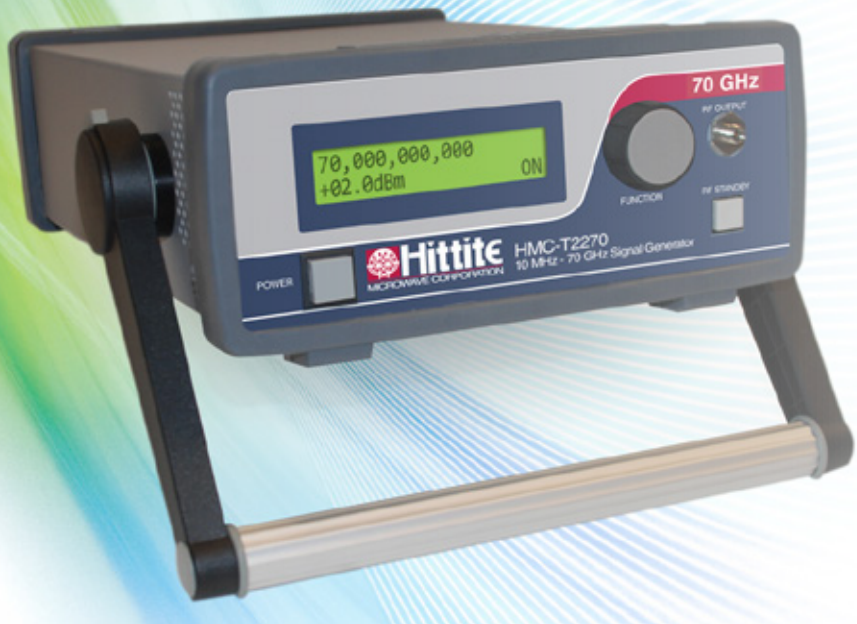
Instrumentation Solutions

Analog, Digital & Mixed-Signal ICs, Modules, Subsystems & Instrumentation

Signal Generators to 70 GHz!



- ***ATE*** ♦
- ***Test & Measurement*** ♦
- ***R&D Laboratories*** ♦
- ***Field Testing*** ♦
- ***Service Installation*** ♦

Signal Generator Solutions

Hittite is committed to providing easy to implement test equipment solutions designed to fulfill your signal generation needs. Built on a foundation of high quality and market leading Hittite MMICs, Hittite's signal generator families provide the highest output power, lowest harmonic levels and broadest frequency range amongst signal generators of their size and cost.

Hittite
MICROWAVE CORPORATION

Ref.# IST-0513

Signal Generators to 70 GHz

Hittite's signal generators combine the highest output power, lowest harmonic levels and broadest frequency range amongst signal generators of their size and cost.

Features:

- *10 MHz Up to 70 GHz, Step Sizes Down to 1 Hz*
- *High Output Power Up to 30 dBm @ 1 GHz*
- *Fast Frequency Switching Below 500 µs*

Advantages:

- *Versatile: Simplifies Test Set-Ups*
- *Reliable: Incorporates Hittite MMICs*
- *Flexible: Manual or Software Control Via USB, GPIB or Ethernet*

HMC-T2270
10 MHz to 70 GHz

Spurious: -60 dBc @ 67 GHz
100 kHz Phase Noise -98 @ 10 GHz

Page 3

HMC-T2240
10 MHz to 40 GHz

Spurious: -70 dBc @ 10 GHz
100 kHz Phase Noise -99 @ 10 GHz

Page 5

HMC-T2220
10 MHz to 20 GHz

Spurious: -70 dBc @ 10 GHz
100 kHz Phase Noise -99 @ 10 GHz

Page 7

HMC-T2220B
10 MHz to 20 GHz

Battery Powered!
Spurious: -70 dBc @ 10 GHz

Page 9

HMC-T2100
10 MHz to 20 GHz

Spurious: -65 dBc @ 10 GHz
100 kHz Phase Noise -93 @ 10 GHz

Page 11

HMC-T2000
700 MHz to 8 GHz

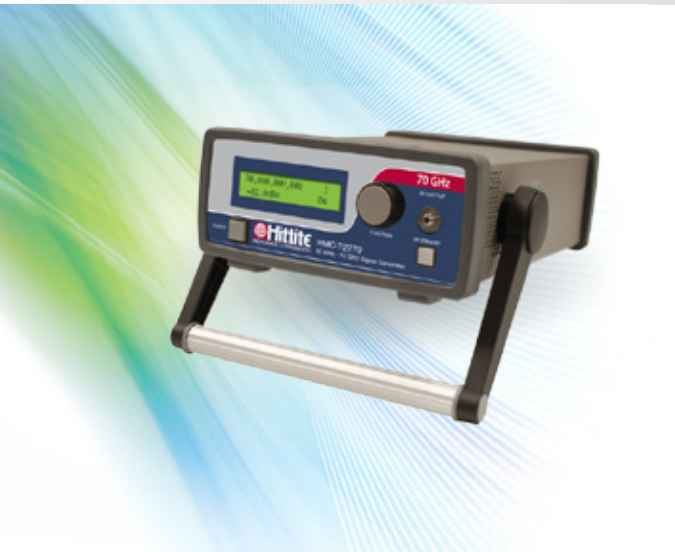
Spurious: -45 dBc @ 4 GHz
100 kHz Phase Noise -87 @ 4 GHz

Page 13

Pricing as of 01/01/2013 is subject to change without notice

HMC-T2270

Signal Generator, 10 MHz to 70 GHz



Performance

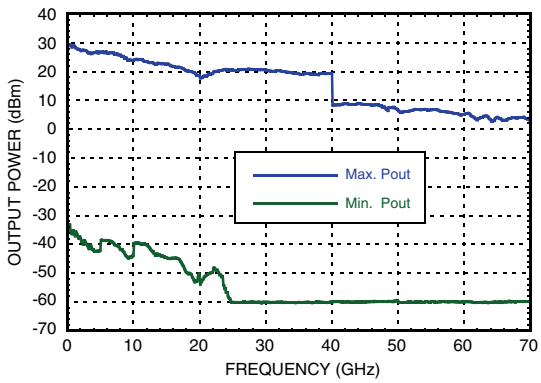
- ***High Output Power: +29 dBm @ 1 GHz, +3.0 dBm @ 70 GHz***
- ***Wide Frequency Range: 10 MHz to 70 GHz***
- ***Excellent Phase Noise Performance: -118 dBc/Hz @ 10 kHz Offset @ 1 GHz, -79 dBc/Hz @ 100 kHz Offset @ 67 GHz***
- ***Integer Spurious: < -65 dBc***
- ***Power Resolution: 0.1 dB***
- ***Frequency Resolution: 1 Hz***

Wideband Coverage from 10 MHz to 70 GHz!

