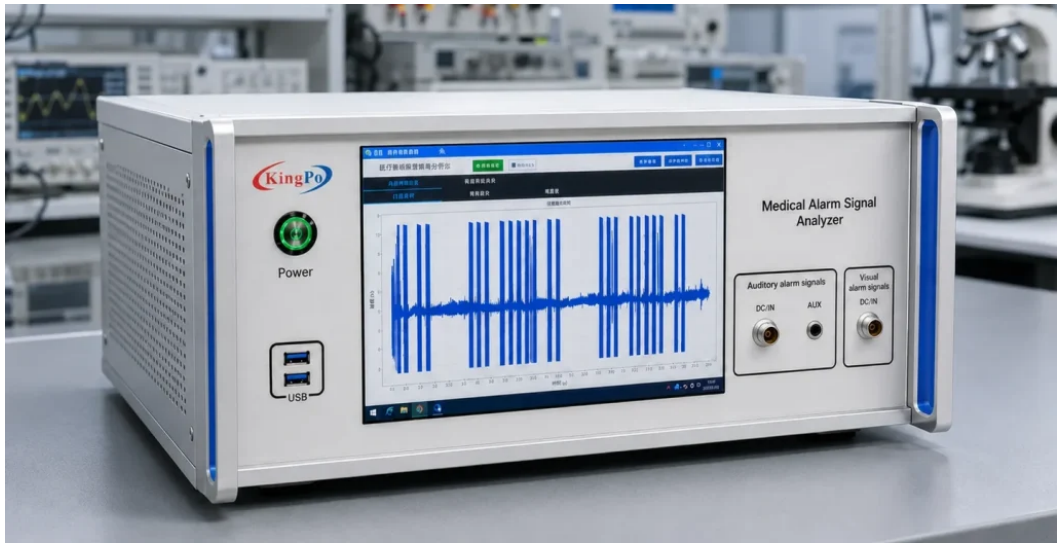
Medical Alarm Signal Analyzer

IEC 60601-1-8 Auditory and Visual Alarm Testing

Model: KP-108



1 Product Overview

The KP-108 Medical Alarm Signal Analyzer is designed for evaluating auditory alarm signals and visual alarm indicators of medical electrical equipment. It supports IEC 60601-1-8 related alarm testing with waveform acquisition, parameter analysis, and automatic report generation.

Key Features

- Auditory alarm signal analysis
- Visual alarm indicator analysis
- Time-domain waveform and FFT spectrum
- Automatic PASS/FAIL report output
- USB and LAN data export

Typical Applications

- Patient monitors
- Infusion pumps
- Ventilators
- Anesthesia systems
- Dialysis systems

Standards and Reports

Standard Reference
IEC 60601-1-8 related testing

Test Types
Auditory and visual alarm signals

Report Output
Waveform, parameters, summary

Testing Capabilities and Report Output

KP-108 Medical Alarm Signal Analyzer

1 What the Analyzer Measures

Auditory Alarm Signals

- Time-domain waveform
- FFT spectrum
- Pulse duration and interval
- Dominant frequency and harmonics
- Priority recognition support

Visual Alarm Indicators

- Flashing frequency
- Duty cycle
- Rise and fall time
- Optical response level
- Wavelength range

2 Typical Test Workflow

1. **Connect** device under test
2. **Capture** alarm signal
3. **Analyze** waveform and parameters
4. **Generate** PASS/FAIL report

3. Key Benefits

- Supports IEC 60601-1-8 related evaluation
- Improves test repeatability and efficiency
- Clear report output for laboratory documentation
- Suitable for R&D, quality control, and compliance testing

