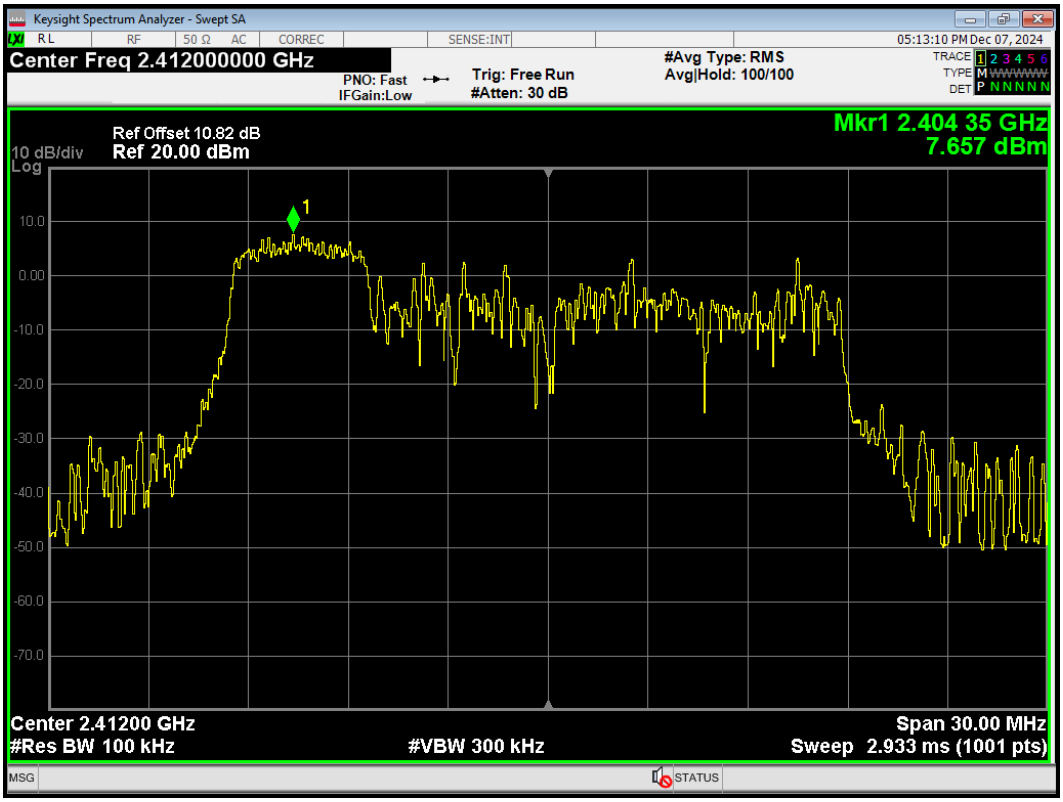
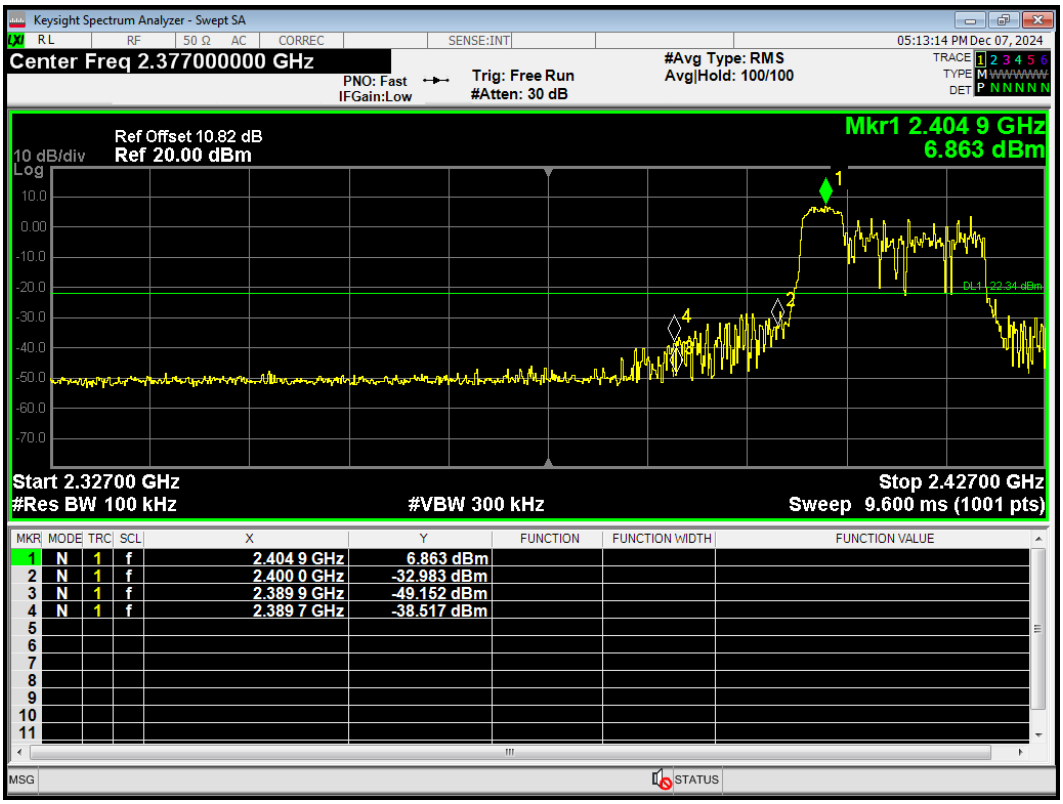
Band Edge 802.11ax(HE20) 52T 2412MHz Ref



Band Edge 802.11ax(HE20) 52T 2412MHz Emission



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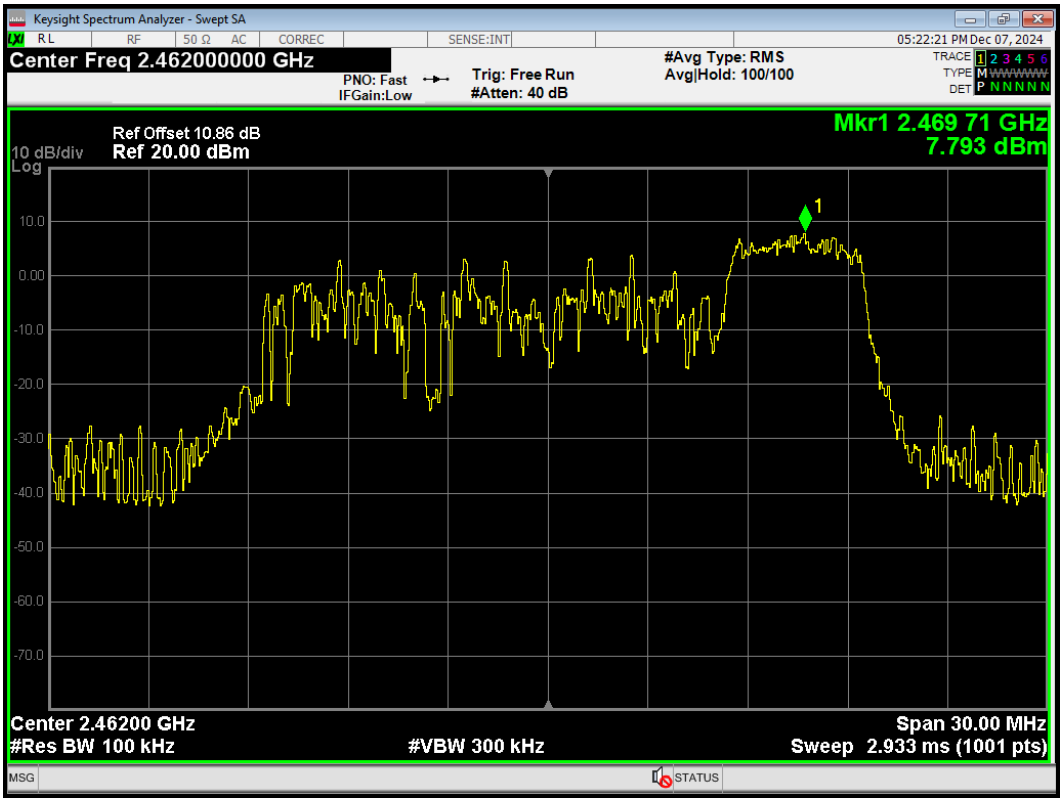
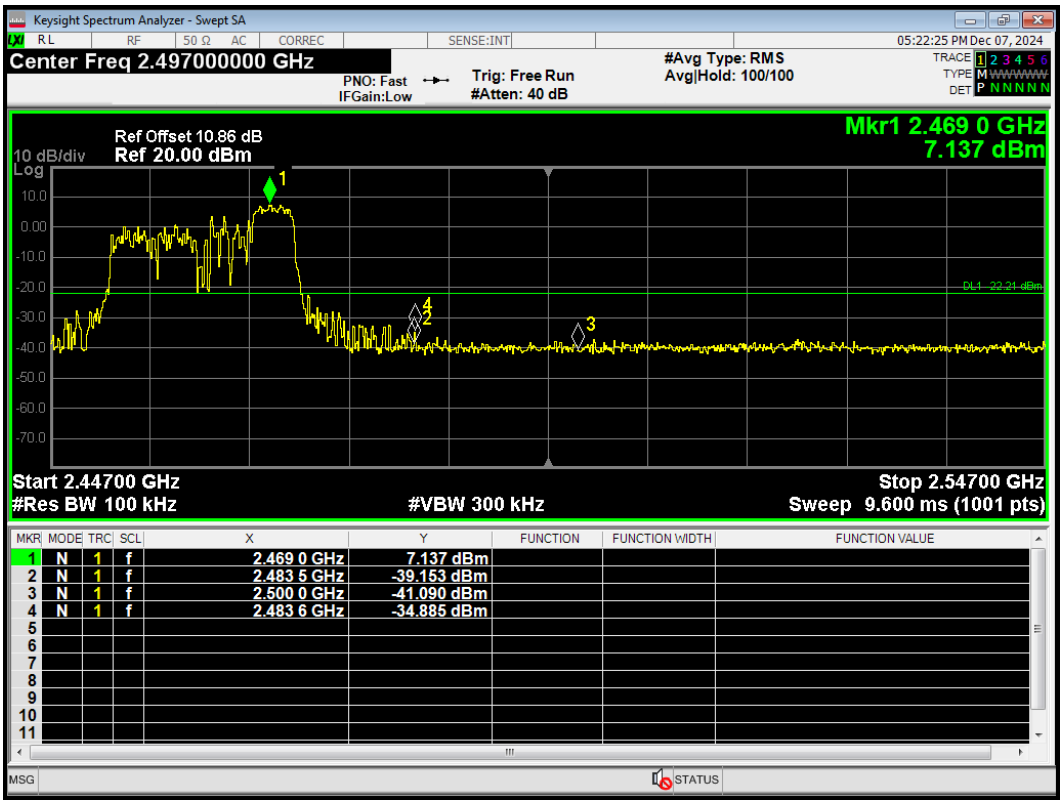
Band Edge 802.11ax(HE20) 52T 2462MHz Ref



Band Edge 802.11ax(HE20) 52T 2462MHz Emission



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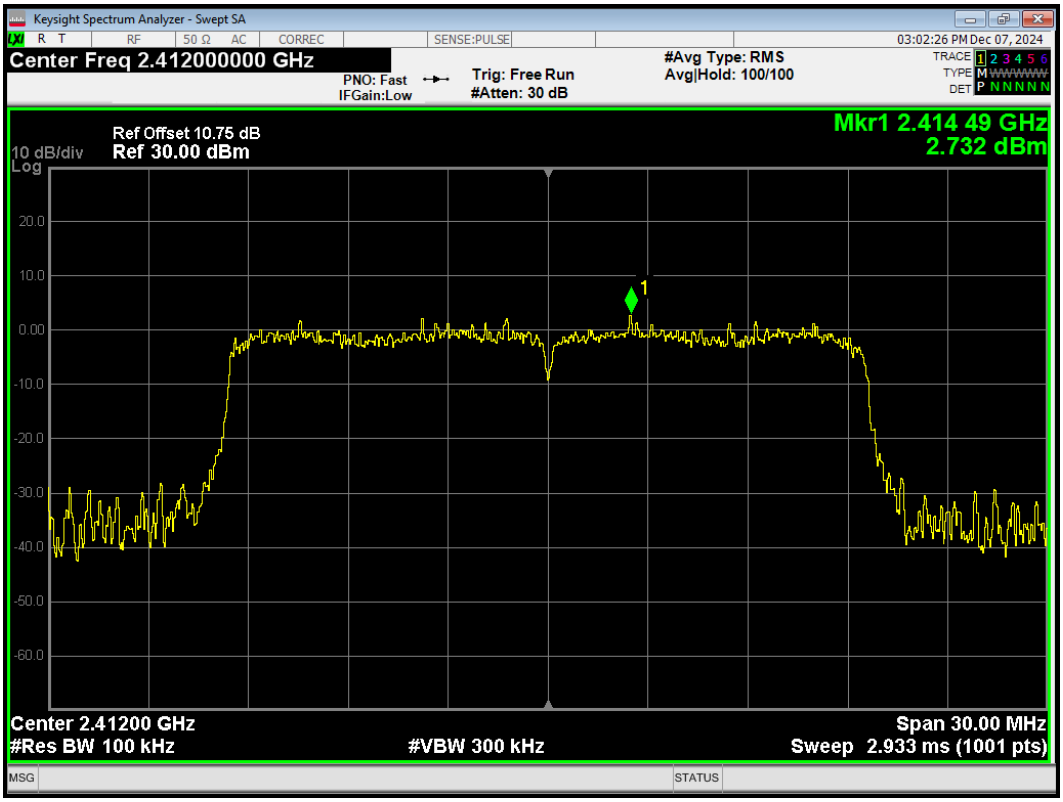
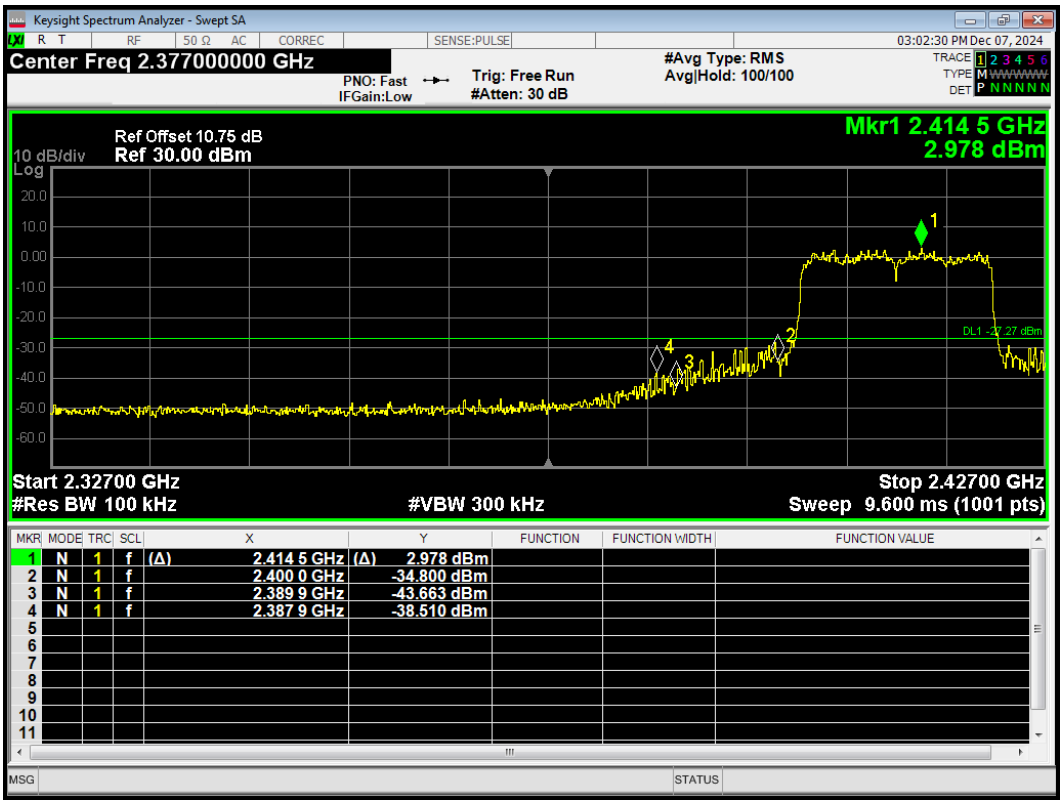
Band Edge 802.11ax(HE20) 242T 2412MHz Ref



Band Edge 802.11ax(HE20) 242T 2412MHz Emission



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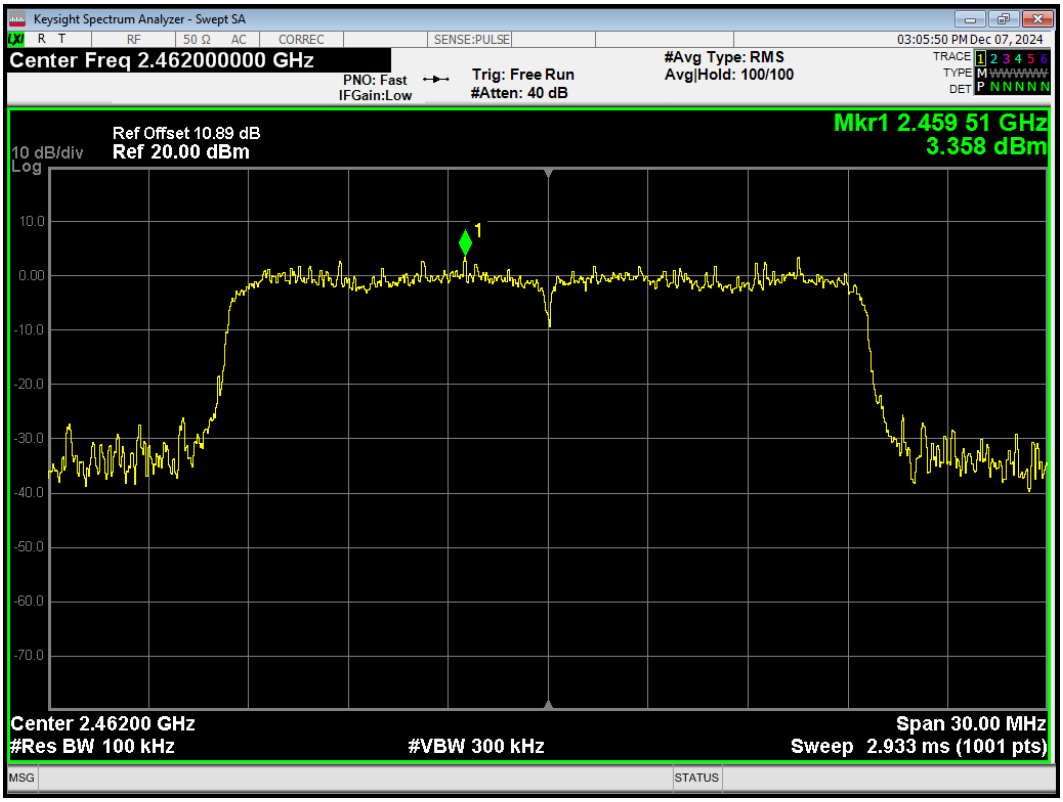
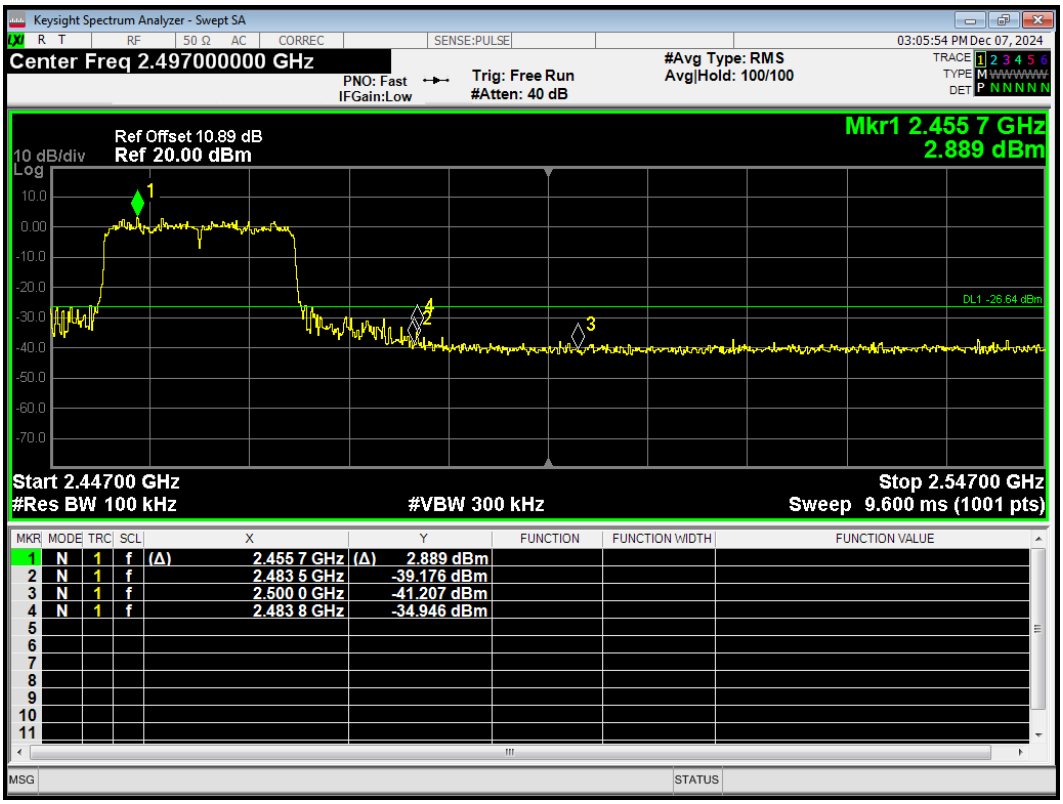
Band Edge 802.11ax(HE20) 242T 2462MHz Ref



Band Edge 802.11ax(HE20) 242T 2462MHz Emission



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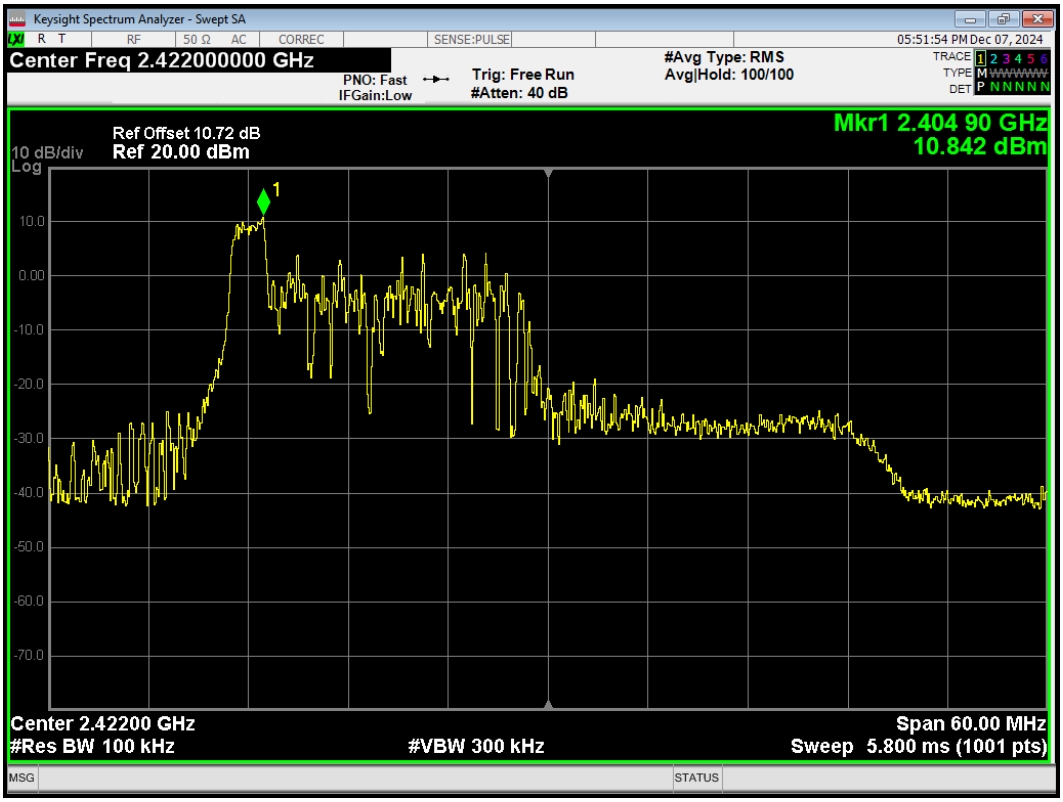
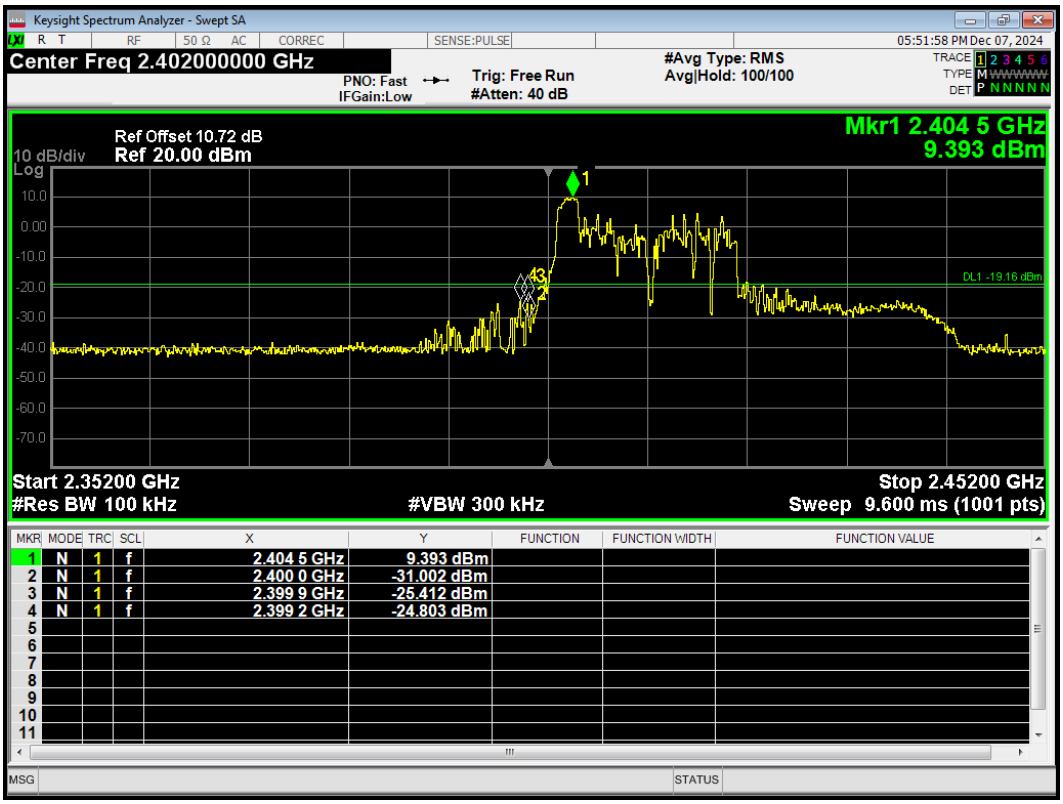
Band Edge 802.11ax(HE40) 26T 2422MHz Ref



