Appendix

Test Data

for BTEK241111036A02E17

Start date	2024/11/30	Finish date	2024/12/2
Temperature	22.0℃	Humidity	45%
RF specifications	2.4G_WIFI- Module 2 GTV	Test Engineer	Zora

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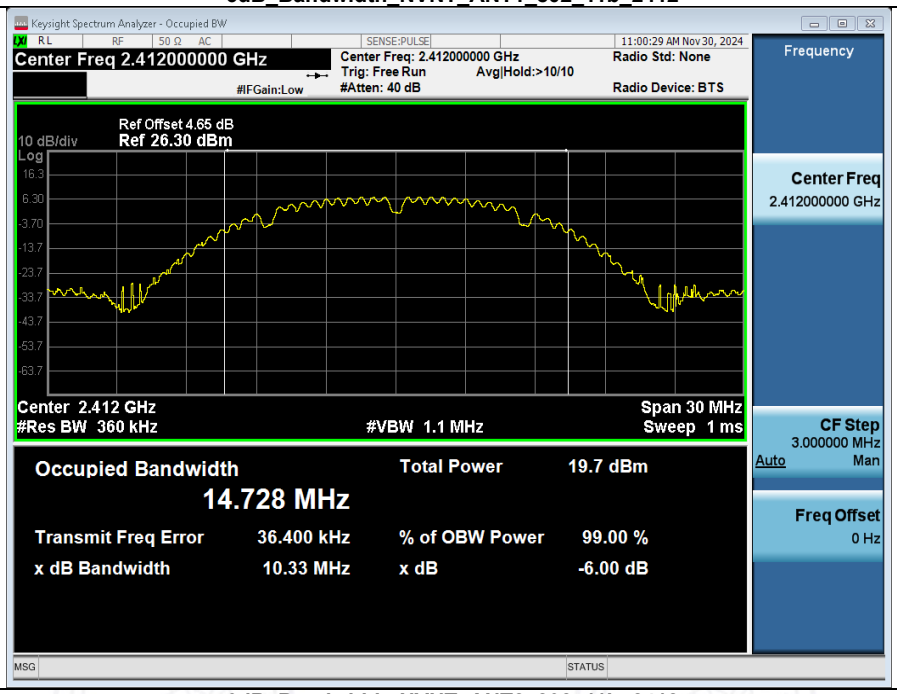
1. -6dB Bandwidth

Condition	Antenna	Modulation	Frequency (MHz)	-6dB BW(MHz)	limit(kHz)	Result
NVNT	ANT1	802.11b	2412.00	10.33	500	Pass
NVNT	ANT2	802.11b	2412.00	10.34	500	Pass
NVNT	ANT1	802.11b	2437.00	10.35	500	Pass
NVNT	ANT2	802.11b	2437.00	10.35	500	Pass
NVNT	ANT1	802.11b	2462.00	10.35	500	Pass
NVNT	ANT2	802.11b	2462.00	10.35	500	Pass
NVNT	ANT1	802.11g	2412.00	16.25	500	Pass
NVNT	ANT2	802.11g	2412.00	16.30	500	Pass
NVNT	ANT1	802.11g	2437.00	16.30	500	Pass
NVNT	ANT2	802.11g	2437.00	16.36	500	Pass
NVNT	ANT1	802.11g	2462.00	16.29	500	Pass
NVNT	ANT2	802.11g	2462.00	16.39	500	Pass
NVNT	ANT1	802.11n(HT20)	2412.00	17.53	500	Pass
NVNT	ANT2	802.11n(HT20)	2412.00	17.59	500	Pass
NVNT	ANT1	802.11n(HT20)	2437.00	17.55	500	Pass
NVNT	ANT2	802.11n(HT20)	2437.00	17.59	500	Pass
NVNT	ANT1	802.11n(HT20)	2462.00	17.57	500	Pass
NVNT	ANT2	802.11n(HT20)	2462.00	17.52	500	Pass
NVNT	ANT1	802.11n(HT40)	2422.00	36.27	500	Pass
NVNT	ANT2	802.11n(HT40)	2422.00	36.46	500	Pass
NVNT	ANT1	802.11n(HT40)	2437.00	36.30	500	Pass
NVNT	ANT2	802.11n(HT40)	2437.00	36.62	500	Pass
NVNT	ANT1	802.11n(HT40)	2452.00	36.01	500	Pass
NVNT	ANT2	802.11n(HT40)	2452.00	36.19	500	Pass

-6dB_Bandwidth_NVNT_ANT1_802_11b_2412



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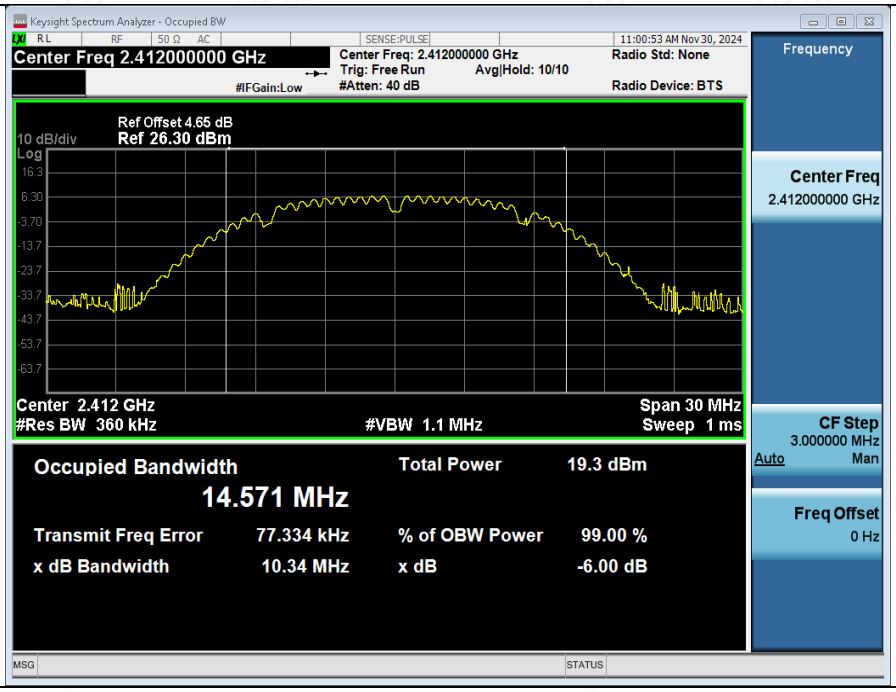

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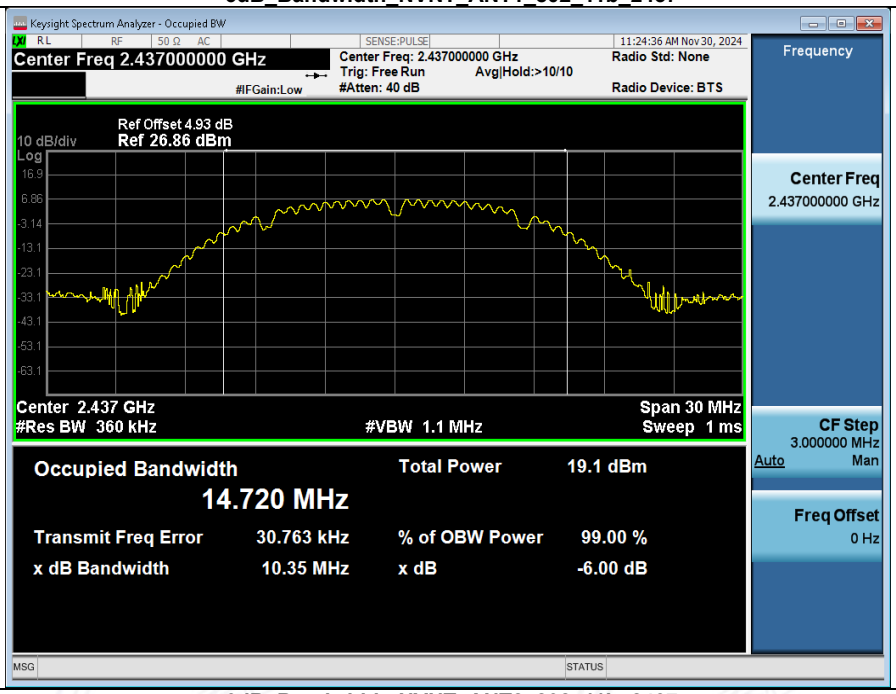

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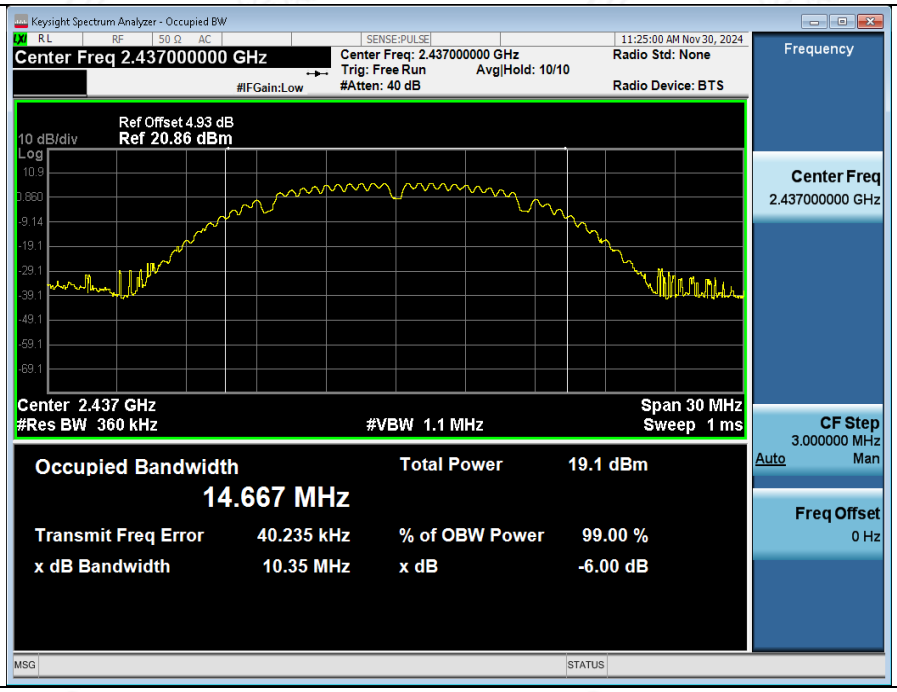

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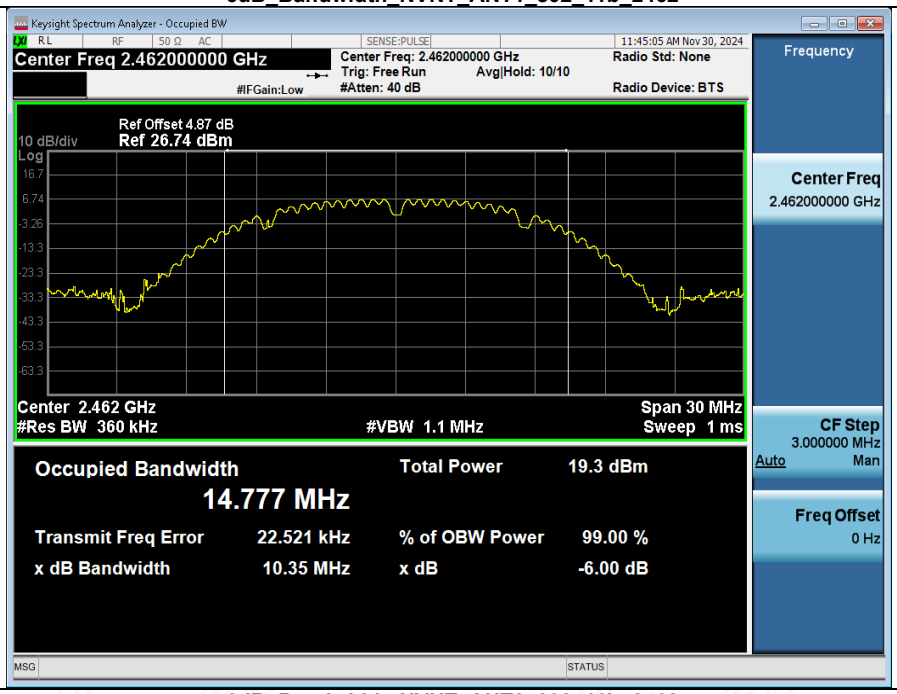

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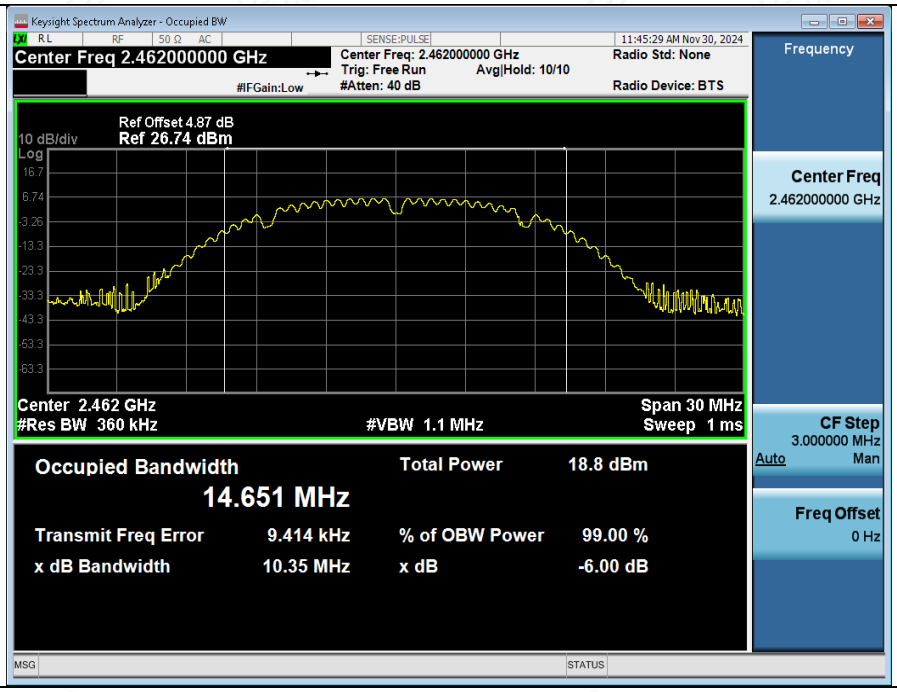

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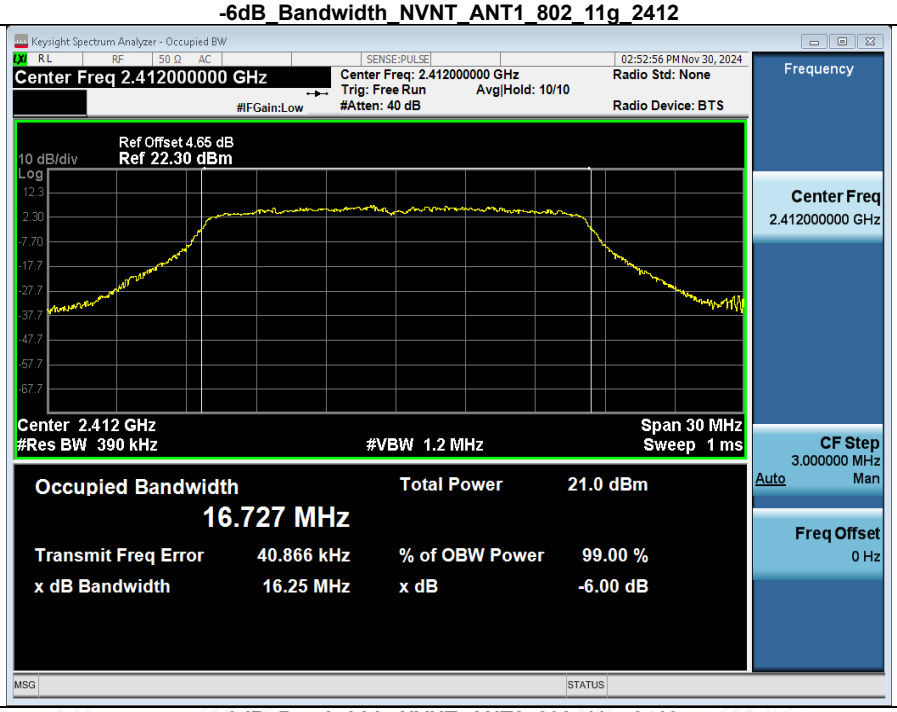

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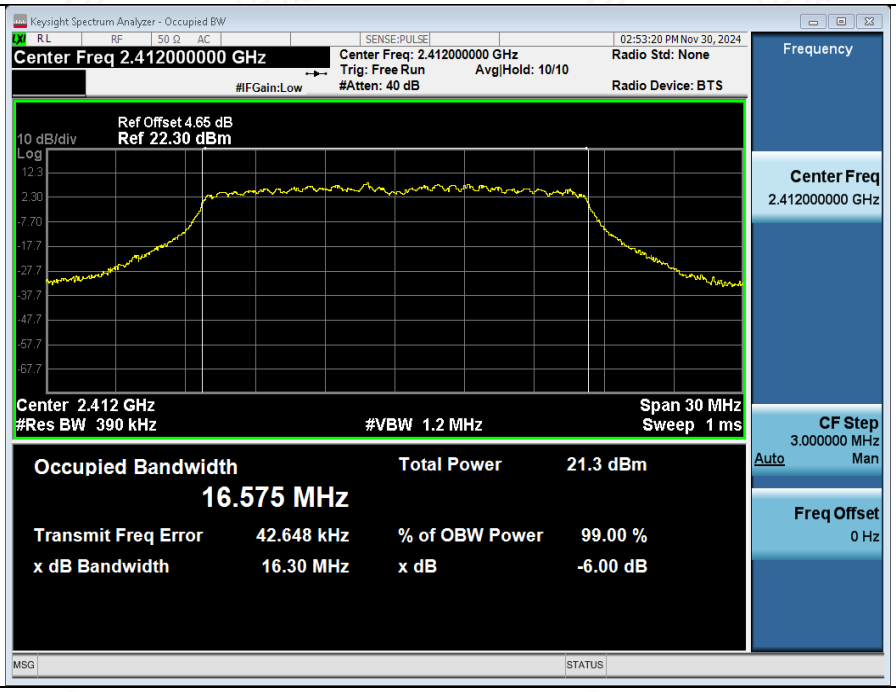

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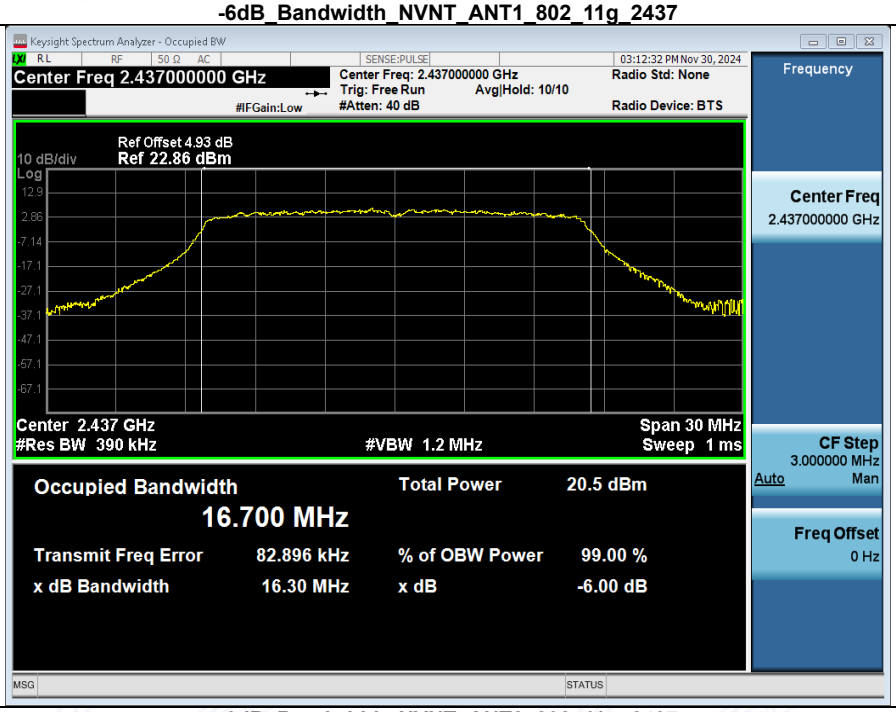

