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Little Known DSRC Regulation Fuels Driverless Car Efforts

Broadband Center of Excellence (BCoE)

DSRC

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Delphi sent a self-driving Audi SUV on a cross country excursion in late March 2014, starting at the Golden Gate Bridge in San Francisco and pointed at New York City. The success of a safe transcontinental voyage is based on a lot of sensors, an engineer behind the wheel but not driving (as insurance in case something goes wrong), and as a baseline communications system for guidance utilizing the DSRC airwaves.

The event got a lot of publicity.

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DSRC, not so much? That is because it is more of an unknown piece of telecom spectrum, unheard of by many at least outside the meetings of standards setting bodies and executives other telecom sectors looking longingly at this 75-MHz patch of prime turf.

DSRC stands for dedicated short-range communications and was enabled by the FCC in 1999 (2004 Report & Order) when the Commission set aside the 75 MHz of spectrum in the 5.9 GHz band to serve vehicle to vehicle and vehicle to infrastructure kinds of communications. To say it has lain fallow since is an understatement.

Simply put, DSRC is meant to provide channels which will keep driverless cars and connected cars from bumping into things, like bicyclists and other cars, either with or without drivers.

The U.S. Department of Transportation says that DSRC is set aside and is preferred over Wi-Fi for this life-saving use because the success of Wi-Fi hand-held and hands-free devices in the 2.4 GHz and 5 GHz bands, along with the projected increase in Wi-Fi hot spots and wireless mesh extensions, could interfere with and hamper active car safety applications.

DOT further states that DSRC is the only short-range wireless alternative today that provides:

- Immediate network acquisition
- Low latency
- High reliability
- Priority for safety applications over non-safety apps
- Interoperability, and
- Security and privacy

Why not IEEE 802.11a?

While similar to IEEE 802.11a, DOT states that DSRC runs rings around that protocol because 802.11 is too slow to link two or more devices, DOT says. DSRC was built with an eye to recognizing and connecting devices in milliseconds, which is what you want when your car is driving let's say from California to New York, or from Bensonhurst Brooklyn to Whitestone Queens.

So, **DSRC transmits safety messages** in short time increments so that vehicles receiving the safety messages can immediately determine if they should respond or not. Not sure about that one.

Other major differences with IEEE 802.11a, again according to U.S. DOT:

- DSRC is targeted to operate in a 75 MHz licensed spectrum around 5.9 GHz, as opposed to IEEE 802.11a that is allowed to utilize only the unlicensed portions in the frequency band.
- DSRC is meant for outdoor high-speed vehicle (up to 120 mph) applications, as opposed to IEEE 802.11a originally designed for indoor WLAN (walking speed) applications. In IEEE 802.11a, all PHY parameters are optimized for the indoor low-mobility propagation environment.
- The DSRC band plan consists of seven channels that include one control channel. It's able to support a large family of vehicular safety and non-safety applications.
- 802.11a doesn't prioritize safety over non-safety apps.
- The bandwidth of each DSRC channel is 10 MHz, as opposed to the 20 MHz IEEE 802.11a channel bandwidth, resulting in better wireless channel propagation with respect to multi-path delay spread and Doppler effects caused by high mobility and roadway environments.

But IEEE 802.11p is a different story. It is designed for connected car communications, and for more information about it, check out **this site**.

More information on DSRC and DOT work with intelligent safety apps is available **here**.