Band Edge 802.11ax(HE40) 26T 2422MHz Emission



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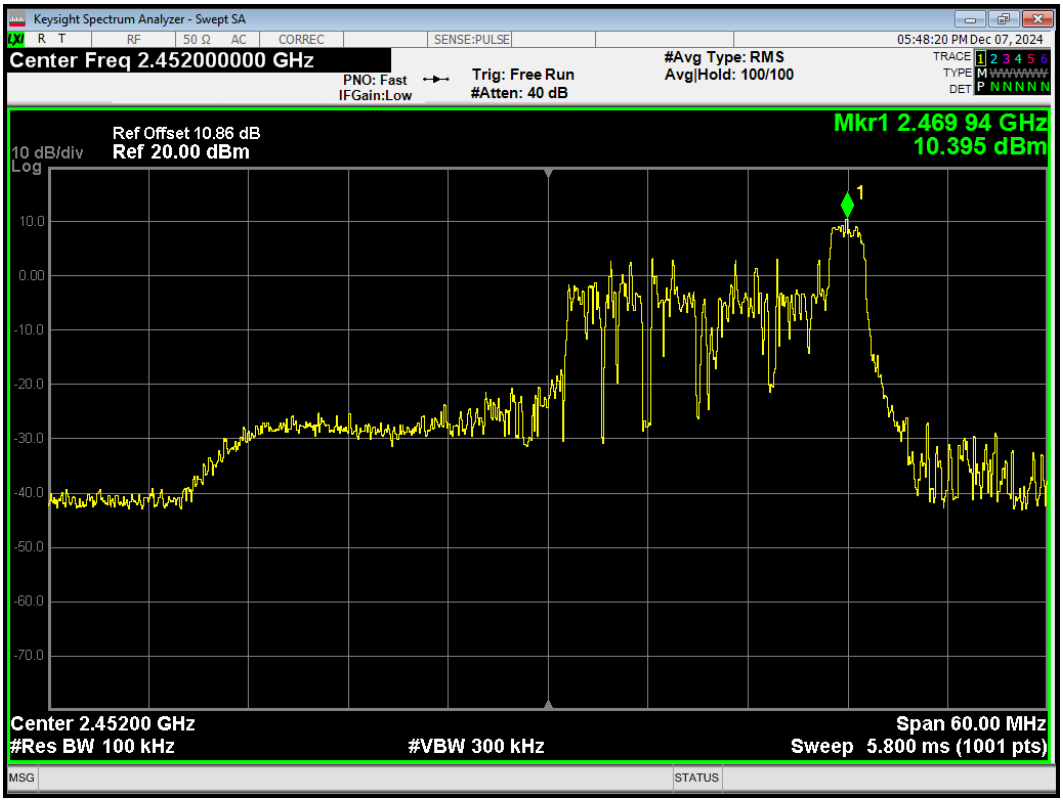
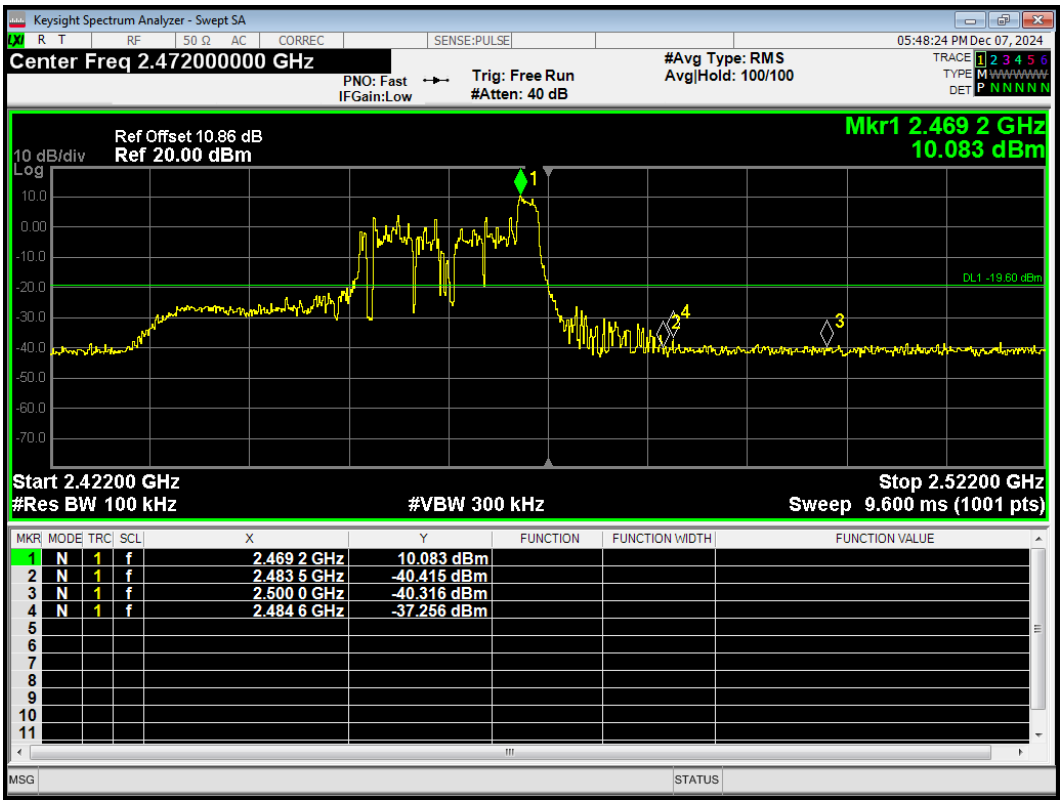
Band Edge 802.11ax(HE40) 26T 2452MHz Ref



Band Edge 802.11ax(HE40) 26T 2452MHz Emission



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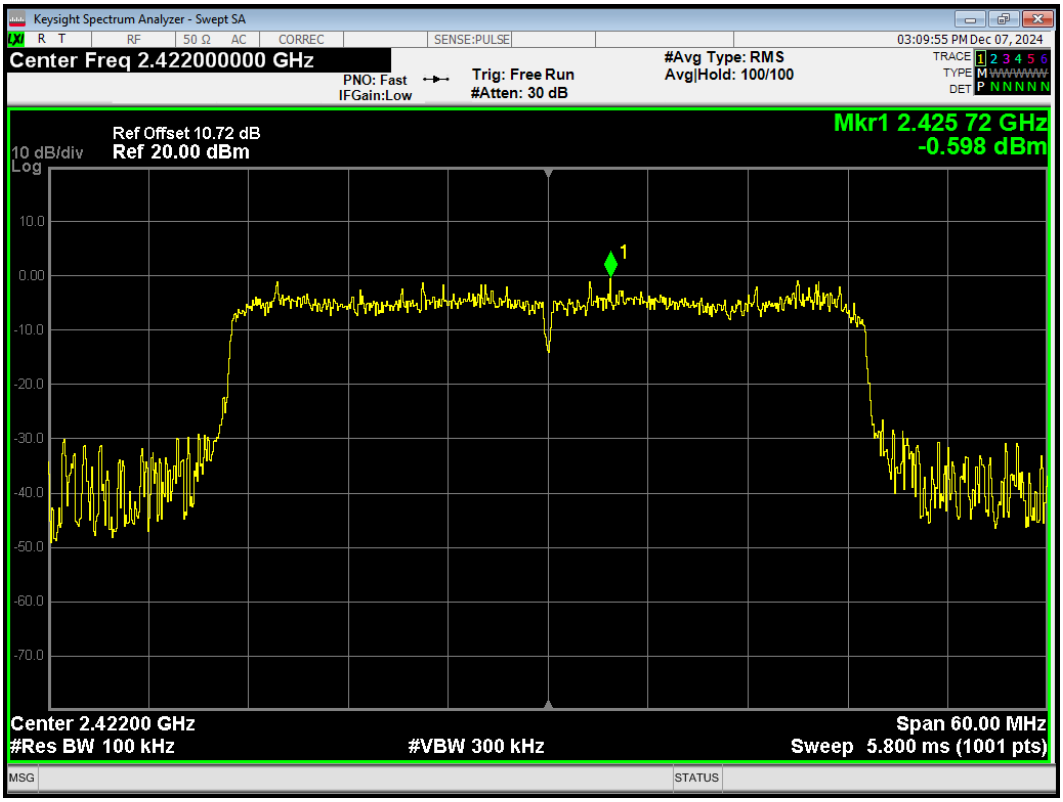
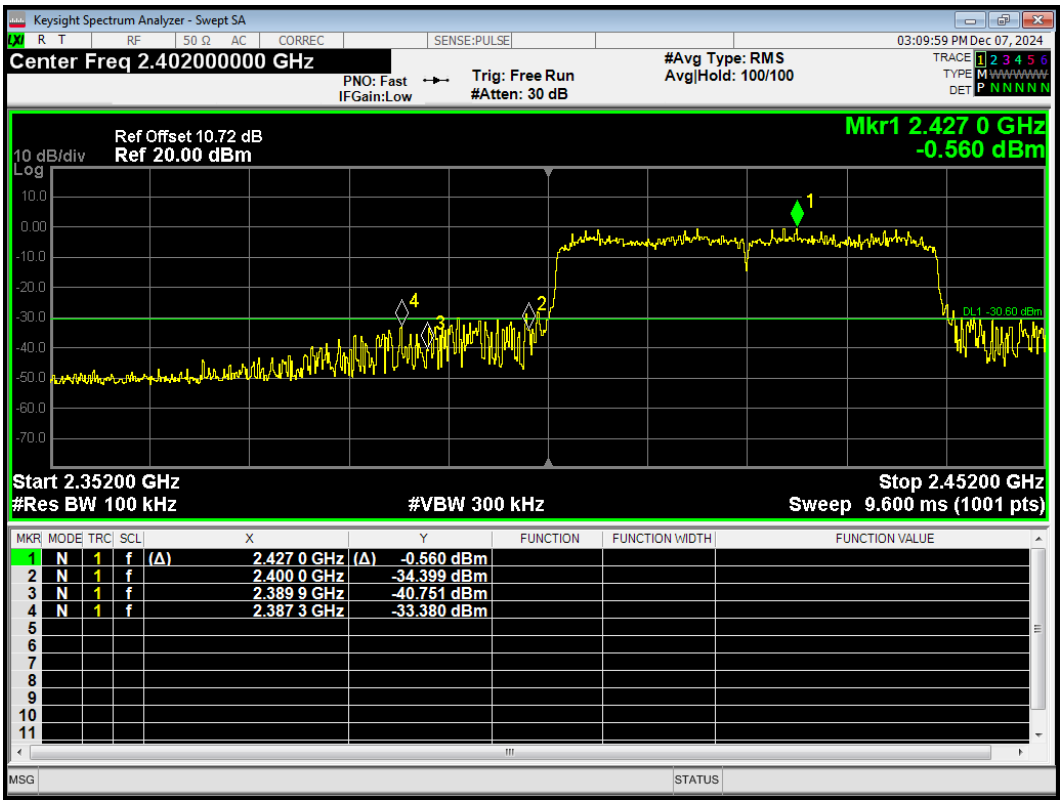
Band Edge 802.11ax(HE40) 484T 2422MHz Ref



Band Edge 802.11ax(HE40) 484T 2422MHz Emission



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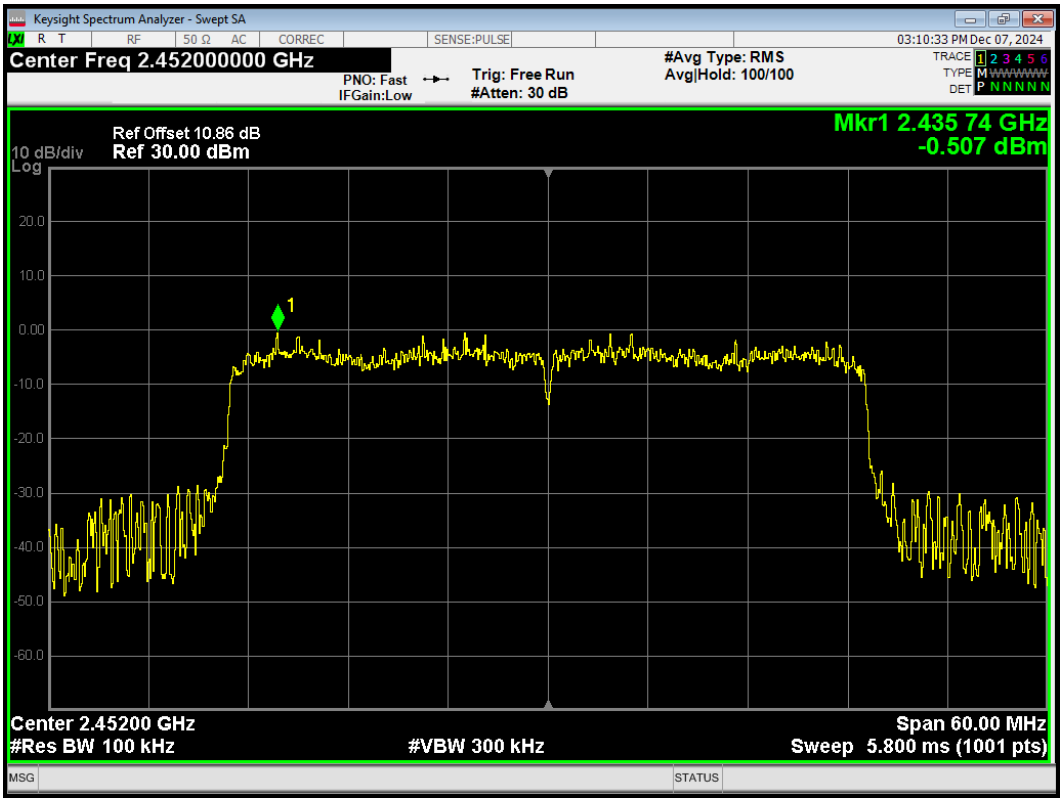
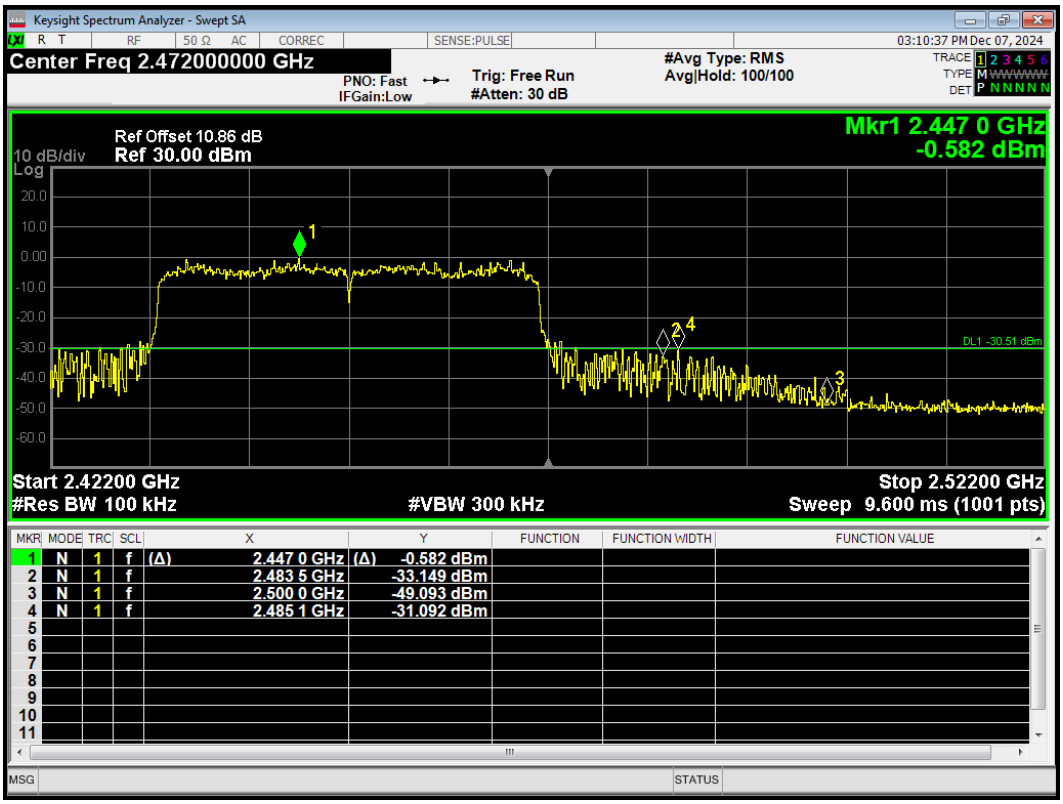
Band Edge 802.11ax(HE40) 484T 2452MHz Ref



Band Edge 802.11ax(HE40) 484T 2452MHz Emission



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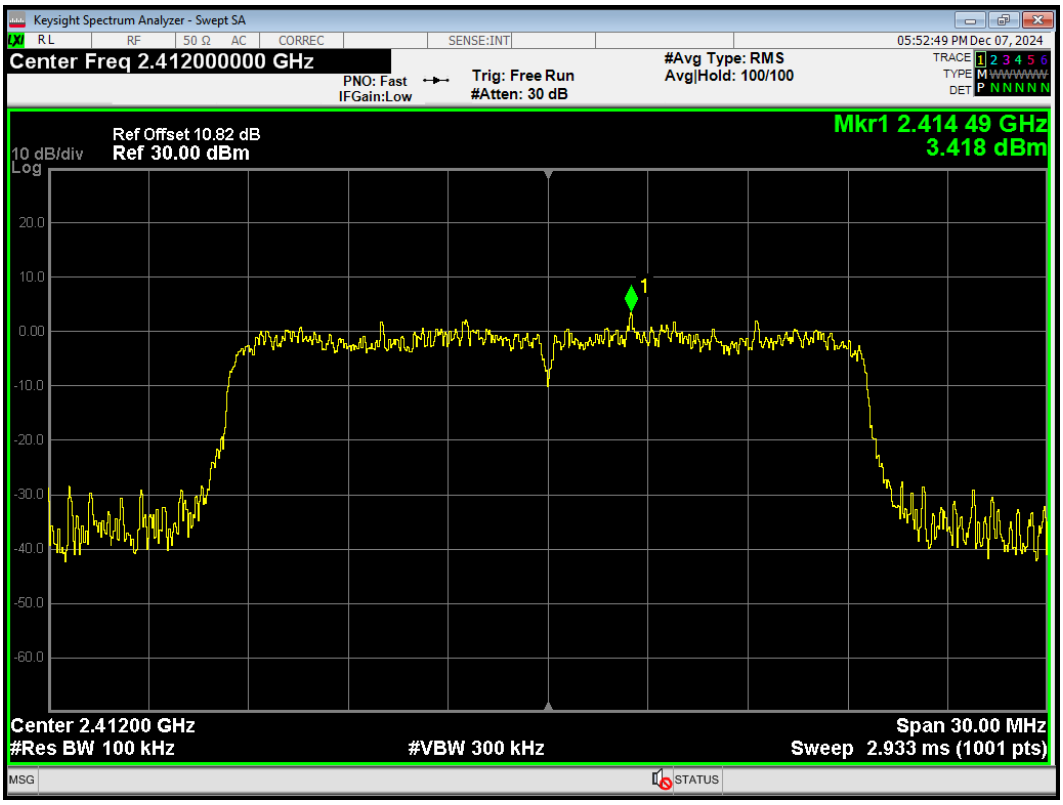
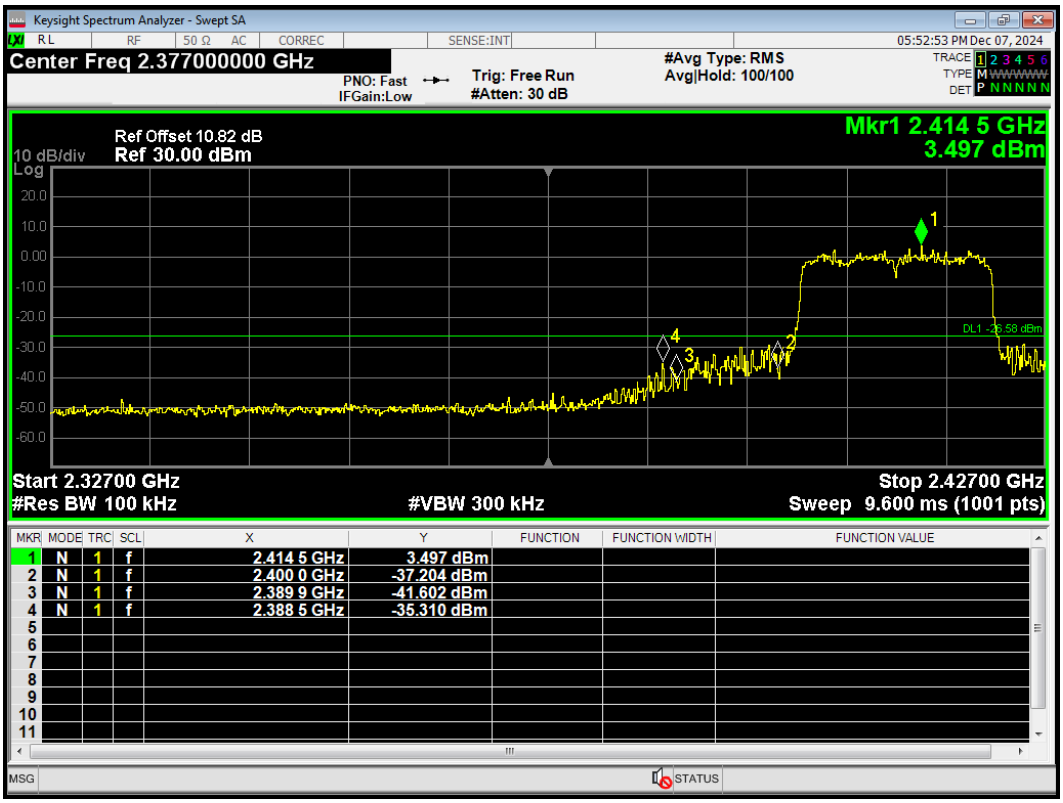
ERSU Mode