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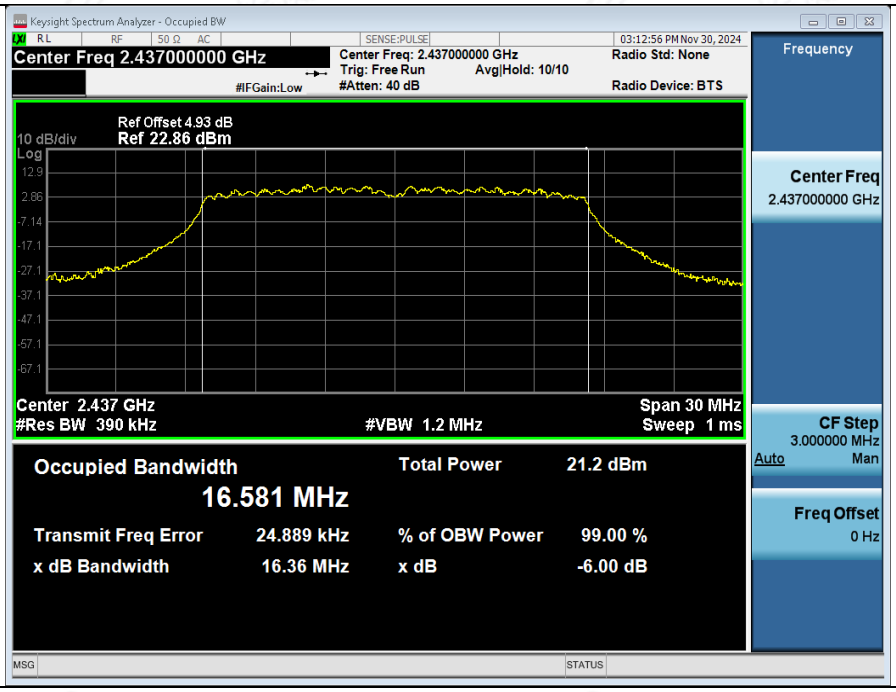

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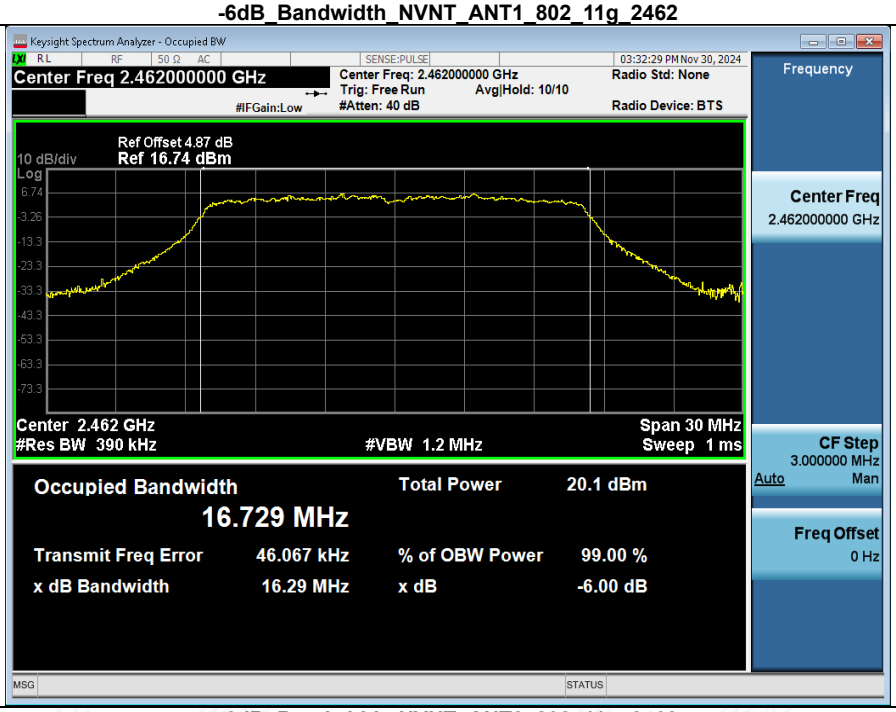

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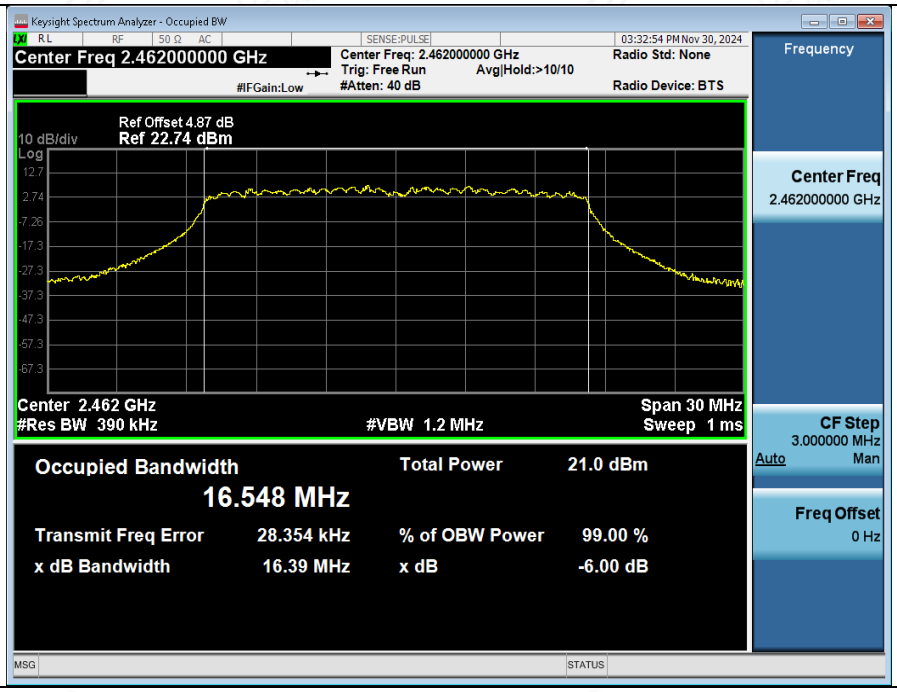

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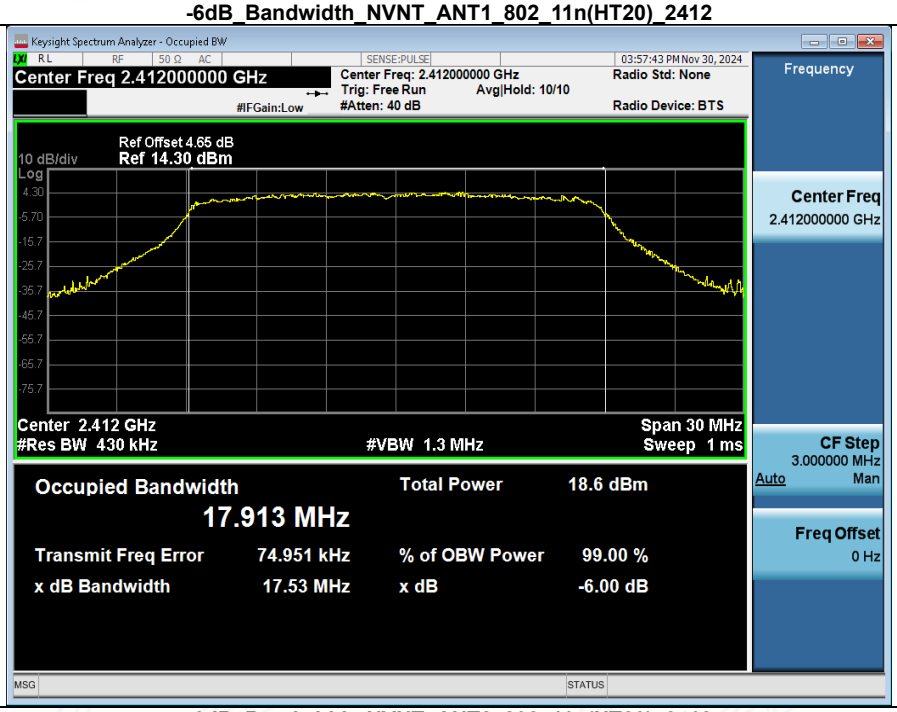

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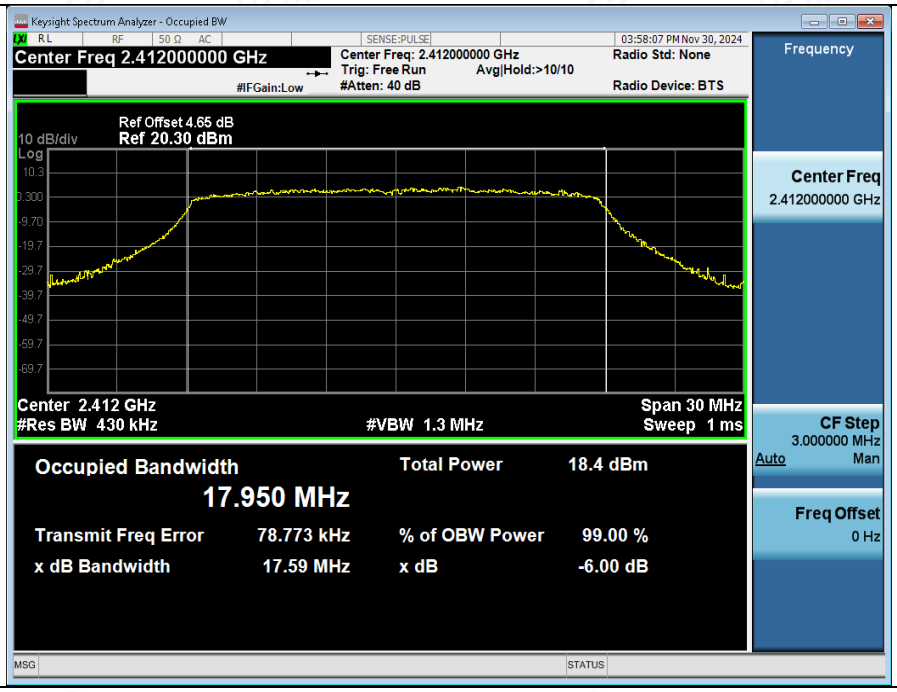

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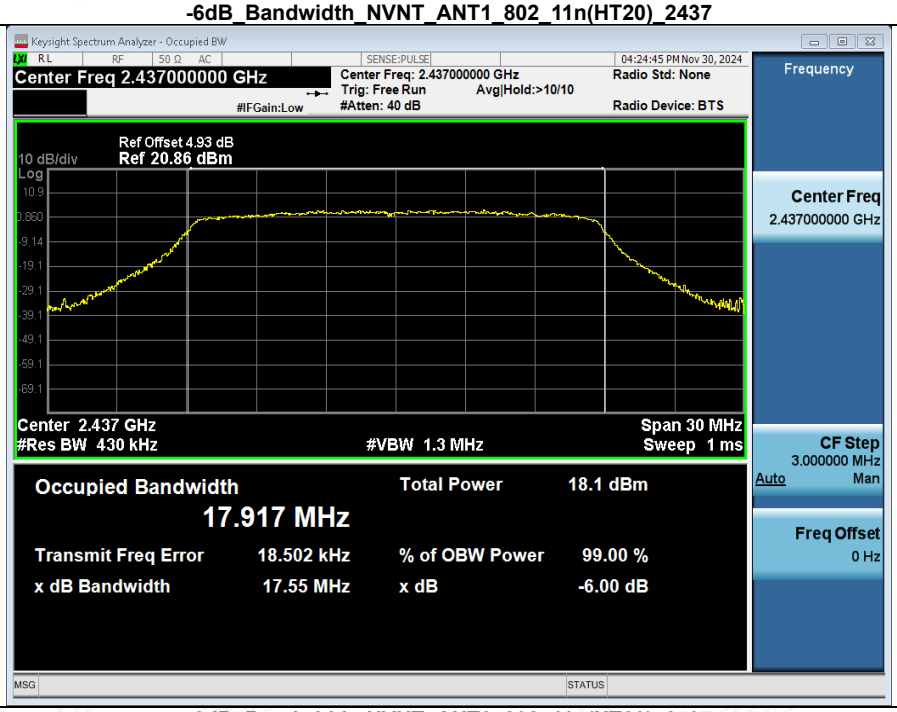

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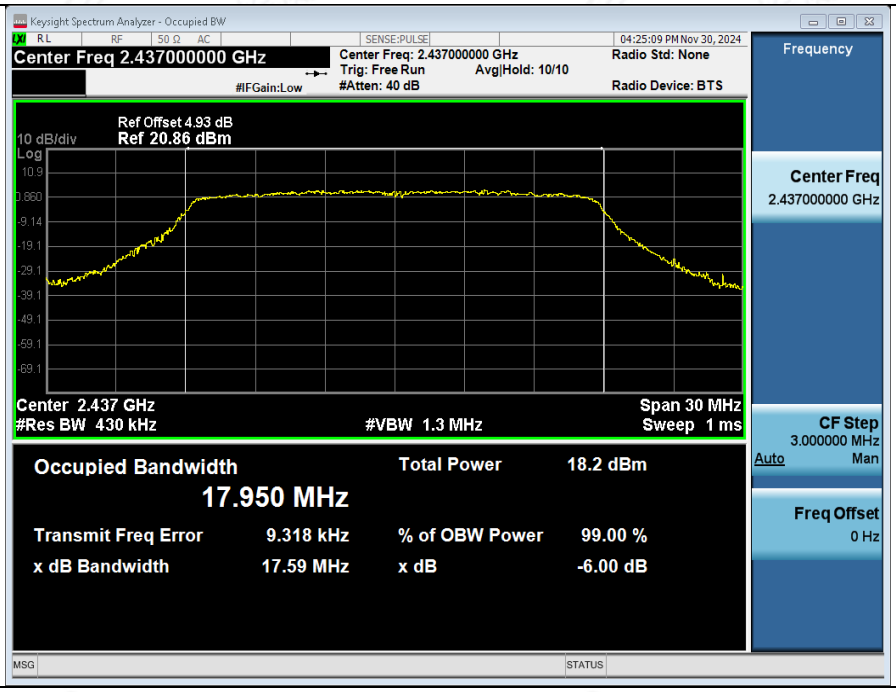

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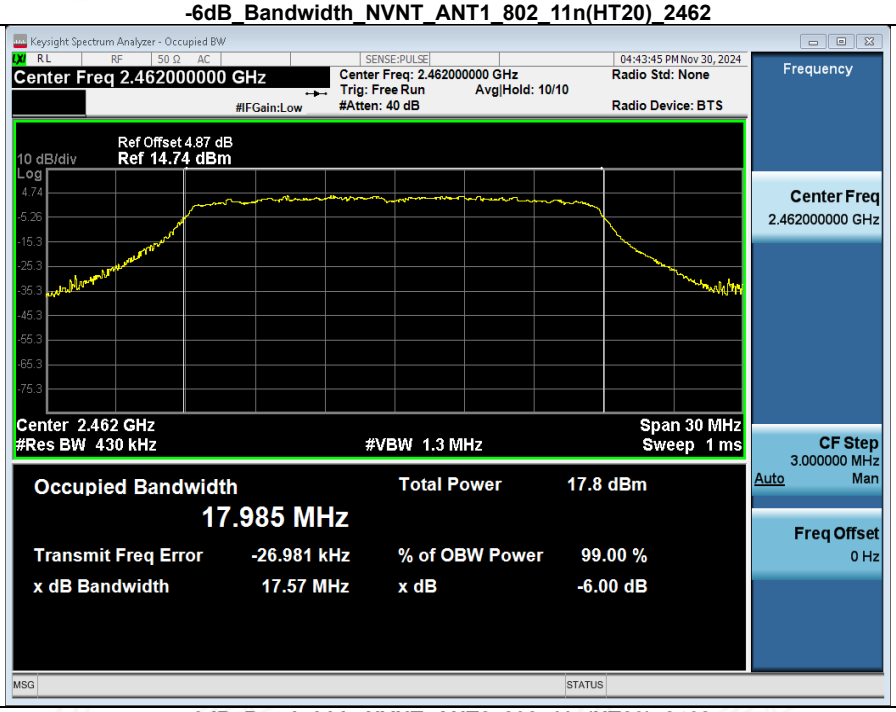

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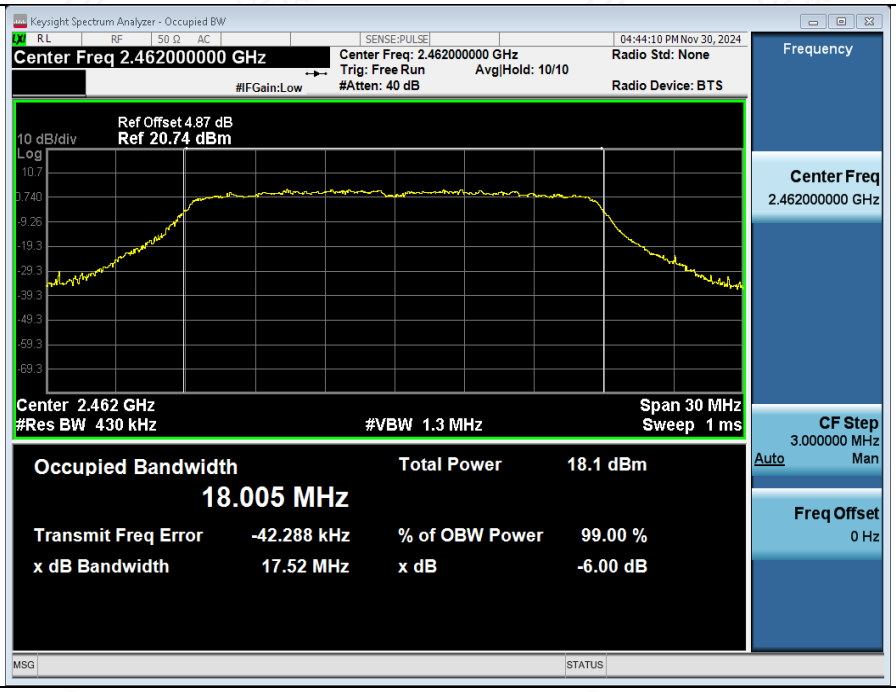

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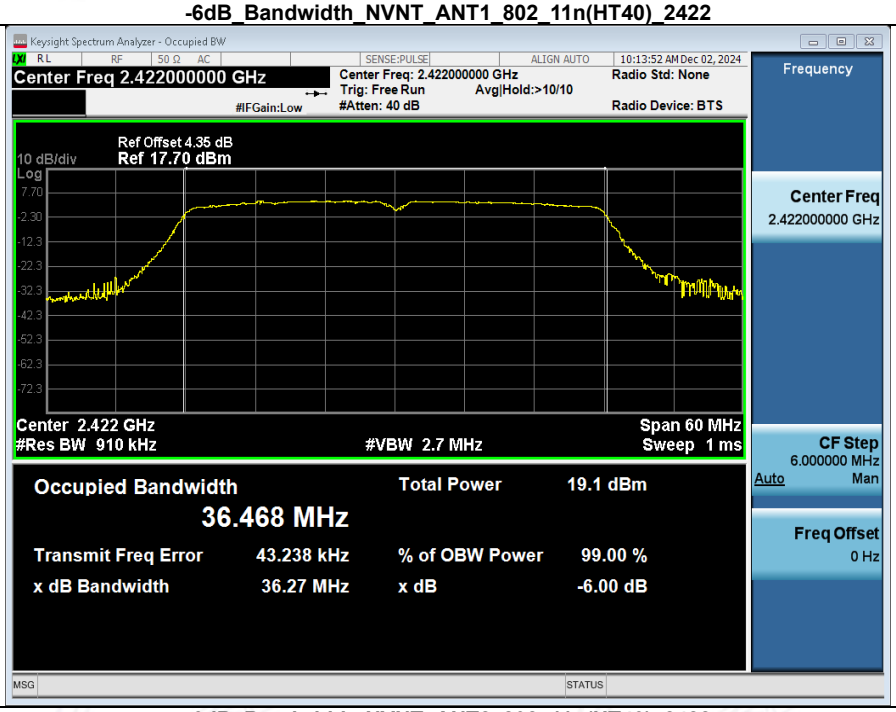

