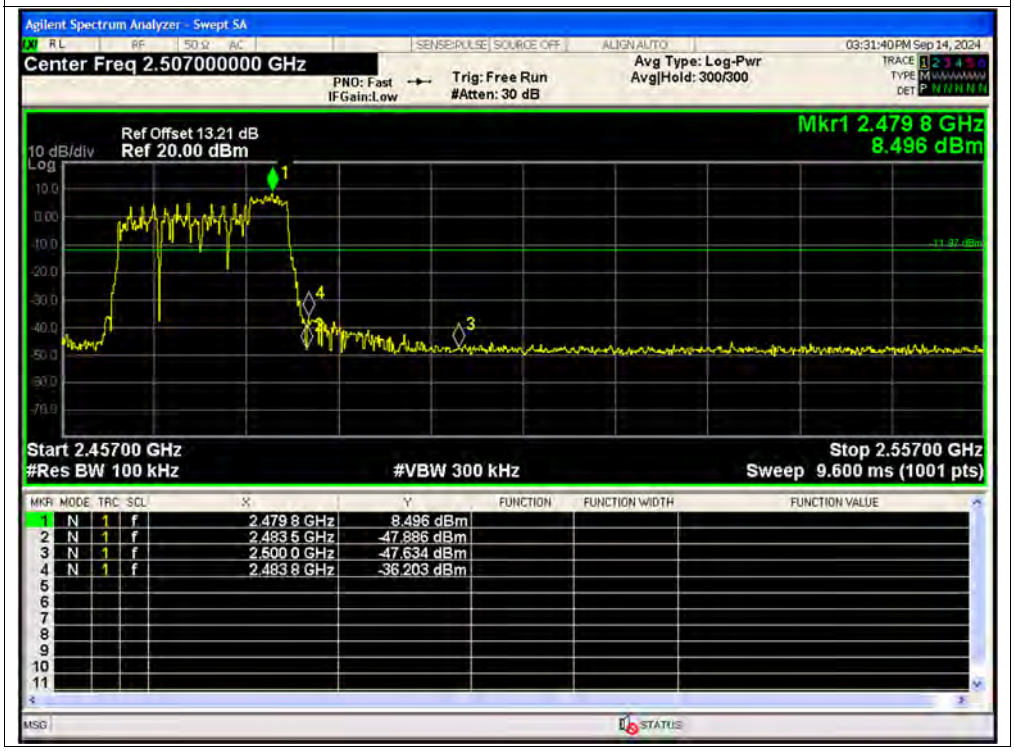
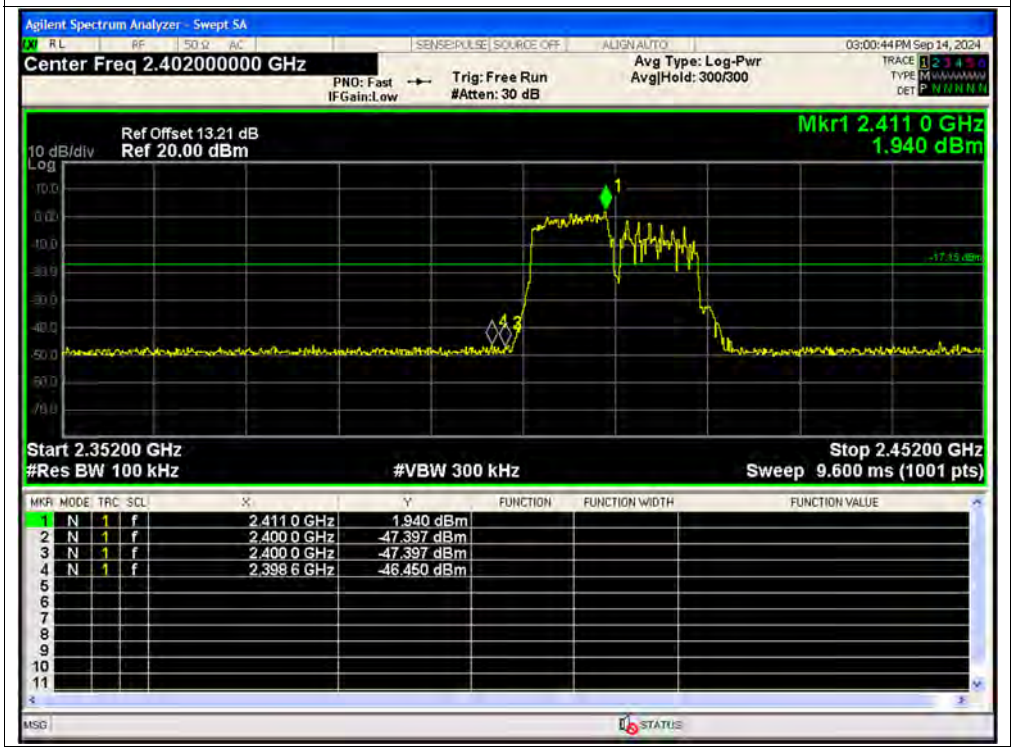
Band Edge NVNT ax20 52@37 2472MHz Ant2 Ref

Band Edge NVNT ax20 52@37 2472MHz Ant2 Emission



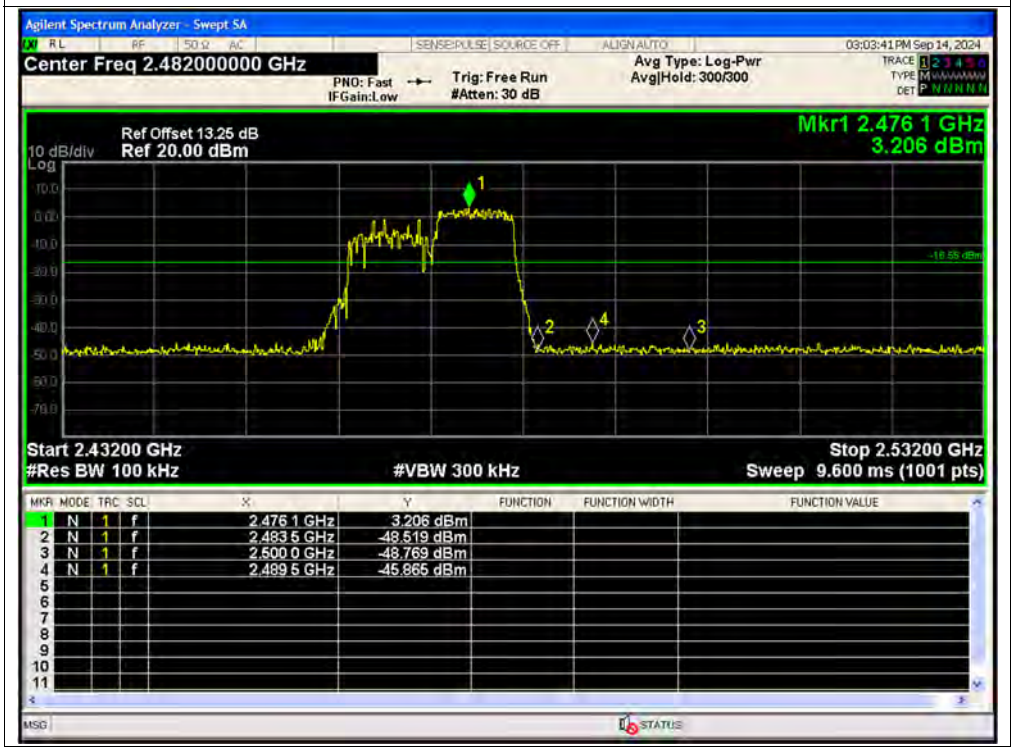
Band Edge NVNT ax40 106@53 2422MHz Ant1 Ref

Band Edge NVNT ax40 106@53 2422MHz Ant1 Emission



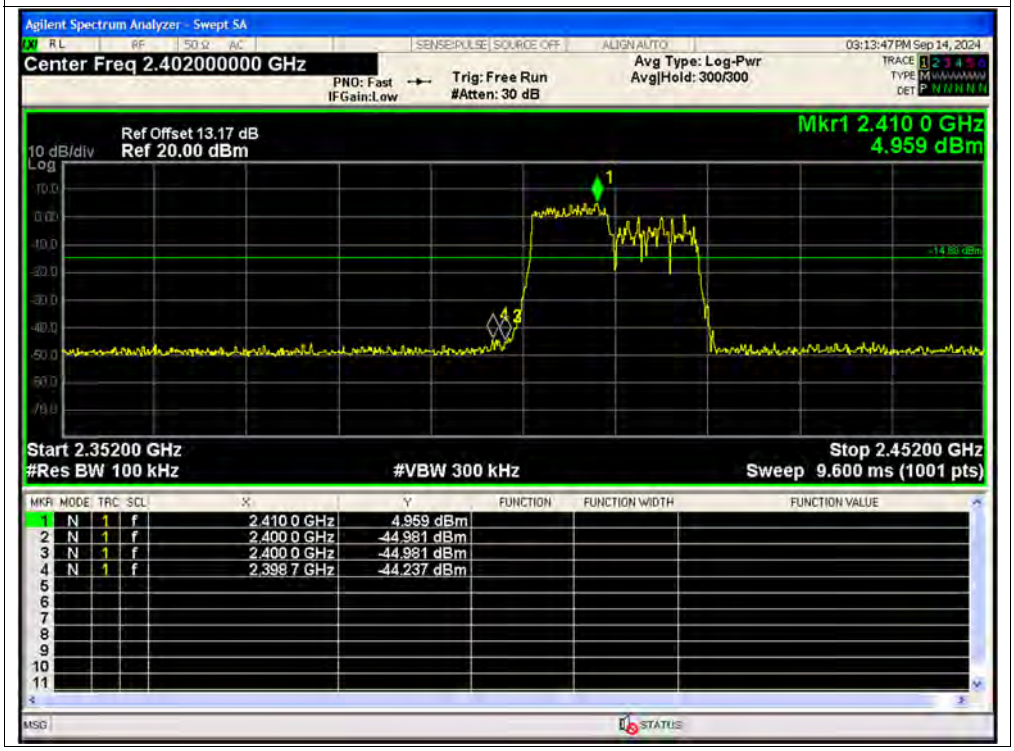
Band Edge NVNT ax40 106@53 2462MHz Ant1 Ref

Band Edge NVNT ax40 106@53 2462MHz Ant1 Emission



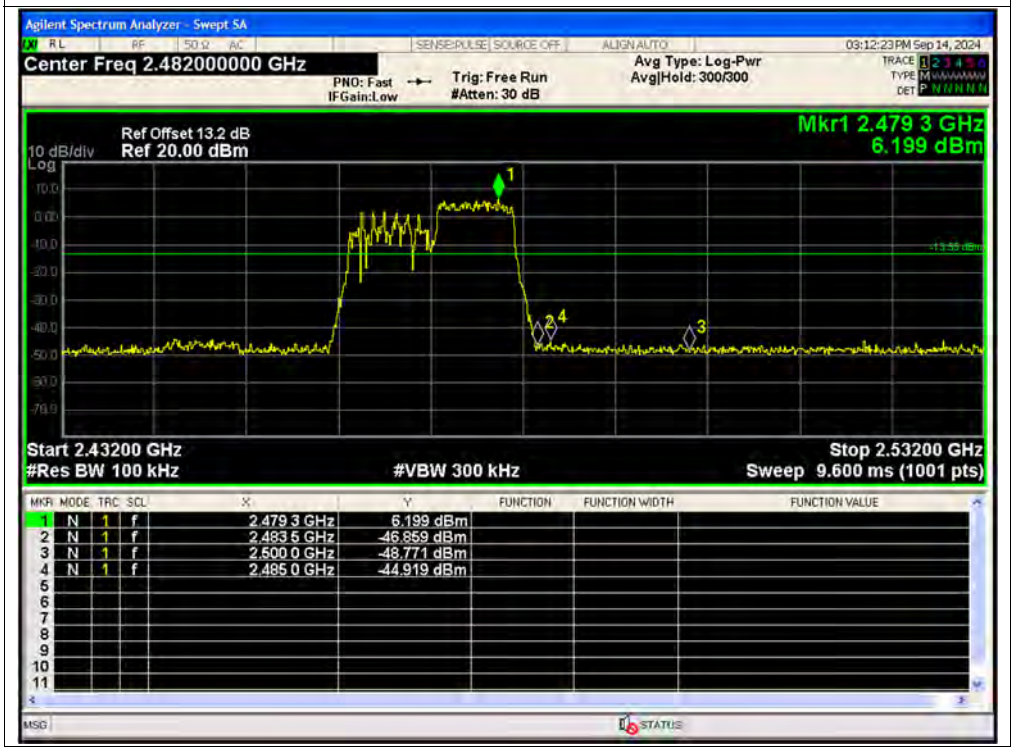
Band Edge NVNT ax40 106@53 2422MHz Ant2 Ref

Band Edge NVNT ax40 106@53 2422MHz Ant2 Emission



Band Edge NVNT ax40 106@53 2462MHz Ant2 Ref

Band Edge NVNT ax40 106@53 2462MHz Ant2 Emission



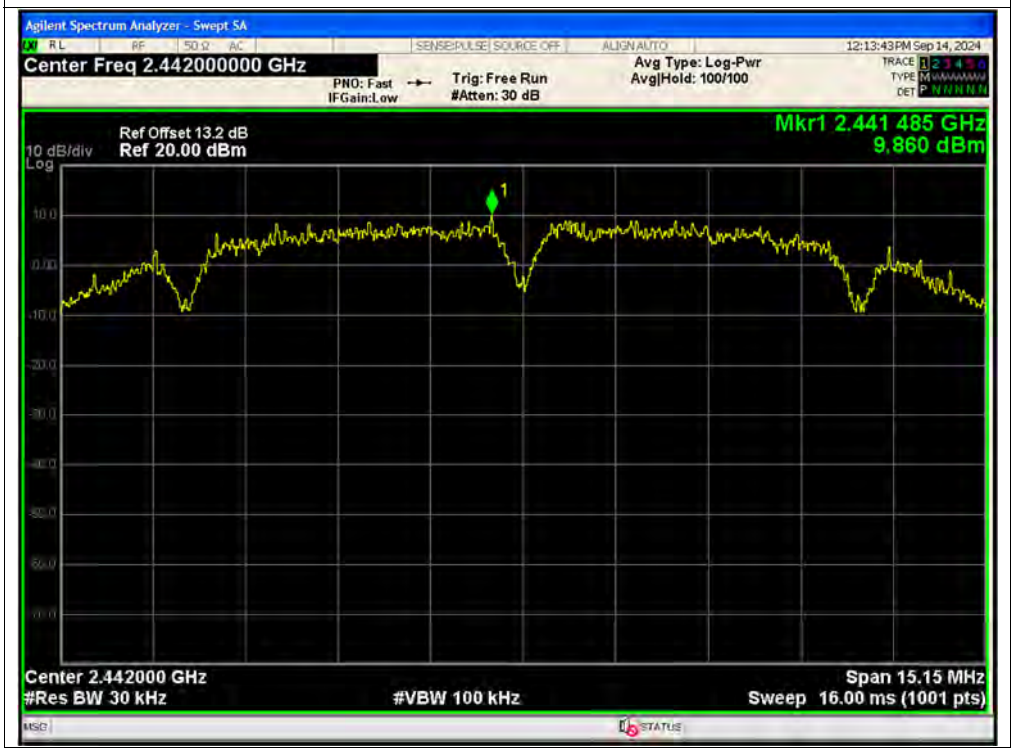
A.7. Power Spectral Density

Condition	Mode	Frequency (MHz)	Antenna	Conducted PSD (dBm/3kHz)	Duty Factor (dB)	Total PSD (dBm/3kHz)	Limit (dBm/3kHz)	Verdict
NVNT	b	2412	Ant1	0.33	0	0.33	8	Pass
NVNT	b	2442	Ant1	-0.14	0	-0.14	8	Pass
NVNT	b	2472	Ant1	0.26	0	0.26	8	Pass
NVNT	b	2412	Ant2	0.13	0	0.13	8	Pass
NVNT	b	2442	Ant2	-0.09	0	-0.09	8	Pass
NVNT	b	2472	Ant2	0.31	0	0.31	8	Pass
NVNT	g	2412	Ant1	-3.32	0	-3.32	8	Pass
NVNT	g	2442	Ant1	-3.69	0	-3.69	8	Pass
NVNT	g	2472	Ant1	-3.21	0	-3.21	8	Pass
NVNT	g	2412	Ant2	-3.32	0	-3.32	8	Pass
NVNT	g	2442	Ant2	-4.37	0	-4.37	8	Pass
NVNT	g	2472	Ant2	-3.3	0	-3.3	8	Pass
NVNT	n20	2412	Ant1	-4.56	0	-4.56	8	Pass
NVNT	n20	2442	Ant1	-4.72	0	-4.72	8	Pass
NVNT	n20	2472	Ant1	-4.78	0	-4.78	8	Pass
NVNT	n20	2412	Ant2	-4.71	0	-4.71	8	Pass
NVNT	n20	2442	Ant2	-4.69	0	-4.69	8	Pass
NVNT	n20	2472	Ant2	-4.8	0	-4.8	8	Pass
NVNT	n40	2422	Ant1	-6.39	0	-6.39	8	Pass
NVNT	n40	2442	Ant1	-6.51	0	-6.51	8	Pass
NVNT	n40	2462	Ant1	-6.12	0	-6.12	8	Pass
NVNT	n40	2422	Ant2	-6.16	0	-6.16	8	Pass
NVNT	n40	2442	Ant2	-6.22	0	-6.22	8	Pass
NVNT	n40	2462	Ant2	-6.35	0	-6.35	8	Pass
NVNT	ax20	2412	Ant1	-4.36	0	-4.36	8	Pass
NVNT	ax20	2442	Ant1	-4.15	0	-4.15	8	Pass
NVNT	ax20	2472	Ant1	-4	0	-4	8	Pass
NVNT	ax20	2412	Ant2	-4.88	0	-4.88	8	Pass
NVNT	ax20	2442	Ant2	-4.43	0	-4.43	8	Pass
NVNT	ax20	2472	Ant2	-3.99	0	-3.99	8	Pass
NVNT	ax40	2422	Ant1	-7.87	0	-7.87	8	Pass
NVNT	ax40	2442	Ant1	-8.21	0	-8.21	8	Pass
NVNT	ax40	2462	Ant1	-7.9	0	-7.9	8	Pass
NVNT	ax40	2422	Ant2	-7.88	0	-7.88	8	Pass

