

Quantum-Resistant Firmware OTA Market: Opportunities, Growth, Share, Competitive Landscape & Forecast to 2029

*The Business Research Company's
Quantum-Resistant Firmware OTA
Market: Opportunities, Growth, Share,
Competitive Landscape & Forecast to
2029*

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What Is The Forecast For The Quantum-Resistant Firmware Over-The-Air Market From 2024 To 2029?



Expected to grow to \$5.66 billion in 2029 at a compound annual growth rate (CAGR) of 34%"

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The market for quantum-resistant firmware over-the-air has seen rapid expansion in the past few years. Expectations are that it will increase from a size of \$1.31 billion in 2024 to a valuation of \$1.76 billion within a year, indicating a compound annual growth rate (CAGR) of 34.4%. Factors such as the growing need to safeguard interconnected devices, heightening awareness of quantum risks, intensifying regulatory constraints, the

surge in integrated vehicle systems, and a rising demand for secure firmware updates are crucial contributors to growth witnessed in the historic period.

The market for quantum-resistant firmware over-the-air is predicted to experience significant expansion in the coming years, reaching \$5.66 billion by 2029, with a compound annual growth rate (CAGR) of 34.0%. This forecasted growth can be tied to a rise in the adoption of post-quantum cryptography, increased cybersecurity investments, a growing need for encrypted FOTA solutions, expansion of IoT and automotive systems, and more stringent compliance regulations. Key trends for this prediction period include improvements in quantum-resistant algorithms, refined FOTA implementation strategies, the creation of secure boot mechanisms, advancements

in cryptographic key management, and the evolution of hybrid quantum-classical security protocols.

Download a free sample of the quantum-resistant firmware over-the-air market report:

<https://www.thebusinessresearchcompany.com/sample.aspx?id=28779&type=smp>

What Are The Core Growth Drivers Shaping The Future Of The Quantum-Resistant Firmware Over-The-Air Market?

The anticipated escalation in cybersecurity threats is set to fuel the advancement of the quantum-resistant firmware over-the-air market. These threats comprise the potential for unwanted individuals gaining access to computer systems or pilfering information, leading to possible damage to individuals or entities. The augmented dependence on digital technology enhances the proliferation of such threats, opening up avenues for attackers to gain access to confidential data. Quantum-resistant firmware over-the-air is integral in mitigating these cybersecurity threats, guaranteeing the security of device updates even in the face of imminent threats from quantum computers, and safeguarding sensitive information from exposure or manipulation. For example, Check Point Software Technologies Ltd., an American enterprise offering cybersecurity solutions to businesses and governments, reported that cyberattacks had seen a rise of 38% in 2022 from the previous year, with firms enduring an average of 1,168 attacks per week in February 2023. As such, the upsurge in cybersecurity threats underpins the expansion of the quantum-resistant firmware over-the-air market.

Which Companies Are Currently Leading In The Quantum-Resistant Firmware Over-The-Air Market?

Major players in the Quantum-Resistant Firmware Over-The-Air Global Market Report 2025 include:

- Microsoft Corporation
- Samsung Electronics Co. Ltd.
- Huawei Technologies Co. Ltd.
- International Business Machines Corporation
- Cisco Systems Inc.
- Honeywell International Inc.
- Qualcomm Technologies Inc.
- Thales Group
- STMicroelectronics N.V.
- Infineon Technologies AG

What Are The Top Trends In The Quantum-Resistant Firmware Over-The-Air Industry?

Leading businesses in the quantum-resistant firmware over-the-air market are venturing into technology development, such as quantum-resistant single-chip solutions, aiming to augment device security, guarantee future-oriented data safety, and facilitate secure updates to counter emerging cyber threats. A quantum-resistant single-chip solution indicates a unified hardware

platform constructed with post-quantum cryptographic algorithms to safeguard data and communication from risks associated with quantum computing. For example, in December 2023, Enova Technology Ltd., a firm based in Taiwan offering hardware-focused encryption and security solutions, introduced its Quantum Resistant (QR) Digital Signature Algorithm (DSA) solution, energized by the FIPS 140-2 Level 3 certified single-chip crypto module X-Wall MX+ xF/QR. This solution employs stateful hash-based eXtended Merkle Signature Scheme (XMSS) and multi-tree XMSS (XMSSMT) DSA to uplift secure user and device authentication. Meanwhile, the inbuilt AES 256-bit hardware accelerator facilitates enhanced protection of handled unclassified information (CUI), thus ensuring privacy and confidentiality.

Comparative Analysis Of Leading Quantum-Resistant Firmware Over-The-Air Market Segments
The quantum-resistant firmware over-the-air market covered in this report is segmented as

- 1) By Security Algorithm: Lattice-Based Cryptography, Multivariate Cryptography, Hash-Based Cryptography, Code-Based Cryptography, Others Security Algorithm
- 2) By Device Type: Smartphones, Connected Vehicles, Industrial Equipment, Wearables, Others Device Type
- 3) By Deployment Mode: On-Premises, Cloud-Based
- 4) By Application: Automotive, Consumer Electronics, Industrial Internet Of Things (IoT), Healthcare, Aerospace And Defense, Others Application
- 5) By End-User: Original Equipment Manufacturer (OEMs), Service Providers, Enterprises, Others End-User

Subsegment:

- 1) By Lattice-Based Cryptography: Learning With Errors (LWE), Ring Learning With Errors (RLWE), Module Learning With Errors (MLWE), Nth-degree Truncated Polynomial Ring Units (NTRU), Short Integer Solution (SIS)
- 2) By Multivariate Cryptography: Unbalanced Oil and Vinegar (UOV), Rainbow Signature Scheme, Hidden Field Equations (HFE), Matsumoto-Imai (MI) Cryptosystem
- 3) By Hash-Based Cryptography: Merkle Signature Scheme (MSS), Extended Merkle Signature Scheme (XMSS), Leighton-Micali Signature (LMS), SPHINCS Or SPHINCS+
- 4) By Code-Based Cryptography: McEliece Cryptosystem, Niederreiter Cryptosystem, Bit Flipping Key Encapsulation (BIKE), Hamming Quasi-Cyclic (HQC)
- 5) By Others Security Algorithm: Isogeny-Based Cryptography, Symmetric Key Quantum-Resistant Schemes, Hybrid Post-Quantum Cryptography

View the full quantum-resistant firmware over-the-air market report:

<https://www.thebusinessresearchcompany.com/report/quantum-resistant-firmware-over-the-air-global-market-report>

Which Regions Are Dominating The Quantum-Resistant Firmware Over-The-Air Market Landscape?

In 2024, North America held the dominant position in the quantum-resistant firmware over-the-

air global market. The highest growth rate is projected for the Asia-Pacific region. The geographical zones detailed in the report include Asia-Pacific, Western Europe, Eastern Europe, North America, South America, Middle East, and Africa.

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