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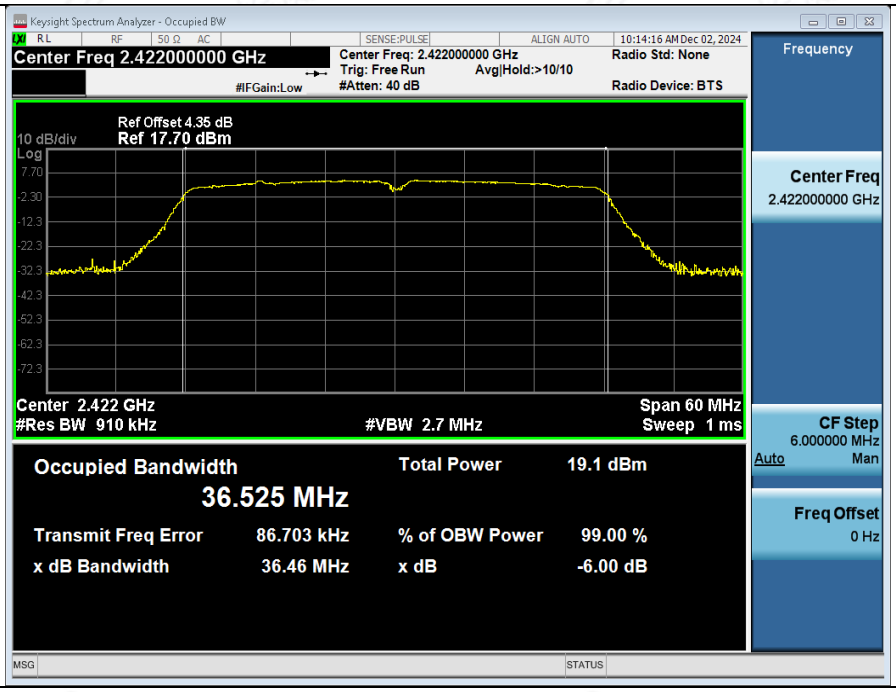

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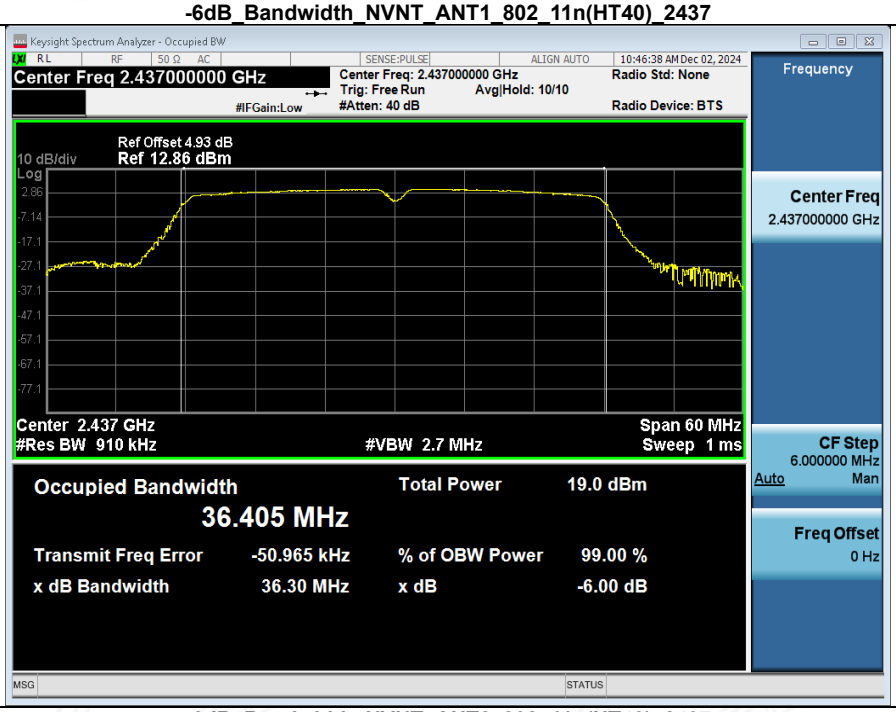

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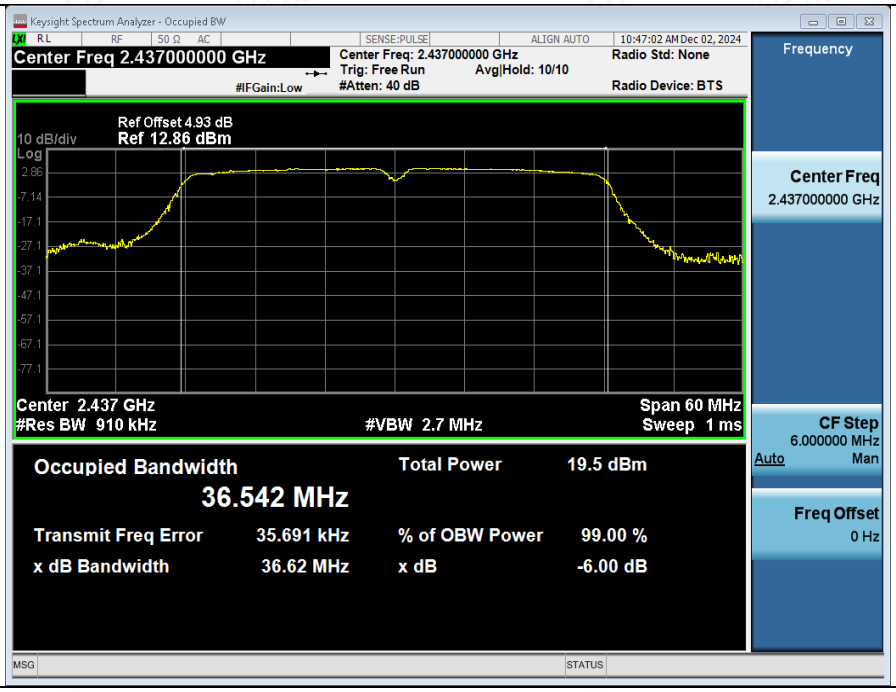

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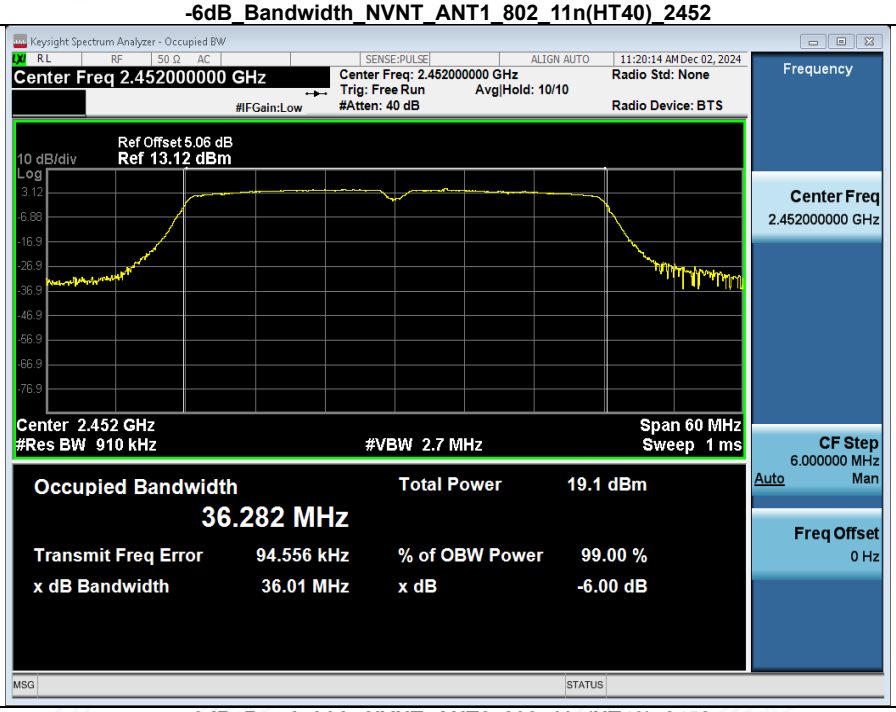

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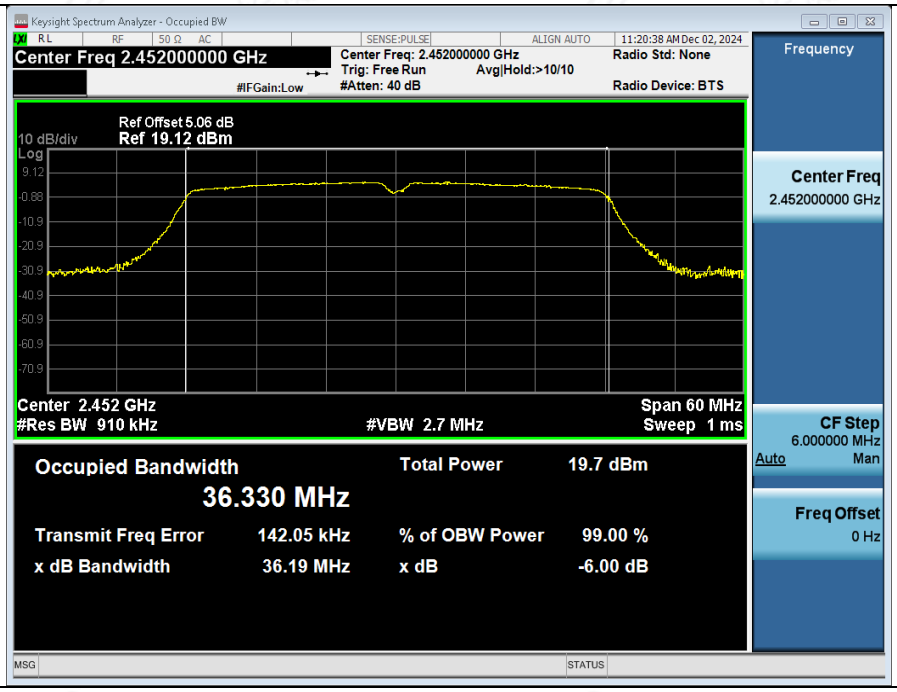
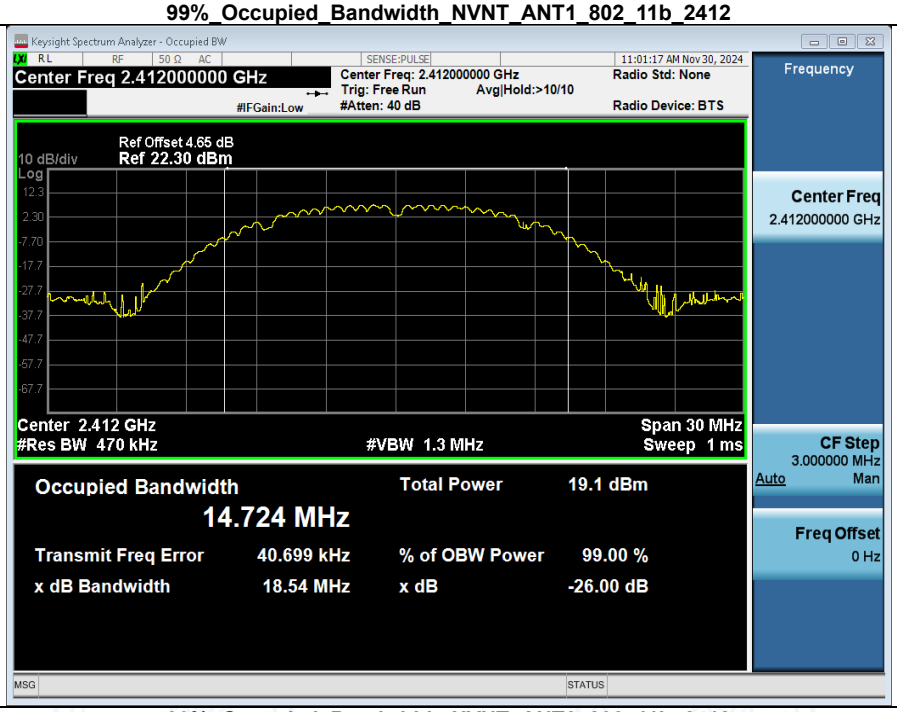

Keysight Spectrum Analyzer - Occupied BW
RL
RF
50 Ω AC
SENSE:PULSE
ALIGN AUTO
11:20:38 AM Dec 02, 2024
Center Freq 2.452000000 GHz
Center Freq: 2.452000000 GHz
Trig: Free Run
Avg|Hold:>10/10
#Atten: 40 dB
#IFGain:Low
Radio Std: None
Radio Device: BTS
Frequency
Ref Offset 5.06 dB
10 dB/div
Ref 19.12 dBm
Log
9.12
-0.88
-10.9
-20.9
-30.9
-40.9
-50.9
-60.9
-70.9
Center Freq
2.452000000 GHz
Center 2.452 GHz
#Res BW 910 kHz
#VBW 2.7 MHz
Span 60 MHz
Sweep 1 ms
CF Step
6.000000 MHz
Auto
Man
Occupied Bandwidth
36.330 MHz
Total Power
19.7 dBm
Transmit Freq Error
142.05 kHz
% of OBW Power
99.00 %
x dB Bandwidth
36.19 MHz
x dB
-6.00 dB
Freq Offset
0 Hz
MSG
STATUS

2. 99% Occupied Bandwidth

Condition	Antenna	Modulation	Frequency (MHz)	99%%BW(MHz)
NVNT	ANT1	802.11b	2412.00	14.724
NVNT	ANT2	802.11b	2412.00	14.612
NVNT	ANT1	802.11b	2437.00	14.729
NVNT	ANT2	802.11b	2437.00	14.670
NVNT	ANT1	802.11b	2462.00	14.793
NVNT	ANT2	802.11b	2462.00	14.680
NVNT	ANT1	802.11g	2412.00	16.887
NVNT	ANT2	802.11g	2412.00	16.664
NVNT	ANT1	802.11g	2437.00	16.846
NVNT	ANT2	802.11g	2437.00	16.687
NVNT	ANT1	802.11g	2462.00	16.909
NVNT	ANT2	802.11g	2462.00	16.659
NVNT	ANT1	802.11n(HT20)	2412.00	18.066
NVNT	ANT2	802.11n(HT20)	2412.00	18.082
NVNT	ANT1	802.11n(HT20)	2437.00	17.994
NVNT	ANT2	802.11n(HT20)	2437.00	18.115
NVNT	ANT1	802.11n(HT20)	2462.00	18.147
NVNT	ANT2	802.11n(HT20)	2462.00	18.160
NVNT	ANT1	802.11n(HT40)	2422.00	36.433
NVNT	ANT2	802.11n(HT40)	2422.00	36.561
NVNT	ANT1	802.11n(HT40)	2437.00	36.416
NVNT	ANT2	802.11n(HT40)	2437.00	36.558
NVNT	ANT1	802.11n(HT40)	2452.00	36.320
NVNT	ANT2	802.11n(HT40)	2452.00	36.332

99%_Occupied_Bandwidth_NVNT_ANT1_802_11b_2412



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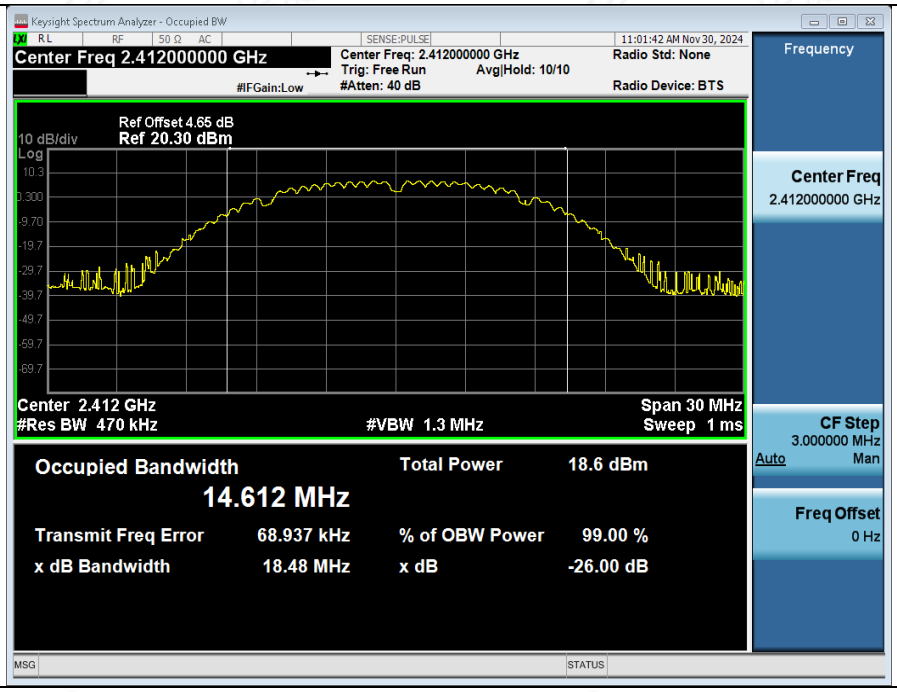

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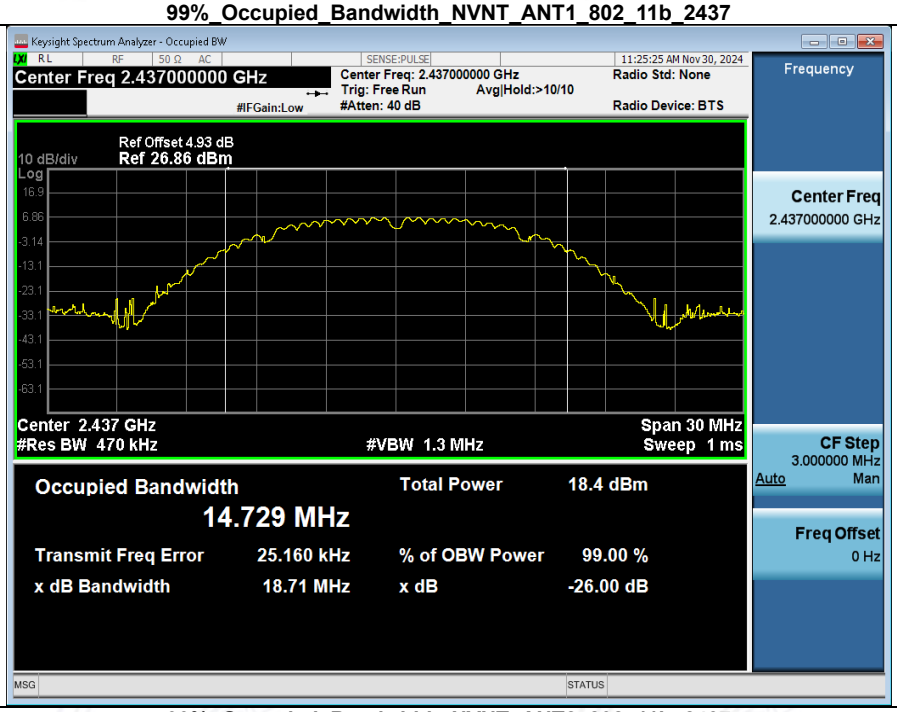

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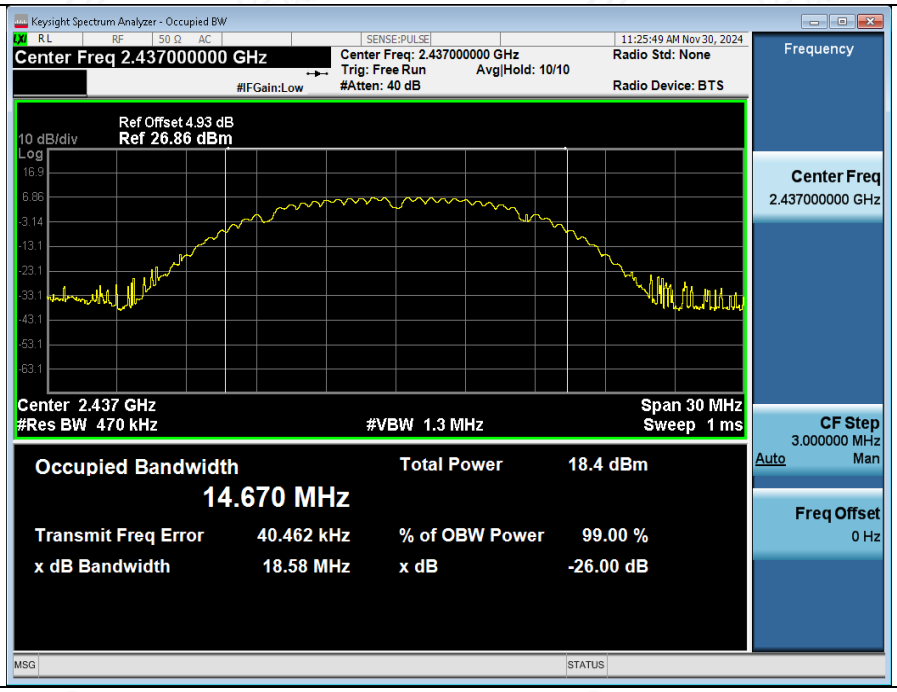

