

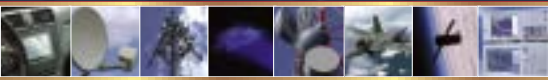


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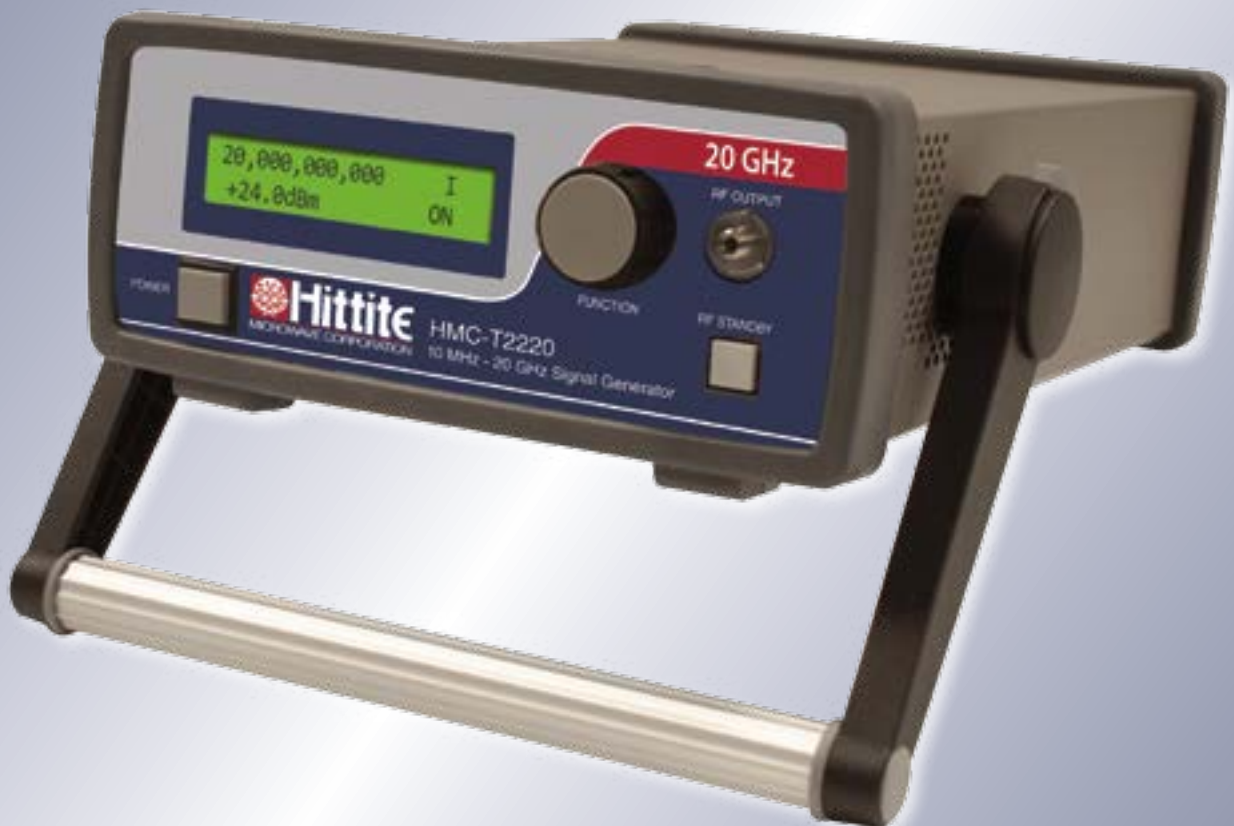


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# HMC-T2220



Synthesized Signal Generator, 10 MHz to 20 GHz



# HMC-T2220

SYNTHESIZED SIGNAL GENERATOR, 10 MHz to 20 GHz

v06.0714

## Wide Frequency Range, 10 MHz to 20 GHz Signal Generator!

The HMC-T2220 is an easy to implement test equipment solution designed to fulfill your signal generation needs. Built on a foundation of high quality and market leading Hittite MMICs, the HMC-T2220 provides the highest output power, lowest harmonic levels and broadest frequency range amongst signal generators of its size and cost.

