1140A SPECIFICATIONS

GENERAL	
Operating Temperature Range	0 to 50 °C
Non-operating Temperature Range	-40 to 70 °C
Relative Humidity	0 to 95%, non-condensing
EMI	
Below 1 GHz	Complies with VXIbus Revision 1.3/1.4 specifications
Above 1 GHz	Complies with RE02 of MIL-STD-461C
Warm-up Time	15 minutes at 25 °C ambient temperature
Weight	<18 lbs
VXIbus	
Compatibility	Full compliance with VXIbus Specification for message-based instruments
Module Size	C-size, 3 slots wide
Device Type	Message-based instrument
Protocol	Word Serial
Address/Data Modes Supported	A16/D16
Local Bus	Not used
ECLTRG Utilization	Available for triggerable functions
TTLTRG Utilization	Available for triggerable functions
CLK10 Utilization	Not used
Cooling	0.1 mm H_2O @ 5 liters/sec for <25 °C internal temperature rise
Power Dissipation	<160 watts
Current Requirements	

Voltage (VDC)	+5	+12	+24	-2	-5.2	-12	-24
I_{PEAK} (Amperes)	2.0	2.8	2.9	0.2	0.2	0.8	2.0

FREQUENCY	
Range	0.01 to 20 GHz
Resolution	1 Hz
Accuracy	Same as timebase
Internal Timebase	
Frequency	10 MHz
Aging Rate	<1 x 10^{-9}/day at 25 °C after 72 hours warm-up
Temperature Stability	<1 x 10^{-7} change over 0 to 50 °C
Switching Time	<50 ms to within 500 Hz (Triggered List Mode, 0.01 to 20 GHz step)

1140A SPECIFICATIONS (Continued)

PROGRAMMING

Compatibility	Conforms to SCPI Version 1993.0
Sweep Mode	Triggered List/Sweep

SPECTRAL PURITY
(at +10 dBm CW output 10 MHz to 18 GHz, +5 dBm 18 to 20 GHz, Complex Modulation OFF)

	10 MHz to 2 GHz	2 to 4.84 GHz	4.84 to 10 GHz	10 to 20 GHz
Subharmonic Spurious	None	None	None	<-60 dBc
Harmonic Spurious	<-20 dBc	<-25 dBc	<-25 dBc	<-25 dBc
Power Line Related Spurious	<-45 dBc	<-51 dBc	<-45 dBc	<-39 dBc

Non-Harmonically Related Spurious

	0.01 to 2 GHz		2 to 4.84 GHz		4.84 to 10 GHz		10 to 20 GHz	
Offset Frequency	Level	Typical	Level	Typical	Level	Typical	Level	Typical
<100 kHz	<-40 dBc	<-50 dBc	<-46 dBc	<-56 dBc	<-40 dBc	<-50 dBc	<-34 dBc	<-44 dBc
100 kHz to <1 MHz	<-50 dBc	<-60 dBc	<-56 dBc	<-66 dBc	<-50 dBc	<-60 dBc	<-44 dBc	<-54 dBc
1 to 100 MHz	<-60 dBc	<-70 dBc	<-60 dBc	<-70 dBc	<-60 dBc	<-70 dBc	<-60 dBc	<-63 dBc
>100 MHz	<-60 dBc①	<-70 dBc	<-70 dBc	<-75 dBc	<-70 dBc	<-75 dBc	<-60 dBc	<-75 dBc

Residual Modulation (50 Hz to 15 kHz bandwidth)

	10 MHz to 2 GHz	2 to 4.84 GHz	4.84 to 10 GHz	10 to 20 GHz
FM	<150 Hz rms	<75 Hz rms	<150 Hz rms	<300 Hz rms
AM	<0.1% peak	<0.1% peak	<0.1% peak	<0.1% peak

