Wireless Video

Introduction

Distribution of real-time, Ultra High-Definition video for professional, and high-performance consumer applications demands a communication channel with consistent high data bandwidth, low latency, low jitter and near zero data loss. Cabled interconnect such as HDMI, Ethernet, SDI etc., can provide quality data links, but they are often inconvenient or even prohibitive in some critical applications. Peraso's 60 GHz products demonstrate the ability to meet real-time video demands while other wireless technologies, even the latest generation of Wi-Fi 7, have proven to be largely unsatisfactory for critical applications.

Wireless communication over unlicensed, shared spectrum will be susceptible to interference from other users. The ubiquitous availability of Wi-Fi has led to near saturation of all available spectrum below 6 GHz, thus rendering it unreliable for quality video transmission. With Wi-Fi 7 additional spectrum above 6 GHz has been added which provides temporary congestion relief, but this spectrum is ultimately destined to reach full utilization. Furthermore, the Wi-Fi protocol is subject to high variability in throughput due to the instantaneous characteristics of the MIMO channel and end-to-end latency and latency jitter can impact video quality.

60 GHz data transmission, implemented according to the IEEE 802.11ad/ay standard, is fundamentally different from traditional Wi-Fi although it has been adopted as a standard

under the Wi-Fi Alliance. Not only are 60 GHz systems operating at frequencies 10X greater than Wi-Fi, but they also have 14 GHz of available spectrum which is the largest slice of unlicensed spectrum available with supported standards and products. This wealth of spectrum allows Peraso's products to utilize robust modulation techniques which are not dependent on MIMO or very high modulation orders to achieve multi-gigabit throughput.

Furthermore, the short wavelength of 60 GHz signals, approximately 5mm, allows construction of phased array antenna structures in a small area. These high gain arrays, driven by automatic, dynamic beamforming algorithms, shape the antenna gain pattern in focused beams which limit dispersion and interference with neighboring systems. The 60 GHz signals propagate in a line-of-sight manner with limited ability to penetrate solid matter or bend around corners.

- **High Data Rates**: The 60 GHz band offers very high bandwidth, which allows for transmission of Ultra High-Definition video

- **Low Interference**: 60 GHz signals have short wavelengths, which means they are less likely to penetrate walls, and allows the beamforming antenna to create a narrow beam pattern. The result is that mmWave RF signals stay "in room" and are less likely to interfere with other systems running nearby.

- **Range Flexibility:** Antenna and RFIC options provide gain to cover from 3 meters to over 1km.

- **Low SWAP**: mmWave frequencies allow for smaller antennas than Wi-Fi. Peraso's power efficient technology helps manage overall power consumption.

- **Spectrum Availability**: Up to 14 GHz of unlicensed spectrum available in the 60 GHz band, reducing the risk of congestion.

- **Easy Integration**: Modules use USB 3.0 interface and are provided with Linux driver which is easily integrated into embedded systems. Peraso also offers a solution for driverless operation supporting any platform with a USB interface that supports the CDC NCM protocol.

- **Easy Operation**: Self-aligning and self-configuring, the modules enable fast and easy to set up, with minimal operator intervention required.

- **Secure**: Adaptive beam-forming and narrow pencil beams, coupled with over-the-air, real-time encryption (128-AES encryption together with rolling key based on GCMP) provide additional layers of security.

Applications

- **Temporary Studio**: Replace long cable runs with wireless connections.

- **Education**: Enable electronic classroom connectivity without dependance on Wi-Fi infrastructure and avoiding classroom-classroom interference.

- **Conference rooms**: Connect cameras, display and console wirelessly.

- **Medical**: Connect diagnostic and surgical equipment to displays without hazardous cables.

- **Smart city**: CCTV networks for public safety and transportation monitoring

- **Industrial Monitoring**: Private security and safety video networking

- **AR/VR**: Untether headsets for improved user experience and remote use-cases

Conclusion

Peraso's products with 60 GHz mmWave communication products offer a combination of high data rates and low latency that make them well-suited for high quality video transmission. The unique qualities of mmWave transmission provide a low susceptibility to interference and a low probability of interception which differentiates the solution from other wireless technologies. Peraso's module level products are easily integrated.

About Peraso

Peraso Inc. (NASDAQ: PRSO) is a pioneer in high-performance 60 GHz unlicensed wireless technology, offering chipsets, antenna modules, software and IP. Peraso supports a variety of applications, including tactical communications, fixed wireless access, immersive video and factory automation. For additional information, please visit www.perasoinc.com.