DKT A/S
Introducing the DKT Wave 2 Wi-Fi mesh platform

Introduction

This Whitepaper describes the new DKT Wave 2 Wi-Fi platform. The platform creates a wider, more robust and more stable Wi-Fi connection throughout the home environment. A mesh network can be defined as a self-healing, self-forming and self-optimizing network of mesh nodes, where the nodes can intercommunicate using smart routing protocols, and select an optimal path to relay the data from one point to another, this by using a wired infrastructure as backbone.

Conclusion

Wi-Fi wave 2 technology enabling MU-MIMO leads to improved wireless performance. Self-Organizing Network (SON) technology creates a robust and stable wireless network. Hassle-free installation leads to high customer satisfaction and fewer customer calls. Transportation media independence allows the use of almost any wired infrastructure in the premises.

Non-proprietary solutions, based on IEEE standards, can interoperate with 3rd party equipment.

The wave 2 Wi-Fi mesh platform

As the size of home networks grows, and because the number of client devices in a home network increases exponentially each year, there is a focus amongst cable operators to guarantee not just consistent performance in terms of throughput and connectivity, but also to provide coverage throughout the entire home.

Most houses have a wired infrastructure, for example power grid (Power Line Communication, PLC), PDS cabling (RJ-45) or coax (typically used for Cable-TV or broadband services). Mesh Access points are quickly gaining attention to support the home networks, mainly due to ease of installation and the smart client steering algorithms.

A mesh network can be defined as a self-healing, self-forming and self-optimizing network of mesh nodes, where the nodes can intercommunicate using smart routing protocols and thereby select an optimal path to relay the data from one point to another. Usually, a good mesh solution should have the ability to steer clients from one Mesh Access Point to another, this by using client steering algorithms. For customers having a home network that includes a wired infrastructure

DKTCOMEGA

DKT A/S
Fanoevej 6
DK-4060 Kirke Saaby

Tlf +45 4646 2626
Fax +46 4646 2625
E-mail mail@dktcomega.com
Web www.dktcomega.com

such as PDS cables or coax, these intelligent solutions open up for backhaul transportation using techniques such as MoCA or G.hn.

Most of the wireless solutions brought to the market these days support IEEE 802.11ac. Especially the deployment and acceptance of the IEEE 802.11ac is the hottest topic of discussion and deployment in Wi-Fi over the past few years. Why? Simply because of the performance that is now possible (three times greater compared to that earlier), but also due to the comprehensive radio resource technology that allows multiple antennas and multiple clients to speak to access points in a more optimized manner via the so-called beamforming methods. Beamforming built into the IEEE 802.11ac specification is a 'smart signal' that detects connected devices and increases signal strength in their specific direction.

The number of consumer products available on the market is enormous. Many of these are sold as wireless-only products, either as repeaters or extenders. These typically use 5GHz to intercommunicate as backhaul. It introduces a dilemma - it adds more and more wireless equipment that is visible to other equipment in the household. This will increase the Wi-Fi pollution" and decrease the Rate vs. Range ratio, resulting in lowered performance to the clients.

It is our belief that a cable infrastructure should be used as backhaul wherever possible.

- Best choice is naturally a coax infrastructure, as this is RF-sealed and robust with stable performance. It co-exists easily with Cable-TV distribution and requires basically no extra installation material.

- Second best solution would be a PDS infrastructure, this using RJ-45 CAT 5e/6 cables. On the negative side, this typically requires installation of a switch to interconnect the individual APs and the gateway.

- Third choice is using the power grid as distribution, also known as Power Line Communication. The drawback is that performance is vulnerable to interference from other equipment on the grid. Furthermore, attenuation between the power phases in the premises may decrease overall performance. It is an easy to deploy solution as power supply is integrated in the product.

Ratified as a standard by the IEEE in November 2013, the first phase of 802.11ac products brought to market is commonly referred to as wave 1.

DKTCOMEGA

DKT A/S
Fanoevej 6
DK-4060 Kirke Saaby

Tlf +45 4646 2626
Fax +46 4646 2625
E-mail mail@dktcomega.com
Web www.dktcomega.com

As mentioned, this provides roughly three times improvement in network performance over its predecessor 802.11n.

