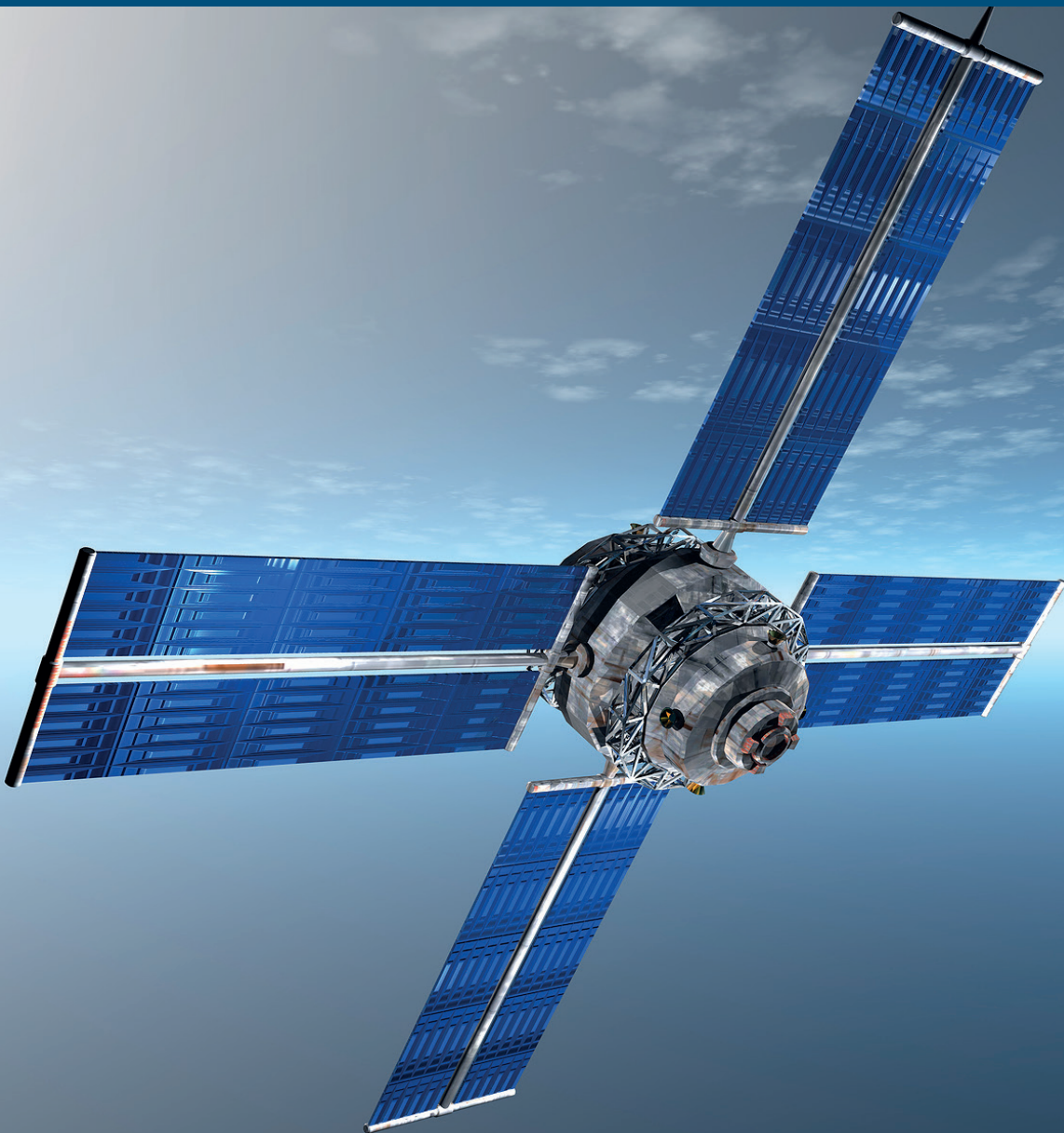


Intelligent RF Spectrum Recorder

DATA SHEET | ODEN 3001



Intelligent RF Spectrum Recorder

INTRODUCTION

ODEN 3001 is a next-generation wideband recorder and signal acquisition system designed for COMINT, ELINT, SATCOM and spectrum monitoring missions. Unlike traditional recorders that capture everything continuously, ODEN 3001 intelligently detects and records only signals of interest. This reduces data volume, lowers storage costs and minimises operator workload without compromising on performance. With frequency coverage up to 26.5 GHz, industry-leading instantaneous bandwidth and scalable storage options, ODEN 3001 delivers the speed, precision and flexibility required for modern electromagnetic spectrum operations and signals intelligence.

