

-Key Features-

- Power Meter 50 to 7000MHz
- Frequency Counter 100 to 7000MHz
- Signal Generator 300 to 9600MHz
- Calibrated Output Power
- High Dynamic Range
- Low Phase Noise
- RF Divider Mode
- Windows GUI Operation USB COM Port
- Internal 280PPB Reference
- External 10MHz Reference Input
- OLED Display and Buttons
- Industry Standard SCPI Commands

DS Instruments

TT7000_{R6}

RF Power Meter, Signal Generator, Frequency Counter



TT7000, A Multi-Purpose Instrument

The TT7000 combines a Microwave Power Meter, Signal Source, Frequency counter, and RF Divider in one compact instrument. The frequency counter and power meter cover up to 7000MHz. The signal generator covers from 300 to 9600MHz.

Counting and Power reading can be done simultaneously over the entire band. The power meter dynamic range is from -50dBm to +5dBm. Accuracy is typically +/- 1.0dB from 0dBm to -30dBm when the frequency count is valid. Frequency can be manually set for low power signals to calibrate the power reading value.

The SG function is fully synthesized with step size less than 10Hz using precision internal or external 10MHz reference. Adjustable output power from +10dBm to -20dBm is now standard for the TT7000 with 0.25dB steps! Signal generator and power meter can function simultaneously and will auto-calibrate to the set frequency.

The RF input can also be processed by a RF Divider with 1/2/4/8 options. The output of the RF Divider is available on the RF OUT port with adjustable power level.

Front Panel and USB Interfaces

With the TT7000 connected to a host PC via its USB port, which is configured as a virtual COM port, industry standard SCPI text commands can control the TT7000 and retrieve instrument measurement data.

The OLED display and interface buttons allow the user to not only verify incoming SCPI commands from the USB interface, but also control the unit in standalone mode with NO HOST PC REQUIRED.



www.dsinstruments.com

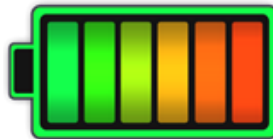
TT7000

Proper Usage and Warnings



Never exceed the maximum power of +15dBm on the meter INPUT port!

- Power measurements can be inaccurate if the automatic counter cannot determine an approximate frequency. Use the PC GUI to manually enter the frequency range of your signal if auto-range is not consistent.
- If the power level is too low or there is no signal input, the frequency counter display will wonder. This is normal functionality.



The TT7000 requires up to **0.75** Amperes in certain modes. Some legacy USB ports are limited to 0.5 Amperes. A stable 5.0 volt input voltage is critical for reliable operation within the unit's specifications. Many common ways to satisfy this requirement exist:

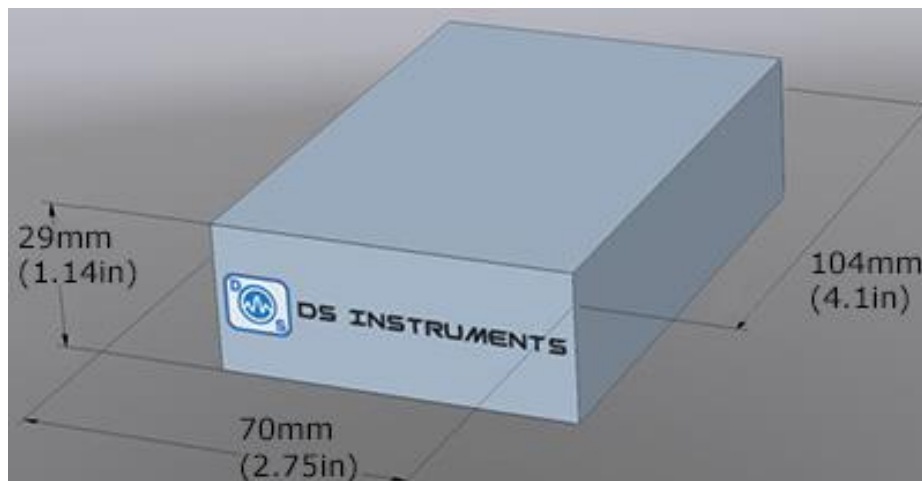
- A high quality USB cable connected directly to a POWERED USB hub.
- A high quality dual-port USB cable connected to two USB ports.
- A high quality USB cable plugged into a blue **USB 3** port.
- A lithium-ion USB battery pack
- A USB smart phone charger (5 Volt wall adapter)

*A "High Quality" USB cable uses a heavier gauge wire resulting in less voltage loss from end to end. Our suggested cable is maximum 1 meter length with 22 AWG conductors.

For more information or questions contact us:
Support@DSInstruments.com

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TT7000 Front and Rear Panel Features



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SIGNAL GENERATOR SPECIFICATIONS