Band Edge 802.11ax(HE20) 242T 2412MHz Ref



Band Edge 802.11ax(HE20) 242T 2412MHz Emission



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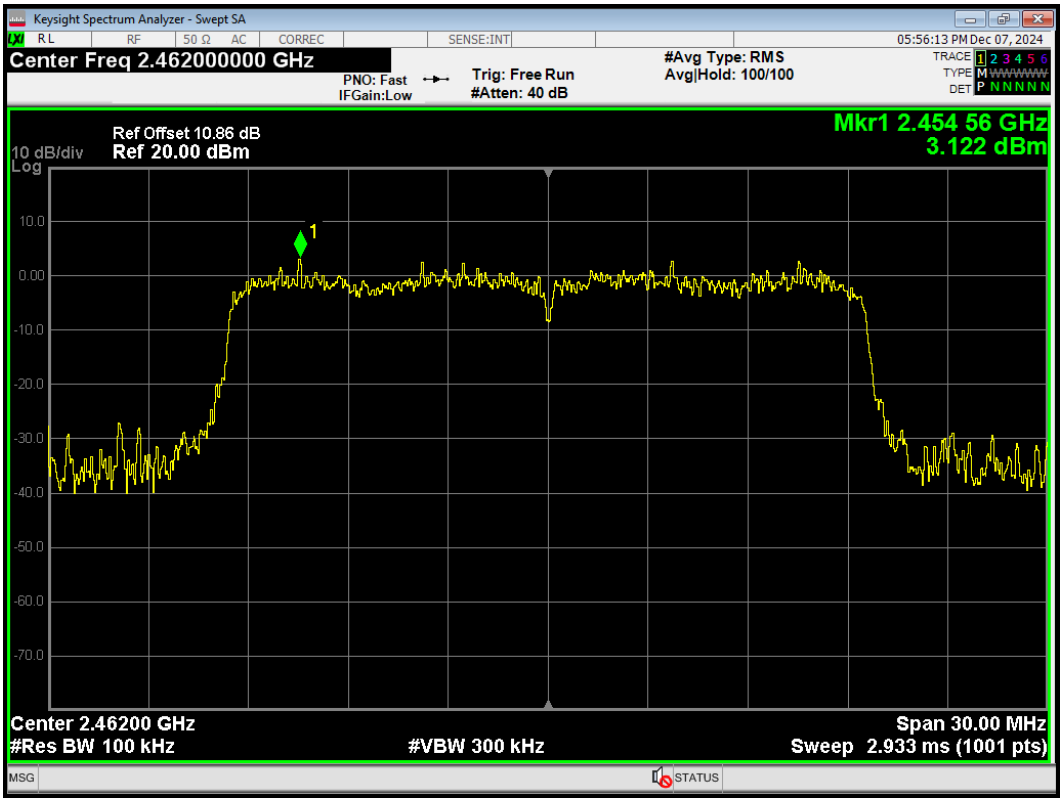
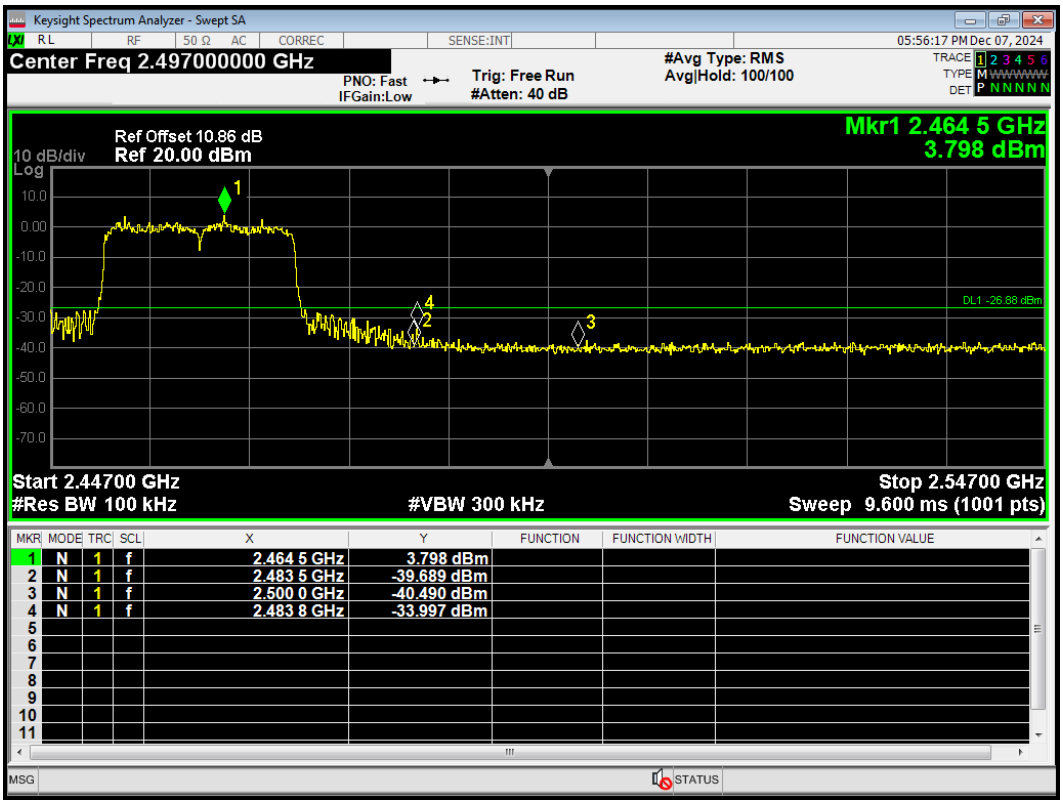
Band Edge 802.11ax(HE20) 242T 2462MHz Ref



Band Edge 802.11ax(HE20) 242T 2462MHz Emission



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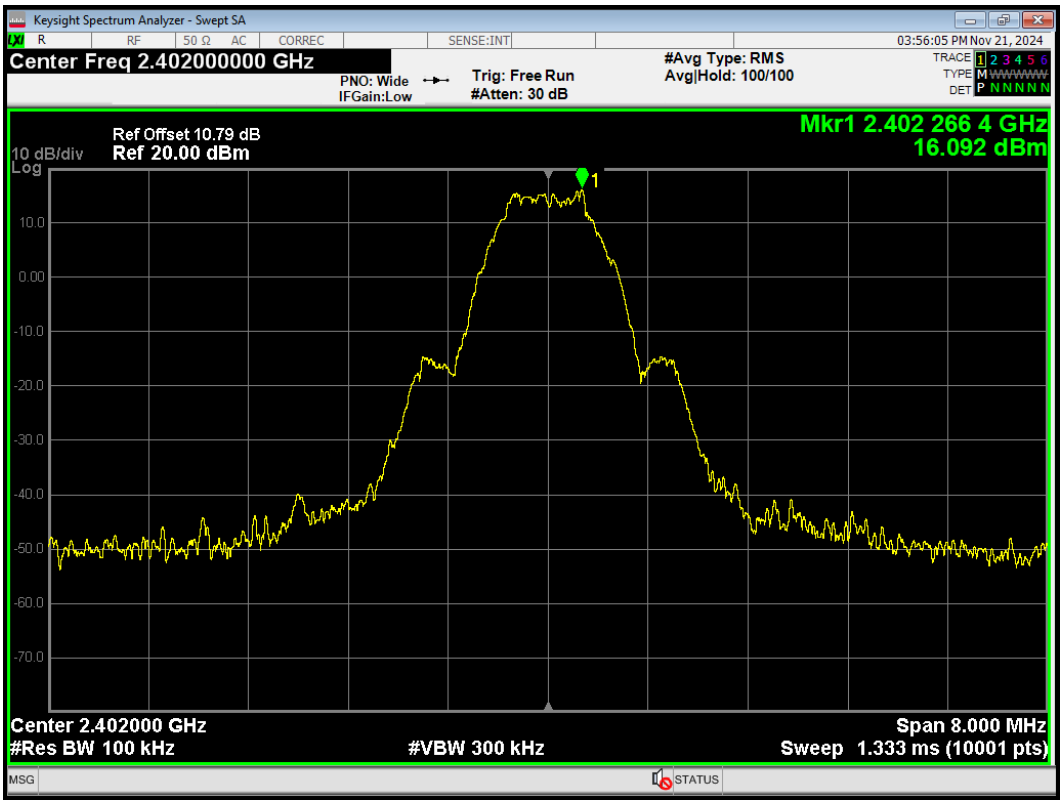
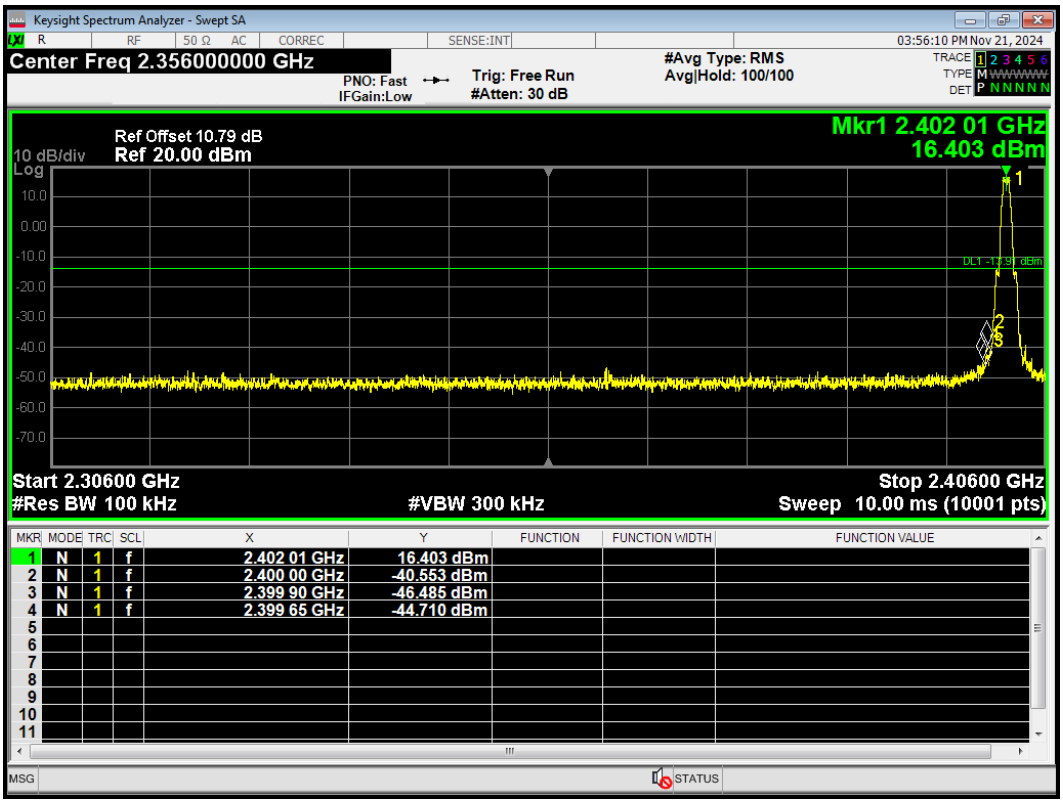
Bluetooth LE

Band Edge Bluetooth LE (1M) 2402MHz Ref



Band Edge Bluetooth LE (1M) 2402MHz Emission



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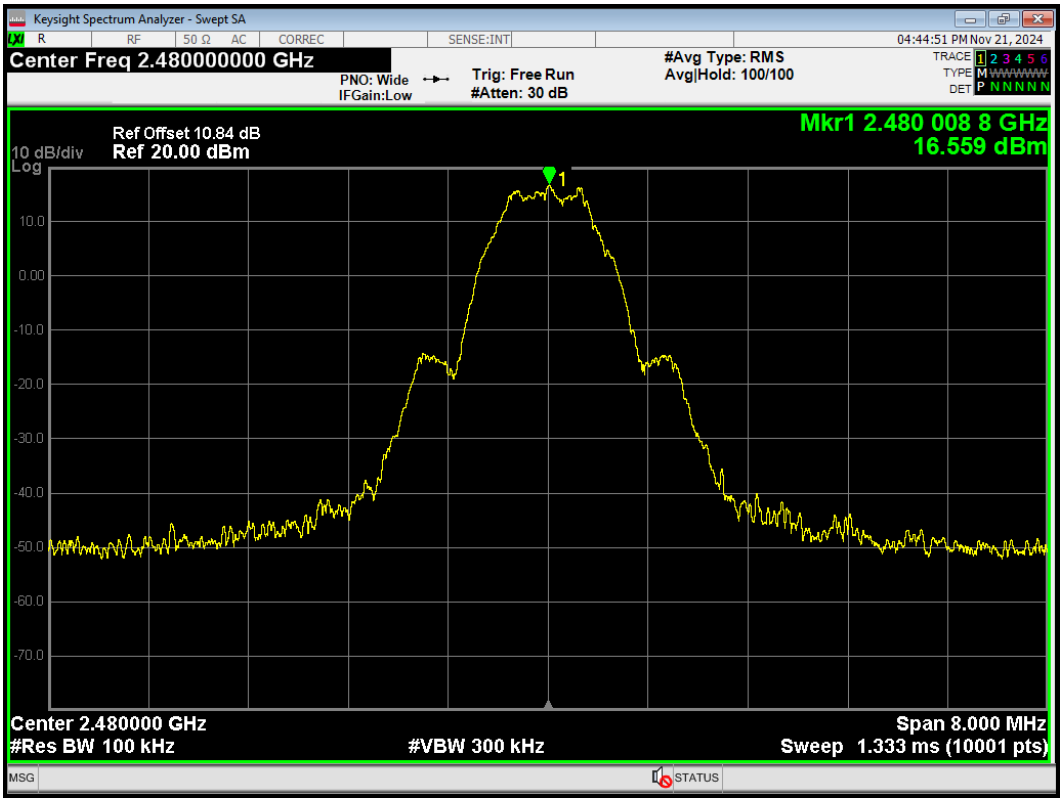
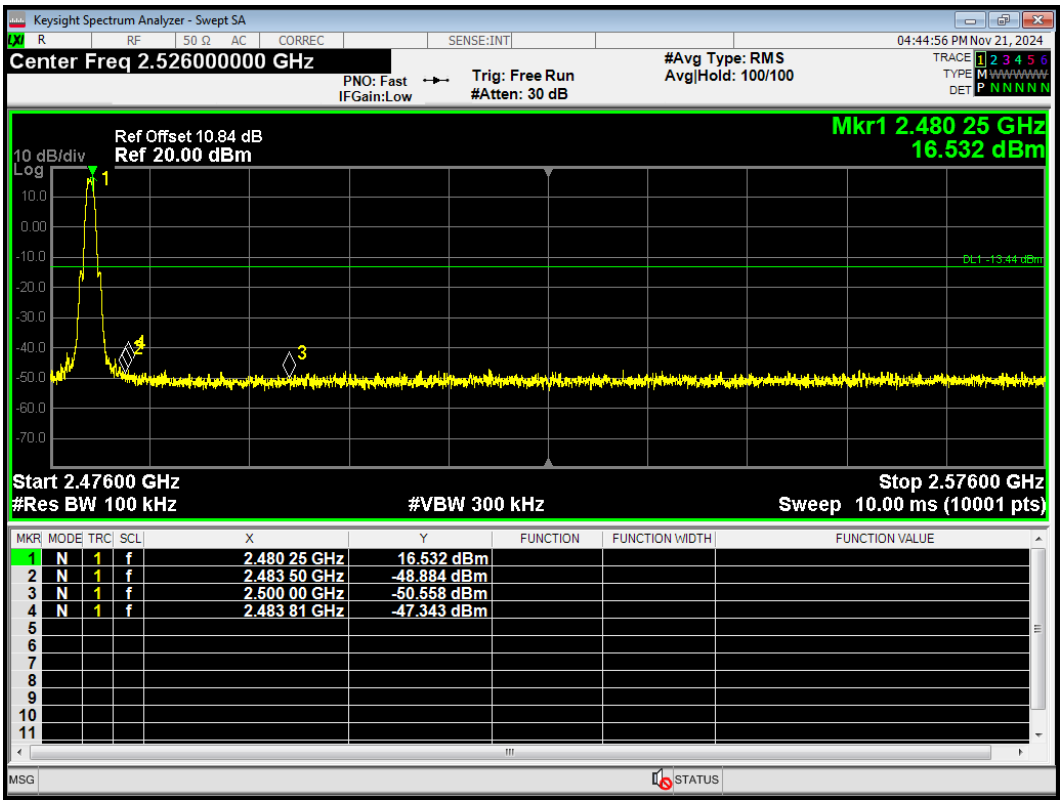
Band Edge Bluetooth LE (1M) 2480MHz Ref



Band Edge Bluetooth LE (1M) 2480MHz Emission



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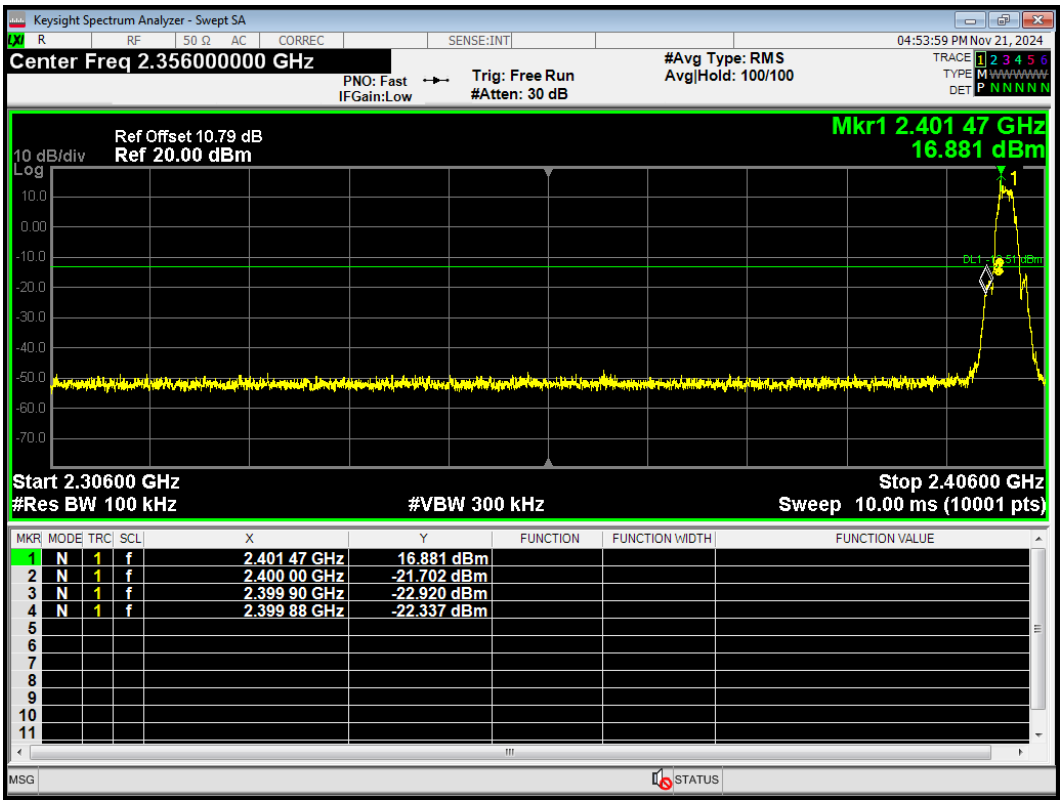
Band Edge Bluetooth LE (2M) 2402MHz Ref

Band Edge Bluetooth LE (2M) 2402MHz Emission



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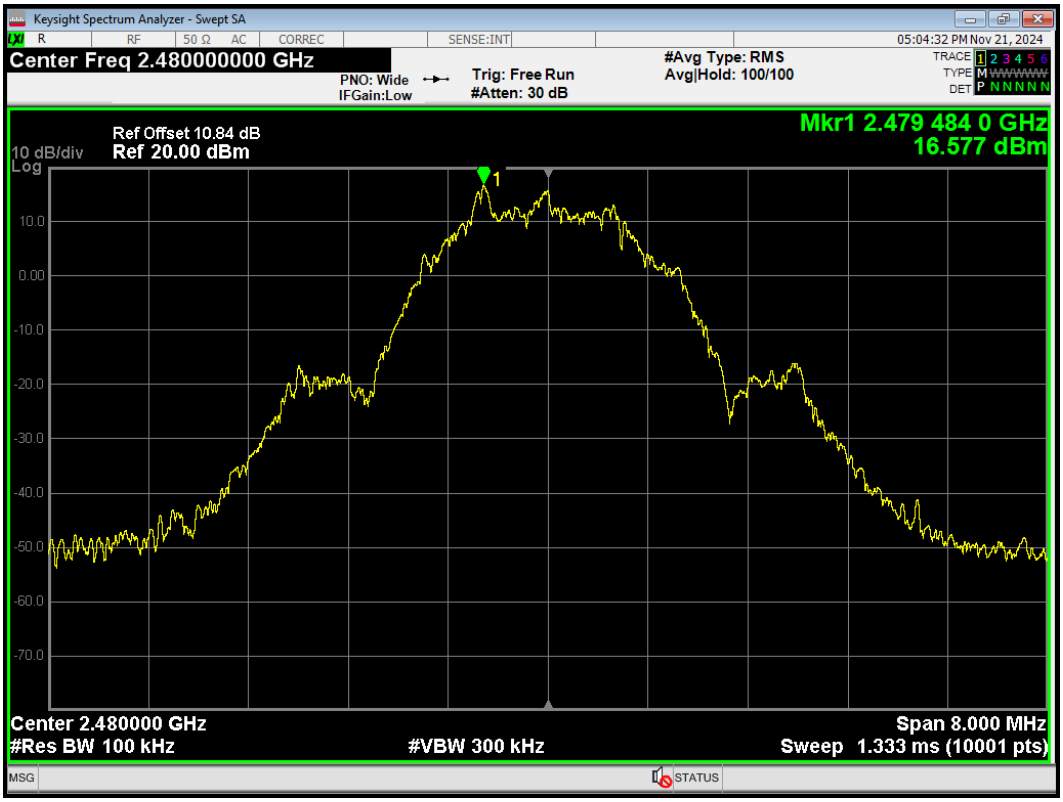
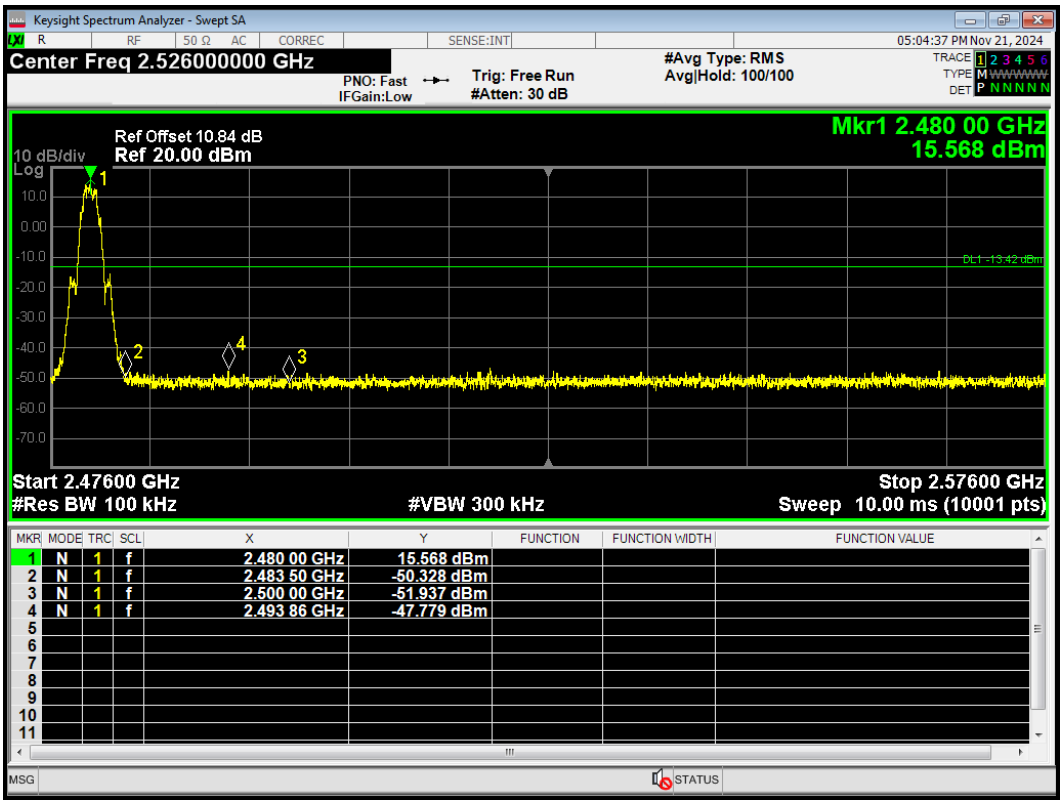
Band Edge Bluetooth LE (2M) 2480MHz Ref



