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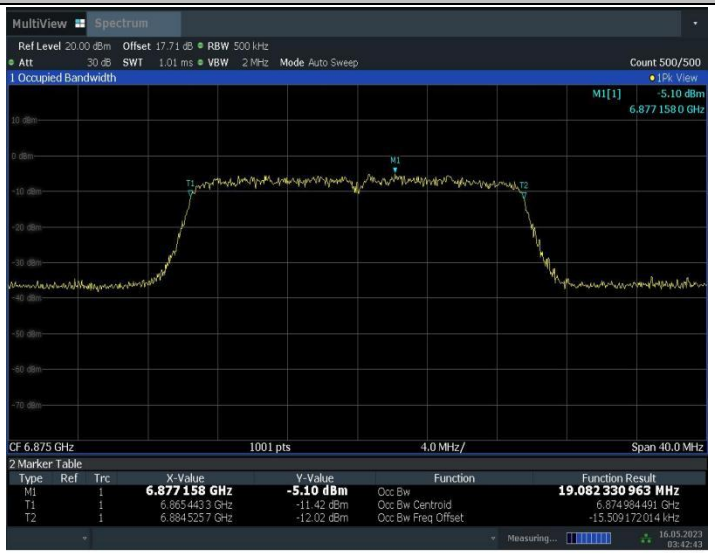

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11AX40MIMO_Ant3_7085

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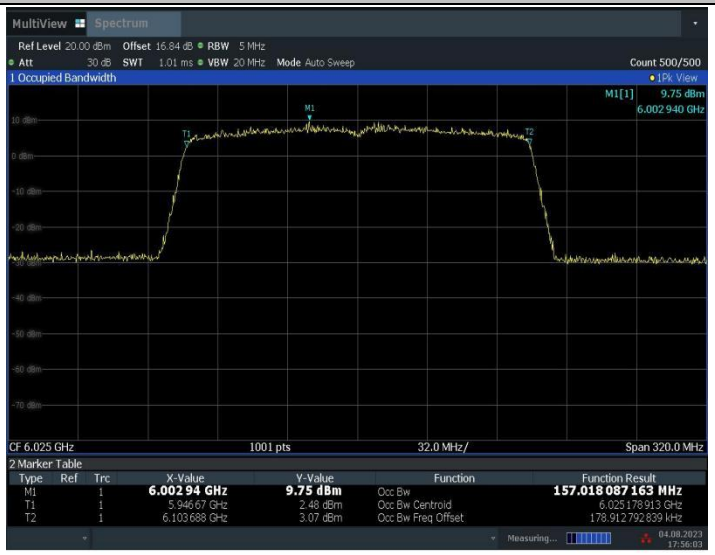

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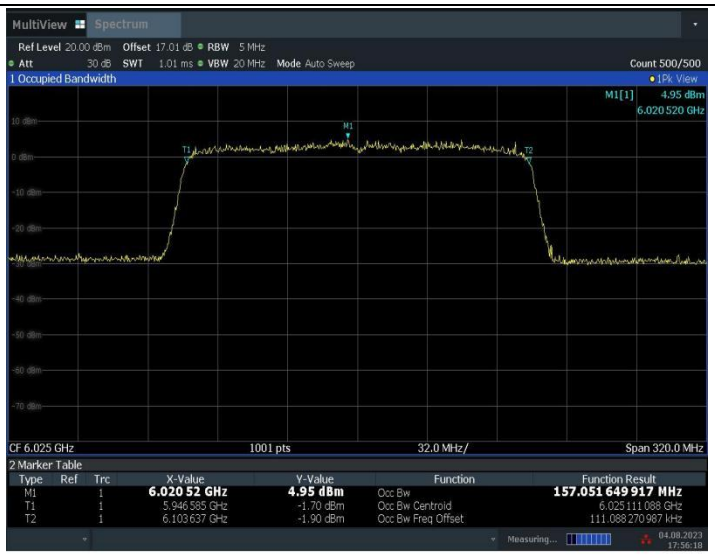

