Data Sheet

**VIAVI**

Specifications for the

**GPSG-1000**

GPS/Galileo Portable Positional Simulator

### User Interface

<table>
<thead>
<tr>
<th>Display</th>
<th>12” color LCD, sunlight readable with back light</th>
</tr>
</thead>
<tbody>
<tr>
<td>Controls</td>
<td>Touch screen</td>
</tr>
</tbody>
</table>

### Antenna Coupler

<table>
<thead>
<tr>
<th>Coupler Type</th>
<th>Cavity, patch</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coupling Loss</td>
<td>21.5 dB typical at 1575.42 MHz</td>
</tr>
<tr>
<td>Isolation</td>
<td>&gt;25 dB at 1575.42 MHz</td>
</tr>
</tbody>
</table>

### Direct Connection Ports

<table>
<thead>
<tr>
<th>Impedance</th>
<th>50 Ω</th>
</tr>
</thead>
<tbody>
<tr>
<td>SWR</td>
<td>1.3:1 maximum</td>
</tr>
<tr>
<td>Connector</td>
<td>TNC x 2</td>
</tr>
<tr>
<td>Coupling</td>
<td>AC (maximum DC input 50 V)</td>
</tr>
</tbody>
</table>

### Generator

**GPS Frequencies**

<table>
<thead>
<tr>
<th>PRN</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>L1</td>
<td>1575.42 MHz (C/A, pseudo P(Y), SBAS)</td>
</tr>
<tr>
<td>L1C</td>
<td>1575.42 MHz</td>
</tr>
<tr>
<td>L2</td>
<td>1227.60 MHz (pseudo P(Y))</td>
</tr>
<tr>
<td>L2C</td>
<td>1227.60 MHz</td>
</tr>
<tr>
<td>L5</td>
<td>1176.45 MHz (New Civil Sol)</td>
</tr>
</tbody>
</table>

**Galileo Frequencies**

<table>
<thead>
<tr>
<th>PRN</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>E1</td>
<td>1575.42 MHz (pseudo-PRS, [pseudo-G/NAV]), (OS, CS, Sol, [I/ NAV])</td>
</tr>
<tr>
<td>E5a</td>
<td>1191.795 MHz center frequency</td>
</tr>
<tr>
<td>E5b</td>
<td>1176.45 MHz (OS, (F/NAV))</td>
</tr>
<tr>
<td>E5c</td>
<td>120714 MHz (CS, Sol, (I/NAV))</td>
</tr>
</tbody>
</table>

### Accuracy

Same as master oscillator

### Inter Channel Bias

Zero (digital design)

### Frame Sync Output

LVTTL

### Channels

1-12 SV simulation, selectable

<table>
<thead>
<tr>
<th>GPS: PRN = 1 to 32</th>
</tr>
</thead>
<tbody>
<tr>
<td>Galileo: PRN = 1 to 36</td>
</tr>
<tr>
<td>SBAS: PRN = 120 to 138</td>
</tr>
</tbody>
</table>

### 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

Selecteable frequency offset ±5.0 kHz, 1 Hz increment

### Amplitude Offset

Sets SV carrier amplitude offset from main attenuator setting ±15 dB in 1 dB increments.

### Step Error

Sets SV pseudo range error ±10 km in 1 m increments (used for RAIM testing)

### Satellite Health

Allows selection of GOOD or BAD

### Code Carrier Coherence

Sets frequency variation between code carriers

<table>
<thead>
<tr>
<th>Range</th>
<th>Increment</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 m/S</td>
<td>1 mm/S</td>
</tr>
</tbody>
</table>
## GPS Codes

<table>
<thead>
<tr>
<th>Code Type</th>
<th>L1 C/A</th>
<th>L2C</th>
<th>L1 P(Y) (not encrypted)</th>
<th>L1C</th>
<th>L5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Code Rate</td>
<td>1.023 Mc/s</td>
<td>0.5115 Mc/s</td>
<td>10.230 Mc/s (primary) x 20 (secondary) bits</td>
<td>10.230 Mc/s</td>
<td>10.230 Mc/s</td>
</tr>
<tr>
<td>Primary Seq. Length</td>
<td>1023 bits</td>
<td>10230/76250 bits</td>
<td>10230 (primary) x 20 (secondary) bits</td>
<td>10230 bits</td>
<td>10230 bits</td>
</tr>
<tr>
<td>Modulation</td>
<td>BPSK</td>
<td>BPSK</td>
<td>BPSK</td>
<td>QPSK</td>
<td>QPSK</td>
</tr>
<tr>
<td>Symbol Rate</td>
<td>50 sps</td>
<td>50 sps</td>
<td>50 sps</td>
<td>250 sps</td>
<td>250 sps</td>
</tr>
<tr>
<td>SBAS</td>
<td>WAAS/EGNOS L1, L5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Additional Characteristics

**NAV Data**
Navigation data is computed in real-time to match the simulation.

**Positional Simulation**
- Max Relative Velocity: ±1000 Kts (514 m/s)
- Max Relative Acceleration: ±98 m/s²
- Max Relative Jerk: ±20 m/s³
- Max Altitude: 100,000 ft.

**Error Models**
- Atmospheric

**Positional Simulation Accuracy**
- Pseudorange: <0.1 m
- Pseudorange Rate: ±0.01 m/s (RMS) with respect to master oscillator
- RF Output Level Direct: -93 to -155 in 1 dB step
- RF Output Level ANT Coupler: -68 to -130 in 1 dB step
  - ±2 dB accuracy into 50 Ω (AC coupled) standard cable, 4 dB loss

**Signal Quality Spurious**
- < -35 dBc over the bandwidth (40 MHz)
- Harmonics: < -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

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### Galileo Services

#### E1
- 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 (1, 1)

#### E5a
- OS: Complete implementation (F/NAV)
- Code Rate: 10.23 Mc/s
- Sequence Length: 10230 (primary) x 20 (secondary) bits
- Symbol Rate: 50 sps
- Modulation: ALTBBOC
  - Sub Modulation: None

#### E5b
- 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: ALTBBOC
  - Sub Modulation: None

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### Additional Characteristics

- Positional Simulation Accuracy
- Pseudorange: <0.1 m
- Pseudorange Rate: ±0.01 m/s (RMS) with respect to master oscillator
- RF Output Level Direct: -93 to -155 in 1 dB step
- RF Output Level ANT Coupler: -68 to -130 in 1 dB step
  - ±2 dB accuracy into 50 Ω (AC coupled) standard cable, 4 dB loss
- Signal Quality Spurious: < -35 dBc over the bandwidth (40 MHz)
- Harmonics: < -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
- 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
- Weight: 52 lb (23.5 kg) kit with shipping case

Antenna Coupler

- Dimensions: 7.54 x 7.46 x 7.46 in (191.5 x 189.5 x 189.5 cm)
- 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

- 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
- Immersion: MIL-STD-810F Method 512.4

(Warning: Data is subject to change without notice.)

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