Reverse Engineering of Medical Devices for Innovation and Advancement in Healthcare

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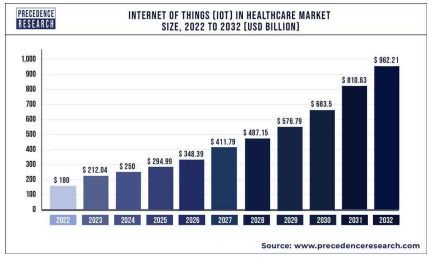
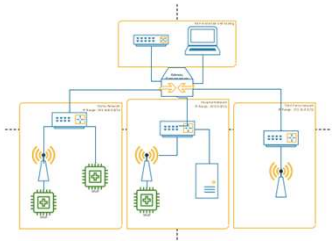
Introduction

Medical cybersecurity research addresses the critical intersection of healthcare and digital security. As medical devices expand and become increasingly interconnected, the healthcare sector is poised to become a primary target for cyber warfare. This project aims to mitigate the risks associated with a field that often underestimates the importance of cybersecurity.

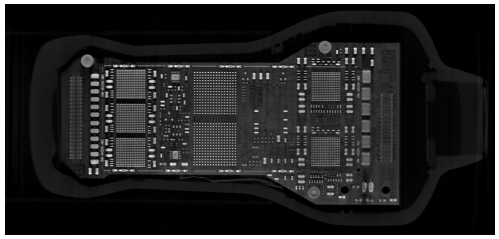


Methods



- Develop testbed environments
- Analyze hardware and methods of communication
- Rigorous reverse engineering and analysis
- Manipulate threat vectors to prove and prevent future exploitation

Medical Internet of Things(MIoT), wireless, and the privacy implications of authentication

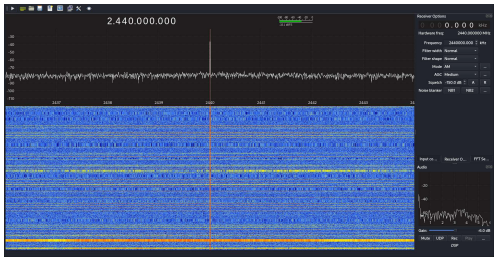


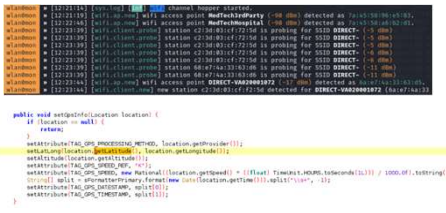
Hardware Analysis:

- Non-destructive analysis utilizing CT scans showed no signs subterfuge or other forms of supply chain attacks

Radio Frequency Analysis

- The frequencies emitted from this device aligned specifically with Bluetooth(2.4Ghz) and Wi-Fi(2.4Ghz/5Ghz)





Reverse engineering and implementation:

- Reverse engineering software shows dependent library requires GPS for authentication
- Network traffic is not fully obfuscated and can be interacted with

Results

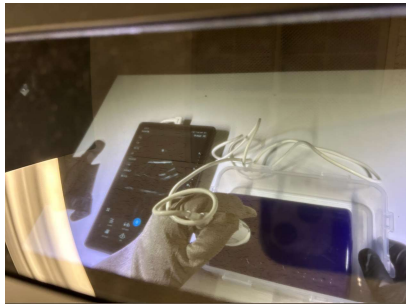
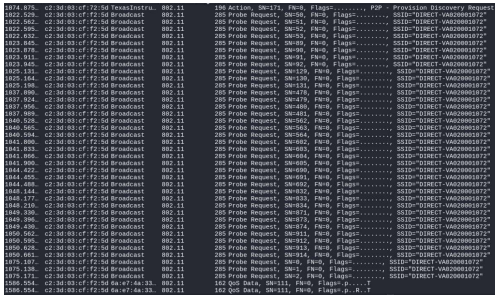


Image shows utilization of ultrasound devices during radiofrequency analysis inside of faraday cage



Network traffic shows the Wi-Fi-direct authentication handshake and successful deauth attack on device

Acknowledgement

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