BROCHURE

PNT Xe

Easy-to-use, economical,
lab-to-field PNT simulator

spirent™
Federal Systems

BROCHURE

Spirent Federal Systems

PNT Xe

Easy-to-use, Economical PNT Simulator Expands Test Access and Coverage

- GPS M-Code capability with unclassified AES-M
- Workflow-based interface shortens learning curve
- RF integrity and trusted results for any budget
- Agile testing for rapid iterations & deployment

Key Features at a Glance

PNT Xe produces high-fidelity GNSS signals via a single combined RF output to the device under test (DUT).

- Support for all global and regional GNSS constellations
- Single or dual-frequency testing
- Unclassified military signals with GPS AES M-Code and P-Code
- 2U, low SWaP-C portable platform with an embedded controller for use in a rack, on a desktop, or in the field

Scale Operations and Efficiency

CHALLENGE:

Large, premier simulation systems are in high demand and often fully booked, leaving many engineers without timely access. Teams need a user-friendly and cost-effective test platform to increase opportunities to test, without compromising RF quality.

SOLUTION:

PNT Xe brings high-fidelity simulation to more engineers in more project phases. Its targeted software provides the capabilities needed, while reducing costs to meet efficiency initiatives.

The **Scenario Assistant** workflow tool simplifies and speeds up test scenario creation and modification:

- Helps new team members or novice users onboard quickly, saving time and resources—no simulation expertise required
- Minimizes the risk of human error for meaningful and accurate test results

No more coordinating schedules around a limited number of lab simulators. With PNT Xe, every engineer can run tests directly from their own desk.

Why Choose PNT Xe?

PNT Xe is built on the same proven architecture as Spirent Federal's premier system, PNT X—the industry benchmark for positioning, navigation, and timing (PNT) testing. PNT Xe's control software is an efficient, tailored interface derived from the most trusted simulation engine available.

- Across 5 decades, Spirent has set the standard for precision and reliability.
- The world's leading PNT systems are designed and verified using Spirent.
- Testing with PNT Xe guarantees alignment with the same test conditions, models, scenarios, and pass/fail criteria.
- The result is a seamless ecosystem for consistent test standards.

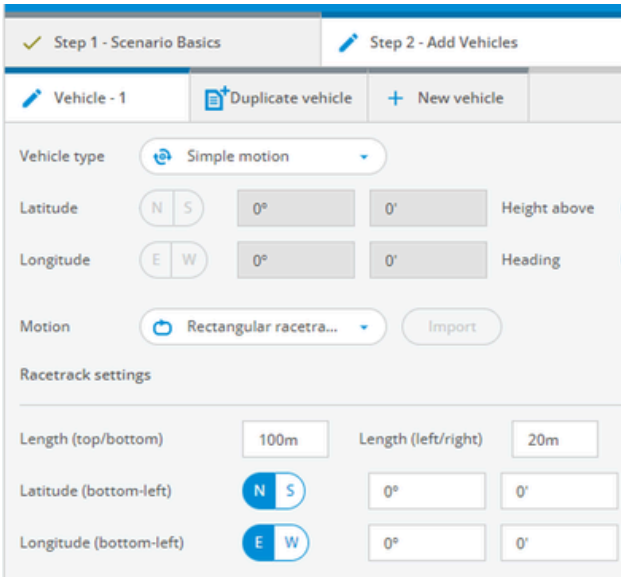

Figure 1. Scenario Assistant creates scenarios from scratch or quickly and easily modifies existing scenarios

GPS AES M-Code for Authorized Users

CHALLENGE:
Modernizing military PNT systems to use encrypted GPS M-Code typically requires access to classified labs.

SOLUTION:
PNT Xe makes M-Code testing accessible.

- By enabling in-house emulation of AES-encrypted M-Code and P-Code in unclassified environments, it eliminates the need for classified lab access.
- This shift reduces logistical complexity and empowers authorized teams to perform early-stage testing and verification more efficiently, accelerating development.

Agile Development with Trusted Results

CHALLENGE:
Development teams face increasing pressure to deliver new PNT technology faster and keep pace with accelerated deployment schedules.

SOLUTION:
PNT Xe supports agile development by enabling rapid, iterative testing.

- An interactive workflow gives teams immediate, actionable feedback on software changes. Developers can make incremental updates, run tests, review results, and adjust again—repeatedly and efficiently—for frequent, fast test cycles that ensure the software works at each step.
- Built-in tools allow teams to automate test execution, manage simulation data, and share results. These automation capabilities integrate smoothly with continuous integration processes for faster iterations.

