

LIST OF FIGURES

1.1	Info Implementation IoHT in MMC Hospital.	3
1.2	Info Implementation IoHT in Warron Hospital.	4
1.3	Timeline of security attacks on health data.	6
1.4	IoHT with MQTT Protocol.	8
2.1	Steganography Embedding Scheme	12
2.2	Classification of network covert channel patterns	13
2.3	MQTT publish-subscribe model	14
2.4	Control packets in MQTT	14
2.5	The general structure of the MQTT control packet	14
2.6	AEAD Algorithm	15
3.1	System Model	16
3.2	System sub model ICC (the broker is unaware of the hidden data exchange)	17
3.3	Encryption Process.	18
3.4	Decryption Process.	21
3.5	The hash mode of ASCON-HASH.	24
3.6	Constant c_r used in the permutation of ASCON.	25
3.7	The 5-bit S-box.	25
3.8	Substitution layer with 5-bit S-box.	25
3.9	Linear layer with 5 linear diffusion functions.	26
3.10	Simulation Scenario.	27
3.11	Test Scenario.	28
4.1	Latency ASCON	31
4.2	AE ASCON	32
4.3	CPU Load ASCON	33
4.4	Latency AES-GCM	34
4.5	AE AES-GCM	35
4.6	CPU Load AES-GCM	36
4.7	Latency ChaCha20 Poly1305	37
4.8	AE ChaCha20 Poly1305	38
4.9	CPU Load ChaCha20 Poly1305	39

4.10	Latency ASCON+ZWC	40
4.11	AE ASCON+ZWC	41
4.12	CPU Load ASCON+ZWC	42
4.13	Latency AES-GCM+ZWC	43
4.14	AE AES-GCM+ZWC	44
4.15	CPU Load AES-GCM+ZWC	45
4.16	Latency ChaCha20 Poly1305	46
4.17	AE ChaCha20 Poly1305+ZWC	47
4.18	CPU Load ChaCha20 Poly1305	48
4.19	Latency ASCON, AES-GCM, & ChaCha20 Poly1305	50
4.20	AE ASCON, AES-GCM, & ChaCha20 Poly1305	51
4.21	CPU Load ASCON, AES-GCM, & ChaCha20 Poly1305	53
4.22	Latency ASCON+ZWC, AES-GCM+ZWC, & ChaCha20 Poly1305+ZWC	55
4.23	AE ASCON+ZWC, AES-GCM+ZWC, & ChaCha20 Poly1305 . . .	56
4.24	CPU Load ASCON+ZWC, AES-GCM+ZWC, & ChaCha20 Poly1305+ZWC	58
4.25	Latency ASCON vs ASCON+ZWC	59
4.26	AE ASCON+ZWC & ASCON	61
4.27	CPU Load ASCON+ZWC & ASCON	63