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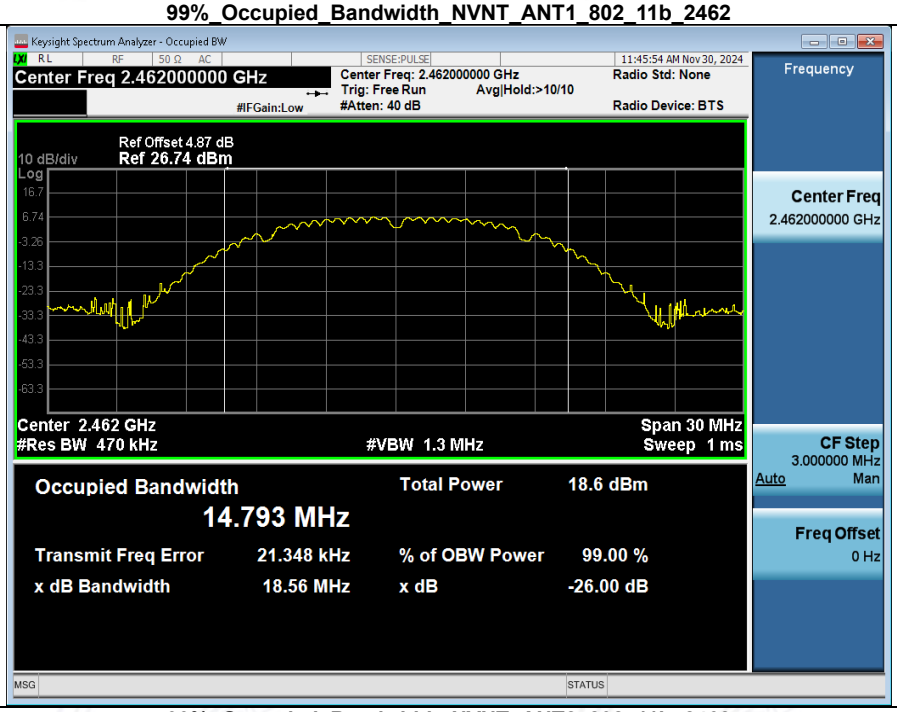

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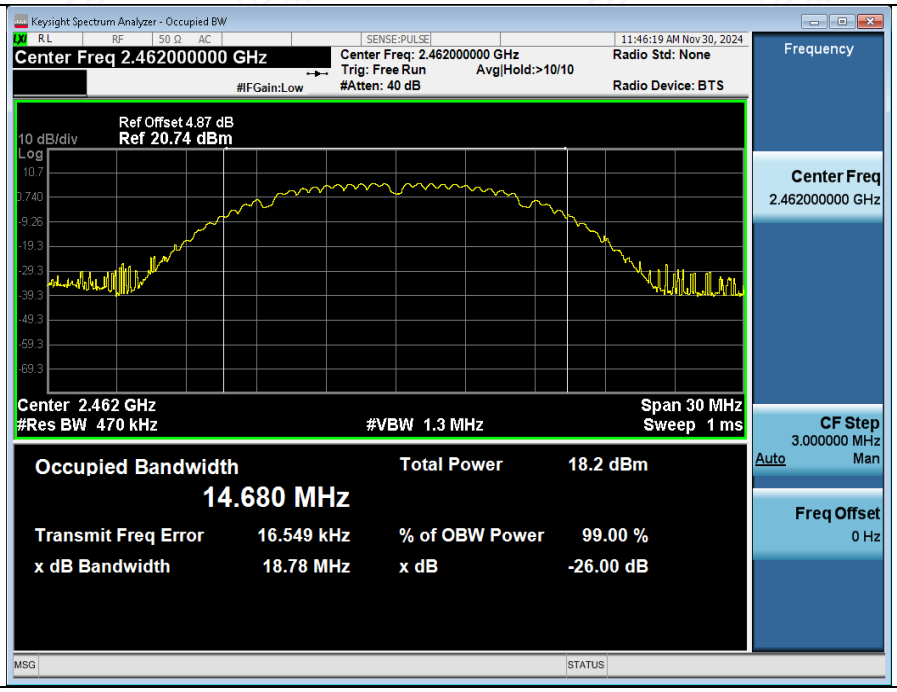

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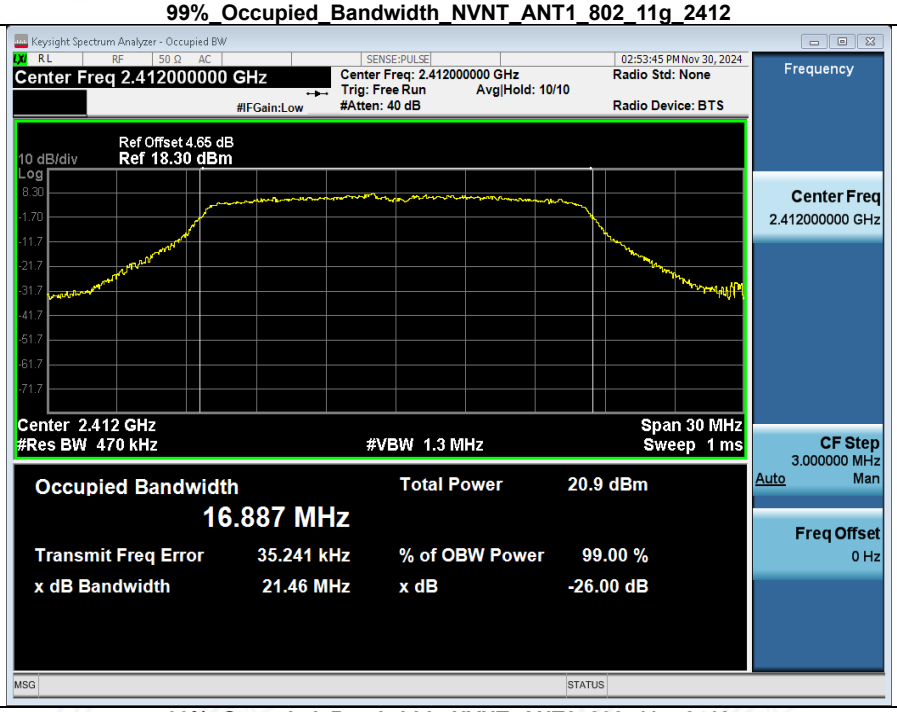

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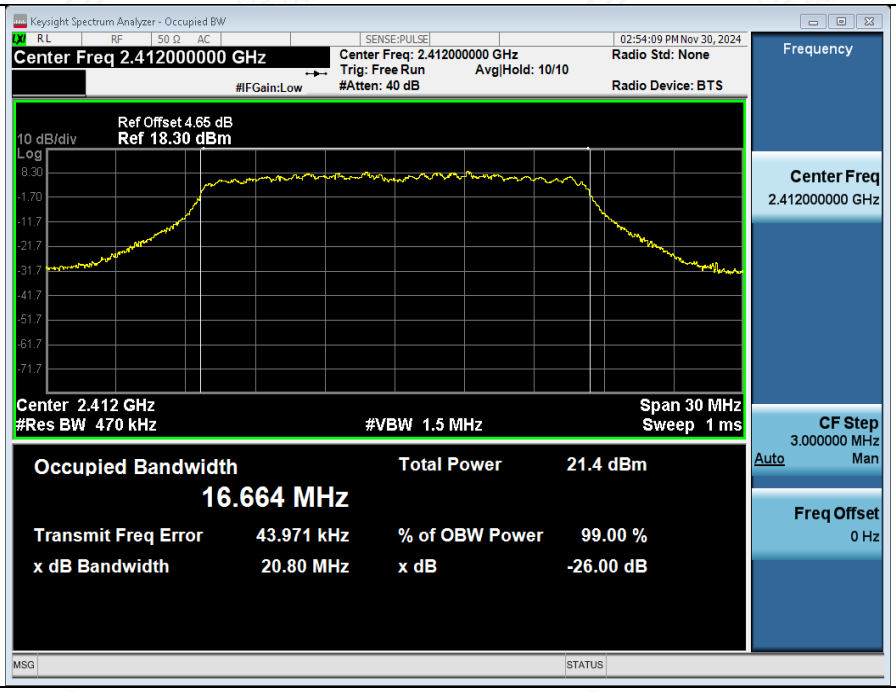

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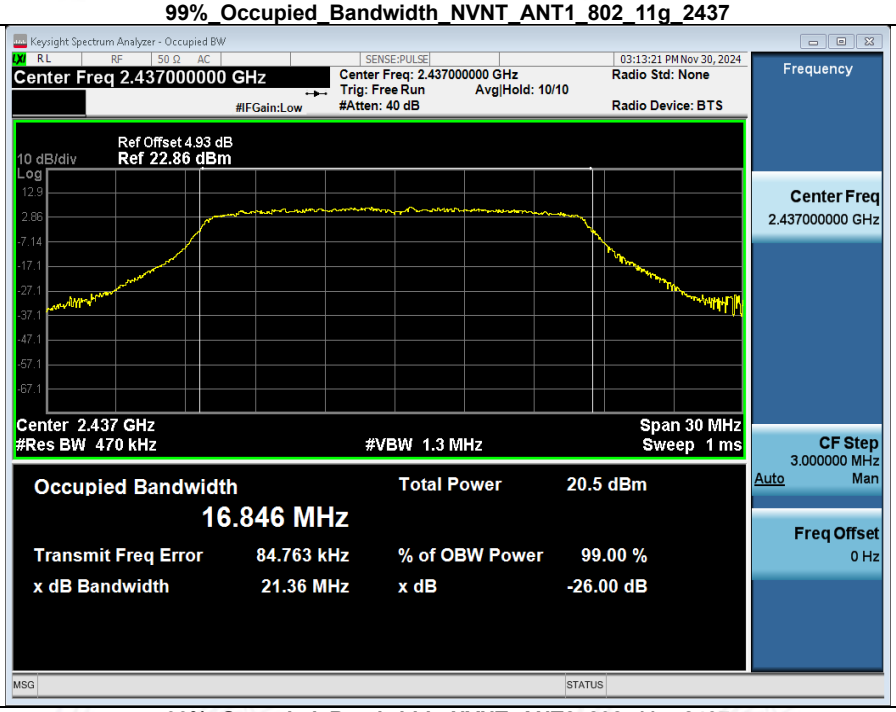

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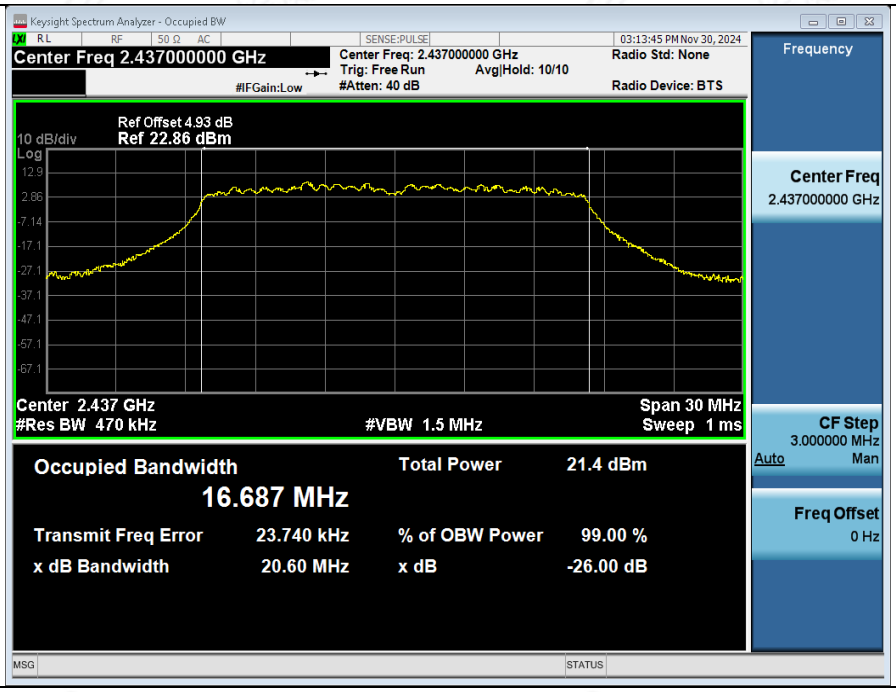

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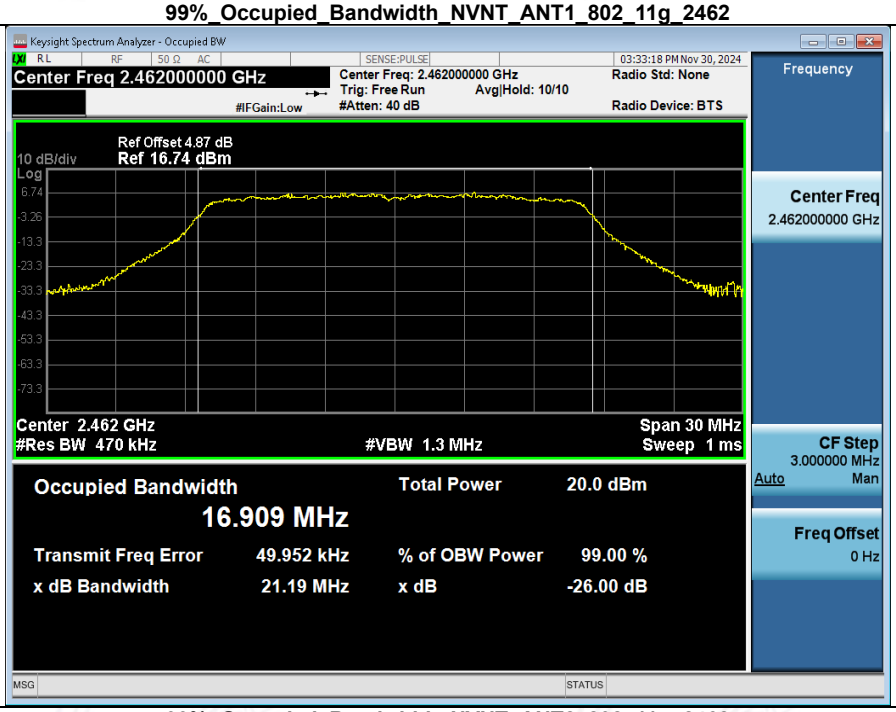

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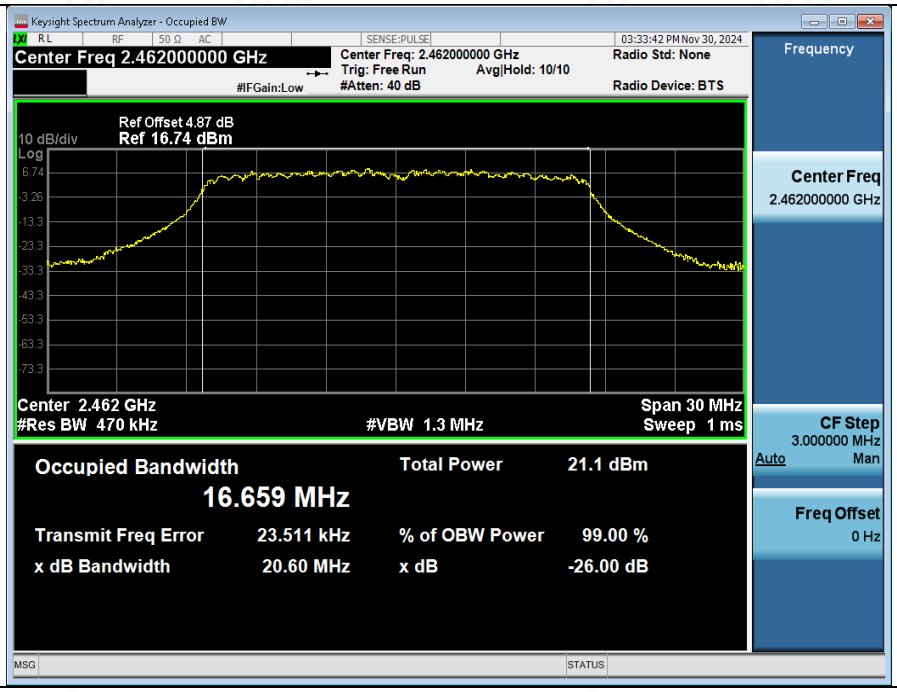

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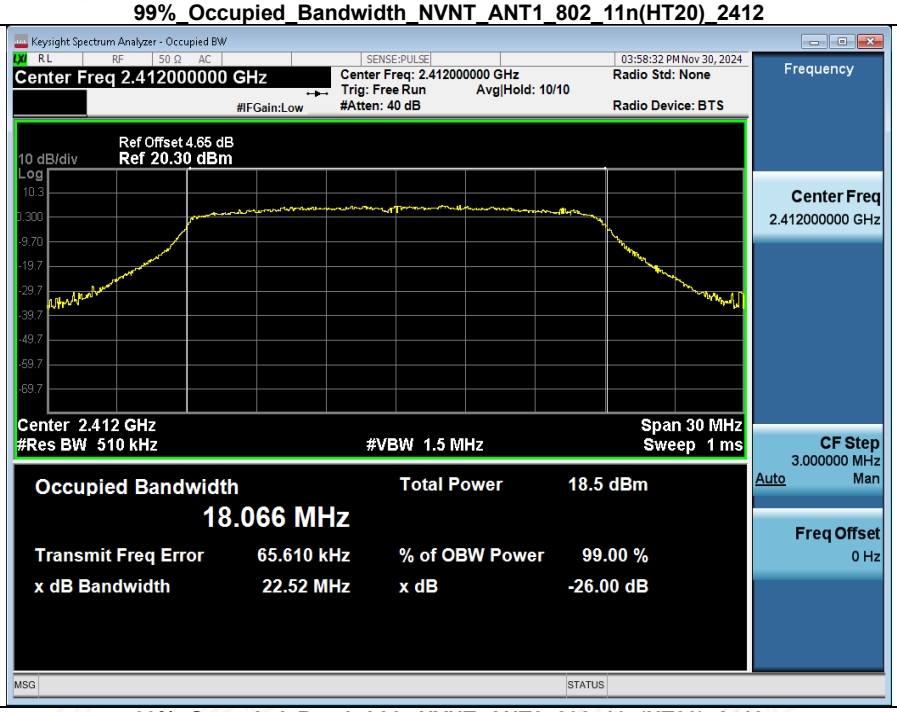

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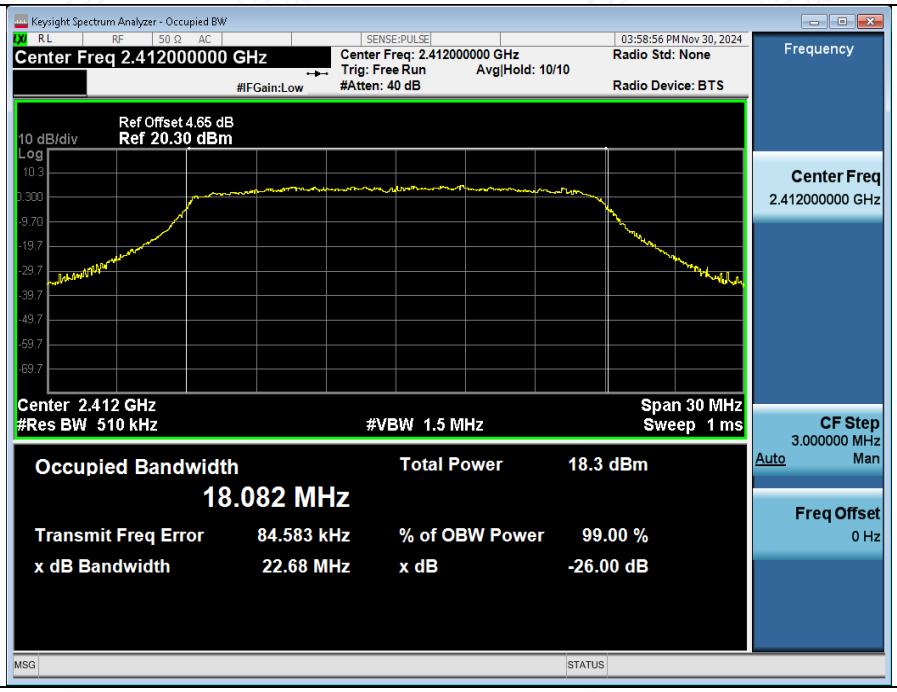
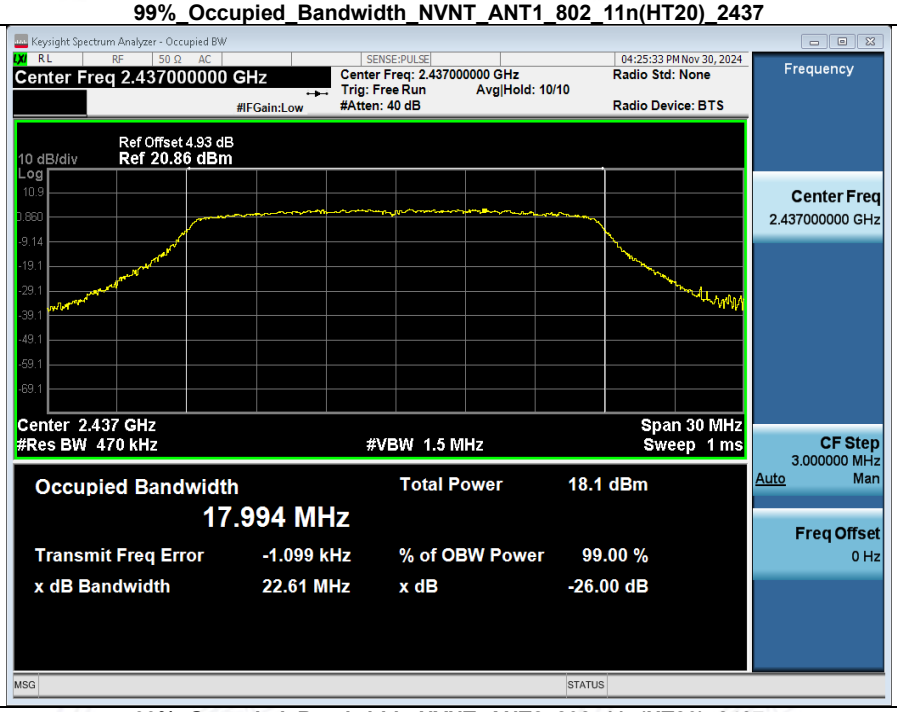
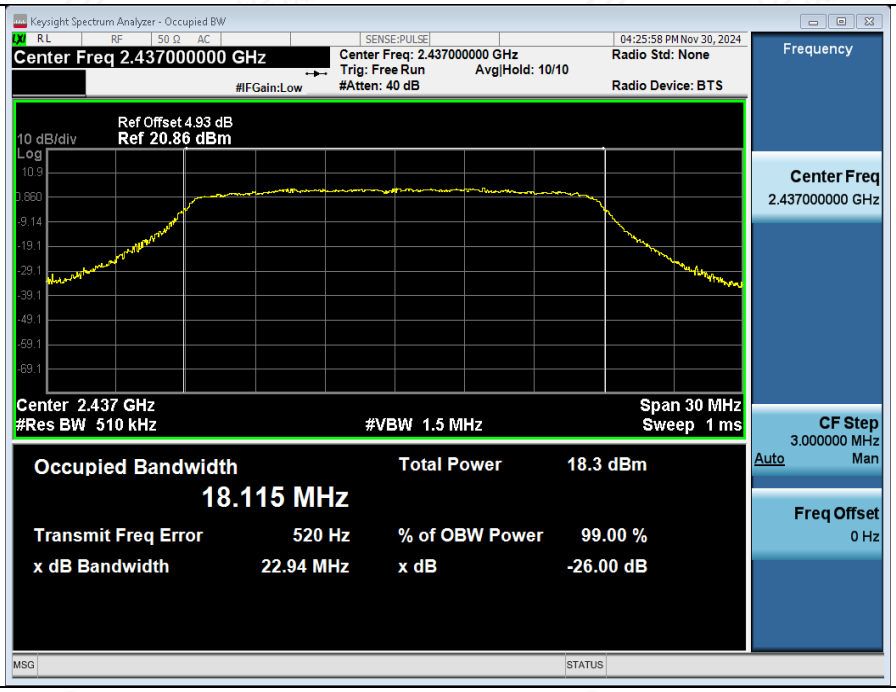


