤ 2 GHz) < −25 (> 2 GHz)	< −40 (≤ 2 GHz) < −60 (> 2 GHz)	< 7 (≤ 8 GHz) < 10 (> 8 GHz)	+10	±15	±1 (≤ 2 GHz) ±0.5 (> 2 GHz)	±100 ±500	±500 ±300	$23,000 $25,750	6645B 6645B-40
	N/A	< −40 (2-26.5 GHz) < −20 (> 26.5 GHz) 4	< −60	< 7 (< 8 GHz) < 10 (8-18 GHz) < 15 (18-26.5 GHz) < 20 (> 26.5 GHz)	±20	±30	±1 (≤ 26.5 GHz) ±2 (> 26.5 GHz)	±500 (≤ 26.5 GHz) ±1000 (> 26.5 GHz)	±300	$35,500 $34,000	6663B 6662B
	1.7 (≤ 12.4 GHz) 2 (> 12.4 GHz)	< −40	< −60	< 7 (< 8 GHz) < 10 (8-18 GHz) < 15 (> 18 GHz)	±20	±30	±1	±100	±500	$26,500	6653B
	1.5 (< 8 GHz) 1.6 (8-12.4 GHz) 1.8 (> 12.4 GHz)	< −40 < −25	< −60	< 7 (≤ 8 GHz) < 10 (> 8 GHz)	±10	±15	±0.5	±100	±500	$19,500 $24,750	6637B 6637B-40
	1.5 (< 8 GHz) 1.6 (8-12.4 GHz) 1.8 (> 12.4 GHz)	< −40 < −25	< −60	< 7 (≤ 8 GHz) < 10 (> 8 GHz)	±10	±15	±0.5	±100	±500	$19,000 $23,500	6635B 6635B-40
	1.5 (< 8 GHz) 1.6 (8-12.4 GHz)	< −40 < −25	< −60	< 10	±10	±15	±0.5	±100	±500	$18,900 $23,750	6621B 6621B-40
	1.5	< −30 (≤ 2 GHz) < −40 (> 2 GHz) < −20 (≤ 2 GHz) < −25 (> 2 GHz)	< −40 (≤ 2 GHz) < −60 (> 2 GHz)	< 7	±5	±10	±1 (≤ 2 GHz) ±0.5 (> 2 GHz)	+100 ±500	±100	$15,100 $16,500	6617B 6617B-40
	1.5	< −40 < −25	< −60	< 7	±10	±15	±0.5	±100	±100	$12,500 $14,000	6619B 6619B-40
	1.6 (≤ 12.4 GHz) 1.8 (> 12.4 GHz)	< −40	< −60	< 10	±10	±15	±0.5	±100	±500	$14,200 $19,000	6629B 6629B-40
	N/A	< −40 (12.4-26.5 GHz) < −20 (> 26.5 GHz) 4	< −60	< 10 (12.4-18 GHz) < 15 (18-26.5 GHz) < 20 (> 26.5 GHz)	±20	±30	±1 (≤ 26.5 GHz) ±2 (> 26.5 GHz)	±500 (≤ 26.5 GHz) ±1000 (> 26.5 GHz)	±300	$27,850	6660B
	1.5	< −30 < −20	< −40	< 7	±5	±10	±1	±100 ±500	±100	$10,900 $12,250	6609B 6609B-50
	1.5	< −30 2	< −60	< 7	±10	±15	±0.5	±100	±500	$9,200	6610B
	1.5	< −20 (1.7-2.26 GHz) < −30 (2.26-4.3 GHz)	< −60	< 7	±10	±15	±0.5	±100	±500	$8,900	6616B
	1.5	< −40	< −60	< 7	±10	±15	±0.5	±100	±500	$9,600	6620B
	1.5	< −30 2	< −60	< 7	±10	±15	±0.5	±100	±500	$10,200	6624B
	1.8	< −40	< −60	< 10	±10	±15	±0.5	±100	±500	$10,600	6627B
	1.8	< −40 < −30	< −60	< 10	±10	±15	±0.5	±100	±500	$10,800 $12,500	6628B 6628B-50
	1.8	< −30	< −60	< 10	±10	±15	±0.5	±100	±500	$10,800 $13,500	6630B 6630B-50
	1.8	< −40	< −60	< 10	±10	±15	±0.5	±100	±500	$11,700	6631B
	2.0	< −40	< −60	< 10	±15	±25	±1	±100	±500	$12,400	6632B
	2.0	< −40	< −60	< 30	±15	±25	±2	±100	±500	$13,500	6636B
	N/A	< −20 < −20 4	< −60	< 40	±20	±30	±2	±200 ±500	±500 ±300	$15,950 $22,450	6640B 6640B-5
	N/A	< −20 4	< −60	< 50	±30	±45	±3	±500	±300	$23,000	6672B

