



SatmonManager™

Satellite Transponder Analysis and Reports system

“Empowering Satellite Operations with Precision Data”

ABOUT SATMONMANAGER™

SatmonManager™ is a satellite monitoring and analysis system that delivers **real-time and historical insights** into transponder performance. It enables RF engineers to monitor signal quality, detect anomalies early, and optimize satellite communication efficiency — all from a centralized web-based platform with no client installation required. Built on MySQL 8.0.45 and modern web technologies, it provides engineering-grade precision across multiple channels and carriers for mission-critical satellite operations.

KEY MONITORING FEATURES

M Comprehensive Monitoring

- Channel Power
- Satellite EIRP
- Carrier-to-Noise Ratio (C/N)
- Carrier-to-Noise Density (C/No)
- Noise Power (N) & Noise Density (No)
- Spectrum Bandwidth (10 dB, 3 dB, 99%)

G Graphical Analysis

- Visualize trends and performance metrics over time
- Interactive time-series charts (Chart.js)
- CDF (Cumulative Distribution Function) plots

R Reporting & Statistics

- Daily / Weekly / Monthly / Yearly reports
- Min / Max / Average / Std Dev per parameter
- Backoff & PEB calculated metrics in reports
- Printable PDF report export

A Alert & Event System

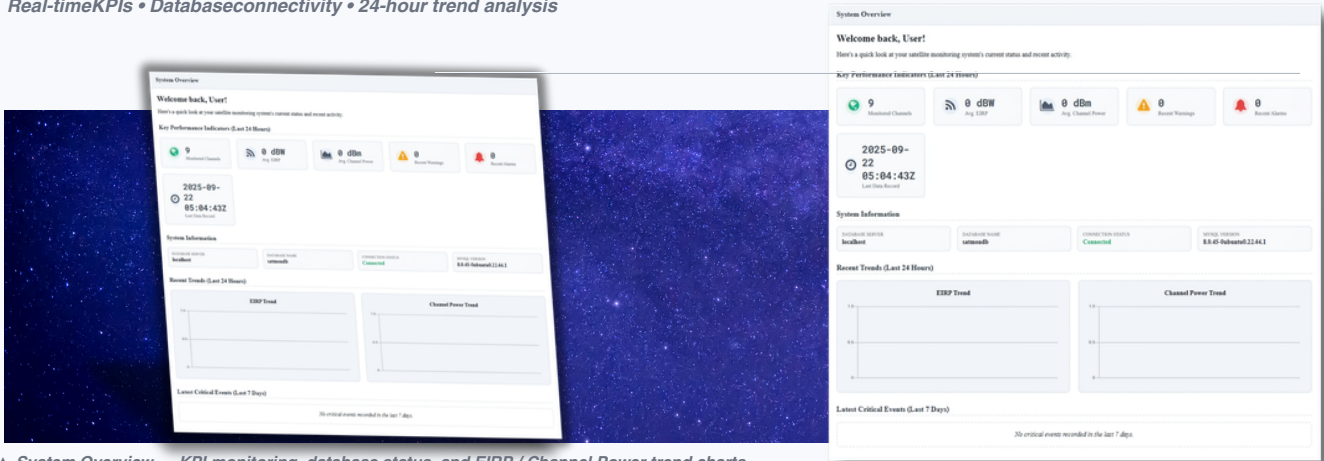
- Warning and alarm threshold tracking
- OK / WARN / ALARM state per parameter
- Automatic event logging to database
- Date-range event history and filtering

ADVANCED PERFORMANCE METRICS

Backoff	Calculated as the difference between a target (e.g. saturated) EIRP and the measured peak EIRP. Indicates how much power margin the transponder has, critical for managing non-linear effects and preventing distortion.
PEB	Power Equivalent Bandwidth — characterizes the effective bandwidth occupied by the signal, taking into account its power distribution. Expressed as a percentage of the nominal bandwidth, revealing how efficiently the transponder spectrum is being used and identifying any unexpected spectral spreading.
CDF Chart	Cumulative Distribution Function plot for key parameters such as C/No. Indicates the percentage of time a signal operates above or below a certain quality level.
Statistical Summary	Automatically calculates Min, Max, Average, and Standard Deviation for each monitored parameter over Daily, Weekly, Monthly, and Yearly periods.
Show on Map	Visualizes the physical location of monitored events and transponders on an interactive map via Leaflet.js. Color-coded status icons (green/yellow/red) with severity popup provide an at-a-glance overview of event status.
Carrier plus Noise to Noise ratio	Carrier-plus-Noise to Noise ratio — a key signal quality metric measured alongside other monitored parameters.

