

# BWO-Powered, GPIB Controlled mm-Wave Generator with Fast Sweep



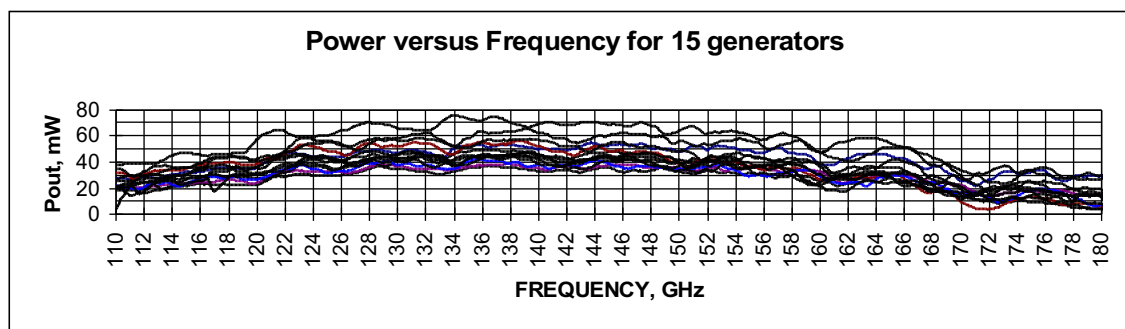
- 37-170GHz in seven bands
- <0.2 ms full waveguide sweep time
- Smooth power/frequency dependence
- Fully packaged
- Program from front panel or GPIB bus
- Frequency accuracy 0.01%
- High output power
- Bias tunable for AFC and phases-locked operation

## Applications

- L.O. for sweeping receivers
- Laboratory measurement and test equipment
- Plasma diagnostics: ECE and ECA radiometers, broadband sweeping interferometers and reflectometers
- Source for Network Analyzers
- Spectrometry

## Description

ELVA-1's announces new **G4-143x** series of BWO generators. This series is a result of further developments of G4-141x/G4-142x (GPIB) generators family. PC compatible microcomputer integrated into the device provides total control of the system. The sweeper self-tests at turn-on. Two independent DAC's control frequency and output power. Minimal full band sweep time is 10 ms. Optionally 0.2 ms sweep time is available. User from front panel or RS-232 (optional GPIB) bus controls power, initial and final frequency, time of sweep, internal amplitude modulation. Various programs of power and frequency change are provided including 10 user-defined programs. There are two inputs for external frequency and power control, which allow to use the generator together with an external phase locking system or power stabilization one. The rugged High Voltage power supply is specially designed to withstand the rapid voltage changes inherent in BWO deceleration. Each generator is individually calibrated for output power versus frequency, with different power levels and frequency versus control voltage relationships. The resulting data supplied with the unit for 15 various generators of G4-143g model (110-170 GHz) are illustrated in the plot below:



2 Voroshilova str. St. Petersburg, 193318 Russia

Tel: +7-812-326-5924, Fax: +7-812-326-1060,

E-mail: korneev@exch.nnz.spb.su INTERNET <http://www.elva-1.spb.ru/>

Millimeter-wave Division

These generators are completely self-contained, including all control and power supply systems required to drive the BWO tube. The BWO tube is fully protected against application of improper operating voltages.

Generators are available in all standard waveguide frequency regions from 37GHz to 170 GHz. Models with not standard frequency ranges are discussible. Turbo Mode with increased output power is provided. This feature allows the BWO to achieve extremely high output power during short time of operation. For instance, the typical peak output power of the G4-143e in Turbo Mode is 120 mW. Turbo Mode is intended for brief, pulsed operation only, as in a tokamak shot for plasma diagnostic experiments. The use of Turbo Mode in CW applications will severely shorten the life of the tube.

## Specifications

MODEL NUMBER	G4-143a	G4-143b	G4-143c	G4-143d	G4-143e	G4-143f	G4-143g
Frequency Range, GHz	37-54	40-60	50-75	60-90	75-110	90-140	110-170
Output waveguide size, mm	5.69x2.84 WR22	4.8x2.4 WR19	3.8x1.9 WR15	3.1x1.5 WR12	2.54x1.27 WR10	2.03x1.02 WR8	1.7x0.83 WR6
Waveguide Flange	UG-383/U	UG-383/U-M	UG-385/U	UG-387/U	UG-387/U-M	UG-387/U-M	UG-387/U-M
Minimum CW power, mW							
Normal mode	20	20	20	20	15	15	10
Turbo mode	30	30	30	30	30	40	40
Typical peak power, mW							
Normal mode	40	40	40	40	60	60	40
Turbo mode	80	80	80	80	120	150	80

## Common Specifications

Frequency accuracy in the CW mode, %	±0.01
Fullband Sweep Time, ms	10 (0.2*)
Maximum CW frequency stability for 15 min	$2 \cdot 10^{-4}$
Residual FM max	$\pm 5 \cdot 10^{-5}$
Output power regulation range, dB	0-20
Output VSWR	1.5
Internal squarewave modulation frequencies, kHz	1-100
Sweep time, mS	10 (0.2*)-40000
External square-wave modulation frequencies, kHz	1-100
Voltage for External Frequency Control, VDC	0 ... +10
Voltage for External Power Control, VDC	0 ... +10
Operating temperature range, °C	5-40
AC Input Voltages:	220 V, 50 Hz (110V/60Hz*)
Consumed power, VA	400
Size, mm	495 x 180 x 480
Weight, kg	23

The device is phase lockable. There is additional control input for the connection with an external PLL. For a small additional charge, customers may select the BWO tube for their generator from data on tubes in inventory. Power levels up to twice the stated specification are often available. A GPIB card and software for PC microcomputer operation are available at extra cost including driver for LabView program. Delivery can be implemented within 10-12 weeks ARO. All ELVA-1 generators are warranted by the manufacturer for one year after receipt.

\* Available optionally upon request. These features are not included in basic models.



2 Voroshilova str. St. Petersburg, 193318 Russia

Tel: +7-812-326-5924, Fax: +7-812-326-1060,

E-mail: korneev@exch.nnz.spb.su INTERNET <http://www.elva-1.spb.ru/>

Millimeter-wave Division