

System Security (201700086)

Covert Channels #3 - Ultrasonic covert channel

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1 Introduction

For this assignment we created a covert channel that utilises ultrasonic frequencies which cannot be heard by the human ear. The human ear cannot hear anything of over about 20kHz. This technique is very stealthy because playing such sounds does not require the permission of the user. We implemented a cover channel in which a pin code sent using these ultrasonic frequencies.

2 Design

The transmission protocol for the covert channel is very simple. It is a on-off keying scheme in which a single digit from a pin number is represented by a series of pulses, where 1 pulse indicates a 0, 2 pulses indicate a 1 and so on. These pulses are of unit length and each series of pulses indicating a digit are separated by a silence of unit length. Each digit is separated by 3 unit length of silence. After a transmission of a pin number, there is a silence of at least 5 unit length.

The receiver side is constantly listening for the transmission frequency which is set at 20kHz. Using a simple band pass filter all other frequencies are filtered out so there is less noise in the signal and hence it is easier to detect the pulses. The receiver simply detects the pulses and then converts them back into a pin number.