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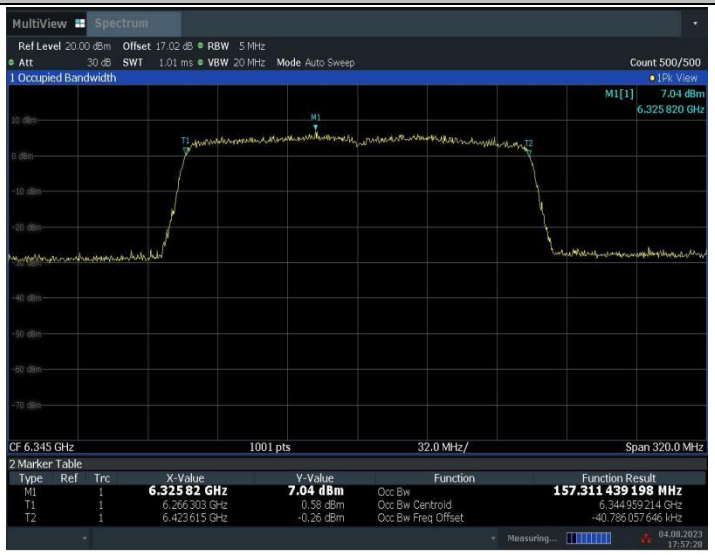

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18:00:26 04.08.2023

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A.6. Contention Based Protocol

Measurement Limit and Method:

Indoor access points, subordinate devices and client devices operating in the 5.925-7.125 GHz band must employ a contention-based protocol.

Unlicensed low-power indoor devices must detect co-channel radio frequency power that is at least -62dBm or lower. Upon detection of energy in the band, unlicensed low power indoor devices must vacate the channel (in which incumbent signal is transmitted) and stay off the incumbent channel as long as detected radio frequency power is equal to or greater than the threshold (-62 dBm)1. The -62 dBm (or lower) threshold is referenced to a 0 dBi antenna gain.

To ensure incumbent operations are reliably detected in the band, low power indoor devices must detect RF energy throughout their intended operating channel. For example, an 802.11 device that plans to transmit a 40 MHz- wide signal (on a primary 20 MHz channel and a secondary 20 MHz channel) must detect energy throughout the entire 40 MHz channel. Additionally, low-power indoor devices must detect co-channel energy with 90% or greater certainty.

The measurement is made according to KDB 987594.

EUT does not use channel puncturing for incumbent avoidance. The EUT use bandwidth reduction for incumbent avoidance. Following figure illustrates an example scenarios of an 160MHz channel centered at 6185 MHz.

For the lower edge:

A 10 MHz AWGN signal (center frequency is 6110MHz) is injected, the signal reduces to 40 MHz centered around 6165MHz.

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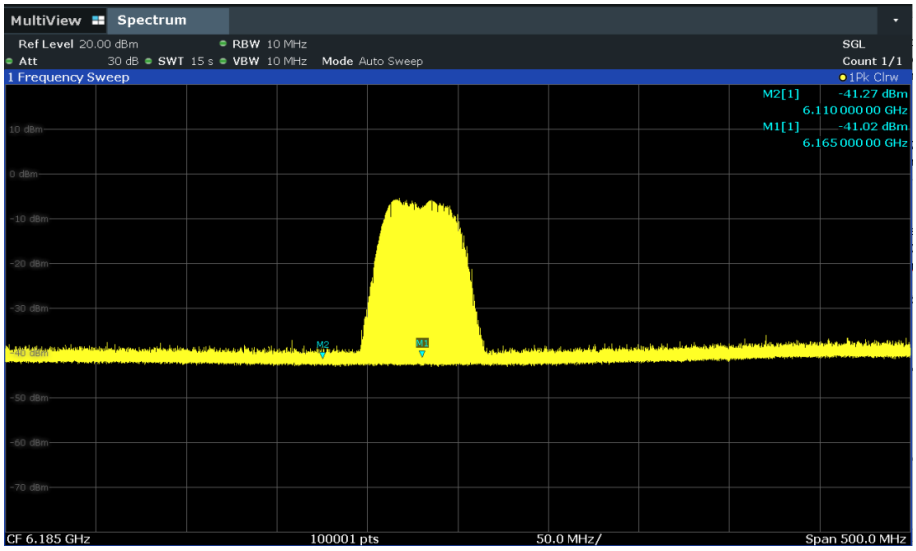
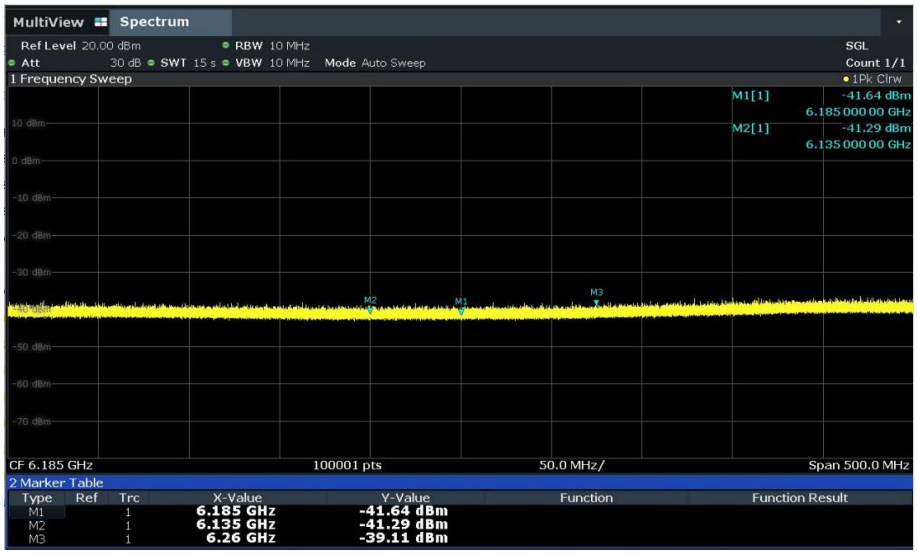