Conditions: 25° C

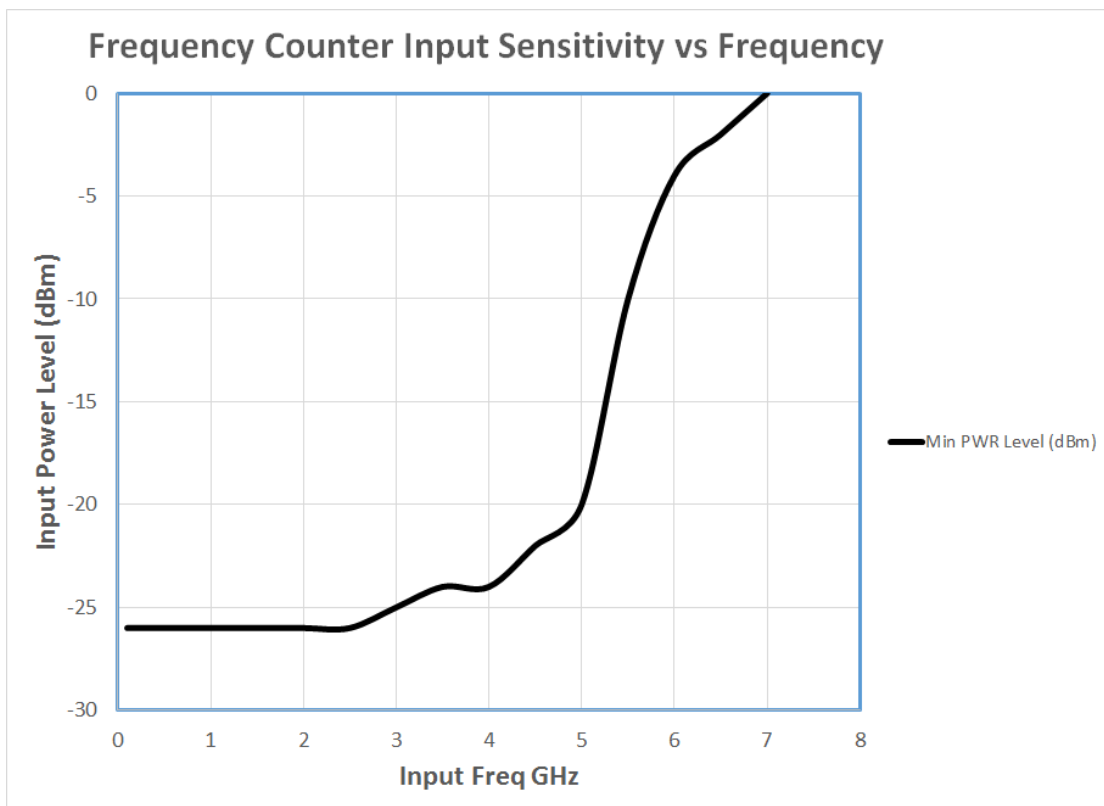
Parameter	Min	Max	Typ	Units
Frequency Range (Adjustable power - Band 1)	300	4800		MHz
RF Output Power (Calibrated Mode – Band 1)	-21	+10		dBm
RF Output Power (Uncalibrated Mode – Band 1)	-35	+12		dBm
Frequency Range (Fixed – Band 2)	4800	9600		MHz
RF Output Power (Fixed: 4800-9600MHz Band 2)	+10	+17	+13	dBm
Phase Noise @ 9600MHz, 10KHz Offset			-76	dBc
@ 4800MHz, 10KHz Offset			-80	dBc
@ 2100MHz, 10KHz Offset			-87	dBc
@ 900MHz, 10KHz Offset			-95	dBc
@ 433MHz, 10KHz Offset			-102	dBc
@ 315MHz, 10KHz Offset			-104	dBc
Output Port Return Loss	6		10	dB
Frequency Step Size (Band 2 is doubled)		10		Hz
Step Attenuator Range (Calibrated Band)		31.5		dB
Attenuator Step Size (Calibrated Band)	0		0.25	dB
Variable Attenuator Dyn. Range (Calibrated Band)			15	dB
Power Output Level Typical Accuracy			±1.5	dBm
USB Voltage	4.75	5.35	5.0	Vdc
Device Current Requirement			0.75	A
Temperature Range	-30	+50	25	C
Reference Frequency MCX Input (10MHz)	-5	+12	+5	dBm
Internal 10MHz Reference Stability			±280	PPB

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FREQUENCY COUNTER SPECIFICATIONS

Conditions: 25° C, USB supplied power

Parameter	Min	Max	Typ	Units
Input Frequency Range	100	7000		MHz
Input Power Sensitivity	-25	+10	0	dBm
Input Impedance			50	Ohm
Input VSWR, 50 to 7000MHz	1.3:1	1.6:1	1.5:1	SWR
Internal 10MHz Time Base Stability			±280	PPB
Resolution @ 1sec Gate Time			1000	Hz
Gate Times (Front Panel Operation Only Supports 1sec Gate)	0.1	10	1	SEC



RMS POWER METER SPECIFICATIONS

Parameter	Min	Max	Typ	Units
Input Frequency Range	50	7000		MHz
Dynamic Range (0.01 – 2.0GHz)	-54	+9		dBm
Dynamic Range (2.0 – 6.0GHz)	-45	+5		dBm
Dynamic Range (6.0 – 7.5GHz)	-35	+5		dBm
Max Power Input (Damage Level)			+15	dBm
Input Impedance			50	Ohm
Input VSWR, 50 to 7000MHz	1.3:1	1.8:1		SWR
Resolution			0.01	dB
Absolute Power Accuracy	±2.00		±0.75	dB
Relative Power Accuracy	±0.75		±0.25	dB
Temperature Stability			±0.25	dB
Power Meter Architecture			RMS	
Measurement Speed	25	500	100	mS
Averaging Range	1	50	10	