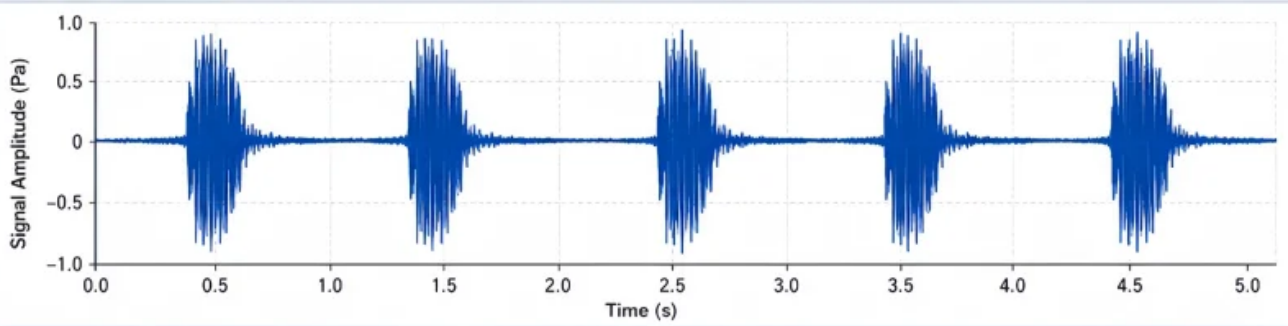
4. Typical Deliverables

- Test waveform screenshots
- Parameter tables
- PASS/FAIL summary
- Exportable report records

Auditory Alarm Signal Analysis Report

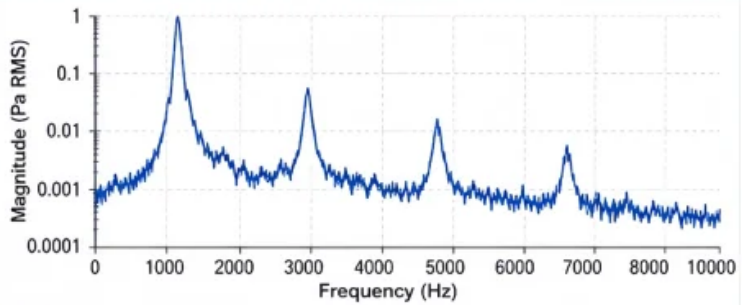
Time-domain waveform, FFT spectrum, alarm parameters and PASS/FAIL summary

1. Time Domain Waveform



Input Range:	±2.0 Pa
Sampling Rate:	48.0 kHz
Record Length:	5.000 s
RMS Level:	0.281 Pa
Peak Level:	0.932 Pa
Crest Factor:	3.31
DC Offset:	-0.001 Pa

2. Frequency Domain (FFT Spectrum)



FFT Size:	16384
Window:	Hann
Frequency Res.:	2.93 Hz
A-Weighting:	On
Ref. Level:	1.000 Pa

3. Alarm Signal Parameters

Parameter	Value	Unit
Pulse Duration (T_{on})	220	ms
Pulse Interval (T_{off})	780	ms
Pulse Period (T_{total})	1000	ms
Rise Time (10–90%)	12.4	ms
Fall Time (90–10%)	18.7	ms
Burst Count (in record)	5	bursts
Dominant Frequency (F_{11})	1520	Hz
Harmonic Content (2nd–5th)	-13.2	dB (avg.)
Overall Level (A-weighted RMS)	0.281	Pa
Priority Recognition Result	High Priority	(recognized)

4. Analysis Summary

Test Result:	**PASS**
Standard/Template:	IEC 60601-1-8:2006 (High Priority)
Compliance:	Within Limits:
Analysis Time:	2025-05-20 14:32:18

Analysis Notes:

- Pulse pattern: 5 bursts, regular.
- Measured pulse duration and interval are within the typical limits for High Priority alarms.
- Dominant frequency at 1520 Hz with harmonics up to 5th order.
- Signal level stable; no clipping or distortion detected.
- Priority recognition algorithm result: High Priority (confidence 96%).

