

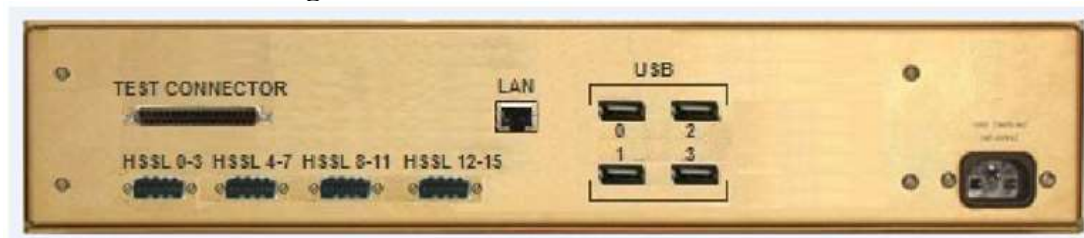
GNSS Navigation RF SIS Generator

Technical Specifications

- The GNSS Navigation RF SIS Generator is a state of art GNSS Navigation RF signal Generator that is capable of generating a SIS Compliant GALILEO L1 and GPS L1 C/A RF signals up to a total of 12 SV channels, arbitrarily configured as either single or dual Constellation.
- It is assembled in a 2U-19" case complete of AC-DC adapter, fan cooler and case vents.



GNSS Navigation RF SIS Generator 19"-2U Case Front Panel



GNSS Navigation RF SIS Generator 19"-2U Case Rear Panel

- The RF Signal Generator has been fully tested using two standard COTS Septentrio GNSS Receivers (PolaRx eG PRO and PolaRx 4 TR PRO) when mixed in real time with SIS GNSS Antenna signals. The Figure below reports the GNSS Navigation signal generator tests using Septentrio Receiver when a GPS SIS PRN signal coming from Antenna is replaced by one PRN coming from the Space Technology GNSS RF Signal Generator. The message formatting of the ST product is PVT compliant with the GALILEO standard (Navigation frames are accepted and well tracked by the COTS third party GNSS Receiver as reported in top graphs of the following Figure) and the Ranging signal quality (bottom graphs of the following Figure) is the same as the one coming from a real Navigation SV.

For any additional information contact:

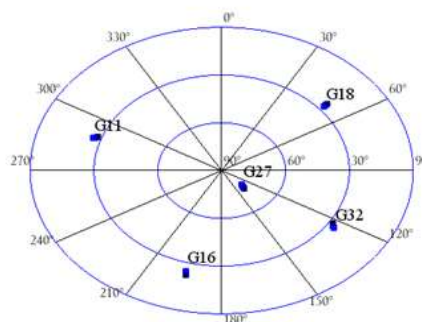
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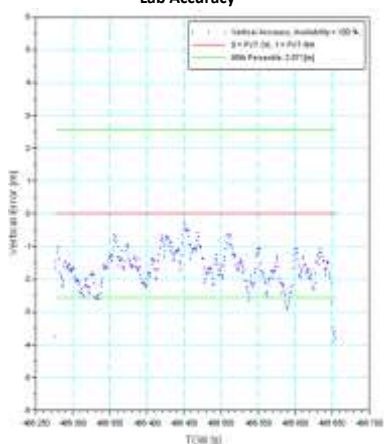
4 Antenna SIS GPS L1 C/A +
1 RF GALILEO L1 from ST GNSS Signal
Generator



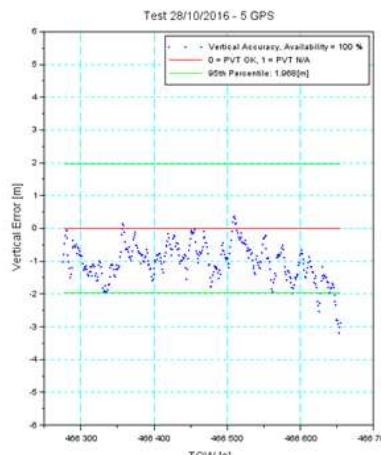
5 Antenna SIS GPS L1 C/A signals



4 SIS GPS + 1 GAL ST Signal
Generator Septentrio Local Test
Lab Accuracy



5 SIS GPS Septentrio Local Test
Lab Accuracy



- The Channel Modeler includes the following effects:
 - On Board GPS and GALILEO Antenna shaping
 - Delay, Doppler and Attenuation profile control compliantly with GPS and GALILEO Satellite Ephemeris
 - Receiver Kinematic specified through ECEF Receiver Coordinate sampled at 100Hz
 - On Board clock errors
 - Ionosphere and Troposphere modeling
 - Receiver Antenna Shaping

- The GNSS RF Signal Generator is built around a Space Technology proprietary Software Defined Radio Board (16 cm by 10 cm form factor), whose picture is reported below.

