Amplifiers

Model 441

Features:

- 11 kW Pulse, 100 - 1000 MHz
- Class AB design
- Full VSWR tolerant
- Built-in fault monitoring, logging and protection
- Touch screen display
- Forward and reverse power monitoring
- Remote control: Ethernet, USB, GPIB, fiber-optic serial, RS-232
- Modular design for easy maintenance and service
- Low acoustical noise

Applications:

- EMC Test applications
- EW Communication/Test/Jamming
- RADAR
- Science

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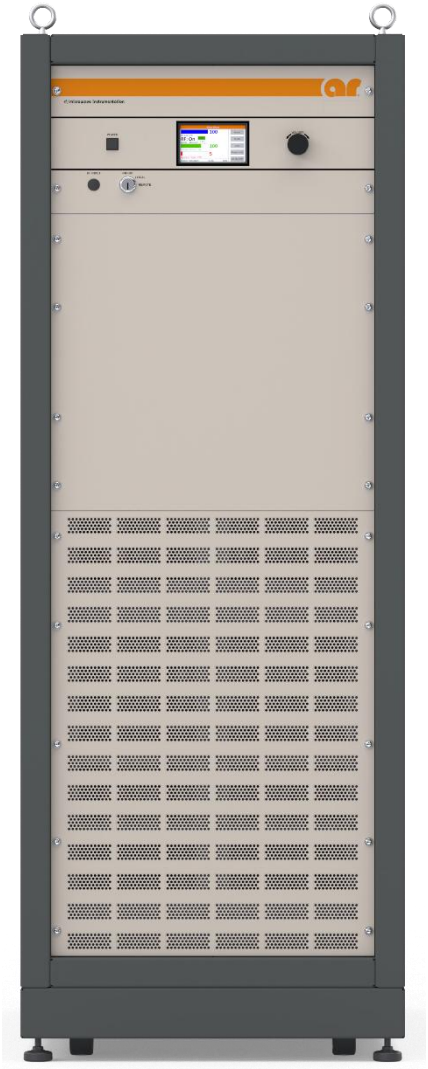
ISO 9001:2015 Certified
ISO 17025:2017 Accredited

The Model 441 is a solid-state, Class AB design, self-contained, air-cooled, broadband power amplifier designed for pulse applications at low duty factors where instantaneous bandwidth and high gain are required. It will provide a minimum of 11 kW minimum across its operating bandwidth.

The Model 441 is equipped with a Digital Control Panel (DCP) which provides both local and remote control of the amplifier. The DCP uses a color LCD touch screen and a single rotary knob to offer status reporting and control capability. The display provides forward power and reflected power values plus amplifier status. Special features include a gain control and RF output level protection.

Protection is provided from various failure conditions including over-temperature and power supply faults. A front panel display indicates the operational status and fault conditions. All amplifier control functions, and status indications are available remotely using GPIB/IEEE-488, RS-232, fiber-optic serial, USB, or Ethernet. Interface connectors are located on the back panel. Local and remote operation is managed by a switch on the front panel.

The export classification for this equipment is EAR99. These commodities, technology or software are controlled for export in accordance with the U.S. Export Administration Regulations. Diversion contrary to U.S. law is prohibited.



Electrical Specifications

Parameter	Symbol	Minimum	Typical	Maximum	Unit
Rated Power Output (100 - 1000 MHz)	PSAT	11	13.5	>16	kW
Input for Rated Output	Pin			1	mW
				0	dBm
Pulse Droop – 20µs pulse @ 11 kW				<-0.2	dB
Operating Frequency	BW	100		1000	MHz
Gain (Small Signal)		70	74	78	dB
Gain Reduction Adjustment (when below compression)		20			dB
Flatness	ΔG		±1	±2	dB
Input Impedance	Z in		50		Ohm
				≤2.0:1	VSWR
Output Impedance	Z out		50		Ohm
Noise Figure	NF	8	10	≤12	dB
Harmonic Distortion @ rated power	H2, H3	-18	- 22	≤-30	dBc
Spurious			≤-60		dBc
Power Consumption for maximum duty-cycle	PD		3.2	3.8	kW
Modulation	AM, FM or Pulse				