6600B Specifications (Continued)

FREQUENCY

Frequency Range: 10 MHz to 60 GHz in 40 models. See pages 6–7.

Frequency Control:

Full: Sweeps upward across the complete frequency range.
F_1-F_2: Sweeps from F1 to F2, entered independently on keypad or control knob. F2 must be greater than F1.
M_1-M_2: Sweeps from M1 to M2 markers, entered independently on keypad or control knob. M2 must be greater than M1.
ΔF: Sweeps upward symmetrically about CF or M1. Sweep width is adjustable on keypad or control knob in MHz or GHz.
CW: Single frequency at CF, F1, F2, M1, and M2, entered independently on keypad or control knob.
Frequency Vernier: Fine adjustment of frequency in CW and ΔF modes up to ±12.7 MHz for models with specified frequency accuracies of < ±10 MHz and up to ±25 MHz for accuracies of > ±10 MHz. A new correction in frequency can be made with the control knob. Correction applies until released with OFF button or the frequency is changed. ACTIVE light is on whenever a vernier adjustment is in use.
Manual: Continuous manual adjustment of frequency between sweep limits in every sweep mode. Can be used to set recorder sweep limits.

CW Filter Enable/Disable:

Enabled: Filter inserted for CW mode and sweep widths ≤50 MHz. Shift key function.
Disabled: Filter removed for all modes of operation.

Frequency Stability:

For Models With Upper Frequency Limit	With Time (10 Minutes, Typical)*	With 10% Line Voltage Change
≤26.5 GHz	±200 kHz	±100 kHz
>26.5 GHz, ≤40 GHz	±400 kHz	±200 kHz
>40 GHz to 60 GHz	±600 kHz	±300 kHz

*After 30 minutes warmup at selected CW frequency.

Frequency Resolution:

Normal: 1 MHz
Frequency Vernier: 100 kHz on ±12.7 MHz range, 200 kHz on ±25 MHz range, 300 kHz on ±37.5 range.
Step Sweep: 4096 programmable points

Frequency Accuracy: See pages 6–7.

MARKERS

Marker Selection: Eight markers at M1 through M8, entered independently on keypad or control knob in MHz or GHz.

Accuracy: Same as frequency accuracy. See pages 6–7.

Resolution: 0.4% of sweep width.

Display: Front panel pushbuttons select one of three marker modes:

Video: Positive video pulse, 0 to +5 volts, TTL-compatible, adjustable with MARKER CONTROL. 1K ohm impedance, rear panel, BNC connector.
RF: Up to 5 dB attenuated RF level at marker frequency, adjustable with MARKER CONTROL.
Intensity: Intensified dot on trace, obtained by momentary dwell in sweep.

Amplitude of video and RF marker(s) displayed on front panel LEDs is twice that of the others.

SWEEP AND TRIGGERING

Alternate Stored Setup: Sweeps alternately between the current front panel setup and one of nine stored setups.

Sweep Triggering:

Auto: Triggers sweep automatically.
Line: Triggers sweep from power line frequency.
External: Triggers sweep from externally applied 4 to 25 Vpk or TTL-compatible pulse with >1 μs width and >5 μs fall time. Rear panel BNC connector.
Single: EXT OR SINGLE SWEEP selects mode, triggers, aborts and resets single sweep.

Sweep Time: Adjustable from approximately 0.01 to 99 s. Entered on keypad or control knob in ms or s.

Retrace RF: Front panel pushbutton activates RF power during sweep retrace.