NVNT	ax40	2442	Ant2	-8.07	0	-8.07	8	Pass
NVNT	ax40	2462	Ant2	-8.25	0	-8.25	8	Pass
NVNT	ax20 52@37	2412	Ant1	-11.3	0	-11.3	8	Pass
NVNT	ax20 52@37	2442	Ant1	-10.1	0	-10.1	8	Pass
NVNT	ax20 52@37	2472	Ant1	-9.78	0	-9.78	8	Pass
NVNT	ax20 52@37	2412	Ant2	-7.82	0	-7.82	8	Pass
NVNT	ax20 52@37	2442	Ant2	-6.92	0	-6.92	8	Pass
NVNT	ax20 52@37	2472	Ant2	-6.97	0	-6.97	8	Pass
NVNT	ax40 106@53	2422	Ant1	-12.37	0	-12.37	8	Pass
NVNT	ax40 106@53	2442	Ant1	-13.2	0	-13.2	8	Pass
NVNT	ax40 106@53	2462	Ant1	-10.52	0	-10.52	8	Pass
NVNT	ax40 106@53	2422	Ant2	-10.46	0	-10.46	8	Pass
NVNT	ax40 106@53	2442	Ant2	-9.92	0	-9.92	8	Pass
NVNT	ax40 106@53	2462	Ant2	-7.99	0	-7.99	8	Pass