Band Edge Bluetooth LE (2M) 2480MHz Emission



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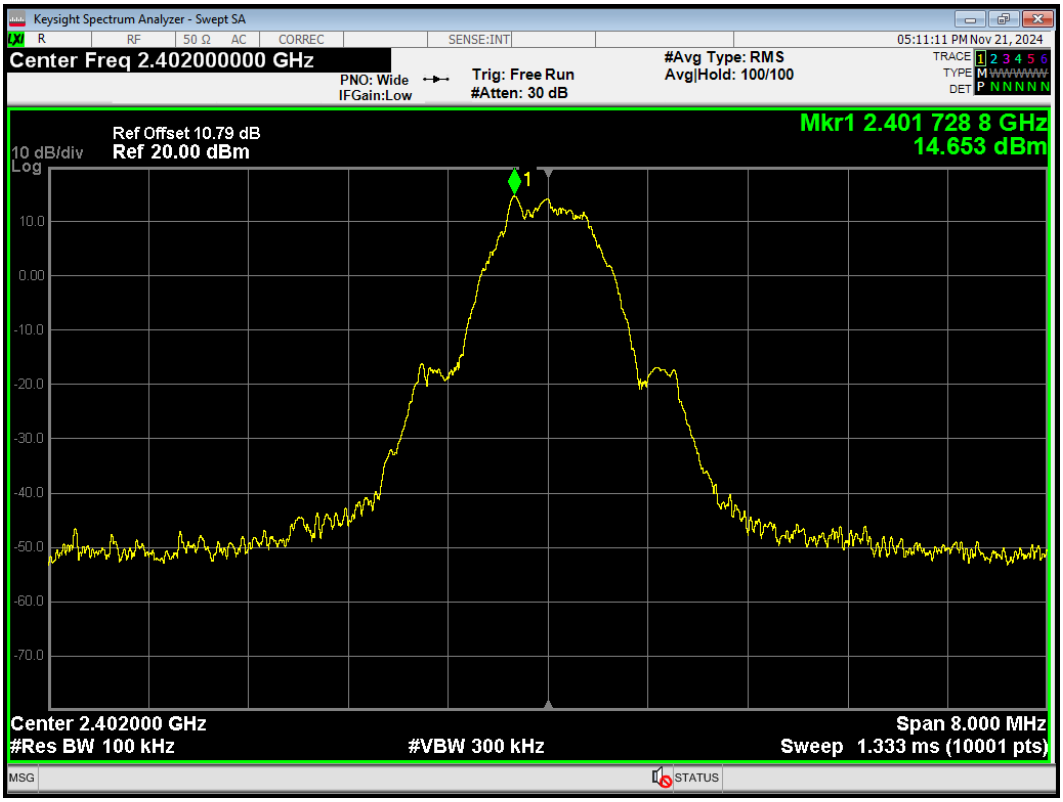
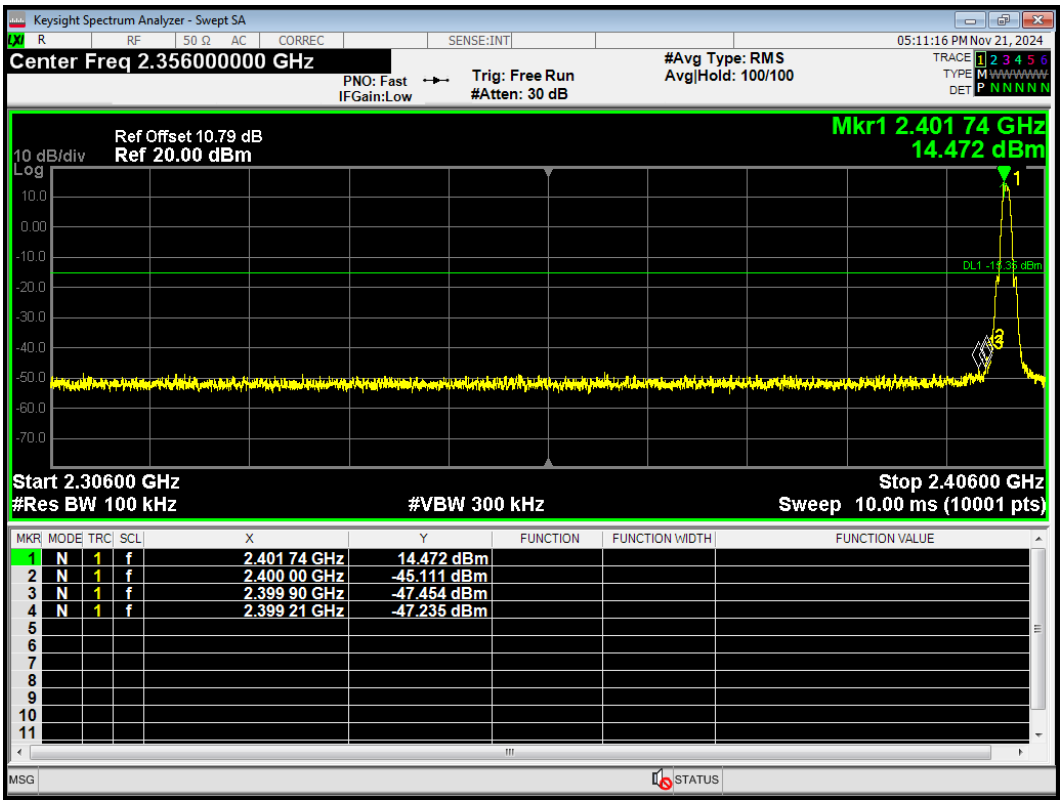
Band Edge Bluetooth LE (S=2) 2402MHz Ref



Band Edge Bluetooth LE (S=2) 2402MHz Emission



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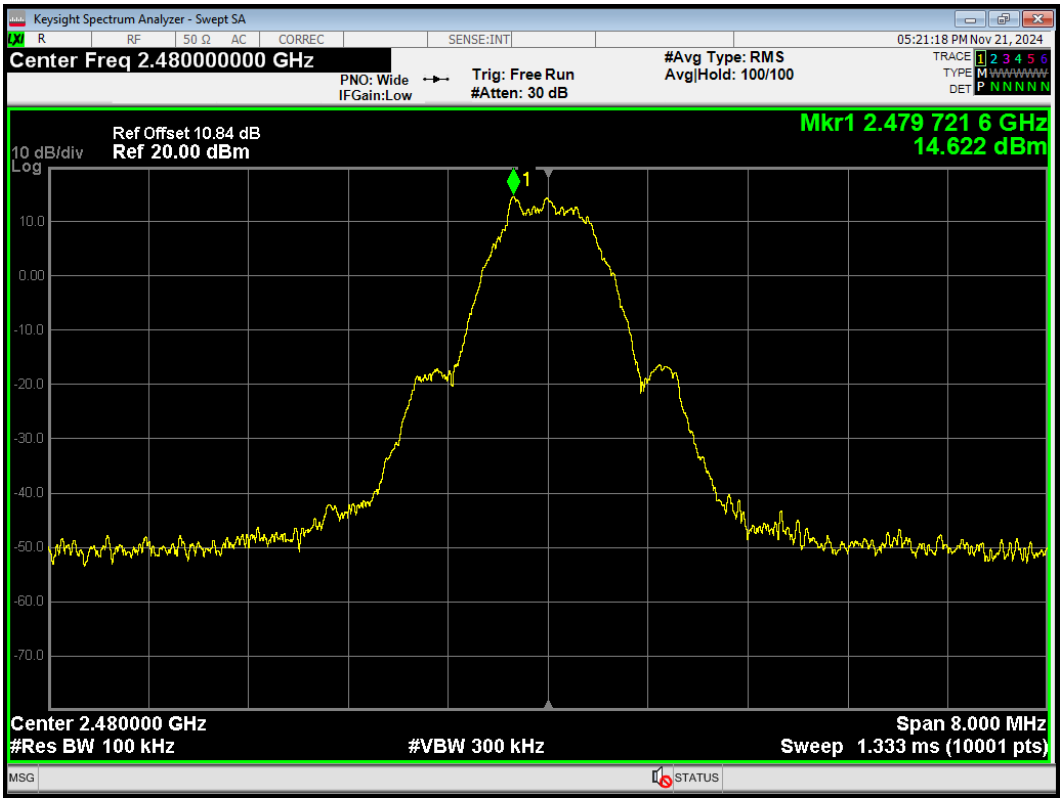
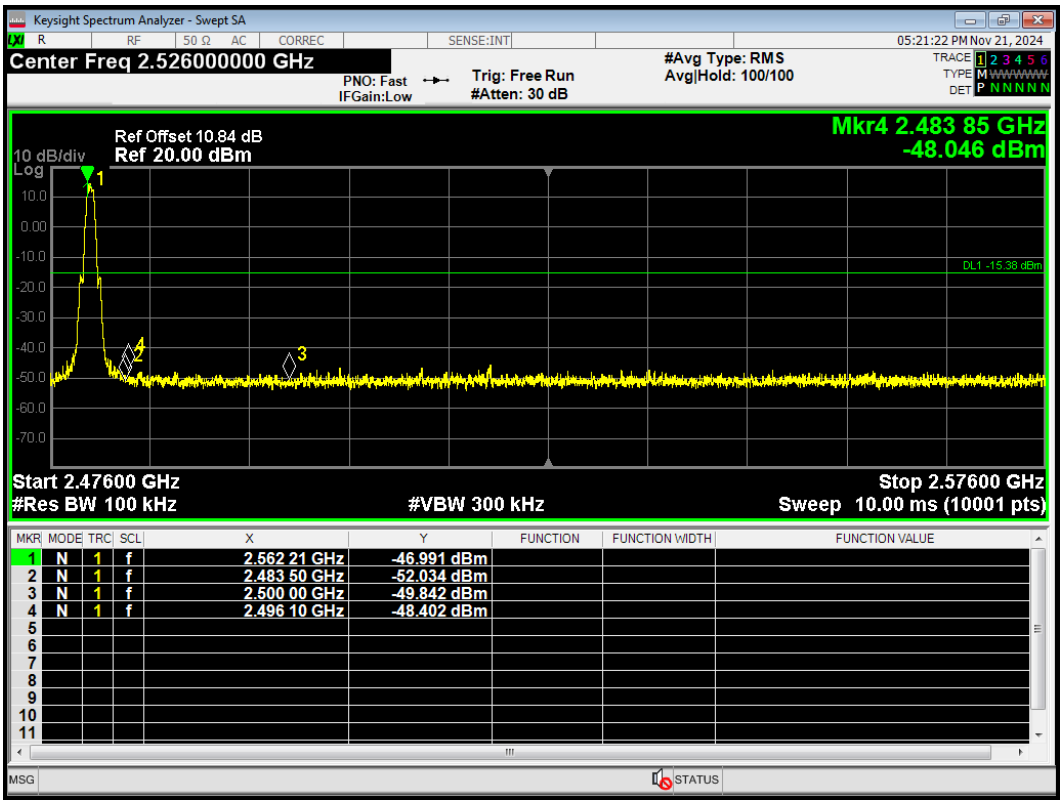
Band Edge Bluetooth LE (S=2) 2480MHz Ref



Band Edge Bluetooth LE (S=2) 2480MHz Emission



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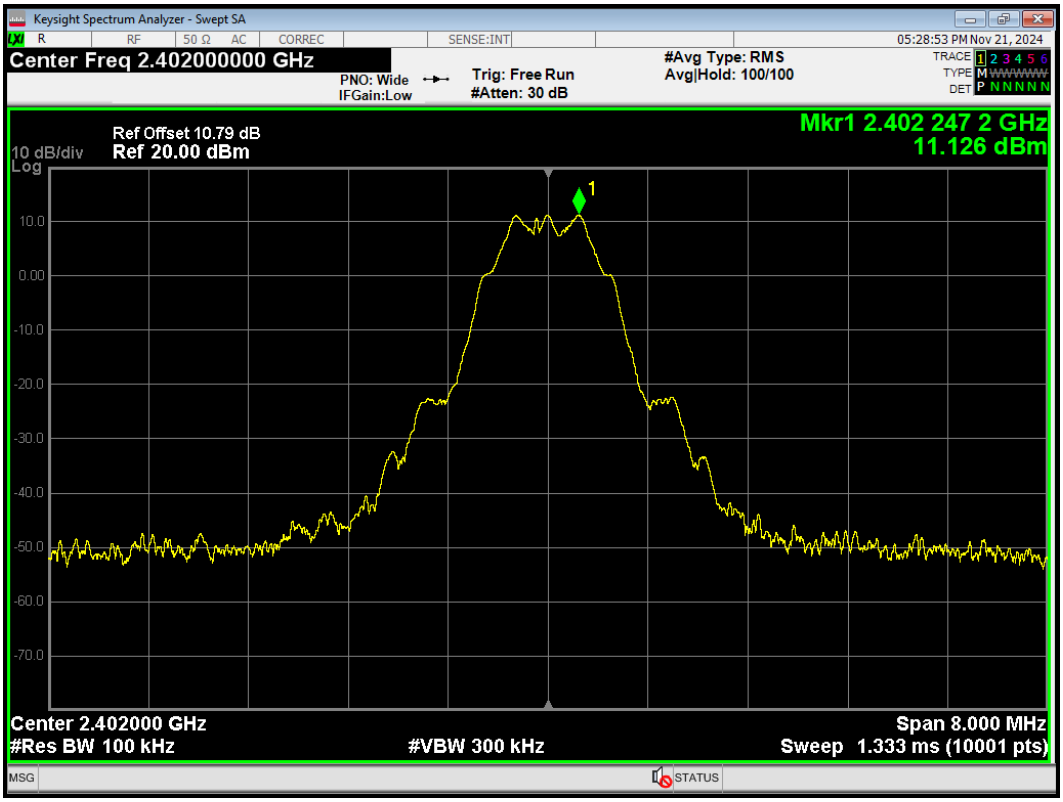
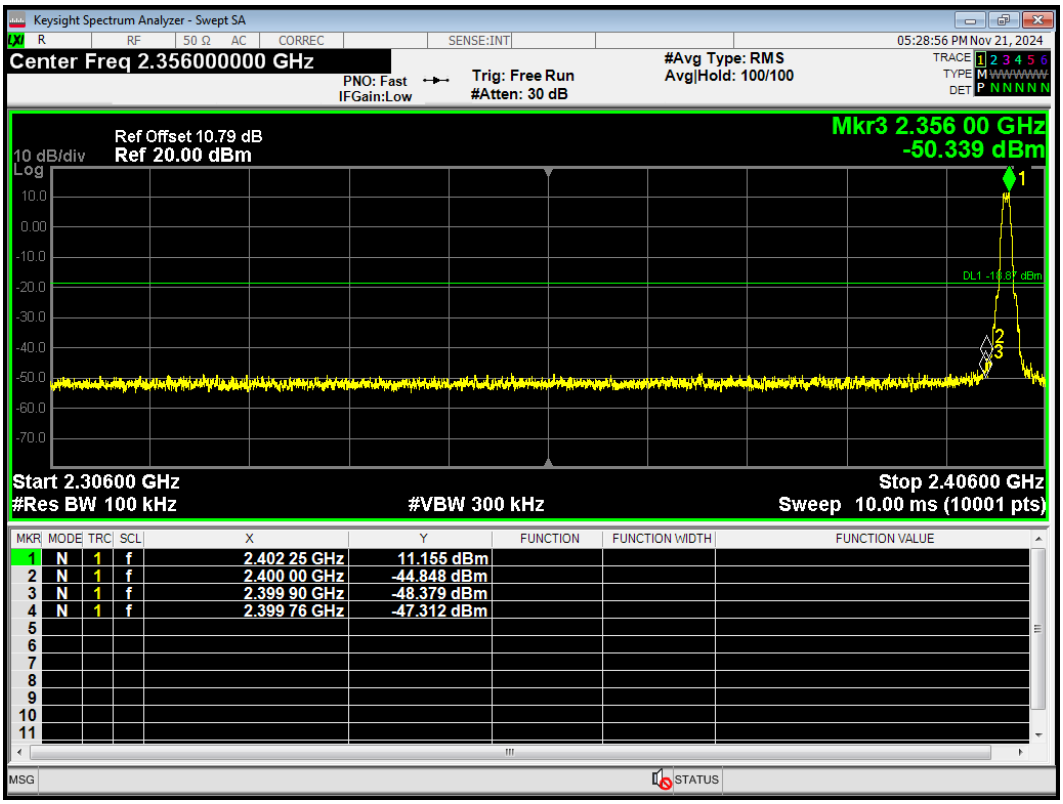
Band Edge Bluetooth LE (S=8) 2402MHz Ref



Band Edge Bluetooth LE (S=8) 2402MHz Emission



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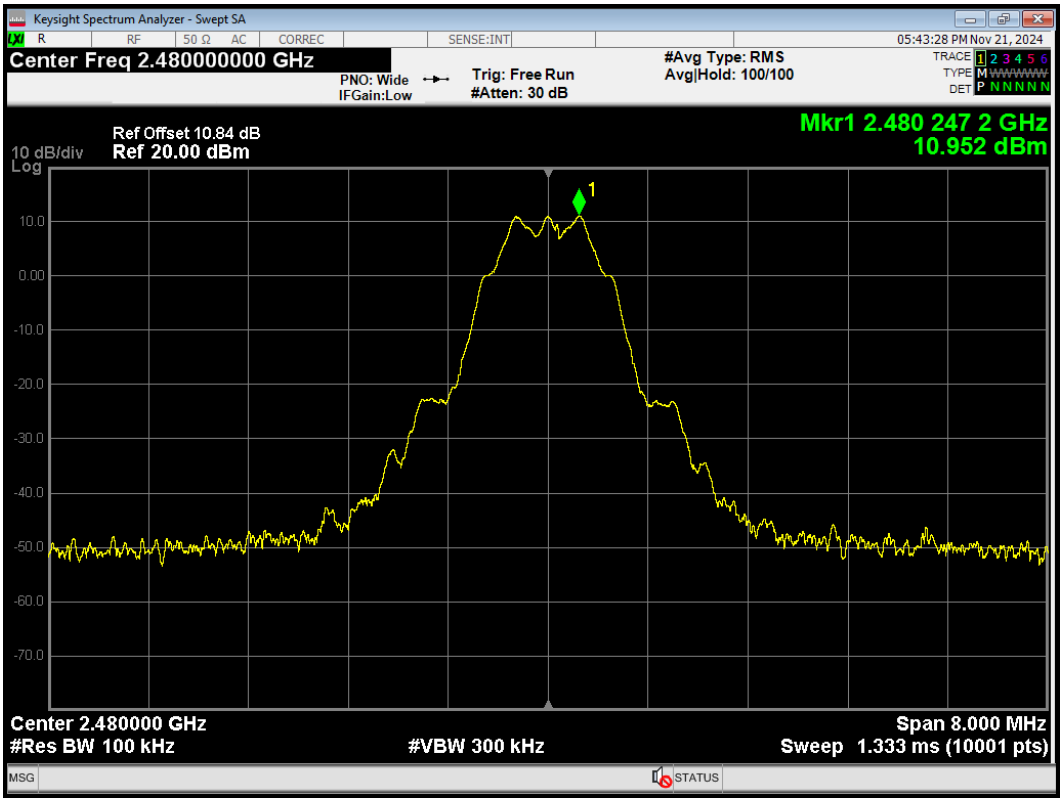
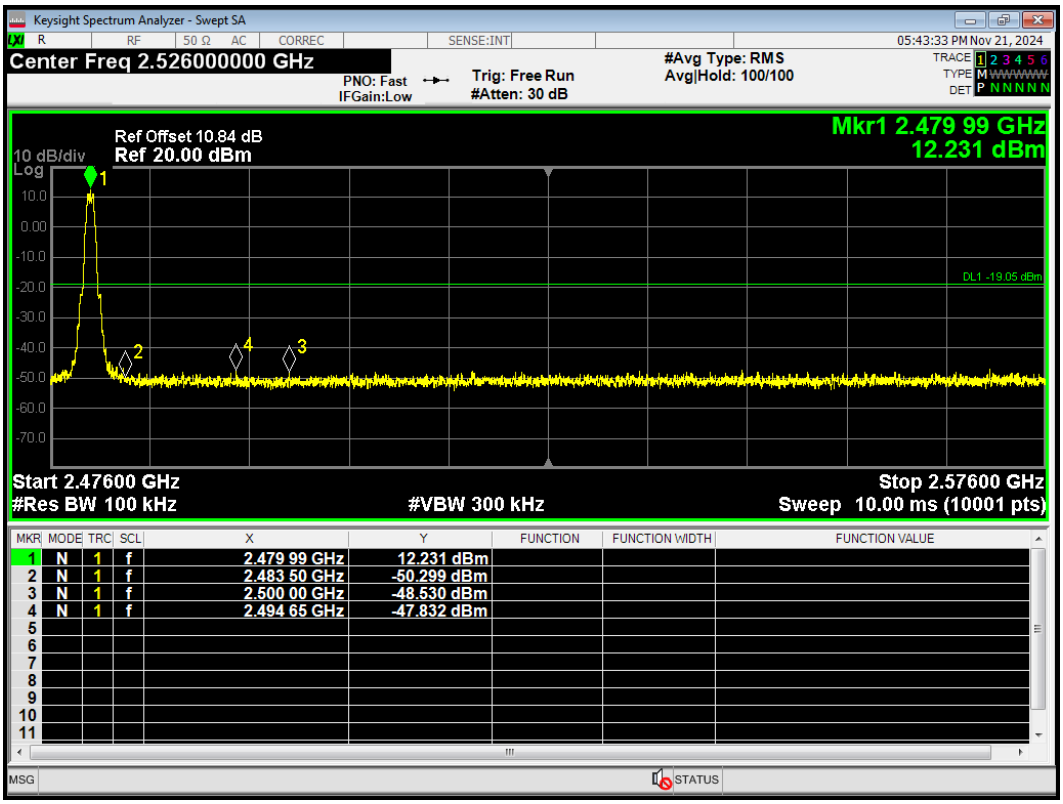
Band Edge Bluetooth LE (S=8) 2480MHz Ref



Band Edge Bluetooth LE (S=8) 2480MHz Emission



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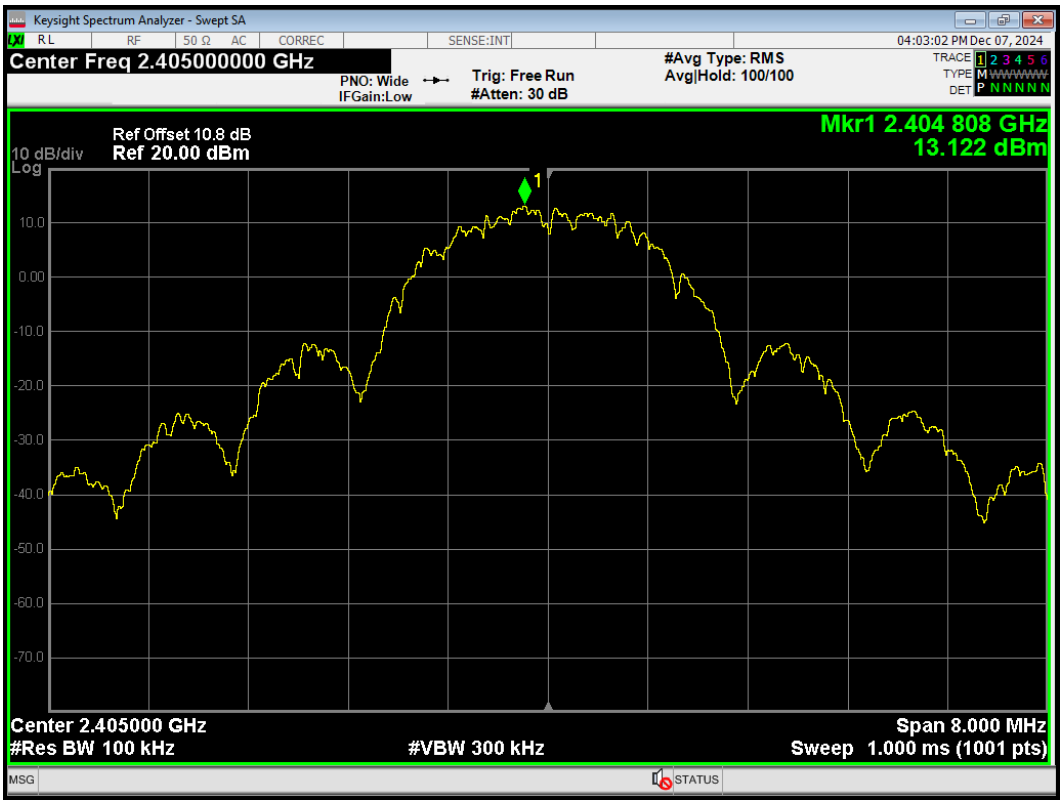
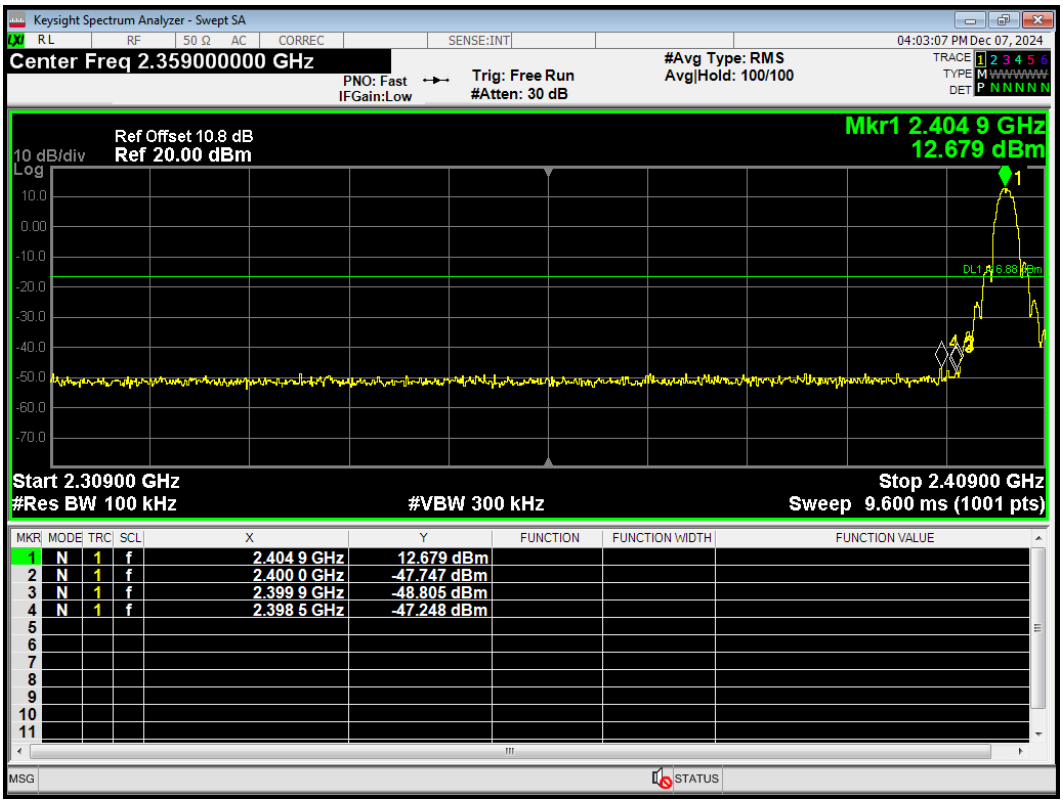
Thread