Wi-Fi is taken to the next level with the recent introduction of Wi-Fi wave 2 technologies and the DKT 475xx series. The key feature in wave 2 is MU-MIMO techniques (Multi-User MIMO). It improves user experience and performance in a specific area.

Basically MU-MIMO will share the entire Wi-Fi spectrum that is available across multiple client devices, thereby optimizing the efficiency of the Wi-Fi network while servicing more client devices. Compare this with today's SU-MIMO (Single User MIMO), where the network services a single client at any one time, and based on the type of client, the Wi-Fi spectrum can be fully utilized or a portion of the network left idle as a client is connected.

The DKT 47500 product family
These products complement the Qualcomm Self Organizing Network (SON) technology, which allows multiple access points to be connected in a mesh structure via a Self-Configuring, Self-Managing, Self-Healing and Self-Defending configuration scheme. This creates a robust and secure wireless network with customer ease of use in mind, and this by using the in-home cabling infrastructure as backbone.

The SON feature improves coverage by adding more devices. Given its architecture with 2x2 antennas, it offers an excellent balance in terms of performance and coverage by using MU-MIMO and SON. At a later stage the scenario will be a 3x3 antenna MU-MIMO and SON, a 4x4 antenna etc. Typically a 2x2 antenna solution would be sufficient when considering multiple APs in the premises where each covers small cell areas. It is a cost-effective solution, which is much cheaper to deploy than the most advanced 8x8 routers available on the market. The mesh solution must be regarded as a complementary, more cost effective, reliable, and a user-friendly transportation method of IP services in the premises.

DKTCOMEGA

DKT A/S
Fanoevej 6
DK-4060 Kirke Saaby

Tlf +45 4646 2626
Fax +46 4646 2625
E-mail mail@dktcomega.com
Web www.dktcomega.com

Basically the end customer should not be concerned with the above, as it all occurs in the device silicon. The only user interaction is the configuration of the network SSID and the user password, thereby resulting in a hassle-free installation, less customer calls and increased customer satisfaction.

The DKT 47500 product family introduced in spring 2017 is based on a non-proprietary solution, utilizing the benefits from the IEEE standards, such as IEEE 802.11k, v, r. In brief:

- IEEE 802.11k is intended to improve the way in which traffic is distributed within a network.
- IEEE 802.11v is intended for clients to exchange information about the network topology.
- IEEE 802.11r is intended to allow fast and seamless transitions of clients between access points.

The above techniques are implemented in the silicon, which will allow interoperability with other 3rd party devices that support the same. Preferably, customers would choose a dedicated SSID for their mesh network, allowing clients to automatically steer to this for optimal performance.

The DKT 47500 family is composed of six distinct products designed to extend network connectivity at home using Wi-Fi and/or MoCA or G.hn technology.

G.hn is a technology based on ITU-T G.9960 and G.9961 standards that provide high-speed connectivity over different types of home wiring (for example coaxial cable and power line). MoCA is specified by the MoCA alliance, which is an international standards consortium publishing specifications for networking over coaxial cable.

This opens up for the flexibility of having a broad range of home network infrastructures, with the end result being a robust, stable wired/wireless backhaul communication of IP distribution within the premises.

Conclusion

- Wi-Fi wave 2 technology enabling MU-MIMO leads to improved wireless performance.
- Self Organizing Network (SON) technology creates a robust and stable wireless network.

DKTCOMEGA

DKT A/S
Fanoevej 6
DK-4060 Kirke Saaby

Tlf +45 4646 2626
Fax +46 4646 2625
E-mail mail@dktcomega.com
Web www.dktcomega.com

- Hassle-free installation leads to high customer satisfaction with fewer customer calls.
- Transportation media independence allows the use of almost any wired infrastructure in the premises.
- Non-proprietary solution implies being based on IEEE standards and can interoperate with 3rd party equipment.

Please refer to www.dktcomega.com for further details.

DKTCOMEGA

DKT A/S
Fanoevej 6
DK-4060 Kirke Saaby

Tlf +45 4646 2626
Fax +46 4646 2625
E-mail mail@dktcomega.com
Web www.dktcomega.com