

# Automotive Test

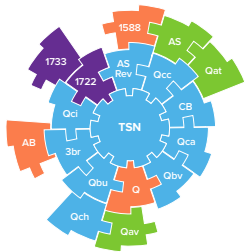
Advances in autonomous driving and the connected car are revolutionizing the automotive industry. In-vehicle networks, V2X, navigation/positioning, security, & Sensor Fusion are providing more convenience and safety, but have become complex systems to test. Spirent helps to ensure conformance, performance, and reliability of these systems that modern drivers and passengers demand.

## In-Vehicle Networks



### Spirent Test Center Automotive

The industry's leading Automotive Ethernet test solution offering realism, scalability and performance. Test automotive Ethernet devices and systems (either InCar or Car2X) with this complete Layer 2-7 test appliance.



### Time Sensitive Networking

Industries such as Automotive are adopting new Ethernet Time Sensitive Networking (TSN) Standards to build a new safety critical networks. Spirent TestCenter TSN test methodologies validate function and performance per new IEEE TSN standards.

TTworkbench	Professional	Basic	Express
TTman			
CL Editor			
TTthree			
Capture & Replay			
GFT Editor			
TTdebug			
RPDE			

### TT Workbench and Suites

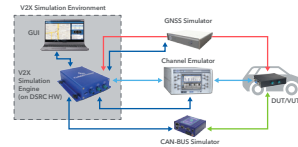
- Check conformance of various Automotive Standards (TC8, AVB, TSN, Wave-DSRC, ITS-G5)
- Quickly find where exactly your SUT deviates from those standards
- Full access to source code to tailor test cases to your requirements

## securitylabs

### SecurityLabs

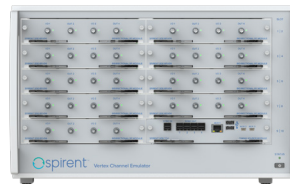
- Security testing and monitoring consulting services.
- Penetration testing and vulnerability scanning.
- Test automotive control modules: ECU, TCU, etc.

## Connected Car & V2X



### V2X & V2V

The auto industry must deliver advanced connectivity services to address the shift in Vehicular communications from one-way to any-way. Spirent's V2X and V2V test solutions enable you to design and implement the next generation of vehicle communications services.



### Vertex

- Channel emulation across the full RF communications spectrum.
- Coverage across 3G, 4G, 5G, Wi-Fi bands
- Modular, scalable, high channel density, advanced channel models

## Autonomy/Navigation



### GSS 7000/9000

Spirent's GSS7000 simulator, along with Multi-GNSS / multi-frequency RTK simulations can also simulate MEMS over CAN plus odometry. Compatible with third party trajectory generation tools such as dSpace, IPG and so on. Compatible with Spirent's V2X Emulator



### Umetrix Video

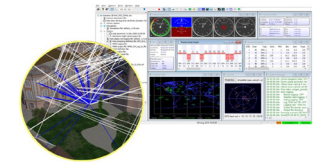
Video is a fundamental technology for ADAS & Autonomy. The Umetrix Video testing solution can measure the human perception of quality using live streams or test content. Umetrix enables testing of cameras, compression, and workflows.



### Record/Playback

The Spirent GSS6450 is the world's smallest high bit depth RF record and playback device, and can offer:

- 3 independent RF ports
- Record and playback:
  - Multi-GNSS / multi-frequency / LTE / Wi-Fi
  - Up to 4 cameras-CANoe



### Sim3D

Multipath and obscuration simulation based on a 3D model reconstruction of real location. Sim3D support HiL setup enables a realistic positioning error simulation in any required environment, i.e., urban, highway, dense forest.



# Security & Performance Test

Take the complexity out of security and performance validation. Spirent empowers customers to prioritize infrastructure and security investments, develop and deploy quickly and safely, meet compliance requirements, validate content-aware device performance, and stop malicious threats in their tracks—so you our users make the most of the opportunities of the Connected Age safely.