Single-sideband Phase Noise (dbc/Hz)②

	Offset from Carrier						Offset from Carrier				
Frequency	30 Hz	100 Hz	1 kHz	10 kHz	100 kHz	Frequency	30 Hz	100 Hz	1 kHz	10 kHz	100 kHz
10 MHz	-81	-84	-84	-85	-87	11 GHz	-76	-78	-80	-79	-81
1 GHz	-78	-81	-82	-83	-84	12 GHz	-75	-78	-79	-79	-81
2 GHz	-85	-86	-89	-92	-93	13 GHz	-74	-77	-78	-79	-81
3 GHz	-83	-85	-88	-91	-93	14 GHz	-72	-77	-77	-78	-80
4 GHz	-83	-85	-84	-86	-87	15 GHz	-72	-76	-77	-78	-79
5 GHz	-83	-84	-84	-85	-87	16 GHz	-72	-75	-76	-77	-78
6 GHz	-81	-84	-84	-85	-87	17 GHz	-72	-75	-76	-76	-78
7 GHz	-78	-82	-83	-84	-86	18 GHz	-71	-73	-76	-76	-78
8 GHz	-78	-81	-82	-83	-84	19 GHz	-71	-73	-76	-75	-76
9 GHz	-77	-79	-80	-82	-84	20 GHz	-71	-73	-76	-74	-74
10 GHz	-77	-79	-80	-80	-80						

① 1.8 to 2 GHz, -55 dBc

② Typical performance is >7 dB lower than specified.

1140A SPECIFICATIONS (Continued)

RF OUTPUT	
Range (Leveled)	
10 MHz to 2 GHz	+10 to -80 dBm
2 to 10 GHz	+13 to -90 dBm
10 to 18 GHz	+10 to -90 dBm
18 to 20 GHz	+5 to -90 dBm
Resolution	0.1 dB
Power Accuracy (In CW mode with attenuator and ALC coupled)	
10 MHz to 2 GHz	± 2.0 dB, >-50 dBm; ± 3.0 dB, ≤-50 dBm
2 to 20 GHz	± 1.0 dB, >-50 dBm; ± 2.0 dB, -50 to -80 dBm; ± 2.0 dB typical, <-80 dBm
Output Level Switching Time (Triggered List mode)	With attenuator change: <100 ms typical Without attenuator change: <5 ms/dB typical
Source Impedance	50 Ω nominal
VSWR	<2.0:1 (0 dB attenuation) typical
Connector	APC 3.5 female
Reverse Power Tolerance	1 watt continuous

10 MHz INPUT/OUTPUT	
Frequency	10 MHz
Level	0 dBm ± 3 dB
Impedance	50 Ω nominal
Connector	BNC female

PULSE MODULATION (external) (at +10 dBm output power)	
Pulse Repetition Frequency	DC to 10 MHz
Minimum Pulse Width	50 ns
On/Off Ratio	>80 dB
Rise/Fall Time	<15 ns, 10% to 90%
Pulse Overshoot, Ringing	<10% for PRF's <1 MHz
Pulse Width Compression	<10 ns at 50% points (<5 ns typical)
Video Feedthrough	<20 mV p-p (<10 mV p-p typical)
Delay Time	<55 ns, 50% TTL to 50% RF (<30 ns typical)
Peak-to-CW Level Accuracy	<0.5 dB change (>50 ns pulse widths excluding leading edge overshoot/ringing)
Input Level	TTL compatible
Input Level Tolerance	-0.5 ≤Vin ≤ +7.0 Vdc continuous
Polarity	RF output is ON with a TTL logic "1" input
Connector	BNC female

1140A SPECIFICATIONS (Continued)

AMPLITUDE MODULATION (external)	
Rate	DC to 100 kHz (3 dB bandwidth, typical)
Depth	0% to 90% minimum
Distortion	<5% (50% depth, 1 kHz rate)
Sensitivity	Programmable from 0% to 100%. 2.0 V p-p input gives full-scale modulation.
Modulation Index Accuracy	± 10% (50% depth, 1 kHz rate, 2.0 V p-p modulating input)
Modulation Overdrive Threshold	± 2 Vdc ± 10%
Average Power Output	$-20 \log\left(1 + \frac{\text{Modulation Index}}{100}\right) \pm 2$ dB relative to set CW level with AM OFF
Input Impedance	10 kΩ ± 10%
Input Level Tolerance	± 20 Vdc continuous
Connector	BNC female

IF INPUT (Complex Modulation)	
Input Frequency	300 MHz to 1 GHz, programmable
Input Level	-6 dBm nominal
Instantaneous 3 dB Bandwidth	>50 MHz typical (ALC OFF)
Spurious Output (+10 dBm output level, ALC ON, -6 dBm input level), typical	

IF Input	Level
300 to <700 MHz	<-30 dBc
700 MHz to 1 GHz	<-60 dBc

Input Impedance	50 Ω nominal
Input VSWR	<2.0:1 typical
Connector	BNC female

Note: Specifications subject to change without notice.