**Research Project Title \***

How should the Federal Communications Commission license millimeter wave frequencies?

**Is the project your Faculty Supervisor's Project or Your Own? \***

It’s my faculty supervisor’s project

**Research Question \***

**Clearly articulate the specific research question and the goals of the project.**

How should the Federal Communications Commission license the usage of millimeter wave frequencies so as to expand the capacity of existing mobile networks without interfering with other sectors that might need to use millimeter wave frequencies (such as space communications) and while allowing as much innovation as possible

**Background \***

**Provide sufficient background information to inform your reader as to why the question or problem is important.**

The Federal Communications Commission needs to lay the regulatory frameworks for commercial entities to begin exploring the usage of millimeter wave frequencies in mobile communications because:

1/ Of unprecedented growth in demand for mobile data due to the increasing popularity of smart phones and other mobiles data. The white paper by Cisco named “Cisco Visual Networking Index: Forecast and Methodology” published in June 2010 predicted that mobile will grow at 109 percent compound annual growth rate with over a thousand fold increase over the next 10 years.

2/ The current sub-3GHz 4G systems including LTE and Mobile WiMAX are already approaching theoretical limits of the rate in which information can be transmitted over its bandwidth.

3/ As the demand for mobile data grows, the sub-3 GHz spectrum is also becoming increasingly crowded. On the contrary, the spectrum in the 3-300 GHz range remains heavily underutilized.

The usage of millimeter-wave frequencies for mobile communication will not only take advantage of these previously empty spectrums, but also allow for a significantly faster information transmission rate. Considering how much mobile technology has empowered individuals in the previous decades, the potential of millimeter-wave frequencies for mobile communication is massive.

**What skills will you acquire from your participation on this project? \***

**How will this relate to your major, academic interests, and goals.**

I first learned about the usage of millimeter-wave frequencies for mobile communication last Fall in my Introduction to Public Policy class. I prepared a presentation on how New York City can license off unused spectrum to fund programs to combat the digital divide in the US. My previously interests in mobile communications cemented into a serious academic and intellectual interests because I saw how mobile communication or the lack thereof can either empower community and individuals or pushes them further down into poverty. Engaging in this project over the summer will help me study the fields in depth and understand the technological changes going on in the field.

My participation in the summer research program will also be useful for my participation in the Best m-Government Service Award in the UAE. The Award aims to encourage students to devise creative and innovative solutions via smartphone applications and mobile phones to improve and promote the usage of government services.

I have an incredibly talented team for the Award:

* Lingliang Zhang, who has interned at the big data company Palantir and will be interning at Facebook this summer. He is an expert on web technology.
* Kenny Song, the director of HackShanghai, will be interning at Google New York on distributed VPN.
* Kai Erik Jensen, the Chief Media Officer of the winning team in the 1 Million DHS Drone for Good Award hosted by the UAE.

Through the summer research program, I will gain an understanding about how information is actually transmitted over mobile networks. This knowledge will fill an important knowledge hole in my team.

Last but not least, my participation in the research project will teach me how to sift through large collections of research papers, pick out essential details and connect these details to reach useful conclusions. Moreover, since the results of this research may aid the Federal Communications Commission, I will also learn how to take into account the role of a federal entity in its engagement with the market, how to transform the philosophy behind the Federal Communications Commission into policy and how to analyze the incentives of different stakeholders involved in the usage of millimeter-wave frequencies.

**Methodological Approach \***

**Describe the methodological approach you will employ to carry out your proposed research.**

I will look at how the Federal Communications Commission makes decisions with regards to its role in creating regulations to understand the philosophy behind their decision-making.

I will also read research papers on the topics of millimeter-wave frequencies and their application in mobile communication to understand some of the challenges and opportunities.

I will read the plethora of Reply from different companies in industry to the Federal Communications Commission Notice of Inquiry to understand their concerns and aspirations with regards to the regulations of millimeter-wave frequencies.

This will be done in tandem with continuous discussion with Professor Dennis Shasha and any experts I can get ahold of to solicit their advice, particularly at NYU Wireless (of which Prof Shasha is an associate director).

**Faculty Supervisor \***

**Describe your relationship with your faculty supervisor, addressing the following points: How did you identify your faculty supervisor? In what capacity did you work with your supervisor in developing your research project? How will you work with your faculty supervisor on this project? How often will you meet?**

I first met my faculty supervisor in person through my J-term class in Abu Dhabi, heuristics. Since then, we have talked on multiple occasions about many different topics. I met him again in Abu Dhabi last J-term and that was when we started to develop the research project.

When I met him last J-term in Abu Dhabi, I shared with him my interests in engaging in research with him over the summer. We then discussed my backgrounds, my interests to find a topic that I can work on, one of them was mobile technology, an academic interests that I developed from my Introduction to Public Policy class as mentioned above. Professor Dennis then introduced to me the proposals to the Federal Communications Commission to release millimeter-wave spectra. To ensure this is something I want to dedicate my summer to, I conducted my own research into the field by reading online newspapers and research articles before formally asking him to accept me as an undergraduate research assistant and sending in this application.

I will work each day in the lab under the professor’s supervision. Thus I can meet him everyday. But I plan to schedule two formal meetings per week to update him on the progress of the research and solicit his advice. One of the outcomes of the project will be an “intelligent document” which a human reader can read in its entirely or in which the reader can choose a particular path based on his/her interests. Thus, another outcome of this work will be technically useful software.