The HMC-T2270 Signal Generator is ideal for engineering development and production test environments in microwave & millimeterwave radio, wireless HDMI, medical, SatCom and sensor equipment applications. The HMC-T2270 delivers the cleanest signal, the broadest frequency coverage with fast switching time at 500 µs and the highest output power compared with any signal generator in its class.

The HMC-T2270 was developed to provide the R&D engineer and the production test engineer with the highest level of performance and functionality, while maintaining reasonable cost. Furthermore, the broad frequency coverage of the HMC-T2270 will be attractive to OEMs involved in the development of new and emerging automotive sensors, millimeterwave communications and medical equipment, as well as those taking advantage of the globally available unlicensed communications spectrum between 57 and 66 GHz.

Output Power Range



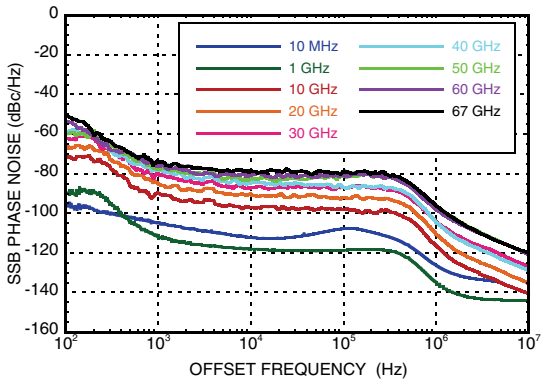
Dynamic Range	Resolution	Power Accuracy	RF OFF
> 60 dB	0.1 dB	±1 dB > -20 dBm ±2 dB < -20 dBm	< -90 dBm

Harmonics

Frequency (GHz)	Sub-Harmonics (dBc)	2nd Harmonics (dBc)	3rd Harmonics (dBc)
0.01	-77	-38	-44
0.5	-78	-34	-55
1	-78	-39	-50
2	-78	-32	-40
5	-74	-37	-59
10	-58	-33	-64
15	-41	-40	-60
25	-71	-29	-
30	-70	-40	-
40	-50	-	-
50	-46	-	-
60	-50	-	-
70	-58	-	-

Output Power:
+10 dBm at or below 40 GHz
See Max. Power above 40 GHz

SSB Phase Noise vs. Frequency



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	-86	-95	-104	-112	-107	-126	-140
1	-80	-90	-111	-118	-118	-134	-143
10	-63	-72	-90	-97	-98	-117	-141
20	-62	-66	-85	-90	-92	-111	-136
30	-54	-62	-80	-87	-87	-105	-127
40	-51	-60	-78	-84	-87	-105	-129
50	-45	-55	-75	-81	-80	-96	-120
60	-41	-54	-76	-81	-81	-98	-121
67	-46	-51	-74	-79	-79	-96	-120

Output Power:
+10 dBm at or below 40 GHz
See Max. Power above 40 GHz

Spurious

< -65 dBc @ Integer Frequencies
< -63 dBc @ Fractional Frequencies <10 GHz
< -57 dBc @ Fractional Frequencies 10-20 GHz
< -52 dBc @ Fractional Frequencies 20-40 GHz
< -46 dBc @ Fractional Frequencies > 40 GHz

Output Power (Maximum Leveled)

Frequency (GHz)	Power Output (dBm)
0.01	26
0.5	29
1	29
2	27
5	26
10	23
15	23
25	20
30	20
40	19
50	7
60	5
70	3

HMC-T2270 Rear Panel I/O Connections

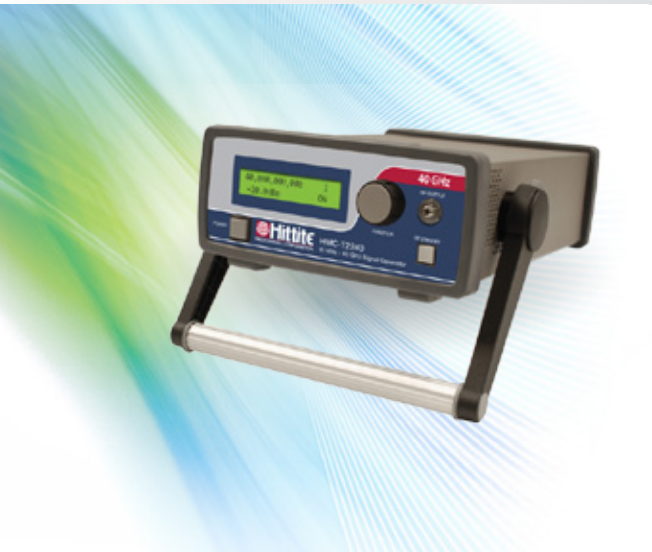
HMC-T2100 Compatibility

To facilitate integration into existing HMC-T2100 applications, the HMC-T2270 has a HMC-T2100 compatibility mode. In this mode, the HMC-T2270 identifies itself as a HMC-T2100 so that the HMC-T2100 USB drivers will work for a HMC-T2270, and programs which use the *IDN? string will recognize a HMC-T2270 as a HMC-T2100. Frequency resolution, maximum and minimum values for power, and minimum sweep dwell time also change to match the HMC-T2100.

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

HMC-T2240

Signal Generator, 10 MHz to 40 GHz



Performance

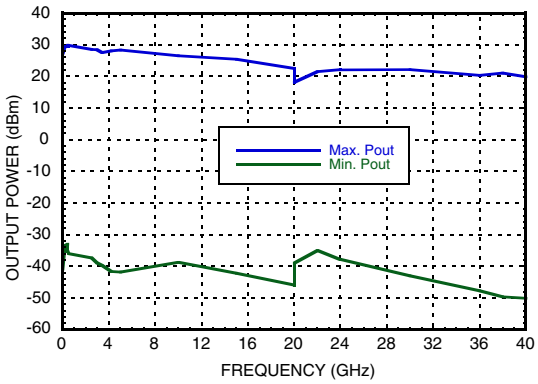
- ***High Output Power: +30 dBm @ 1 GHz***
- ***Wide Frequency Range: 10 MHz to 40 GHz***
- ***Excellent Phase Noise Performance: -98 dBc/Hz @ 10 kHz Offset @ 10 GHz***
- ***Spurious Rejection: -70 dBc @ 10 GHz***
- ***Power Resolution: 0.1 dB***
- ***Frequency Resolution: 1 Hz***

10 MHz to 40 GHz Signal Generator Delivers High Level Performance!

Ideal for use in automated test & measurement environments and research & development laboratories, the HMC-T2240 is a frequency generator that delivers up to +30 dBm of CW output power in 0.1 dB steps over a 60 dB dynamic range. Harmonic rejection is better than -30 dBc and spurious products are better than -52 dBc across the entire bandwidth. Phase noise is -98 dBc/Hz @ 10 kHz offset at 10 GHz. The HMC-T2240 also delivers frequency resolution of 1 Hz and fast switching speed of 500 µs.