Test Graphs
PSD NVNT b 2412MHz Ant1

PSD NVNT b 2442MHz Ant1



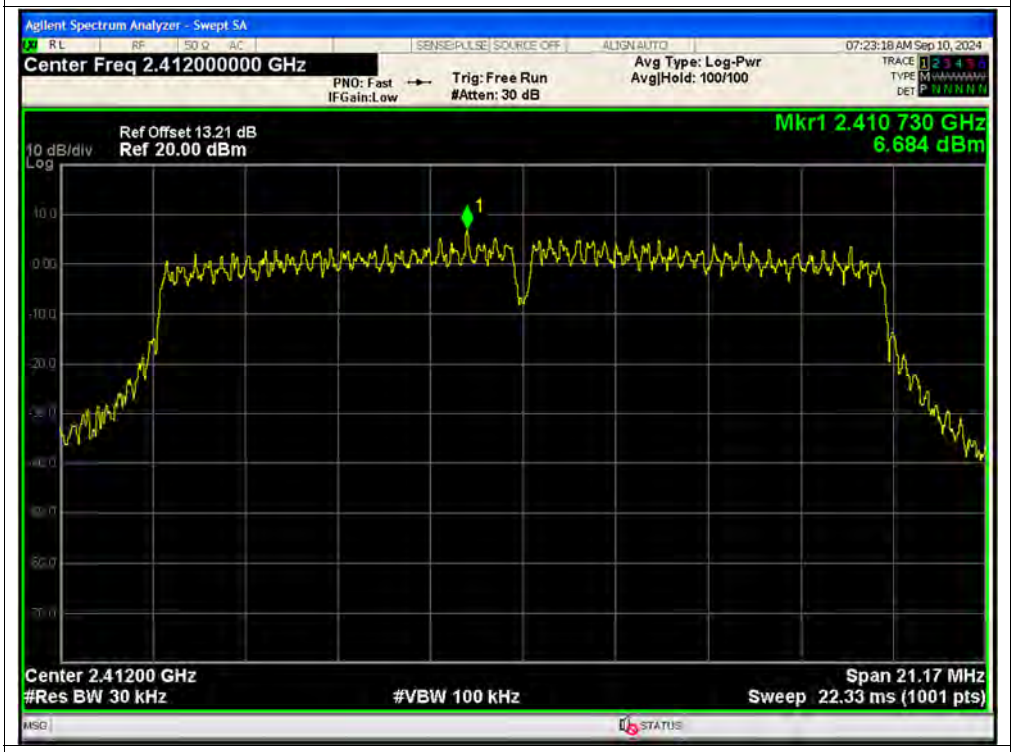
PSD NVNT b 2472MHz Ant1

PSD NVNT b 2412MHz Ant2

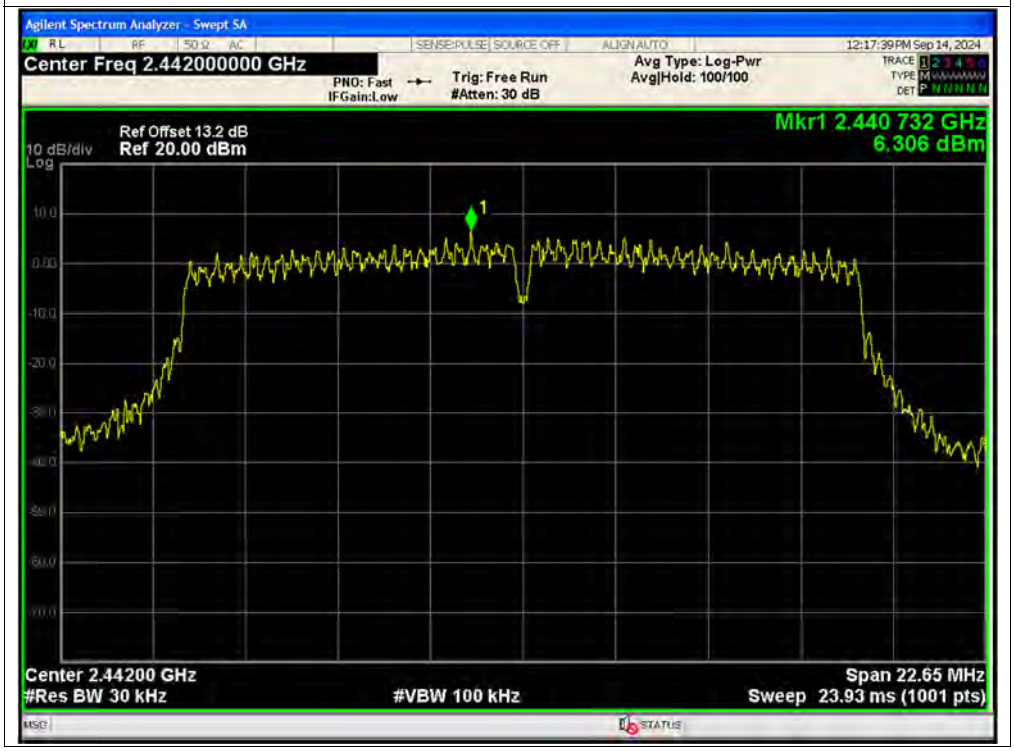
PSD NVNT b 2442MHz Ant2

PSD NVNT b 2472MHz Ant2

PSD NVNT g 2412MHz Ant1



PSD NVNT g 2442MHz Ant1



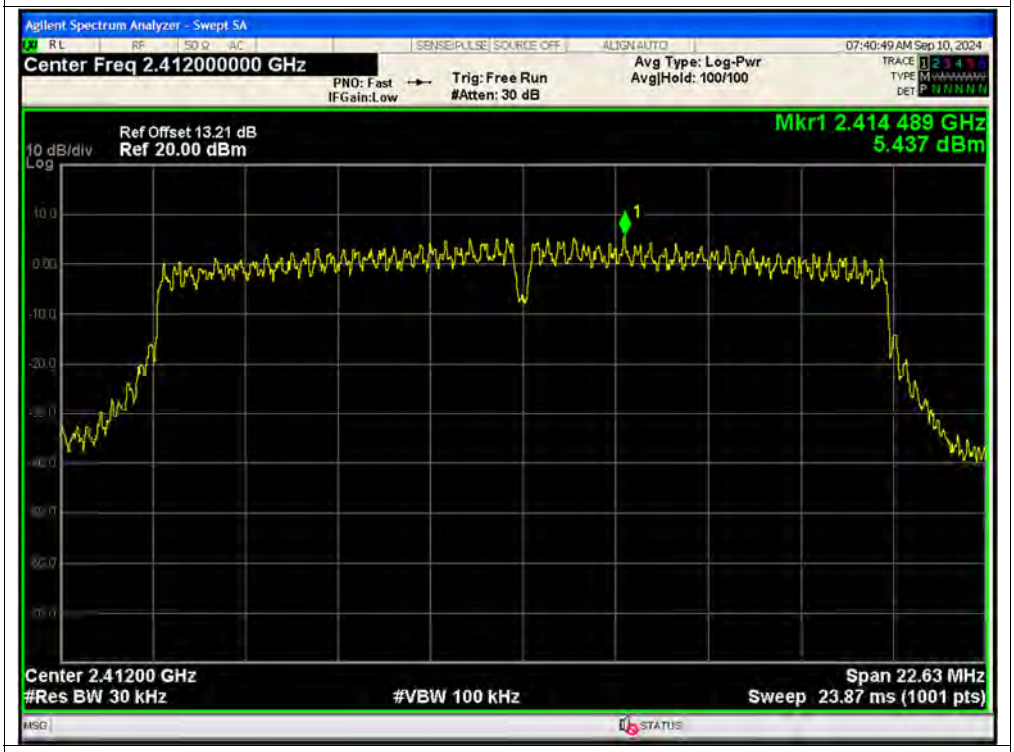
PSD NVNT g 2472MHz Ant1

PSD NVNT g 2412MHz Ant2

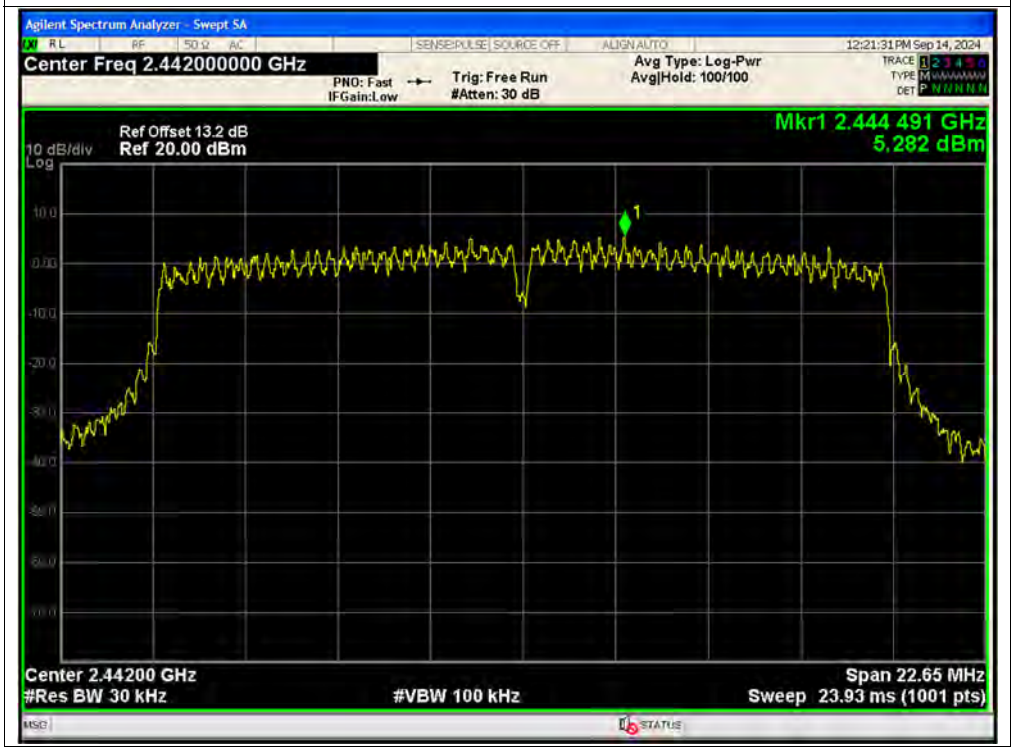
PSD NVNT g 2442MHz Ant2

PSD NVNT g 2472MHz Ant2

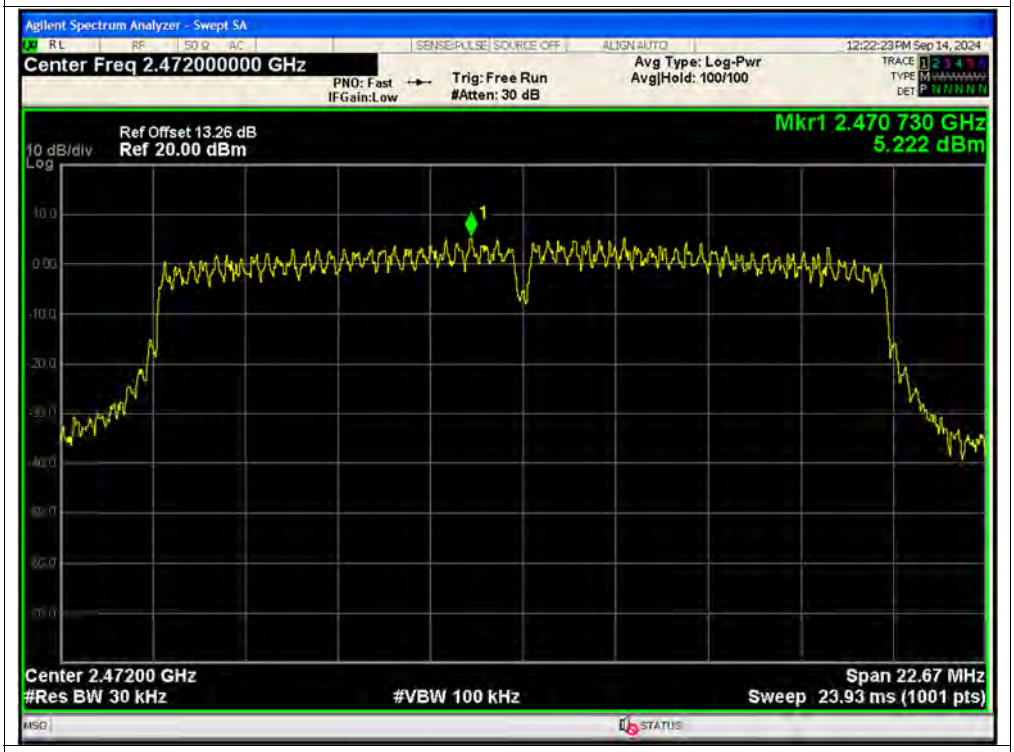
PSD NVNT n20 2412MHz Ant1



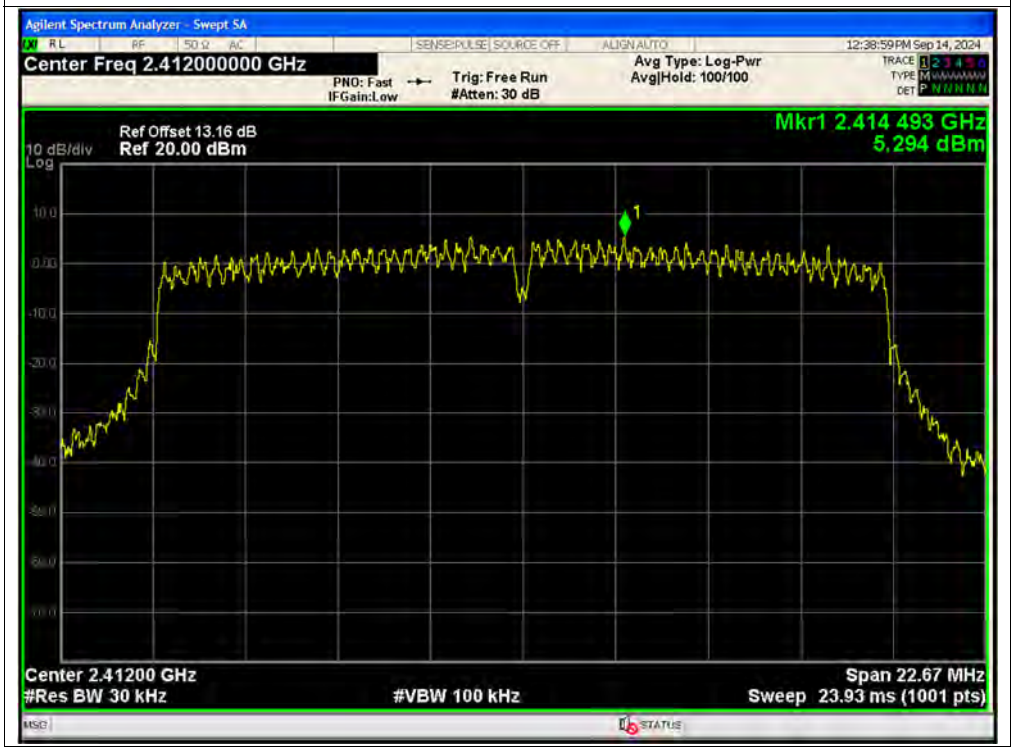
PSD NVNT n20 2442MHz Ant1



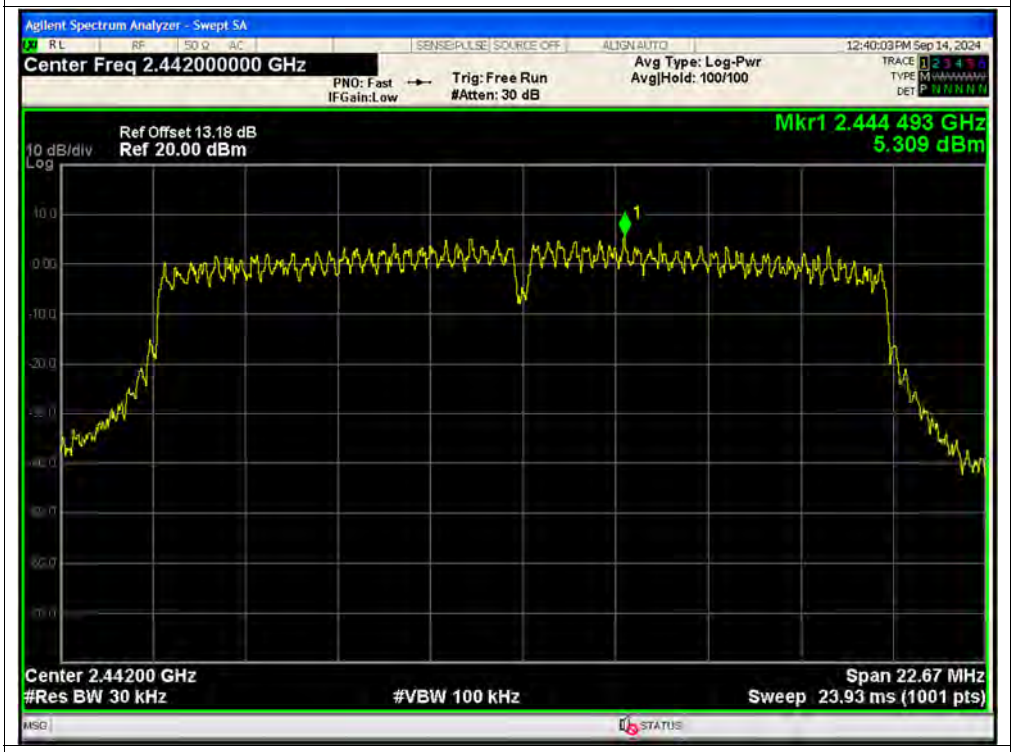
PSD NVNT n20 2472MHz Ant1



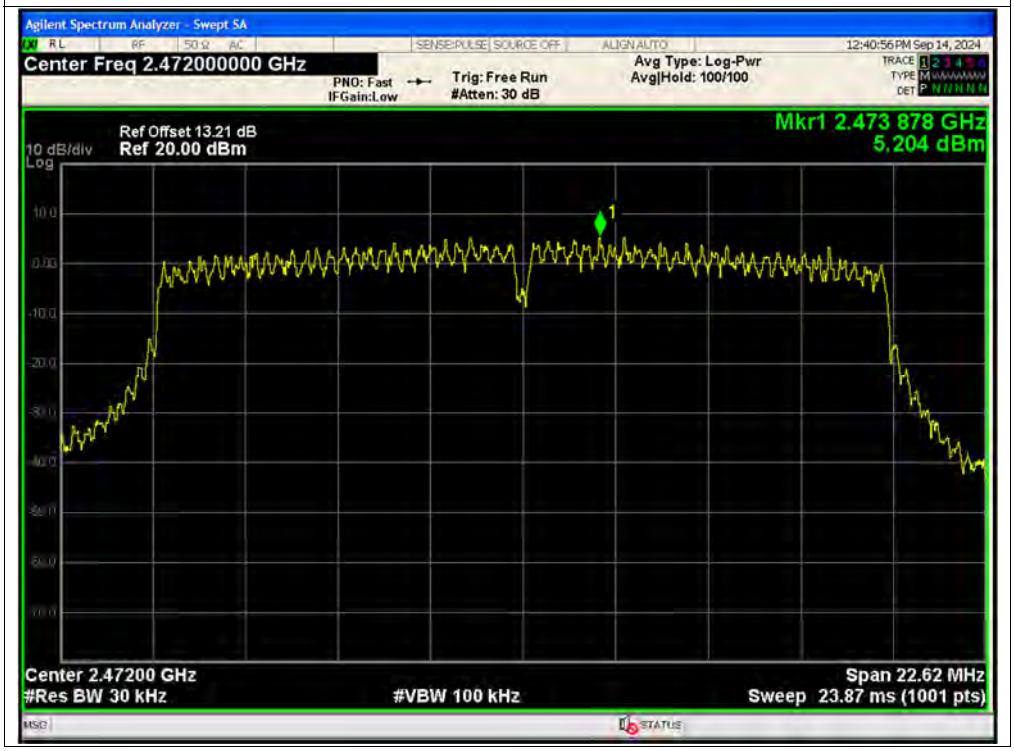
PSD NVNT n20 2412MHz Ant2



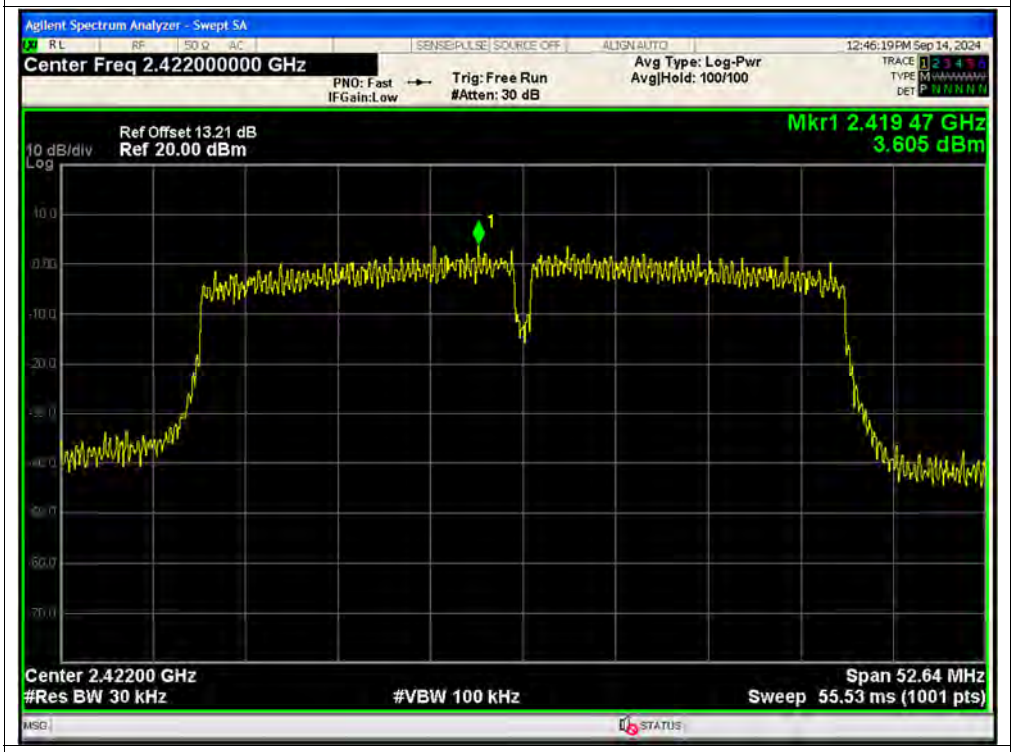
PSD NVNT n20 2442MHz Ant2



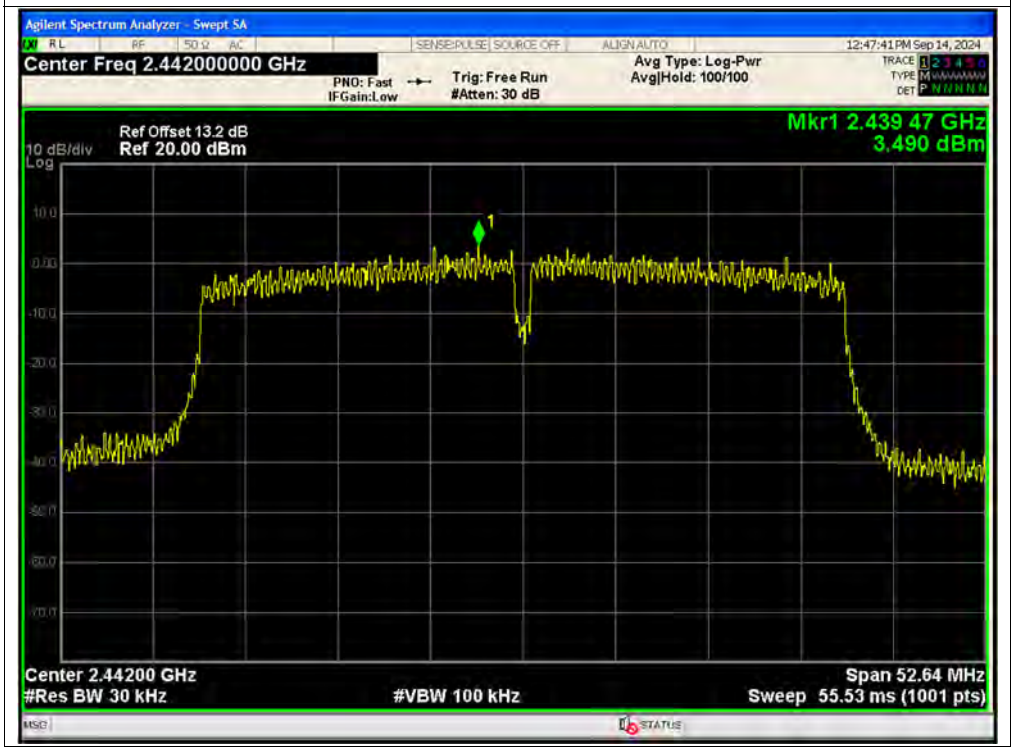
PSD NVNT n20 2472MHz Ant2



