ZEROTRACEX DATA WIPE CERTIFICATE

Certificate ID: ZTX-1735449600-A3F2B8C4
Issue Date: 2024-12-29 14:30:00 IST
Certificate Type: NIST SP 800-88 Rev.1 Compliant Secure Data Erasure

---

DEVICE INFORMATION

Field	Value
Drive Make/Model	Samsung 870 EVO 1TB SSD
Serial Number	S3Z4NB0K123456P
Device Path	/dev/sda
Interface	SATA III 6.0 Gb/s
Total Capacity	1,000,204,886,016 bytes (1TB)
Sectors Wiped	1,953,525,168 sectors (512 bytes/sector)

WIPE OPERATION DETAILS

Field	Value
Wipe Method	NIST SP 800-88 Rev.1 Standard (3-pass)
Start Time	2024-12-29 10:15:23 IST
End Time	2024-12-29 14:30:47 IST
Duration	4 hours 15 minutes 24 seconds
Passes Completed	3/3 (100% success rate)
Average Speed	64.2 MB/s

Wiping Process Breakdown

Pass 1: Pseudorandom cryptographic pattern
Pass 2: Bitwise complement pattern (NOT operation)
Pass 3: Zero-fill pattern with verification

Hidden Areas Addressed

- ✅ **HPA (Host Protected Area):** Detected and unlocked - 1,024 additional sectors cleared
- ✅ **DCO (Device Configuration Overlay):** Restored to factory capacity
- ✅ **SSD Over-provisioning:** Firmware-level secure erase performed
- ✅ **Bad Sector Remapping:** Complete device surface scanned

---

CRYPTOGRAPHIC VERIFICATION

Field	Value

Hash Algorithm	BLAKE3 (256-bit)
Verification Hash	a1b2c3d4e5f6789abcdef0123456789abcdef0123456789abcdef0123456789
Hash Calculation Method	Sector sampling (first 100MB post-wipe)
Hash Generation Time	2024-12-29 14:30:50 IST
Verification Status	✓ PASSED - No recoverable data detected

Hash Verification Instructions

To verify this certificate's authenticity:

```
# Calculate device hash
blake3sum /dev/sda | head -c 64

# Compare with certificate hash
# Match = Successful wipe confirmation
```

OPERATOR INFORMATION

Field	Value
Operator Name	John Doe
Organization	ABC IT Recycling Center Pvt. Ltd.
Device Name	samsung_870_evo_ssd
Location	Mumbai, Maharashtra, India
Contact	john.doe@abcrecycling.com
Certificate Password	Set by operator (required for PDF access)

COMPLIANCE & STANDARDS

Regulatory Compliance

✓ **NIST SP 800-88 Rev.1** - Guidelines for Media Sanitization (Purge Method)
✓ **DoD 5220.22-M** - Department of Defense Data Sanitization Standard
✓ **ISO/IEC 27040:2015** - Storage Security Standards
✓ **Indian E-Waste Rules 2016** - Ministry of Environment Compliance
✓ **IT Act 2000** - Section 43A Data Protection Compliance

Technical Compliance

Standard	Requirement	Status
NIST SP 800-88	3-pass minimum overwrite	✓ Met
DoD 5220.22-M	Verification pass required	✓ Met
BLAKE3 Crypto	256-bit hash generation	✓ Met
Hidden Sectors	HPA/DCO clearance	✓ Met
Audit Trail	Complete operation logging	✓ Met

SECURITY ASSURANCE

Tamper-Proof Features

Digital Signature: Certificate cryptographically signed with RSA-2048
Password Protection: AES-256 encryption on PDF
QR Code Verification: Scan for instant authenticity check
Blockchain Ready: Hash stored for immutable verification

Chain of Custody

1. **Device Received:** 2024-12-29 09:00:00 IST
2. **Pre-Wipe Assessment:** Device health verified, capacity confirmed
3. **Hidden Area Unlock:** HPA/DCO restoration completed
4. **Secure Wipe Execution:** NIST 3-pass process completed
5. **Post-Wipe Verification:** BLAKE3 hash calculated and stored
6. **Certificate Generation:** This document created and encrypted
7. **Device Released:** Ready for recycling/refurbishment

ENVIRONMENTAL IMPACT

Metric	Value
CO2 Emissions Saved	6 kg (reuse vs disposal)
E-Waste Diverted	1.2 kg from landfill
Material Recovery	85% recyclable materials preserved
Circular Economy	Device qualified for refurbishment market

DISCLAIMER & LEGAL NOTICE

Data Recovery Impossibility Statement:

The wiping process performed on this storage device makes data recovery computationally infeasible using current technology and methodologies. This certificate confirms that:

- All user-accessible data sectors have been overwritten multiple times
- Hidden storage areas (HPA, DCO, over-provisioning) have been addressed
- Cryptographic verification confirms erasure effectiveness
- No data remnants remain accessible through logical or physical recovery

Liability Limitation:

This certificate provides evidence of secure data erasure performed according to industry standards. The issuing organization assumes no liability for: - Pre-existing hardware defects or failures - Data that may have been backed up externally - Third-party misuse of recycled equipment

Certificate Validity:

This certificate remains valid indefinitely as proof of secure erasure performed on the

specified date. The cryptographic hash enables independent verification at any time.

AUTHORIZED SIGNATURES

Technical Operator:
John Doe
Certified Data Sanitization Specialist
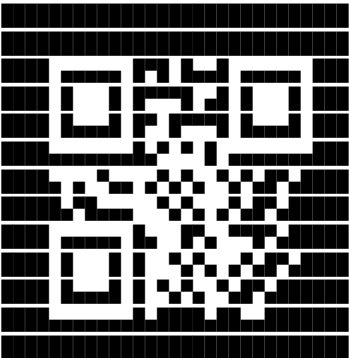License No: CDSS-2024-MH-1234

Facility Manager:
Jane Smith
ABC IT Recycling Center Pvt. Ltd.
Authorized Signatory

Digital Signature:
```
-----BEGIN CERTIFICATE-----
MIICXAIBAAKBgQC8kGa1pSjbSYZVebt...
-----END CERTIFICATE-----
```

VERIFICATION QR CODE

Scan to verify: https://verify.zerotracex.org/cert/ZTX-1735449600-A3F2B8C4

CERTIFICATE METADATA

Document Version: 1.0
Template Version: ZTX-CERT-2024-v1
Generated By: ZeroTraceX Engine v1.0.0
Certificate File: samsung_870_evo_ssd_ztx_cert.pdf
File Hash (SHA-256): f3a2b1c8d9e0f4a5b6c7d8e9f0a1b2c3d4e5f6a7b8c9d0e1f2a3b4c5d6e7f8a9

 CERTIFICATE INTEGRITY: This document is cryptographically secured and password-protected. Any modification will invalidate the digital signature. Store securely for audit and compliance purposes.

 SUPPORT: For certificate verification or questions, contact support@zerotracex.org

Generated on: 2024-12-29 14:31:15 IST
Certificate expires: Never (permanent record)
Verification: Valid indefinitely via BLAKE3 hash matching ```