Highlights

- Wide frequency range: 2 MHz – 6 GHz, or 30 MHz – 26.5 GHz, depending on configuration
- Large instantaneous bandwidth: Up to 2 GHz
- Advanced frequency mask trigger (FMT) with high-resolution detection
- Scalable digital downconverters (DDCs): up to 1,024 channels
- Flexible acquisition rules: Full region, defined channels, or no region
- Real-time monitoring: Live FFT and spectrogram views
- Recording editor for FMTs, acquisition regions, and rules
- Enterprise-grade storage: Up to 384 TB per system
- Flexible replay options: Software-based replay and hardware playback



ODEN 3001

KEY CAPABILITIES

What's in the Box

ODEN 3001 is built on a rugged 19" chassis that integrates wideband RF receivers, enterprise-grade storage and modular digital signal processing. At its core is a flexible architecture offering 128 or 1024 digital downconverters (DDCs), a frequency mask trigger (FMT) engine and acquisition region control. The base unit includes in-chassis RAID storage, with options for external expansion. Users receive a complete recording and monitoring solution out of the box: RF input modules, control and streaming hardware, an intuitive software GUI and all cabling required for operation. Designed for mission-critical COMINT, ELINT, SATCOM and spectrum monitoring tasks, ODEN 3001 is immediately deployment-ready.

Product Functionality

ODEN 3001 is a high-performance RF spectrum recorder designed to capture, store and replay signals with unprecedented efficiency. Unlike traditional recorders that require continuous wideband capture, ODEN 3001 intelligently monitors the spectrum and records only events of interest, dramatically reducing storage requirements and analysis workload.

With up to 80 MHz instantaneous bandwidth, the system supports both wideband and narrowband recording, enabling simultaneous surveillance across diverse signals. Its flexible DDCs allow users to focus on multiple sub-bands within the spectrum, while acquisition rules dictate how and when data is stored. This makes the ODEN 3001 equally suited for unknown signal detection, interference hunting and mission-driven data collection.

The platform integrates live spectrum and spectrogram views, allowing real-time monitoring alongside recording. Each captured signal is stored as an individual, searchable file that can be replayed, exported or archived for later analysis. Built with enterprise-grade RAID storage and robust data indexing, ODEN 3001 ensures reliable performance during long-duration operations.

Ultimately, ODEN 3001 combines advanced trigger logic, configurable acquisition regions and high-capacity storage into a single streamlined system that reduces cost, operator workload and data volume, while ensuring no signal of interest is missed.

Key Technology

Intelligent Recording

The key innovation of ODEN 3001 lies in its intelligent recording capability. Traditional spectrum recorders either capture the entire monitored bandwidth continuously, resulting in terabytes of unnecessary data, or require operators to manually trigger recordings, with the risk of missing fleeting or unknown signals. ODEN 3001 solves both challenges by automatically detecting and capturing only the signals that matter.

Its frequency mask trigger (FMT) uses up to 32,768 mask points per FFT bin, processed on dedicated FPGA hardware for real-time responsiveness. Operators can configure hysteresis thresholds, start and stop levels and acquisition timing rules. This means short-lived or low-level disturbances may be ignored if desired, filtering out noise and allowing meaningful signals to be acquired.

Once a trigger condition is met, ODEN 3001 applies acquisition rules to determine what to store. Options include recording the entire instantaneous bandwidth, capturing only the defined acquisition region, or isolating narrow-band channels centred on the signal. A large ring buffer ensures that recordings include the beginning of each event, eliminating gaps.

Each detected signal is stored in its own indexed file, making later analysis straightforward. Users can search, filter, replay and export recordings without wading through terabytes of irrelevant spectrum data. This targeted approach dramatically reduces both storage requirements and offline processing time.

By automating spectrum monitoring, ODEN 3001 eliminates the need for continuous operator oversight, cuts operational cost and ensures that rare or unknown signals are never missed. Whether for COMINT, ELINT, spectrum compliance or interference mitigation, intelligent recording transforms how organisations capture and manage RF data.

