



H-Link

Millimeter-wave radio signals, high-data through plastic media

What is H-Link?

H-Link is the first system that guides radio waves both in the air and through a flexible plastic tube. This low-cost hybrid technology allows the transmitter to perform 360° rotations, avoiding cable kinking. Initially designed for robotics, H-Link ensures broadband in confined areas (eg. glove boxes).

H-Link can transfer information over distances up to ten meters at a speed of 15 Gbits/s. With an average data transmission speed of 6 Gbits/s over a little more than two meters, the system can transfer a 4K video, eliminating the data compression/decompression.

Applications

H-link has been designed for **robotics**, enabling high data rate communication to perform:

- Remote chemistry in confined volume
- Remote biology in glove box: viruses and bacteria
- Remote micro-nano technology development
- Remote nuclear material manipulation, etc.

H-link can also be used for **e-health**, such as remote medical visits/check-up, and surgical intervention (dentistry).

What's new?

H-link offers significant advantages over copper and fiber optic cable:

- It uses a tenth of the energy required to transmit a signal
- It is less sensitive to vibration and electromagnetic waves
- Because the system uses millimeter waves rather than nanometer waves (optical fiber), it does not need to be heat spliced or welded—it can be connected by hand with a piece of tape
- Plastic is much lighter in weight than copper

H-Link's emitter transform digital SDI in mmW modulated signal. The signal is radiated through either a plastic wave guide or an antenna free space link to the receiver which delivers digital SDI. In terms of technical performance, H-Link offers:

- Full duplex, multi channels.
- No additional conversion (vs. optics), no equalization (vs. copper)
- No micron-level alignment (vs. optic), no electrical contact (vs. copper)
- Low loss versus copper and wireless
- High energy efficiency (around 1pJ/bit/m)
- Freedom of movement including tilt, angle and misalignment

What's next?

CEA-Leti is currently working towards the development of customer ad-hoc solution using STMicroelectronics' 60ghz transceiver and Radiall's antenna horn interface.

The team is improving the interface and developing a multi-channels transceiver within the 100-150 GHz band. They also try to enhance the plastic coupling structures.

Key facts

- "A 12Gbs 64QAM and OFDM compatible Millimeter-Wave Communication Link Using Plastic Waveguide Design", F. Voineau, C. Dehos, B. Martineau, M. Sié, M. Perchicot, H. Nguyen, A. Ghiotto and E. Kerhervé; 2018 IEEE Radio and Wireless Symposium (RWS) Anaheim CA 2018, pp. 250-252
- Patents: 3 STMicroelectronics, 4 CEA-Leti, 1 IMS



Interested in this technology?

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