Horizontal Output: 0 to 10 volt ramp coincident with sweep in all sweep modes. In CW mode, output voltage varies in proportion to frequency, 0 volts at 0 GHz and 10 volts at upper frequency limit. In shift key CW RAMP mode, voltage varies from 0 to 10 volts between sweep limits. Rear panel BNC connector.

Sequential Sync Output: +5 volt TTL-compatible pulse occurring at oscillator bandswitching points and during sweep retrace. −5 volt occurring at markers, −10 volts at selected marker. Rear panel BNC connector.

Retrace Blanking (−) Output: −5 volt pulse occurring during sweep retrace. Rear panel BNC connector. <100 ohm impedance.

Retrace Blanking (+) Output: +5 volt TTL-compatible pulse occurring during sweep retrace. Rear panel BNC connector.

Bandswitch Blanking Output: ±5 volt pulse occurring during oscillator bandswitching points. Polarity selected on rear panel switch. Rear panel BNC connector. <100 ohm impedance.

V/GHz Output: Reference voltage varying in proportion to output frequency as follows:

For Models With Upper Frequency Limit	V/GHz Output
≤20 GHz	1 V/GHz
>20 GHz to ≤40 GHz	0.5 V/GHz
>40 GHz to 60 GHz	0.33 V/GHz

Rear panel BNC connector. <100 ohm impedance.

Penlift Output: Normally-open relay contacts for lifting recorder pen during sweep retrace. Internal jumper can be installed to provide normally-closed contacts. Rear panel BNC connector.

Sweep Dwell Input: Low true TTL-compatible pulse causes frequency sweep to stop. Can be used to count marker frequencies with an external counter and Frequency Counter Interface output, Option 13.

External Sweep Input: Externally applied 0 to 10 volt ramp sweeps frequency between selected sweep limits. Rear panel BNC connector. 10K ohm impedance. Front panel control.

POWER SWEEP AND LEVELING

Leveling:

Internal: Levels output power at front panel connector. See pages 6–7 for power variation specifications. Not available on 6640B and 6672B.

External Detector: Levels output power at remote test position where directional detector samples RF power and provides a positive or negative polarity detected signal of 5 mV to 500 mV to front panel BNC connector. Front panel ALC gain control adjusts input signal level to optimum value.
Power Meter: Levels output power at remote test position where a power meter samples RF power and provides a ±1V full scale video signal to a front panel BNC connector. Front panel ALC gain control adjusts input signal level to optimum value.
Unleveled Indicator: Lights when output power is insufficient to maintain leveling across the selected sweep range.

Power Sweep: Sweeps over up to 15 dB range, entered on keypad or control knob. Option 2 Attenuator offsets sweep range in 10 dB steps over 70 dB range.

Attenuator: Option 2 adds a 10 dB attenuator with a 70 dB range. See pages 6–7 for accuracy specifications.

RF Slope Control: Adjusts slope of leveled output power by increasing power at the higher frequencies to compensate for frequency-dependent cable losses in test setup.

MODULATION

External AM Input: Rear panel BNC connector. 10K ohm impedance.
Sensitivity: 1 dB/V
Frequency Response (Typical): DC–50 kHz
Input Impedance: 10K ohm
Amplitude Control Range: >13 dB
Maximum Input: 20V

External FM and Phase Lock Input: Rear panel BNC connector 10K ohm impedance.
Sensitivity: −6 MHz/V
Maximum Deviation for Modulation Frequency of:
DC–100 kHz: ±25 MHz
100–250 kHz: ±5 MHz

External Square Wave Input: Externally applied TTL-compatible square wave modulates output at DC to 50 kHz rate. Will accommodate ±6V square wave. On/Off ratio, typically 40 dB. Maximum input, ±20 volts. Rear panel BNC connector. Order Option 11 for 6610B, 6616B, 6619B, 6619B-40, 6620B, 6624B, 6627B, 6628B, 6628B-50, 6630B, 6630B-50, 6631B, 6632B, 6636B, 6640B, and 6672B. Standard on all others.