The HMC-T2240 is compact and lightweight, making it well suited for integration within various test environments while improving overall productivity and equipment utilization. The compact size and high output power capability of the HMC-T2240 ensures a simpler test configuration, while the broad frequency range of 10 MHz to 40 GHz allows the user to sweep across many microwave and millimeterwave frequency bands with a single synthesizer.

Output Power Range



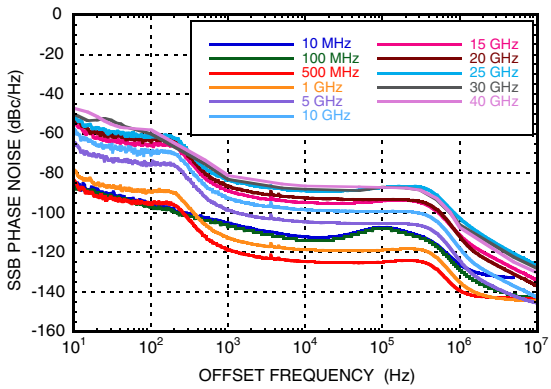
Minimum Settable	Dynamic Range	Resolution	Power Accuracy	RF OFF
-40 dBm	>60 dB	0.1 dB	±1 dB > -20 dBm ±2 dB < -20 dBm	< -70 dBm

Harmonics

Frequency (GHz)	2nd Harmonics (dBc)	3rd Harmonics (dBc)
0.01	-37	-45
0.05	-30	-42
0.1	-30	-40
0.5	-35	-58
1	-34	-52
2	-30	-48
5	-32	-58
10	-34	-68
15	-47	-75
20	-55	-
25	-35	-

Output Power = +10 dBm

SSB Phase Noise vs. Frequency



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	-85	-95	-105	-112	-107	-126	-140
0.10	-88	-97	-106	-114	-108	-128	-142
0.50	-83	-95	-118	-124	-124	-139	-142
1	-79	-89	-112	-118	-119	-135	-144
5	-64	-76	-98	-104	-105	-124	-145
10	-57	-71	-93	-98	-99	-118	-142
15	-54	-66	-88	-94	-94	-111	-134
20	-52	-64	-86	-92	-93	-112	-137
25	-51	-61	-83	-89	-87	-102	-126
30	-50	-60	-83	-88	-87	-106	-128
40	-48	-57	-81	-86	-87	-107	-130

Output Noise: Floor < -150 dBc/Hz 10 MHz to 20 GHz
< -140 dBc/Hz 20 GHz to 40 GHz

Spurious @ 10 dBm Output

< -70 dBc @ Integer Frequencies
< -65 dBc @ Fractional Frequencies <10 GHz
< -57 dBc @ Fractional Frequencies 10-20 GHz
< -52 dBc @ Fractional Frequencies > 20 GHz

Output Power (Maximum Leveled)

Frequency (GHz)	Power Output (dBm)
0.01	25
0.1	28
0.5	30
1	30
5	28
10	26
15	25
20	19
25	20
30	22
40	20

HMC-T2240 Rear Panel I/O Connections

HMC-T2100 Compatibility

To facilitate integration into existing HMC-T2100 applications, the HMC-T2240 has a HMC-T2100 compatibility mode. In this mode, the HMC-T2240 identifies itself as a HMC-T2100 so that the HMC-T2100 USB drivers will work for a HMC-T2240, and programs which use the *IDN? string will recognize a HMC-T2240 as a HMC-T2100. Frequency resolution, maximum and minimum values for power, and minimum sweep dwell time also change to match the HMC-T2100.

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

HMC-T2220

Signal Generator, 10 MHz to 20 GHz

Performance

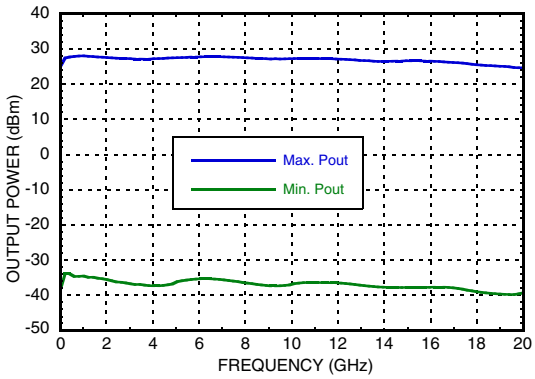
- ***High Output Power: +28 dBm @ 1 GHz***
- ***Wide Frequency Range: 10 MHz to 20 GHz***
- ***Excellent Phase Noise Performance: -98 dBc/Hz @ 10 kHz Offset @ 10 GHz***
- ***Spurious Rejection: -70 dBc @ 10 GHz***
- ***Power Resolution: 0.1 dB***
- ***Frequency Resolution: 1 Hz***

Compact and Versatile Signal Generator covers 10 MHz to 20 GHz with Excellent Phase Noise!

The HMC-T2220 is a compact and lightweight frequency generator that delivers up to +28 dBm of CW output power in 0.1 dB steps over a 60 dB dynamic range. Harmonic rejection is better than -30 dBc and spurious products are better than -57 dBc across the entire bandwidth. Phase noise is -99 dBc/Hz @ 100 kHz offset at 10 GHz with insignificant deviation over the temperature range of 0 to +55 °C. The broad frequency range of 10 MHz to 20 GHz covers all major communication bands with frequency resolution of 1 Hz and fast switching speed of 300 µs.

The HMC-T2220 incorporates several product upgrades compared to the HMC-T2100: 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.