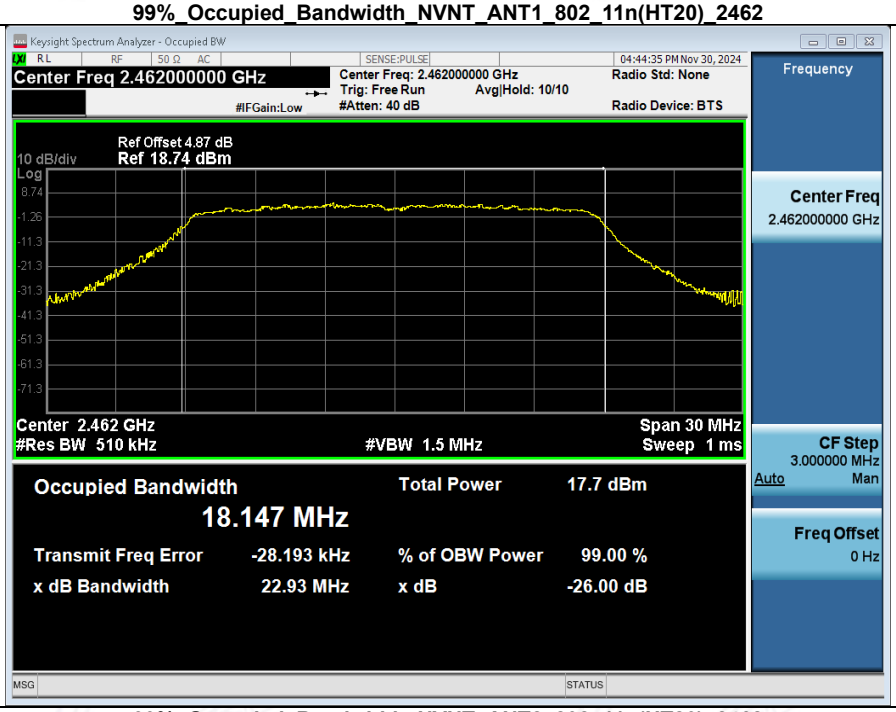
99%_Occupied_Bandwidth_NVNT_ANT1_802_11n(HT20)_2437



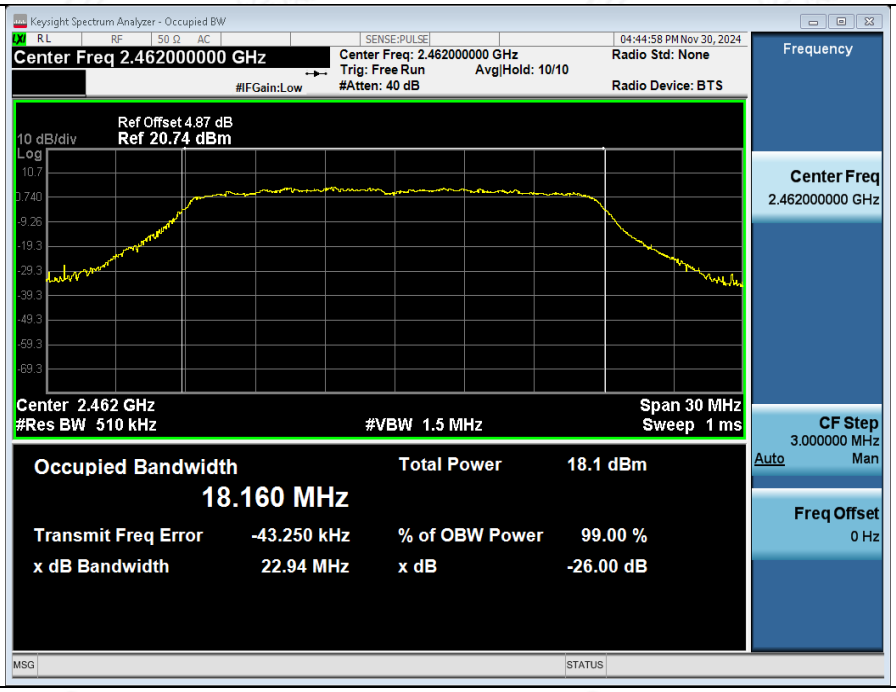
99%_Occupied_Bandwidth_NVNT_ANT2_802_11n(HT20)_2437



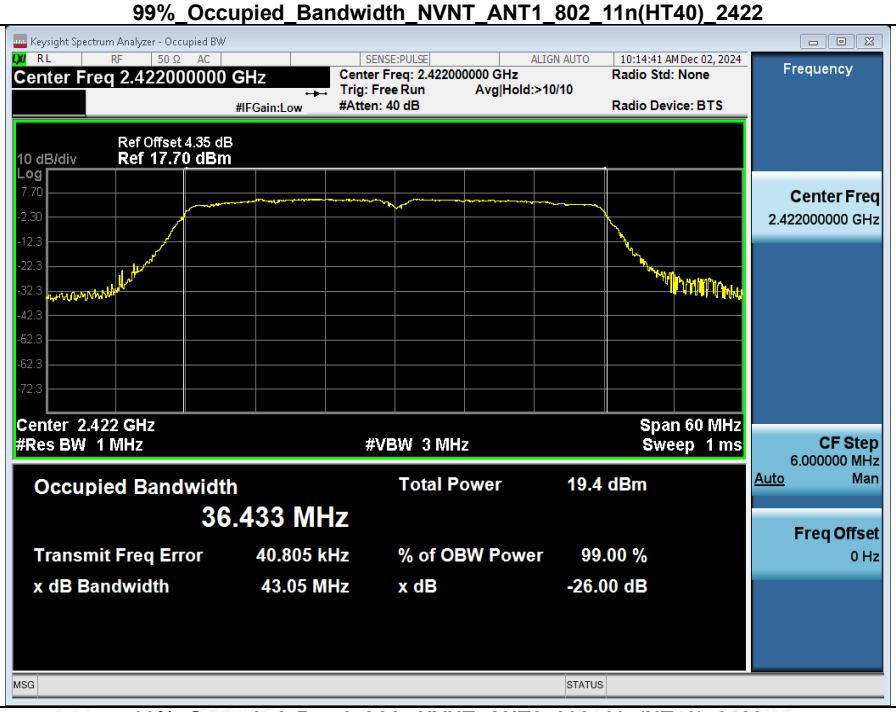
99%_Occupied_Bandwidth_NVNT_ANT1_802_11n(HT20)_2462



99%_Occupied_Bandwidth_NVNT_ANT2_802_11n(HT20)_2462



99%_Occupied_Bandwidth_NVNT_ANT1_802_11n(HT40)_2422



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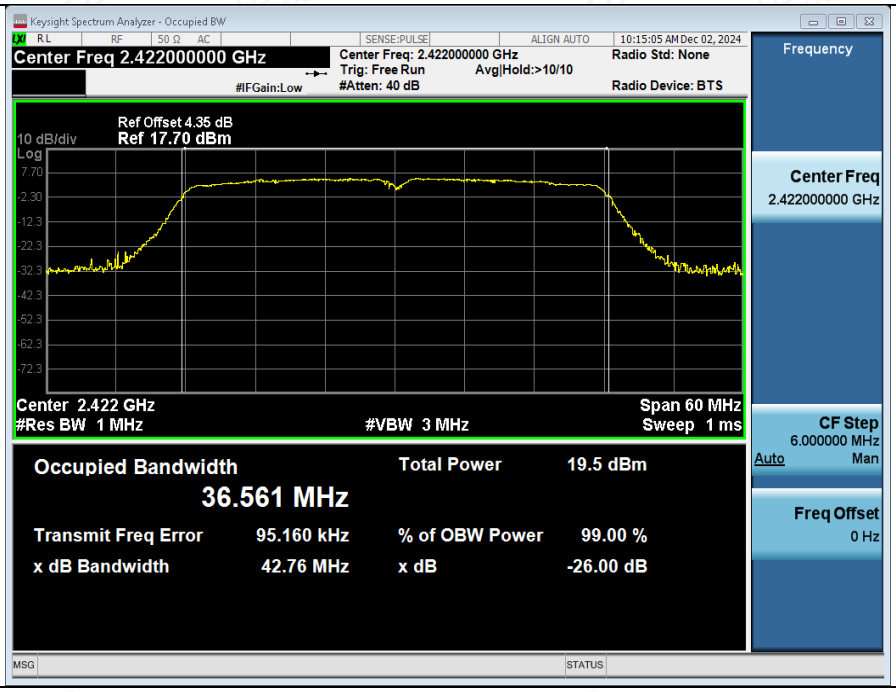
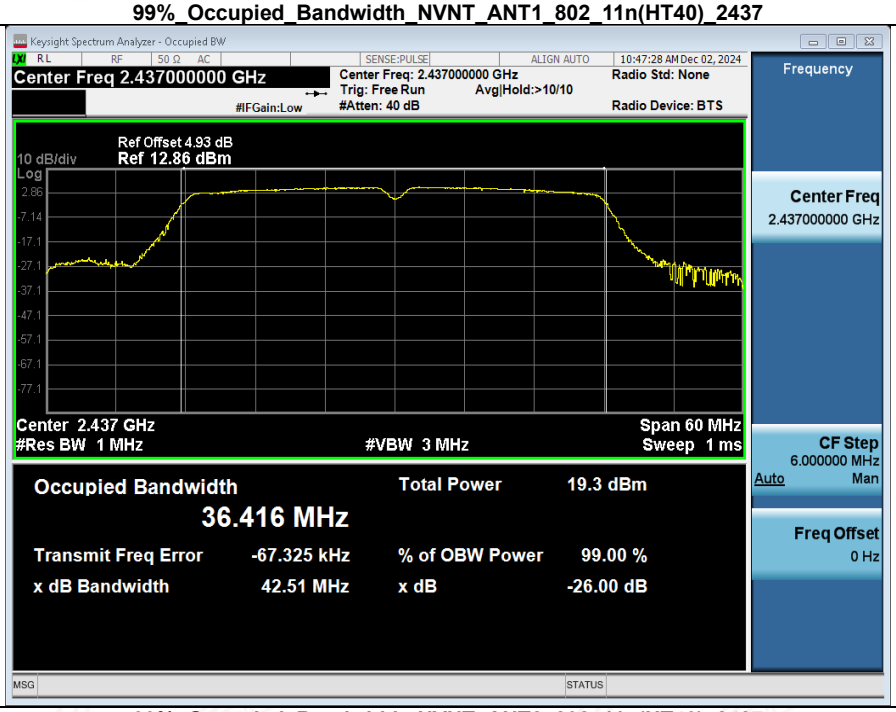
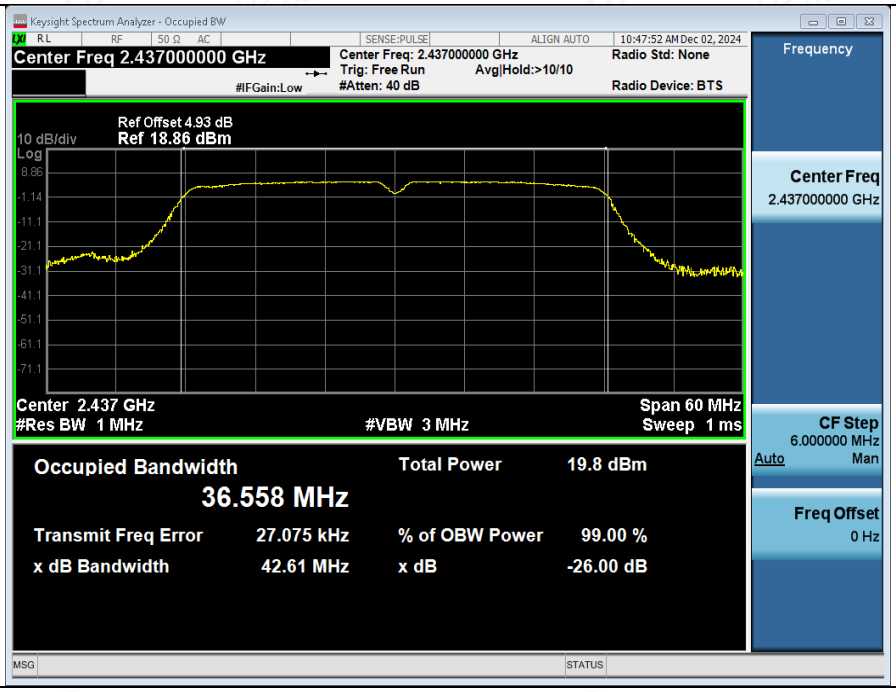


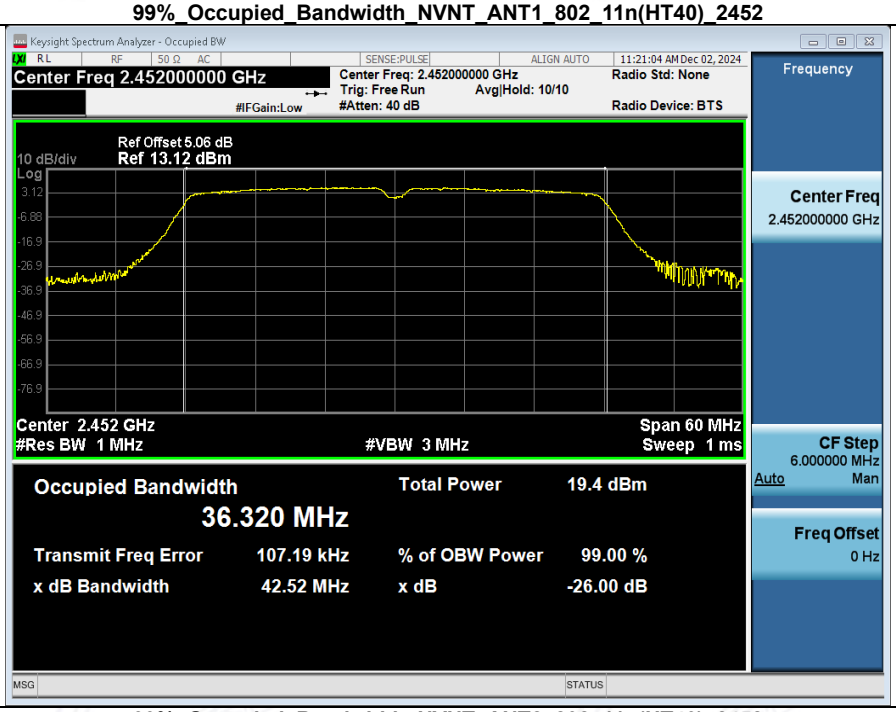
99%_Occupied_Bandwidth_NVNT_ANT1_802_11n(HT40)_2437



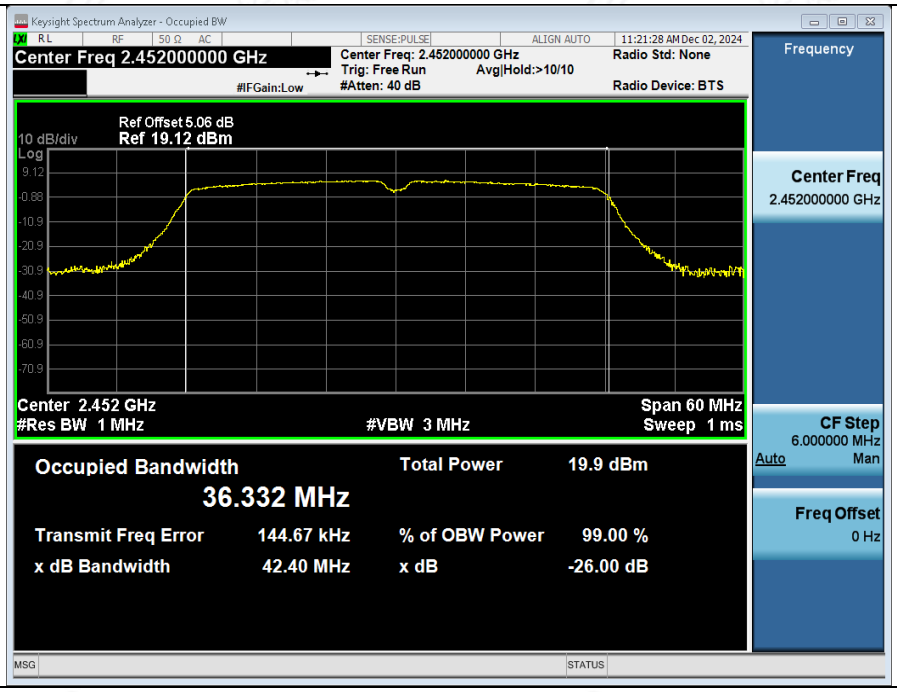
99%_Occupied_Bandwidth_NVNT_ANT2_802_11n(HT40)_2437



99%_Occupied_Bandwidth_NVNT_ANT1_802_11n(HT40)_2452



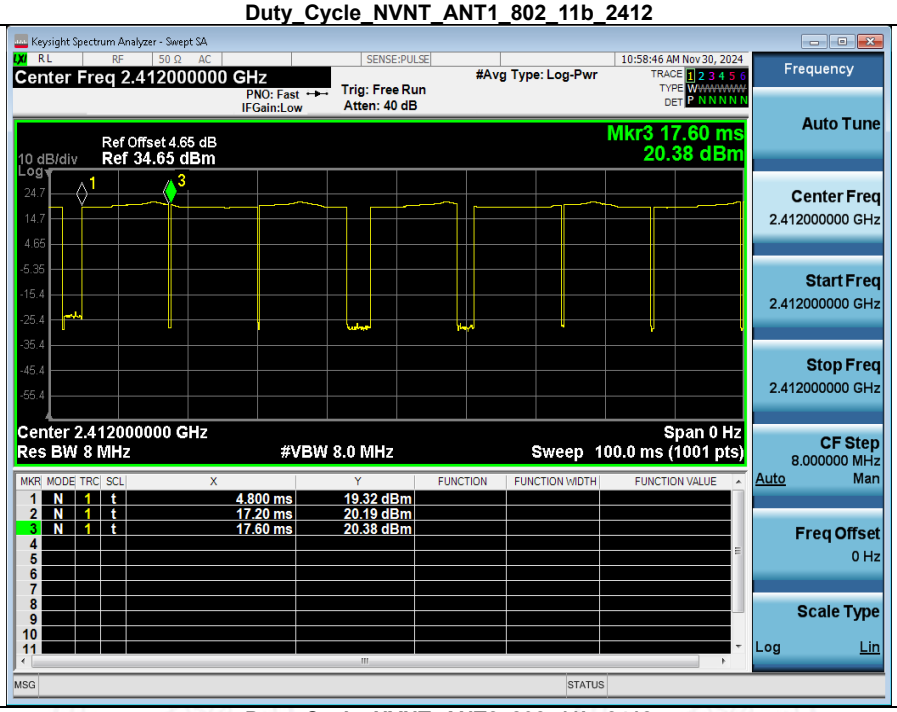
99%_Occupied_Bandwidth_NVNT_ANT2_802_11n(HT40)_2452