## Security & Performance Validation



### CyberFlood: C100-S3

- Highest performing Security and Applications performance assessment solution available in the industry.
- CyberFlood Application: Intuitive web based solution that emulates thousands of attacks, malware, DDoS and application traffic load from a database of current content to verify network infrastructure performance and security robustness
- CyberFlood capabilities along with best in breed encryption/TLS testing with high density 1G/10G/25G/40G/50G and 100G options.



### CyberFlood: CF20

- Versatile and self-contained 1G/10G/25G/40G/50G and 100G security and applications performance assessment solution.
- Emulate thousands of attacks, malware, DDoS and application traffic load from a database of current content to verify network infrastructure performance and security robustness
- High depth TLS/SSL testing to verify next generation firewall capacity and performance of every increasing cryptographic traffic

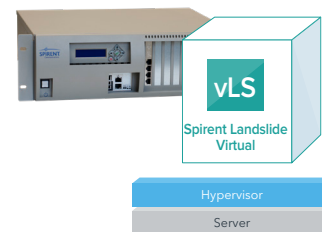
**cyberflood**



### CyberFlood: Virtual

- All the features of appliance based CyberFlood solution package in virtualized software for use in virtualized environments (ESXi, KVM).
- For small to large scale deployments.
- Assess and verify performance and capacity of NFV and SDN infrastructure

## Secure Mobile Network Connectivity



### Landslide C100, Virtual

- Mobile network security-gateway testing for: SmallCell-SecGW, ePDG GW, Macrocells-SecGW. Test any mobile network node requiring a securitization layer
- User data encryption traversing mobile and Wi-Fi networks: includes UE Untrusted Wi-Fi, SIP over TLS, SRTP, HTTPS over network, Diameter over IPsec, DiameterTLS.
- Landslide C100: for high scale 2G/3G/4G/5G mobile network infrastructure performance and function testing up to 100G interfaces.
- Landslide Virtual: for virtualized networks

## L2-7 Security Multi-Function Unit



### Spirent C1 Appliance

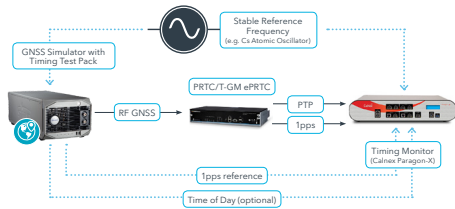
- Economical entry level platform supporting multiple Spirent test applications.
- Spirent TestCenter and Avalanche deliver L2-7 traffic generation and network emulation
  - CyberFlood provides performance and security testing of network and devices.
  - Perfect for pre-deployment testing, troubleshooting and validation of network configurations.
  - Available in numerous configurations for both Ethernet and Wi-Fi networks.



# 5G Test

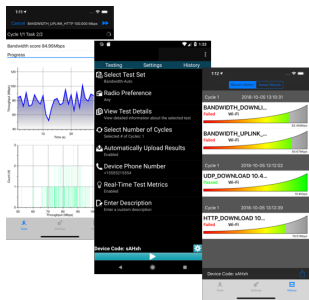
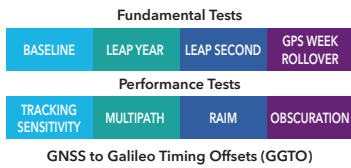
5G promises to transform our world and empower a new industrial and social revolution. The rush is on, but to make 5G possible, everything will change. When such complexity meets such urgency, test and assurance becomes critical. Spirent's Test & Assurance leadership will assure the communications industry fulfils its promise of quickly, safely and economically delivering 5G.

## Device Testing



### GNSS Timing (6300,7000)

Spirent Timing Scenario Set provides all of the cases needed to test the performance and resilience of your PRTC, using one or several major GNSS.



### Umetrix Data 5G

- Measure & evaluate 5G data throughput to assure it delivers the perceived user experience for new 5G MBB KPIs.
- QoE Active Test for mobile service and device launch, benchmarking and monitoring.

