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IEEE 802.11ad Vs Wireless HD Comparison Study Base on Video Streaming

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Abstract

There are two competing standards for 60-GHz applications: Wireless HD and IEEE 802.11ad. Both target the short-range video transport market that provides products to connect HDTV sets, set-top boxes, DVRs, games, and other video devices capable of streaming uncompressed HD video over a short range in this paper we give an a Comparison study for both technologies.

Keywords: *IEEE802.11ad, Wireless HD.*

1. Introduction

Dozens of cellular technologies are fighting for consumer, business, and professional applications. Most have found a credit card applicatoin specific-niche which allows them to are present. These solutions can be divided by ability and specs such as broadband, low speed, brief range, long range, fine mesh capabilities, security, cost, low electricity, or some mixture of these features. Some technologies remain competitive, but most do not. Also, there's significant overlap in functions among them.

Many of these technologies contend for range space. Wi-Fi, Bluetooth, ZigBee, and some others, for example, all use the two 2.4-GHz unlicensed music group. Generally, co-existence can be done because of technology inventions within the requirements that let them work. But as competition rises, and higher rates of speed and less disturbance are demanded, the craze has gone to move to the bigger frequencies.

The very best example is Wi-Fi moving to the 5-GHz music group. That development is carrying on as some applications are moving to the 60-GHz group. With semiconductor technology now in a position to provide functional and affordable transceiver potato chips, the 60-GHz variety, once a wasteland, soon will be occupied by an incredible number of devices.

2. The 60-GHz Spectrum

Generally in most countries, like the U.S., the range around 60 GHz is specified as unlicensed and can be utilized for a number of wireless applications. Inside the U.S., that range is a 7-GHz swath from 57 to 64 GHz. That is clearly a whole lot of bandwidth, and it's really suitable for transmitting high-speed digital data.

Data rates over 1 Gbit/s are often achieved with basic binary stage change keying (BPSK) or quadrature period transfer keying (QPSK) modulation. Data rates to 25 Gbits/s can be come to with higher-level modulation techniques.

Which makes this band a higher priority of these wishing to transfer high-definition (HD) training video wirelessly. While HD

Video is currently moved by some Wireless methods; almost all of it is compressed using the H.264 standard (MPEG4 version). Uncompressed training video is recommended as it still keeps greater detail and faithful duplication of the materials.

Generally in most home consumer electronic digital systems using High definition tv, the training video is moved with HDMI wires, which are costly and have span constraints. Also,

multiple HDMI cords are bulky and simply enhance the already untidy nest of wires in an average home entertainment centre installation. Wireless is an extremely desirable option.

Already, some Wi-Fi 802.11n and 802.11ac ability has been put into TV packages and other products for training video loading. Most use compressed video tutorial. With video tutorial now rivalling for space in the two 2.4- and 5-GHz rings, some interference will arise. Many if not most gadgets manufacturers already are investing in some 60-GHz technology that provides the range space to transfer uncompressed video tutorial at broadband from pack to box within an interference-free environment.66

A few disadvantages offset these benefits. First, the number of transmitting is very brief and constrained essentially by physics. The Fries Wireless range formula evidently declares that the received transmission electric power is proportional to the square of the wavelength:

Pr = PtGrGt?2/16?2r2

Pr = electricity received

Pt = electricity transmitted

Gr = obtain antenna gain (electricity ratio)

Gt = transfer antenna gain (electricity ratio)

r = range or distance from antenna

The shorter the wavelength, the higher the attenuation and the shorter the number. Normally, this is offset by higher transmitter electricity as well as receives and transmits antenna benefits. However, the number continues to be shorter than other technology at the low frequencies. A variety of a few ft is typical with the target to accomplish a maximum selection of about 10 meters. Adaptive beamforming is another approach that stretches range while bettering link consistency with highly directional antennas with high gain.

Attenuation is also frustrated by H2O absorption. Normal water (mainly oxygen substances) in the atmosphere absorbs radio waves because the signal wavelength is approximately how big is the oxygen substances. This absorption impact peaks at 60 GHz, causeing this to be a real concern for longer-range applications. For a variety of significantly less than 10 meters, it isn't a lot of a limitation.