Band Edge Thread 2405MHz Ref



Band Edge Thread 2405MHz Emission



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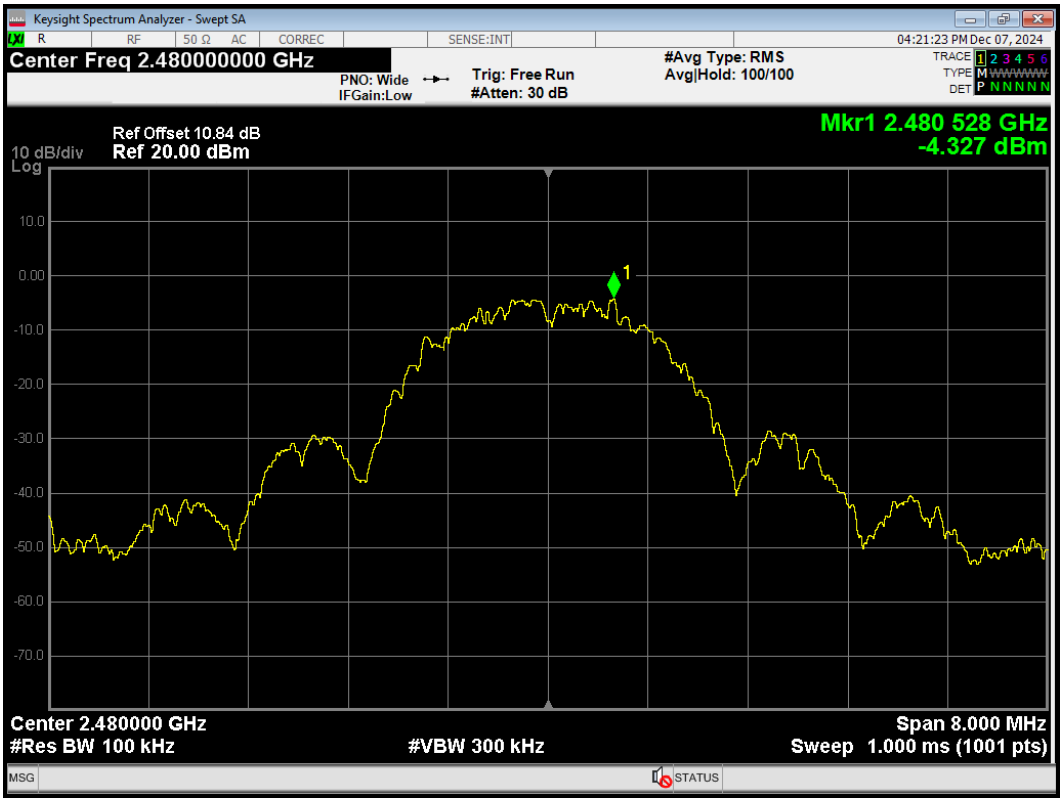
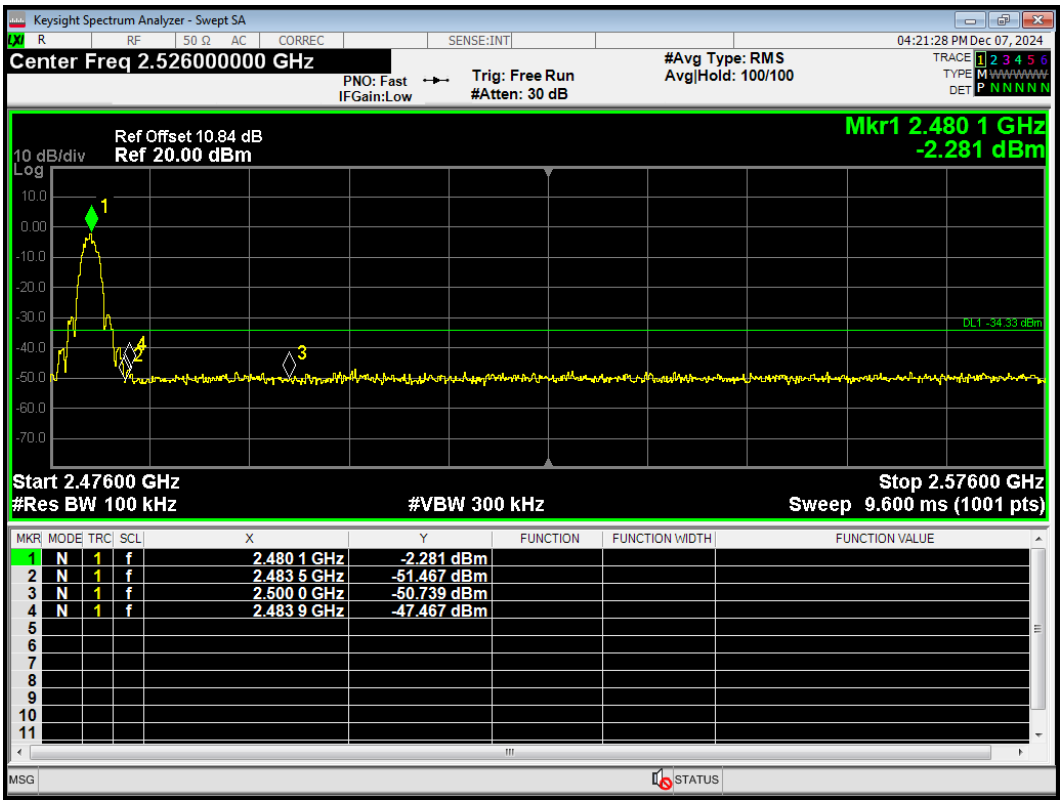
Band Edge Thread 2480MHz Ref



Band Edge Thread 2480MHz Emission



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5.4. Power Spectral Density

Ambient Condition

Temperature	Relative humidity
15°C ~ 35°C	20% ~ 80%

Method of Measurement

During the process of the testing, The EUT was connected to Spectrum Analyzer with a known loss. The EUT is max power transmission with proper modulation.

Method AVGPSD-1 was used for this test.

a) Set instrument center frequency to DTS channel center frequency

b) Set span to at least 1.5 times the OBW

c) Set RBW to:3kHz≤RBW≤100kHz

d) Set VBW≥[3x RBW]

e) Detector=power averaging (rms) or sample detector (when rms not available)

f) Ensure that the number of measurement points in the sweep ≥ [2 X span/RBW]

g) Sweep time auto couple

h) Employ trace averaging (rms) mode over a minimum of 100 traces

i) Use the peak marker function to determine the maximum amplitude level.

j) If the measured value exceeds requirement, then reduce RBW (but no less than 3 kHz) and repeat (note that this may require zooming in on the emission of interest and reducing the span to meet the minimum measurement point requirement as the RBW is reduced)

Method AVGPSD-2 was used for this test.

a) Measure the duty cycle (D)of the transmitter output signal as described in 11.6

b) Set instrument center frequency to DTS channel center frequency

c) Set span to at least 1.5 times the OBW

d) Set RBW to:3kHz≤RBW≤100kHz

e) Set VBW≥[3x RBW]

f) Detector= power averaging (rms) or sample detector (when rms not available)

g) Ensure that the number of measurement points in the sweep ≥ [2 X span/RBW]

h) Sweep time =auto couple

i) Do not use sweep triggering; allow sweep to "free run”

j) Employ trace averaging (rms) mode over a minimum of 100 traces

k) Use the peak marker function to determine the maximum amplitude level

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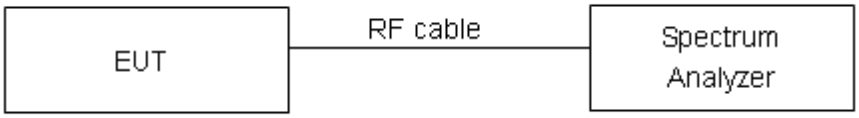
l) Add [10 log(1/ D)], where D is the duty cycle measured in step a), to the measured PSD to compute the average PSD during the actual transmission time

m) If measured value exceeds requirement specified by regulatory agency then reduce RBW (but no less than 3 kHz) and repeat (note that this may require zooming in on the emission of interest and reducing the span to meet the minimum measurement point requirement as the RBW is reduced)

Test setup



Limits

Rule Part 15.247(e) specifies that" For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. ''

Limits	≤ 8 dBm / 3kHz

Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor *k* = 2, *U*= 0.75dB.

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Test Results:

Test Mode	Carrier frequency (MHz)/ Channel	Read Value (dBm / 30kHz)	Power Spectral Density (dBm / 3kHz)	Limit (dBm / 3kHz)	Conclusion
802.11b	2412/CH 1	-6.10	-16.10	8	PASS
	2437/CH 6	-5.95	-15.95	8	PASS
	2462/CH11	-6.17	-16.17	8	PASS
802.11g	2412/CH 1	-7.12	-17.12	8	PASS
	2437/CH 6	-6.66	-16.66	8	PASS
	2462/CH11	-6.16	-16.16	8	PASS
802.11n HT20	2412/CH 1	-9.80	-19.80	8	PASS
	2437/CH 6	-9.71	-19.71	8	PASS
	2462/CH11	-9.33	-19.33	8	PASS
802.11n HT40	2422/CH3	-12.12	-22.02	8	PASS
	2437/CH6	-12.22	-22.12	8	PASS
	2452/CH9	-12.29	-22.19	8	PASS
802.11ax HE20	2412/CH 1	-10.16	-20.16	8	PASS
	2437/CH 6	-10.69	-20.69	8	PASS
	2462/CH11	-9.85	-19.85	8	PASS
802.11ax HE40	2422/CH3	-12.89	-22.77	8	PASS
	2437/CH6	-12.57	-22.45	8	PASS
	2452/CH9	-12.42	-22.30	8	PASS
Note: Power Spectral Density (dBm/3kHz) =Read Value+Duty cycle correction factor + 10*log10(3/30)					

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TB Mode

Network Standards	Carrier frequency (MHz)/ Channel	RU Index	Read Value (dBm / 30kHz)	Power Spectral Density (dBm / 3kHz)	Limit (dBm / 3kHz)	Conclusion
802.11ax HE20 26-Tones	2412/CH 1	0	-2.40	-12.19	8	PASS
	2437/CH 6	4	-2.68	-12.47	8	PASS
	2462/CH11	8	-1.93	-11.72	8	PASS
802.11ax HE20 52-Tones	2412/CH 1	37	-5.32	-15.11	8	PASS
	2437/CH 6	38	-4.48	-14.27	8	PASS
	2462/CH11	40	-4.89	-14.68	8	PASS
802.11ax HE20 106-Tones	2412/CH 1	53	-8.1	-17.89	8	PASS
	2437/CH 6	53	-8.03	-17.82	8	PASS
	2462/CH11	54	-7.57	-17.36	8	PASS
802.11ax HE20 242-Tones	2412/CH 1	61	-11.05	-20.84	8	PASS
	2462/CH11	61	-11.13	-20.92	8	PASS
802.11ax HE40 26-Tones	2422/CH3	0	-2.00	-11.79	8	PASS
	2452/CH9	17	-2.04	-11.83	8	PASS
802.11ax HE40 484-Tones	2422/CH3	65	-13.82	-23.61	8	PASS
	2452/CH9	65	-13.95	-23.74	8	PASS
Note: Power Spectral Density (dBm/3kHz) =Read Value+Duty cycle correction factor + 10*log10(3/30)						

ERSU Mode

Network Standards	Carrier frequency (MHz)/ Channel	RU Index	Read Value (dBm / 30kHz)	Power Spectral Density (dBm / 3kHz)	Limit (dBm / 3kHz)	Conclusion
802.11ax HE20 242-Tones	2412/CH 1	61	-11.04	-20.83	8	PASS
	2437/CH 6	61	-11.06	-20.85	8	PASS
	2462/CH11	61	-10.87	-20.66	8	PASS
Note: Power Spectral Density (dBm/3kHz) =Read Value+Duty cycle correction factor + 10*log10(3/30)						

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Test Mode	Carrier frequency (MHz)/ Channel	Read Value (dBm / 3kHz)	Power Spectral Density (dBm / 3kHz)	Limit (dBm / 3kHz)	Conclusion
Bluetooth (Low Energy) (1M)	2402/CH0	-3.01	-0.94	8	PASS
	2440/CH19	-2.65	-0.58	8	PASS
	2480/CH39	-3.03	-0.96	8	PASS
Bluetooth (Low Energy) (2M)	2402/CH0	-8.74	-5.08	8	PASS
	2440/CH19	-8.86	-5.20	8	PASS
	2480/CH39	-8.63	-4.97	8	PASS
Bluetooth (Low Energy) (S=2)	2402/CH0	2.68	3.37	8	PASS
	2440/CH19	2.96	3.65	8	PASS
	2480/CH39	3.05	3.74	8	PASS
Bluetooth (Low Energy) (S=8)	2402/CH0	6.64	7.47	8	PASS
	2440/CH19	7.10	7.93	8	PASS
	2480/CH39	7.00	7.83	8	PASS
Thread	2405/CH11	-11.11	-5.34	8	PASS
	2440/CH18	-11.40	-5.63	8	PASS
	2480/CH26	-27.63	-21.86	8	PASS
Note: Power Spectral Density =Read Value+Duty cycle correction factor					

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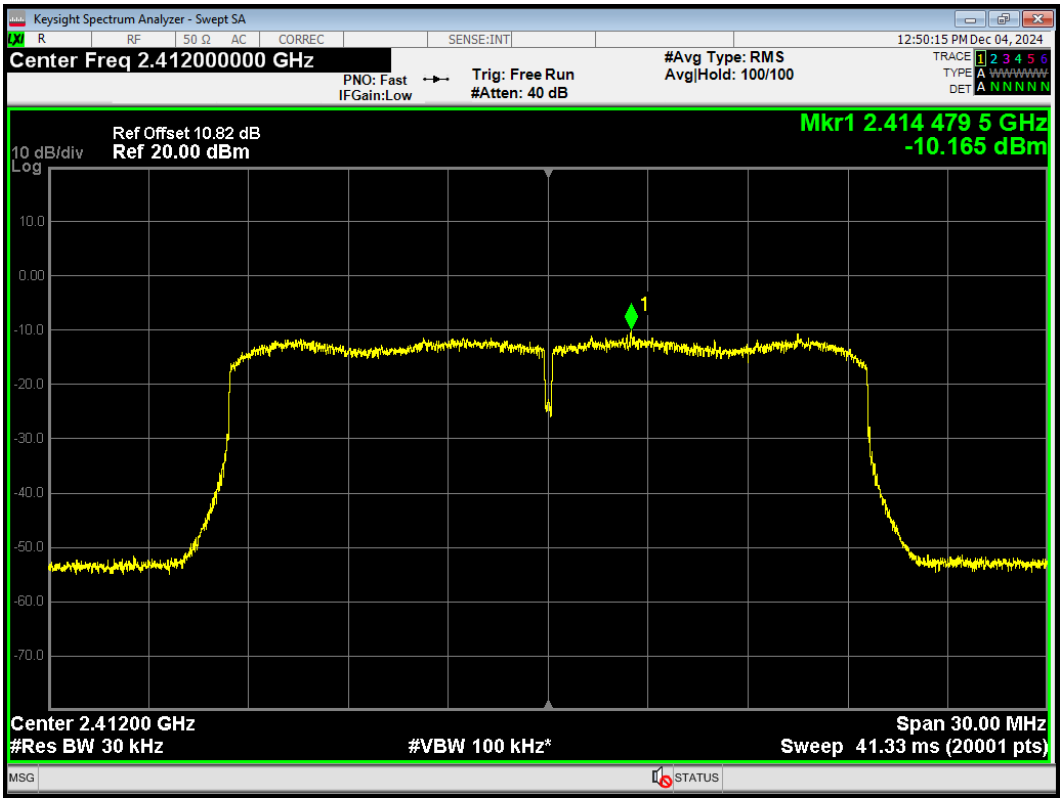
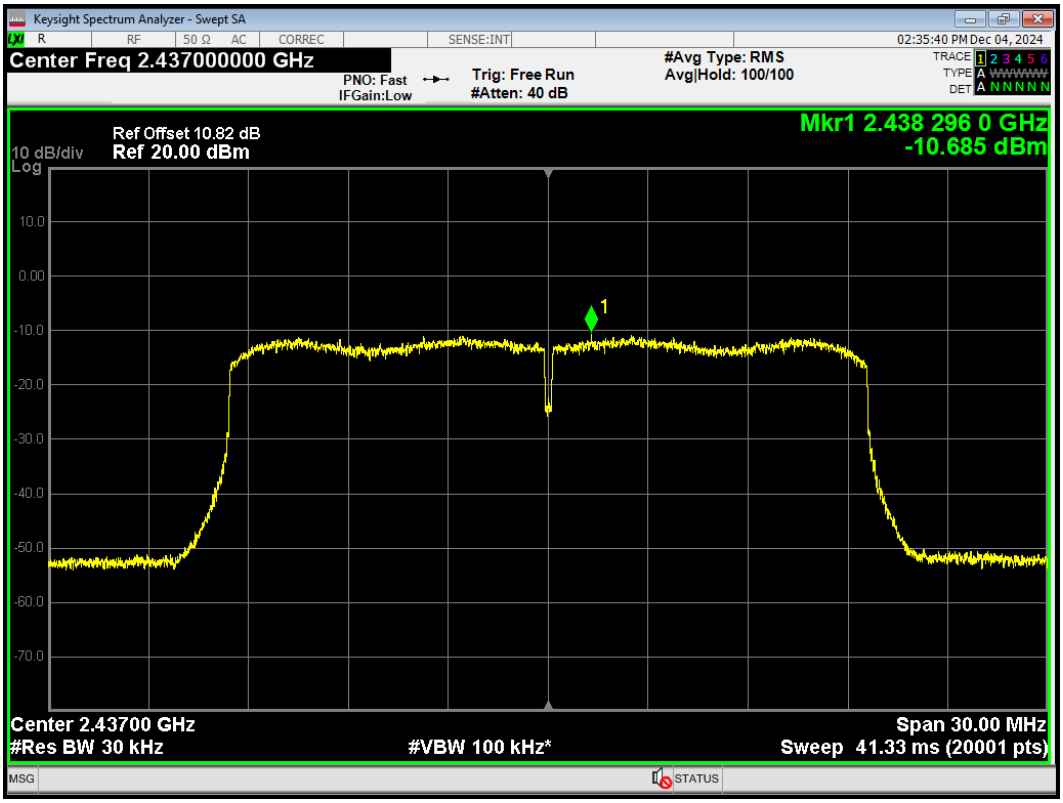
PSD 802.11ax(HE20) 2412MHz



PSD 802.11ax(HE20) 2437MHz



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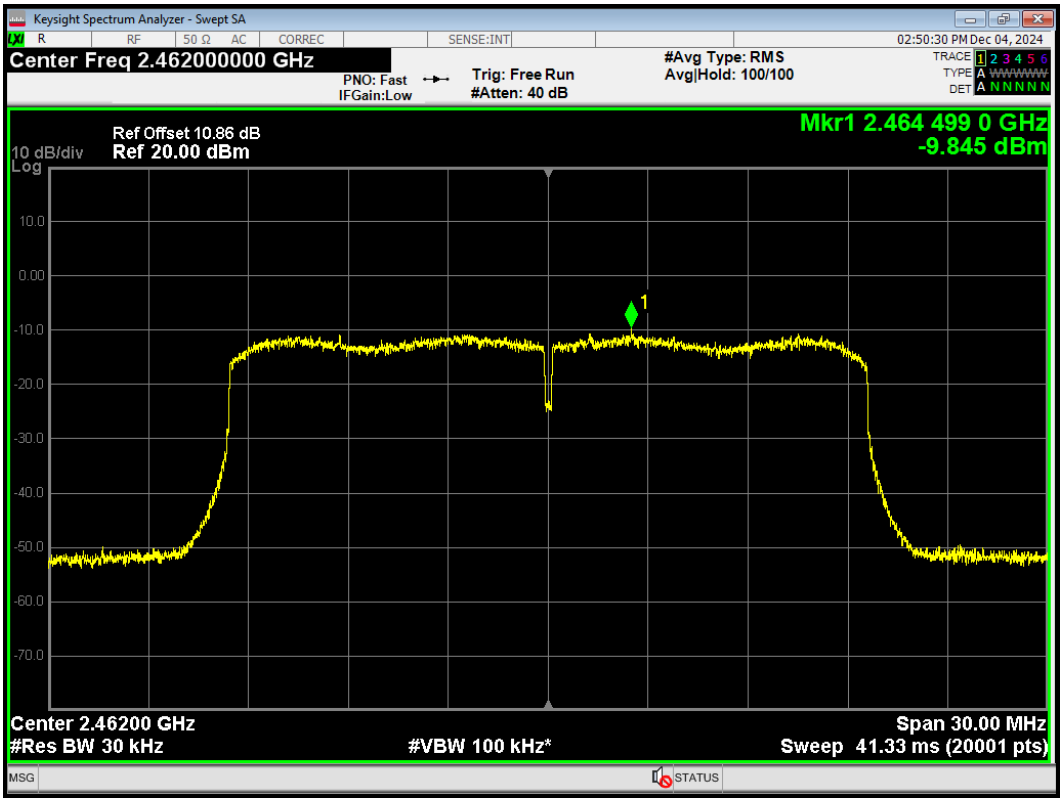
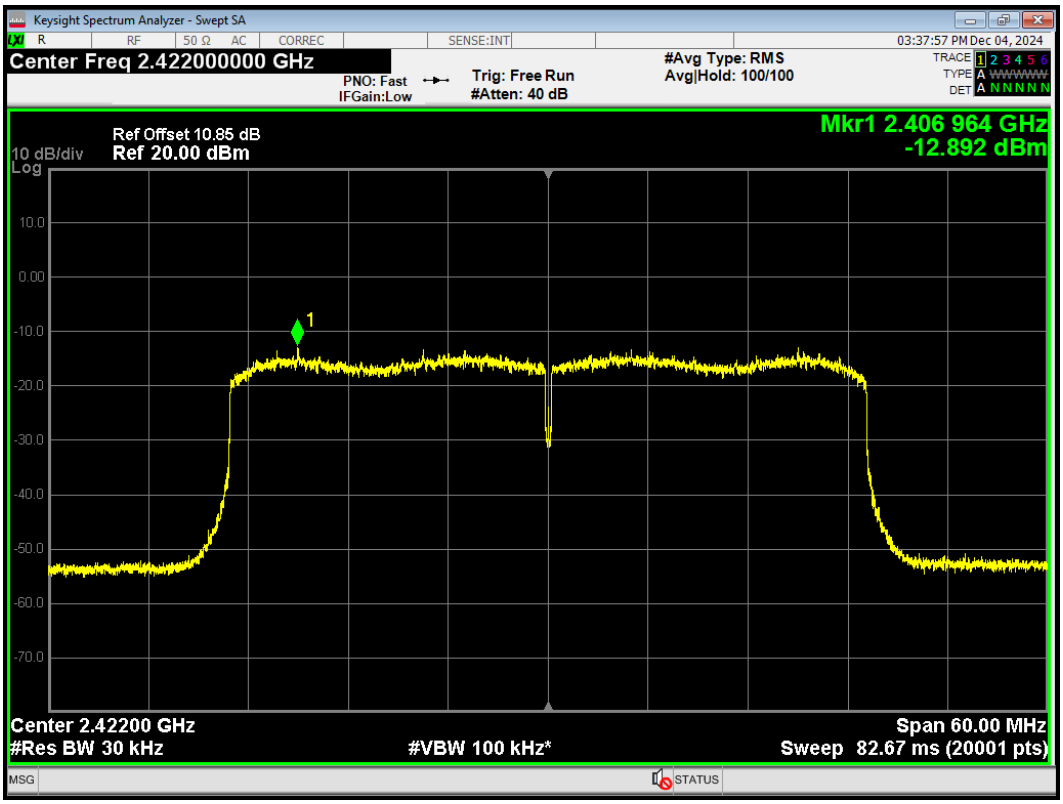
PSD 802.11ax(HE20) 2462MHz



PSD 802.11ax(HE40) 2422MHz



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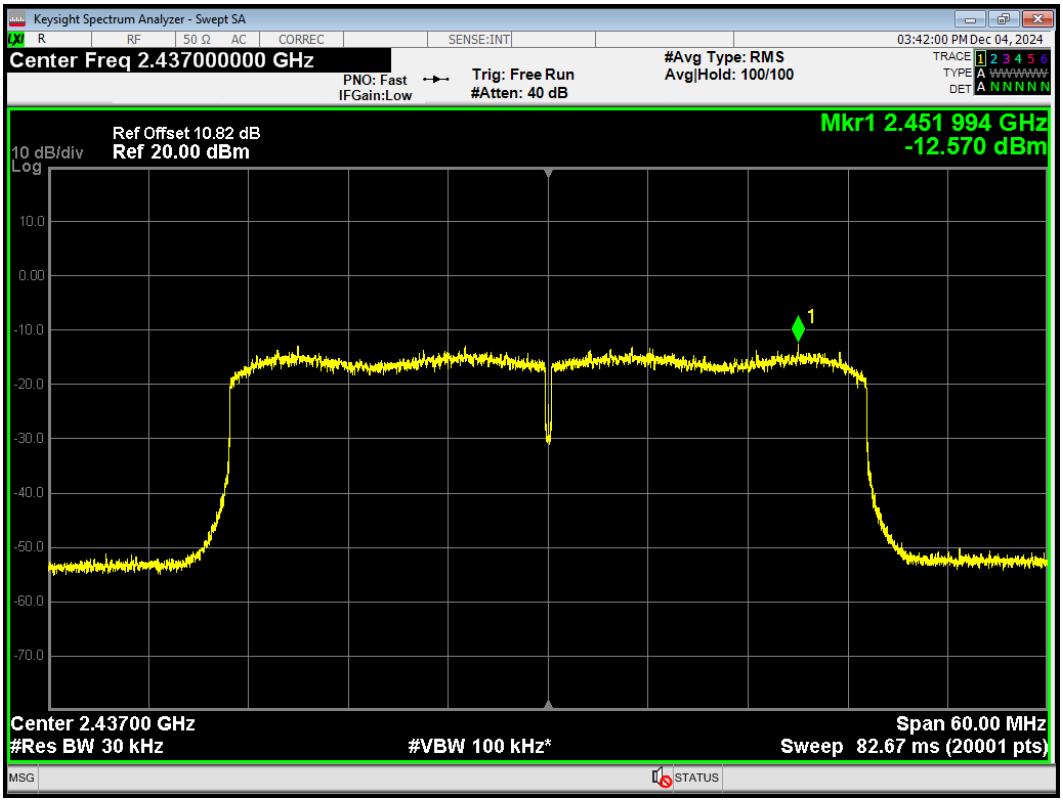
PSD 802.11ax(HE40) 2437MHz



