

INDUSTRY TALK 6 : Wifi6

GROUP 5

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DESCRIPTION OF THE INFRASTRUCTURE DISCUSSED IN THE TALK

Wifi 6 has a 4 times larger bandwidth of 9.6 Gbps and an optional 20M bandwidth. Internet speed is also improved by 100% due to the gateway and terminal of 160 Mbit per second. The spatial stream is doubled and the rate of each spatial stream increases by 5.2%. Meanwhile, the subcarrier quantity efficiency increased from 91.41 to 95.7% effective rate. The symbol duration changes from 3.2 μ s in 802.11ac to 12.8 μ s in 802.11ax. The coding mode also improved from 256 QAM to 1024 QAM with a rate of spatial stream at 25% and a 8x8 MU-MIMO which means The capability of concurrently transcribing with numerous client devices is known as multi-user MIMO (MU-MIMO).

In addition, leveraging to UL/DL OFDMA and UL/DL MU-MIMO for high concurrency. Multiple clients connected to the access point will be able to transmit acknowledgement answers (ack) at the same time, reducing airtime use. the update from OFDM to OFDMA on the other hand allows multiple lanes w traffic lights and the MU-MIMO for multi-user sequential scheduling. In terms of anti interference, the OFDMA of wifi 6 uplinks multi-user concurrency which improves network capacity to handle four times the concurrent users and handle more traffic without interference. OFDMA means orthogonal frequency division multiple access for context.

We also mentioned how the OFDMA update helps reduce airtime use in the paragraph above. This is related to IoT oriented energy saving. Less airtime use equals airtime efficiency. This in return reduces terminal power consumption by 30% through TWT (Target Wake Up Time) which allows terminals to wake up on demand. Thus, Wifi 6 has a low power consumption at only 20MHz. Power consumption is reduced as STA (Station) is in sleep mode with a target wake up time.

Wifi 6 also has low latency with a spectrum utilization of 10 m/s and a vast spectrum at 2.4, 5 and 6G Hz. Wifi 6's basic service set (BSS) Colouring is introduced to enable better spatial reuse. BSS Colouring helps with managing interference when the number of users increases. This way, data can be transmitted at the same channel simultaneously with different colours for different users. BSS Colouring also allows wifi 6 to exploit spatial reuse by discovering spatial reuse opportunities. The service latency is also reduced to 10ms and the average latency is reduced by 50%.

Dedicated algorithm is also one of the features of Wifi 6 which gives better performance in terms of data carrying. Data to transmit and to receive (2T2R) is at 2.4 GB now. The algorithm also has an omnidirectional coverage when connecting to traditional wifi5 STAs. The coverage has also improved to provide full house coverage of 5GHz signals. Meanwhile, the RF is optimized, improving TX power and sensitivity under the same signal quality. SNR (Signal-to-noise ratio) at the receiving end of OFDMA is then increased by 9dB+ based on the RU narrowband connection.

Wifi 6 also heavily supports the evolution of home value added services like multi-screen IPTV, HD video teaching, cloud VR interaction and e-sports acceleration while enhancing the positioning of gateways as the control centre of smart home with 10+ terminals, 20 billion online devices and a 129% growth rate.

Photo from the Wi-Fi NOW website



The Devices Used

Wifi6 supports gigabit broadband promotion: 1 gbit/s to mobile phones and personal computers, for a fast download and cloud backup experience. Companies like Qualcomm, Asus, Huawei and Charter Commercial created Wifi 6 routers and series chips. Meanwhile, Samsung was the first mobile phone that supports wifi6 followed by Apple's Iphone 11.

Examples Of Any Domain

Country	Regulatory Domain	Country	Regulatory Domain	Country	Regulatory Domain
North America		EMEA (continued)		APAC	
Canada	FCC	Latvia	ETSI	Australia	FCC
Mexico	FCC	Liechtenstein	ETSI	China	ETSI
U.S.	FCC	Lithuania	ETSI	Hong Kong	FCC
EMEA		Luxembourg	ETSI	India	FCC
Algeria	ETSI	Malta	ETSI	Indonesia	ETSI
Austria	ETSI	Monaco	ETSI	Japan	TELECOM
Bahrain	ETSI	Netherlands	ETSI	Korea	KCC
Belgium	ETSI	Norway	ETSI	Malaysia	FCC
Croatia	ETSI	Oman	ETSI	New Zealand	FCC
Bulgaria	ETSI	Pakistan	ETSI	Philippines	FCC
Cyprus	ETSI	Poland	ETSI	Singapore	ETSI
Czech Republic	ETSI	Portugal	ETSI	Taiwan	FCC
Denmark	ETSI	Romania	ETSI	Thailand	ETSI
Egypt	ETSI	Russian Federation	ETSI	Vietnam	ETSI
Estonia	ETSI	Russian Federation	FCC	South America	
Finland	ETSI	Saudi Arabia	ETSI	Argentina	FCC
France	ETSI	Slovakia	ETSI	Brazil	FCC
Germany	ETSI	Slovenia	ETSI	Chile	FCC
Gibraltar	ETSI	South Africa	ETSI	Colombia	FCC
Greece	ETSI	Spain	ETSI	Costa Rica	FCC
Hungary	ETSI	Sweden	ETSI	Dominican Republic	FCC
Iceland	ETSI	Switzerland	ETSI	Ecuador	FCC
Ireland	ETSI	Turkey	ETSI	Panama	FCC
Israel	ETSI	U.A.E.	ETSI	Paraguay	FCC
Italy	ETSI	Ukraine	ETSI	Peru	FCC
Kazakhstan	ETSI	United Arab Emirates	ETSI	Puerto Rico	FCC
Kuwait	ETSI	U.K.	ETSI	Venezuela	FCC

Wi-Fi 6 Technology Building Blocks

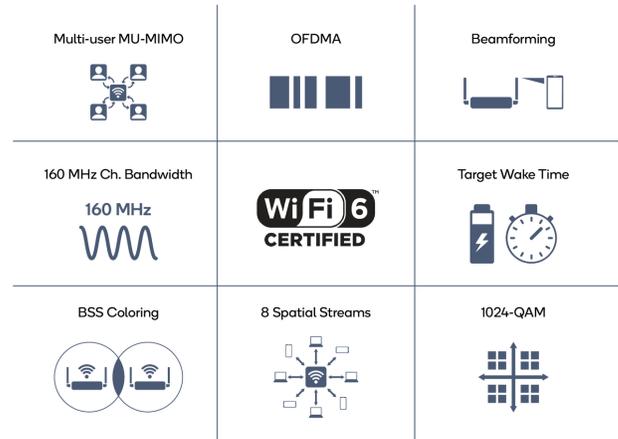


Photo from the Qualcomm Network Developer website

The Reflection From The Talk

From this talk, we can conclude that wifi has evolved for years and enterprises and technology companies will expand their products to accommodate this evolution. For instance, Huawei created Wifi 6 router and Samsung was the first mobile phone to support Wifi 6 followed closely by Apple with their Iphone 11. Wifi 5 could only transfer 3.5Gb per second maximum while Wifi 6 evolved to transfer 9.6Gb per second maximum. Wifi 6 is also better for energy saving as it has low power consumption when STA is in sleep mode. The evolution of Wifi is more environmentally friendly. There are more developments to come and hopefully government agencies and local Malaysian technology companies will be able to provide proper accommodation and infrastructure for the most effective application of these technological evolution.