Terahertz Communication

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Abstract

Terahertz Communication is an up and coming frequency between 0.14 THz to 10 THz. It is currently being tested on and researched to find out what the best first steps are to implementing it. There have been trials that have found very interesting things about this new frequency that ranges from good news to issues that could completely scrap the idea of Terahertz communication.

Introduction

Terahertz communication is the successor for the current frequencies that are being used. Which are currently around 28 to 39Ghz in 5G. Terahertz communication looks to push way past that range, with a starting point at 140GHz it is going to blow the previous frequencies out of the park. Terahertz communication is going to be very useful when it comes to bandwidth. With the higher frequency that it will be providing the higher the bandwidth will be.Another thing that

Terahertz communication will benefit is close communications, specifically in personal area networks because it will be able to provide that high bandwidth along with very low latency.

Background information

This type of communication is being started off by the use of lower frequencies in other applications. Helping jumpstart the beginning of Terahertz communication. One it is similar to is mmWave, one of mmWaves current big issues is signal loss due to molecule absorption. This is one of the issues Terahertz communication will face and will need to overcome to become that much more substantial compared to mmWaves.

Trial Results

One of the known Trials that have been done was conducted at a shopping mall by Aalto University. They conducted a test at the frequencies of 140 GHz and 28 GHz. One of their main goals with this test was to address the issue mmWave was having with molecule absorption and to see if it would be present in Terahertz communications. What they found was that at 28 GHz there was a 3.2 dB/cm and at 140 GHz there was a 14 dB/cm. There is good news and bad news when it comes to comparing the results. At 140GHz if you were to make the 28GHz equal to 140 GHz it would be atr 16 dB/cm meaning you have less loss at the higher frequency which is really good news. Though despite this the result everyone would hope for is for it stay at around 3.2 dB/cm and 140 GHz which did not happen. Meaning there are possibilities for higher frequencies to have much more attenuation, as we do not know if this number will change for better or worse when at 300 GHz or 5 THz, and on and on.

Another result that we have seen from research done on Terahertz communication is the use of prototypes that can be used to transmit in the Terahertz range. There are also a bunch of applications and codes being used to help transmit at 140 GHz, like seen in the trials from prior. One big helper in all of this Terahertz communications start up is a transceiver system that was used for mmWaves. It is being used to help kick start Terahertz communications and setting up protocols for the beginning of all this testing.

Conclusion

After there is not much information out there about Terahertz communications but there is hope for what it can become in the future, but at the same time there is small chances all that is thought to come of Terahertz communication could crumble to the ground as it may just not be feasible at this time in life. The trials that were gone through are good signs for things to come along with the devices and applications that are being put to use/developed to create a frequency of the future.

References

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