NGRAVE ZERO - High Level Competitive Comparison
Vs. Other Crypto Hardware Wallets / Security Solutions
NGRAVE – LEDGER – TREZOR – ELLIPAL (1/2)

Benchmark	NGRAVE ZERO	Ledger Nano X	Trezor Model T	Stripped Mobile Phones (e.g. Ellipal, but also Bitfi, etc.)
HARDWARE				
Dimensions	125 x 70 x 13mm (4.92 x 2.7 x 0.51")	72 x 19 x 12mm (2,83 x 0,75 x 0.47")	64 x 39 x 10mm (2.52 x 1.54 x 0.39")	119 x 64 x 9.9 mm (4.68 x 2.52 0.39")
Weight	180g (6.35 oz)	34g (1.20 oz)	22g (0.77oz)	Not disclosed, ca. 160g (5.6 oz)
Hardware type	Multi-Layered Anti-Tampered Hardware Device	Encrypted Flash Drive	Encrypted Flash Drive	Android Smartphone, Stripped
Camera	Yes, with Built-in Light Sensor	-	-	Yes
Biometric Sensor	12 x 12mm Fingerprint Sensor	-	-	-
Materials	High End Metal	Mostly Plastic & Some Brushed Stainless Steel	Reinforced Plastic	Plastic
USER EXPERIENCE				
Screen size	102 mm (4") diagonal	Ca. 25 mm (1") diagonal	Ca. 51 mm (2") diagonal	102 mm (4") diagonal
Screen Resolution	480 x 800 High brightness 600Cd / m2	128 x 64	240 x 240	Not disclosed
Screen Type	High Pixel Density Colour Capacitive LCD Touch Screen with enhanced Brightness	Monochrome Screen	Color Monochrome Capacitive LCD Touch Screen	Colour Capacitive LCD Touch Screen
Offline Experience	Yes	No	No	Yes
Water & Dust Resistant	Yes	No	No	Yes, IP65 Certified
Battery Capacity	1 200 mAH (Ultra-Efficient Low Power)	100mAh	No battery, USB only	Battery Not Disclosed
Crypto Support	Multi-Currency	Multi-Currency	Multi-Currency	Multi-Currency
Mobile Version	Yes	Yes	No	Yes
Desktop Version	-	Yes	Yes	-
Charging	Wall Charging	USB Charging	USB Charging	USB Charging
Open Source	Yes	No	Yes	No, app only
SECURITY	Very secure	Secure	Secure	Limited Secure
HIGH LEVEL SECURITY FEATURES	Very Secure	Secure	Secure	Limited Secure
Online Attack Surface	None, No Network Capabilities & Fully Airgapped	Minimized But Still Vulnerable	Minimized But Still Vulnerable	Not Fully Airgapped: Interior Smartphone Network Capabilities Can Be Turned On, a.o. EDGE, GPRS, 4G, HSPA+, BLE, WiFi, and GPS, FM Radio
Physical Attack Countermeasures	Multi-Layered Anti-Tampering Framework: Tamper-Resistant, Tamper-Evident, Tamper-Reactive, Tamper-Resolution	Mostly reliant on Secure Element and Passphrase	Mostly Reliant on Tamper Evident Package Stickers and Passphrase	Very Limited, Multiple Critical Weaknesses, Mentioning Of "ARM TrustZone" Is Incorrect, Dynamic Backdooring Feasible
MCU/MPU	State-Of-The-Art STM32MP157C (2019), Including Secure Boot, Secure RAMs, Secure RTC, Active Tamper And TrustZone Peripherals, And More	STM32WB55 (2016)	STM32F427VIT6 (2013)	Not Disclosed
Secure Element	State-Of-The-Art (not disclosed for additional security)	ST33J2M0	-	Mediatek SoC (MT6580A) Designed For Low-Cost Smartphones
Security Certification	CC EAL5+	CC EAL5+	Not CC EAL Certified	Not CC EAL Certified
Communication Method	One-Way QR Code	USB Type C or BLE	USB Type C	One-Way QR Code
Radio Frequency Shielding	Yes	-	-	-

NGRAVE ZERO - High Level Competitive Comparison
Vs. Other Crypto Hardware Wallets / Security Solutions
NGRAVE – LEDGER – TREZOR – ELLIPAL (2/2)

Benchmark	NGRAVE ZERO	Ledger Nano X	Trezor Model T	Stripped Mobile Phones (e.g. Ellipal, but also Bitfi, etc.)
SECURE KEY GENERATION	Very Secure	Secure	Secure	Limited Secure
Strong Key Generation, High Entropy	Yes	Yes	Yes	No, Due To ECB Mode Encryption
Additional Entropy Enhancement	Yes, Fingerprint and Ambient Light	-	-	-
User's Eyes Only Principle	Yes	-	-	-
Offline Key Gen Experience	Yes	-	-	Yes
SECURE KEY BACKUP	Very Secure	Limited Secure	Limited Secure	Secure
Backup Form	Everlasting Double Security NGRAVE GRAPHENE High Quality Backup Solution	Single Point of Failure, Non-Durable Paper Sheet	Single Point of Failure, Non-Durable Paper Sheet	Single Point of Failure Ellipal Mnemonic Metal
Only User Knows and Owns The Key At Any Point	Yes	Residual Risk	Residual Risk	Residual Risk
Durable Material	Yes	-	-	Yes
Fire-Resistant	Yes	-	-	Yes
Water- & Corrosion Resistant	Yes	-	-	Yes
Shock Resistant	Yes	-	-	Yes
Key Split Principle For Additional Security	Yes	-	-	-
SECURE KEY RECOVERY	Very Secure	-	-	-
Riskless Recoverable Backup	Yes	-	-	-
Posthumous Recovery Capability	Yes	-	-	-
SECURE WALLET MANAGEMENT	Very Secure	Secure	Secure	Secure
Biometrics Multi-Factor Access And Authorization	Yes	-	-	-
Fully Airgapped Accounts Syncing, And Transactions Signing	Yes, No Network Capabilities	Yes, But Residual Vulnerabilities	Yes, But Residual Vulnerabilities	Supposedly, But Network Capabilities Can Be Turned On
Firmware updates	USB-C, Very Secure (e.g. Resistant Against All Publicly Documented Vulnerabilities & Other)	USB-C or BLE, Secure	USB-C, Secure	16Gb Micro SD Card, APK Encryption 3DES in ECB Mode, Not Good Practice