EMPACTS SLIDESHOW WI-FI ROUTER TESTING

GROUP MEMBERS

WES MARTIN, DAMON CHRISTIAN,

CADEN CARDOZA, KONO GEARY

Physics and Human Affairs, Spring 2023, EMPACTS Project
Sean Nomoto, Instructor
Northwest Arkansas Community College
Bentonville, AR 72712

HOW WE CONDUCT OUR EXPERIMENT

- To conduct this experiment, we will use a Wi-Fi Router to first test speeds of Wi-Fi router without any interference.
- We will them use different objects to attempt to create an interference around Wi-Fi Router and test the interferences affects.
- Given the results of the interferences, we will conduct a hypothesis on how the interferences gave us the results we obtained.

WHAT WE TEST AND HOW WE DO IT

- When testing for Wi-Fi speeds, we will be using an online website known as “Ookla." This cite test Wi-Fi speeds by giving us two statistics.
  - Download mbps
    - This stat measures how fast you download data from online
  - Ping in ms (milliseconds)
    - This stat measures how long it takes for a set of data to be transferred from your device to Wi-Fi router

POSSIBLE COMPLICATIONS AND HOW WE COMBAT THEM

- Wi-Fi speeds vary largely depending on not only how far you are away from the router, but also types of devices that are nearby or connected to the same Wi-Fi router.
- To combat these issues, we will test Wi-Fi speeds in the same room as the router as well as keep the same number of devices connected to the router at the same time.
- To further keep the experiment as precise and accurate as possible, we will limit any if not all Wi-Fi use on other devices at the time of recording data.

MATERIALS USED TO CREATE INTERFERENCE

- Tin/aluminum foil
- Parchment/Wax paper
- Saran/Cling Wrap
- Clothing (shirt)

TINFOIL UPLOAD SPEEDS (MBPS)

Layers of Tinfoil	Test 1	Test 2	Test 3	Avg. Ping (ms)
0	573.57	587.64	578.47	12
1	543.71	532.27	535.99	11.33
2	482.64	461.06	476.43	12
3	384.43	406.56	400.09	11.66
4	386.52	374.65	374.56	11.33
5	360.89	355.65	361.24	11
6	337.27	339.49	340.70	11.66
7	256.65	255.49	257.91	12
8	233.76	229.53	230.03	12.33
9	205.96	193.02	200.21	12
10	183.96	176.09	181.67	11.33

TINFOIL PHOTOS

PARCHMENT PAPER

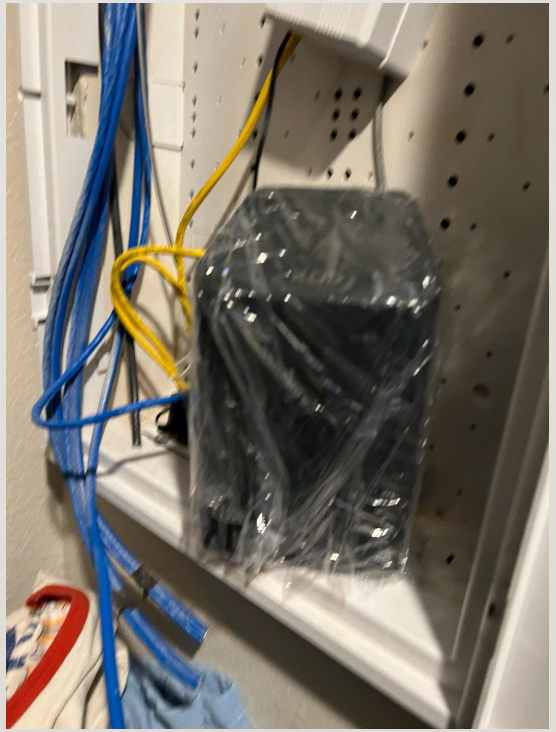
Layers of Parchment	Test 1	Test 2	Test 3	Avg. Ping (ms)
1	554.16	568.25	567.98	12
2	562.34	560.21	556.32	11.66
3	558.00	561.34	560.22	12
4	560.12	570.43	565.90	12

PARCHMENT PAPER PHOTOS

CLING WRAP/SARAN WRAP

Layers of Cling Wrap	Test 1	Test 2	Test 3	Avg. Ping (ms)
1	566.21	564.47	559.99	12
2	562.32	560.03	563.52	11.66
3	560.21	558.43	572.12	12
4	559.05	558.34	562.61	12

CLING WRAP/SARAN WRAP PHOTOS



CLOTHING (SHIRT)

Layers of Shirts	Test 1	Test 2	Test 3	Avg. Ping (ms)
1	556.72	564.32	558.03	12
2	560.78	568.77	563.21	11.66
3	569.09	559.32	563.65	12

CLOTHING (SHIRT) PHOTOS

CONCLUSION FROM RESULTS

- Looking at each of the different material types, it appears that many of the materials had little to no effect on the router connection/speeds.
- Tinfoil was the only material which showed a difference in router connection/speeds.
- As more layers of tinfoil were added, the connection got slower and slower also having a slightly stronger effect on the ping as well.

SCIENCE EXPLAINED

- Aluminum foil is a conductive material which reflects as well as absorbs the radio waves sent from the router.

- By adding more layers of foil, we were able to reflect more and more of the radio waves causing the router to produce slower and slower results as we progressed.

- Other materials such as parchment paper, saran wrap, and even a shirt, are not conductive. Causing the connection to have little to no effect at all.

Acknowledgements

- Professor Nomoto
- EMPACTS Lab Staff
- Professor C. D. Phillips, EMPACTS Program Facilitator