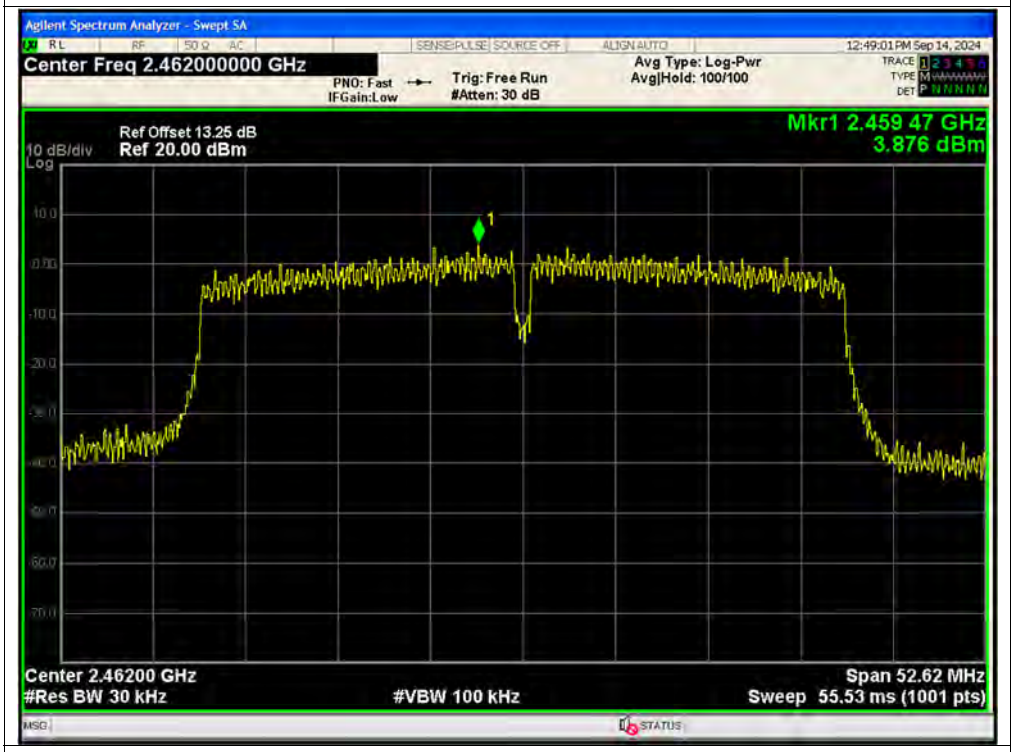
PSD NVNT n40 2422MHz Ant1



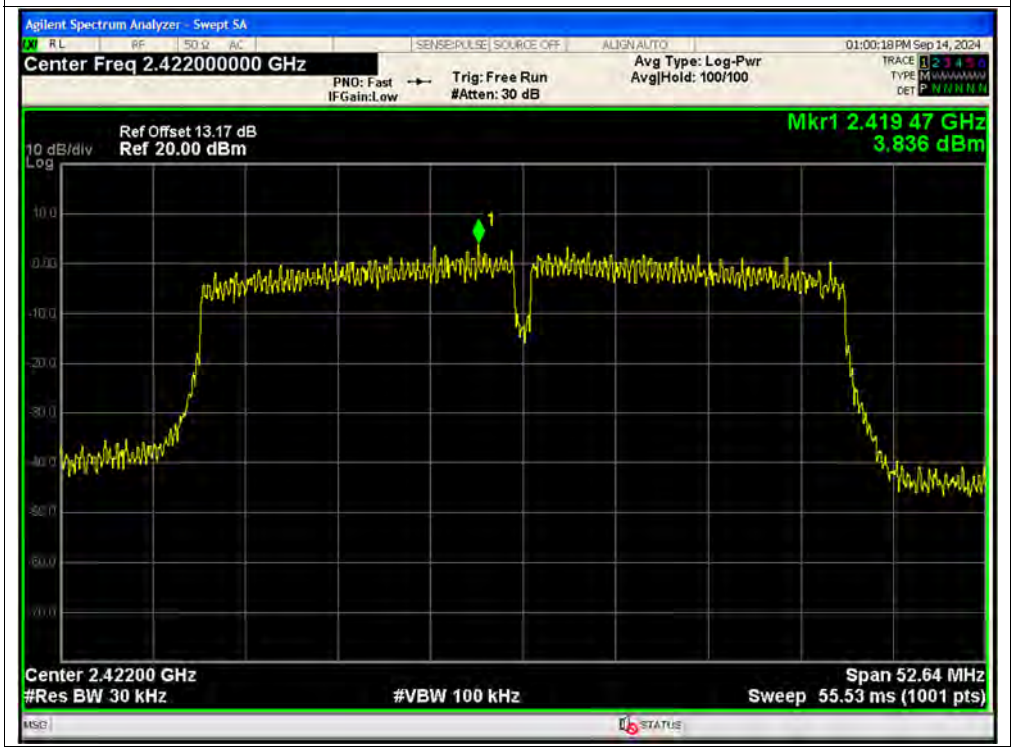
PSD NVNT n40 2442MHz Ant1



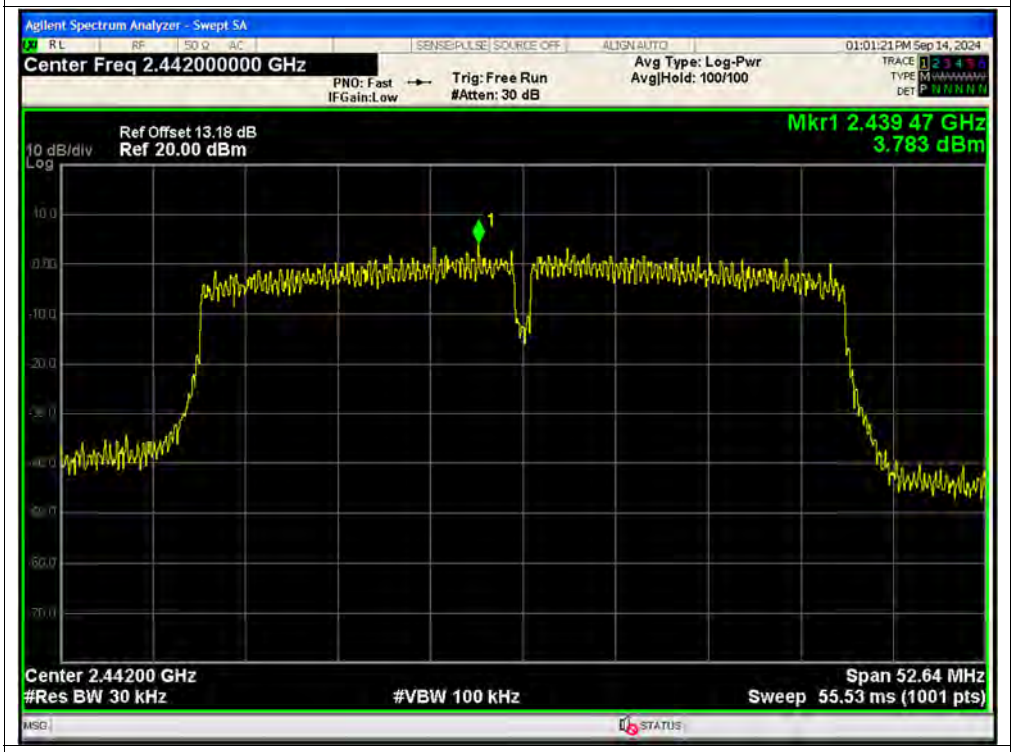
PSD NVNT n40 2462MHz Ant1



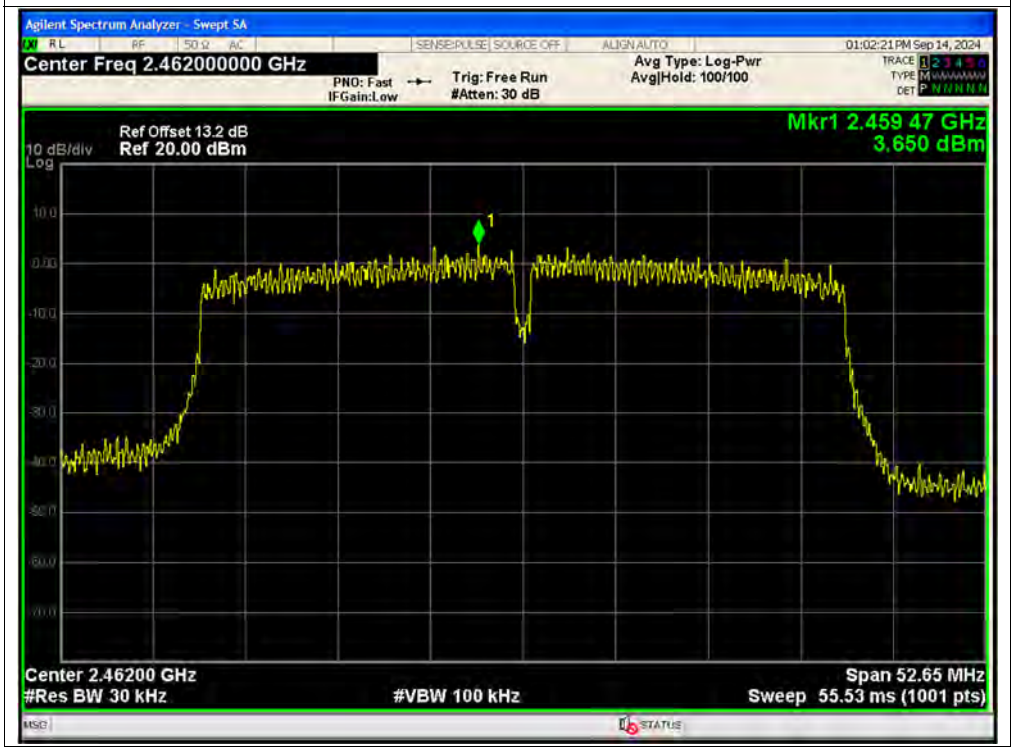
PSD NVNT n40 2422MHz Ant2



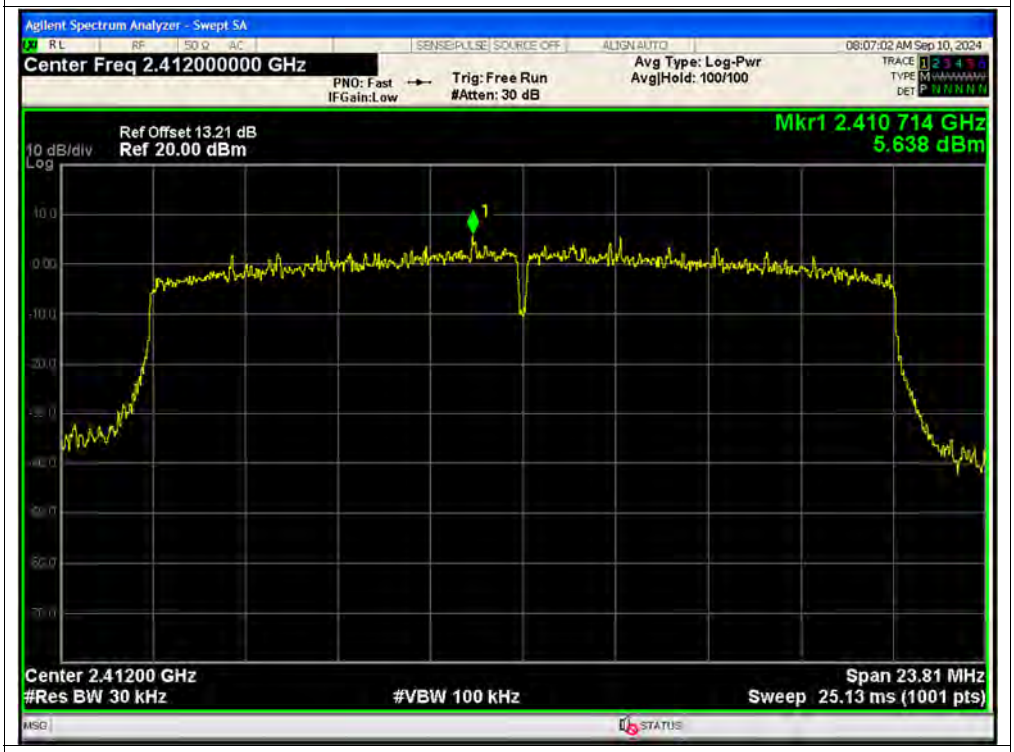
PSD NVNT n40 2442MHz Ant2



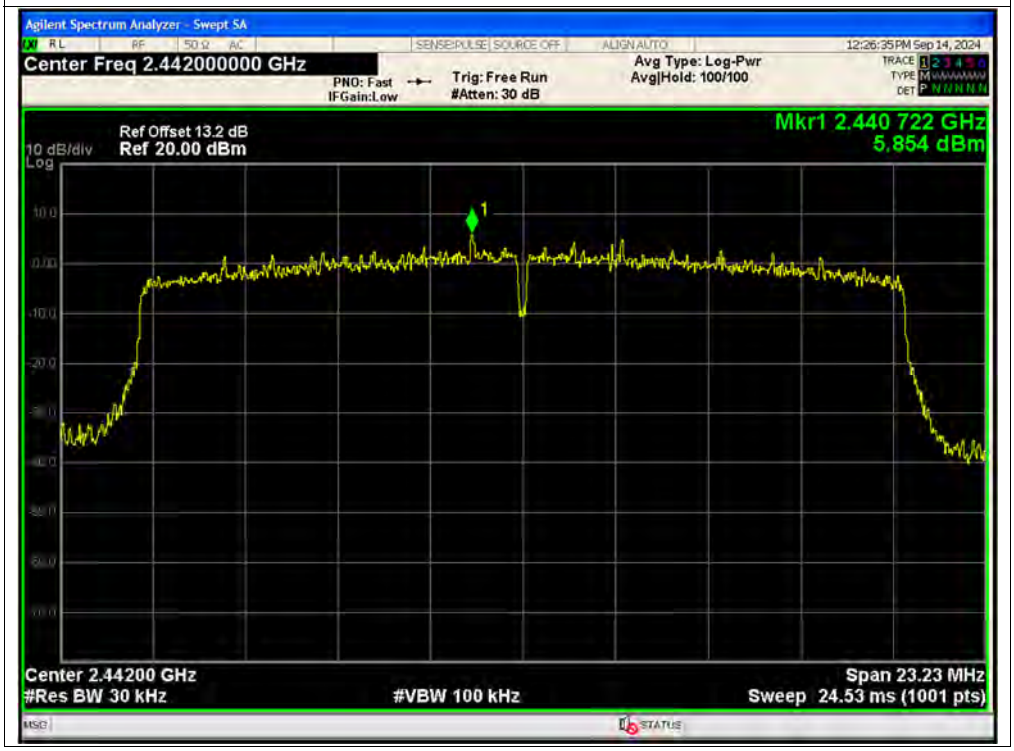
PSD NVNT n40 2462MHz Ant2



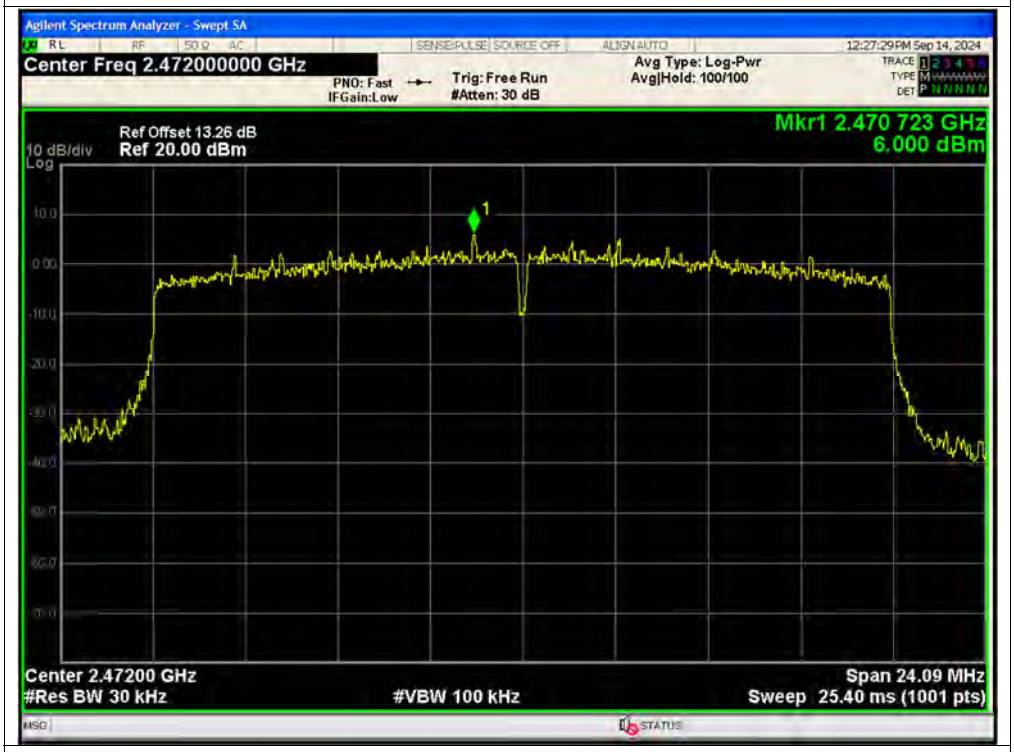
PSD NVNT ax20 2412MHz Ant1



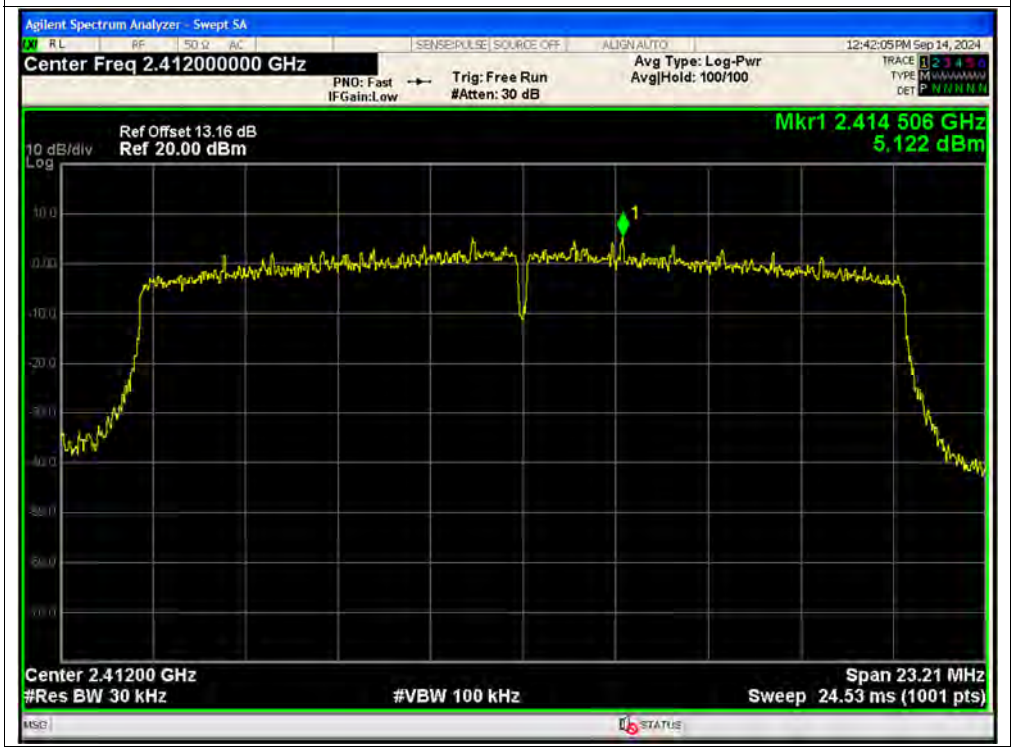
PSD NVNT ax20 2442MHz Ant1



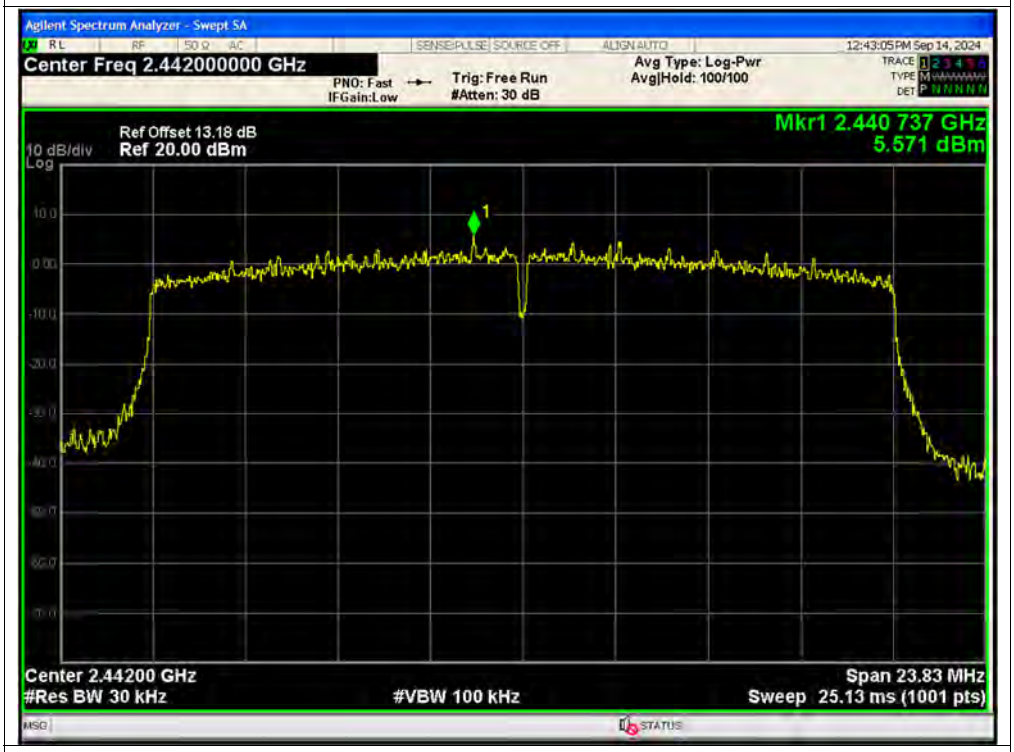
PSD NVNT ax20 2472MHz Ant1



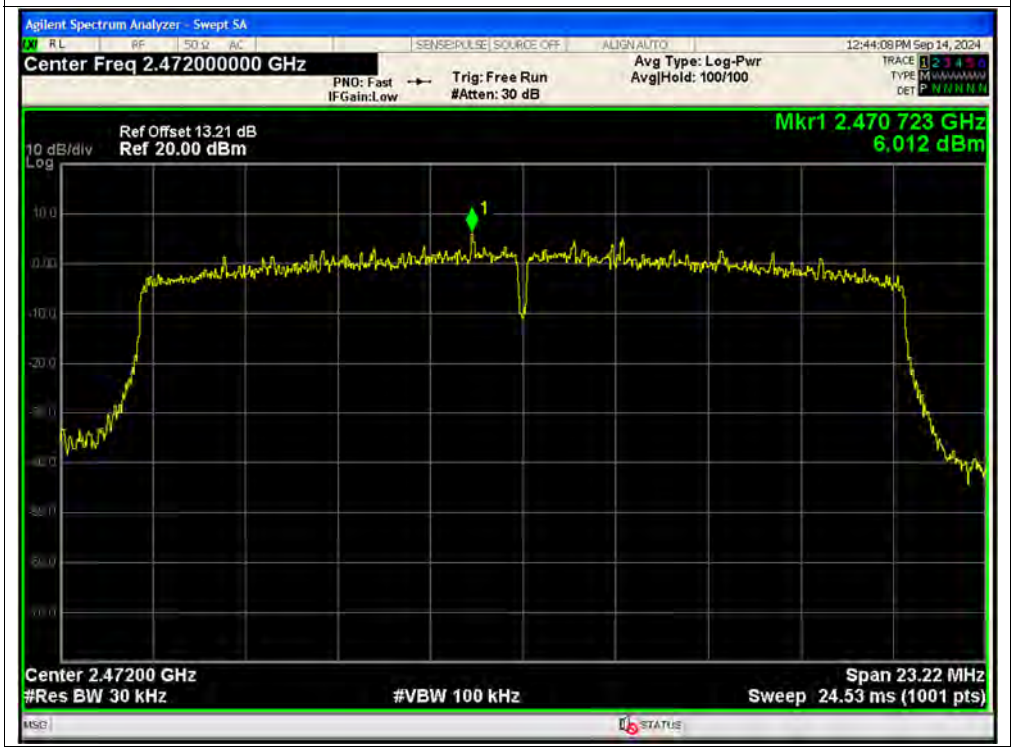
PSD NVNT ax20 2412MHz Ant2



PSD NVNT ax20 2442MHz Ant2

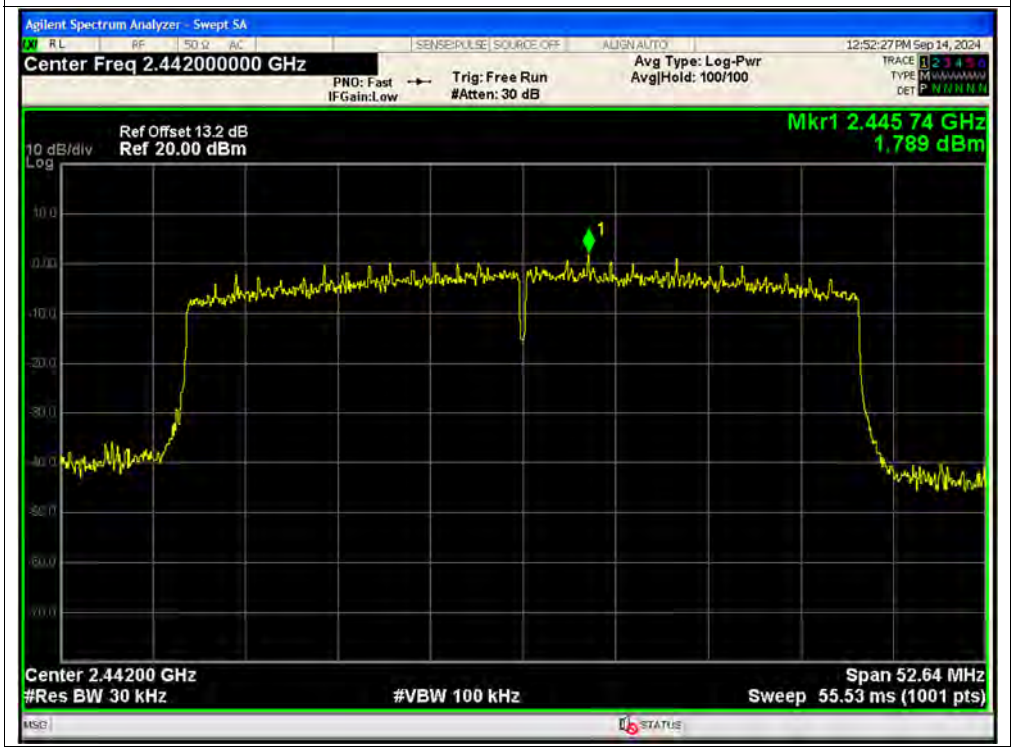


PSD NVNT ax20 2472MHz Ant2

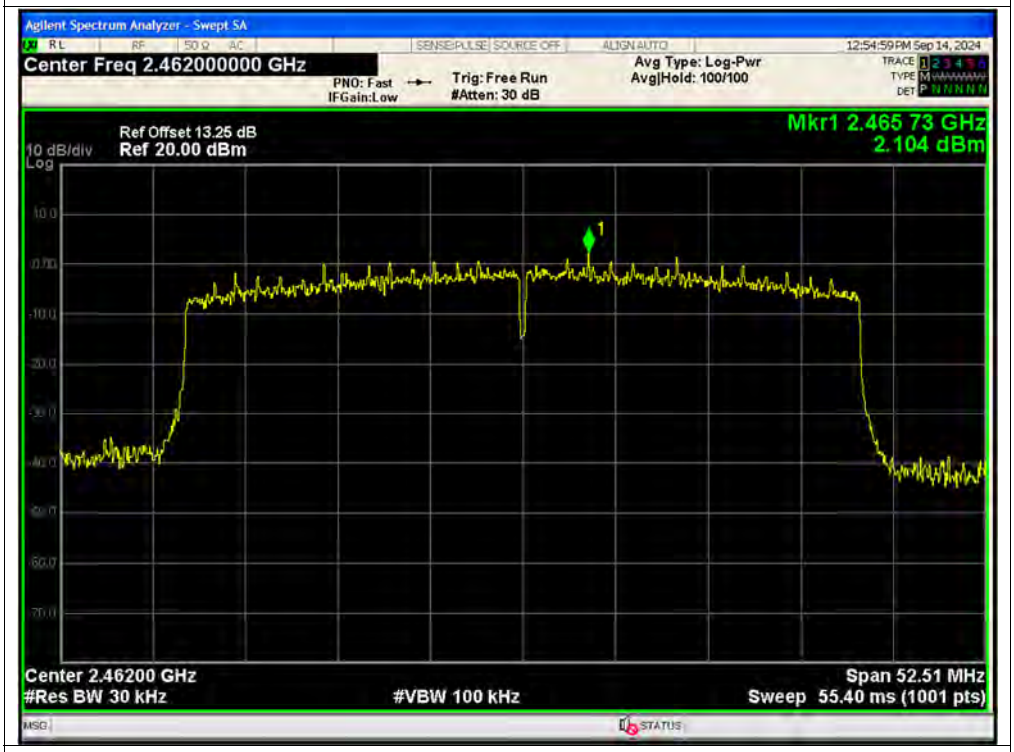


PSD NVNT ax40 2422MHz Ant1

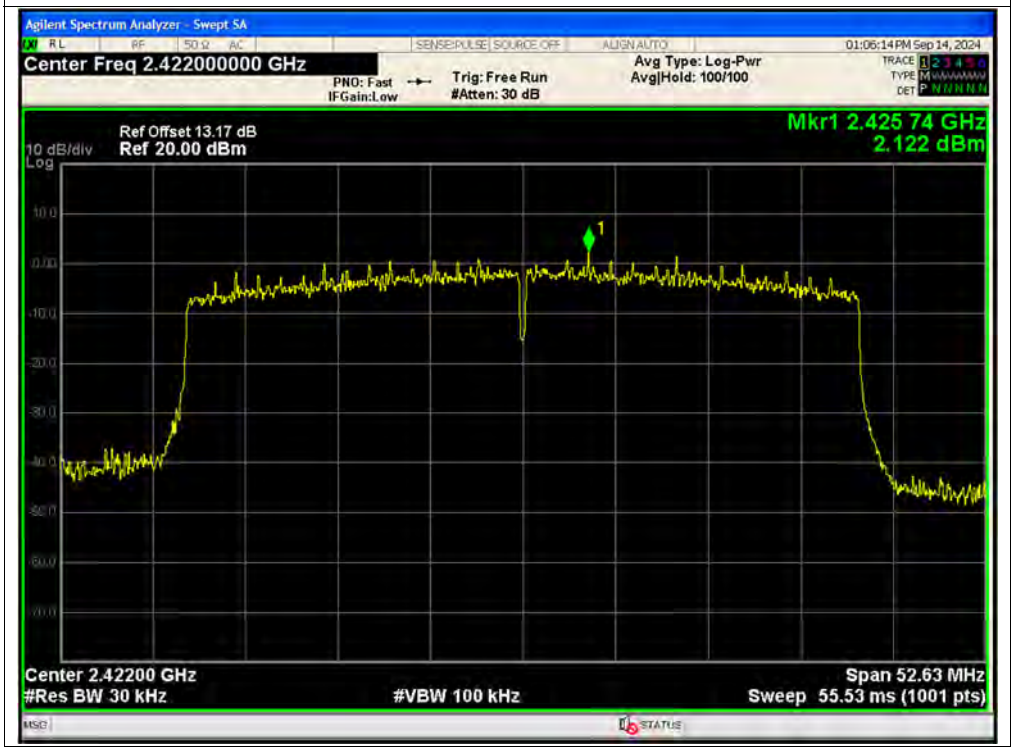
