

# MMW Sources with Power Modulation



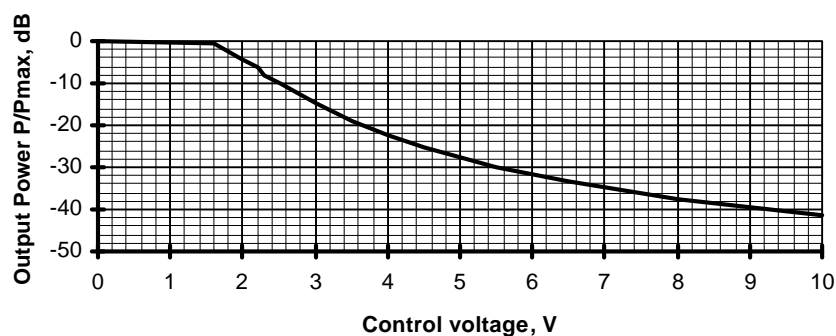
- 26.5-150 GHz operation frequency
- High output power IMPATT diode source
- High frequency stability
- Fine spectrum
- Built-in generator for the sinusoidal output power modulation
- External control of output power

## Applications

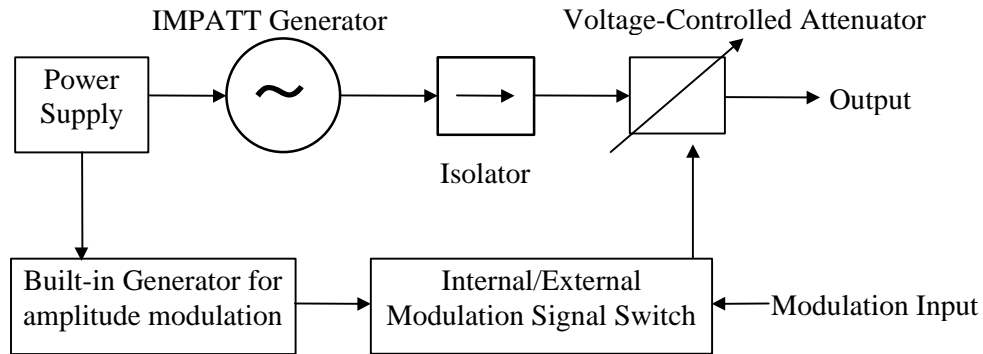
- ◆ Instrumentation subsystems
- ◆ Laboratory test equipment
- ◆ General purpose source
- ◆ MMW channels testing
- ◆ MMW receivers testing
- ◆ Lock-in detection systems

## Description

ELVA-1 series **SPM** provide the whole range frequency sources with internal and external controllable amplitude modulation. The standard model uses Cavity Stabilized IMPATT Diode Generators **CIDO** series as MMW signal source, and Voltage-Controlled Variable Attenuators **VCVA** series as an output power modulator. Voltage Controlled sweepers are available optionally on the base of Active Frequency Multipliers with 6-8 GHz pumping VCO or Voltage Controlled IMPATT Oscillator **VCIO**. Each model has built-in controllable signal generator for the output power modulation and a plug for an external modulation signal. We supply each device with a personal calibration characteristic for output power versus external control voltage. Typical dependence is as follows:



SPM devices can be produced with integrated power supplies. The block-diagram of the typical SPM device is presented below:



Using an external Modulation Input one can control the output power by means of different power supplies, voltage generators and digital-analog converters (DAC). DAC card for standard PC microcomputer with software is available optionally. External modulation up to 20 kHz rate may be applied to switch the attenuator between its high and low insertion loss states, or optionally to vary the attenuation with the external voltage applied. The device contains all the electronic circuitry and power supplies required to bias the attenuator. Built-in Generator can be produced according customer specification. Typical version provides sinusoidal modulation of output power with 10 dB depth and modulation frequencies 0.02-12.5 kHz with a correction of nonlinear characteristic of attenuation/voltage dependence. Depth and frequency of modulation are controlled manually from the front panel of the device.

## Electrical Specification

Model Number	SPM-28	SPM-22	SPM-19	SPM-15	SPM-12	SPM-10	SPM-8	SPM-6
Fixed Frequency within the Band and Range, GHz	Ka 26.5-40	Q 33-50	U 40-60	V 50-75	E 60-90	W 75-110	F 90-140	D 110-150
Maximum Power Output*	150	150	100	100	100	70	50	30
Relative Frequency Stability (30 min)	$5 \cdot 10^{-6}$	$5 \cdot 10^{-6}$	$5 \cdot 10^{-6}$	$5 \cdot 10^{-6}$	$5 \cdot 10^{-6}$	$5 \cdot 10^{-6}$	$5 \cdot 10^{-6}$	$5 \cdot 10^{-6}$
Power Modulation Depth, dB	40	40	40	40	40	40	40	38
Rise Time*, 10-90%, ms	0.1	0.05	0.05	0.025	0.025	0.01	0.01	0.01
Line Width max, kHz	1	1	1.5	1.5	2	3	5	5

\*Values are presented for the middle frequency of the frequency band.

Size: 150x180x70 mm  
 AC Input Voltages: 110 V, 60Hz; 220 V, 50 Hz  
 Input Voltage for Variable Attenuation: 0 to +10 V  
 Switching Voltage for External Modulation: 0 to +5 V

Model with 60 dB power modulation depth is available optionally on the base of new improved VCVA. The modulation depth would be significantly increased using two attenuators connected in series. The device would be optionally equipped by phase modulator or fast P-I-N modulator (5 ns, 40 dB).