This compact and lightweight signal generator also features USB, GPIB and Ethernet interfaces ensuring carefree integration within various test environments while improving overall productivity and equipment utilization.

The HMC-T2220 incorporates several product upgrades: reduced spurious, wider dynamic range, higher frequency resolution, higher RF output power, reduced RF off leakage, quieter fan operation, improved front panel knob functions for display scrolling, a ruggedized handle that is customer removable, and an added TRIGGER OUT function.

### Applications

- ◆ ATE
- ◆ Test & Measurement
- ◆ R&D Laboratories

### Advantages

- ◆ Versatile: Higher Drive Simplifies Test Set-Ups
- ◆ Efficient: 300  $\mu$ s Frequency Switching
- ◆ Reliable: Incorporates Hittite MMICs
- ◆ Flexible: Manual or Software Control  
Via USB, GPIB or Ethernet



### Performance

- ◆ High Output Power: +26 dBm @ 1 GHz
- ◆ Wide Frequency Range:  
10 MHz to 20 GHz
- ◆ Excellent Phase Noise Performance:  
-98 dBc/Hz @ 10 kHz Offset @ 10 GHz
- ◆ Spurious Rejection: -70 dBc @ 10 GHz
- ◆ Power Resolution: 0.1 dB
- ◆ Frequency Resolution: 1 Hz

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### Frequency

Accuracy: As Per Internal Ref.  $\pm 1.5$  ppm  
Resolution: 1 Hz  
Internal Reference: 10 MHz  
Aging Rate: <1 ppm/yr  
External Reference Input: 10 MHz (Sine)  
Internal Reference Output: 10 MHz (Square Wave)  
Frequency Switching Speed: 300  $\mu$ s

### Output Power (Maximum)

Frequency (GHz)	Power Output (dBm)
0.01	24
0.05	26
0.1	26
0.5	26
1	26
2	25
4	25
10	25
15	24
20	21

Minimum Settable: -35 dBm  
Dynamic Range: >60 dB  
Resolution: 0.1 dB  
Power Accuracy:  $\pm 1$  dB > 500 MHz  
 $\pm 2$  dB  $\leq 500$  MHz  
 $\pm 2$  dB < -20 dBm (All Frequencies)  
RF Off: < -80dBm

### Spurious @ 10 dBm Output

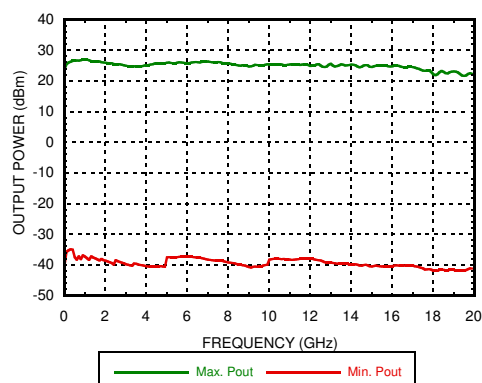
< -70 dBc @ Integer Frequencies  
< -65 dBc @ Fractional Frequencies <10 GHz  
< -57 dBc @ Fractional Frequencies >10 GHz