Regardless, even though brief range is a restriction, additionally it is an advantage since local devices essentially won't hinder one another. This enables rate of recurrence reuse and a multiplicity of requirements to easily coexist without disturbance.

3. Methodology

3.1 IEEE 802.11ad

The IEEE 802.11 standard for Wireless LANs (WLANs) has many variants including 11b, 11a, 11g, 11n, 11ac, and today 11ad. The 11b/g/n specifications operate in the two 2.4-GHz group. The 11a/ac/n criteria operate in the 5-GHz strap, and the 11ad standard focuses on the 60-GHz strap. All share an identical media gain access to control (Apple pc) part to provide interoperability. The IEEE 802.11ad working group developed the 11ad standard with insight from the Cellular Gigabit Alliance (WiGig). It had been fully ratified this year 2010. Chip units are in development by Wilocity.

The 11ad standard divides the 60-GHz group into four 2.16-GHz large stations. Data rates as high as 7 Gbits/s are possible using OFDM with different modulation strategies. A single-channel version for low-power procedure is offered and can deliver a increase to 4.6 Gbits/s.

The WiGig/11ad standard also specifies an adaptive beamforming option that delivers high antenna profits and thin directionality to reduce interference and the capability to change to the encompassing to boost data rate and hyperlink reliability. It also allows the utilization of process adaption tiers (PALs), which is software

that delivers a means for creators to interface to specific shows like HDMI and Screen Dock as well as interfaces such as PCI Exhibit and USB.

The target is tri-band Wi-Fi potato chips that can move seamlessly in one standard to some other in another of the three Wi-Fi rings: 2.4, 5, or 60 GHz.

3.1.1 Characteristics IEEE 802.11ad

- WiGig is some sort of wireless HDMI

WiGig's range is a lot shorter than Wi-Fi's - it'll go out of puff at about ten metres and doesn't do walls - and it's really made to work along with, not rather than, existing wireless systems. The theory is to obtain Wi-Fi for your broadband interconnection and WiGig to wirelessly interconnect entertainment devices, Computers, tablets and so forth. You might use WiGig to hook up tablets and other devices to in-car entertainment systems and headrest-mounted video recording screens. If you are thinking Wireless HDMI, you're on the right lines.

- WiGig is fast

WiGig uses the relatively uncluttered 60GHz occurrence band to provide speeds as high as 7Gbps, although like Wi-Fi you will need hardware with multiple aerials to get the utmost possible throughput. Interconnection speeds drop speedily when you put any distance in the middle of your devices: up to now peak speeds arise when they're within three metres of 1 another and tail off considerably after that.

- WiGig wants to utilize everything

WiGig can become a connection part for devices that be prepared to hook up via USB, Screen Interface, PCI and HDMI. Provided devices have the right radios installed, it could be backwards appropriate for 802.11 Wi-Fi associations in the two 2.4GHz and 5GHz consistency bands.

- WiGig is efficient

WiGig has been designed as a minimal vitality technology, and boasts to be five times more energy conserving than Wi-Fi. It runs on the technology called "beamforming" to focus on its radio beams for best performance, minimizing congestion and effectively directing the radio transmission where it requires to look. The WiGig Alliance says that beamforming will also permit robust relationships beyond the ten-meter make, but there's a huge difference between "robust" and "speedy".

- WiGig wishes to hook up everything

WiGig isn't only about connecting entertainment system to HDTVs: it wishes to adopt tablets, cell phones and Computers too. If put in place well, it might mean automated, instant Wireless docking - so for example when you flop onto the couch with your smartphone, it might automatically hook up to and stream its screen to your telly.

- WiGig is not a proprietary standard

WiGig originates from the Cellular Gigabit Alliance. Alliance associates include Broadcom, Cisco, Intel, Microsoft, Dell, Nokia, Toshiba, Qualcomm, NEC, Panasonic and many other big hitters. Which means it should get widespread support. Regrettably some of these associates also support other, contending criteria such as Cellular HD. Talking about standards.