Keysight Spectrum Analyzer - Occupied BW
RL
RF
50 Ω AC
SENSE:PULSE
ALIGN AUTO
11:21:28 AM Dec 02, 2024
Center Freq 2.452000000 GHz
Center Freq: 2.452000000 GHz
Trig: Free Run
Avg|Hold:>10/10
#Atten: 40 dB
#IFGain:Low
Radio Std: None
Radio Device: BTS
Frequency
Ref Offset 5.06 dB
10 dB/div
Ref 19.12 dBm
Log
9.12
-0.88
-10.9
-20.9
-30.9
-40.9
-50.9
-60.9
-70.9
Center Freq
2.452000000 GHz
Center 2.452 GHz
#Res BW 1 MHz
#VBW 3 MHz
Span 60 MHz
Sweep 1 ms
CF Step
6.000000 MHz
Auto
Man
Occupied Bandwidth
36.332 MHz
Total Power
19.9 dBm
Transmit Freq Error
144.67 kHz
% of OBW Power
99.00 %
x dB Bandwidth
42.40 MHz
x dB
-26.00 dB
Freq Offset
0 Hz
MSG
STATUS

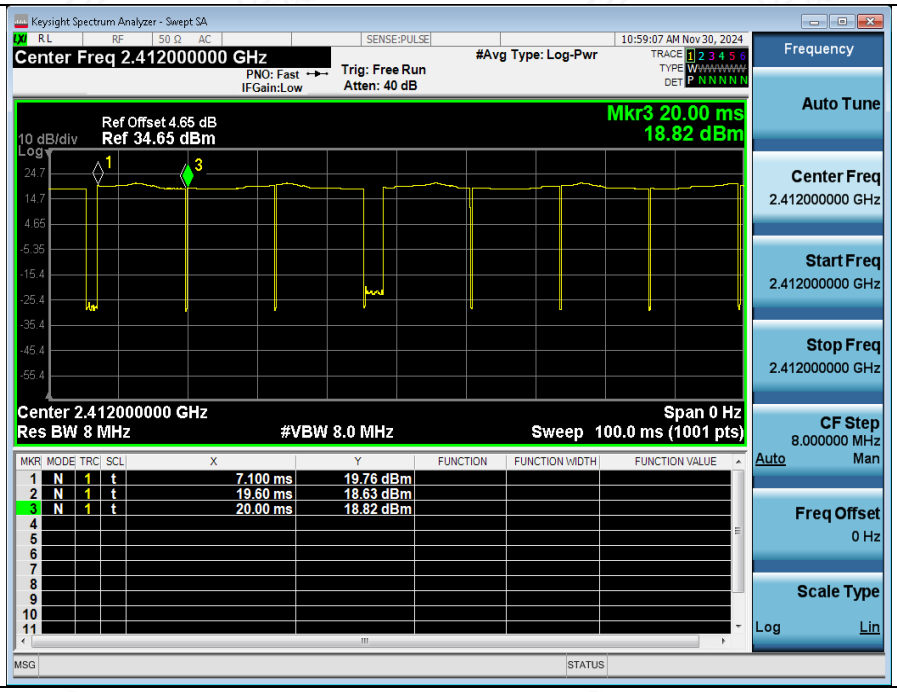
3. Duty Cycle

Condition	Antenna	Modulation	Frequency (MHz)	Duty cycle(%)	Duty factor(dB)
NVNT	ANT1	802.11b	2412.00	97.66	0.10
NVNT	ANT2	802.11b	2412.00	97.67	0.10
NVNT	ANT1	802.11b	2437.00	97.66	0.10
NVNT	ANT2	802.11b	2437.00	96.90	0.14
NVNT	ANT1	802.11b	2462.00	98.43	0.00
NVNT	ANT2	802.11b	2462.00	96.90	0.14
NVNT	ANT1	802.11g	2412.00	93.69	0.28
NVNT	ANT2	802.11g	2412.00	94.55	0.24
NVNT	ANT1	802.11g	2437.00	95.41	0.20
NVNT	ANT2	802.11g	2437.00	93.75	0.28
NVNT	ANT1	802.11g	2462.00	91.23	0.40
NVNT	ANT2	802.11g	2462.00	92.04	0.36
NVNT	ANT1	802.11n(HT20)	2412.00	95.10	0.22
NVNT	ANT2	802.11n(HT20)	2412.00	90.65	0.43
NVNT	ANT1	802.11n(HT20)	2437.00	96.04	0.18
NVNT	ANT2	802.11n(HT20)	2437.00	91.51	0.39
NVNT	ANT1	802.11n(HT20)	2462.00	92.38	0.34
NVNT	ANT2	802.11n(HT20)	2462.00	94.17	0.26
NVNT	ANT1	802.11n(HT40)	2422.00	85.71	0.67
NVNT	ANT2	802.11n(HT40)	2422.00	81.36	0.90
NVNT	ANT1	802.11n(HT40)	2437.00	88.89	0.51
NVNT	ANT2	802.11n(HT40)	2437.00	90.57	0.43
NVNT	ANT1	802.11n(HT40)	2452.00	84.21	0.75
NVNT	ANT2	802.11n(HT40)	2452.00	90.57	0.43