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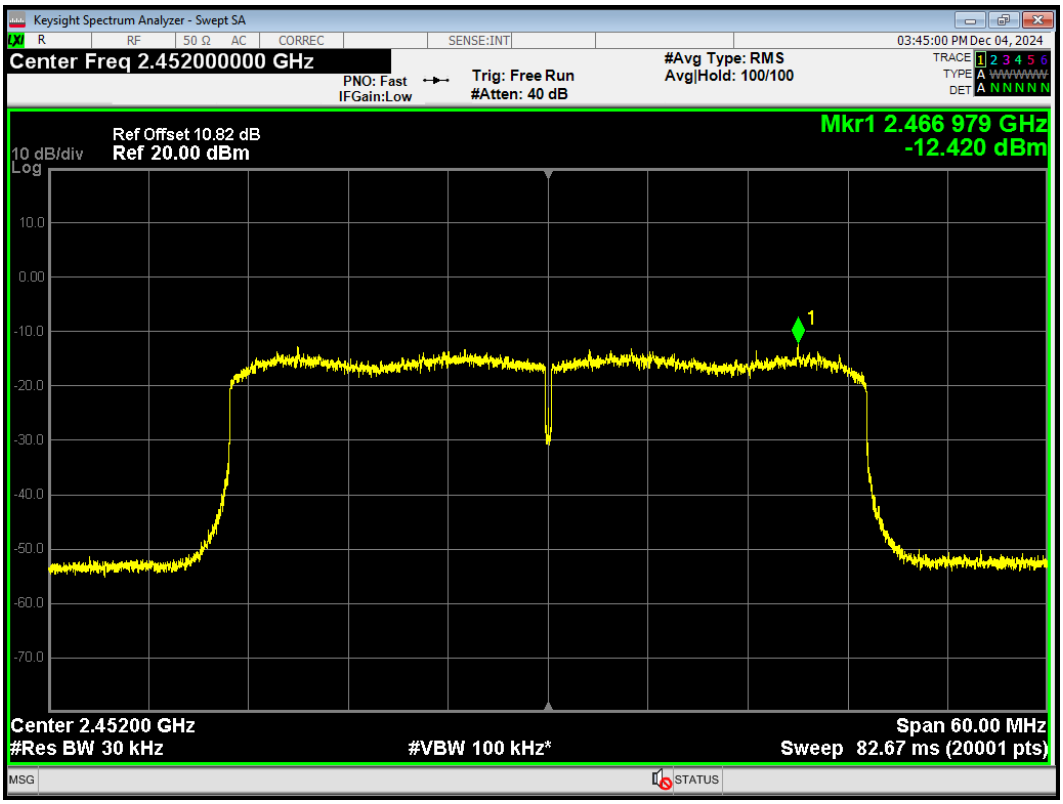

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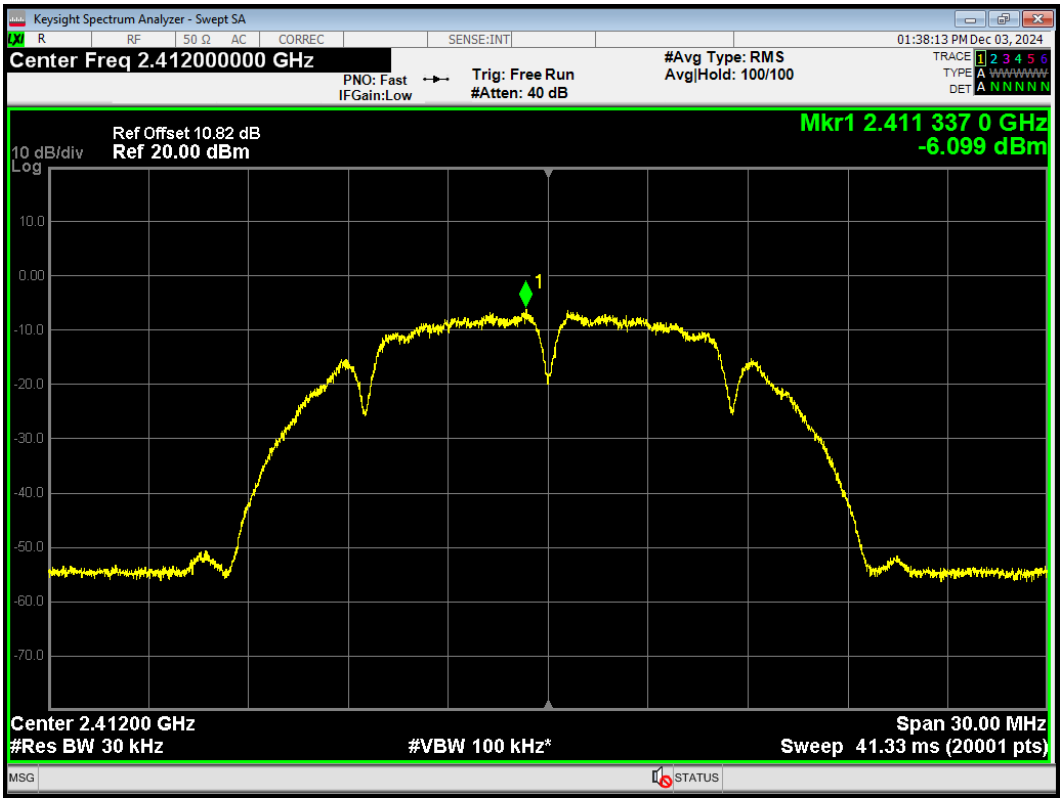
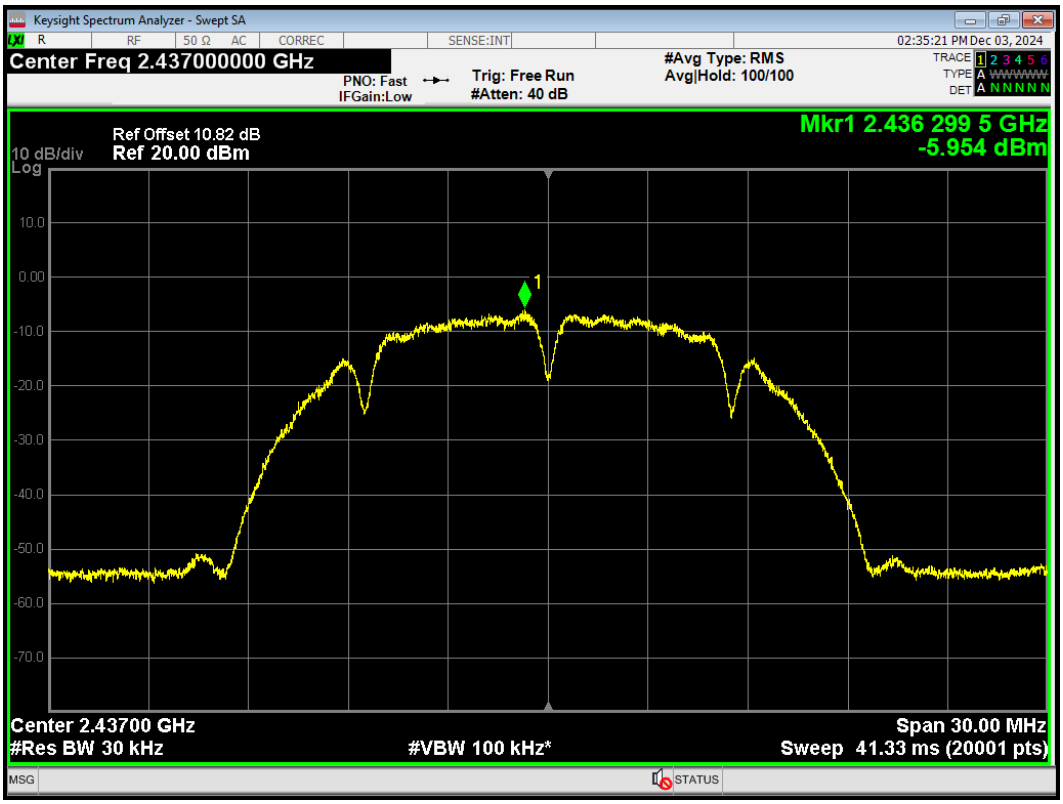
PSD 802.11b 2412MHz



PSD 802.11b 2437MHz



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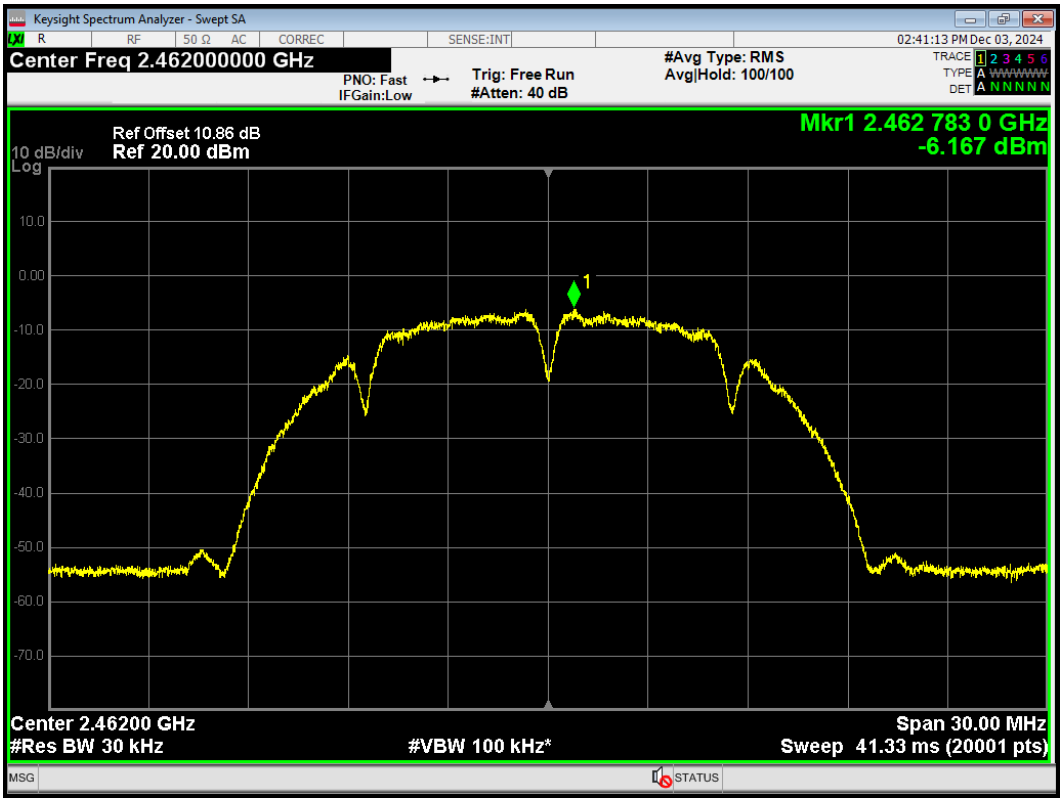
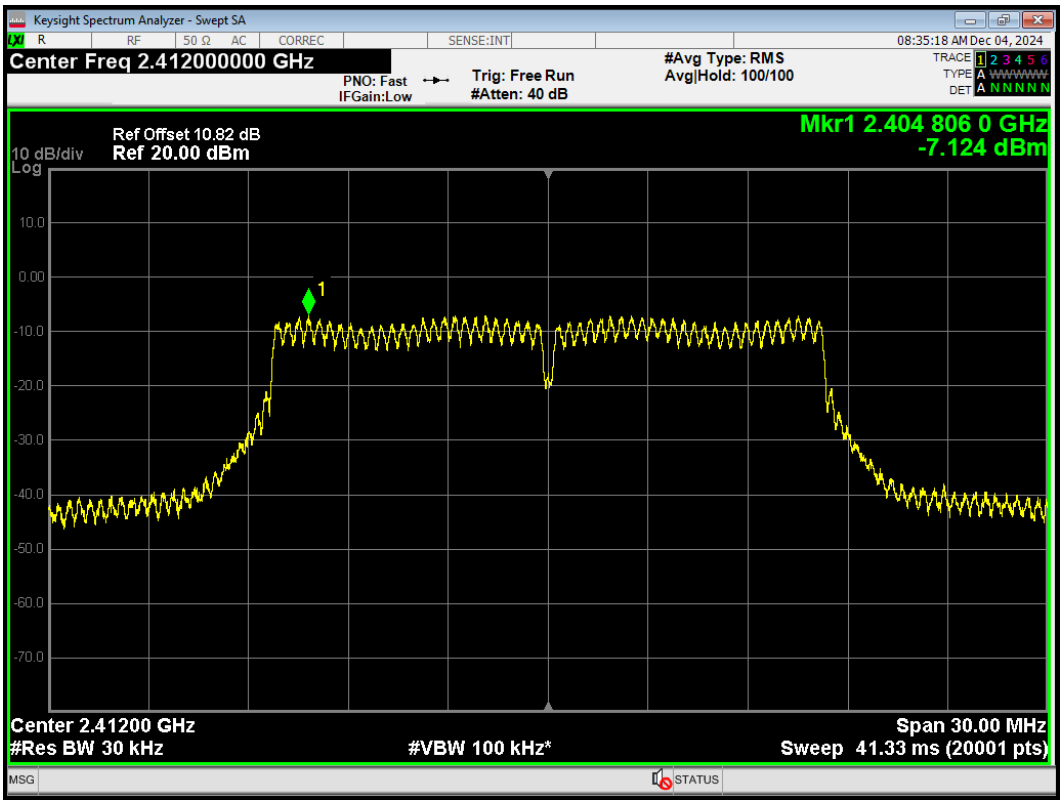
PSD 802.11b 2462MHz



PSD 802.11g 2412MHz



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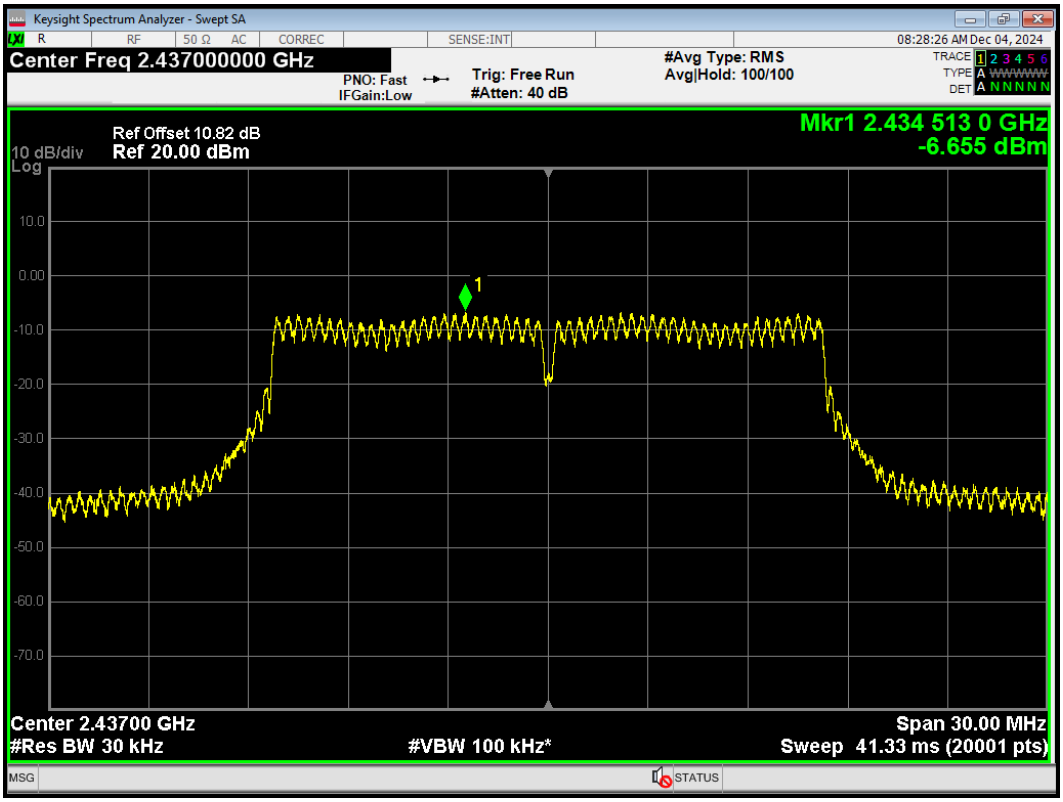
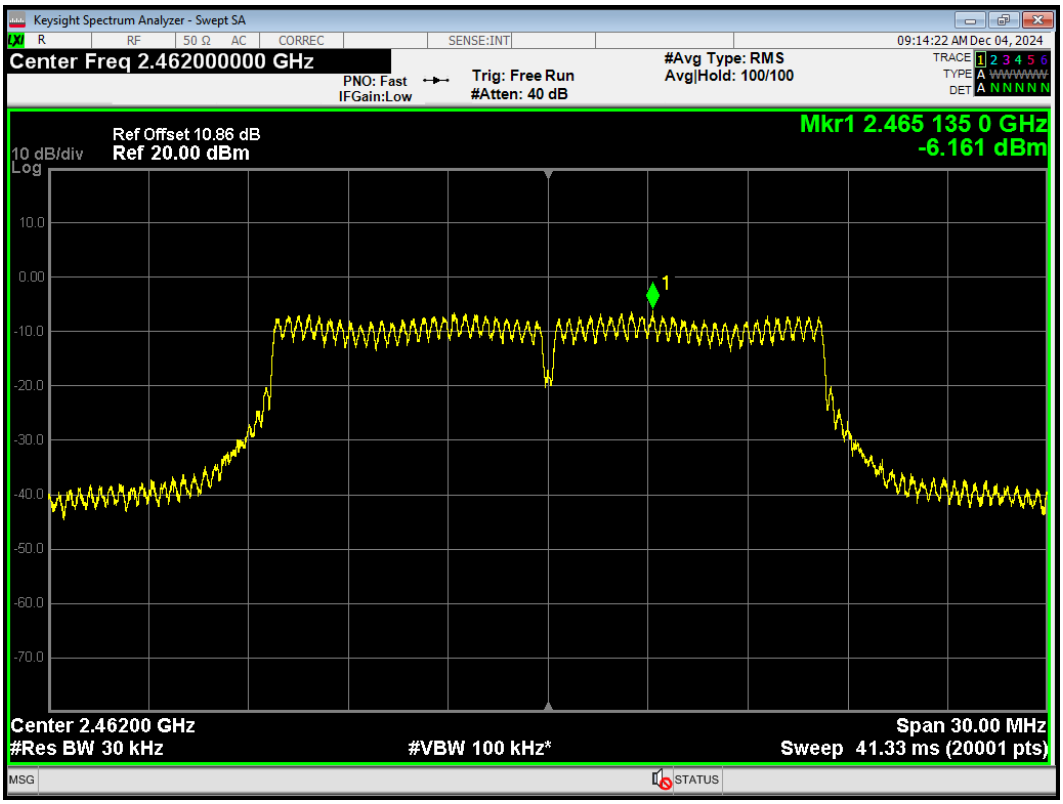
PSD 802.11g 2437MHz



PSD 802.11g 2462MHz



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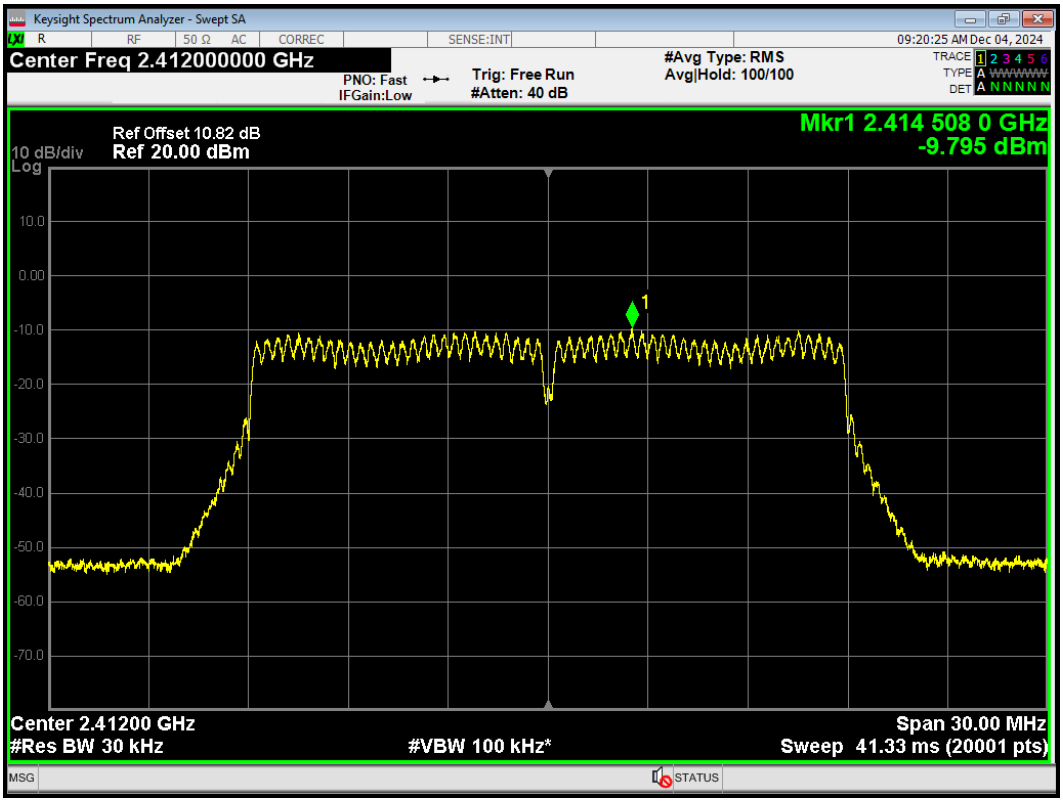
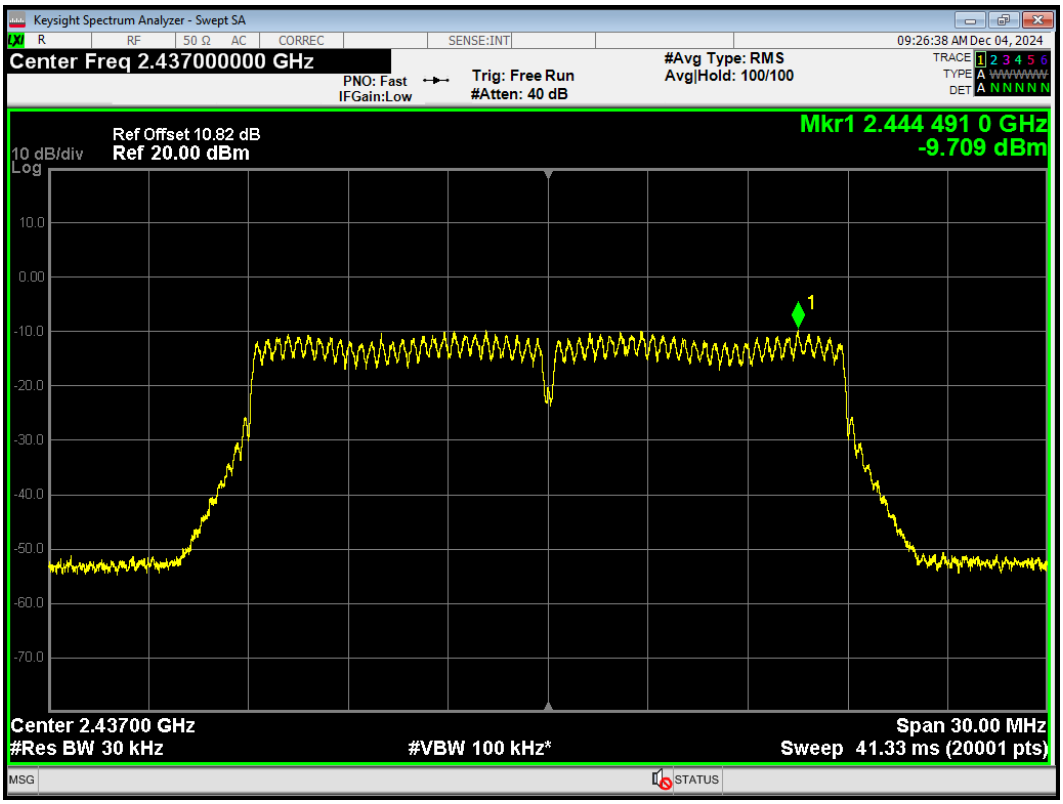
PSD 802.11n(HT20) 2412MHz