### Harmonics

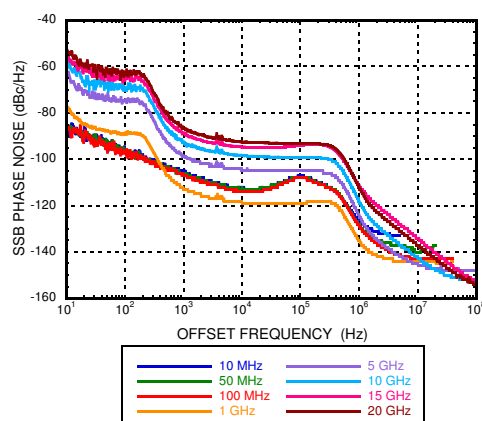
Frequency (GHz)	2nd Harmonics (dBc)	3rd Harmonics (dBc)
0.01	-34	-44
0.05	-30	-42
0.1	-31	-46
0.5	-34	-55
1	-33	-52
2	-43	-57
5	-32	-54
10	-34	-58
15	-39	-48
20	-55	-

Output Power = +10 dBm

### Output Power Range @ 25°C



### SSB Phase Noise vs. Frequency



### RF Output Impedance

VSWR < 2.0:1

### SSB Phase Noise (dBc/Hz)

Frequency (GHz)	Offset From Carrier						
	10 Hz	100 Hz	1 kHz	10 kHz	100 kHz	1 MHz	10 MHz
0.01	-87	-97	-106	-113	-107	-126	-140
0.05	-86.4	-96.2	-106	-112	-108	-128	-140
0.10	-86	-97	-107	-114	-108	-129	-143
0.50	-82	-95	-109	-125	-125	-139	-143
1	-77	-89	-113	-119	-119	-135	-144
5	-64	-75	-99	-105	-105	-124	-145
10	-58	-69	-92	-98	-99	-118	-143
15	-56	-66	-89	-95	-94	-111	-134
20	-51	-63	-86	-92	-93	-112	-137

Output Noise: Floor < -155 dBc/Hz

Above data is typical performance at +25°C after 30 minutes of warm-up time unless otherwise stated.

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### General Specifications

Frequency:	Power - AC:
Accuracy:	100 to 240 VAC @ 50 to 60 Hz
For < 2.5 GHz, Reference +0/-90 nHz	Operating Temperature (for indoor use only) <sup>[4]</sup> :
For > 2.5 GHz, Reference +0/-2.88 $\mu$ Hz	0 to 55 °C
Internal Reference: $\pm$ 1.5 ppm	Storage Temperature: -20 to 70 °C
Resolution: 1 Hz	Cooling: 2 Internal Fans
Aging Rate: <1 ppm/yr	Fan Noise: < 50 dBA
External Reference Input: 10 MHz (Sine Wave)	Mechanical Vibration & Shock:
Internal Reference Output: 10 MHz (Square Wave)	MIL PRF-288000 Class 4, non operating
Frequency Switching Speed: 300 $\mu$ s	Compliance:
RF Output Power Change Versus Temperature:	CSA & CE
10 MHz to 5 GHz      0.10 dB/°C	ECCN:
5 GHz to 15 GHz      0.125 dB/°C	EAR99
15 GHz to 20 GHz      0.20 dB/°C	General Mechanical Characteristics
Input / Output:	H: 76.2 mm (3 in)
10 MHz REFOUT <sup>[1]</sup>	W: 203 mm (8 in)
10 MHz REFIN <sup>[2]</sup>	D: 305 mm (12 in)
TRIGGER IN <sup>[3]</sup> : TTL	Weight 3.2 kg (7.0 lbs)
TRIGGER OUT <sup>[3]</sup> : TTL	Warranty: 1 Year Parts and Labor
RS-232 (used for field upgrades)	
Ethernet	
GPIO	
USB 2.0	
RF Output SMA Female	
Maximum DC voltage applied to RF Output: 8 Volts	

[1] +10 dBm typ. into 50 Ohms; BNC Connector

[2] +5 dBm max. -5 dBm min., 50 Ohms; BNC Connector

[3] The trigger input can be driven from either 3.3V or 5V sources for direct interface with TTL signal levels; BNC Connector

[4] S/N 325 or higher

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### HMC-T2220 Rear Panel I/O Connections



### Connectivity & Control

Its compact size, light weight, fast switching speed and USB, GPIB and Ethernet control interfaces support the standard SCPI command set ensuring smooth integration within all test environments, particularly those associated with automated test. An installation disk that accompanies each unit includes all the drivers required to remotely control the device as well as a user friendly GUI interface (right) compatible with a Windows XP®, Windows Vista® or Windows 7® operating system. User control is facilitated via pull down menus that allow programming of single or swept modes in frequency or power. Integration of multiple units within a production test environment is easy, and affordable.

