



GSG-55

GPS 16-channel Simulator

- Versatile 16-channel GPS signal generator with pre-configured test scenarios
- SBAS (WAAS, EGNOS) simulation
- Configurable multipath simulation
- White noise generator for receiver SNR testing
- Easy-to-use and intuitive
- Fully operational via front-panel
- Multiple interfaces for remote control
- Affordable and powerful



The GSG-55 is a GPS constellation simulator that expands on the set of features of the popular GSG-54, adding 16-channel simulation, SBAS simulation and white noise generation. These new features make the GSG-55 capable for in-line production testing, including navigational fix and position testing, for engineering and development of even more applications than the GSG-54.

Easy to Use

The GSG-55 user can configure scenarios on-the-fly without the need for external PC and pre-compilation phase. Via the front panel the user can swiftly modify parameters such as user position, time and specify output powers in carrier to noise ratio instead of absolute output power. Utilizing the white noise generation extends the usability and flexibility.

Flexibility

The GSG-55 16-channel simulator makes it possible to simulate all the visible satellites for the receiver under test. In addition other channels can be used for SBAS simulation of EGNOS or WAAS satellites, or for simulating multipath. If more channels are required, simply synchronize two or more units via the external 1PPS sync signal to generate 32, 48,..., channel simulation.

GSG-55 is shipped with several multipath scenarios where the receivers' response to an increased multipath environment can be analyzed. It also has a set of trajectories (static, circles, rectangular according to 3GPP TS 25.171) that allows the user to upload their own trajectories in NMEA standard format. The user can upload their own ephemeris data in standard RINEX format or re-use the default data for any time periods. GSG-55 can even automatically download historical RINEX, WAAS and EGNOS data from official websites, as needed. GSG-55 has USB, GPIB as well as Ethernet interface, allowing remote control via network connection.

Connectivity Extends Ease of Use and Flexibility

The GSG-55 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-55 for later upload.

Suitable for Testing Timing Receivers

Besides the variety of built-in navigation/positioning tests, the GSG-55 is also suited for accurate testing of timing GPS-receivers. The GSG-55 can be equipped with an ultra-high-stability OXCO timebase for precision timing of the satellite data, or use external synchronization from a 10 MHz reference from e.g. a Cesium or Rubidium clock. A built-in 1-pps output, 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-55 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, leap seconds, 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 receivers' susceptibility for noise (SNR limit testing).
- 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: 16

Channel configuration:

16 GPS satellites

Up to 3 WAAS or EGNOS satellites (instead of 1-3 GPS satellites)

White noise channel

Data format:

50 bits/s, GPS frame structure

250 bits/s, SBAS

PRN codes: 1 to 210

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

Order GSG-55E to extend these limits, contact the factory for more information

White noise signal level: -47 to -160 dBm

0.1 dB resolution down to -150 dBm;

0.3 dB down to -160 dBm.

± 1.0 dB accuracy

External Frequency Reference Input

Connector: BNC female

Frequency: 10 MHz nominal

Input signal level: 0.1 to 5Vrms

Input impedance: >1 k Ω

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

GPIB (IEEE-488.2), USB 1.X or 2.X (USB-

TMC-488), Ethernet (100/10 Mbps)

Settings

Predefined scenarios: 12;

User can change date, time, position, trajectory, no of satellites, satellite power level and 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 ± 2 MHz

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 @

<12,000 m (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 Models

GSG-55: GPS 16-channel simulator; with standard OCXO timebase

GSG-55E: GPS 16-channel simulator; extended limits, export restrictions apply

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 warrant

Built-in Options

Option 40/54: Ultra-high-stability OCXO

instead of standard OCXO

Optional Accessories

Option 01/70: Helix 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)