PSD NVNT ax40 2442MHz Ant1



PSD NVNT ax40 2462MHz Ant1

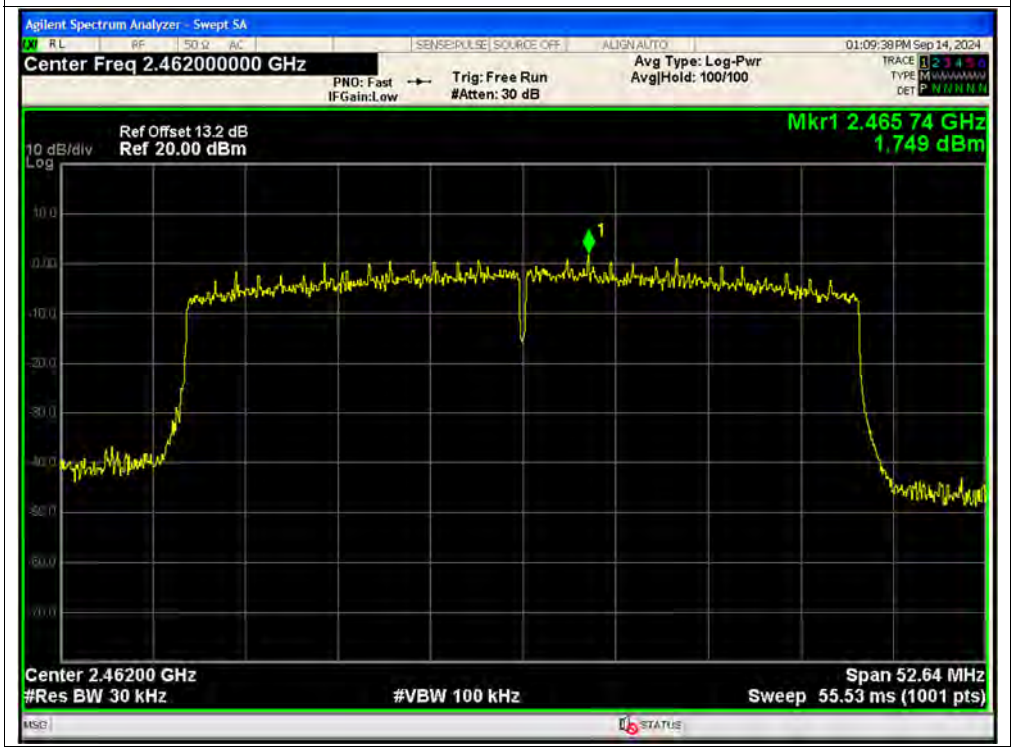


PSD NVNT ax40 2422MHz Ant2

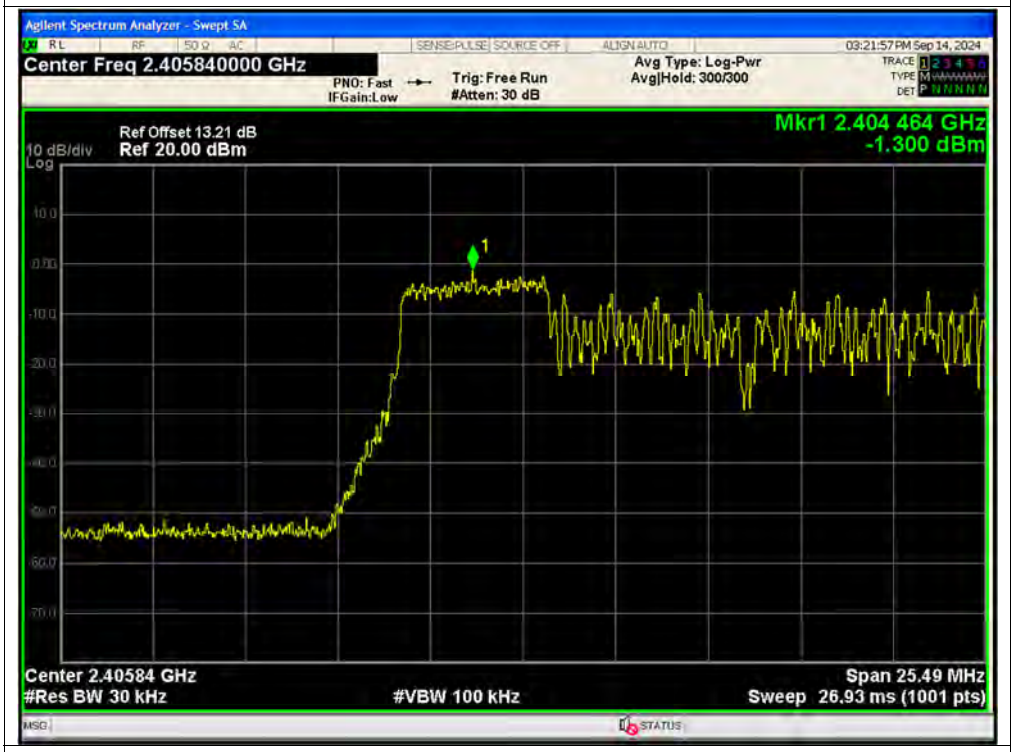


PSD NVNT ax40 2442MHz Ant2

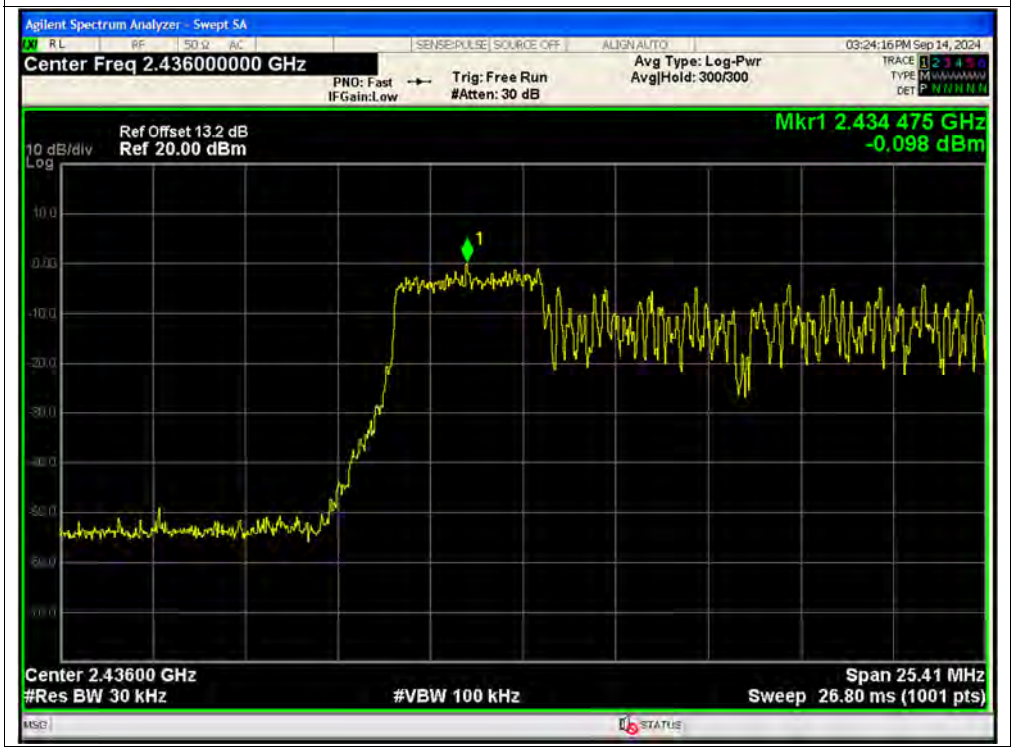
PSD NVNT ax40 2462MHz Ant2



PSD NVNT ax20 52@37 2412MHz Ant1

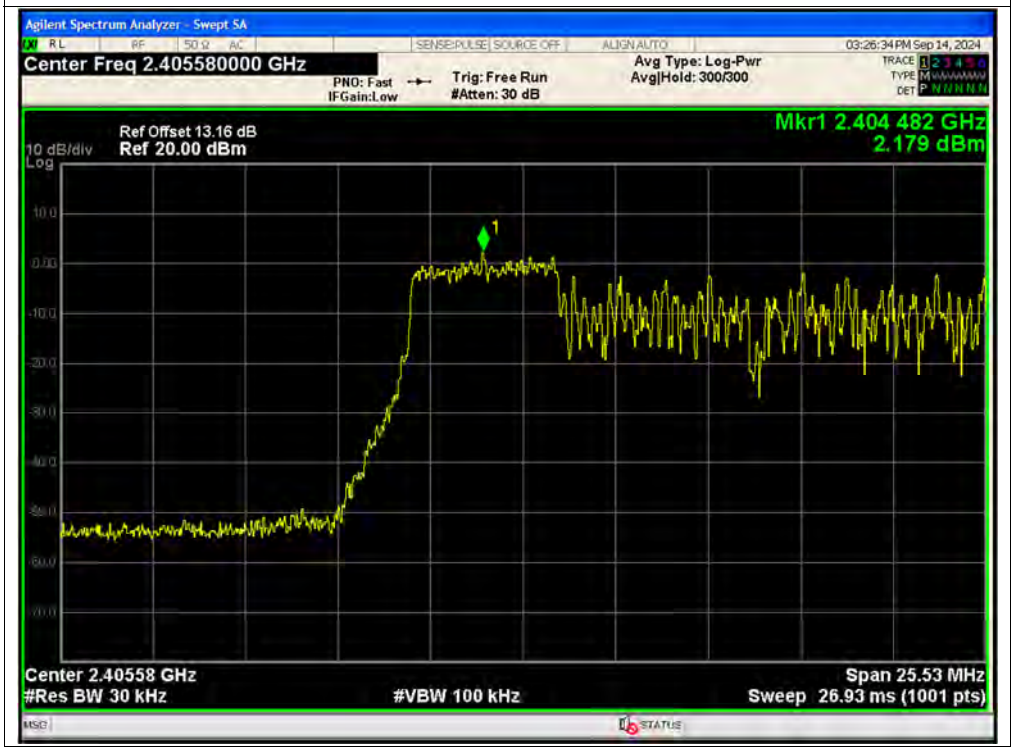


PSD NVNT ax20 52@37 2442MHz Ant1



PSD NVNT ax20 52@37 2472MHz Ant1

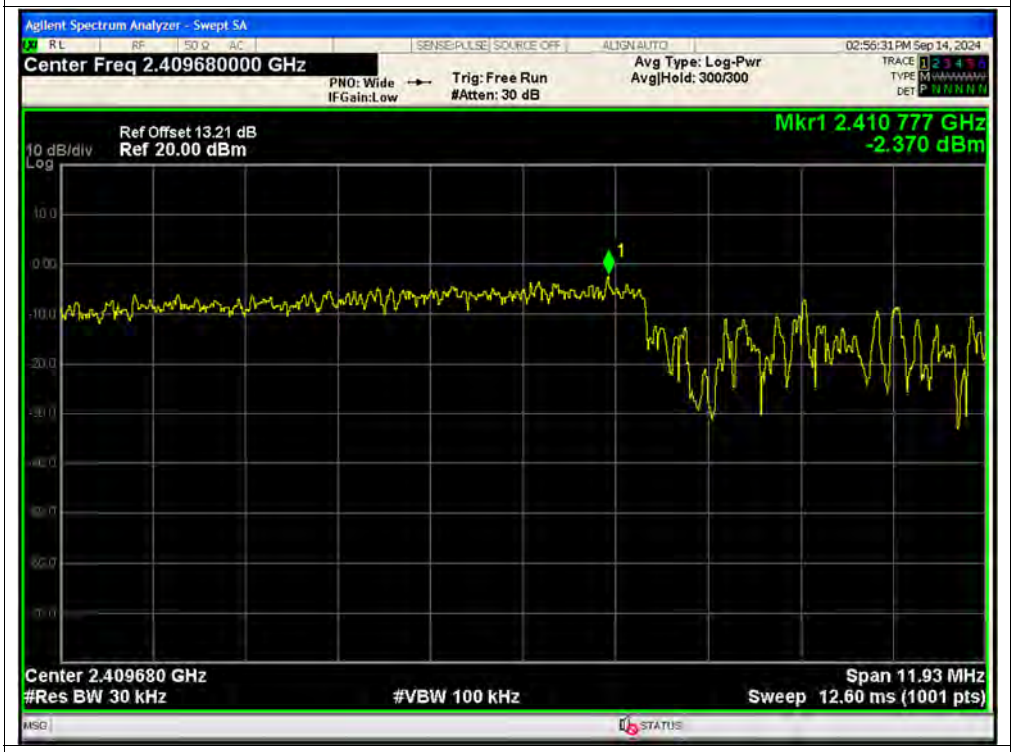
PSD NVNT ax20 52@37 2412MHz Ant2



PSD NVNT ax20 52@37 2442MHz Ant2

PSD NVNT ax20 52@37 2472MHz Ant2

PSD NVNT ax40 106@53 2422MHz Ant1

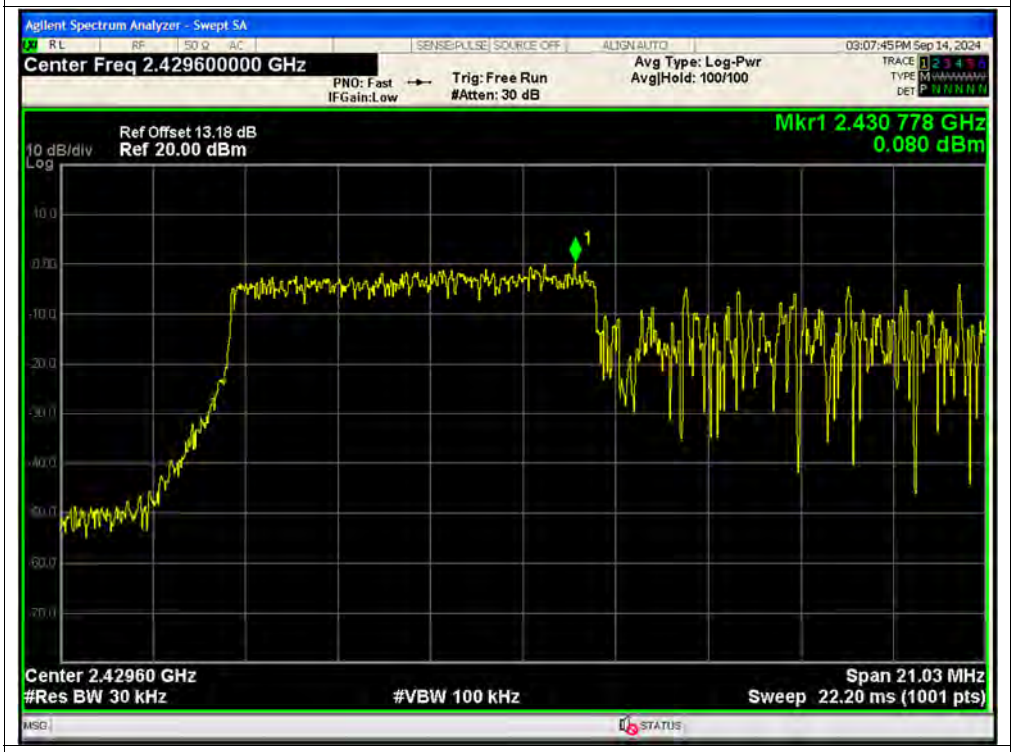


PSD NVNT ax40 106@53 2442MHz Ant1

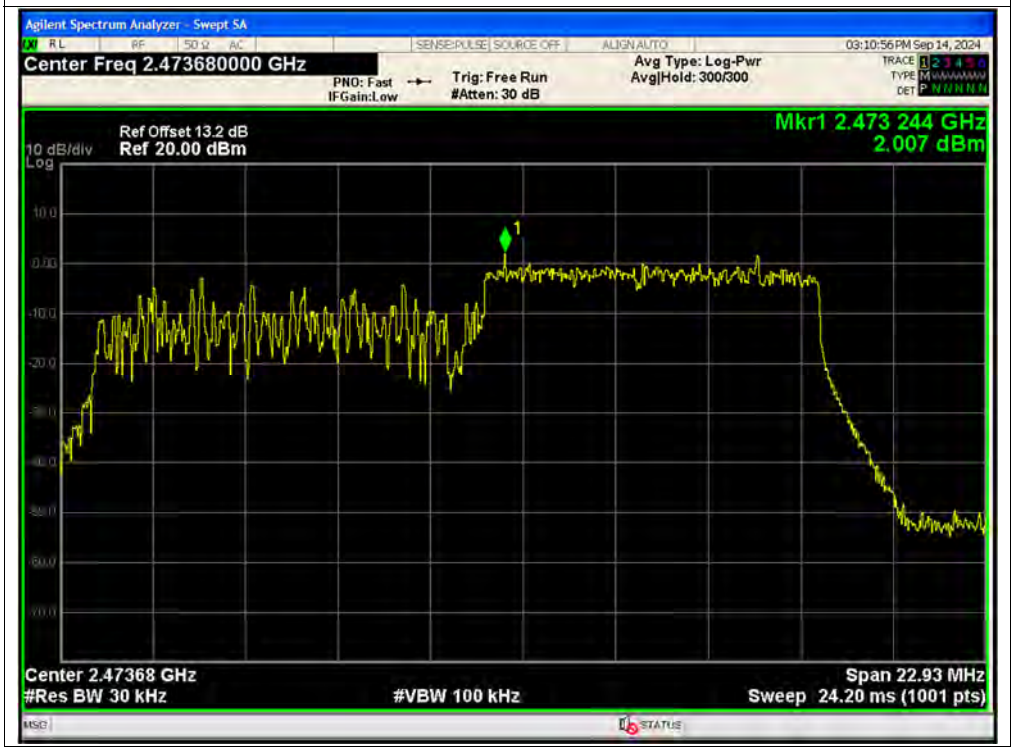
PSD NVNT ax40 106@53 2462MHz Ant1

PSD NVNT ax40 106@53 2422MHz Ant2

PSD NVNT ax40 106@53 2442MHz Ant2



PSD NVNT ax40 106@53 2462MHz Ant2



A.8. Conducted Emission