Output Power Range



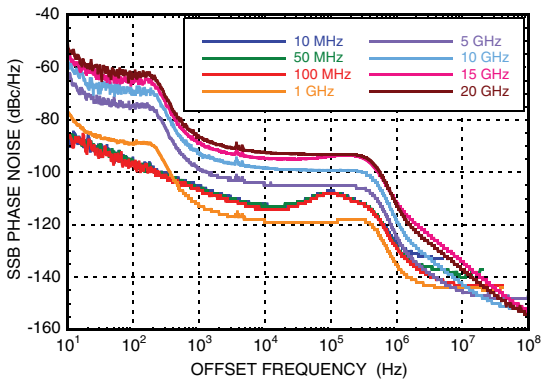
Minimum Settable	Dynamic Range	Resolution	Power Accuracy	RF OFF
-35 dBm	>60 dB	0.1 dB	±1 dB > -20 dBm ±2 dB < -20 dBm	< -80 dBm

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

SSB Phase Noise vs. Frequency



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	-119	-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

Spurious @ 10 dBm Output

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

Output Power (Maximum)

Frequency (GHz)	Power Output (dBm)
0.01	24
0.05	28
0.1	28
0.5	28
1	28
2	27
4	27
10	27
15	27
20	24

HMC-T2220 Rear Panel I/O Connections

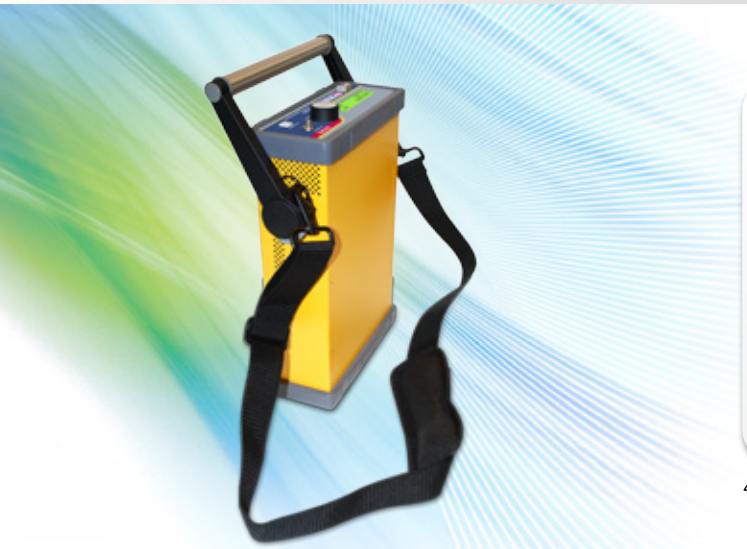
HMC-T2100 Compatibility

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.

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

HMC-T2220B

Portable Signal Generator, 10 MHz to 20 GHz



Performance

- ***High Output Power: +28 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***

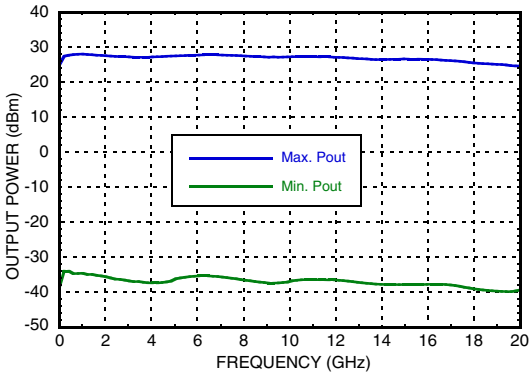
4 hours continuous operation from a fully charged condition with 2 batteries

Battery Powered 20 GHz Signal Generator with 4 Hours of Operation!

The HMC-T2220B is a battery powered, portable test equipment solution designed to fulfill your signal generation needs in the field or on the bench. Internal rechargeable batteries allow for 4 hours of continuous operation, making the HMC-T2220B a portable and versatile instrument, which is particularly attractive for wireless/wired service installation, field testing or remote on-site maintenance applications including cellular base stations.

The HMC-T2220B incorporates several product upgrades compared to the HMC-T2100B: 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 and an added TRIGGER OUT function.

Output Power Range



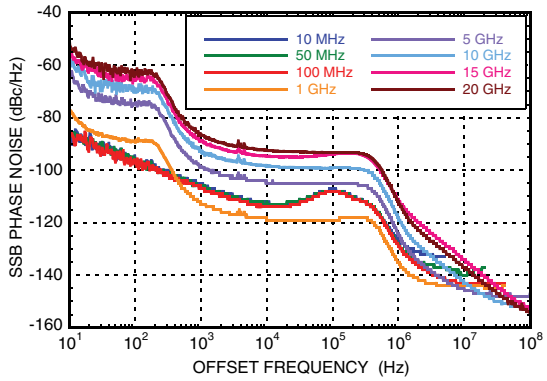
Minimum Settable	Dynamic Range	Resolution	Power Accuracy	RF OFF
-35 dBm	>60 dB	0.1 dB	±1 dB > -20 dBm ±2 dB < -20 dBm	< -80 dBm

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

SSB Phase Noise vs. Frequency



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	-119	-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

Spurious @ 10 dBm Output

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

Battery Power

Type: Lithium Ion, Capacity: 6750 mAh (73 Wh)

Rated Voltage: 10.8V

Continuous Operating Time:
4 hours with 2 Batteries, Hot Swappable

Output Power (Maximum)

Frequency (GHz)	Power Output (dBm)
0.01	24
0.05	28
0.1	28
0.5	28
1	28
2	27
4	27
10	27
15	27
20	24

HMC-T2220B Rear Panel I/O Connections

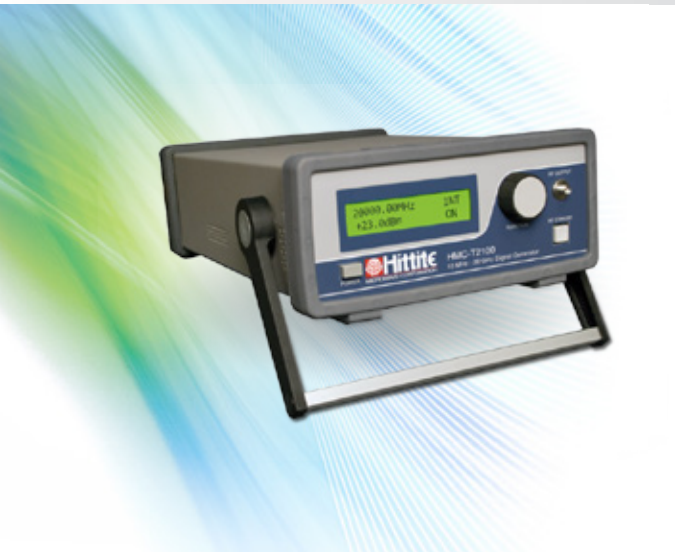
HMC-T2100 Compatibility

To facilitate integration into existing HMC-T2100 applications, the HMC-T2220B has a HMC-T2100 compatibility mode. In this mode, the HMC-T2220B identifies itself as a HMC-T2100 so that the HMC-T2100 USB drivers will work for a HMC-T2220B, and programs which use the *IDN? string will recognize a HMC-T2220B as a HMC-T2100. Frequency resolution, maximum and minimum values for power, and minimum sweep dwell time also change to match the HMC-T2100.