#### Remote Interface

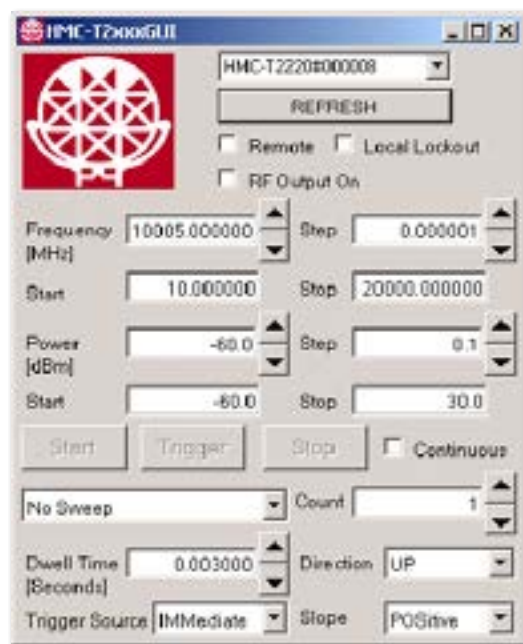
Hardware: USB (Windows XP®, Windows 7®, Windows Vista® Drivers Supplied), GPIB or Ethernet

Software: LabVIEW 2009 Driver

Frequency Switching Speed:  
300  $\mu$ s Typ.

#### Local Interface

Front Panel Rotary Knob & Display



### HMC-T2100 Compatibility

To facilitate integration into existing HMC-T2100 applications, the HMC-T2220 has a HMC-T2100 compatibility mode. In this mode, the HMC-T2220 identifies itself as a HMC-T2100 so that the HMC-T2100 USB drivers will work for a HMC-T2220, and programs which use the \*IDN? string will recognize a HMC-T2220 as a HMC-T2100. Frequency resolution, maximum and minimum values for power, and minimum sweep dwell time also change to match the HMC-T2100.