The maximum conducted interference is searched using Peak (PK), if the emission levels more than the AV and QP limits, and that have narrow margins from the AV and QP limits will be re-measured with AV and QP detectors. Tests for both L phase and N phase lines of the power mains connected to the EUT are performed. Set RBW=9kHz, VBW=30kHz. Refer to recorded points and plots below.

Note: Both of the test voltage AC 120V/60Hz and AC 230V/50Hz were considered and tested respectively, only the results of the worst case AC 120V/60Hz were recorded in this report.

A. Test Setup:

Test Mode: EUT + RJ45 Cable + Adaptor + WIFI TX

Test voltage: AC 120V/60Hz

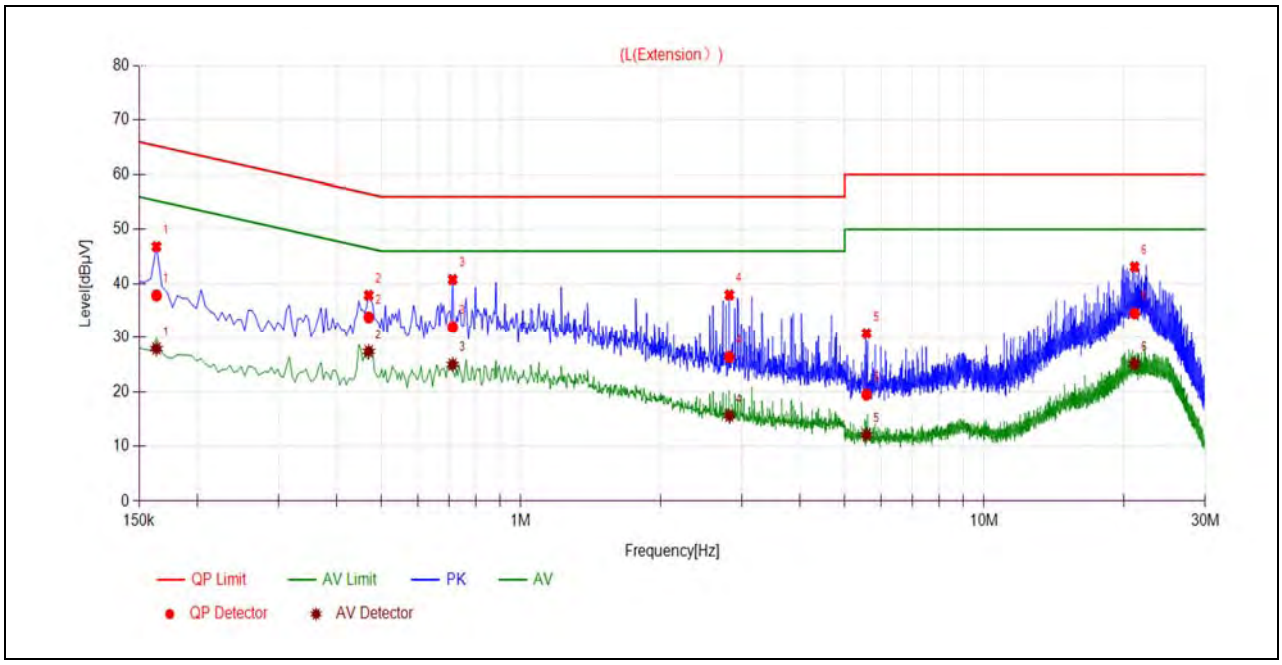
The measurement results are obtained as below:

$E\ [dB\mu V] = U_R + L_{Cable\ loss}\ [dB] + A_{Factor}$

U_R: Receiver Reading

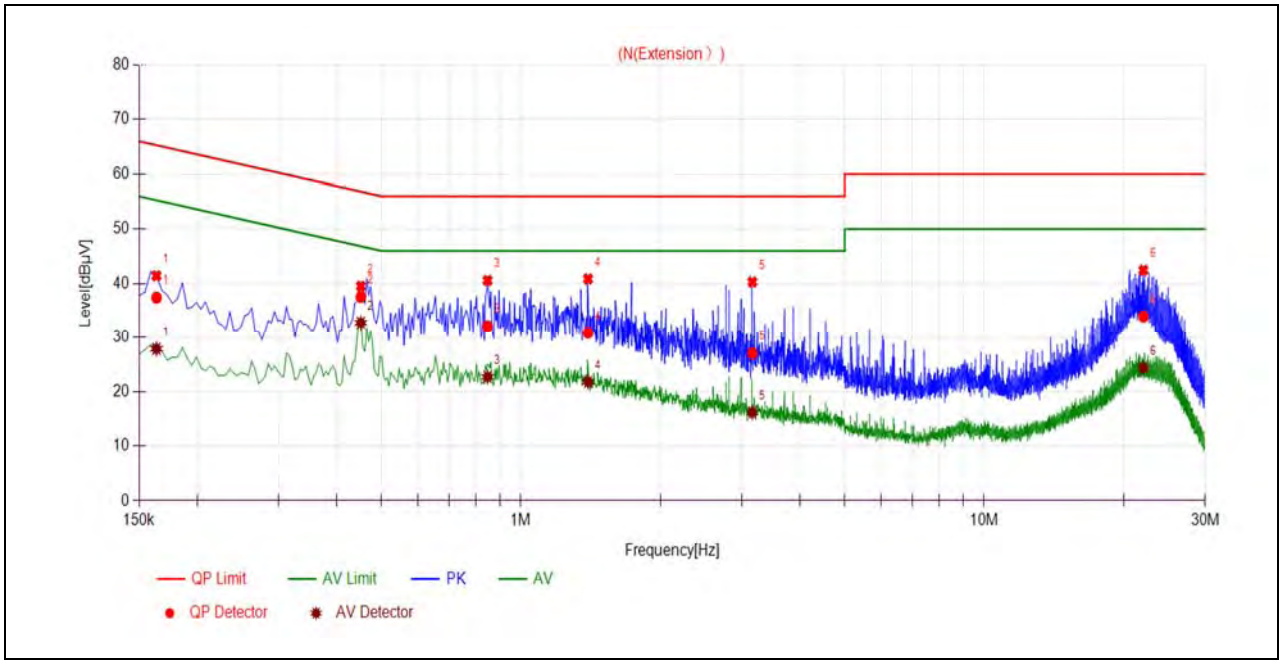
A_{Factor}: Voltage division factor of LISN

