

A Cautionary Tale about Wi-Fi Direct

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Wi-Fi Direct has just been announced by the Wi-Fi Alliance. Wi-Fi Direct is a mechanism to add a soft access point in one device so that two different products can form a direct point to point secure wireless connection. Supposedly it will be easy to set up and relatively fast. The objective is to avoid having to configure a consumer device with all of the info required to use a standard WiFi access point and enable a somewhat simpler point to point file transfer.

[The cartoon video on YouTube from the Wi-Fi alliance](#) [1] demonstrates a few of many potential use cases. Transfer of photos from one camera to a tablet or laptop, transferring photos from a camera to a printing kiosk, handheld to handheld gaming, and handheld to handheld biz card transfers. All of these applications are focused on file transfer oriented use cases (NOTE: they don't involve streaming media, which is not one of Wi-Fi's strengths).

But be careful . . .

The applications cited, as well as other cable replacement applications, give Wi-Fi Direct the edge in essentially killing off any aspirations the Bluetooth SIG may have had in pursuing higher speed data transfers in the 2.4GHz spectrum and probably is the coup de grace for Bluetooth 3.0. I expect Wi-Fi Direct will find its way into some interesting convenience applications. However, it has some restrictions and future ramifications which are not obvious.

Wi-Fi Direct is likely to be limited to use in the already heavily congested 2.4GHz band. It seems that almost everything wireless in your house communicates on these same bands and there is only so much bandwidth to go around. In addition, these random data transfers will certainly mess up corporate Wi-Fi networks with interference. It should work fine in most suburban situations but most likely will have problems in apartment complexes and in business settings. One application it most certainly will tromp on is Intel's WiDi wireless display which uses the same

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spectrum.

Interestingly, we are unlikely to see Wi-Fi Direct being used in the 5GHz; wind shear radars used at all of the worlds major airports operate in this frequency band. In the US the FCC has stringent rules about 5GHz since they don't want to see a rental car bus full of "Wi-Fi Direct beaming business people" causing glitches on the radar screens at airports - so the FCC is being responsibly aggressive here[1]. The esoterica of DFS (dynamic frequency selection) and avoiding radar interference is beyond the scope of this blog, but suffice it to say the only safe place for most manufacturers to intro Wi-Fi Direct will be in the 2.4GHz band that as we have noted is already saturated.

In the end what this all means is that for products that already have a Wi-Fi radio and some form of user interface you can expect Wi-Fi Direct data transfers to become enabled over the next few years. Smartphone connections to HDTV is one that comes to mind. While both Smartphones and cameras have integrated Wi-Fi technology today battery drain when using it has become of significant concern to users. OEMs will be very careful in the rollout because the connection in most cases will not be suitable for streaming - but rather bulk file transfers. Products where a user would expect video streaming may not be enabled since it won't work well. Further, in many cases these new applications will not have a parallel application that currently requires a cable. As a result, there is no consumer transference from a current connectivity application to the more convenient wireless applications. Therefore, these new applications, though interesting, will take longer gain the attention of consumers and to penetrate into mainstream consumer market.

In the mean time, Wi-Fi Direct is a step closer to a future "life without wires". However trying to use an already overcrowded 2.4GHz spectrum will undoubtedly cause a host of new problems as well as severely limiting the users bandwidth (and experience). Expect this new added convenience to likely cause performance issues if you own a Intel WiDi video system and to slow down your laptop internet access to your Wi-Fi access point. By the way, since I travel a lot, let's hope the FCC keeps up its diligence to keep Wi-Fi Direct away from 5GHz TDWRs and from causing havoc with our airports wind shear radar. Naturally, as consumers try Wi-Fi Direct, many will like the convenience, but won't like the low throughput, battery drain and unpredictable performance caused by 2.4GHz radio interference. To solve these problems manufacturers will turn to yet another radio - UWB. UWB is very small, low power, high throughput and was architected from its inception to do high speed point to point data transfers without suffering from Wi-Fi interference for both data files and streaming video."

[1] Due to increasing interference being seen by radar operators at US airports, the FCC conducted testing and found a myriad of potential alarming interference issues. In a letter dated July 27th of 2010, the FCC commissioner issued a memorandum on the topic of 5GHz Wi-Fi interference with TDWRs (Terminal Doppler Weather Radar) asking operators to remove 5GHz equipment within 35m or line of site of airports.

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[1] <http://www.youtube.com/watch?v=je2lWjfpwQ>