Figure 2. PNT Xe brings AES M-Code testing out of the classified lab

Hardware

PNT Xe is a compact, single-unit system with an embedded controller. Engineered for field and range deployment, it is MIL-STD-810H compliant for ground vehicle vibration and operates reliably from 0°C to +50°C. It supports one RF output and two software-defined radio (SDR) cards.

Each SDR card can be configured to generate up to 64 channels of any signal type within one of four frequency bands. Multiple constellations can be generated within a single SDR card, as long as they operate within the same frequency band. **See Table 1.**

1561.098 - 1601.719 MHz	1202.025 - 1248.06 MHz	1176.45-1191.795 MHz	1268.52 - 1278.75 MHz
GPS L1 (C/A, C, P, AES-M) SBAS L1 Galileo E1 GLONASS FDMA L1 GLONASS CDMA L1OC BeiDou B1I BeiDou B1C QZSS L1 NavIC L1	GPS L2 (C, P, AES-M) GLONASS FDMA L2 GLONASS CDMA L2OC GLONASS CDMA L3OC BeiDou B2I BeiDou B2b QZSS L2	GPS L5 SBAS L5 Galileo E5 BeiDou B2a NavIC L5 QZSS L5	Galileo E6 BeiDou B3I QZSS L6

Table 1. Signals grouped by frequency band

Software

PNT Xe's control software is driven by the leading PNT simulation engine. The user interface has been simplified for targeted development and validation testing. Spirent's precise constellation and navigation modeling is built-in, including SimROUTE, a trajectory generation tool using Google Maps® or OpenStreetMap.

Automation

- **Remote Control**. PNT Xe can be controlled via GUI or remote commands. Commands are formatted according to Spirent's SimREMOTE ICD and are sent via TCP/IP.
- **Spyder API using Python**. The open source Python development environment can more quickly and easily automate your test system, create software add-ons, and control the system remotely from another PC or simulator, saving time and resources.

Single Channel Utility (SCU)

PNT Xe supports the generation of a single channel satellite signal—ideal for testing where single satellite control is required.

Licensable Software Features

Feature	Description
SimMCODE	Unclassified GPS AES M-Code for authorized users only
Remote Vehicle Motion	External injection of 6DoF motion data: commands streamed in as trajectory
NMEA Output	Output NMEA data for post-processing comparison with the receiver's NMEA
Data Streaming	Stream vehicle or satellite information to an IP address for real time analysis
RTCM Corrections	Improves the location accuracy for the simulated vehicle

Interoperability

PNT X users can generate compatible PNT Xe scenarios for backwards and forwards interoperability.

Field Upgradable

PNT Xe supports in-field upgrades for future scalability.

- In-field hardware upgrades for additional RF SDR card (maximum of 2)
- Software feature keys to enable additional GNSS signals

NAVWAR Threat Representation

Compatible hardware modules:

Spoofing Resilience Testing

- **Live-sky Signals + Spoofing Signals with STANDPOINT**
- Synchronize real satellite signals and simulated for spoofing testing.
- Traditional spoofing techniques rely on radiated signals that can require special licenses and approvals.
- PNT Xe injects spoofed signals directly to the device under test (DUT) via the RF output, while the DUT continues to track live GNSS signals.
- Alternatively, for approved range testing, PNT Xe can radiate spoofed signals over the air.
- PNT Xe with Standpoint enables highly-realistic spoofing scenarios under operational conditions.
- It also enables receivers to integrate from live sky into an anechoic chamber without disruption.

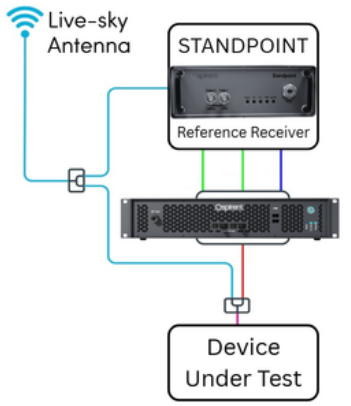

Figure 3. PNT Xe with STANDPOINT

Figure 4. Range spoofing testing with PNT Xe & STANDPOINT

Jamming Signals

Spirent GSS7765 Interference Generator provides a comprehensive solution for testing in the presence of intentional or unintentional RF interference. Seamless integration with PNT Xe ensures full control over jamming signal dynamics.