PSD 802.11n(HT20) 2437MHz



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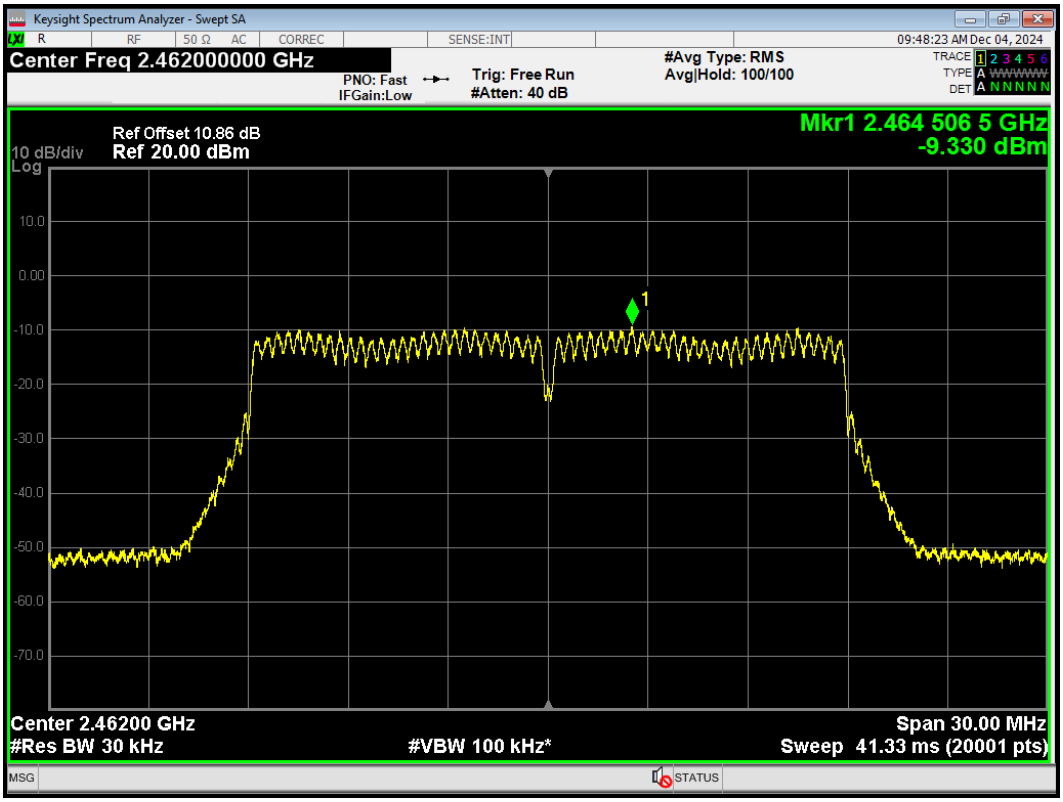
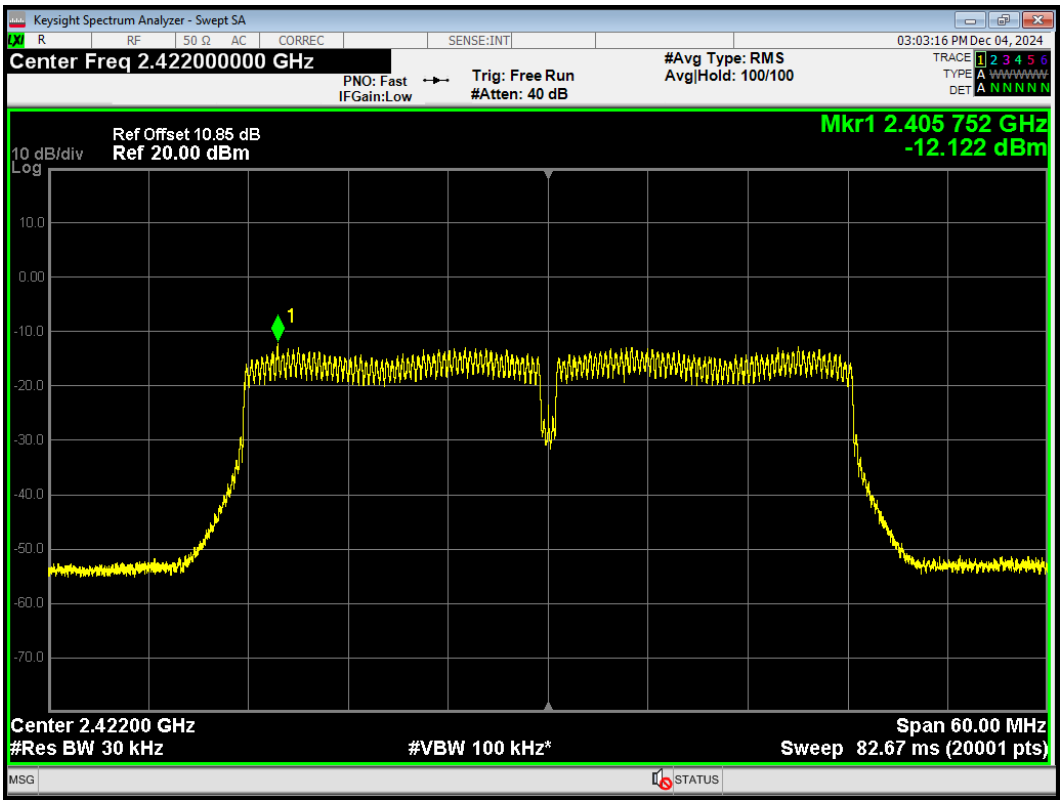
PSD 802.11n(HT20) 2462MHz



PSD 802.11n(HT40) 2422MHz



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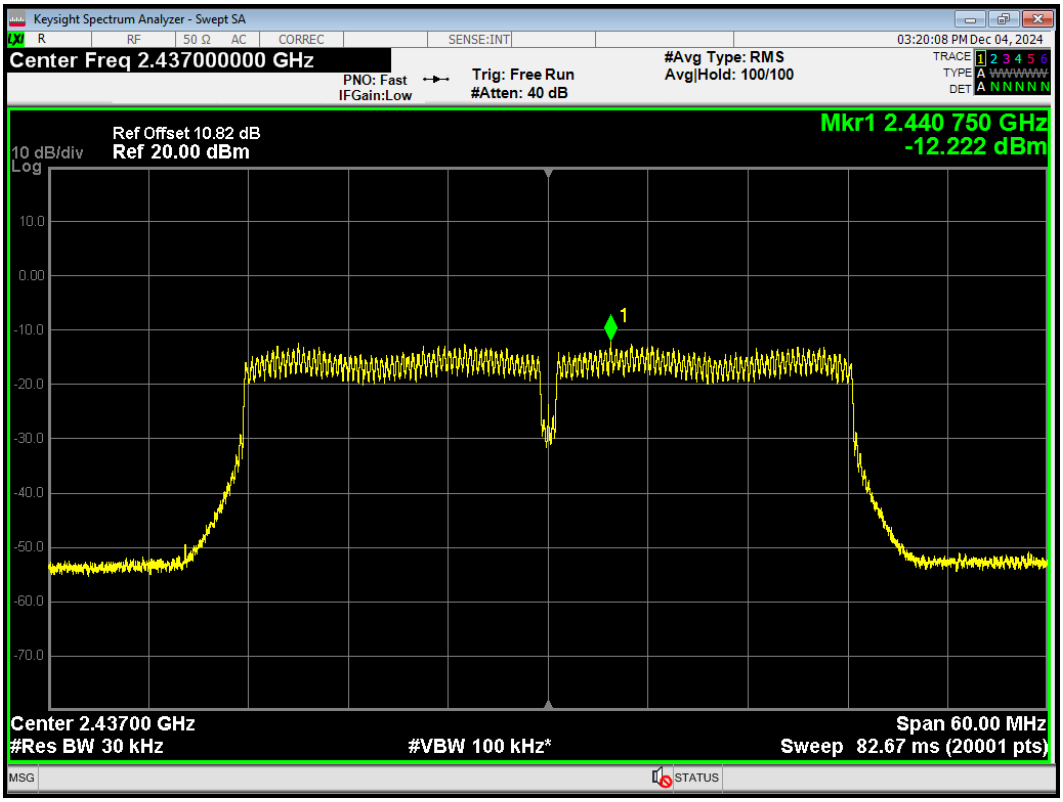
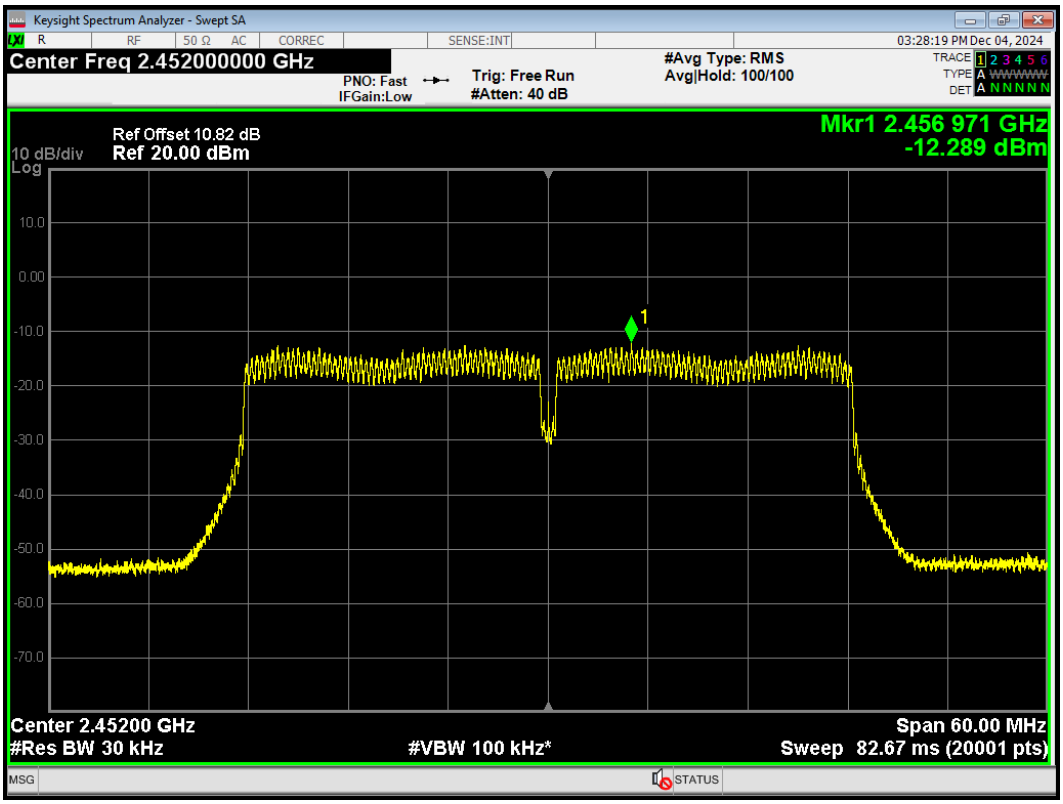
PSD 802.11n(HT40) 2437MHz



PSD 802.11n(HT40) 2452MHz



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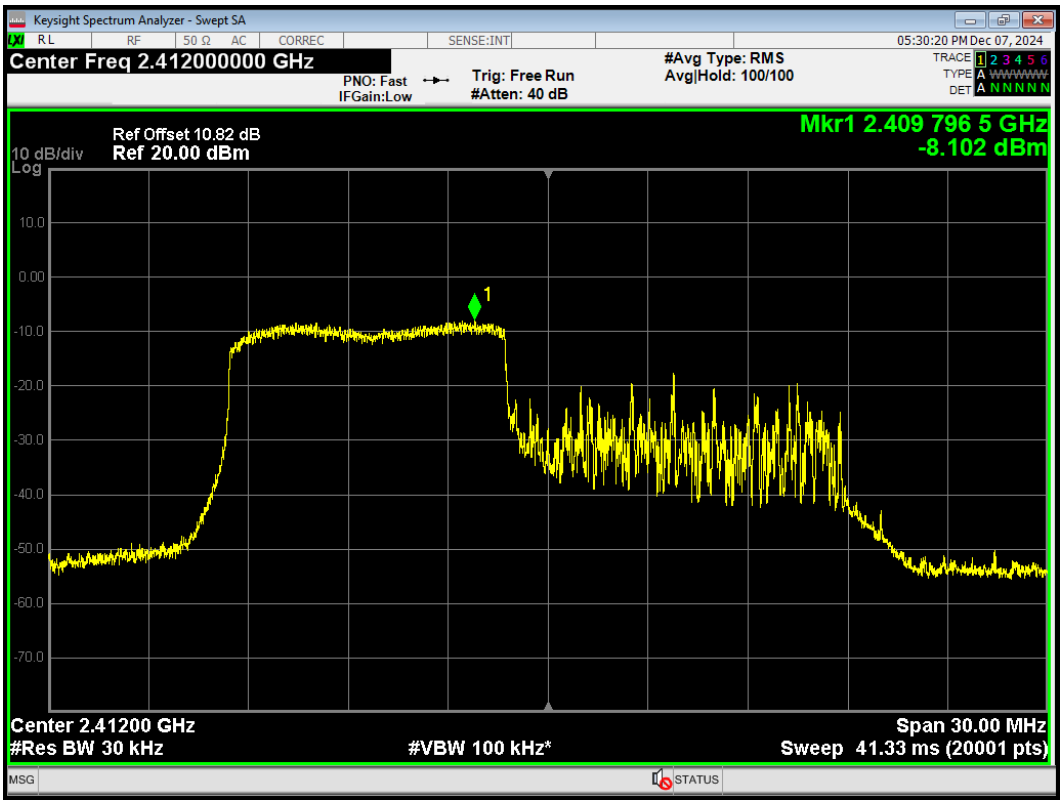
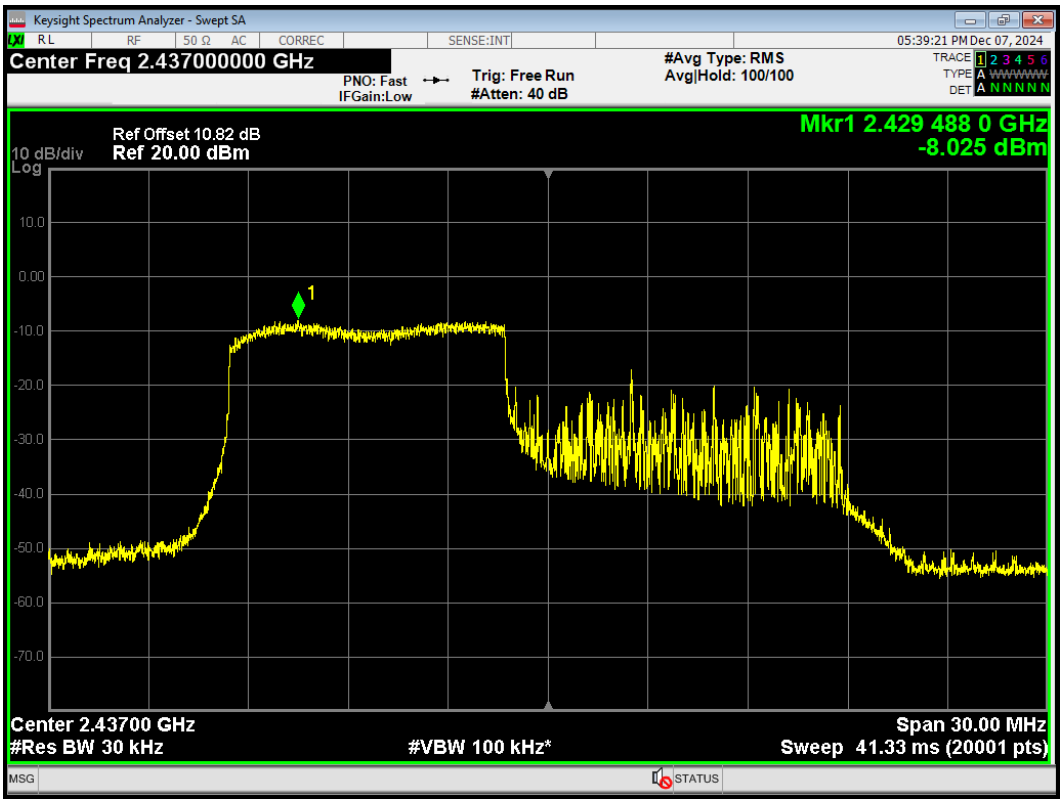
TB Mode

PSD 802.11ax(HE20) 106T 2412MHz



PSD 802.11ax(HE20) 106T 2437MHz



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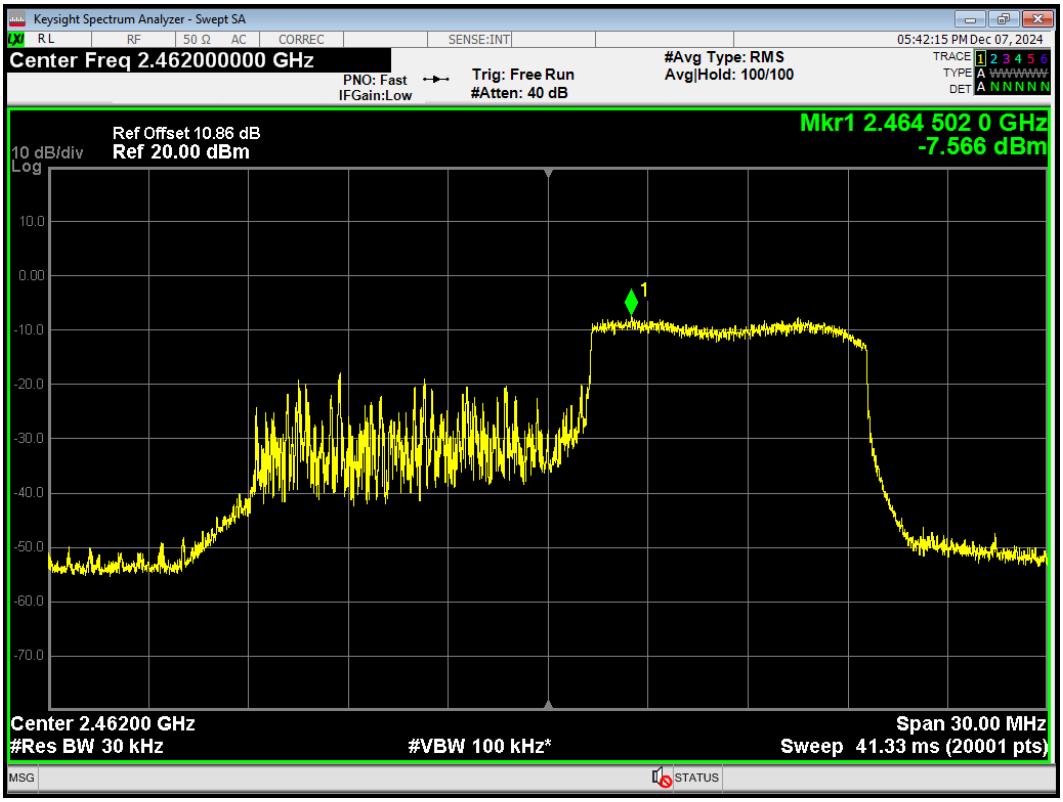
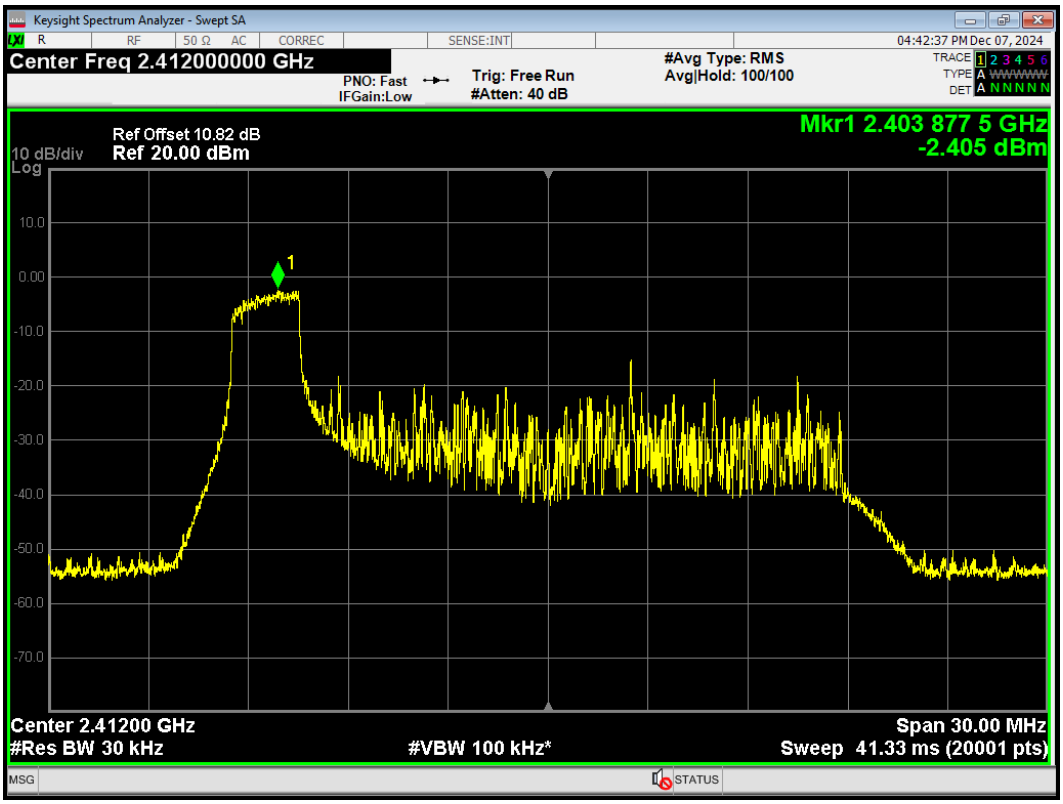
PSD 802.11ax(HE20) 106T 2462MHz



PSD 802.11ax(HE20) 26T 2412MHz



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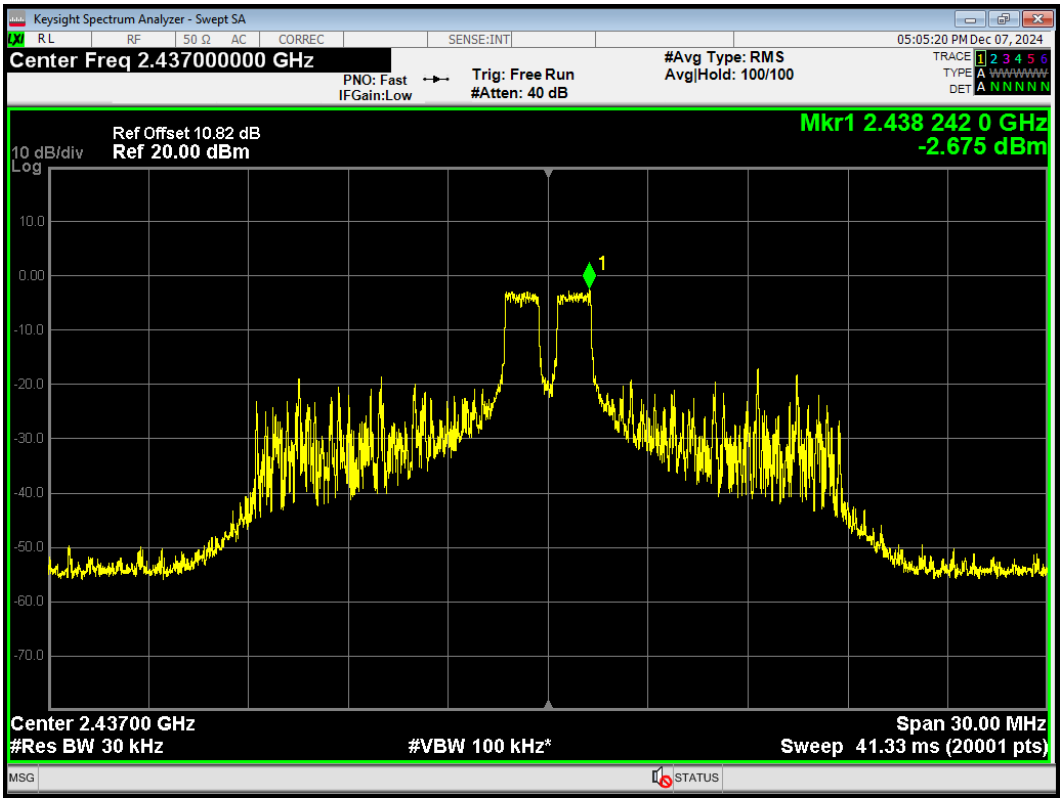
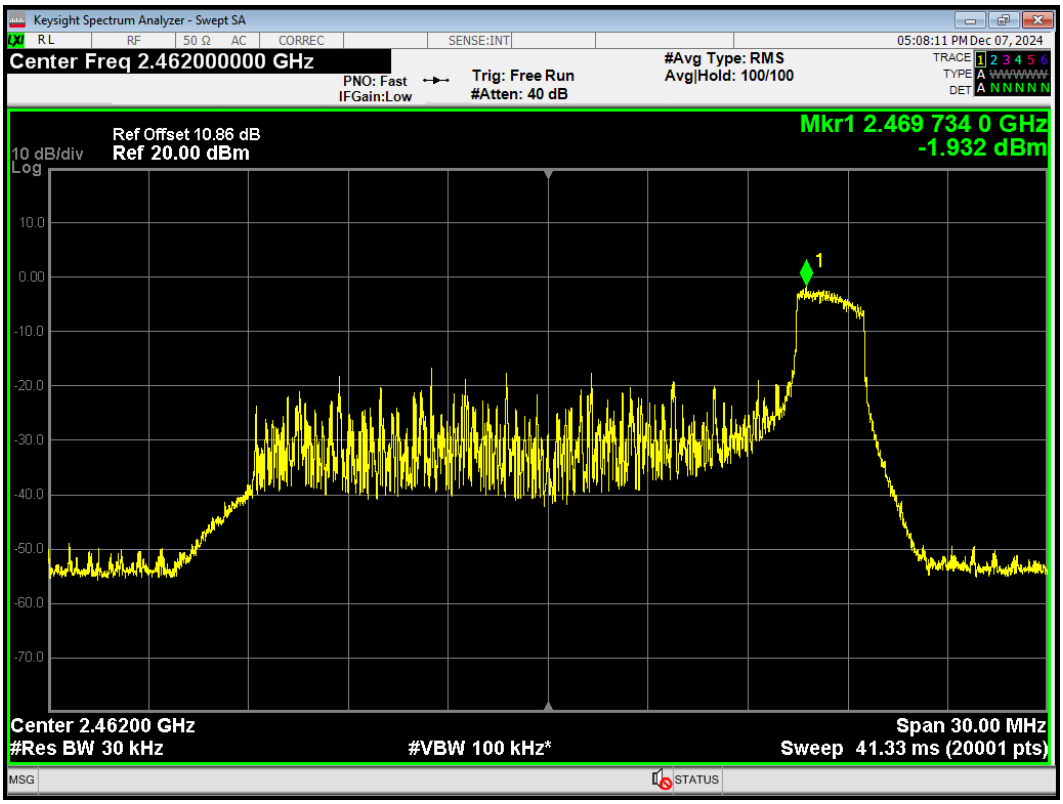
PSD 802.11ax(HE20) 26T 2437MHz