Example Applications

SATCOM Link Recording for System-Level Validation

The ODEN 3001 Recorder may be used to record and play back real RF channel conditions, including the impact of multipath fading, atmospheric noise and interference. Triggering may be set up to record events such as frequency mask interactions or power control transmissions. The recorded data may be exported to signal generators or channel emulators for the hardware-in-the-loop (HIL) or baseband testing.

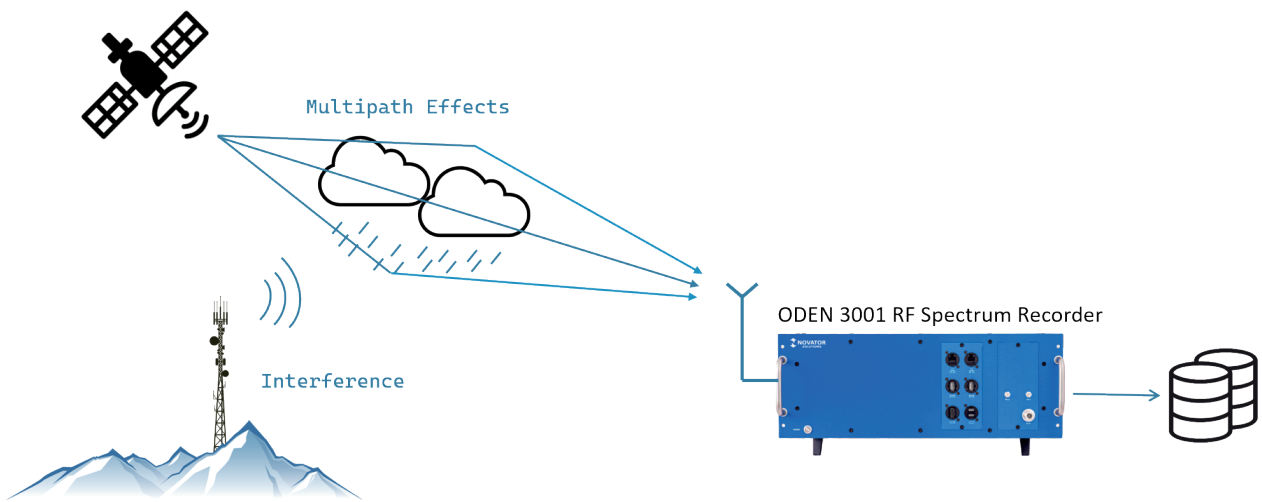


Figure 1: Monitoring and recording SATCOM signals with ODEN 3001

Radar Record and Playback

ODEN 3001 may be used to record and replay IQ data, to test radar devices under test (DUTs) with bit-accurate signal representation. This enables a DUT to be stimulated with real-world signals for system validation and fault finding.

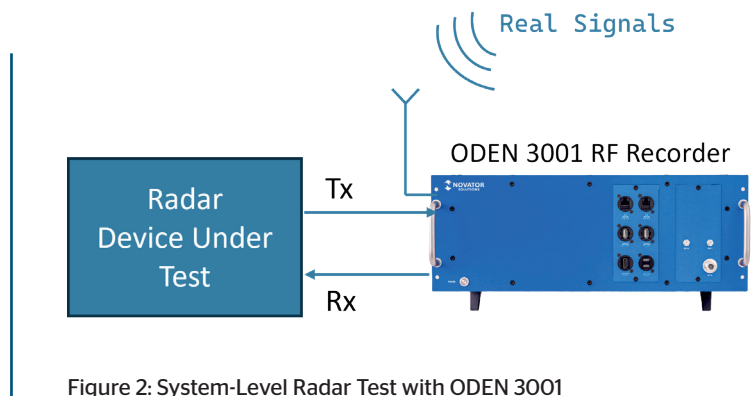


Figure 2: System-Level Radar Test with ODEN 3001

Specifications

Typical RF Specifications

RF Receiver		
Spec	With NI Vector Signal Transceiver	With Novator Solutions Analogue Receiver Module
RF channels	1	2
Connector	3.5 mm (female)	SMA
Input Impedance	50 Ω	50 Ω
Maximum Input Power	+ 27 dBm	+ 17 dBm
Maximum Frequency	26.5 GHz	6 GHz
Maximum Instantaneous Bandwidth	2 GHz	80 MHz
Displayed Average Noise Level (DANL)	> -167.5 dBm / Hz	- 163 dBm / Hz
Frequency Resolution	8.89 μ Hz	<1 Hz
VSWR	< 1.8:1	2.35:1
Linearity / IP3	-8 to +38 dBm	+10 dBm
Phase Noise	10 kHz Offset: -129 to -112 dBc/Hz; 100 kHz Offset: -140 to -119 dBc/Hz; 1 MHz Offset: -145 to -131 dBc/Hz; 10 MHz Offset: -146 to -136 dBc/Hz	10 & 100 kHz Offset: -98 dBc/Hz; 1 MHz Offset: -109 dBc/Hz; 10 MHz Offset: -135 dBc/Hz