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

HMC-T2100

Signal Generator, 10 MHz to 20 GHz



Performance

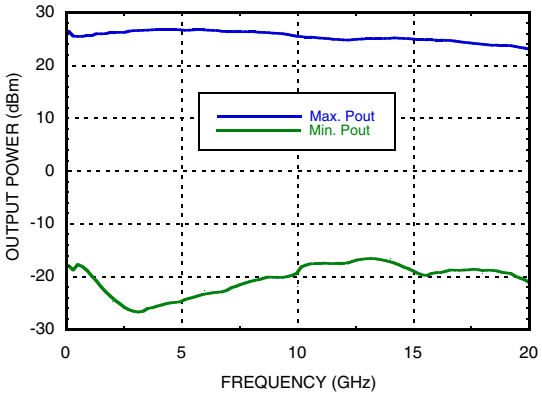
- ***High Output Power: +27 dBm***
- ***Wide Frequency Range: 10 MHz to 20 GHz***
- ***Excellent Phase Noise Performance: -113 dBc/Hz @ 100 kHz Offset @ 1 GHz***
- ***Spurious Rejection: -65 dBc @ 10 GHz***
- ***Power Resolution: 0.1 dB***
- ***Frequency Resolution: 10 kHz***

10 MHz to 20 GHz Signal Generator with Simple Test Configuration!

The HMC-T2100 is an easy to implement 10 MHz to 20 GHz Signal Generator which provides the highest output power, lowest harmonic levels and broadest frequency range compared with any signal generator in its class. The HMC-T2100 is compact and lightweight making it well suited for integration within various test environments, while improving overall productivity and equipment utilization. The size and capability of the HMC-T2100 ensures a simpler test configuration coupled with exceptional value.

Ideal for use in automated test & measurement environments and research & development laboratories, the HMC-T2100 delivers up to +27 dBm of CW output power in 0.1 dB steps over a 40 dB dynamic range. Harmonic rejection is better than -39 dBc at 1 GHz and integer mode spurious products are better than -65 dBc at 10 GHz. Phase noise is -113 dBc/Hz @ 100 kHz offset from 1 GHz with insignificant deviation over the temperature range of 0 to +35 °C. The broad frequency range of 10 MHz to 20 GHz covers all major communication bands with frequency resolution of 10 kHz and fast switching speed of 300 µs.

Output Power Range



Minimum Settable	Dynamic Range	Resolution	Output Source Match	Power Accuracy	RF OFF
-15 dBm	>40 dB @ 10 GHz	0.1 dB	< 2.0:1	±1 dB for leveled outputs	< -60 dBm

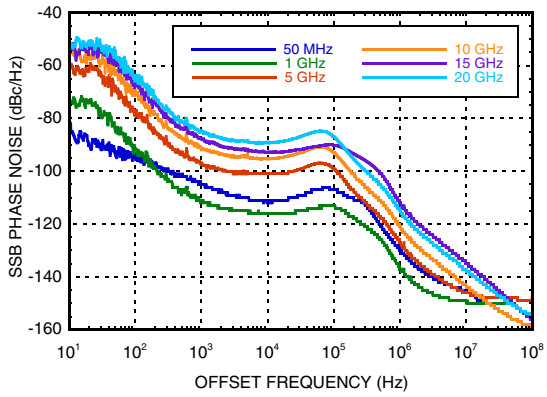
Spectral Purity

Frequency (GHz)	2nd Harmonics (dBc)	3rd Harmonics (dBc)	Spurious [1] (dBc)
0.01	-20	-36	-78
0.05	-36	-41	-52
0.1	-21	-31	-80
0.5	-27	-38	-80
1	-39	-49	-80
2	-32	-52	-89
5	-38	-56	-75
10	-29	-55	-65
15	-27	-44	-51
20	-42	-	-55

Output Power = +10 dBm

[1] Integer mode frequencies

SSB Phase Noise vs. Frequency



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	-79	-89	-97	-105	-104	-126	n/a
0.05	-89	-95	-105	-111	-107	-130	-145
0.1	-83	-94	-105	-112	-107	-129	-145
0.5	-80	-96	-117	-122	-119	-142	-150
1	-73	-91	-111	-116	-113	-137	-149
2	-67	-83	-106	-110	-107	-131	-147
5	-59	-77	-98	-101	-99	-127	-146
10	-55	-69	-92	-95	-93	-121	-143
15	-51	-67	-87	-93	-90	-112	-135
20	-53	-66	-85	-89	-87	-115	-137

Output Noise: Floor < -155 dBc/Hz

Spurious @ 10 dBm Output

< -33 dBc @ Fractional Frequencies < 10 GHz
< -27 dBc @ Fractional Frequencies > 10 GHz

Output Power (Maximum Leveled)

Frequency (GHz)	Power Output (dBm)
0.01	22
0.05	26
0.1	26
0.5	25
1	25
2	26
4	27
10	25
15	24
20	22

HMC-T2100 Rear Panel I/O Connections

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

HMC-T2000

Signal Generator, 700 MHz to 8 GHz

Performance

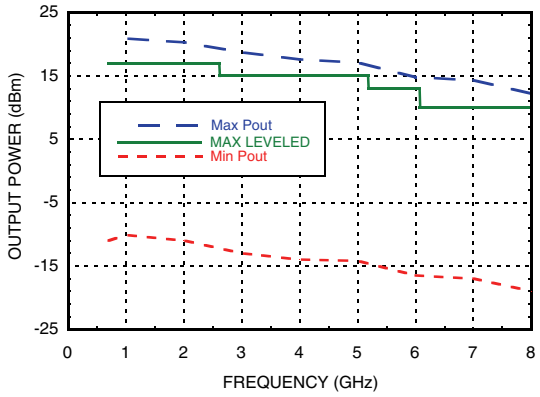
- ***High Output Power: +17 dBm***
- ***Wide Frequency Range: 700 MHz to 8 GHz***
- ***Spurious Rejection: < -45 dBc***
- ***Phase Continuity Capability: Integer Mode Architecture***

Signal Generator Covering 700 MHz to 8 GHz, is an Exceptional Value!

The HMC-T2000 is a compact and lightweight frequency generator that delivers up to +20 dBm (+17 dBm leveled) of CW output power with better than -30 dBc of harmonic rejection at 1 GHz and spurious products better than -42 dBc across the entire frequency range. Phase noise is -87 dBc/Hz @ 100 kHz offset from 4 GHz with insignificant deviation over the temperature range 0 to +35 °C. The broad frequency range of 700 to 8000 MHz covers all major communication bands with a frequency resolution of 1 MHz and a fast switching speed of <200 us at 100 MHz steps.