Absolute Maximum Rating

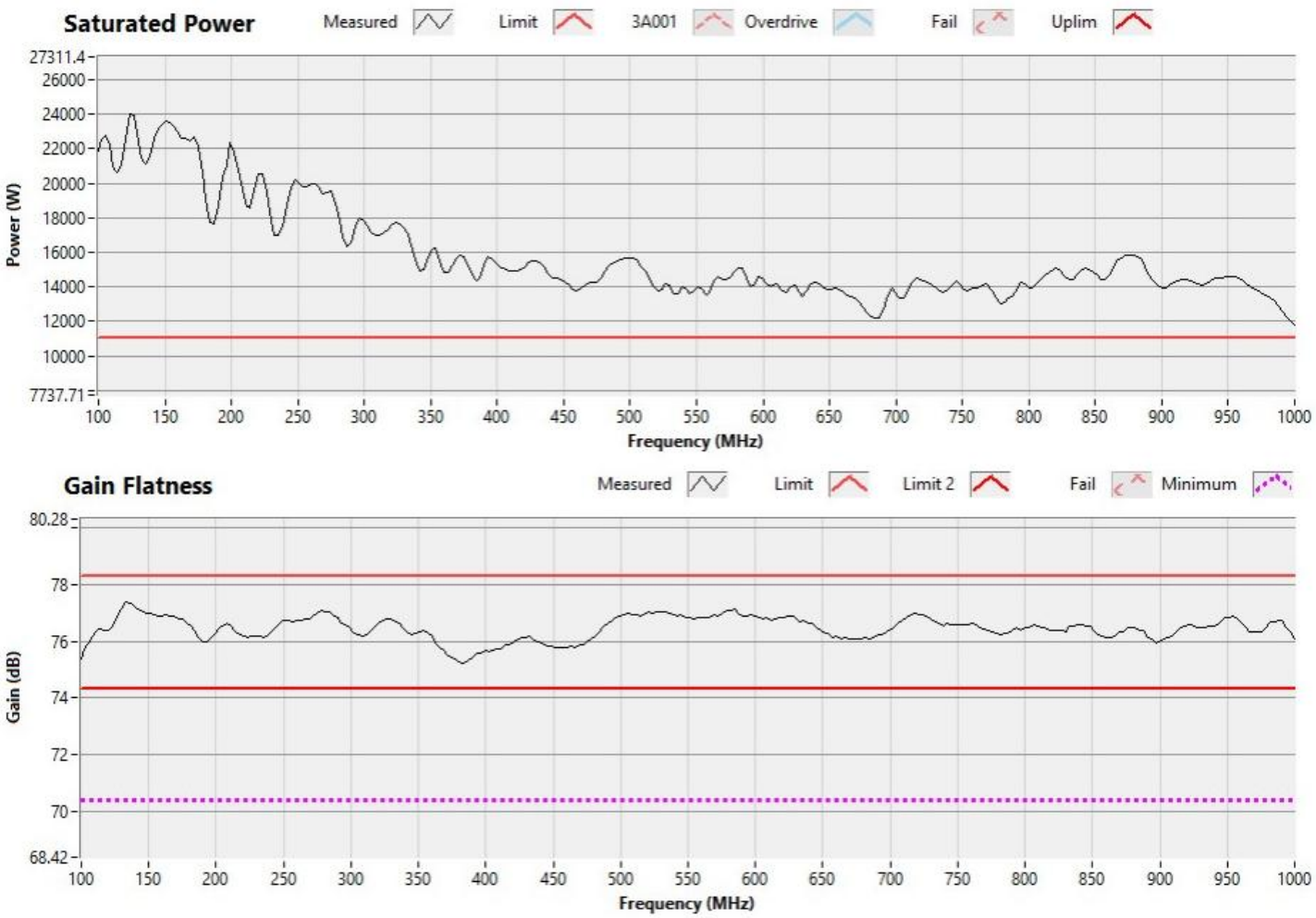
Exceeding any of the limits listed here may result in permanent damage to the device.

Parameter	Minimum	Typical	Maximum	Unit
RF Drive			+13	dBm
RF Load		1:1	3:1 @ rated power	VSWR
RF Load Reflected Will operate without damage or oscillation when connected to any load impedance. Alarm and protection above 2.75 kW			25	%
AC Power (single phase)	200		240	VAC
AC Power	47		63	Hz
Ambient Temperature	+5	+25	+40	°C
Storage Temperature	-20		+50	°C
Altitude			2000	m
Shock/Vibration	MIL-STD-810G			

Pulse Capability	
Parameter	**Value**
Pulse Width	20 µs maximum
Pulse Rate (PRF)	2 kHz maximum
Duty Cycle	4% maximum
RF Rise and Fall	30 ns maximum (10 - 90 %)
Delay	≤1 µs from pulse input to RF 90%
Pulse Width Distortion	±25 ns maximum (difference between Pulse input gate and RF pulse)
Pulse Off Isolation	60 dB minimum
Pulse Input	+3.3 V nominal / +2.4 to 3.6 V

Mechanical Specifications		
Parameters		**Unit**
Dimensions (With Cabinet) (35U) (W x H x D)	56.3 x 176.0 x 95.5	cm
	22.6 x 69.3 x 37.6	in
Weight (With Cabinet)	427	kg
	942	lb
Cooling	Forced air (self-contained fans) Side /front inlets - rear outlet Δt = +7°C (typical)	
Acoustical Noise (Measured @ 1 meter from the front)	66 (typical)	dBA

Regulatory Compliance	
Type	**Standard**
EMC	EN 61326-1
Safety	UL 61010-1
	CAN/CSA C22.2 #61010-1
	CENELEC EN 61010-1
RoHS	Directive 2011/65/EU
Export	EAR99

Connector interfaces	
Function	**Type**
RF Input	N female (50 Ω)
RF Output	7-16 female (50 Ω)
Pulse Input	BNC female
RF Sample	N female (50 Ω) (56dB typical)
IEEE-488	24-pin female
RS-232	9-pin subminiature D female
RS-232 (fiber optic)	ST
USB 2.0	Type B
Ethernet	RJ-45
Interlock	15-pin subminiature D female

TYPICAL PSAT POWER @ 0 dBm AND GAIN