Digital Specifications

Spec	
Digital Downconverters (DDCs)	1024 (up to 200 MHz IBW) 128 (above 200 MHz IBW)
High-resolution frequency mask trigger (FMT)	32768 mask points

Storage Specifications

Spec	M.2 Storage	U.2 Storage
Form factor	Single-slot module	Single-slot module
Removable disk(s)	No	Yes
Total storage capacity	8 - 32 TB per module	7.68 / 15.2 TB per module
Write speed	7 GB/s	3 GB/s

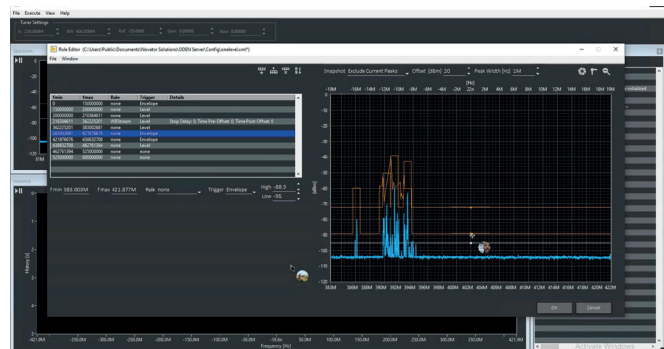
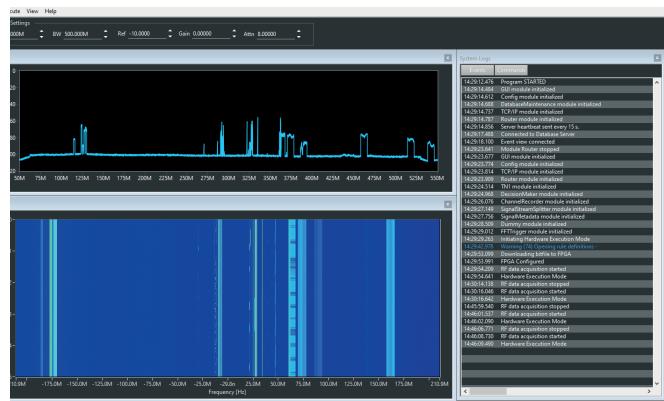
Configurations

Software & Product Configurations

ODEN 3001 ships with a user-friendly graphical interface that simplifies setup, monitoring and data management. The GUI provides live spectrum and spectrogram views, as well as an integrated frequency mask editor where users can configure, load and save masks, acquisition regions and rules. Recordings are listed in an intuitive file view, allowing rapid filtering, replay and export to external storage or third-party analysis tools.

The system is available in multiple hardware and storage configurations to suit operational requirements. Options range from 128 to 1024 DDCs, with aggregated signal bandwidths of 125–250 MHz depending on configuration. Storage can be scaled up to 384 TB using in-chassis RAID arrays. Frequency coverage stretches from 2 MHz to 6 GHz, or 30 MHz to 26.5 GHz, depending on hardware configuration.

For deployment flexibility, ODEN 3001 can operate as a standalone recorder or be integrated into larger EW, SIGINT and spectrum monitoring systems. Optional playback hardware allows recorded signals to be re-injected into test environments, supporting training and validation scenarios. This modularity ensures ODEN 3001 can be tailored to mission-specific needs, whether focused on wideband surveillance, interference monitoring or targeted signal intelligence collection.



Novator Solutions AB, part of Novator Consulting Group, is at the forefront of SIGINT and EW technology. Our highly skilled R&D team combines expertise in high-speed data processing and software defined radio (SDR) technology to develop cutting-edge monitoring receivers and RF signal recorders. Our software proficiency, combined with modular hardware designs, allows us to create customised solutions that meet specific project and mission needs.

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