GSS7765 supports a broad range of jamming signal types, including Continuous Wave (CW), AM, and FM (pulsed signals also available). It also supports noise generation with variable bandwidth.

Table 2. PNT Xe and PNT X Comparison Matrix

System Capabilities	PNT Xe	PNT X
Max Purpose-built SDR Cards	2	10
Max Channels (Each channel can generate multiple signals for one satellite at one frequency, e.g., a L1 channel could create L1C/A, L1C, L1P(Y), and L1M signals.)	128	640
Supported Constellations and Frequencies	All	All
Max Number of Frequencies at One Time	2	4 + S-band
Number of RF Outputs / Antennas	1	10
Encrypted Military Signals	**PNT Xe**	**PNT X**
Max Secure Channels	32	320
GPS AES M-Code and P-Code	✓	✓
Full Suite of Secure Military Signals for GPS and Galileo	No	✓
NAVWAR	**PNT Xe**	**PNT X**
Embedded Jamming and Spoofing	No	✓
Compatible with GSS7765 Interference Generator	✓	✓
Live-sky + Injected Spoofing Signals with Standpoint	✓	✓
CRPA, Wavefront and Anechoic Chamber	No	✓
Complementary Signals and Sensors	**PNT Xe**	**PNT X**
Inertial Navigation Systems	No	✓
LEO Constellations and ALTNAV	No	✓
Custom Signal Generation	No	✓

Size, Weight, and Power	PNT Xe	PNT X
Dimensions (Height x Width x Depth)	2U Chassis Only: 88.1 x 448.7 x 495.5 mm (3.47 x 17.66 x 19.51 in) With Rackmount Ears + Ports: 88.1 x 482.6 x 513 mm (3.47 x 19.00 x 20.20 in)	4U for Signal Generator + 4U for C50 X Controller Combined units: ~ 354 x 486.8 x 665.8 mm (~ 14 x 19.17 x 26.22 in)
Weight (Configuration Dependent)	<15 kg (33 lbs)	Combined units: <50.7 kg (111.7 lbs)
Power	100-240V 5A Max 50 to 60 Hz	100-240 V 9A Max 50 to 60 Hz
Ruggedized	Yes – Compliant with MIL-STD-810H Vibration in Ground Vehicle & Operating Range from 0°C to +50°C (32°F to 122°F)	No

Environmental Social & Governance (ESG)

Spirent's Positioning Technology business unit has been committed to ESG good practice and improvement since achieving ISO14001:2015 Environmental Managemental System certification in 2004.

ESG is a priority for Spirent across all aspects of our business, from sustainable buildings and sustainable product design to sustainable supply chain, manufacturing and shipping/export processes. As is best practice, we follow a continuous improvement process in respect to ESG.

Many of Spirent's test solutions rely on physical test equipment used in situ by our customers. We are working to reduce the lifecycle impacts of our products, and the environments in which they are used, in a number of ways:

- Designing for environment and end of life, including compliance with all legal requirements;
- Reducing the size, weight, noise and power use of our products;
- Visualization and the development of Test-as-a-Service via PNT Professional Services;
- Improving utilization and automation; and
- In-field servicing and upgrades.

We use formal sustainability metrics in the product development process.

For more specific information on how ESG applies to our PNT test solutions, please contact your Spirent representative. For more information on Spirent initiatives, visit **corporate.spirent.com/sustainability**.

Ordering Information

Available to Order from Spirent Federal Systems

- info@spirentfederal.com
- 801-785-1448

PNT Xe Part Numbers

- PNT Xe and associated products are commercial-off-the-shelf (COTS) products.
- **Due to PNT Xe's flexibility and wide range of use cases, there are several COTS options to fit your test needs.**
- Please contact us to determine which options will work best for you.

About Spirent Communications

Spirent Communications is a global leader with deep expertise and decades of experience in testing, assurance, analytics and security, serving developers, service providers, and enterprise networks. We help bring clarity to increasingly complex technological and business challenges. Spirent's customers have made a promise to their customers to deliver superior performance. Spirent assures that those promises are fulfilled.

About Spirent Federal Systems

Spirent Federal Systems provides the world's leading PNT test solutions to the US Government and contractors to enable resilient PNT under any conditions and outpace evolving navigation warfare threats. As a US proxy company, Spirent Federal enhances Spirent's commercial offerings with classified and other sensitive military signal emulation capabilities. For more information, visit **spirentfederal.com**.

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