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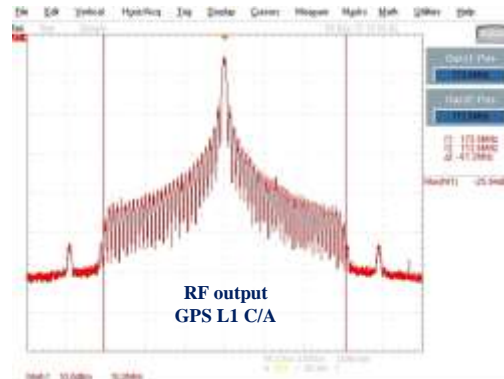
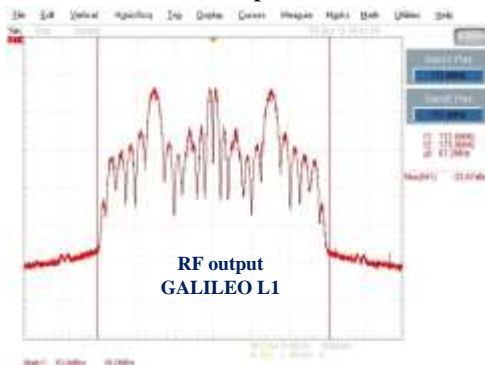
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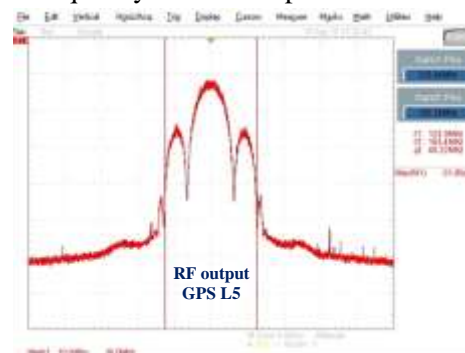
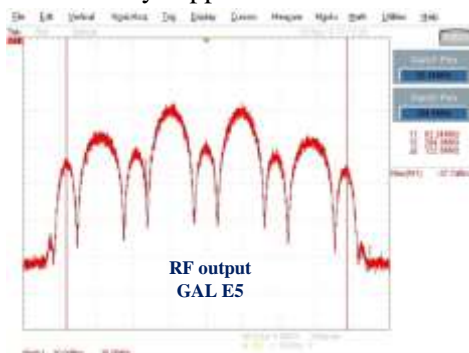


GNSS Signal Generator SDR HW platform

- The RF Recorder Front End is a COTS GNSS RF Receiver Up Converter Front End provided by DIGIMIMIC (www.digimimic.com) with the PN DM9300. Below a snapshot of the Spectrum Analyzer L band measured spectra at infinite C/N0 is reported



Although the Navigation Message generation validation for GALILEO E5 and GPS L5 signals is current on going, the ST RF HW, both at Base Band and RF level already support those additional Navigation frequency bands as reported below



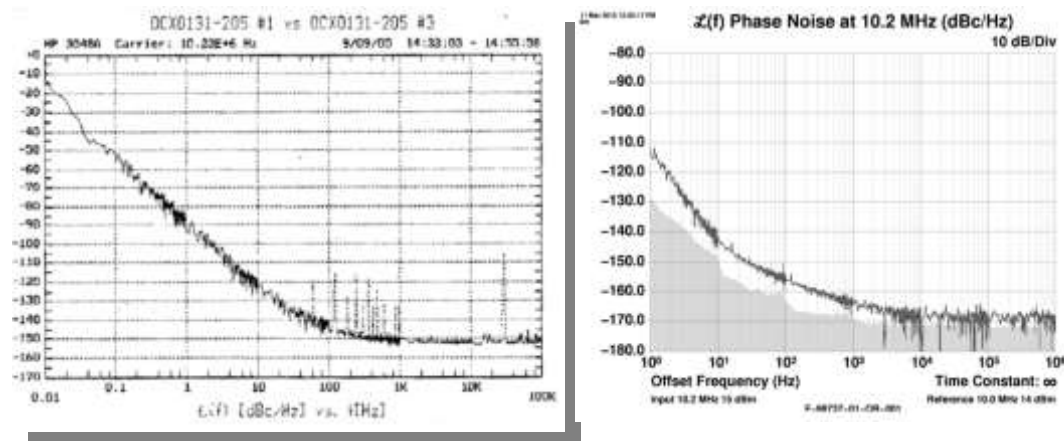
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- The ST RF Signal Generator can embed inside, when ordered with such option, a local PC I5 INTEL Core Mother Board 8Gbytes RAM e HD 500Gbytes (LAN, USB 3.0, USB 2.0, VGA or HDMI external interfaces) to run the SW Graphical User Interface. Alternatively it can be configured and monitored using an external PC, through a standard Windows OS PC using a single USB 2.0 link and the SW Driver provided by Space Technology.
- The ST RF Signal Generator allows the Code and Navigation Sequences to be externally controllable in real time using a fast USB 3.0 Driver and HW Bridge developed by Space Technology for its Navigation Recorder and Player products (see the relevant data sheets).
- Together with standard GALILEO L1 and GPS L1 C/A Constellation Modulation factors the ST supports different BOC(n,m). When n and m are different from the aforementioned Navigation standards the chip and data sequences shall be controlled externally via the local PC embedded inside the 2U-19" assembling.
- The fast USB 3.0 link (300Mbytes/sec sustained rate) allows the Multipath Delay, Attenuation and Doppler to be externally controlled for custom GNSS Propagation Channel implementation and validation

The GNSS Signal Generator embeds a state of art and very low phase noise 10.23MHz OCXO reference oscillator (see Figure below right side) that allows the Signal Generator RF Front End Phase Noise performances being even superior to the current GNSS On Board CMCU (Clock Monitoring and Control Unit). A cheaper option more in line with current flying OCXO CMCUs performances is also available (see Figure below left side).



The internal OCXO can be locked through a very accurate analog PLL embedded inside the ST GNSS Signal Generator to an Atomic 10.00MHz external reference.

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