spectracom

GSG-56
GLONASS+GPS 16-channel Simulator

ГЛОНАСС
GLONASS COMPATIBLE

- **Simultaneous GLONASS and GPS L1 simulation in one box**
- **Versatile 16-channel GNSS signal generator with pre-configured test scenarios**
- **Operates with StudioView™ for easy trajectory creation via Google Maps**
- **SBAS simulation: WAAS (N. America), EGNOS (Europe), GAGAN (India), MSAS (Japan)**
- **Configurable multipath simulation**
- **White noise generator for SNR testing**
- **Fully operational via front-panel, web-based remote control, or SCPI protocol**
- **Multiple interfaces for remote control: Ethernet, USB, GPIB**
- **Affordable, powerful, and easy-to-use**

The GSG-56 is the latest offering of the popular GSG-5x family of simulators from Spectracom. In addition to all the features of the advanced GSG-55, it provides simultaneous simulation of the L1 signals of GLONASS and GPS systems as well as all the currently operating Satellite-Based Augmentation Systems [SBAS] for worldwide coverage.

Easy to Use
The GSG-56 user can configure scenarios on-the-fly without the need for an 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. And using the optional StudioView™ software facilitates easily created scenarios via a Google Maps interface.

Flexibility
The GSG-56 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, WAAS, GAGAN, or MSAS 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. Some restrictions apply.

GSG-56 is shipped with several multipath scenarios where the receivers' response to an increased multipath environment can be analyzed. It also has a set of built-in trajectories (static, configurable circle, and rectangular as defined in 3GPP TS 25.171) or the user can 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-56

can even automatically download historical RINEX, WAAS and EGNOS data from official websites, as needed.

Connectivity Extends Ease of Use and Flexibility
The GSG-56 can be controlled via an Ethernet 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-56, for later upload.

Suitable for Testing Timing Receivers
Besides the variety of built-in navigation/positioning tests, the GSG-56 is also suited for accurate testing of timing GPS-receivers. The GSG-56 is equipped with an ultra-high-stability OCXO 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-56 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 sensitivity and positioning receivers' accuracy (conducted or over-the-air).
- 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 GLONASS+GPS L1

Connector: Type N female
DC Blocking: internal, up to 7 VDC;
470 Ω nominal load
Frequency: 1575 - 1606 MHz (L1)
Number of output channels: 16
Channel configuration:
16 GPS or GLONASS satellites, any combination
GPS L1 or GLONASS freq ch -7 to +6
Up to 3 SBAS satellites (instead of 1-3 GNSS satellites)
White noise channel
Data format:
50 bits/s, GPS and GLONASS frame structure
250 bits/s, SBAS
PRN codes: 1 to 210, plus GLONASS
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: 18,240 m (60,000 feet)
- Acceleration: 4.0 g
- Velocity: 515 m/s (1000 knots)
- Jerk: 20 m/s^3

Order GSG-56E to extend these limits to:
- Altitude: 20,200 km
- Acceleration: No limit
- Velocity: 20,000 m/s (38874 knots)
- Jerk: No limit

White noise signal level: -50 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: >1kΩ

Frequency Reference Output

Connector: BNC female
Frequency: 10 MHz sine
Output signal level: 1Vrms in to 50 Ω load

External Trigger Input

Connector: BNC female
Frequency: TTL level, 1.4V nominal

1PPS Output

Connector: BNC female
Output signal level:
approx. 0V to +2.0V in 50 Ω load
Accuracy: Calibrated to ±10 nSec of RF
timing mark output

Built-in Timebase

Internal Timebase – High Stability OCXO

Ageing per 24 h: <5x10^{-10}
Ageing per year: <5x10^{-8}
Temp. variation 0...50°C: <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, number 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™ (see separate
datasheet)

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 - 1606 MHz
Impedance: 50 Ω
VSWR: <2:1 (typ)
Connector: SMA male
Dimensions: 15 mm diameter x 36 mm length

Environmental

Class: MIL-PRF-28800F, Class 3
Temperature: 0°C to +50°C (operating);
-40°C to +70°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-56: GLONASS+GPS 16-channel
simulator; with standard OCXO timebase
GSG-56E: GLONASS+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 warranty[1]

[1]The warranty period may be dependent on country.

Optional Accessories

Option 01/71: Passive GPS+GLONASS+Galileo
Antenna
Option 22/90: Rack-mount kit
Option 27H: Heavy-duty hard transport case
Option 90/54: Calibration Certificate with Protocol
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)