## New Radio Validation



### Vertex

Simplify & streamline the prototyping & testing of 5G new radio frequencies (mmWAVE, sub 6GHz) & RAN technologies (Beamforming, M-MIMO) with consistent, repeatable RF Channel emulation & modeling.

## Security

### securitylabs

#### SecurityLabs

- Continuous security testing & auditing of the 5G environment to pre-emptively identify vulnerabilities & prioritize risk mitigation with Security Labs services.
- Vulnerability, SSL penetration testing for cellular IoT devices.



## Mobile Core Network Emulation



### Landslide: C-100, Virtual, E10

Validate the evolution path to 5G from 4G enhancements to R15 5G core network testing:

- Emulate millions of mobile subscribers consuming real world traffic (voice, video, apps) to verify the network under real world conditions
- Automate the testing to support 5G capabilities such as New Radio (NR), native slicing, native CUPS and interaction with other technologies such as 2G/3G/4G, Wi-Fi, IMS and Diameter
- Test physical/virtual/hybrid infrastructure
- Obtain realtime over-the-air analysis of services' QoE

## Mobile Fronthaul

### Spirent TestCenter Chassis

Spirent Test Center is leading the way to adoption of High Speed Ethernet in 5G fronthaul networks. Support for Flex Ethernet (FlexE) and new protocols including eCPRI and NGFI let customers test and validate new 5G fronthaul equipment and networks.

## Cloud-RAN & Data Center



### Spirent TestCenter: Chassis, Appliance, Virtual

Spirent Test Center provides a complete testing platform, test methodologies, and professional services for validating and deploying multivendor network infrastructures for 5G Cloud RAN and Distributed Data Centers.

### CloudStress & CloudScore:



Build and deploy better cloud and virtualized infrastructures through accurate capacity planning, debugging, fault isolation and ongoing benchmarking. Spirent's step by step test methodologies and industry leading test platforms take the guess work out of your cloud and virtual deployments.



# Positioning, Navigation & Timing Test

Spirent offers the most comprehensive portfolio of robust Positioning, Navigation and Timing test solutions. These solutions are centered around simulation in the lab, recording and replaying real word conditions from the field and assessing GNSS vulnerabilities. Supporting this quality product range is a team of experts who can help you with tailored solutions and testing scenarios.

## GNSS Simulators



### GSS7000, GSS9000

Spirent's GSS7000 is available with 3 different levels of software—SimGEN™ / SimREPLAYplus™ / SimTEST—and offers all current and future signals.

- Multi-GNSS / multi-frequency simulation
- Simulate up to 256 satellites simultaneously
- MEMS simulation
- RTK message simulation
- Rack mountable and remote controllable
- SimROUTE for generation of road matched trajectories including elevation
- Multipath simulation

## GNSS Record/Playback



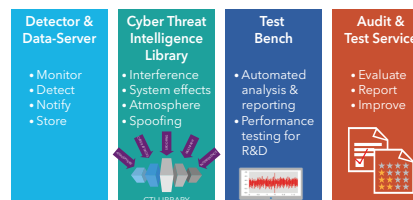
### GSS6450

The world's smallest high bit depth RF record and playback device, and can offer:

- 3 independent RF ports
- Record and playback:
  - Multi-GNSS / multi-frequency / LTE / Wi-Fi
  - Up to 4 cameras
  - CANoe

6450 has true recording flexibility, writing up to 4 GNSS signals at variable bit depths (4, 8, or 16), and a choice of three bandwidths (10, 30, or 50 MHz).

## GNSS Vulnerability



### RPNT Framework

The increasing prevalence of GNSS threats means it has now become important to understand the RF environment in which GNSS systems are operated. This involves monitoring, mapping and analyzing real-world threats in order to assess their prevalence and monitor their evolution. Spirent's solutions such as detector, cloud analytics help customers with the ultimate aim of building appropriate countermeasures into susceptible GNSS-dependent systems

## Multi-GNSS Generator



### GSS6300

As an entry level offering, GSS6300 is designed for fundamental design verification tests and high volume production test applications.