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RF DIVIDER SPECIFICATIONS

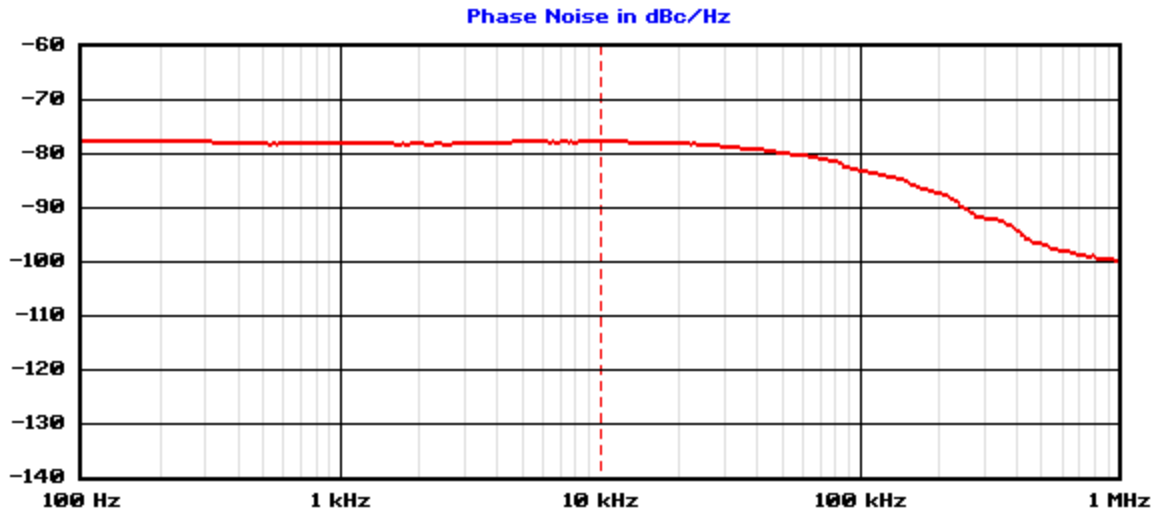
Parameter	Min	Max	Typ	Units
Input Frequency Range @ RF IN Jack	300	7000		MHz
Output Frequency Range @ RF OUT Jack	37.5	3500		MHz
Divide Ratios Available		1/2/4/8		----
Input Power Sensitivity	-10	+10	0	dBm
Input Impedance @ RF IN Jack			50	Ohm
Input VSWR, 300 to 7000MHz	1.2:1	1.6:1	1.4:1	SWR
Output Power @ RF Out Jack	+7	+14	+10	dBm
Output Impedance @ RF OUT Jack			50	Ohm
Output VSWR	1.3:1	1.6:1	1.25:1	SWR

Conditions: 25° C

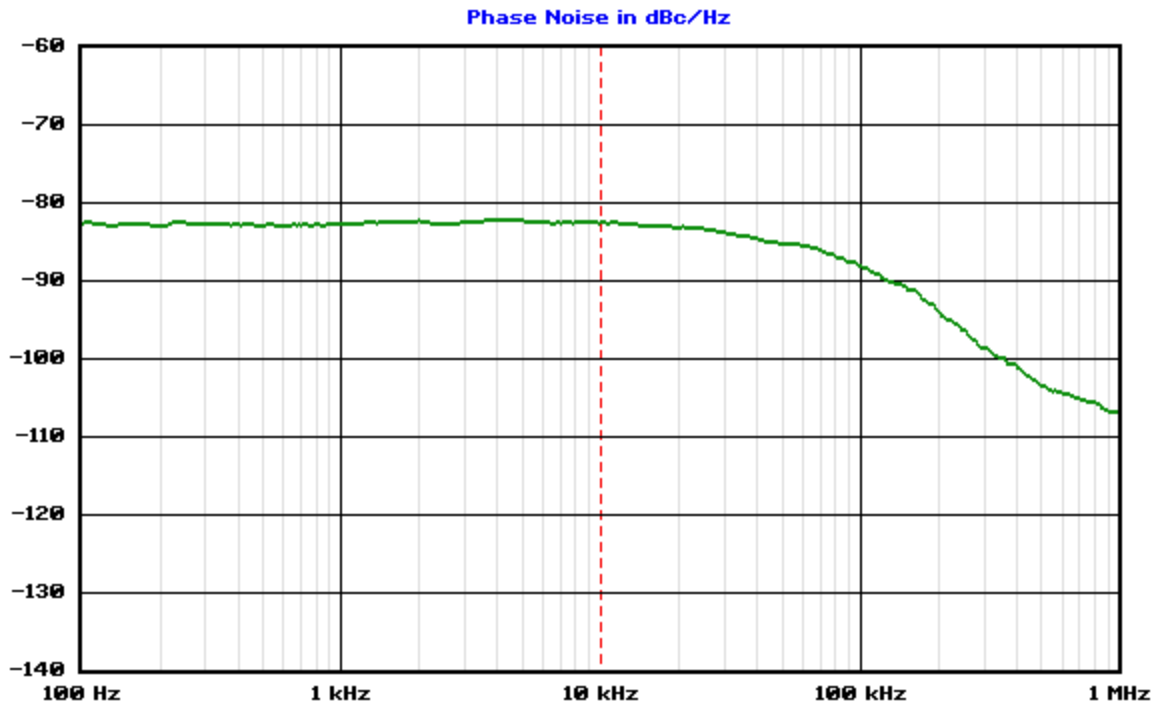
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Typical Phase Noise

[25 Deg. C, USB Power]