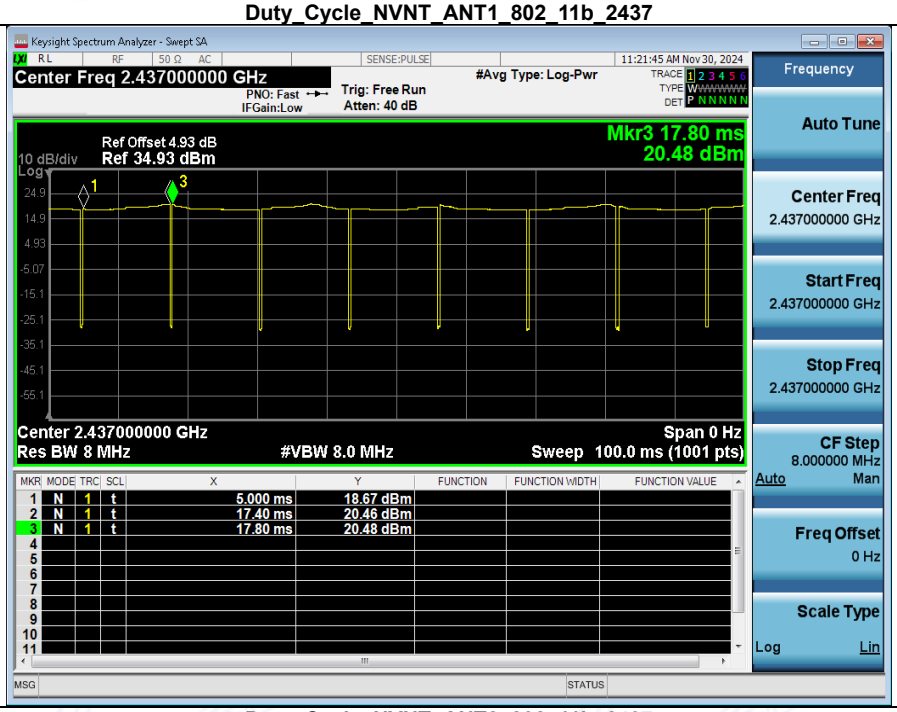
Duty_Cycle_NVNT_ANT1_802_11b_2412



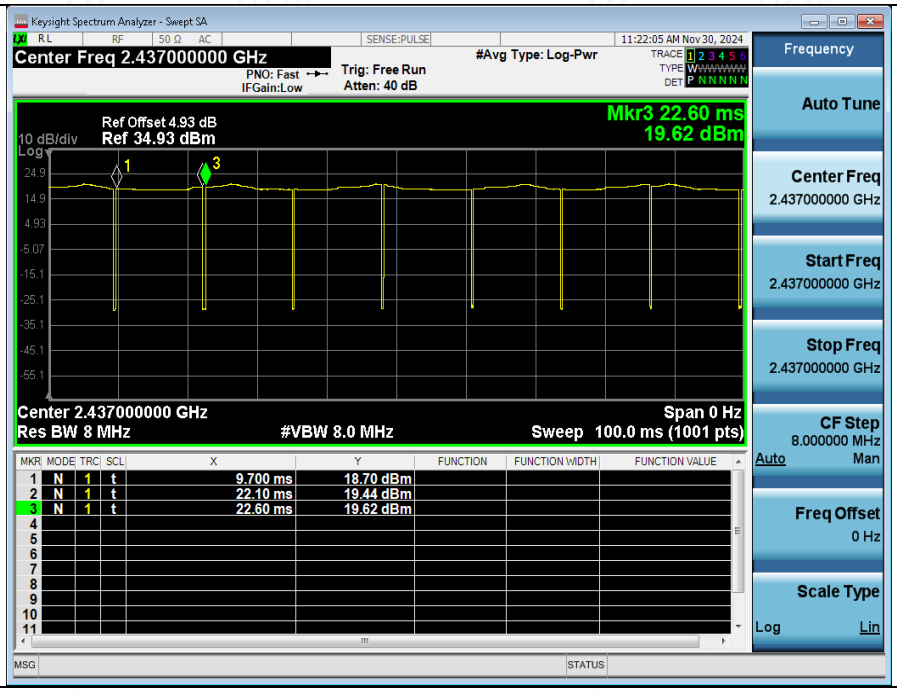
Duty_Cycle_NVNT_ANT2_802_11b_2412



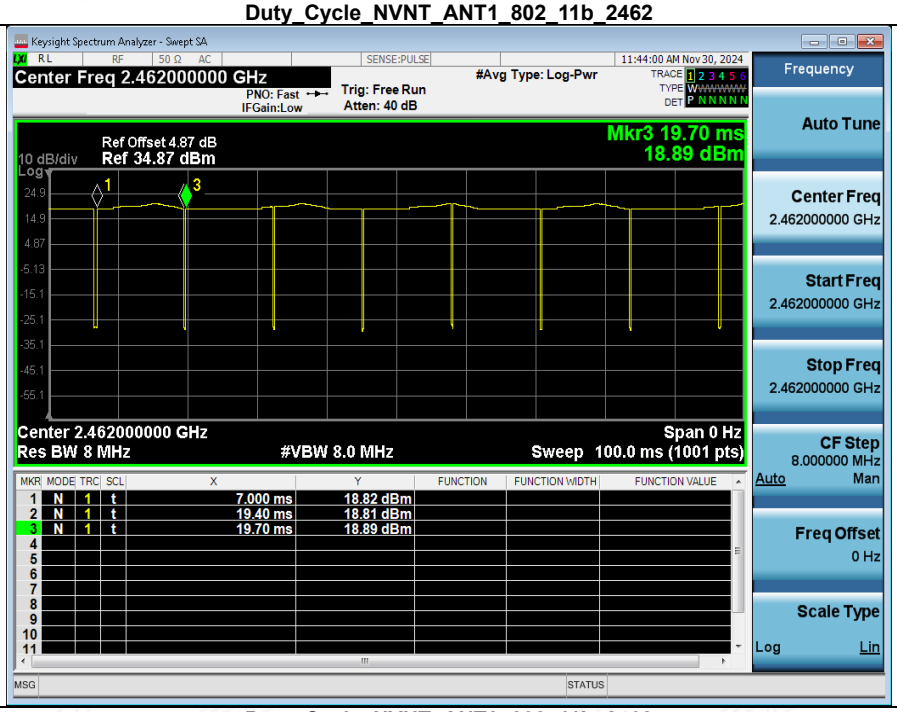
Duty_Cycle_NVNT_ANT1_802_11b_2437



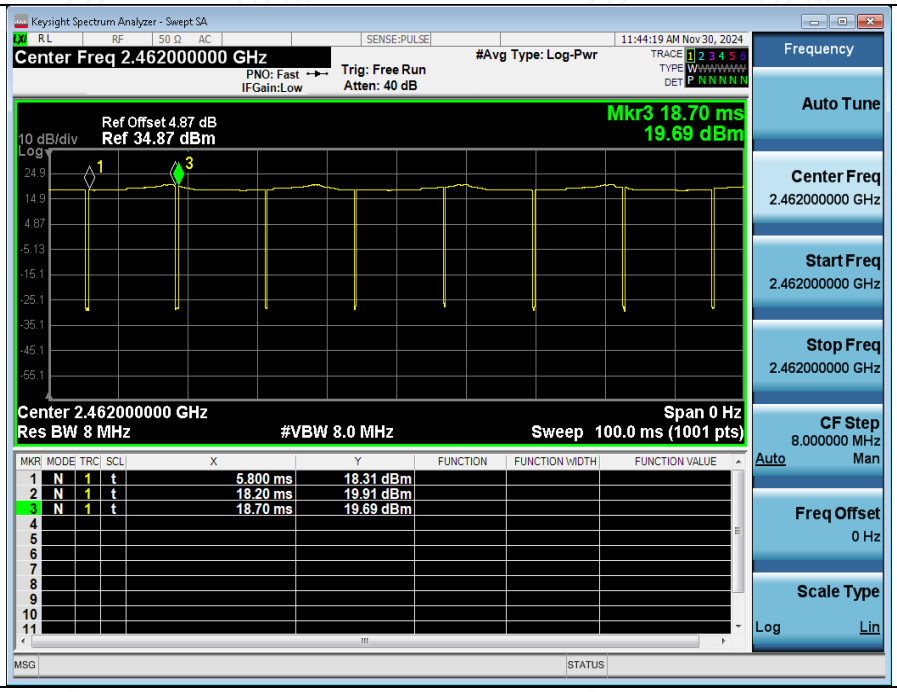
Duty_Cycle_NVNT_ANT2_802_11b_2437



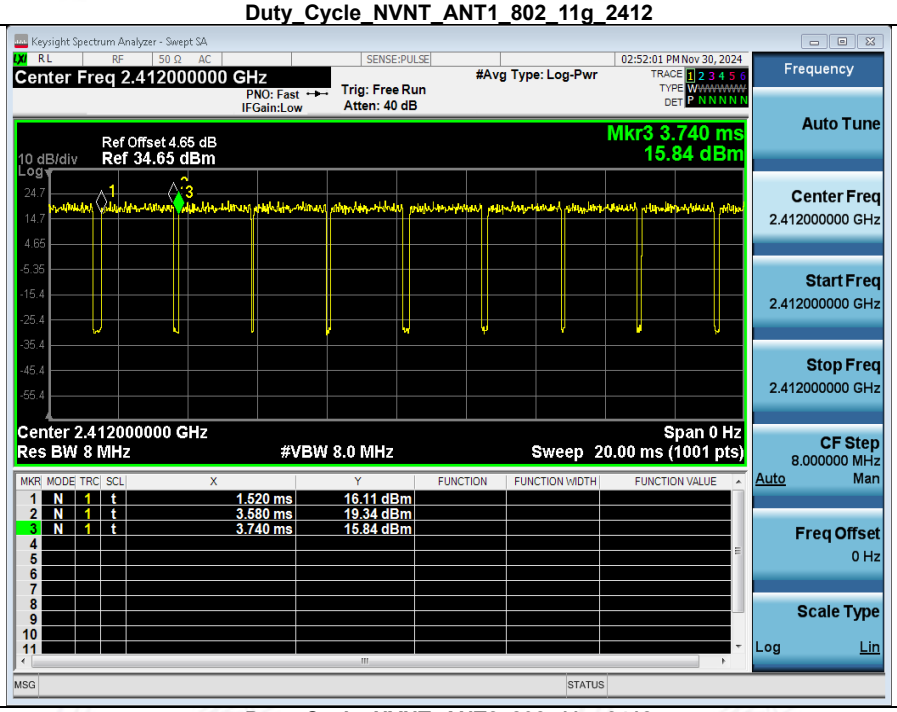
Duty_Cycle_NVNT_ANT1_802_11b_2462



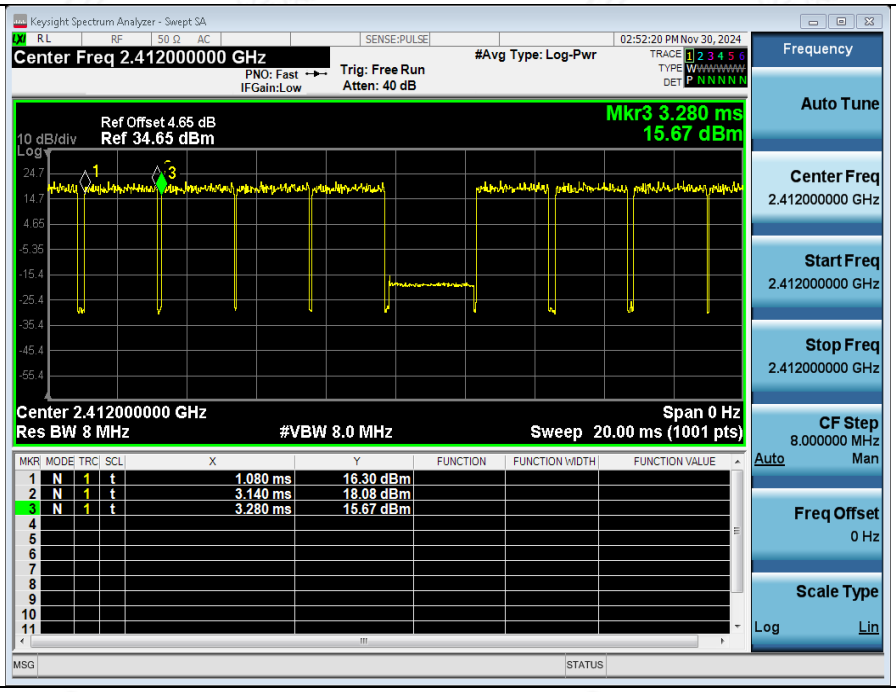
Duty_Cycle_NVNT_ANT2_802_11b_2462



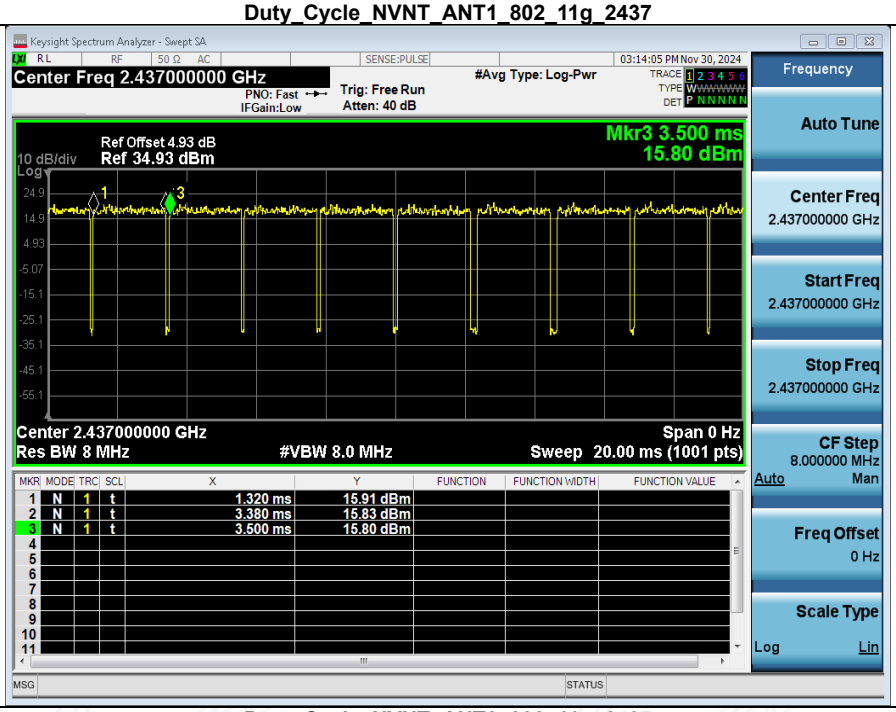
Duty_Cycle_NVNT_ANT1_802_11g_2412



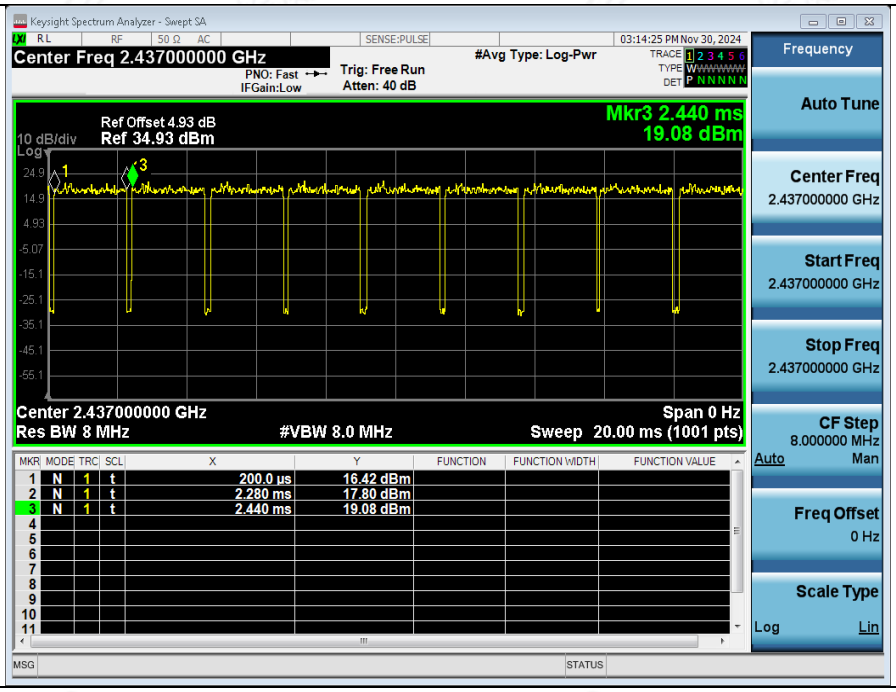
Duty_Cycle_NVNT_ANT2_802_11g_2412



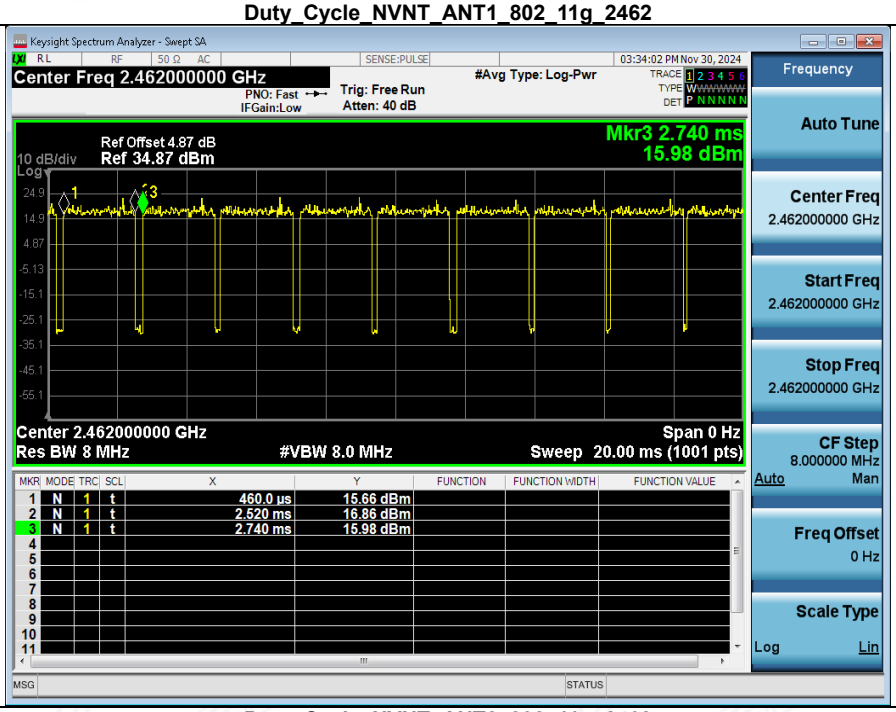
Duty_Cycle_NVNT_ANT1_802_11g_2437



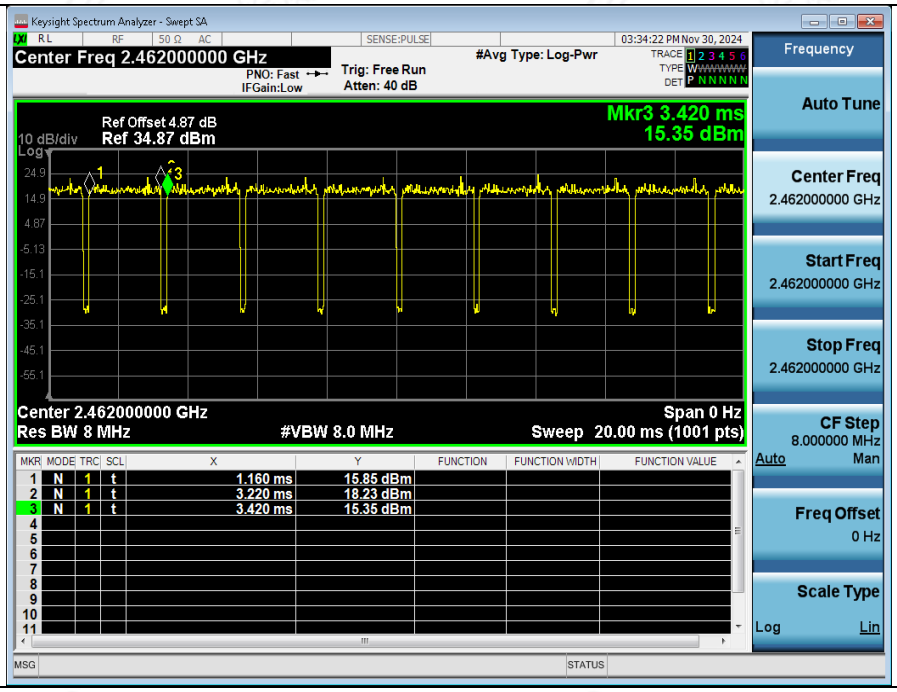
Duty_Cycle_NVNT_ANT2_802_11g_2437



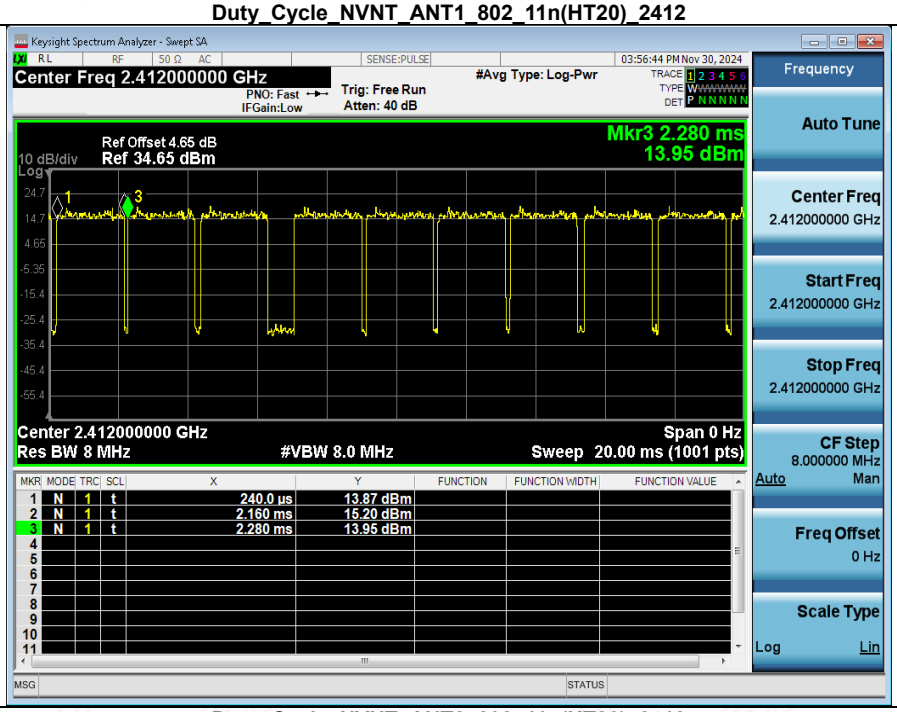
Duty_Cycle_NVNT_ANT1_802_11g_2462



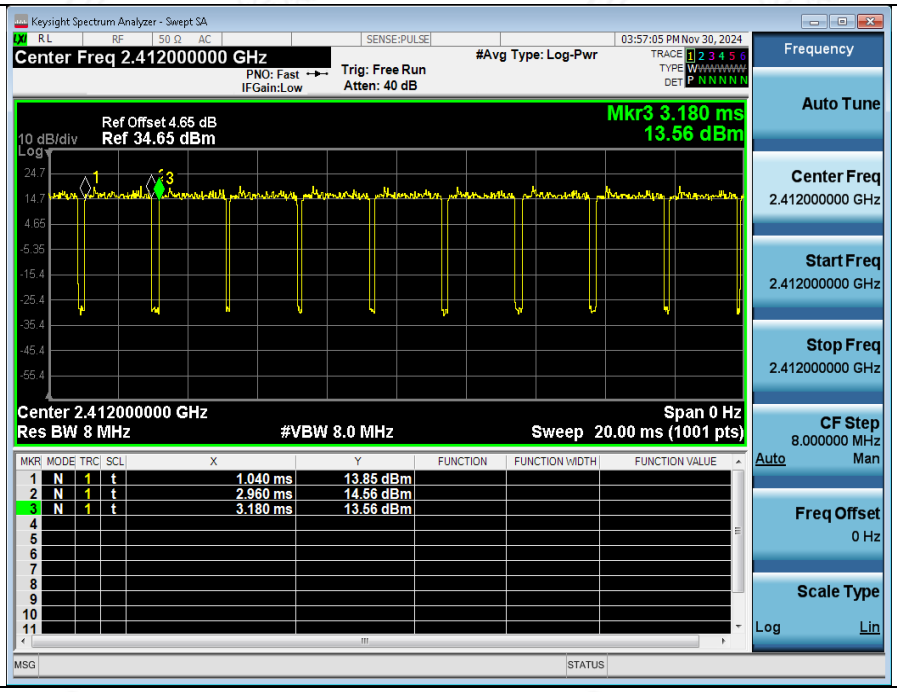
Duty_Cycle_NVNT_ANT2_802_11g_2462



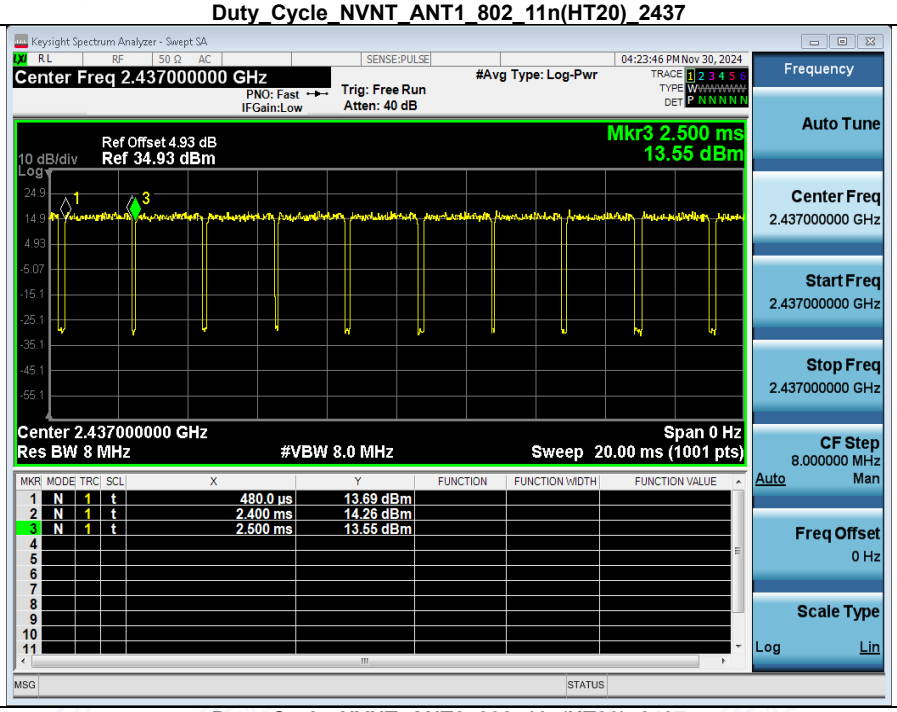
Duty_Cycle_NVNT_ANT1_802_11n(HT20)_2412



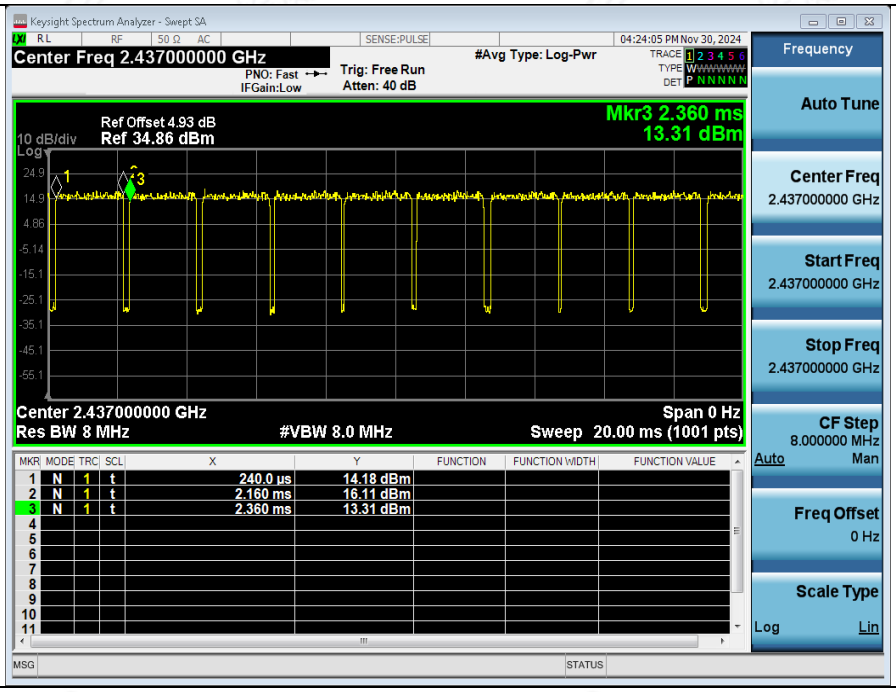
Duty_Cycle_NVNT_ANT2_802_11n(HT20)_2412



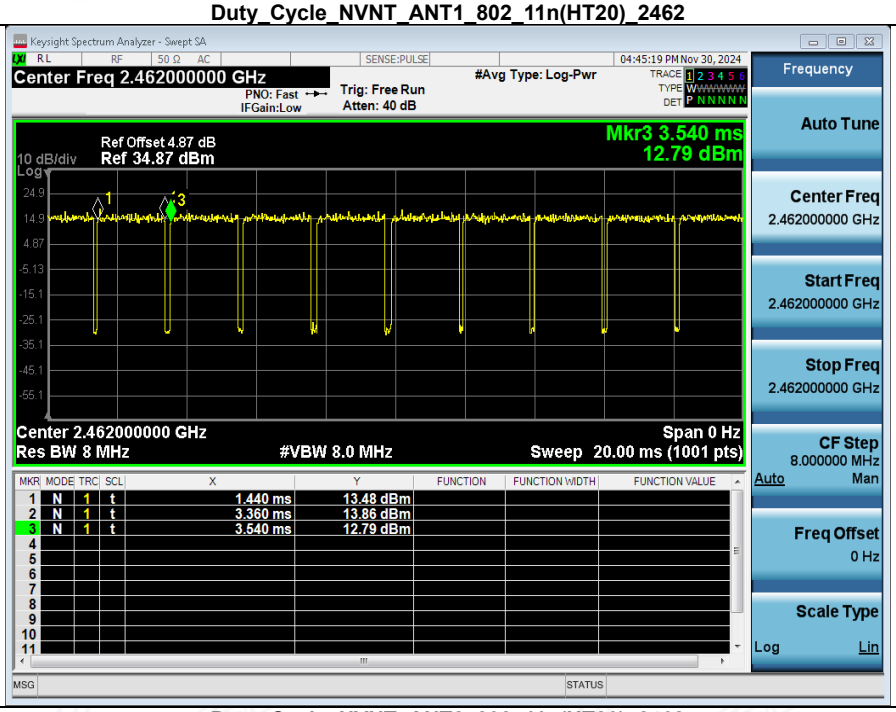
Duty_Cycle_NVNT_ANT1_802_11n(HT20)_2437



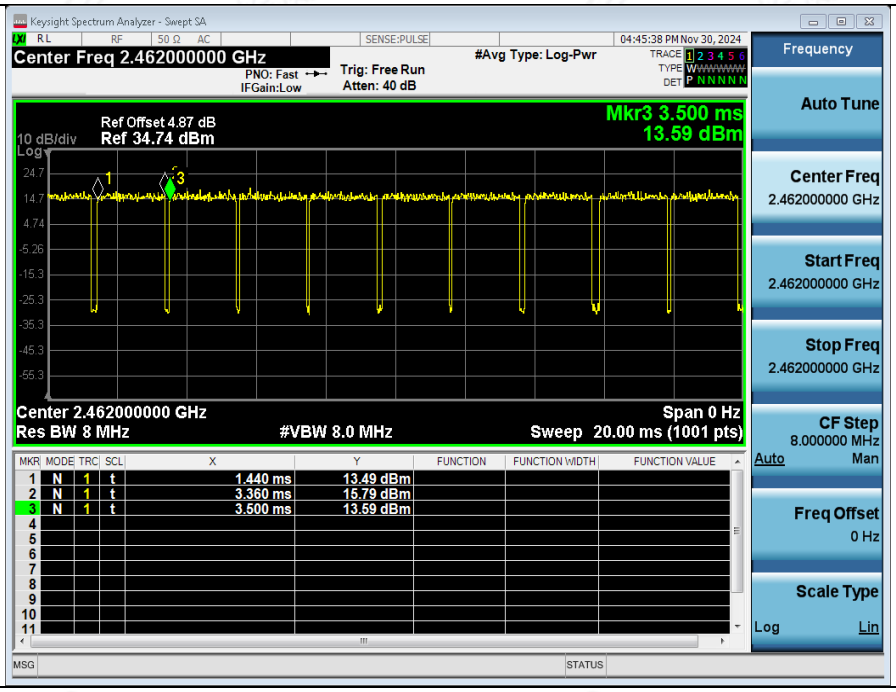
Duty_Cycle_NVNT_ANT2_802_11n(HT20)_2437



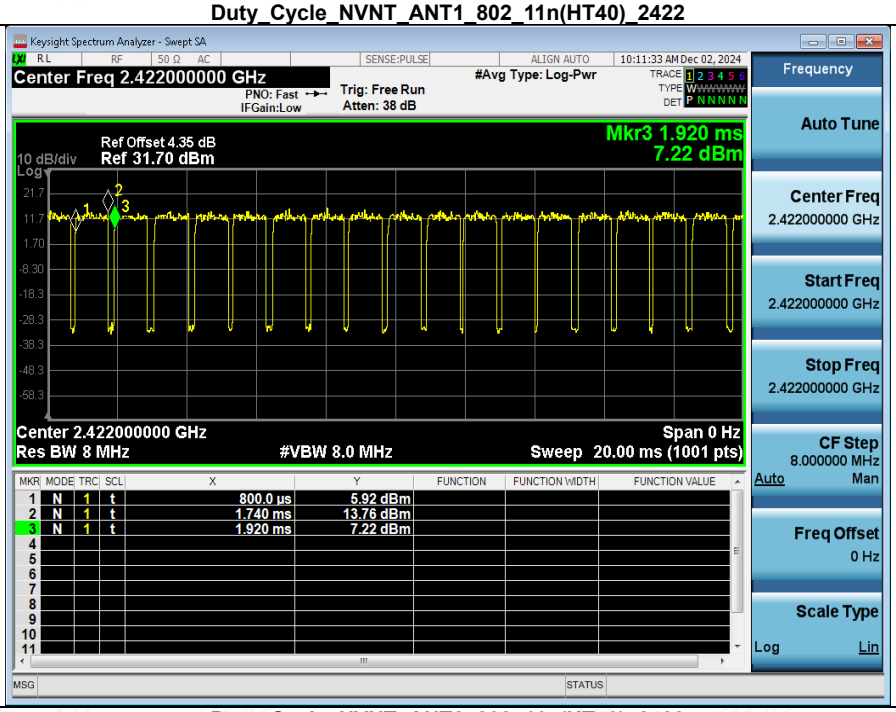
Duty_Cycle_NVNT_ANT1_802_11n(HT20)_2462



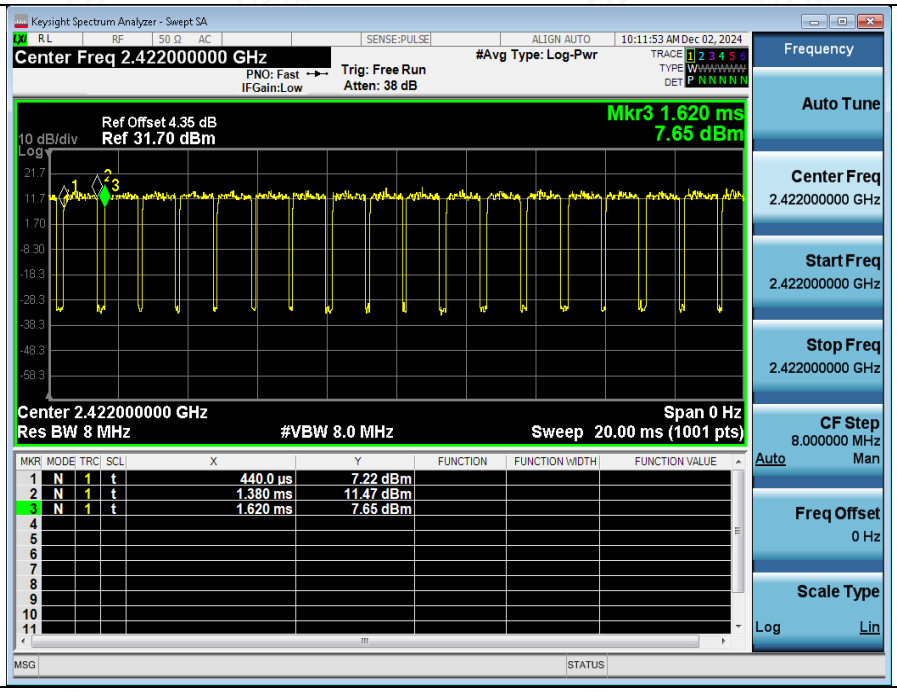
Duty_Cycle_NVNT_ANT2_802_11n(HT20)_2462



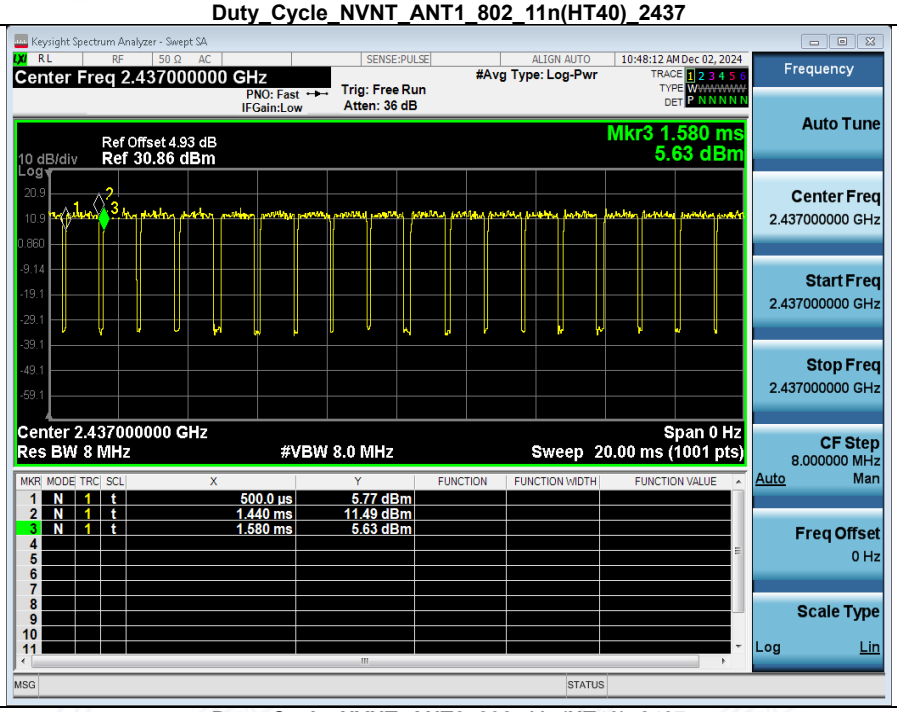
Duty_Cycle_NVNT_ANT1_802_11n(HT40)_2422



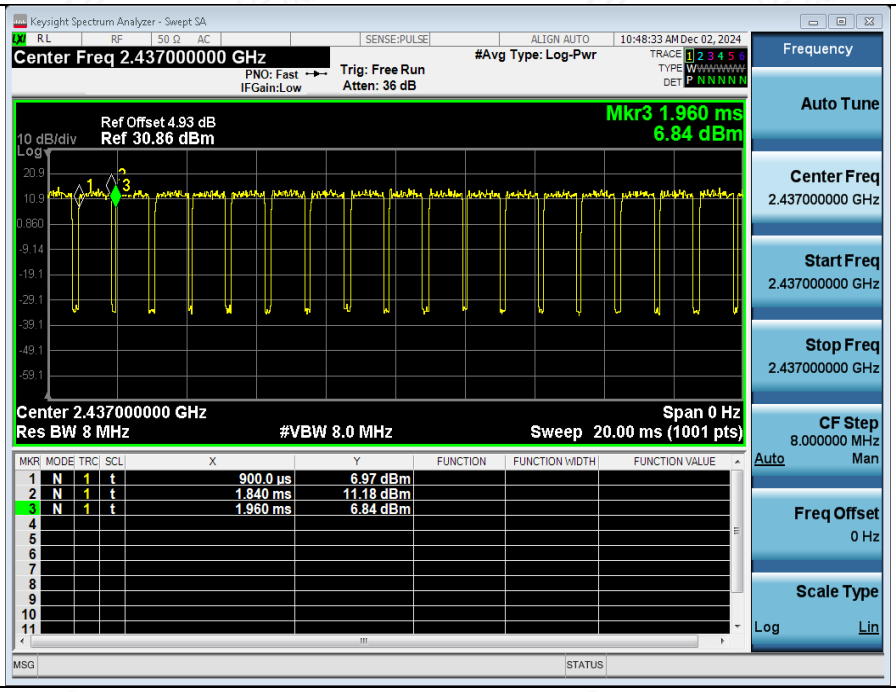
Duty_Cycle_NVNT_ANT2_802_11n(HT40)_2422



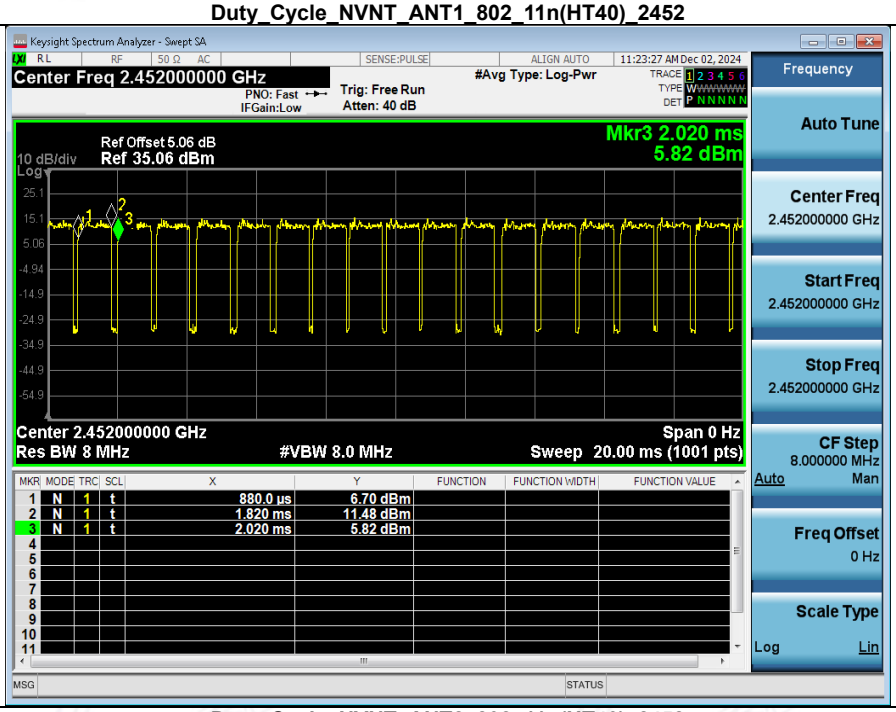
Duty_Cycle_NVNT_ANT1_802_11n(HT40)_2437



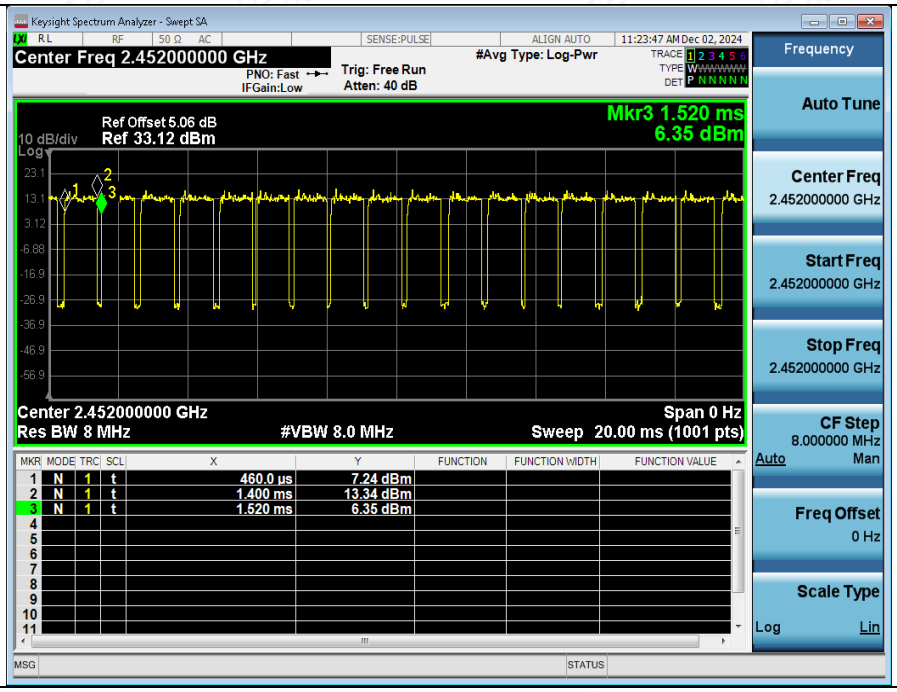
Duty_Cycle_NVNT_ANT2_802_11n(HT40)_2437



Duty_Cycle_NVNT_ANT1_802_11n(HT40)_2452



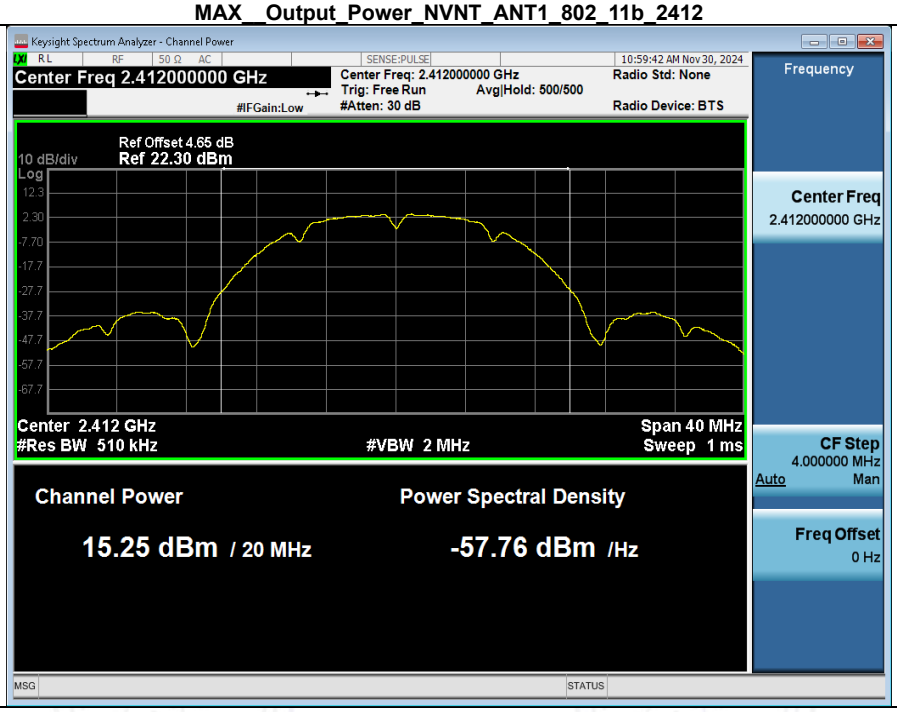
Duty_Cycle_NVNT_ANT2_802_11n(HT40)_2452


Keysight Spectrum Analyzer - Swept SA
Center Freq 2.452000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 40 dB
#Avg Type: Log-Pwr
11:23:47 AM Dec 02, 2024