For the center frequency

A 10 MHz AWGN signal (center frequency is 6185MHz) is injected, the signal completely ceases operation.



For the upper edge:

A 10 MHz AWGN signal (center frequency is 6260MHz) is injected, the signal reduces to 40 MHz centered around 6125MHz.

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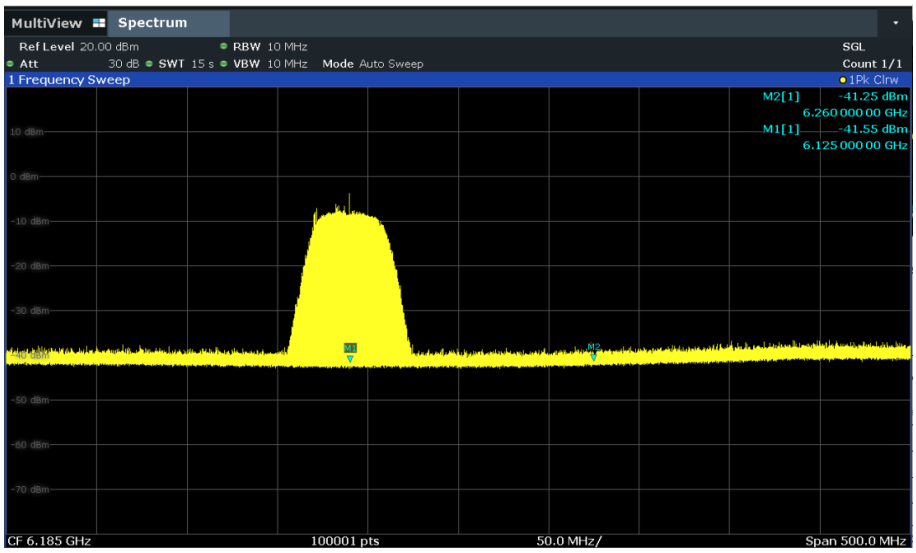

Measurement Results:

UNII Band 5:20M-6175MHz

Incumbent Frequency (MHz)	Injected (AWGN) Power (dBm)	Antenna Gain (dBi)	Adjusted Power (dBm)	Detection Limit (dBm)	EUT TX Status
6175	-73.71	1.2	-74.91	-62	Ceased
	-74.71	1.2	-75.91	-62	Minimal
	-80.00	1.2	-81.20	-62	Normal

Note: Adjusted Power(dBm)=Injected (AWGN) Power(dBm)-Antenna Gain(dBi)+Path loss(dB). Path loss is negligible (0dB). The adjusted power level is less than or equal to the detection threshold (-62dBm) with reference to 0dBi antenna gain.