B. Test Plot:



(L Phase)

No.	Fre. (MHz)	Emission Level (dBµV)		Limit (dBµV)		Power-line	Verdict
		Quai-peak	Average	Quai-peak	Average		
1	0.1635	37.83	27.87	65.28	55.28	Line	PASS
2	0.4695	33.78	27.39	56.52	46.52		PASS
3	0.7125	31.97	24.98	56.00	46.00		PASS
4	2.8182	26.38	15.56	56.00	46.00		PASS
5	5.5728	19.44	12.06	60.00	50.00		PASS
6	21.1229	34.53	25.11	60.00	50.00		PASS



(N Phase)

No.	Fre. (MHz)	Emission Level (dBµV)		Limit (dBµV)		Power-line	Verdict
		Quai-peak	Average	Quai-peak	Average		
1	0.1635	37.41	27.87	65.28	55.28	Neutral	PASS
2	0.4515	37.56	32.78	56.85	46.85		PASS
3	0.8474	32.14	22.67	56.00	46.00		PASS
4	1.3965	30.88	21.75	56.00	46.00		PASS
5	3.1602	27.04	16.11	56.00	46.00		PASS
6	22.0601	33.94	24.35	60.00	50.00		PASS

A.9. Restricted Frequency Bands

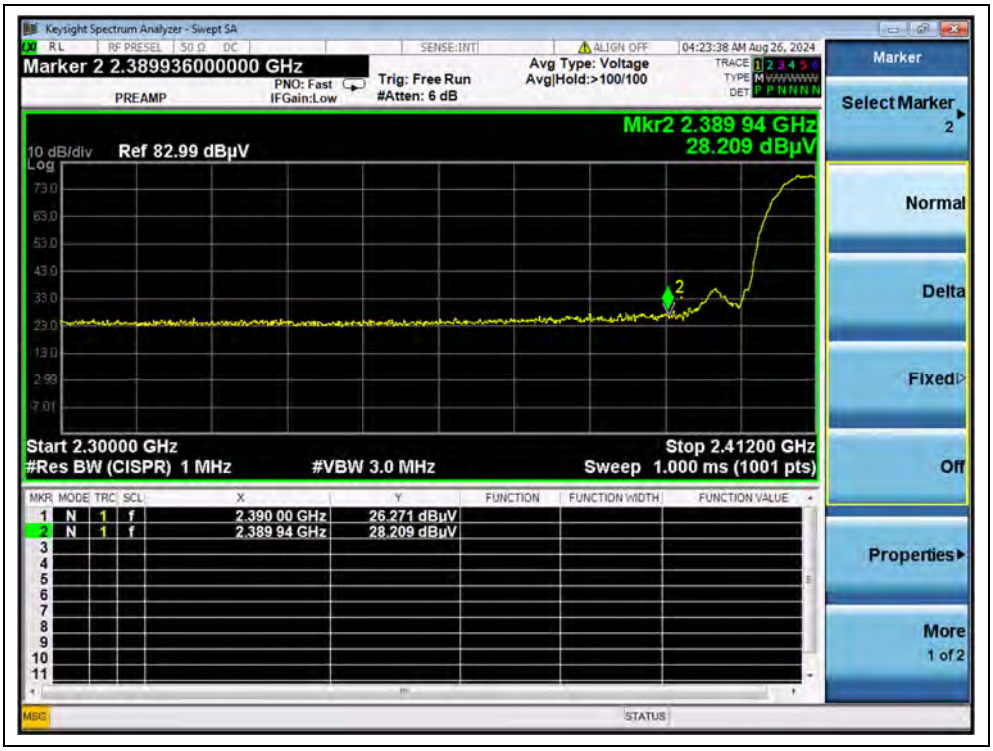
The lowest and highest channels are tested to verify the Restricted Frequency Bands.
The measurement results are obtained as below:
E [dBμV/m] =U_R + A_T + A_{Factor} [dB]; A_T =$L_{Cable\ loss}$ [dB]-G_{preamp} [dB]
A_T: Total correction Factor except Antenna
U_R: Receiver Reading
G_{preamp}: Preamplifier Gain
A_{Factor}: Antenna Factor at 3m

Note 1: Restricted Frequency Bands were performed when antenna was at vertical and horizontal polarity, and only the worse test condition was recorded in this test report.

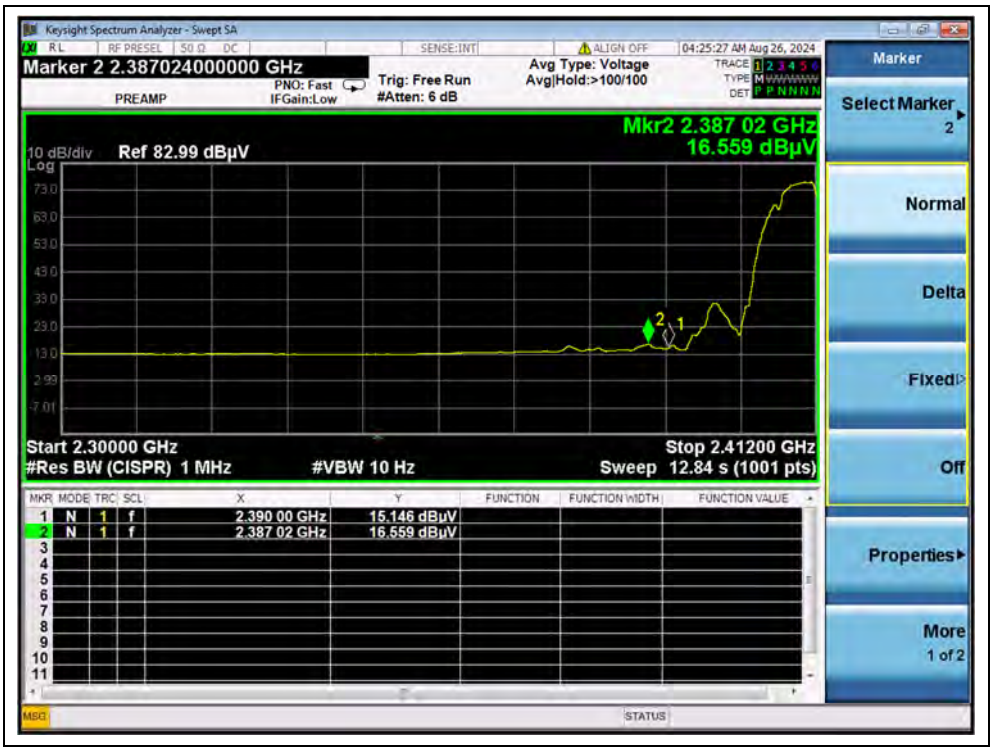
Note 2 All test modes and bandwidth were considered and evaluated respectively by performing full test, only the worst data were recorded for each bandwidth.

802.11b Mode

Channel	Frequency (MHz)	Detector	Receiver Reading U_R (dBμV)	A_T (dB)	A_{Factor} (dB@3m)	Max. Emission E (dBμV/m)	Limit (dBμV/m)	Verdict
		PK/ AV						
1	2389.94	PK	28.21	6.74	27.20	62.15	74	PASS
1	2387.02	AV	16.56	6.74	27.20	50.50	54	PASS
13	2484.38	PK	27.66	6.74	27.20	61.60	74	PASS
13	2484.40	AV	19.54	6.74	27.20	53.48	54	PASS



(PEAK, Channel 1, 802.11b)



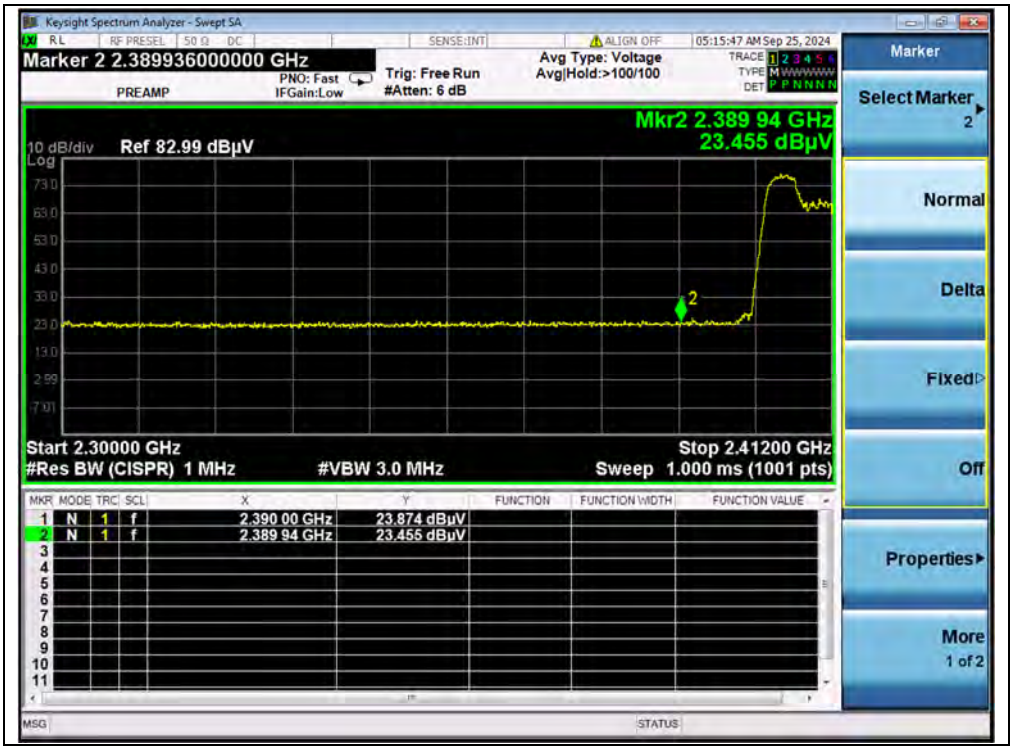
(AVERAGE, Channel 1, 802.11b)

(PEAK, Channel 13, 802.11b)

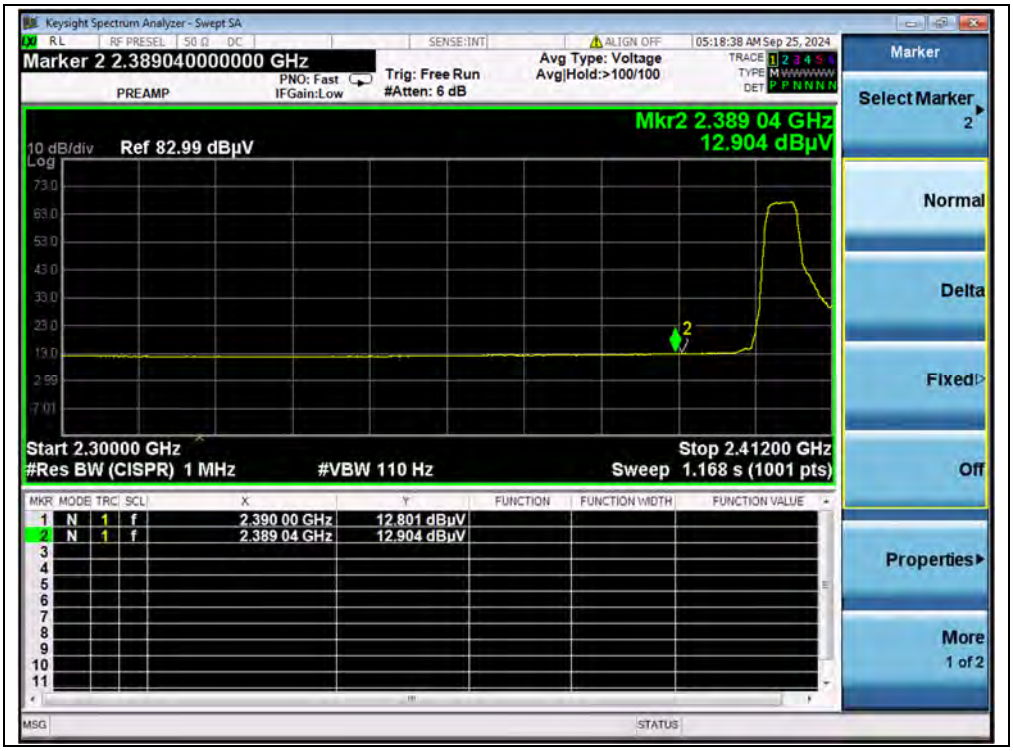
(AVERAGE, Channel 13, 802.11b)

802.11ax (HEW20) Mode

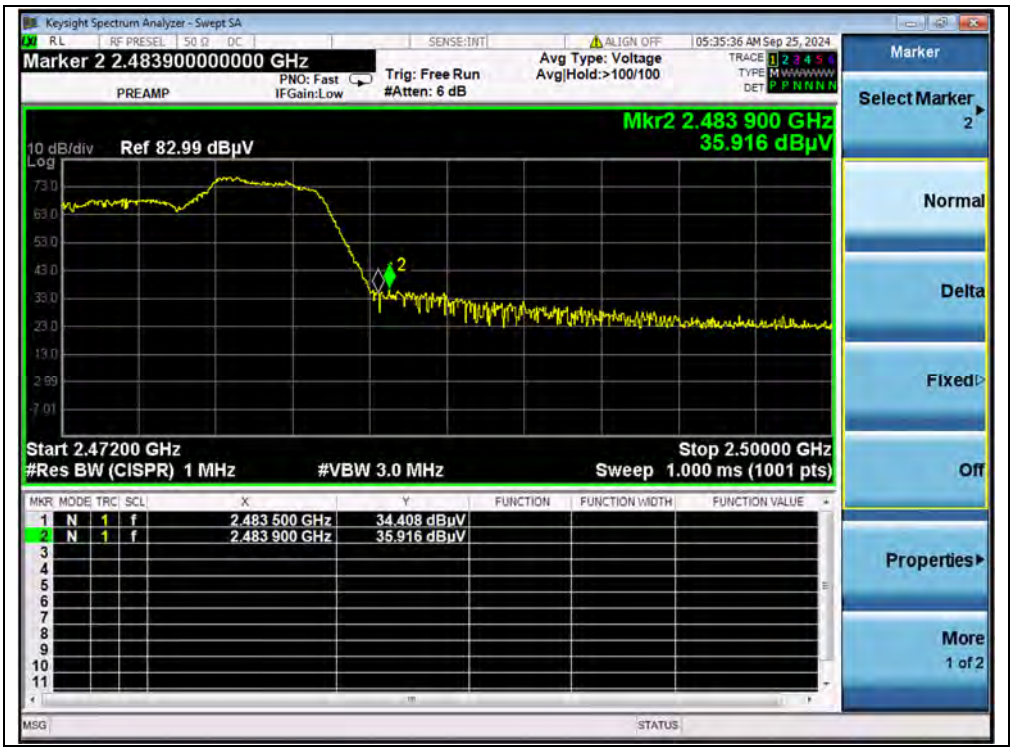
Channel	Frequency (MHz)	Detector PK/ AV	Receiver Reading U_R (dBμV)	A_T (dB)	A_{Factor} (dB@3m)	Max. Emission E (dBμV/m)	Limit (dBμV/m)	Verdict
1	2305.71	PK	25.47	6.74	27.20	59.41	74	PASS
1	2389.70	AV	12.55	6.74	27.20	46.49	54	PASS
13	2484.24	PK	36.82	6.74	27.20	70.76	74	PASS
13	2483.50	AV	14.93	6.74	27.20	48.87	54	PASS



(PEAK, Channel 1, 802.11ax (HEW20))



(AVERAGE, Channel 1, 802.11ax (HEW20))