- Single channel GPS / SBAS / QZSS L1 C/A and/or GLONASS L1 C/A and/or BeiDou-2 B1 and/or Galileo E1 signals in one chassis
- Easily field upgradable for more constellations
- Industry leading accuracy, fidelity and reliability
- Comprehensive remote command set for easy ATE integration
- In-rack annual calibration



# High Speed Network Test

Spirent's High-Speed Network (HSE) Test portfolio is the industries most trusted and comprehensive solution for test, measurement and validation of Ethernet and Wi-Fi based networking equipment, network services, and applications. Reduce development costs, accelerate time to market, eliminate issues, and assure a high-quality user experience with Spirent.



## High Speed Ethernet

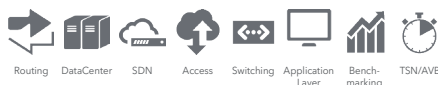


### Spirent Test Center Overview

- Layer 2-7 traffic generation and emulation of complex network topologies and traffic conditions supporting speeds from 10M to 400G
- Functional and performance testing/validation of networking equipment, networks, network services and applications.
- Validate any ethernet based network including service provider, enterprise & campus, mobile, datacenter, industrial, automotive, and more.

### Spirent Test Center Chassis & Appliances

- Spirent TestCenter chassis-based solutions offer the highest scale, deepest functionality, most cost-effective solution for testing Ethernet, Wi-Fi products from 10M to 400G.
- Spirent TestCenter appliances offer the power of Spirent's L2-7 router, switch, application, security, and Wi-Fi test solutions in a portable or bench-top form factor.



### Spirent Test Center Protocols

Extensive protocol support for Routing, DataCenter, SDN, Access, Switching, TSN/AVB and more.

- Test application layer protocols over any of the supported protocols of Spirent TestCenter such as web-based HTTP, file transfer, voice, video, and IPTV.
- Industry Standard IETF RFC Benchmarks for Layer 3 Switching, Layer 2 Switching, and IP Multicast.
- Comprehensive Wizards for error-free setup.



### Spirent Test Center Modules

- Spirent TestCenter Modules can be plugged into Spirent TestCenter chassis and appliances to support any speed or protocol.
- dX3 modules for the highest density fabric.
- pX3 modules for high density fabric and protocols.
- fX3 modules for highest functionality.
- mX3 modules for highest performance across multiple protocols.

## Wi-Fi



### Spirent Test Center Wi-Fi

- Spirent TestCenter appliances (C1, C50) with Wi-Fi support 802.11ac Wave2 and 802.11ax
- Spirent Test Center Wi-Fi Modules bring Wi-Fi 802.11ac Wave2 and 802.11ax (Wi-Fi6) test capabilities to chassis based solutions



### Landslide E10, C100, Virtual

Allows easy over-the-air Wi-Fi (a/b/g/n and AC Wave-1, Wave-2) testing by emulating devices using voice, video, apps and moving across APs, Validate deployments (QoE, performance,...) and the impact technologies like MU-MIMO or tunneling mechanisms (None, GRE, CAPWAP,...)



### Vertex

- RF Channel emulation for device and AP validation test
- Wi-Fi Test: Up to 200MHz BW per RF channel, up to 8x8Bi MIMO, 802.11a,b,g,n,ac um.

## Network Emulation & Impairment



### Spirent Attero

- Attero and Attero-X provides powerful and precise traffic impairments for negative testing up to 10GbE. Full bandwidth line-rate impairment with up to 0.80sec delay at 10GbE.
- Attero 100G provides powerful and precise traffic impairments for negative testing for 40GbE, 50GbE & 100GbE interfaces. Full bandwidth line-rate impairment with up to 0.25sec delay at 100GbE.



### Spirent Network Emulator

Network Emulator providing deep functionality and higher port counts for service test and enterprise network emulation. Perfect for testing SD-WAN, Cloud, campus and other common distributed network designs.