SYSTEM OVERVIEW DASHBOARD

Real-time KPIs • Database connectivity • 24-hour trend analysis



▲ System Overview — KPI monitoring, database status, and EIRP / Channel Power trend charts

<p>9</p> <p>channels</p> <p>Monitored Channels</p>	<p>0</p> <p>dBW (live)</p> <p>Avg. EIRP</p>	<p>0</p> <p>dBm (live)</p> <p>Avg. Channel Power</p>	<p>0</p> <p>last 24 h</p> <p>Recent Warnings</p>	<p>0</p> <p>last 24 h</p> <p>Recent Alarms</p>
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LAST DATA RECORD	— (live timestamp)	DB SERVER	localhost	DB NAME	satmondb	STATUS	● Connected	MYSQL VER.	8.0.45
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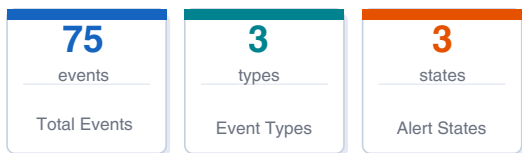
EIRP Trend	Interactive 24-hour line chart across all monitored channels
Channel Power Trend	Multi-channel overlay chart for the last 24 hours
Recent Warnings (24 h)	Live count of WARN-state events in the last 24 hours
Recent Alarms (24 h)	Live count of ALARM-state events in the last 24 hours
Last Data Record	Timestamp of the most recently ingested measurement — confirms data feed is live
Latest Critical Events	Last 7-day ALARM log displayed directly on the Overview page
System Information	Live display of DB server, DB name, connection status, and MySQL version

EVENT STATISTICS & ANALYTICS DASHBOARD

Multi-dimensional event analysis • Filter by date, type, carrier, channel, state

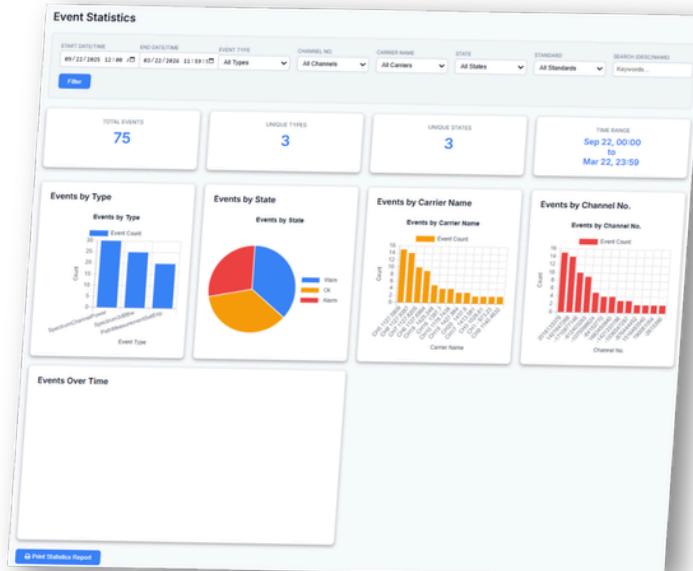
Intelligent Event Aggregation

The Event Statistics dashboard aggregates all monitoring events across configurable date ranges, carriers, and channels. Engineers can rapidly identify fault patterns and review event distribution across time.



Dashboard Visualizations

- Events by Type**
Bar—SpectrumChannelPower, PathMeasurementSatEirp, Spectrum3dBW
- Events by State**
Pie—Warn/OK/Alarm proportional distribution
- Events by Carrier**
Bar—per-carrier event frequency ranking
- Events by Channel**
Bar—per-channel event breakdown
- Events Over Time**
Timeline chart — event count across the selected date range



▲ Event Statistics Dashboard — charts by type, state, carrier, channel

Alert States: OK WARN ALARM

BENEFITS TO ENGINEERS AND OPERATORS

Proactive Issue Resolution	Early detection of performance degradation before it impacts service quality.
Optimized Resource Utilization	Insights from PEB and Backoff calculations help in fine-tuning transponder loading and maximizing spectral efficiency.
Enhanced Quality of Service (QoS)	Consistent monitoring ensures communication links meet performance guarantees.
Reduced Downtime & Operational Costs	Faster fault isolation and predictive maintenance reduce service interruptions and expensive repair efforts.
Improved Regulatory Compliance	Comprehensive reporting facilitates adherence to operational licenses and quality standards.
Simplified Troubleshooting	Detailed historical data and graphical analysis accelerate the diagnostic process.