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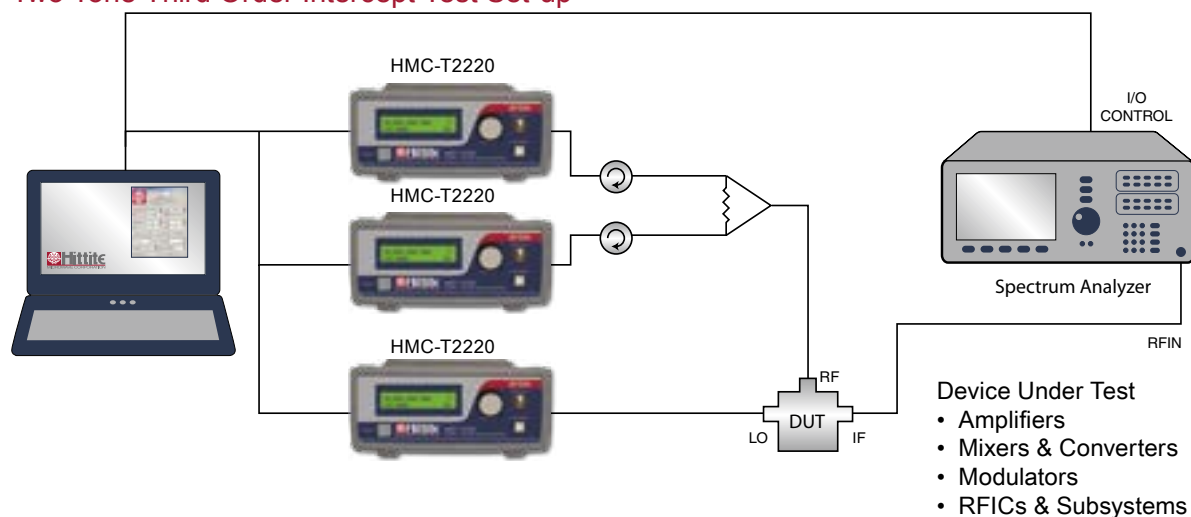
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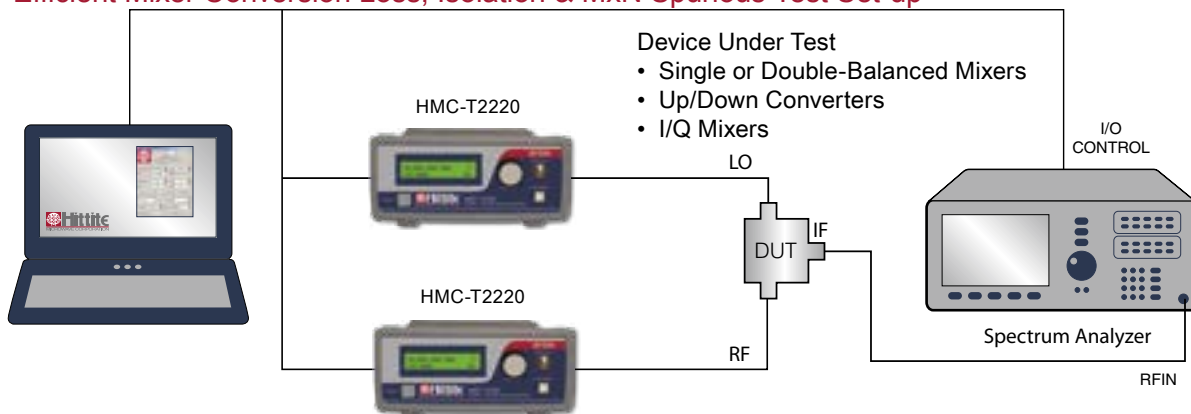
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## Two Tone Third Order Intercept Test Set-up



## Efficient Mixer Conversion Loss, Isolation & MxN Spurious Test Set-up



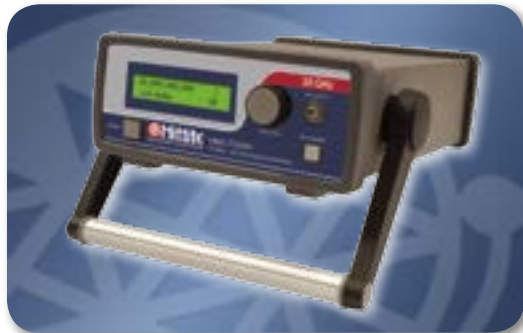


# HMC-T2220

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## HMC-T2220



### Ordering Information

Model Number	Description	Price
HMC-T2220	Synthesized Signal Generator 10 MHz to 20 GHz	\$9,998.00

Includes 100 - 240V AC Power Supply and one Power Cord at no cost.  
Please specify your preferred power cord part number at time of ordering. (see "Optional Power Cord" table)

### Test Rack Mount Kit

Part Number	Description	Price
HMC-RM02	Dual Rack Mounting Plate 19" 2u Chassis	\$385.00



### Power Cord

Part Number	Region
HMC-PC01	Continental Europe
HMC-PC02	United Kingdom
HMC-PC03	China
HMC-PC04	Australia, New Zealand
HMC-PC05	North America
HMC-PC06	South Africa / India
HMC-PC07	Switzerland
HMC-PC08	Denmark
HMC-PC09	Israel
HMC-PC10	Italy
HMC-PC11	Japan

All pricing is in U.S. Dollars and is subject to change without notice.

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