The HMC-T2000 Signal Generator capability and size ensures a simpler test configuration coupled with an exceptional value compared to alternatives.

Output Power Range



Minimum Settable	Dynamic Range	Resolution	Output Source Match	Power Accuracy
-18 dBm @ 8 GHz	31 dB	0.5 dBm	< 2.0:1	±1 dB from -18 to +20 dBm

Spectral Purity

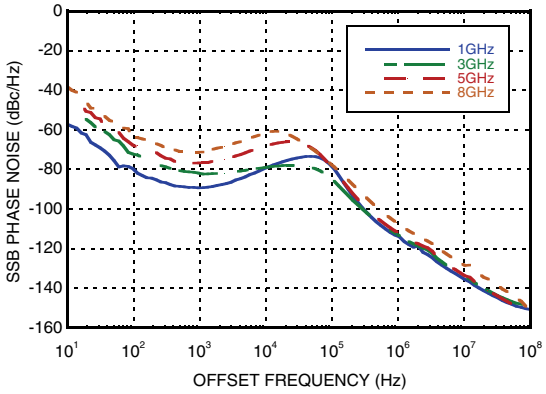
Frequency (GHz)	2nd Harmonics (dBc)	3rd Harmonics (dBc)	Spurious (dBc)
1	-30	-44	-57
4	-33	-54	-55
8	-26	-56	-45

Output Power = +10 dBm

Output Power (Maximum Leveled)

Frequency (GHz)	Power Output (dBm)
0.7 to 2.6	+17
2.6 to 5.0	+15
5.0 to 6.0	+13
6.0 to 8.0	+10

SSB Phase Noise vs. Frequency



SSB Phase Noise (dBc/Hz)

Frequency (GHz)	Offset From Carrier					
	100 Hz	1 kHz	10 kHz	100 kHz	1 MHz	10 MHz
1 GHz	-79	-83	-79	-78	-113	-127
4 GHz	-67	-79	-74	-87	-111	-133
8 GHz	-65	-72	-65	-72	-106	-128

Output Noise: Floor < -150 dBc/Hz

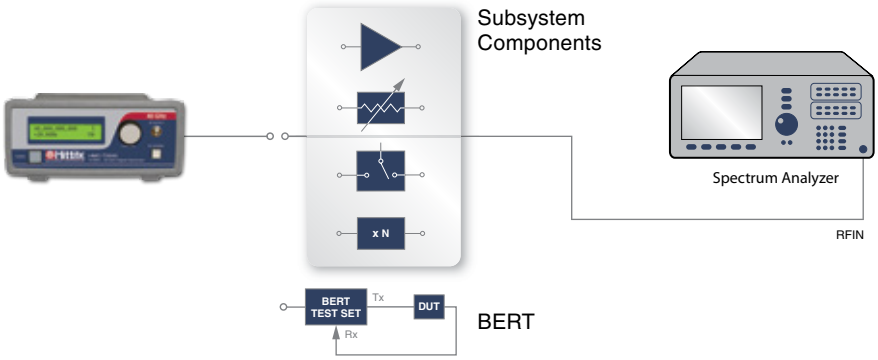
HMC-T2000 Rear Panel I/O Connections

Note: All specifications apply over +15 °C to +35 °C ambient range after 30 minutes of warm-up time unless otherwise stated.

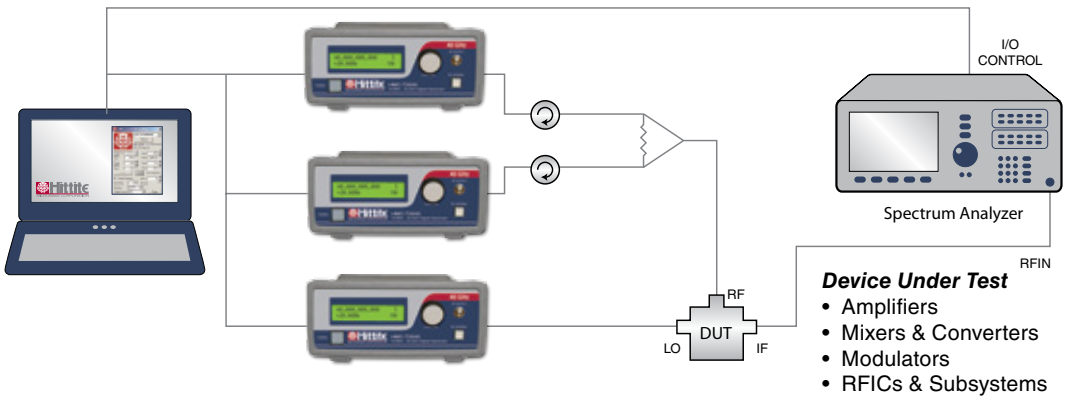
Typical Applications:

- *Automatic Test Equipment*
- *Test & Measurement*
- *R&D Laboratories*
- *Field Testing & Service Installation*

