

# VIAVI

Specifications for the

## GPSG-1000

GPS/Galileo Portable Positional Simulator

### User Interface

Display	12" color LCD, sunlight readable with back light
Controls	Touch screen

### Antenna Coupler

Coupler Type	Cavity, patch
Coupling Loss	21.5 dB typical at 1575.42 MHz
Isolation	>25 dB at 1575.42 MHz

### Direct Connection Ports

Impedance	50 Ω
SWR	1.3:1 maximum
Connector	TNC x 2
Coupling	AC (maximum DC input 50 V)

### Generator

#### GPS Frequencies

L1:	1575.42 MHz (C/A, pseudo P(Y), SBAS)
L1C:	1575.42 MHz
L2:	1227.60 MHz (pseudo P(Y))
L2C:	1227.60 MHz
L5:	1176.45 MHz (New Civil SoL)

#### Galileo Frequencies

E1:	1575.42 MHz (pseudo-PRS, [pseudo-G/NAV]), (OS, CS, SoL, [I/ NAV])
E5:	1191.795 MHz center frequency
E5a:	1176.45 MHz (OS, (F/NAV))
E5b:	1207.14 MHz (CS, SoL, (I/NAV))

<b>Accuracy</b>	Same as master oscillator
<b>Inter Channel Bias</b>	Zero (digital design)
<b>Frame Sync Output</b>	LVTTL
<b>Channels</b>	1-12 SV simulation, selectable
	GPS: PRN = 1 to 32
	Galileo: PRN = 1 to 36
	SBAS: PRN = 120 to 138

#### Positional Simulation

Static: Via user entry of Latitude/Longitude/Altitude or selectable from waypoint database

Dynamic: Create, store, and recall routes consisting of multiple route points.

Trajectory: Record and playback GPS receiver data.

#### User Defined Doppler Error

Selectable frequency offset	±5.0 kHz, 1 Hz increment
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<b>Amplitude Offset</b>	Sets SV carrier amplitude offset from main attenuator setting ±15 dB in 1 dB increments.
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<b>Step Error</b>	Sets SV pseudo range error ±10 km in 1 m increments (used for RAIM testing)
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<b>Satellite Health</b>	Allows selection of GOOD or BAD
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#### Code Carrier Coherence

Sets frequency variation between code carriers	
Range	2 m/S
Increment	1 mm/S



## GPS Codes

<b>L1 C/A</b>	
Code Rate	1.023 Mc/s
Primary Seq. Length	1023 bits
Modulation	BPSK
Symbol Rate	50 sps
SBAS	WAAS/EGNOS L1, L5
<b>L2C</b>	
Code Rate	0.5115 Mc/s
Sequence Length	10230/767250 bits
Modulation	BPSK
Symbol Rate	50 sps
<b>L1 P(Y) (not encrypted)</b> Long random codes simulated	
Code Rate	10.230 Mc/s
Sequence Length	15345000 bits
Modulation	BPSK
<b>L1C</b>	
Code Rate	10.230 Mc/s
Sequence Length	10230 bits
Modulation	BOC (1, 1)
<b>L5</b>	
Code Rate	10.230 Mc/s
Sequence Length	10230 bits
Modulation	QPSK
<b>Almanac</b>	Obtainable from built-in GPS receiver or external file load in .alm format

## Galileo Services

<b>E1</b> PRS not supported	
Pseudo G/NAV	Long random codes simulated
Code Rate	2.5575 Mc/s
Sequence Length	25575 bits
Symbol Rate	100 sps
Modulation	Interplex/CBOC
Sub Modulation	BOC (15, 2.5)
<b>E1</b>	
OS	Complete implementation (I/NAV)
CS	Null message content (pseudo I/NAV)
SoL	Compliant, no integrity alerts (I/NAV)
Code Rate	1.023 Mc/s
Sequence Length	4092 (primary) x 1 (secondary) bits
Symbol Rate	250 sps
Modulation	Interplex/CBOC
Sub Modulation	CBOC(6,1)

<b>E5a</b>	
OS	Complete implementation (F/NAV)
Code Rate	10.23 Mc/s
Sequence Length	10230 (primary) x 20 (secondary) bits
Symbol Rate	50 sps
Modulation	ALTBQC
Sub Modulation	None
<b>E5b</b>	
OS	Complete implementation (F/NAV)
CS	Null message content (pseudo I/NAV)
SoL	Compliant, no integrity alerts (I/NAV)
Code Rate	10.23 Mc/s
Sequence Length	10230 (primary) x 4 (secondary) bits
Symbol Rate	250 sps
Modulation	ALTBQC
Sub Modulation	None

