



GSG-54

GPS 8-channel Simulator

- Versatile 8-channel GPS signal generator with pre-configured test scenarios
- Easy-to-use and intuitive
- Fully operational via front-panel
- Multiple interfaces for remote control
- Stand-alone, compact and portable bench-top chassis
- 3GPP A-GPS Standards-based testing
- Affordable and powerful



The GSG-54 provides a wide-range of capabilities for in-line production testing, including navigational fix and position testing with up to 8 GPS signals, while offering ease-of-operation and extremely fast test cycles. It also benefits engineering and development organizations for integrating GPS receivers into their devices.

Easy to Use

The easy-to-use GSG-54 is an 8-channel GPS constellation simulator. The user can configure scenarios on-the-fly without the need for external PC and without pre-compilation phase. Using the front panel the user can swiftly modify parameters such as user position and time and can define the scenario through a set of pre-defined antenna and atmospheric models, as well as trajectories and events.

Flexibility

GSG-54 comes with a built-in set of trajectories (static, circles, rectangular according to 3GPP TS 25.171) to stimulate the motion receivers. Or you can upload your own trajectories in NMEA standard format. Create dynamic events such as fades and reflected signals to simulate various impairments. Ephemeris data is via standard RINEX format. Use the pre-loaded default data for any time periods, use your own ephemeris data, or configure scenarios to automatically download ephemeris data from official websites.

Connectivity Extends Ease of Use and Flexibility

The GSG-54 can be controlled via network connection, USB or GPIB. A built-in web interface allows complete operation of the

instrument through front panel controls. With the optional GSG StudioView™ PC Software, you can build, edit, and manage the most complex scenarios, including building trajectories via Google Maps, independent of the GSG-54 for later upload.

Suitable for Testing Timing Receivers

Besides the variety of built-in navigation/positioning tests, the GSG-54 is also suited for accurate testing of timing GPS-receivers. The GSG-54 can be equipped with an ultra-high-stability OXCO timebase for precision timing of the satellite data, and to emulate the actual atomic clocks in the satellites, there is an input for external synchronization from a 10 MHz reference from e.g. a Cesium or Rubidium clock. A built-in 1-pps output, which is synchronized to the generated satellite data, allows comparison with the 1-pps signal from the timing receiver under test.

The Affordable Test Solution

The GSG-54 is a perfect fit for a wide-variety of test cases including:

- Test of simulated movements (user trajectories).
- Test of receivers' sensitivity to loss of satellites, multi-path, and atmospheric conditions.
- Fast production test of connectivity and sensitivity (conducted or over-the-air).
- Production test of positioning receivers accuracy.
- Test of timing receiver accuracy.
- Test of receivers' dynamic range.
- Test of leap second transition.

Input and Output Specifications

RF Signal GPS L1

Connector: Type N female

Frequency: 1575.42 MHz (L1)

Number of output channels: 8

Data format/Frame structure:

50 bps (GPS C/A code)

Spurious transmission: <-40 dBc

Harmonics: <-40 dBc

Output signal level: -65 to -160 dBm;

0.1 dB resolution down to -150 dBm;

0.3 dB down to -160 dBm.

Power accuracy: ±1.0 dB

Pseudorange accuracy: 1mm

Inter-channel bias: Zero

Inter-channel range: ±54 dB

Limits:

- Altitude: 60,000 feet (18,240 m)
- Acceleration: 4.0 g
- Velocity: 515 m/s (1000 knots)
- Jerk: 20 m/s³

External Frequency Reference Input

Connector: BNC female

Frequency: 10 MHz nominal

Input signal level: 0.1 to 5Vrms

Input impedance: >1kΩ

Frequency Reference Output

Connector: BNC female

Frequency: 10 MHz sine

Output signal level: 1Vrms in to 50 Ω load

1PPS Output

Connector: BNC female

Output signal level: approx. 0V to +2.0V in 50 Ω load

Built-in Timebase

Internal Timebase – Standard OCXO

Ageing per 24 h: <5x10⁻⁹

Ageing per year: <2x10⁻⁷

Temp. variation 20...26°C: <2x10⁻⁸

Short term stability (Adev @1s): <1x10⁻¹⁰

Internal Timebase – Optional

Ultra-High-Stability OCXO

Ageing per 24 h: <3x10⁻¹⁰

Ageing per year: <1.5x10⁻⁸

Temp. variation 20...26°C: <2.5x10⁻⁹

Short term stability (Adev @1s): <5x10⁻¹²

Auxiliary Functions

Interface

GPIO (IEEE-488.2), USB 1.X or 2.X (USB-TMC-488), Ethernet (100/10 Mbps)

Settings

Predefined scenarios: 6;

User can change date/time/position/trajectory/no of satellites/atmospheric model

User defined scenarios: Unlimited

Trajectory data: NMEA format (GGA or RMC messages, or both), convert from other formats with GSG StudioView

General Specifications

Certifications

Safety: Designed and tested for Measurement Category I, Pollution Degree 2, in accordance with EN/IEC 61010-1:2001 and CAN/CSA-C22.2 No. 61010-1-04 (incl. approval)

EMC: EN 61326-1:2006, increased test levels per EN 61000-6-3:2001 and EN 61000-6-2:2005

Dimensions

WxHxD: 210 x 90 x 395 mm (8.25" x 3.6" x 15.6")

Weight: approx. 2.7 kg (approx. 5.8 lb)

Optional Antenna

Frequency: 1575.42 ±2MHz

Impedance: 50 Ω

VSWR: <2:1 (typ)

Op. Temperature: -40° to +85°C

Connector: SMA male

Dimensions: 12 mm diameter x 38 mm length

Environmental

Class: MIL-PRF-28800F, Class 3

Temperature: 0°C to +50°C (operating);

-40°C to +71°C non-condensing @

<12,000m (storage)

Humidity:

5-95 % @ 10 to 30°C

5-75 % @ 30 to 40°C

5-45 % @ 40 to 50°C

Power

Line Voltage: 90-265 VRMS, 45-440 Hz

Power Consumption: <25 W

Ordering information

Basic Model

GSG-54: GPS 8-channel simulator; with standard OCXO timebase

Included with instrument

- User manual and GSG StudioView software (30-day trial) on CD
- RF cable, 1.5 m
- SMA to Type N adapter
- USB cable
- Certificate of calibration
- 3-year warranty

Built-in Options

Option 40/54: Ultra-high-stability OCXO instead of standard OCXO

Optional Accessories

Option 01/70: Antenna

Option 22/90: Rack-mount kit

Option 27: Soft carrying case

Option 27H: Heavy-duty hard transport case

Option 90/54: Calibration Certificate with Protocol

Option 95/03: Extended warranty to 3 years

Option 95/05: Extended warranty to 5 years

OM-54: Users manual (printed)

GSG StudioView PC Software: License key enables full functionality, one key required per machine (file transfer functionality is available without a key)