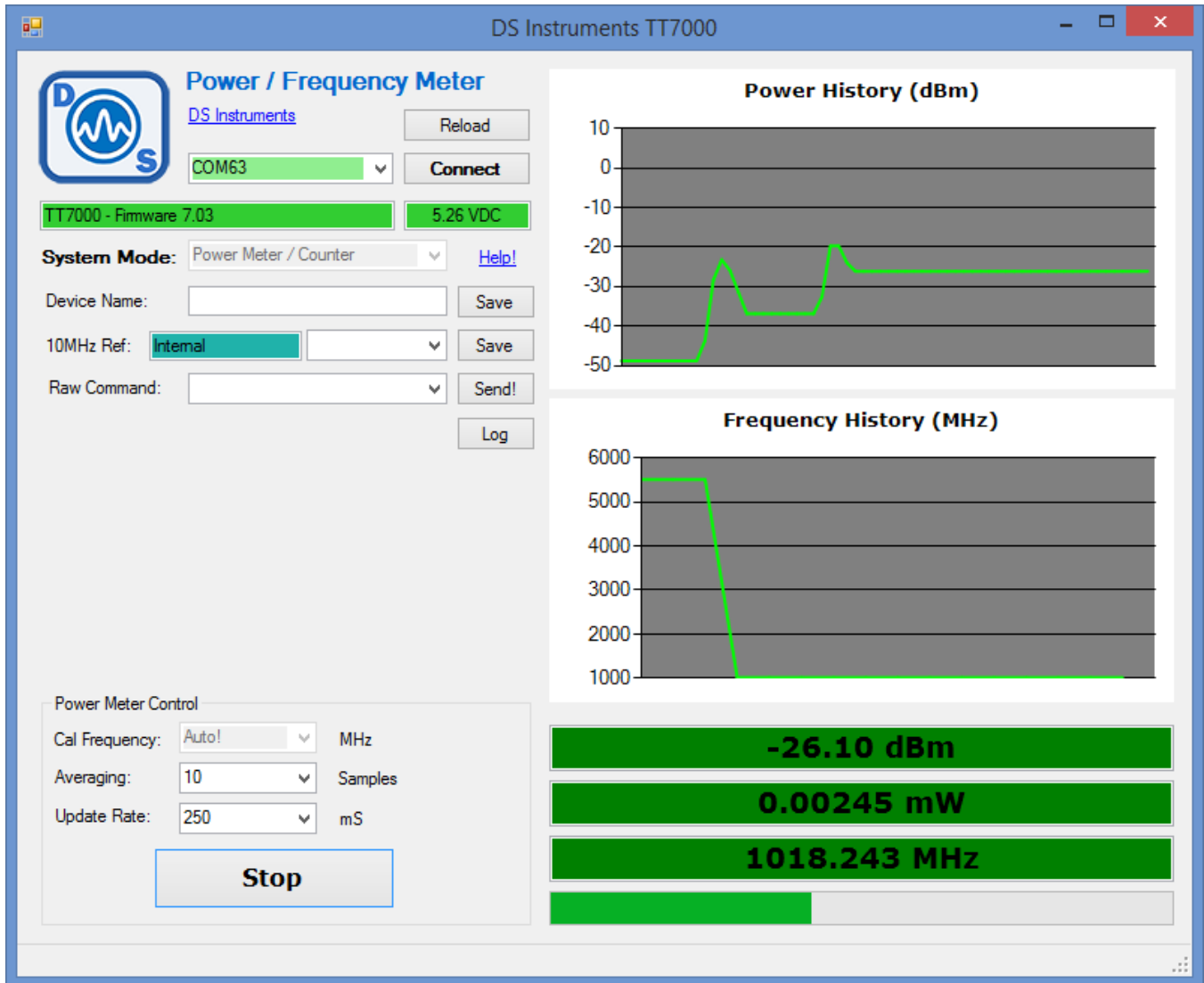
Carrier Hz	Carrier dBm	dBc/Hz at 10000 Hz	RF Atten dB	VBW/RBW	Sweep
9 600 000 000	7.60	-77.5	10	1.00	70s



Carrier Hz	Carrier dBm	dBc/Hz at 10000 Hz	RF Atten dB	VBW/RBW	Sweep