Conclusion: PASS

UNII Band 5:160M-6185MHz

Incumbent Frequency (MHz)	Injected (AWGN) Power (dBm)	Antenna Gain (dBi)	Adjusted Power (dBm)	Detection Limit (dBm)	EUT TX Status
6110 (Lower Edge)	-71.71	1.2	-72.91	-62	Ceased
	-72.71	1.2	-73.91	-62	Minimal
	-80.00	1.2	-81.20	-62	Normal
6185	-67.71	1.2	-68.91	-62	Ceased

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(Center Frequency)	-68.71	1.2	-69.91	-62	Minimal
	-80.00	1.2	-81.20	-62	Normal
6260 (Upper Edge)	-72.71	1.2	-73.91	-62	Ceased
	-73.71	1.2	-74.91	-62	Minimal
	-80.00	1.2	-81.20	-62	Normal

Note: Adjusted Power(dBm)=Injected (AWGN) Power(dBm)-Antenna Gain(dBi)+Path loss(dB). Path loss is negligible (0dB). The adjusted power level is less than or equal to the detection threshold (-62dBm) with reference to 0dBi antenna gain. EUT support bandwidth reduction mechanism.

Conclusion: PASS

UNII Band 6:20M-6435MHz

Incumbent Frequency (MHz)	Injected (AWGN) Power (dBm)	Antenna Gain (dBi)	Adjusted Power (dBm)	Detection Limit (dBm)	EUT TX Status
6435	-73.71	1.2	-74.91	-62	Ceased
	-74.71	1.2	-75.91	-62	Minimal
	-80.00	1.2	-81.20	-62	Normal

Note: Adjusted Power(dBm)=Injected (AWGN) Power(dBm)-Antenna Gain(dBi)+Path loss(dB). Path loss is negligible (0dB). The adjusted power level is less than or equal to the detection threshold (-62dBm) with reference to 0dBi antenna gain.

Conclusion: PASS

UNII Band 6:160M-6505MHz

Incumbent Frequency (MHz)	Injected (AWGN) Power (dBm)	Antenna Gain (dBi)	Adjusted Power (dBm)	Detection Limit (dBm)	EUT TX Status
6430 (Lower Edge)	-71.71	1.2	-72.91	-62	Ceased
	-72.71	1.2	-73.91	-62	Minimal
	-80.00	1.2	-81.20	-62	Normal
6505 (Center Frequency)	-67.71	1.2	-68.91	-62	Ceased
	-68.71	1.2	-69.91	-62	Minimal
	-80.00	1.2	-81.20	-62	Normal

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6580 (Upper Edge)	-72.71	1.2	-73.91	-62	Ceased
	-73.71	1.2	-74.91	-62	Minimal
	-80.00	1.2	-81.20	-62	Normal

Note: Adjusted Power(dBm)=Injected (AWGN) Power(dBm)-Antenna Gain(dBi)+Path loss(dB). Path loss is negligible (0dB). The adjusted power level is less than or equal to the detection threshold (-62dBm) with reference to 0dBi antenna gain. EUT support bandwidth reduction mechanism.

Conclusion: PASS

UNII Band 7:20M-6855MHz

Incumbent Frequency (MHz)	Injected (AWGN) Power (dBm)	Antenna Gain (dBi)	Adjusted Power (dBm)	Detection Limit (dBm)	EUT TX Status
6855	-74.71	1.2	-75.91	-62	Ceased
	-75.71	1.2	-76.91	-62	Minimal
	-80.00	1.2	-81.20	-62	Normal

Note: Adjusted Power(dBm)=Injected (AWGN) Power(dBm)-Antenna Gain(dBi)+Path loss(dB). Path loss is negligible (0dB). The adjusted power level is less than or equal to the detection threshold (-62dBm) with reference to 0dBi antenna gain.

Conclusion: PASS

UNII Band 7:160M-6665MHz

Incumbent Frequency (MHz)	Injected (AWGN) Power (dBm)	Antenna Gain (dBi)	Adjusted Power (dBm)	Detection Limit (dBm)	EUT TX Status
6590 (Lower Edge)	-72.71	1.2	-73.91	-62	Ceased
	-73.71	1.2	-74.91	-62	Minimal
	-80.00	1.2	-81.20	-62	Normal
6665 (Center Frequency)	-68.71	1.2	-69.91	-62	Ceased
	-69.71	1.2	-70.91	-62	Minimal
	-80.00	1.2	-81.20	-62	Normal
6740 (Upper	-72.71	1.2	-73.91	-62	Ceased
	-73.71	1.2	-74.91	-62	Minimal

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Edge)	-80.00	1.2	-81.20	-62	Normal

Note: Adjusted Power(dBm)=Injected (AWGN) Power(dBm)-Antenna Gain(dBi)+Path loss(dB). Path loss is negligible (0dB). The adjusted power level is less than or equal to the detection threshold (-62dBm) with reference to 0dBi antenna gain. EUT support bandwidth reduction mechanism.