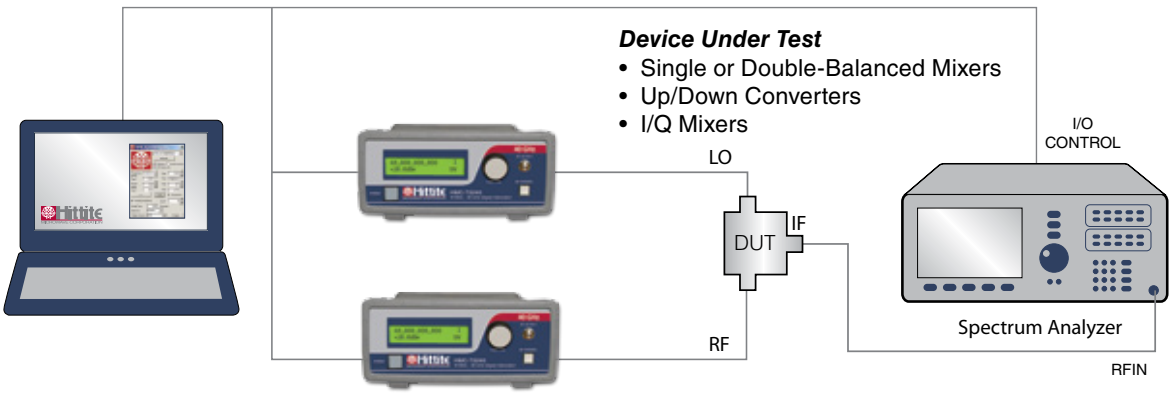
Subsystem Test Set-up Including BERT



Two Tone Third Order Intercept Test Set-up



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



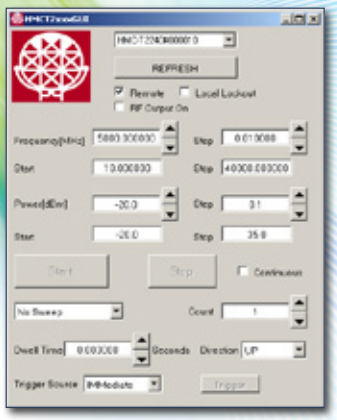
General Specifications

	HMC-T2270	HMC-T2240	HMC-T2220
Frequency:	Accuracy: For < 2.5 GHz, Reference +0/-90 nHz For > 2.5 GHz, Reference +0/-2.88 uHz Internal Reference: ±1.5 ppm Resolution: 1 Hz Aging Rate: <1 ppm/yr External Reference Input: 10 MHz (Sine Wave) Internal Reference Output: 10 MHz (Square Wave) Frequency Switching Speed: 500 µs	Accuracy: As Per Internal Ref. ±1.5 ppm Resolution: 1 Hz Internal Reference: 10 MHz Aging Rate: <1 ppm/yr External Reference Input: 10 MHz (Sine Wave) Internal Reference Output: 10 MHz (Square Wave) Frequency Switching: 500 µs	Accuracy: As Per Internal Ref. ±1.5 ppm Resolution: 1 Hz Internal Reference: 10 MHz Aging Rate: <1 ppm/yr External Reference Input: 10 MHz (Sine Wave) Internal Reference Output: 10 MHz (Square Wave) Frequency Switching: 300 µs
Input / Output:	10 MHz REFOUT [1] 10 MHz REFIN [2] TRIGGER IN [3]: TTL TRIGGER OUT [3]: TTL RS-232 (used for field upgrades) Ethernet GPIB USB 1.1/2.0 RF Output 1.85 mm Female	10 MHz REFOUT [1] 10 MHz REFIN [2] TRIGGER IN [3]: TTL TRIGGER OUT [3]: TTL RS-232 (used for field upgrades) Ethernet GPIB USB 1.1/2.0 RF Output 2.92 mm Female	10 MHz REFOUT [1] 10 MHz REFIN [2] TRIGGER IN [3]: TTL TRIGGER OUT [3]: TTL RS-232 (used for field upgrades) Ethernet GPIB USB 1.1/2.0 RF Output SMA Female Maximum DC voltage applied to RF Output: 8V
Power - AC:	100 to 240 VAC @ 50 to 60 Hz	100 to 240 VAC @ 50 to 60 Hz	100 to 240 VAC @ 50 to 60 Hz
Operating Temperature	0 to 35 °C	0 to 35 °C	0 to 55 °C[4]
Storage Temperature:	-20 to 70 °C	-20 to 70 °C	-20 to 70 °C
Cooling:	2 Internal Fans	2 Internal Fans	2 Internal Fans
Fan Noise:	< 50 dBa	< 50 dBa	< 50 dBa
Environment:	(for indoor use only): 0 to 35 °C	(for indoor use only): 0 to 35 °C	(For indoor use only): 0 to 35 °C
Mechanical Vibration & Shock:	MIL PRF-288000 Class 4	MIL PRF-288000 Class 4	MIL PRF-288000 Class 4
Compliance:	CSA & CE	CSA & CE	CSA & CE
General Mechanical Characteristics:	H: 76.2 mm (3 in) W: 203 mm (8 in) D: 305 mm (12 in) Weight 3.7 kg (8.16 lbs)	H: 76.2 mm (3 in) W: 203 mm (8 in) D: 305 mm (12 in) Weight 3.6 kg (7.94 lbs)	H: 76.2 mm (3 in) W: 203 mm (8 in) D: 305 mm (12 in) Weight 3.2 kg (7.05 lbs)
Warranty:	1 Year	1 Year	1 Year

[1] +10 dBm typ. into 50 Ohms; BNC Connector
[2] -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

General Specifications

	HMC-T2220B	HMC-T2100	HMC-T2000
Frequency:	Accuracy: As Per Internal Ref. ±1.5 ppm Resolution: 1 Hz Internal Reference: 10 MHz Aging Rate: <1 ppm/yr External Reference Input: 10 MHz (Sine Wave) Internal Reference Output: 10 MHz (Square Wave) Frequency Switching: 300 µs	Accuracy: As Per Internal Ref. ±1.5 ppm Resolution: 10 kHz Internal Reference: 10 MHz Aging Rate: <1 ppm/yr External Reference Input: 10 MHz (Sine Wave) Internal Reference Output: 10 MHz (Sine Wave) Frequency Switching: 300 µs	Accuracy: As Per Internal Ref. ±2.0 ppm Resolution: 1 MHz Power Slope: 0 to 0.8 dB/GHz Internal Reference : 10 MHz Aging Rate: <1 ppm/yr Temperature Stability: <0.5 ppm External Reference Input: -10 dBm to +5 dBm into 50 Ohms 10 MHz square, 200 to 1200 mVp-p Internal Reference Output: 10 MHz (LVTTL)
Input / Output:	10 MHz REFOUT [1] 10 MHz REFIN [2] TRIGGER IN [3]: TTL TRIGGER OUT [3]: TTL RS-232 (used for field upgrades) Ethernet GPIB USB 1.1/2.0 RF Output SMA Female Maximum DC voltage applied to RF Output: 8V	10 MHz REFOUT [1] 10 MHz REFIN [2] TRIGGER IN [3]: LVTTL RS-232 (factory use only) Ethernet GPIB USB 1.1 / 2.0	RF Out: N-type Connector 10 MHz Ref : BNC Connector USB 1.1 / 2.0
Power - AC:	100 to 240 VAC @ 50 to 60 Hz	100 to 240 VAC@ 50 to 60 Hz	100 to 240 VAC @ 50 to 60 Hz
Operating Temperature	0 to 35 °C	0 to 35 °C	0 to 35 °C
Storage Temperature:	-20 to 70 °C	-20 to 70 °C	-20 to 70 °C
Cooling:	2 Internal Fans	2 Internal Fans	Convection
Fan Noise:	< 50 dBa	< 60 dBa	N/A
Environment:	0 to 35 °C	(For indoor use only): 0 to 35 °C	(For indoor use only): 0 to 35 °C
Mechanical Vibration & Shock:	MIL PRF-288000 Class 4	MIL PRF-288000 Class 4	MIL PRF-288000 Class 4
Compliance:	CSA & CE	CSA & CE	CE
General Mechanical Characteristics:	H: 76 mm (3 in) W: 203 mm (8 in) D: 305 mm (12 in) Weight: 5 kg (11.02 lbs)	H: 76.2 mm (3 in) W: 203 mm (8 in) D: 305 mm (12 in) Weight 3.2 kg (7.05 lbs)	H: 63.5 mm (2.49 in) W: 184 mm (7.24 in) D: 254 mm (10 in) Weight 1.6 kg (3.52 lbs)
Warranty:	1 Year	1 Year	1 Year



Connectivity & Control

The units' compact size, light weight, fast switching speed and USB, GBIP 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 (Labview included) 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® or 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.