4 800 000 000	9.80	-82.4	10	1.00	70s

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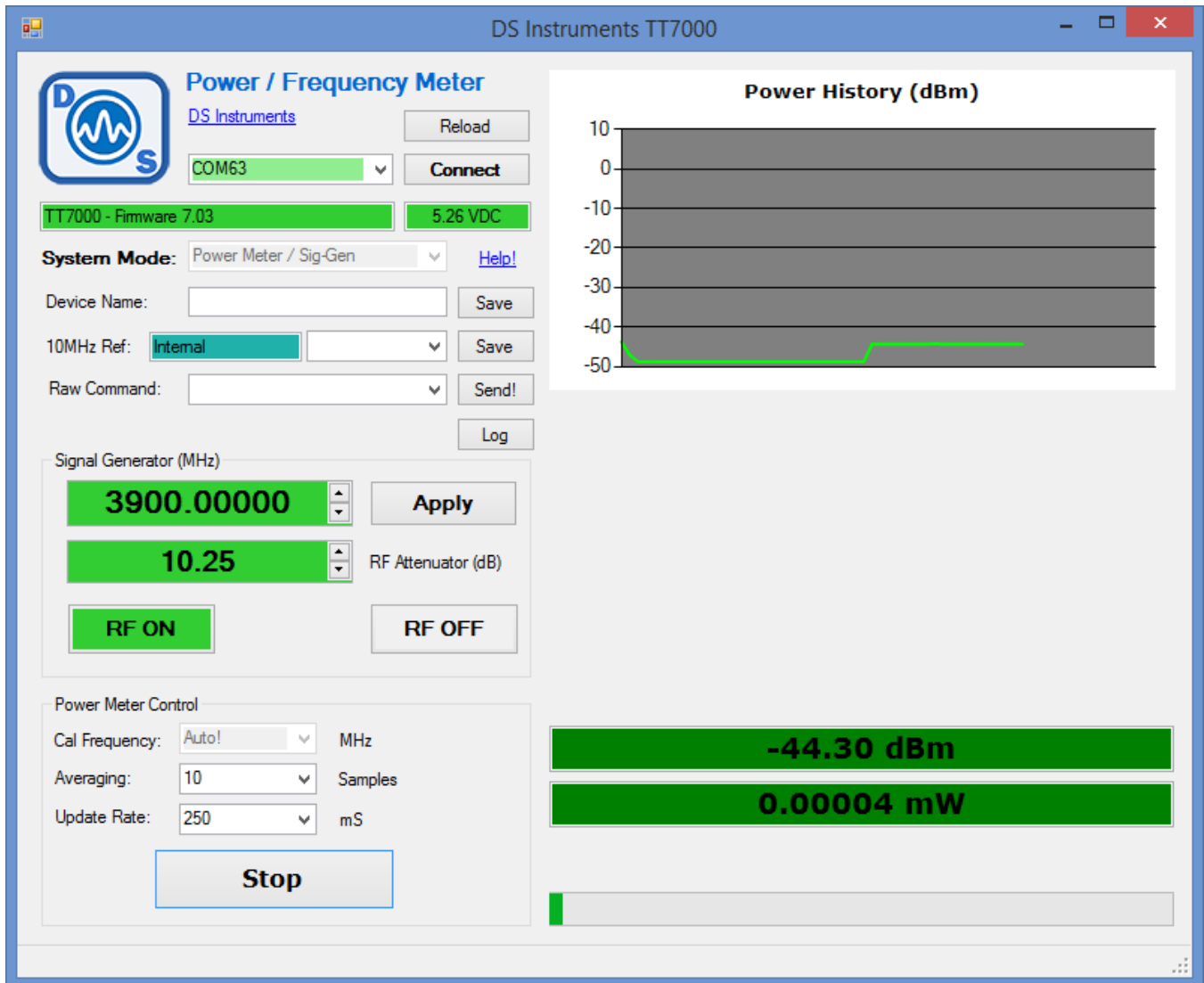
Windows Power Meter and Frequency Counter GUI via USB



