A Quick Look at Wi-Fi 6E

1200 MHz of new spectrum for Wi-Fi access networks

802.11ax in 2.4/5 GHz

Wi-Fi 6E

802.11ax in 6 GHz

1200 MHz CONTIGUOUS SPECTRUM

- 14 non-overlapping 80 Mhz channels
- 7 non-overlapping 160 Mhz channels

802.11n, 802.11ac RATES ARE NOT ALLOWED – 802.11ax ONLY

THREE POWER CLASSES

- Low Power Indoor, aka LPI
- Standard Power, aka SP
- Very Low Power, aka VLP

RULES FOR WIRELESS CLIENTS, WIRELESS REPEATERS AND FIXED WIRELESS CLIENTS

- Ad-hoc networks not allowed, too great a chance for interference
- Client transmit power is 6 dB lower than the AP
- MESH nodes and fixed client transmit power same as the AP

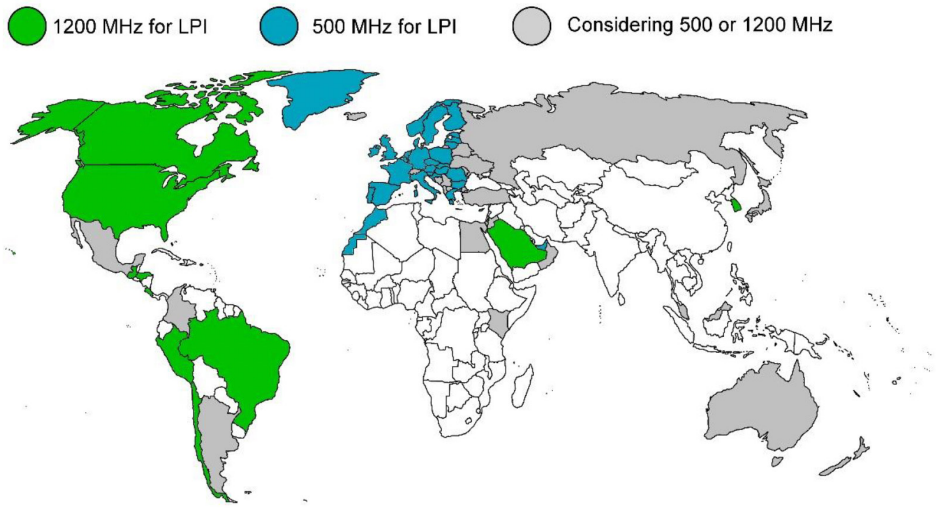
6 GHz: 5925 MHz – 7125 MHz

Incumbent

5925 MHz	6425 MHz	6525 MHz	6875 MHz	7125 MHz
UNII-5	**UNII-6**	**UNII-7**	**UNII-8**	
Standard Power, 36 dBm, Require AFC. SP varies widely by regulatory domain.	Not Allowed	Standard Power, 36 dBm, Require AFC. SP varies widely by regulatory domain.	Not Allowed for Most Domains.	

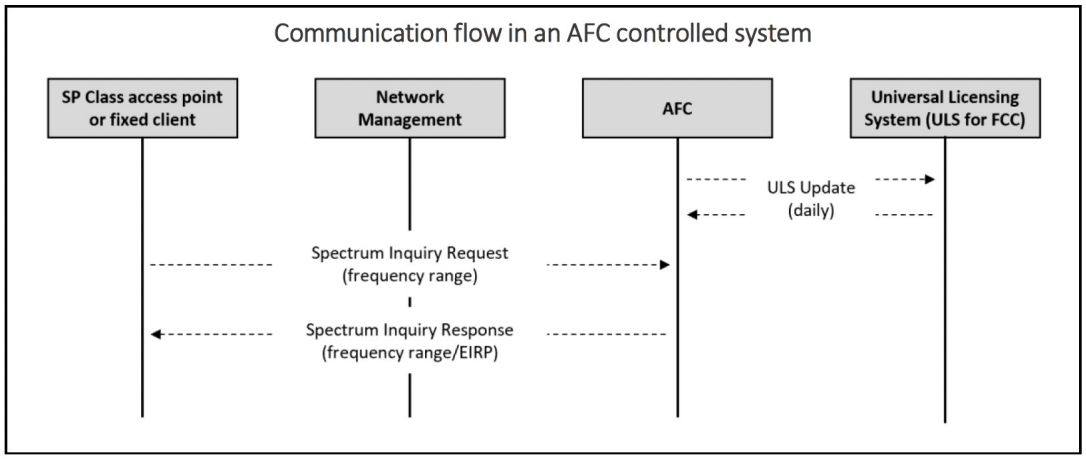
All sub-bands support low power indoor (up to 30 dBm EIRP in most domains. 23 dBm or 24 dBm in other domains).