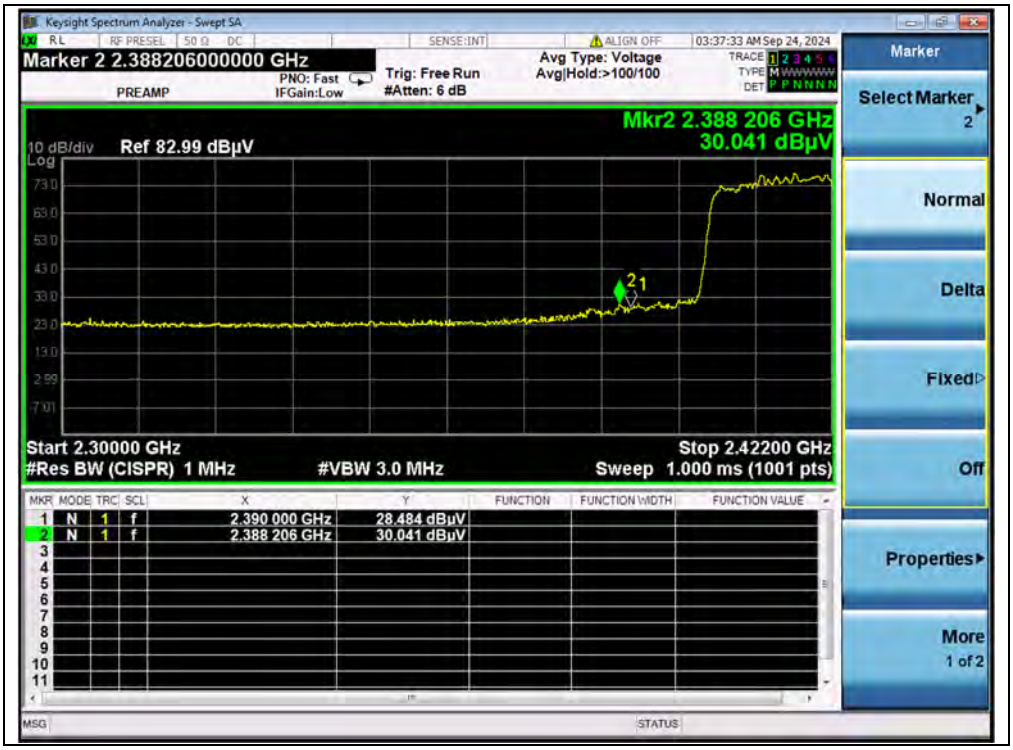


(PEAK, Channel 13, 802.11ax (HEW20))

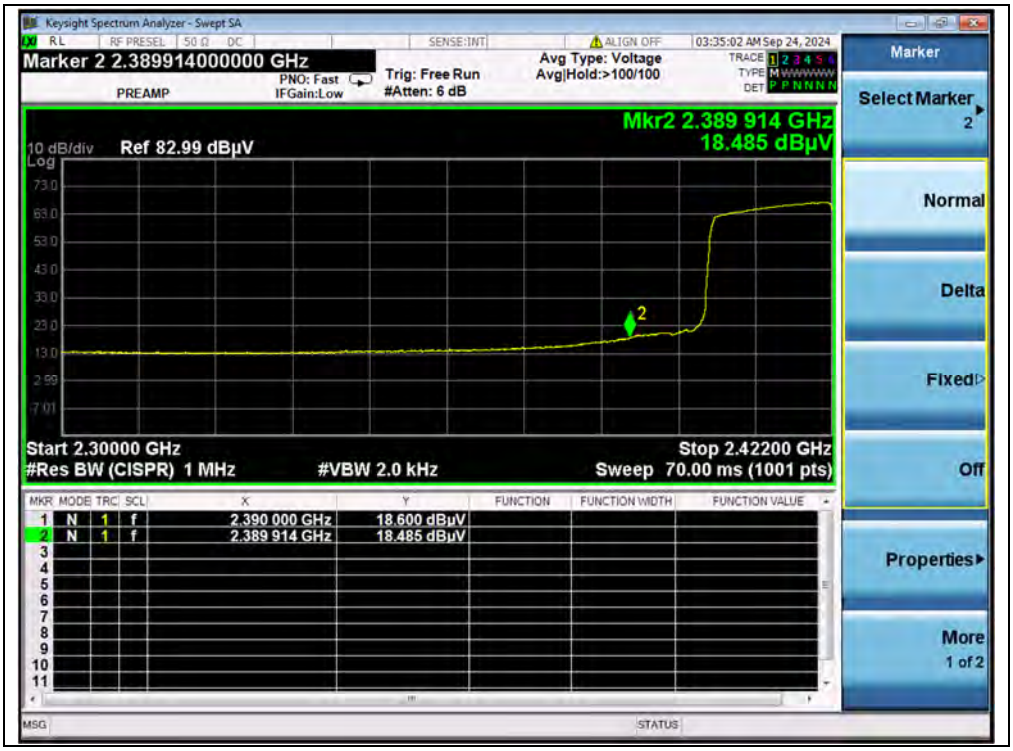
(AVERAGE, Channel 13, 802.11ax (HEW20))

802.11ax (HEW40) Mode

Channel	Frequency (MHz)	Detector	Receiver Reading U_R (dBμV)	A_T (dB)	A_{Factor} (dB@3m)	Max. Emission E (dBμV/m)	Limit (dBμV/m)	Verdict
		PK/ AV						
3	2388.08	PK	31.09	6.74	27.20	65.03	74	PASS
3	2389.91	AV	18.82	6.74	27.20	52.76	54	PASS
11	2496.96	PK	29.68	6.74	27.20	63.62	74	PASS
11	2483.50	AV	18.21	6.74	27.20	52.15	54	PASS



(PEAK, Channel 3, 802.11ax (HEW40))



(AVERAGE, Channel 3, 802.11ax (HEW40))

(PEAK, Channel 11, 802.11ax (HEW40))

(AVERAGE, Channel 11, 802.11ax (HEW40))

A.10. Radiated Emission

According to ANSI C63.10, because of peak detection will yield amplitudes equal to or greater than amplitudes measured with the quasi-peak (or average) detector, the measurement data from a spectrum analyzer peak detector will represent the worst-case results, if the peak measured value complies with the quasi-peak (or average) limit, it is unnecessary to perform an quasi-peak measurement (or average).

The measurement results are obtained as below:

$E\ [dB\mu V/m] = U_R + A_T + A_{Factor}\ [dB]$; $A_T = L_{Cable\ loss}\ [dB] - G_{preamp}\ [dB]$

A_T: Total correction Factor except Antenna

U_R: Receiver Reading

G_{preamp}: Preamplifier Gain

A_{Factor}: Antenna Factor at 3m

During the test, the total correction Factor A_T and A_{Factor} were built in test software.

Note1: All radiated emission tests were performed in X, Y, Z axis direction. And only the worst axis test condition was recorded in this test report.

Note2: For the frequency, which started from 9kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit was not recorded.

Note3: For the frequency, which started from 18GHz to 10th harmonic of the highest frequency, was pre-scanned and the result which was 20dB lower than the limit was not recorded.

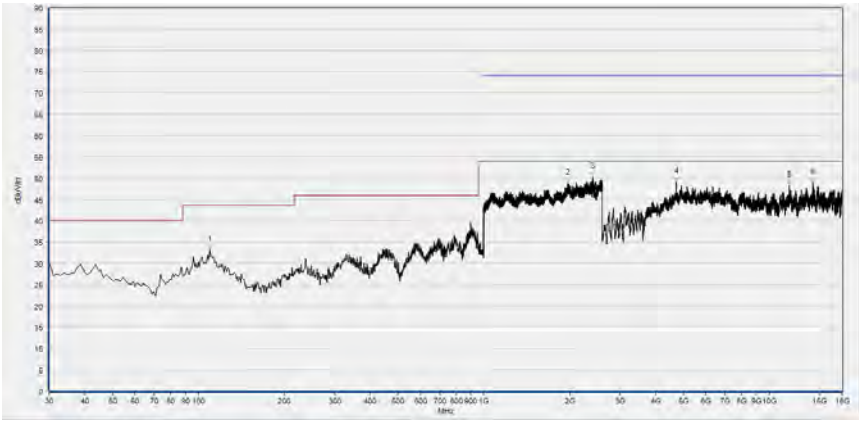
Field strength of fundamental:

Frequency (MHz)	Reading_Peak (dBμV/m)	Antenna Factor (dB)	Path Loss (dB)	Final_Peak (dBμV/m)	Antenna Polarity
2469.25	68.95	27.20	6.74	102.89	Horizontal

The field strength (the lowest) of fundamenta is more than 20dB higher than the unwanted emissions, in accordance with FCC part 15.215(b).

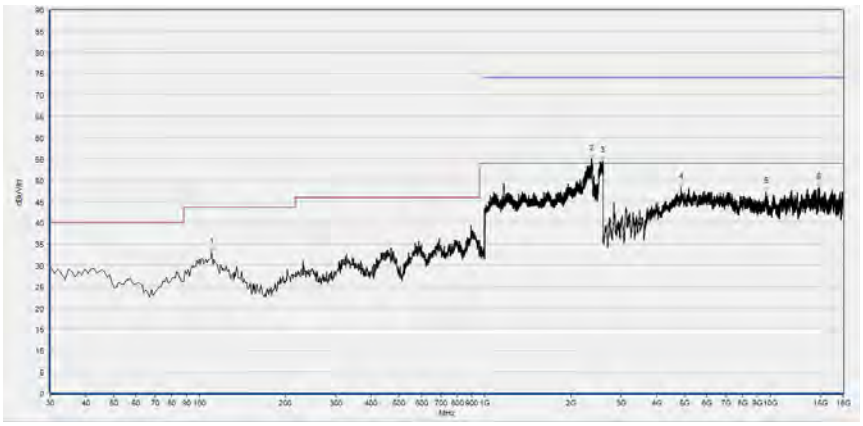
802.11b Mode

Plot for Channel 1



Fre. (MHz)	PK (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
109.540	33.16	N/A	N/A	N/A	43.50	N/A	Horizontal	PASS
1968.000	48.85	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
2410.667	50.24	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
4715.960	49.04	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
11775.320	48.28	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
14186.960	49.01	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS

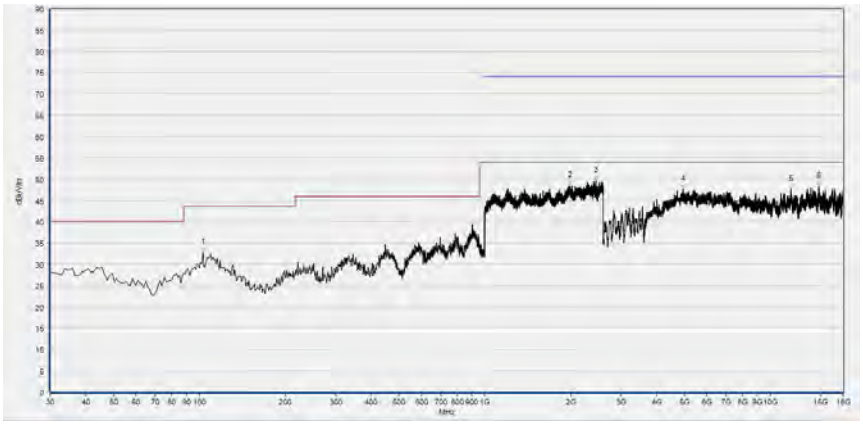
(Antenna Horizontal, 30MHz to 18GHz)



Fre. (MHz)	PK (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
110.510	33.10	N/A	N/A	N/A	43.50	N/A	Vertical	PASS
2363.733	55.05	N/A	42.62	74.00	N/A	54.00	Vertical	PASS
2576.000	54.42	N/A	43.03	74.00	N/A	54.00	Vertical	PASS
4879.200	48.29	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
9643.960	47.24	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
14787.560	48.34	N/A	N/A	74.00	N/A	54.00	Vertical	PASS

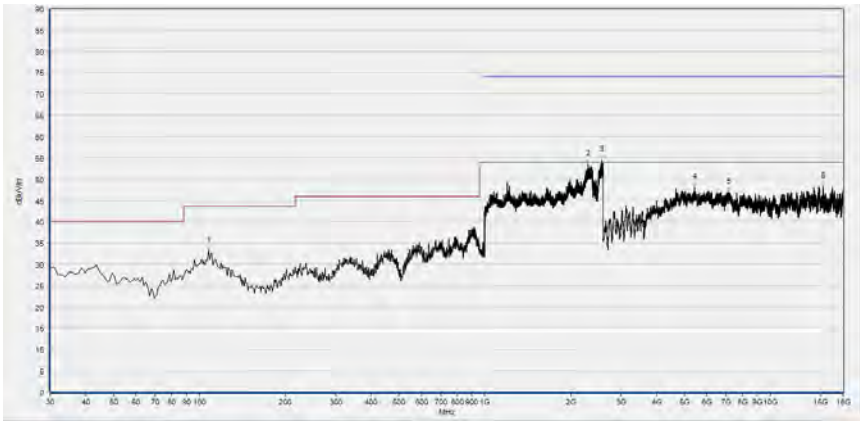
(Antenna Vertical, 30MHz to 18GHz)

Plot for Channel 7



Fre. (MHz)	PK (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
102.750	32.69	N/A	N/A	N/A	43.50	N/A	Horizontal	PASS
1994.133	48.41	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
2452.800	49.55	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
4956.200	47.53	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
11824.600	47.56	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
14759.840	48.19	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS

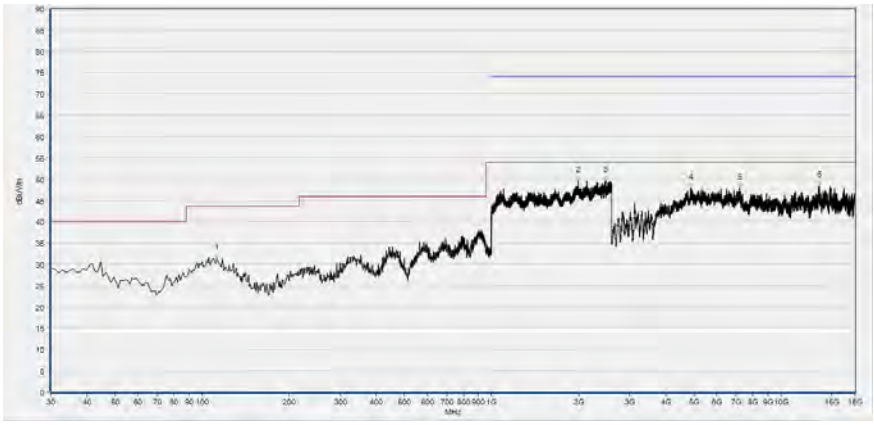
(Antenna Horizontal, 30MHz to 18GHz)



Fre. (MHz)	PK (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
107.600	33.23	N/A	N/A	N/A	43.50	N/A	Vertical	PASS
2297.600	53.49	N/A	40.96	74.00	N/A	54.00	Vertical	PASS
2568.000	54.48	N/A	41.49	74.00	N/A	54.00	Vertical	PASS
5418.200	48.04	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
7167.640	46.99	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
15320.400	48.29	N/A	N/A	74.00	N/A	54.00	Vertical	PASS

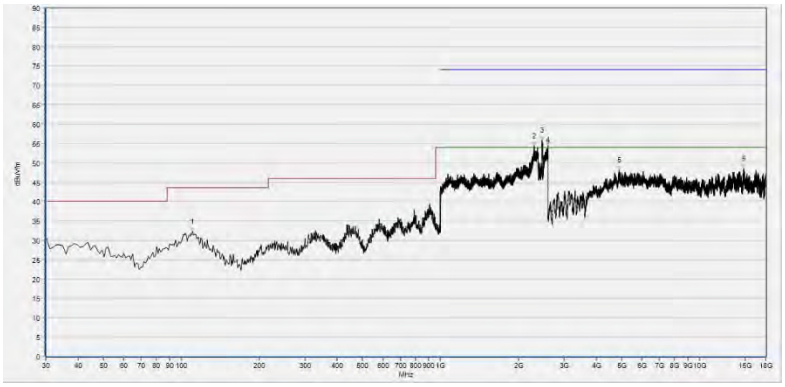
(Antenna Vertical, 30MHz to 18GHz)

Plot for Channel 13



Fre. (MHz)	PK (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
112.450	31.41	N/A	N/A	N/A	43.50	N/A	Horizontal	PASS
1992.000	49.62	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
2473.600	49.56	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
4897.680	47.92	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
7195.360	47.89	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
13577.120	48.38	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS

(Antenna Horizontal, 30MHz to 18GHz)



Fre. (MHz)	PK (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
110.510	32.13	N/A	N/A	N/A	43.50	N/A	Vertical	PASS
2303.467	54.36	N/A	41.51	74.00	N/A	54.00	Vertical	PASS
2468.267	55.76	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
2590.400	54.48	N/A	41.75	74.00	N/A	54.00	Vertical	PASS
4882.280	48.07	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
14833.760	48.50	N/A	N/A	74.00	N/A	54.00	Vertical	PASS

(Antenna Vertical, 30MHz to 18GHz)

END OF REPORT