Power meter is automatically calibrated using the frequency counter. Both values are displayed and graphed in real time. Values are color-coded to indicate level of reliability and signal strength.

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Windows Signal Generator GUI via USB

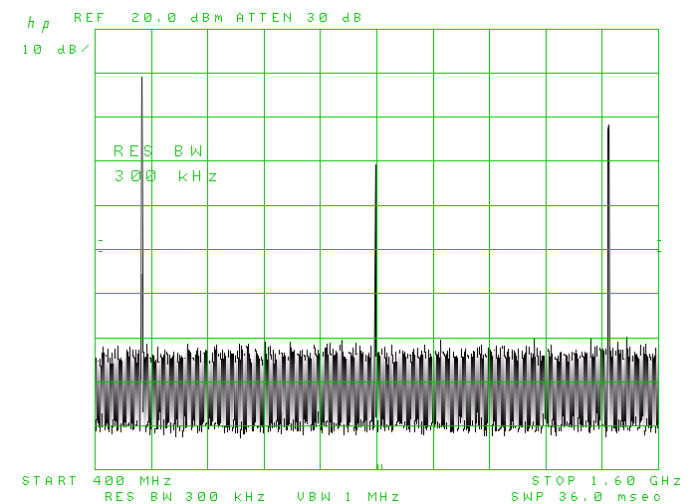
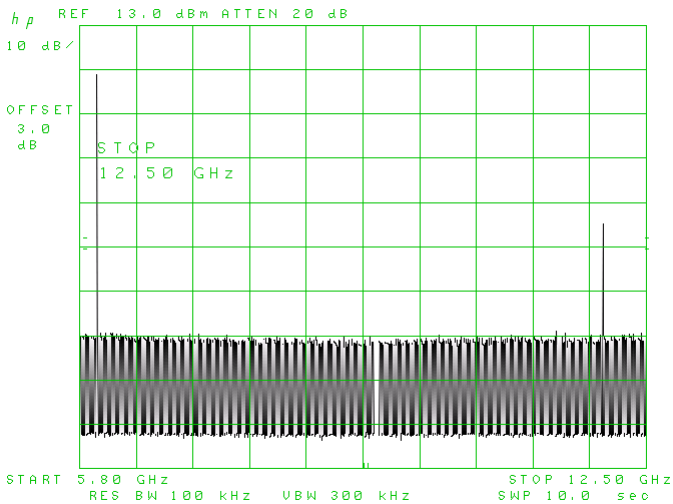
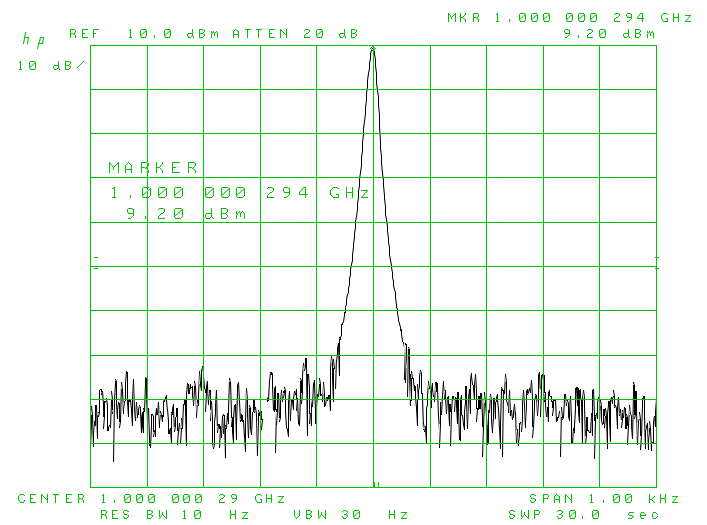
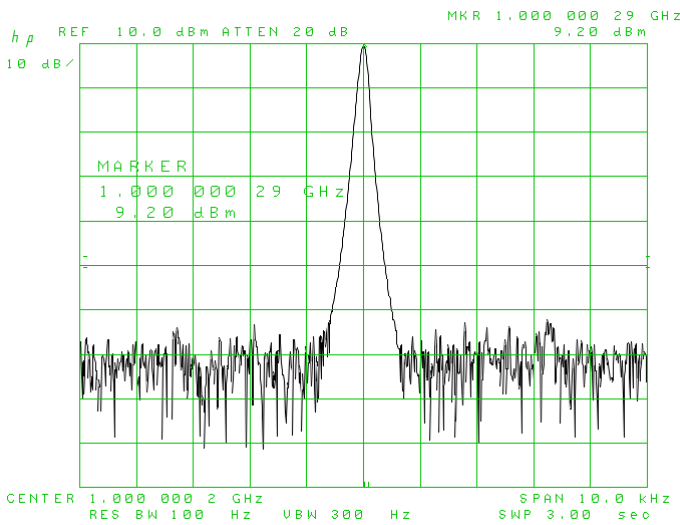
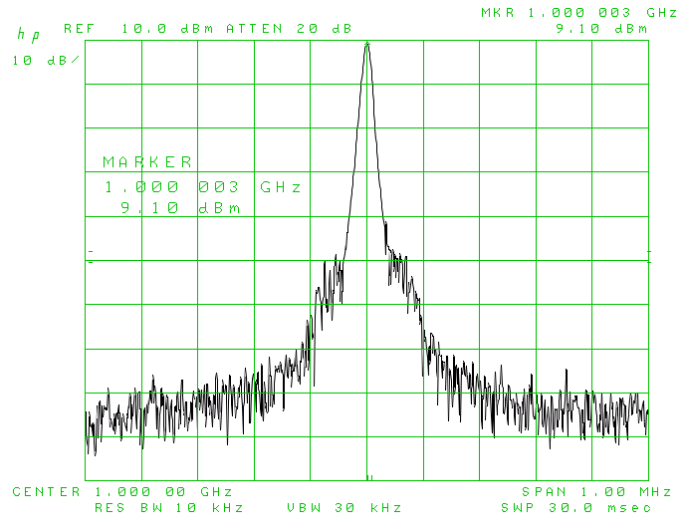
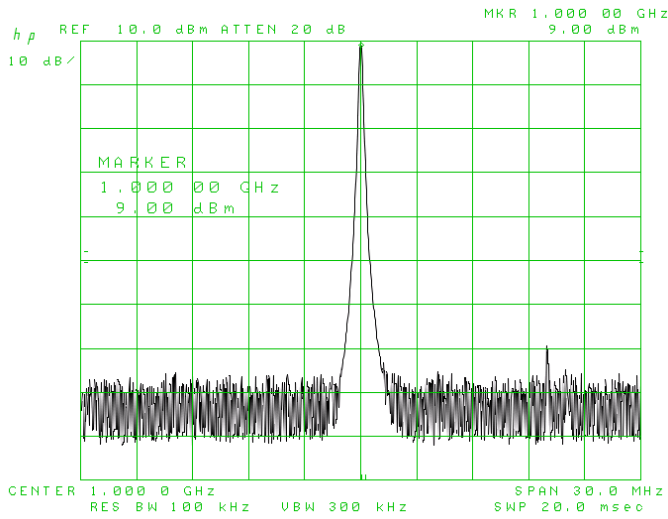