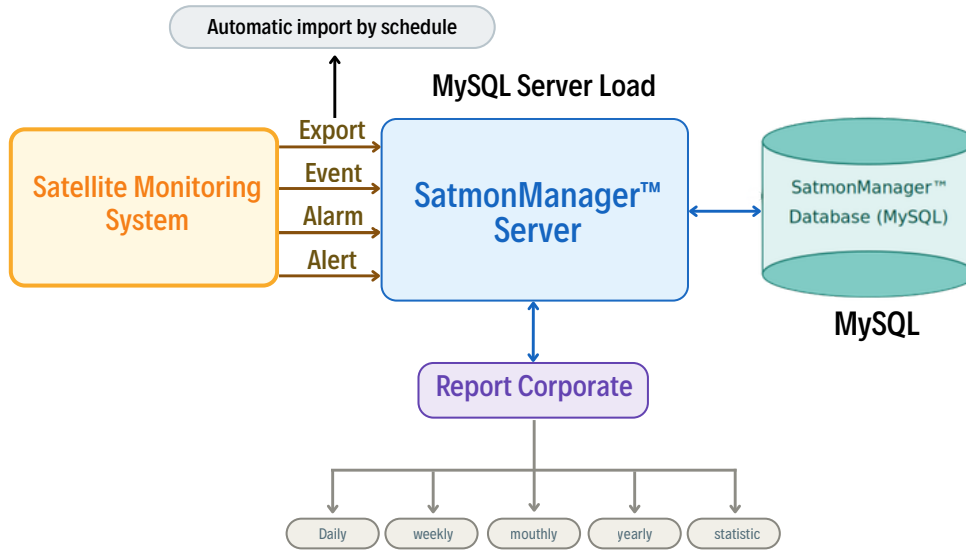
ENGINEER NOTES

Each Daily Report and filtered Event List view includes a dedicated **Engineer Notes** text area where operators can record observations, interference reports, maintenance activities, and any other relevant information for that date or filtered period. Notes are saved to the database and appear on printed / PDF exports.

UTILITY TOOLS, DATA MANAGEMENT & TECHNOLOGY STACK

Utility Tools	Data Management	Technology Stack
dB Calculator Signal level conversion	Import Data CSV / structured format	Backend PHP
Link Budget RF path loss analysis	MySQL 8.0.45 Relational data storage	Database MySQL 8.0.45
Geo Visualization Geographic signal map	Historical Query Long-term trend analysis	Frontend HTML5 / CSS3 / JS
Filter Engine Date / carrier / channel	Event Logging Auto-record all events	Charts Chart.js
Print Report PDF statistics export	Export Raw data & PDF download	Server OS Ubuntu Linux 24.04 LTS
Converters Unit conversion tools for RF-engineering calculations		Icons Font Awesome
		Map Leaflet.js (time-series, CDF, bar, pie)
		Client Any modern browser (no installation required)

SatmonManager™ System



SUPPORTED STANDARDS & SIGNAL TYPES



SYSTEM SPECIFICATIONS & DEPLOYMENT

PARAMETER	SPECIFICATION / VALUE
Deployment	Web-based — browser access only, no client installation required
Monitoring Mode	Real-time and historical query across all channels simultaneously
Monitored Parameters	Channel Power, EIRP, C/N, C/No, Noise Power, 3 dB / 10 dB / 99% BW, Backoff, PEB
Parameters Alert	SpectrumChannelPower • PathMeasurementSatEirp • Spectrum3dBBw
Multi-Channel	Simultaneous monitoring of up to 9 channels with per-carrier views
User Management (User Management menu)	User management system with access control
Database	MySQL 8.0.45 on Ubuntu Linux 24.04 — scalable, multi-carrier
Reporting Periods	Daily / Weekly / Monthly / Yearly
Export Formats	On-screen dashboard • PDF statistics report • CSV export
Event History	Historical data stored in MySQL database
Geo Map	Leaflet.js — color-coded icons (green/yellow/red) + severity popup
Engineer Notes	Per-report text field saved to DB, included in PDF exports

DEPLOYMENT & SCALABILITY

Infrastructure

- Web server: Apache / Nginx on Ubuntu
- Database: MySQL 8.0.45 — shared with web-based application
- Client: Any modern browser — no install

Scalability & Access

- Multi-user with role-based access control
- Supports up to 9 simultaneous channels
- Expandable carrier definitions
- MySQL database shared with web-based application