PSD 802.11ax(HE20) 26T 2462MHz



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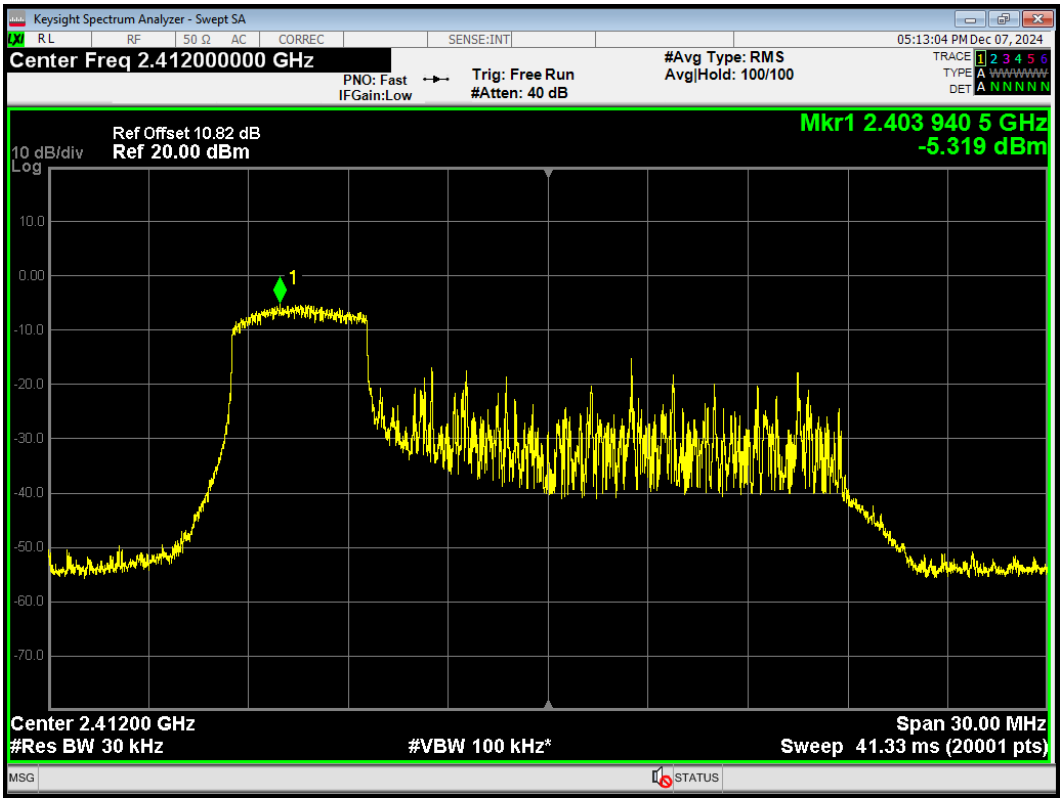
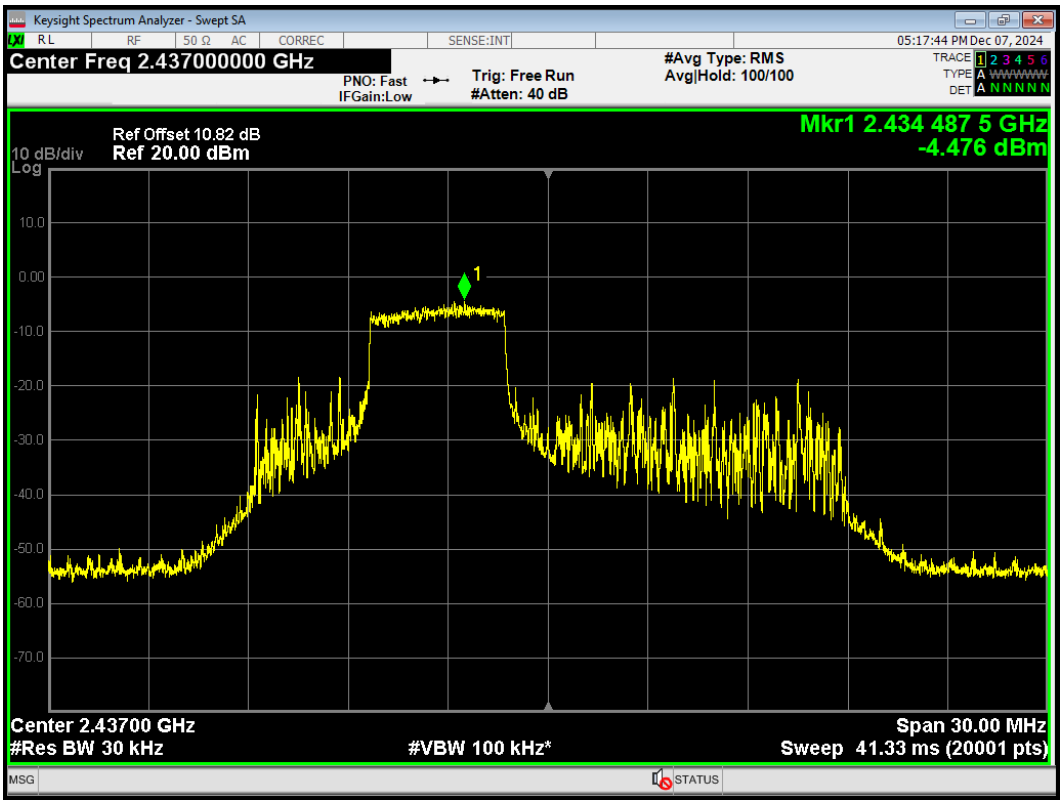
PSD 802.11ax(HE20) 52T 2412MHz



PSD 802.11ax(HE20) 52T 2437MHz



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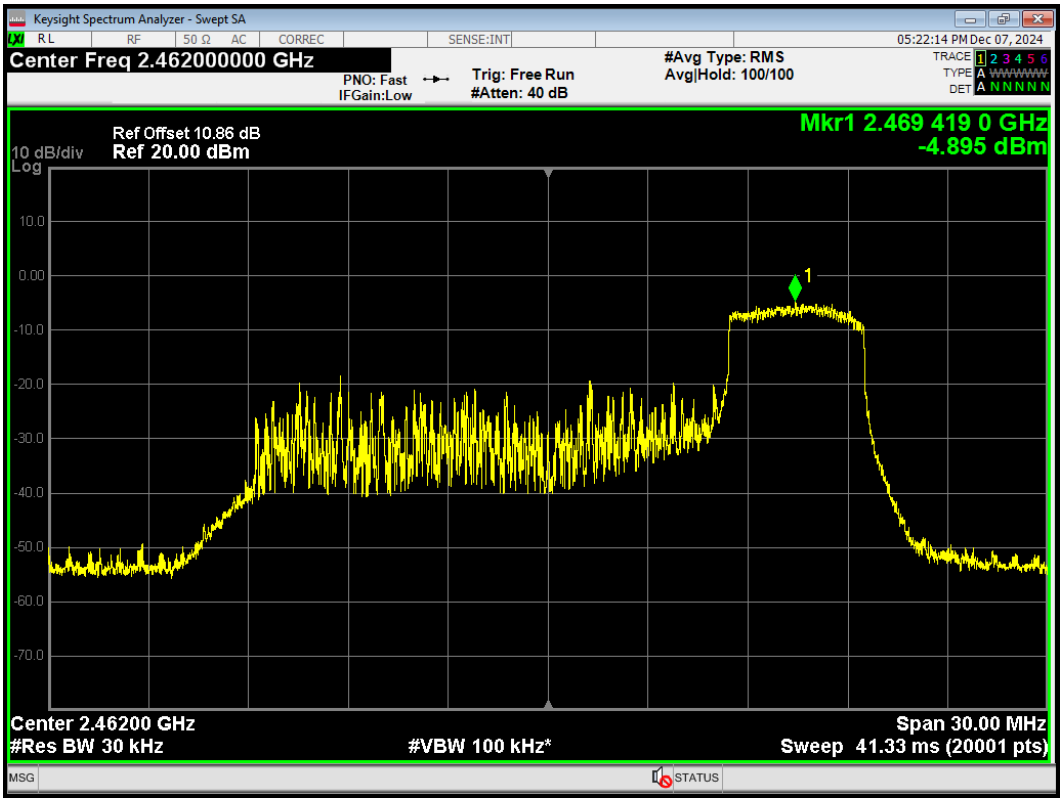
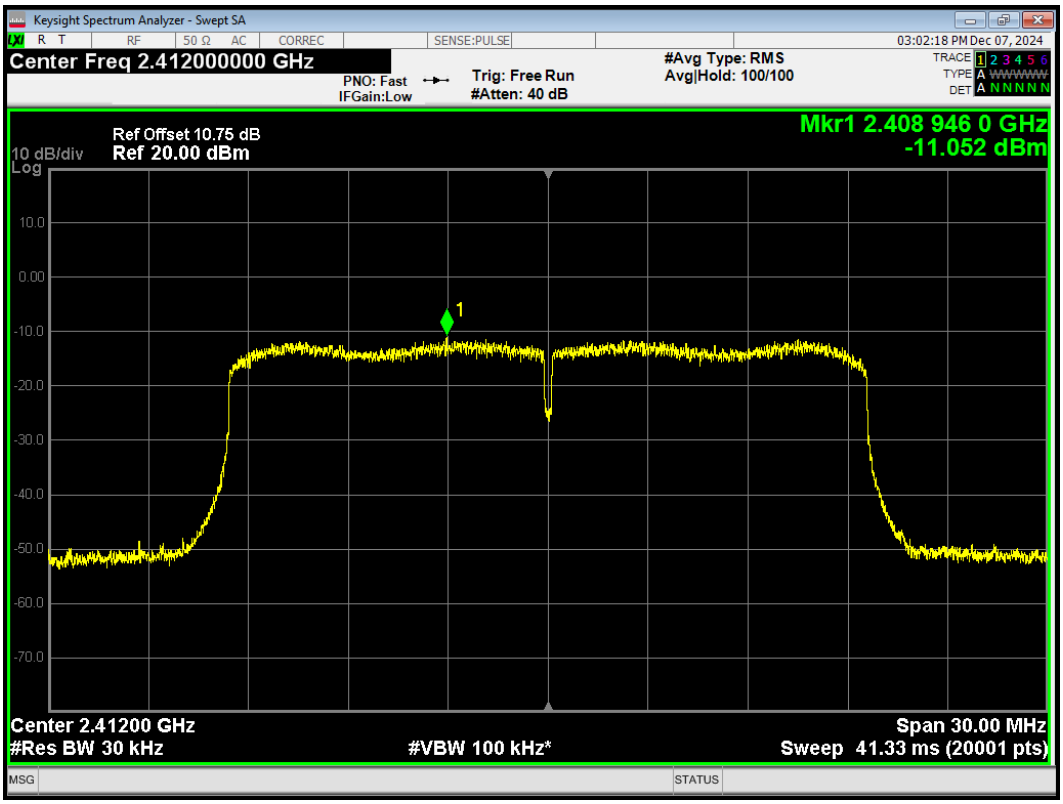
PSD 802.11ax(HE20) 52T 2462MHz



PSD 802.11ax(HE20) 242T 2412MHz



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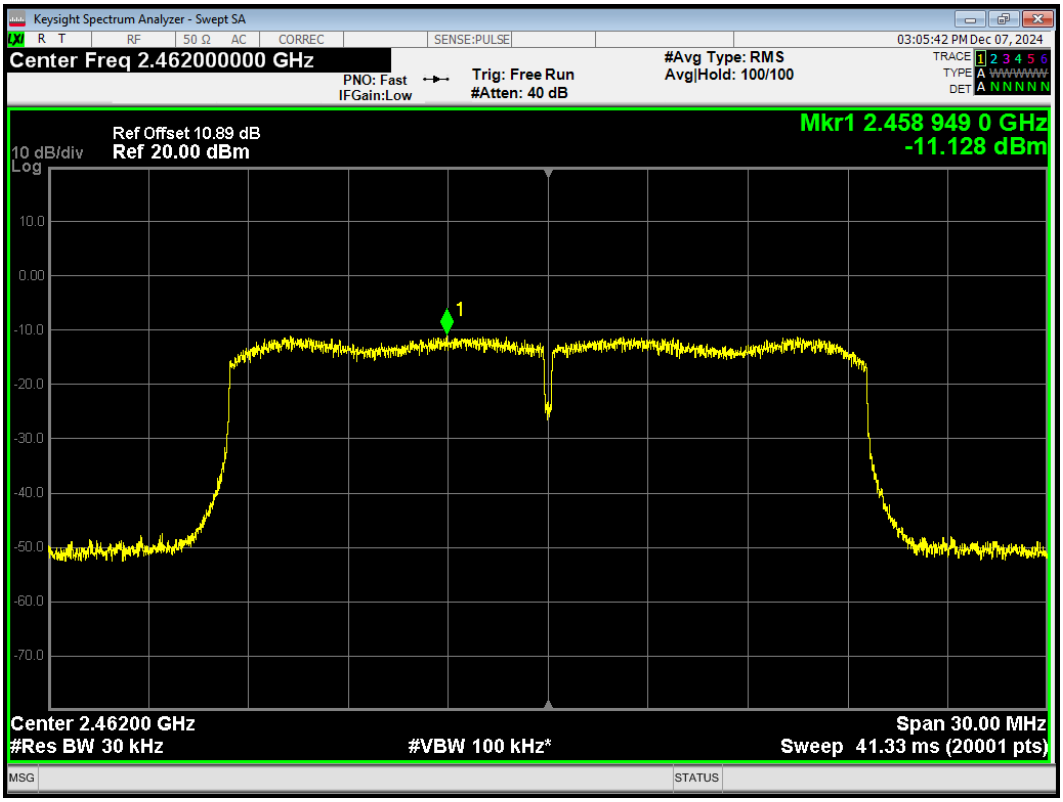
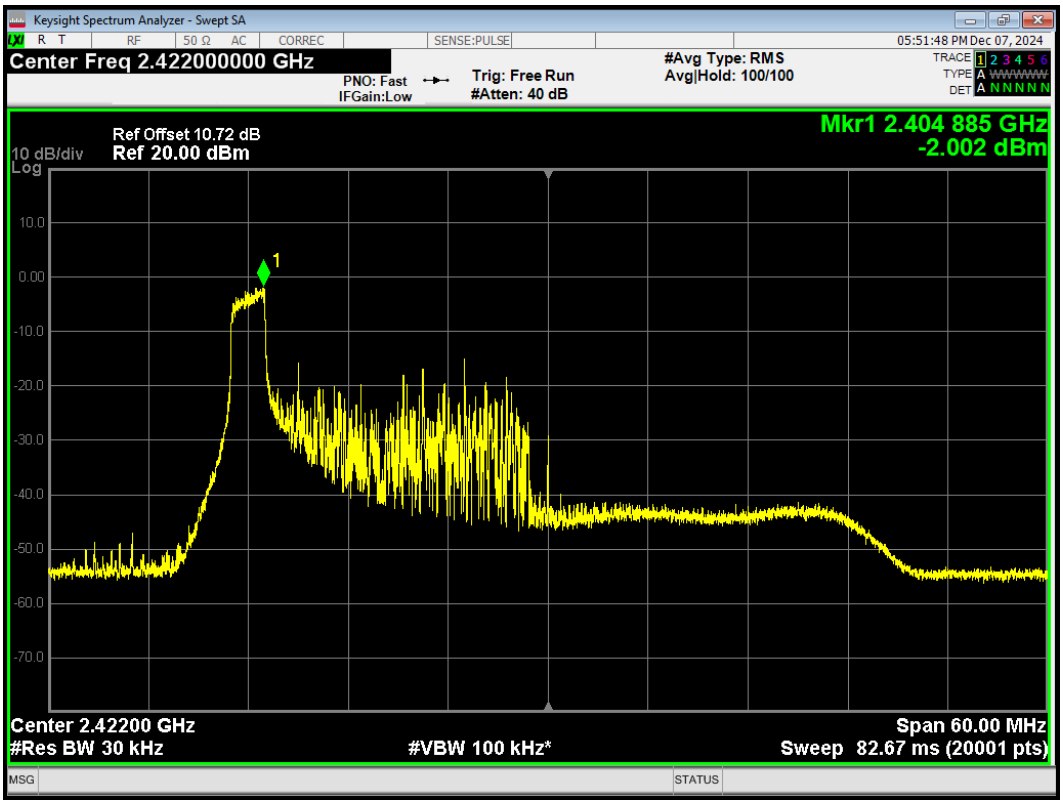
PSD 802.11ax(HE20) 242T 2462MHz



PSD 802.11ax(HE40) 26T 2422MHz



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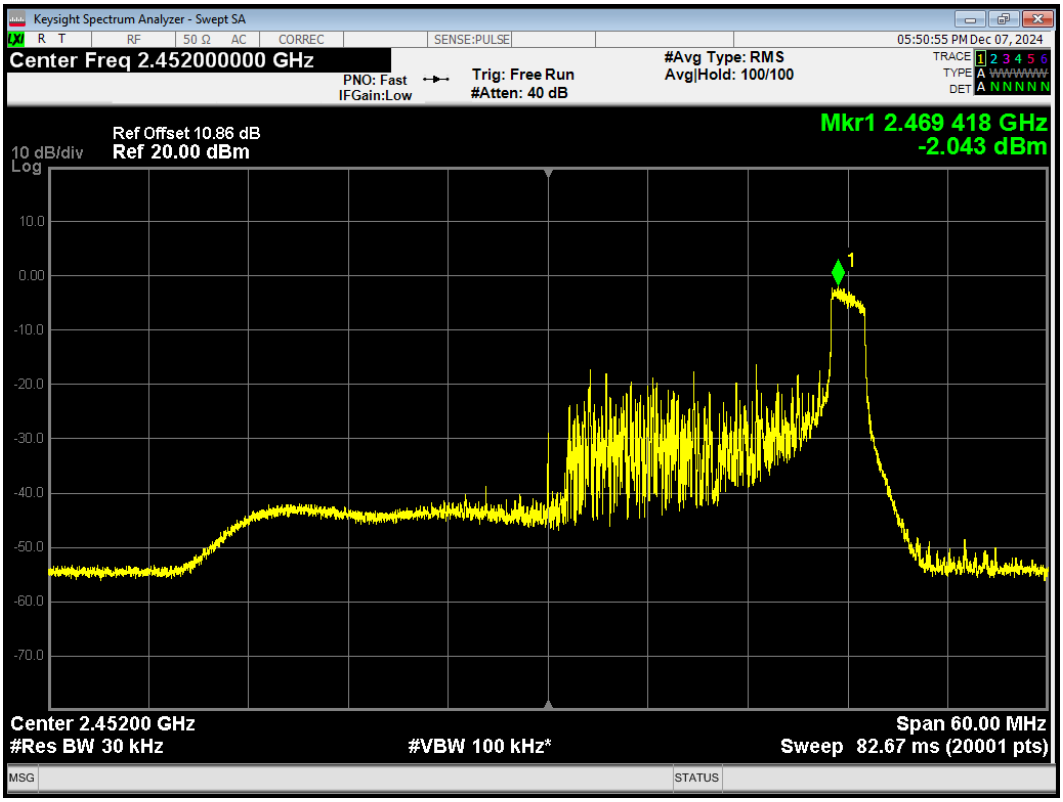
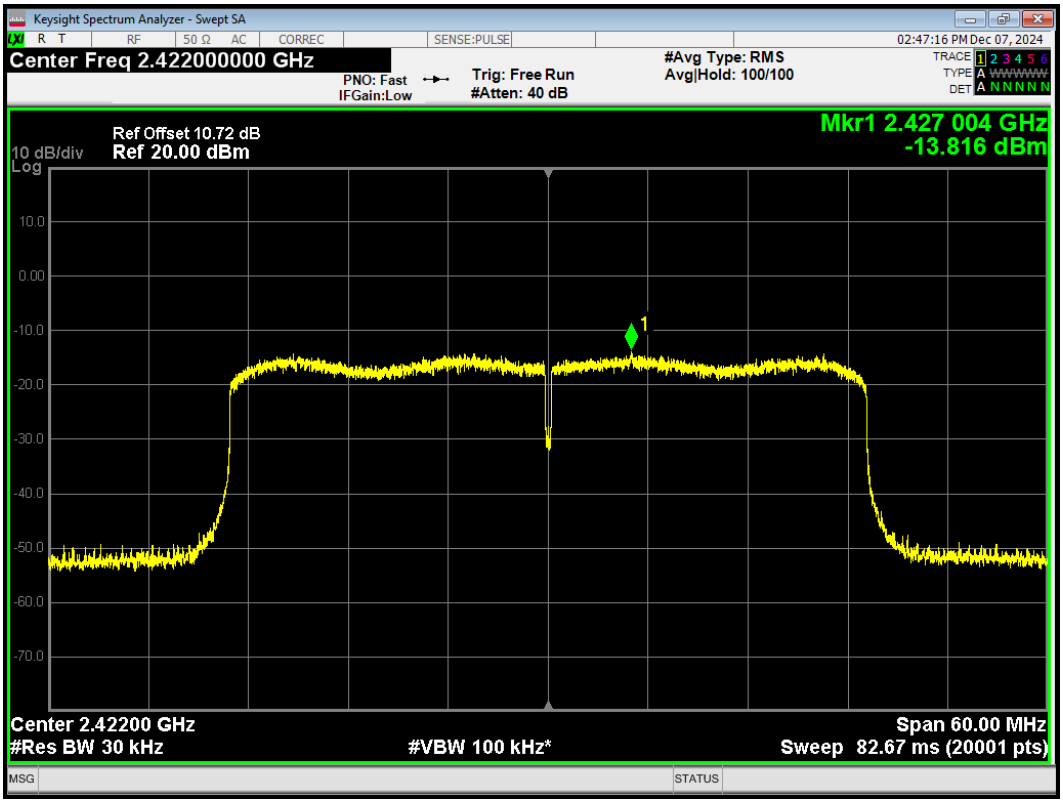
PSD 802.11ax(HE40) 26T 2452MHz



PSD 802.11ax(HE40) 484T 2422MHz



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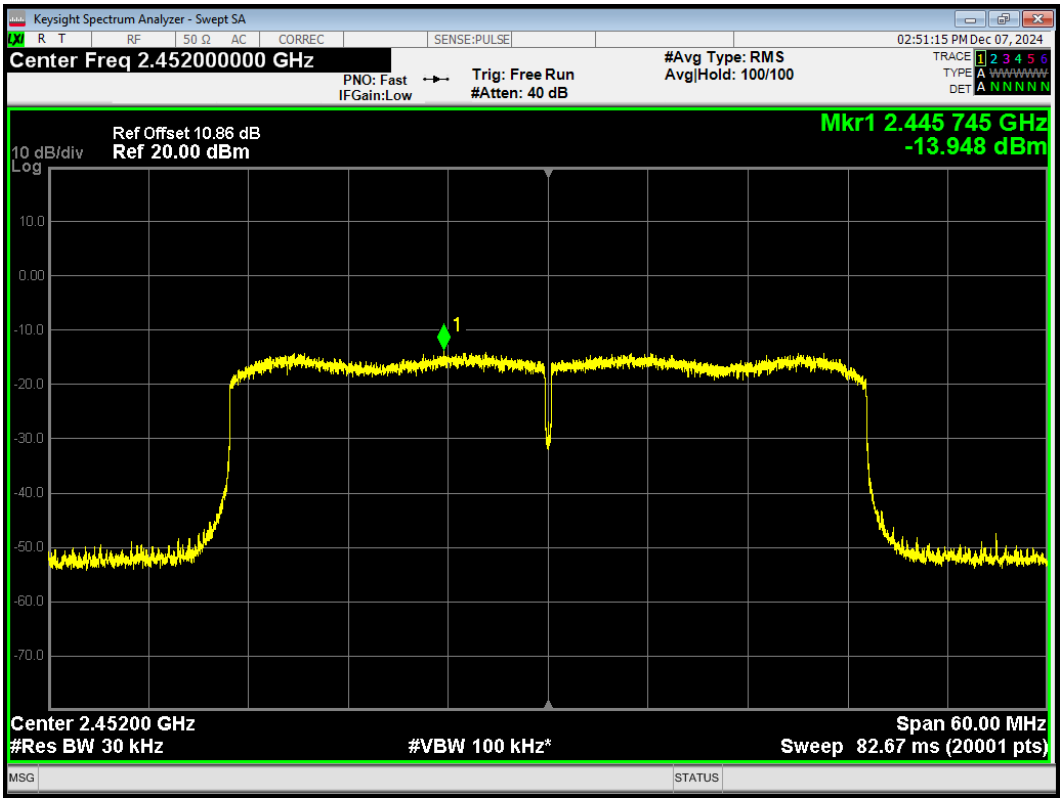
PSD 802.11ax(HE40) 484T 2452MHz



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