Step attenuation is available up to 4800MHz. Signal Generator and power meter **can** be used simultaneously.

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Typical Output Power Spectrums

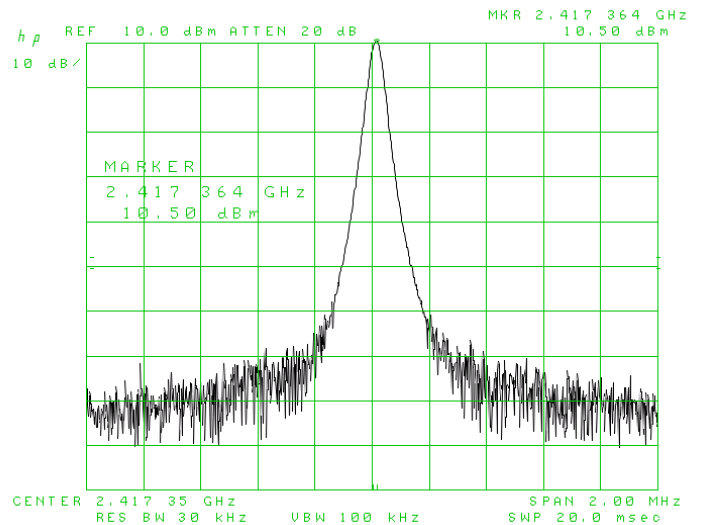
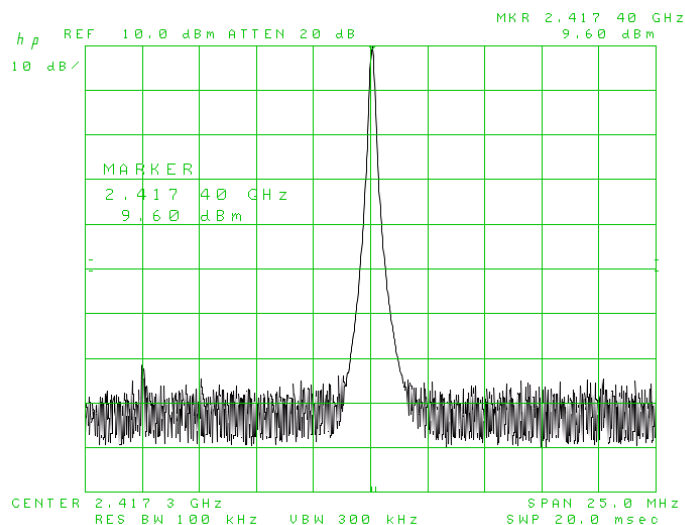
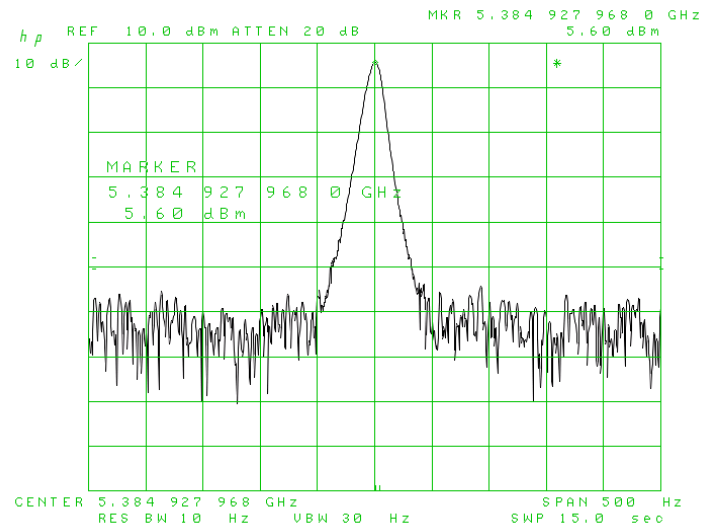
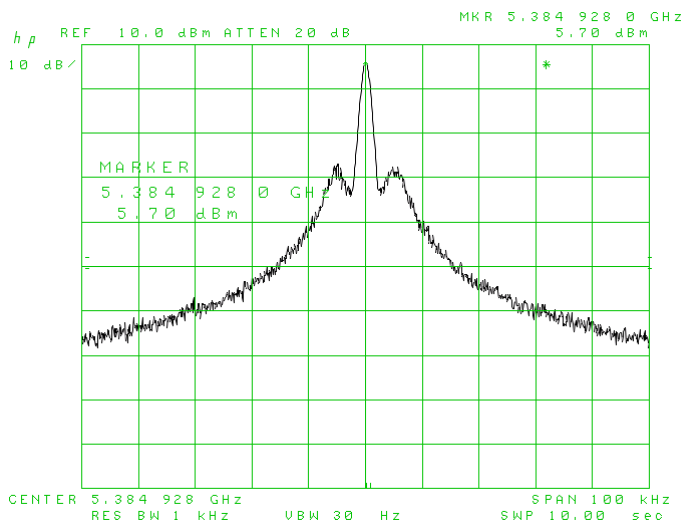
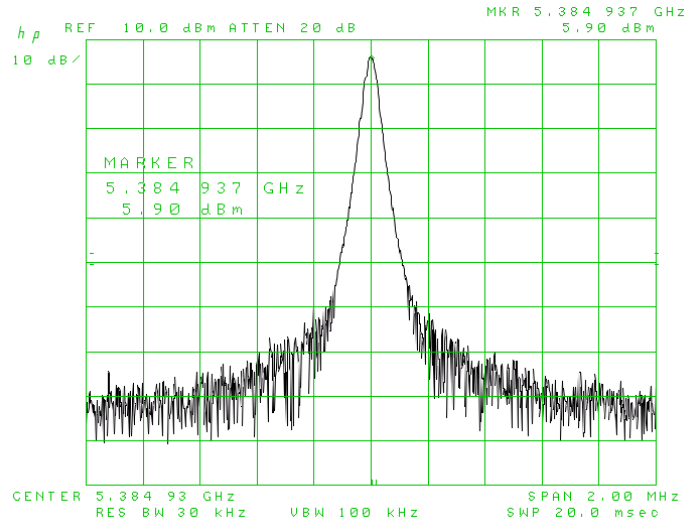
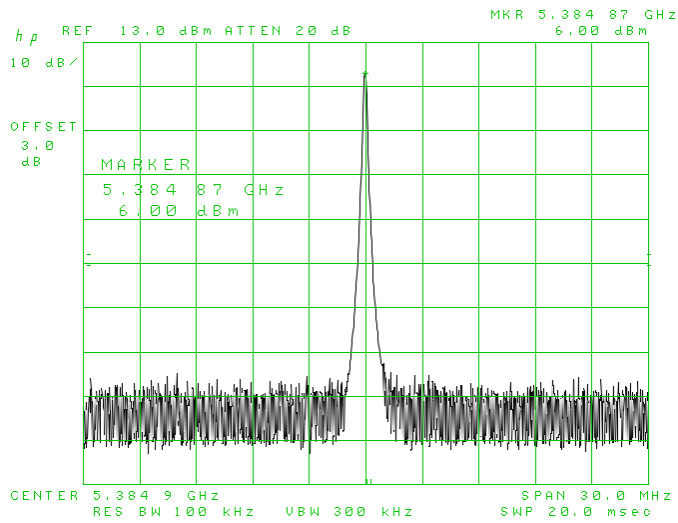
[25 Deg. C, USB Power]



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Typical Output Power Spectrums, Cont.

