FIGURE 12 - QUANTUM RANDOM NUMBER GENERATION INTEGRATION

QUANTUM RANDOM NUMBER GENERATOR

Entropy Generation System

ENTROPY SOURCES (1201-1204)

Photon Source (1201)	Vacuum Fluct. (1202)	Phase Noise (1203)	Decay (1204)
Single Photon	Zero-Point	Laser Phase	Radioactive
Beam Splitter	Energy	Fluctuations	Source
●		⊘	α

EXTRACTION ALGORITHMS (1205-1208)

Von Neumann (1205)	Hash Function (1206)	Toeplitz (1207)	XOR (1208)
Bias Removal	SHA-3/512	Matrix Extract	Whitening

HEALTH MONITORING (1209-1212)

Statistical Tests (1209-1210)	Entropy Estimation (1211)	Failure Detection (1212)
• NIST SP 800-90B • Diehard	Min-Entropy: 7.89 bits/byte	Auto-Shutdown on Fail

SECURE KEY GENERATION INTERFACES (1213-1216)

AES-256   ML-KEM   ML-DSA   SLH-DSA

Side-Channel Protection (1217-1220)	QRNG Management AI Agents (1221-1224)