Software: Medical Alarm Analyzer **Version:** 2.5.1

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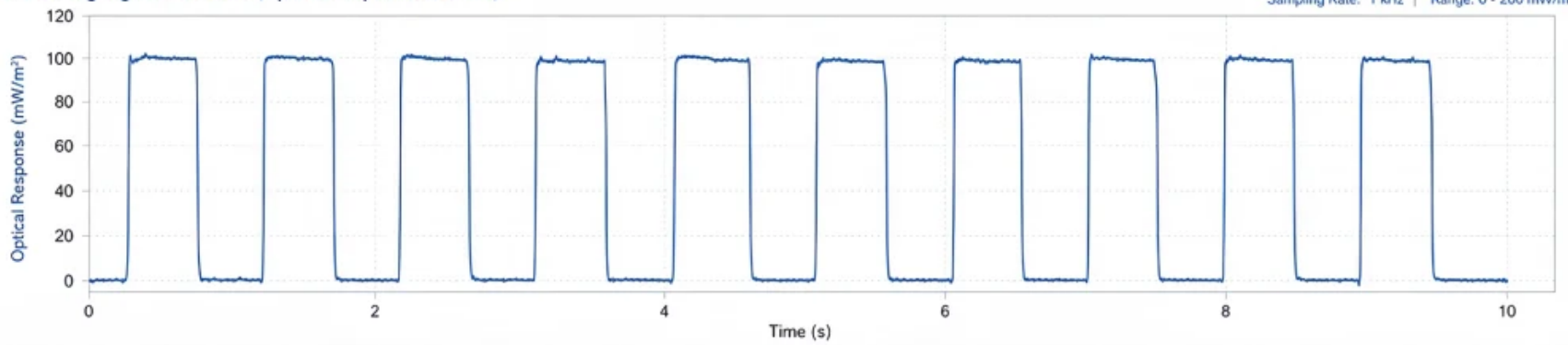
Visual Alarm Indicator Analysis Report

Flashing waveform, pulse train, visual alarm parameters and status summary

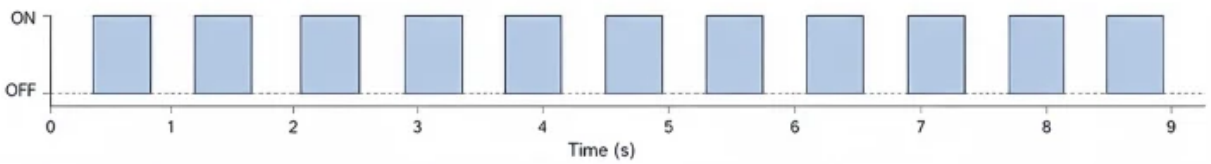
1. Flashing Signal Waveform (Optical Response vs. Time)

Sampling Rate: 1 kHz | Range: 0 - 200 mW/m²

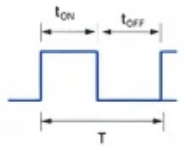


2. Pulse Train View (Visual Indicator)

Flashing Frequency: 1.00 Hz (60.0 fpm) Duty Cycle: 49.8 %



ON (t_{ON})	0.50 s
OFF (t_{OFF})	0.50 s
Period (T)	1.00 s



3. Visual Alarm Indicator Parameters

Parameter	Measured Value	Specification	Result
Flashing Frequency	1.00 Hz (60.0 fpm)	0.5 – 2.0 Hz (30 – 120 fpm)	PASS
Duty Cycle	49.8 %	30 – 70 %	PASS
Rise Time (10% – 90%)	12.3 ms	≤ 100 ms	PASS
Fall Time (90% – 10%)	11.7 ms	≤ 100 ms	PASS
Wavelength Range (Peak)	629 nm	620 – 635 nm	PASS
Optical Response (Peak)	101.2 mW/m²	≥ 20 mW/m²	PASS
Optical Response (Min)	0.18 mW/m²	≤ 5 mW/m²	PASS

All measurements performed in accordance with IEC 60601-1-8:2020, Clause 8.6 (Visual Alarms).

4. Status Summary

Overall Test Result: PASS

Analysis Notes:

- Visual alarm indicator flashes within specified frequency range.
- Duty cycle is within allowable limits.
- Rise and fall times meet response requirements.
- Peak wavelength and optical response are within specification.
- No irregularities detected in flashing waveform.

Test Mode:	Continuous Capture	**Detector:**	Si Photodiode
Measurement Range:	0 – 200 mW/m²	**Optical Probe S/N:**	PD-1000-2A-0187
Ambient Light:	12.5 lux	**Calibration Date:**	Mar 12, 2025
Test Distance:	1.0 m	**Next Calibration Due:**	Mar 12, 2026

End of Report