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Re: [UWB Aggregation and WiFi 6E]

Abstract: [UWB Aggregation and Coexistence Testing with 802.11ax]

Purpose: [Discuss results of tests to determine impact of UWB on 802.11 ax and successors; and discuss aggregation of UWB transmissions]

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UWB Alliance Aggregation and Wi-Fi 6E coexistence Testing

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Goals of Tests

- Determine Aggregation Rate of IR UWB
 - Test multiple devices at different rates
 - with varying quantity of UWB devices operating
- Test Effects of UWB on Wi-Fi 6E
 - Do UWB Devices

Test Conditions



- Typical indoor business office environment
 - WeWork, Washington, DC
 - Busy work area with people coming and going using various computer/smart phone devices

Wi-Fi 6E Equipment for Tests

- Three models of APs' were used
 - ASUS AXE6600 tri-band mesh Wi-Fi 6e system
 - Linksys MX8500 Wi-Fi 6e tri-band
 - TP-link AXE7800 tri-band 8-stream Wi-Fi 6e router
 - APs' bandwidth was autoconfigured
- Multiple PC notebook and smartphone clients
 - Set at nominal fixed distances of 8 ft to AP's
- NETGEAR Nighthawk Wi-Fi 6e client device was used with laptop computer as iPerf client

UWB Equipment for Tests

- 10 Qorvo DW3000 Development Kits
 - Set as ranging pairs
 - Each pair configured to transmit at a rate of one ranging exchange per second
- 10 Spark Microsystems SR1000 Series Evaluation Kits
 - Set as communications pairs
 - Each pair configured to transmit a continuous stream of data.
- AS-48461 Series Dual-polarized quad-ridged horn antenna was focused on the UWB transmitters to minimize reception from the Wi-Fi Access Points.

WiFi 6E Test Process

- Ambient environment baseline measured
 - Aircheck3 used to examine the ambient RF
 - Recorded 305 RF devices operating in the 2.4, 5, and 6GHz bands
- UWB devices introduced to environment 1 at a time
- Measurements taken at 1 m , 0.5 m and 0.012 m distance from APs'

UWB Effect on Wi-Fi 6E

No UWB

3 UWB devices



Worst Case 6E Test



- 8 Spark UWB
- 10cm from the AP
- Streaming

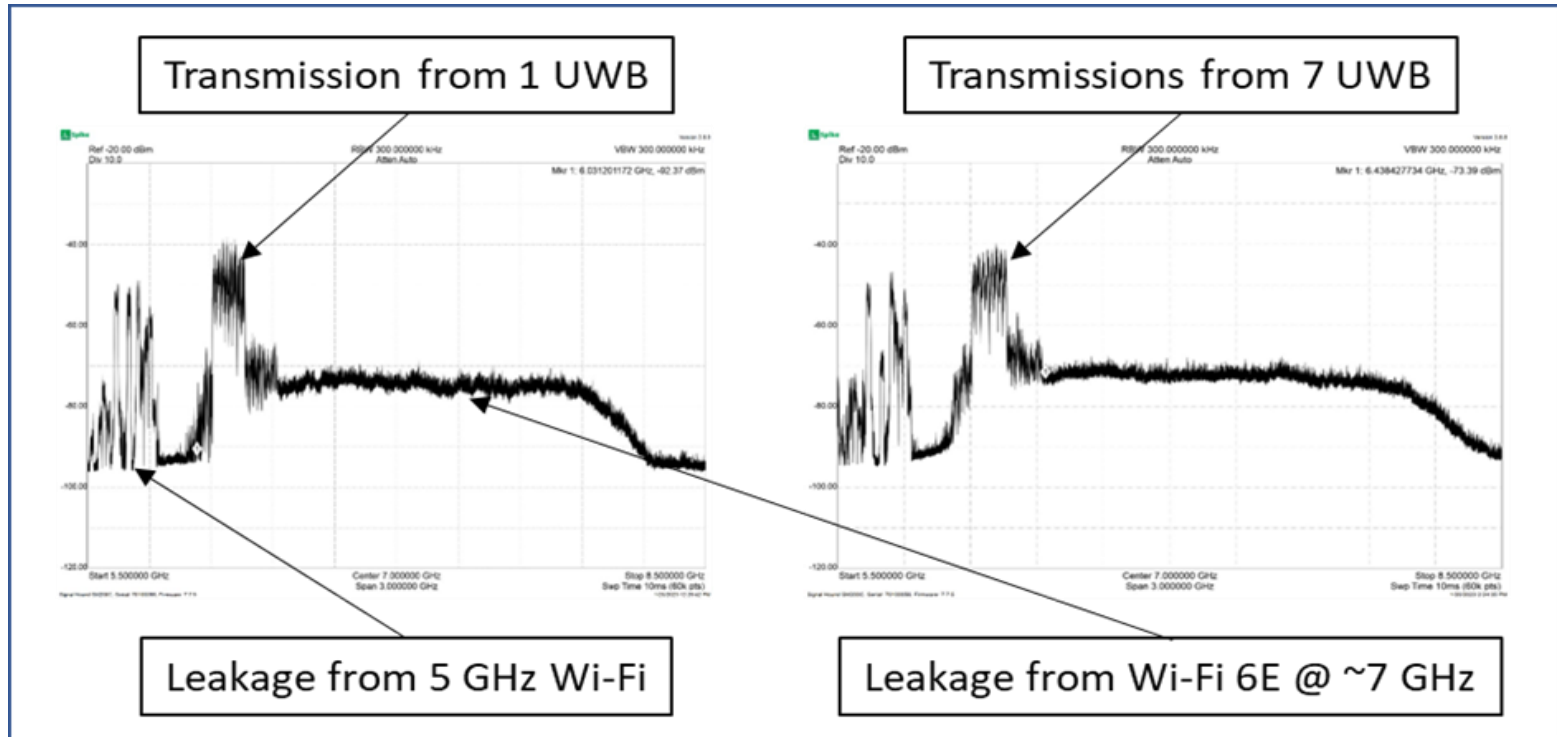
- No measurable impact on the Wi-Fi 6E performance

Test Results of UWB Effect on Wi-Fi 6E

- UWB did not have any measurable impact on 802.11ax performance
- Factors that did impact Wi-Fi 6E
 - Quantity of Wi-Fi 6E devices operating in the area
 - Presence of people near the Aps
 - Positioning of the people throughout the room

Detecting UWB and aggregation of UWB

- Minimal Aggregation detected



Next Steps

- Additional Aggregation Tests
 - Increase quantity of UWB devices
 - 100+ devices
 - Increase duty cycle of UWB devices
 - Test at international facility
 - Joint Research Center – Brussels, Belgium

Summation of Results of Tests

- Determine Aggregation Rate of IR UWB
 - Even when operated at high transmission rates UWB power did not aggregate linearly with the number of devices.
- Test Effects of UWB on Wi-Fi 6E
 - UWB did not have any measurable impact on 802.11ax performance
 - Factors that did impact Wi-Fi 6E
 - Quantity of Wi-Fi 6E devices operating in the area
 - Presence of people near the Aps
 - Positioning of the people throughout the room