3.2 WirelessHD

Wireless HD is a typical of the Wireless HD Consortium. It uses the 60-GHz music group but is not Wi-Fi appropriate. Actually, it was designed from nothing to be utilized as a training video transport method alternatively than using existing Wi-Fi or various other technology not optimized for video recording. It helps the 1080p/60-Hz video tutorial format with a 10-9-pixel mistake rate in addition to all or any EIA-861 video types. It also helps both picture-in-pictures (PI) and solo source to multiple shows.

As for audio tracks potential, the support includes two stations of 192 kHz; linear pulse-code modulation (LPCM); 5.1 stations for 24-tad, 96-kHz multi-channel LPCM audio tracks;

and 13.1 programs of 24-little bit, 192-kHz compressed Dolby TrueHD or DTS-HD sound.
The standard can perform rates in the 10- to 28-Gbit/s range, which allows concurrent transmitting of uncompressed Hd-video and multi-channel music and data. The air technology is orthogonal consistency department multiplexing (OFDM) with adaptive beamforming. It could achieve a transmitting range up to 10 meters.

Furthermore, WirelessHD provides Digital Transmitting Content Coverage (DTCP) functionality, which defends high-value digital films, Television set programs, and music against unauthorized interception and copying. In addition, it facilitates HDCP 2.0, a content safety standards associated with HDMI.

Aim for applications include High definition tv units including 3D, Blu-ray players, set-top bins, game titles, and other training video accessories. Chip pieces (Omnilink60) can be found from Silicon Image (SiBeam), plus some end products are on the marketplace.

WirelessHD was formerly part of an attempt to build up a high-speed option for the IEEE 802.15.3c standard. That development group gone into hibernation in November 2009.
Full-resolution 1080p, up to 60Hz, uncompressed. Essentially no lag. The technology is with the capacity of Ultra HD "4K" resolutions, but most up to date products only do 1080p.

Basically requires type of eyesight. The 60GHz transmitting might be much above wireless disturbance (like the majority of Wi-Fi impulses), but it may easily be obstructed by, well, almost anything. A wall structure, a pantry door, your system fundamentally, if your far off fails where you want to place the transmitter, WirelessHD will most likely not either.

4. Result

Table 1: IEEE802.11ad Vs. Wireless HD

S.No.	Specifications	IEEE 802.11ad	Wireless HD
1	Frequency band	60 GHz	60 GHz
2	Maximum data rate	Up to 7 Gbit/s	10 to 28 Gbit/s
3	Max coverage distance	33 ft/10 m	About 10 m
4	Resolution	4k	1080p/60
5	Compatibility	IEEE 802.11b, 11a, 11g, 11n, 11ac	Not compatible with Wi-Fi
6	Walls	Ability to work through walls	transmitter and receiver must see each other (any wall causing loss of signal)
7	Power	excellent power efficiency	excellent power efficiency
8	Key feature	Beamforming	Beamforming
9	Connectivity	Connect automatic to instant wireless docking like (HDTVs- PCs- smart phone -tablet)	Need to manual connect every time you lose the signal
10	Companies supported	Apple, Intel, Microsoft, Samsung, Sony	Epson, LG, Panasonic

5. Conclusions

1- Technologies are operating in the same frequency band and also have a great deal of similar characteristics a lot of similar characteristics (excellent power efficiency - high data rate - coverage distance) .
2- Wireless HD is great for picture quality, promising uncompressed full HD, but you'll have to make sure the transmitter and receiver can see each other. If you stand in front of one or the other, you could temporarily lose signal and also this technique does not have Compatibility with Wi-Fi technology, and because of the failure of ability to work through the walls it need to be connected manually whenever you lose the signal.
3- IEEE 802.11ad Technology offering data rate significantly less than the wireless HD, but it has the ability to work through walls, giving it the capability to communicate fully automatic with hardware and is also compatible with all versions of Wi-Fi allowing Capability to integrate of electronic digital chips with each other.
4- IEEE 802.11 ad it is the best technology for the Communication between personal Home Appliance

References

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