AC Power Cord [1]

Part Number	Region	Price [2]
HMC-PC01	Continental Europe	$9.25
HMC-PC02	United Kingdom	$20.50
HMC-PC03	China	$15.50
HMC-PC04	Australia, New Zealand	$9.25
HMC-PC05	North America	$9.25
HMC-PC06	South Africa / India	$20.50
HMC-PC07	Switzerland	$15.50
HMC-PC08	Denmark	$15.50
HMC-PC09	Israel	$15.50
HMC-PC10	Italy	$9.25
HMC-PC11	Japan	$9.25

AC Power Supply [1]

Part Number	Description	Price [2]
HMC-T2000-PSUP	100 - 240V AC Power Supply	$70.00
HMC-T2100-PSUP	100 - 240V AC Power Supply	$100.00
HMC-T2200-PSUP[3]	100 - 240V AC Power Supply	$120.00

[1] One AC power cord and AC power supply are included with each instrumentation product. Please specify the power cord upon ordering.
[2] Pricing as of 01/01/2013 is subject to change without notice.
[3] For HMC-T2100B and HMC-T2200 Series products.

Replacement Batteries & Chargers

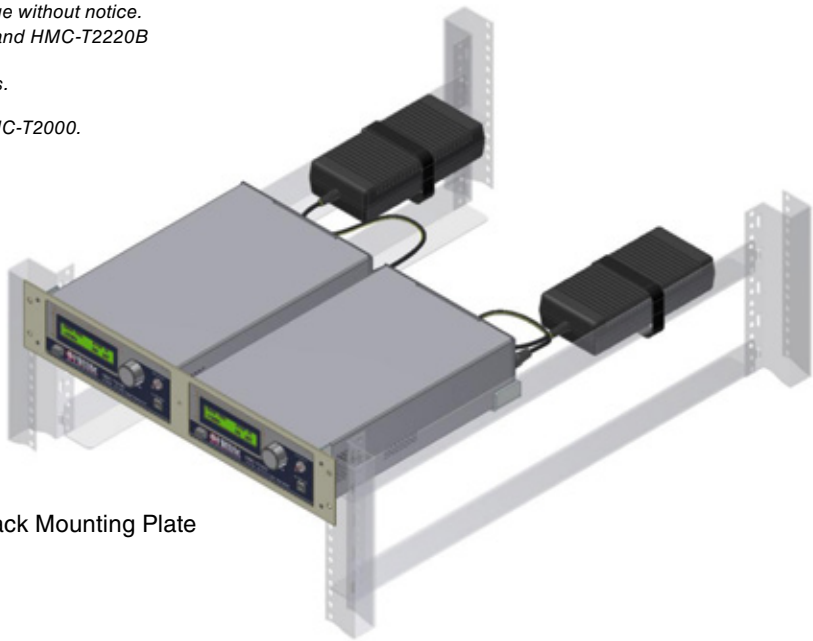
Model Number	Description	Price [2]
HMC-T2220B-BATTERY [4]	Lithium-Ion Battery Pack 10.8V, 6900mAh	$179.00
HMC-T2220B-CHARGER [5]	Lithium-Ion Battery Charger, 10.8V 11.1V 7200mAh	$280.00

HMC-T2220B Portable Shown with Batteries

Test Rack Mount Kit

Part Number	Description	Price [2]
HMC-RM01 [6]	Dual Rack Mounting Plate 19" 2u Chassis	$385.00
HMC-RM02 [7]	Dual Rack Mounting Plate 19" 2u Chassis	$385.00

[2] Pricing as of 01/01/2013 is subject to change without notice.
[4] Two batteries included with HMC-T2100B and HMC-T2220B instrumentation products.
[5] For HMC-T2100B and HMC-T2220B orders.
[6] For HMC-T2000 Only.
[7] For all instrumentation products except HMC-T2000.



HMC-T2220 Configured with Dual Rack Mounting Plate

Certifications

- CE Certification
- CSA Certification

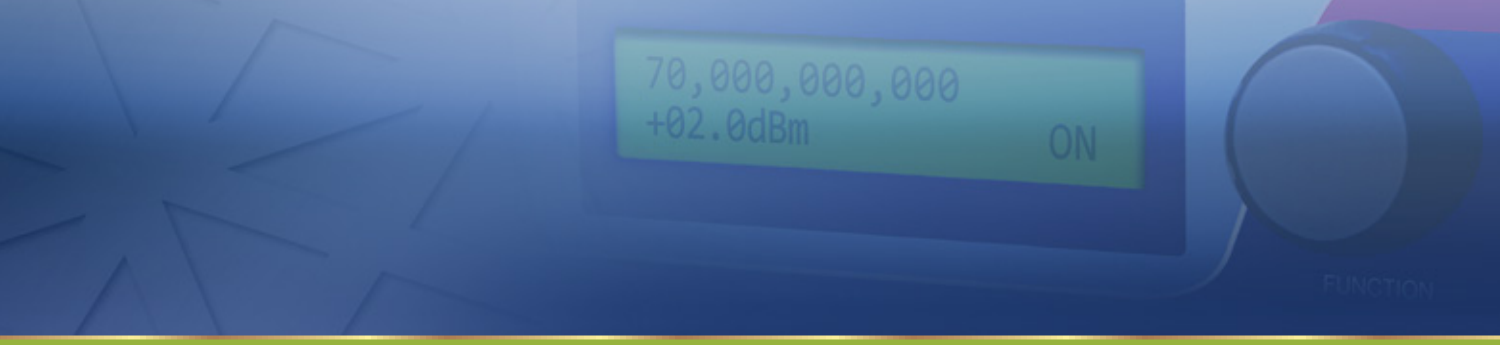
Certificates are available for download at www.tm-hittite.com

Warranty

All products come with a standard 1 year warranty covering parts, labor and shipping costs.

Service / Repair / Calibration

For details visit our web site at http://www.hittite.com/products/service.html or contact the Hittite Sales Department (USA) at 978-250-3343 or send an email to TE@hittite.com.



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