Very low power indoor/outdoor (14 dBm) in most domains, not allowed or TBD in others.



STANDARD POWER AUTOMATIC FREQUENCY CONTROL (AFC) PROTECTS INCUMBENTS (US FCC EXAMPLE)

- ULS database contains information about licensed services in UNII 5 and UNII 7 sub bands
- The SP access point or fixed client sends Spectrum Inquiry Request with its FCC ID, serial number, GPS coordinates, and antenna height to the AFC
- AFC calculates an interference model for the location of the SP class access point or fixed client
- AFC sends back a set of frequencies and maximum EIRP levels that are acceptable

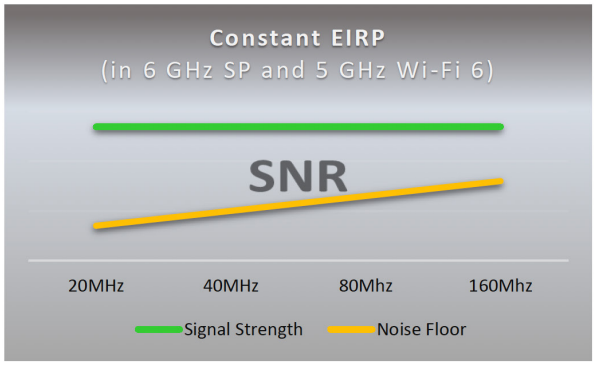


LOW POWER INDOOR CONSIDERATIONS

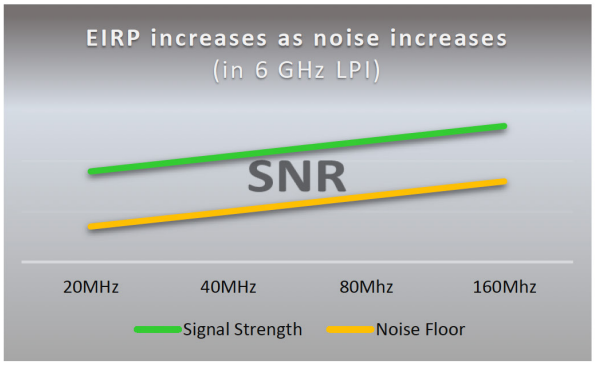
- Average of 2 dB greater RF path loss than 5 GHz band
- Allowed transmit power increases by 3 dB each time the channel width doubles
- 20 Mhz channel starts at 18 dBm EIRP (5dBm / MHz + 10log20MHz = 5 + 13 = 18 dBm)

THREE REASONS 80 MHZ AND 160 MHZ CHANNELS WILL BE COMMON IN 6 GHZ, LPI

- 7 and 14 non non-overlapping channels reduce co co-channel interference
- Client SNR does not degrade as the channel width increases from 20 MHz up to 160 MHz
- Does not contend with older protocols that do not support wide channels



In 6 GHz SP class, the PSD measured in dBm/MHz matches the maximum EIRP on a 20 Mhz channel. Thus, as the channel width increases, the SNR decreases.



In 6 GHz LPI, the PSD matches the maximum EIRP at the maximum channel width.

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