Conclusion: PASS

UNII Band 8:20M-6995MHz

Incumbent Frequency (MHz)	Injected (AWGN) Power (dBm)	Antenna Gain (dBi)	Adjusted Power (dBm)	Detection Limit (dBm)	EUT TX Status
6995	-72.71	1.2	-73.91	-62	Ceased
	-73.71	1.2	-74.91	-62	Minimal
	-80.00	1.2	-81.20	-62	Normal

Note: Adjusted Power(dBm)=Injected (AWGN) Power(dBm)-Antenna Gain(dBi)+Path loss(dB). Path loss is negligible (0dB). The adjusted power level is less than or equal to the detection threshold (-62dBm) with reference to 0dBi antenna gain.

Conclusion: PASS

UNII Band 8:160M-6985MHz

Incumbent Frequency (MHz)	Injected (AWGN) Power (dBm)	Antenna Gain (dBi)	Adjusted Power (dBm)	Detection Limit (dBm)	EUT TX Status
6910 (Lower Edge)	-70.71	1.2	-71.91	-62	Ceased
	-71.71	1.2	-72.91	-62	Minimal
	-80.00	1.2	-81.20	-62	Normal
6985 (Center Frequency)	-68.71	1.2	-69.91	-62	Ceased
	-69.71	1.2	-70.91	-62	Minimal
	-80.00	1.2	-81.20	-62	Normal
7060 (Upper Edge)	-72.71	1.2	-73.91	-62	Ceased
	-73.71	1.2	-74.91	-62	Minimal
	-80.00	1.2	-81.20	-62	Normal

Note: Adjusted Power(dBm)=Injected (AWGN) Power(dBm)-Antenna Gain(dBi)+Path loss(dB). Path loss is negligible (0dB). The adjusted power level is less than or equal to the detection threshold (-62dBm) with

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reference to 0dBi antenna gain. EUT support bandwidth reduction mechanism.

Conclusion: PASS

Detection Probability Evaluation

Mode	UNII Band	Center Frequency (MHz)	Incumbent Frequency (MHz)	Injected AWGN (dBm)	1	2	3	4	5	6	7	8	9	10	Detection Probability (%)	Limit (%)
802.11ax -HE20	5	6175	6175	-73.71	√	√	√	√	√	√	√	√	√	√	100	90
	6	6435	6435	-73.71	√	√	x	√	√	√	√	√	√	√	90	90
	7	6855	6855	-74.71	√	√	√	√	√	√	√	√	√	√	100	90
	8	6995	6995	-72.71	√	√	√	√	√	√	√	√	√	√	100	90
802.11ax -HE160	5	6185	6110	-71.71	√	√	√	√	√	√	√	√	√	√	100	90
			6185	-67.71	√	√	√	√	√	x	√	√	√	√	90	90
			6260	-72.71	√	√	√	√	√	√	√	√	√	√	100	90
	6	6505	6430	-71.71	x	√	√	√	√	√	√	√	√	√	90	90
			6505	-67.71	√	√	x	√	√	√	√	√	√	√	90	90
			6580	-72.71	√	√	√	√	√	√	√	√	√	√	100	90
	7	6665	6590	-72.71	√	√	√	√	√	√	√	√	√	√	100	90
			6665	-68.71	√	√	√	√	√	√	√	x	√	√	90	90
			6740	-72.71	√	√	√	√	√	√	√	√	√	√	100	90
	8	6985	6910	-70.71	√	√	√	√	√	√	√	√	√	√	100	90
			6985	-68.71	√	√	√	√	√	√	x	√	√	√	90	90
			7060	-72.71	√	x	√	√	√	√	√	√	√	√	90	90

.**Conclusion: PASS**

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Test graphs as below:

Mode	Frequency(MHz)	AWGN Signal Level	cease transmission
802.11ax20	6995	See test graph	See test graph
802.11ax160	6185	See test graph	See test graph

AWGN Signal Level 802.11ax HE20 6995MHz (at Antenna Port)

Contention Based Protocol 802.11ax HE20 6995MHz (cease transmission)

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