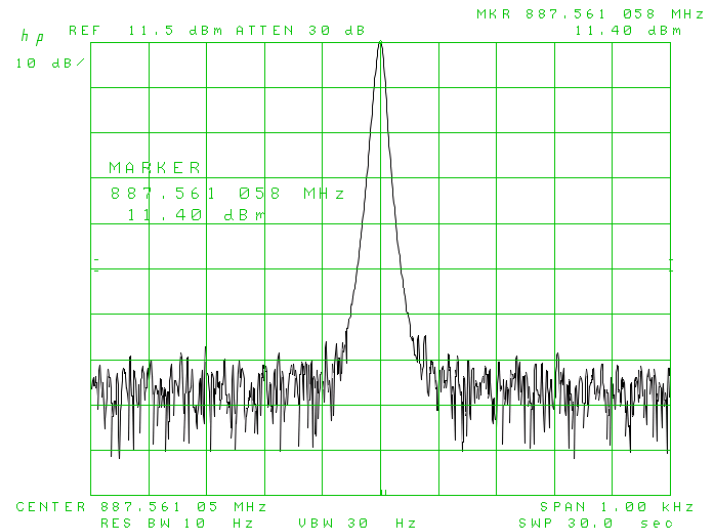
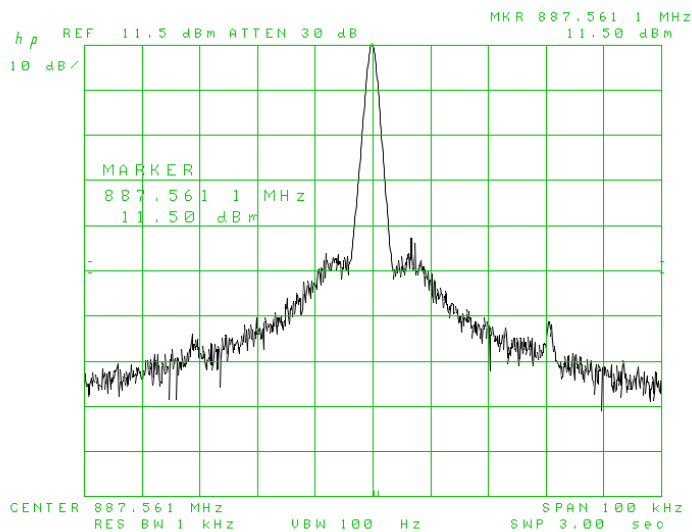
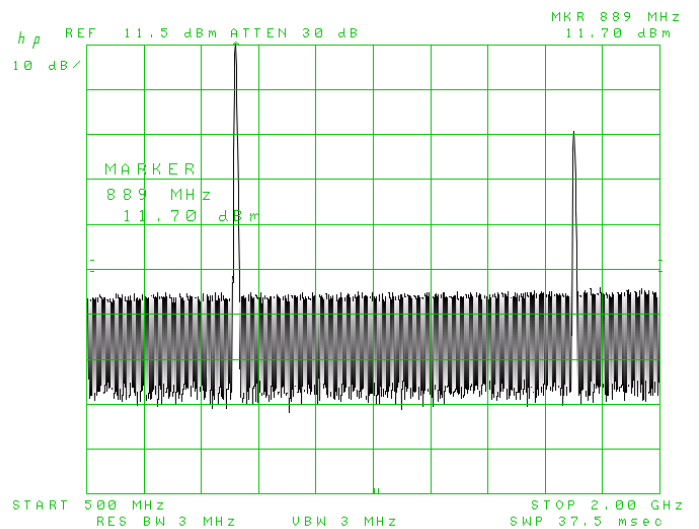
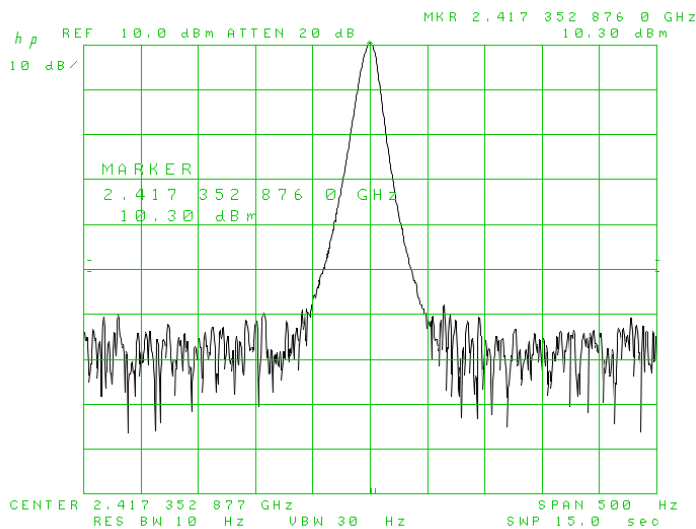
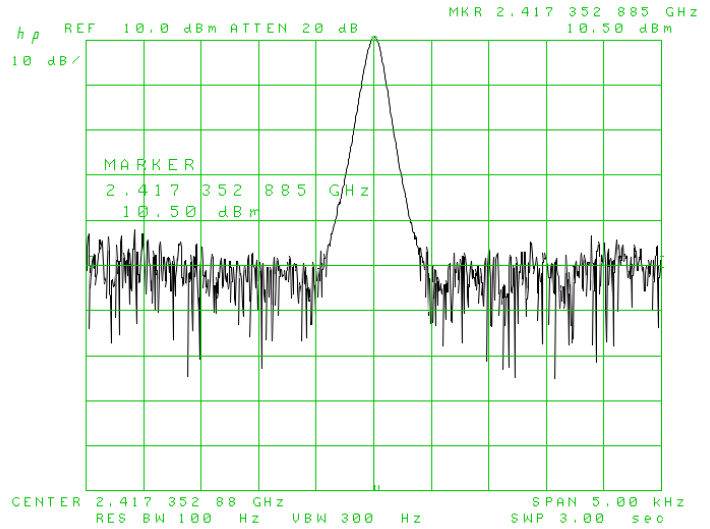
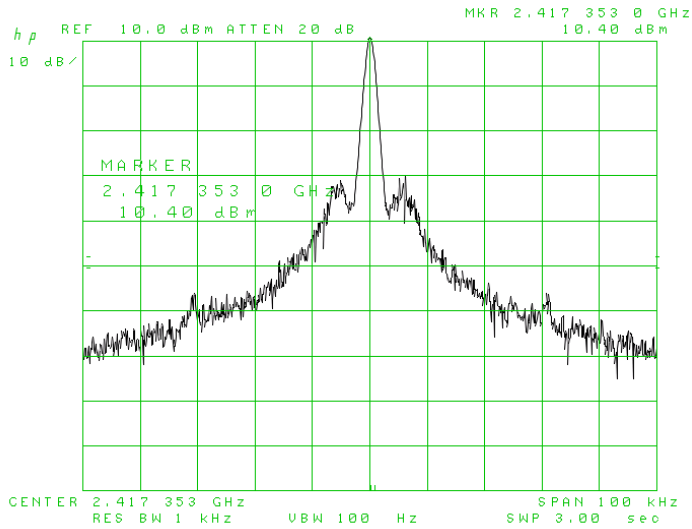
[25 Deg. C, USB Power]



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Typical Output Power Spectrums, Cont.

[25 Deg. C, USB Power]



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Ordering Information

TT7000 – Meter / Counter / Generator	\$1200.00
TT7000 – Meter / Counter / Generator (NO OLED)	\$1100.00
TT7000 – Meter / Counter / Generator (Ethernet).....	\$1400.00

MADE IN



U. S. A.