

The Problem with 160MHz wide Wireless Channels

Full Control
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Whitepaper

The Problem with 160MHz wide Wireless channels and the new 6.0GHz band

The biggest requirement driving wireless technology forward is the quest for greater speed. One way of achieving that has been to widen the wireless channels. Originally, channels were 20MHz wide but over the years 40, 80 and now 160MHz wide channels are available. This allows the Access Point manufacturers to talk in terms of 1Gig plus speeds, as long as certain conditions are met. But being network people, we just see the 1Gig plus and just go for it anyway!

However, there are problems with this in a commercial environment. Perhaps the biggest at the moment is that wide channels can take up the whole wireless spectrum, leaving no room to space the channels out.

That said, we've visited plenty of sites recently where 160MHz wide channels were being advertised, whilst at the same time users were complaining that the wireless was running poorly. What is going on?

One of the issues which is not helping is a lack of clarity on exactly how many 160MHz wide channels you can actually have. A quick search on the web throws up four different answers (1, 2, 3 or 4).. which is not very helpful!



There are a number of reasons for this, but the main ones are:

- The use of the middle UNII-2 band of channels (100-144) being governed by DFS rules (interference from radar). Some sites include this as a useable range, some say it shouldn't be relied upon.
- Governments slowly increasing the maximum channel allocation in UNII-3 but at different rates in different parts of the world. This means you can find charts showing channels up to 177 in 5GHz, where some counties stop at channel 149 (at the time of writing!)
- When 5GHz wireless chipsets are developed they fix the upper limits of which channels they can work with, so new channels will remain unused with older hardware.

The biggest issue that stops people getting faster wireless is cross channel interference, referred to as CCI. This is Access Points on a particular channel seeing other APs on the same channel and the net affect is to slow everything down. The most effective solution for this at the moment is to use narrow channels in the 5GHz band, where you can spread everything out and get pretty reliable results.

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However, that doesn't sell more APs. The promise of faster wireless does; hence in specifications speeds are quoted as the highest achievable – which, if you're a pessimist, is only when you're within 5 meters of a single AP, with 160MHz wide channel and no other wireless in sight.

Clearly that doesn't make a commercial wireless solution so the AP manufacturers look at it another way, how can we find more space for these (potentially) very fast 160MHz wide channels to be spaced out better? Answer, find some more spectrum space.

Hence the move to use the 6GHz space is really about taking the carrot of faster wireless (at 160MHz channels on a 4x4 MIMO) and giving it the space to be designed out properly. However, there is little to no equipment out there ready to work in the 6GHz space yet (at time of writing) and also remember that's at both ends; both AP and device have to be able to play in these new spaces for this to work. So practical solutions are still a year or two away even if you are prepared to replace both the APs and the end devices.

So, should you use 160MHz wide wireless now? Probably not and interestingly its use is not recommended on a number of manufacturers websites. However, the settings are in modern wifi controllers and we know people will turn them on, because it might be faster, without considering the fact it's probably going to be slower.

If you ask Full Control Networks to get involved, the first thing we will look for is good information on the current situation (probably a survey) and then start planning the most effective design based on these numbers. In summary, looking at how best to separate out the channels and reduce CCI is more effective than using wider and wider channels.

Product recommendations:

- Wifi survey and planning tools – [AirMagnet Survey Pro](#)
- Real-time troubleshooting and performance testing tools – NetAlly [AirCheck G2](#) and [EtherScope nXG](#)
- Full Control Networks [Professional Services](#)