## Additional Characteristics

<b>NAV Data</b>	Navigation data is computed in real-time to match the simulation.
<b>Positional Simulation</b>	
Max Relative Velocity	±1000 Kts (514 m/s)
Max Relative Acceleration	±98 m/s <sup>2</sup>
Max Relative Jerk	±20 m/s <sup>3</sup>
Max Altitude	100,000 ft.
<b>Error Models</b>	Atmospheric
<b>Positional Simulation Accuracy</b>	
Pseudorange	<0.1 m
Pseudorange Rate	±0.01 m/s (RMS) with respect to master oscillator
<b>RF Output Level Direct</b>	-93 to -155 in 1 dB step
<b>RF Output Level ANT Coupler</b>	-68 to -130 in 1 dB step ±2 dB accuracy into 50 Ω (AC coupled) standard cable, 4 dB loss
<b>Signal Quality Spurious</b>	<-35 dBc over the bandwidth (40 MHz)
<b>Harmonics</b>	<-45 dBc

## Master Oscillator

Frequency	10 MHz nominal
Temperature Stability	±0.05 ppm
Aging Rate	±0.3 ppm /yr., ±2.5 ppm /10 yr.
Uncertainty	±1 ppm

## External Reference Input

Input Level	0.25 to 6.0 Vp-p
Input Impedance	50 ohm nominal
Input Frequency	10.0 MHz ±10 Hz

## Master Oscillator (continued)

External Reference Output		
Output Level	1.5 Vp-p nominal into 50 Ω	
Output Frequency	10.0 MHz nominal	
Battery		
14.4V 6.75 Ah Lithium Ion		
Battery Temperature Range for Charging		
0° to 45°C (32° to 113°F)		
DC Input		
11-32 VDC	75 W max.	5 A max.

## Environmental

Test Set	
Operational Temperature	-20° to 55° C (-4° to 131°F)
Storage Temperature	-30° to 71° C (-22° to 159.8°F)
Operational Humidity	MIL-PRF-28800F Class 2
Storage Humidity	MIL-PRF-28800F Class 2
Altitude	10,000 feet
Supplied External AC to DC Converter	
Use	Indoors
Altitude	10,000 feet
Operating Temperature	5°C to 40°C (41° to 104°F)
Storage Temperature	-20°C to 71°C (-4° to 159.8°F)

## Physical Characteristics

Dimensions (H x W x D)	11.22 x 15.15 x 3.54 in (28.5 x 38.5 x 9 cm)
Dimensions (Shipping Case)	20.8 x 31.5 x 13 in (53 x 80 x 33 cm)
Weight	15.5 lb (7 kg) Test set only 52 lb (23.5 kg) kit with shipping case

### Antenna Coupler

Dimensions	7.54 x 7.46 x 7.46 in (19.15 x 18.95 x 18.95 cm)
(Note: Maximum antenna height accommodated 1.5 in)	
RF Gasket	Flexible seal
Connector	TNC
Positioning	By hand or with optional 8 ft placement pole via hook.
Placement Security	Weighted peripheral bag

### Multiple GPS Antenna Support

Supports two to three GPS antennas using optional antenna coupler kits.

## Certifications

Test Set	
Vibration Limits	MIL-PRF-28800F Class 2
Shock, Functional	MIL-PRF-28800F Class 2
Transit Drop	MIL-PRF-28800F Class 2
Drip Proof	MIL-PRF-28800F Class 2
Dust	MIL-PRF-28800F Class 2
Explosive Atmosphere	MIL-PRF-28800F Class 2
Safety Compliance	UL-61010-1 EN-61010-1
WEEE, ROHS	
EMC	
Emissions	MIL-PRF-28800F Class 2 EN 61326-1 Class A EN 61000-3-2 EN 61000-3-3
Immunity	MIL-PRF-28800F Class 2 EN 61326-1 Class A
External AC-DC Converter	
Safety Compliance	UL 1950 DS CSA 22.2 No. 234 VDE EN 60 950
EMI/RFI Compliance	FCC Docket 20780 Curve "B" EMC EN 61326
Transit Case	
Drop Test	FED-STD-101C, Method 5007I Paragraph 6.3, Procedure A, Level A
Falling Dart Impact	ATA 300 Category I
Vibration, Loose Cargo	FED-STD-101C Method 5019
Vibration, Sweep	ATA 300 Category I
Simulated Rainfall	MIL-STD-810F Method 506.4 Procedure II of 4.1.2 FED-STD-101C Method 5009.1 Sec 6.7.1
Immersion	MIL-STD-810F Method 512.4