INSTRUMENT STATUS

GPIB Indicators: When GPIB Option 3 is added to the instrument, LED lights indicate the following conditions:
Remote: Operating on GPIB
Talk: Talking on GPIB
Listen: Listening on GPIB
SRQ: Sending a service request
Local Lockout: Disabling the RETURN TO LOCAL pushbutton
The instrument can be placed in local mode only via GPIB.

Nonvolatile Memory: Retains front panel control settings in memory for up to 10 years. Whenever instrument is turned on, control settings come on at the same functions and values existing when power was removed.

Self-Test: Performs self-test every time power is applied or when SELF TEST pushbutton is pressed. If an error is detected, a diagnostic code appears, identifying the cause and location of the error.

GENERAL

Test Setup Storage: Stores nine test setups for recall during normal or Alternate Stored Setup modes.

Continuous Control: Knob provides smooth, continuous control of frequency, sweep time, and power.

Front Panel Security: Blanks LEDs to secure test parameters.

Power Variation With Temperature: ±0.08 dB/°C. Not applicable to units with external leveling only.

Residual AM (30 kHz Bandwidth): >50 dBc. Not applicable to units with external leveling only.

Output Connector: Type N Female all models except:
Model 6632B and 6636B: Ruggedized WSMA Female
Model 6640B: WR28 Waveguide (UG-599/U Flange)
Models 6662B and 6668B: Ruggedized WSMA Female to 26.5 GHz, WR28 Waveguide 26.5 to 40 GHz (UG-599/U Flange)
Models 6653B, 6659B, 6660B, 6663B and 6669B: Ruggedized K Connector™ Female
Model 6672B: WR19 Waveguide (UG-383/U Flange)

Test Parameter Data Entry: Frequency, sweep time, and power level are entered on keypad with up to 5 digit resolution or on continuous control knob. Entry is terminated by pressing appropriate unit (MHz, dB, mS or GHz, dBm, Sec) pushbutton. Entry errors are cleared by pressing CLEAR ENTRY.

Reset Control: Returns controls to following conditions:
Frequency Range: Full
Trigger: Auto
Markers: Off
RF: On
Level: Specified power level
Leveling: Internal
Sweep Time: 50 ms
CW, Marker, Delta F Frequencies: Varies with model number.

Shift Key: Activates dual function controls—CW RAMP (horizontal output ramp), CW FILTER (CW filter enable/disable), DISPLAY OFF (blanks front panel LEDs), POWER SWEEP (sweeps output power), and EXTERNAL SWEEP (external sweep input).

Warranties: Two years on YIG oscillators, one year on instrument.

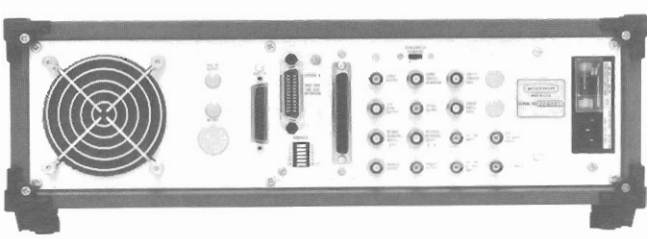
Dimensions: 133 H × 432 W × 476 D mm
(5.25 H × 17 W × 18.75 D in.)

Weight: 16 kg (35.4 lb) maximum.

Input Power: 100V/120V/220V/240V ±5%, −10% selectable on rear panel, 50–60 Hz, 250 VA maximum.

Operating Temperature Range: 0 to +55°C.

Rear Panel:



6600B Options

Rack Mounting, Option 1: Unit supplied with mounting ears and chassis track slide (90° tilt) installed. **Price: $250**

Attenuator, Option 2: Adds 10 dB step attenuator with 70 dB range. Output power is selected on keypad or control knob directly in dBm over an 82 dB range. Not available on models with upper frequency limit above 26.5 GHz.

For Models With Upper Frequency Limit	Order	Price
18 GHz	Option 2A	**$1500**
20 GHz	Option 2B	**$2200**
26.5 GHz	Option 2C	**$2200**

GPIB Interface, Option 3: Adds GPIB (IEEE-488/IEC-625). All pushbutton controls except line power on/off are bus controlled. Field installable. **Price: $500**

Rear Panel RF Output, Option 9: Option 9S adds SMA female and Option 9N adds Type N female rear panel RF output connector and deletes front panel RF connector, degrading output power (typically 1 dB at 20 GHz), source SWR (typically 2 at >8 GHz), and power variation. Not available on units with upper frequency above 26.5 GHz. **Price: $350**

Auxiliary Rear Panel RF Connector, Option 10: Adds SMA female connector to the rear panel, providing an attenuated (approx. −15 to −25 dBm) sample of the reduced RF output signal (typically 1.5 dB, ≤18 GHz, 2 dB >18 GHz). Not available on models with upper frequency limit above 26.5 GHz. **Price: $450**

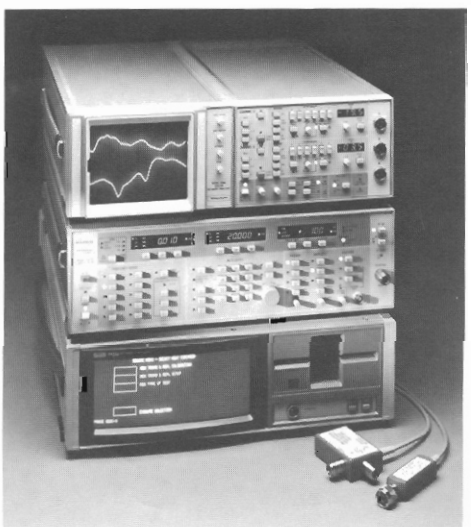
External Square Wave Input, Option 11: Adds rear panel BNC connector for externally applied TTL-compatible signal which modulates RF at rates from DC to 50 kHz. On/off ratio, tyically 40 dB. Maximum input, ±20 volts. Accommodates ±6 volt square wave. Order for 6610B, 6616B, 6619B, 6619B-40, 6620B, 6624B, 6627B, 6628B, 6628B-50, 6630B, 6630B-50, 6631B, 6632B, 6636B, 6640B, and 6672B. Standard on all others. **Price: $350**

Frequency Counter Interface, Option 13: Adds rear panel BNC connector to provide interface with HP 56343A counter for counting marker frequencies. **Price: $100**

The Best Signal Source for Network Analyzers

Compatible With Newer Network Analyzers (See Wiltron Application Note 6600-12)

The 6600B Sweep Generator is the superior signal source for network analyzer applications. It is used with the Wiltron 560A to form the 5600M Series (manually controlled) and the 5600 Series (desktop computer controlled) Scalar Network Analyzer Systems.



The Wiltron 5600 Series consists of twelve models, each of which includes a network analyzer, sweep generator, all required measurement components, and a desktop controller. For broadband applications, the 5669 covers the 10 MHz to 40 GHz range from a single coaxial test port. By using the 5672 and waveguide measurement components, you can extend frequency coverage up to 60 GHz.

5600 Network Analyzer System Ordering Information

Model	Description	Price
5609-50	10 MHz to 2 GHz, 50 ohms	**$26,525**
5609-75	10 MHz to 2 GHz, 75 ohms	**26,700**
5617	10 MHz to 8 GHz	**32,310**
5636	18 to 26.5 GHz	**31,735**
5637	2 to 18 GHz	**36,710**
5640	26.5 to 40 GHz	**30,685**
5647	10 MHz to 18 GHz	**40,710**
5653	2 to 26.5 GHz	**44,735**
5659	10 MHz to 26.5 GHz	**46,235**
5663	2 to 40 GHz	**54,135**
5669	10 MHz to 40 GHz	**57,635**
5672	40 to 60 GHz	**37,885**

WILTRON

Wiltron Company Offices: California, Morgan Hill, (408) 778-2000; Anaheim (714) 220-1201 • **Massachusetts,** Woburn, (617) 933-8330 • **New Jersey,** Saddlebrook, (201) 845-8030 • **Canada,** Nepean, Ontario, (613) 725-8800 • **United Kingdom,** Crowthorne, Berkshire, 44-344-777778 • **West Germany,** Gilching, 49-8105-8535 • **Japan,** Tokyo, (03) 798-0411, Yokohama, (045) 316-0381

P/N 11350-00014