Ref Offset 5.06 dB
10 dB/div
Ref 33.12 dBm
Mkr3 1.520 ms
6.35 dBm
Center 2.452000000 GHz
Res BW 8 MHz
#VBW 8.0 MHz
Span 0 Hz
Sweep 20.00 ms (1001 pts)
1 N 1 t 460.0 µs 7.24 dBm
2 N 1 t 1.400 ms 13.34 dBm
3 N 1 t 1.520 ms 6.35 dBm
Frequency
Auto Tune
Center Freq
2.452000000 GHz
Start Freq
2.452000000 GHz
Stop Freq
2.452000000 GHz
CF Step
8.000000 MHz
Auto Man
Freq Offset
0 Hz
Scale Type
Log Lin

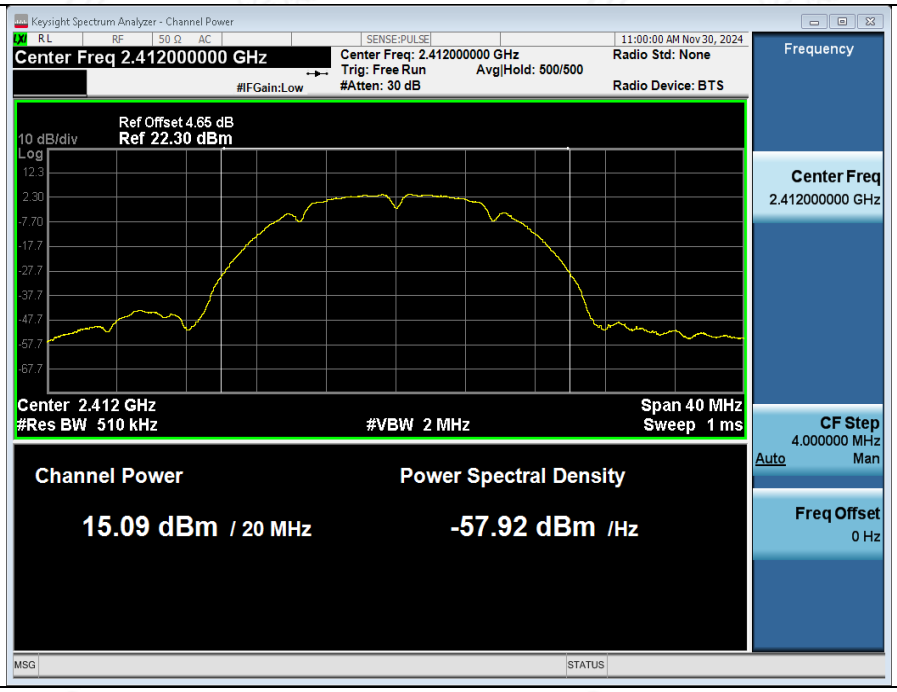
4. MAX. Output Power

Condition	Antenna	Modulation	Frequency (MHz)	Detector	Conducted Power(dBm)	Duty factor(dB)	Total Power(dBm)	limit(dBm)	Result
NVNT	ANT1	802.11b	2412.00	RMS	15.25	0.10	15.35	30	Pass
NVNT	ANT2	802.11b	2412.00	RMS	15.09	0.10	15.19	30	Pass
NVNT	ANT1	802.11b	2437.00	RMS	15.54	0.10	15.64	30	Pass
NVNT	ANT2	802.11b	2437.00	RMS	15.54	0.14	15.68	30	Pass
NVNT	ANT1	802.11b	2462.00	RMS	15.72	0.00	15.72	30	Pass
NVNT	ANT2	802.11b	2462.00	RMS	15.24	0.14	15.38	30	Pass
NVNT	ANT1	802.11g	2412.00	RMS	13.30	0.28	13.58	30	Pass
NVNT	ANT2	802.11g	2412.00	RMS	13.16	0.24	13.40	30	Pass
NVNT	ANT1	802.11g	2437.00	RMS	13.20	0.20	13.40	30	Pass
NVNT	ANT2	802.11g	2437.00	RMS	13.43	0.28	13.71	30	Pass
NVNT	ANT1	802.11g	2462.00	RMS	12.87	0.40	13.27	30	Pass
NVNT	ANT2	802.11g	2462.00	RMS	13.27	0.36	13.63	30	Pass
NVNT	ANT1	802.11n(HT20)	2412.00	RMS	10.94	0.22	11.16	30	Pass
NVNT	ANT2	802.11n(HT20)	2412.00	RMS	10.71	0.43	11.14	30	Pass
NVNT	ANT1	802.11n(HT20)	2437.00	RMS	10.87	0.18	11.05	30	Pass
NVNT	ANT2	802.11n(HT20)	2437.00	RMS	10.98	0.39	11.37	30	Pass
NVNT	ANT1	802.11n(HT20)	2462.00	RMS	10.63	0.34	10.97	30	Pass
NVNT	ANT2	802.11n(HT20)	2462.00	RMS	10.91	0.26	11.17	30	Pass
NVNT	ANT1	802.11n(HT40)	2422.00	RMS	10.71	0.67	11.38	30	Pass
NVNT	ANT2	802.11n(HT40)	2422.00	RMS	10.77	0.90	11.67	30	Pass
NVNT	ANT1	802.11n(HT40)	2437.00	RMS	10.63	0.51	11.14	30	Pass
NVNT	ANT2	802.11n(HT40)	2437.00	RMS	11.06	0.43	11.49	30	Pass
NVNT	ANT1	802.11n(HT40)	2452.00	RMS	10.54	0.75	11.29	30	Pass
NVNT	ANT2	802.11n(HT40)	2452.00	RMS	11.12	0.43	11.55	30	Pass

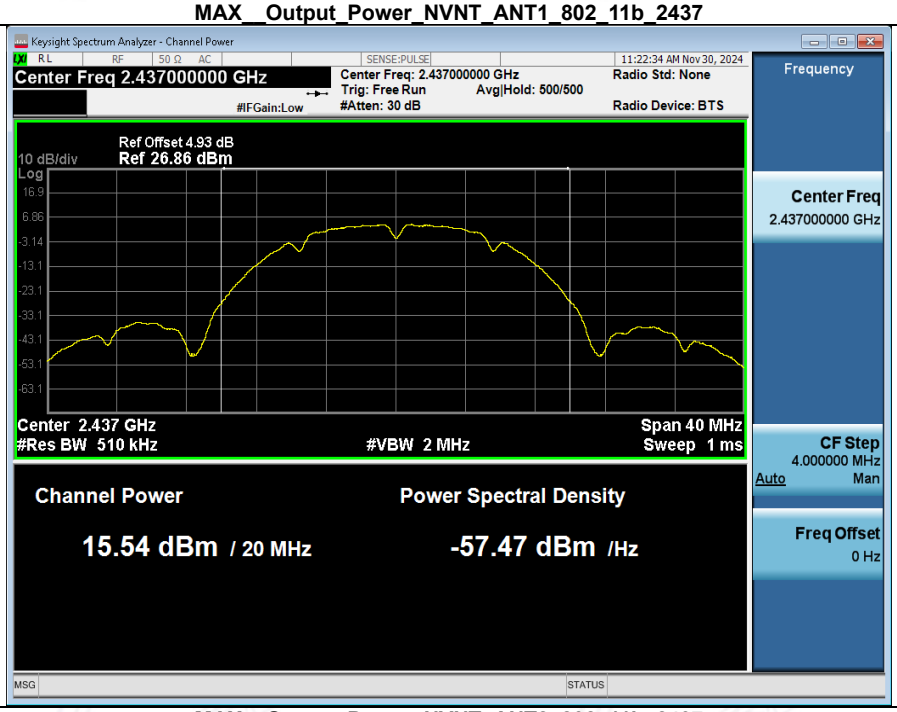
MAX__Output_Power_NVNT_ANT1_802_11b_2412



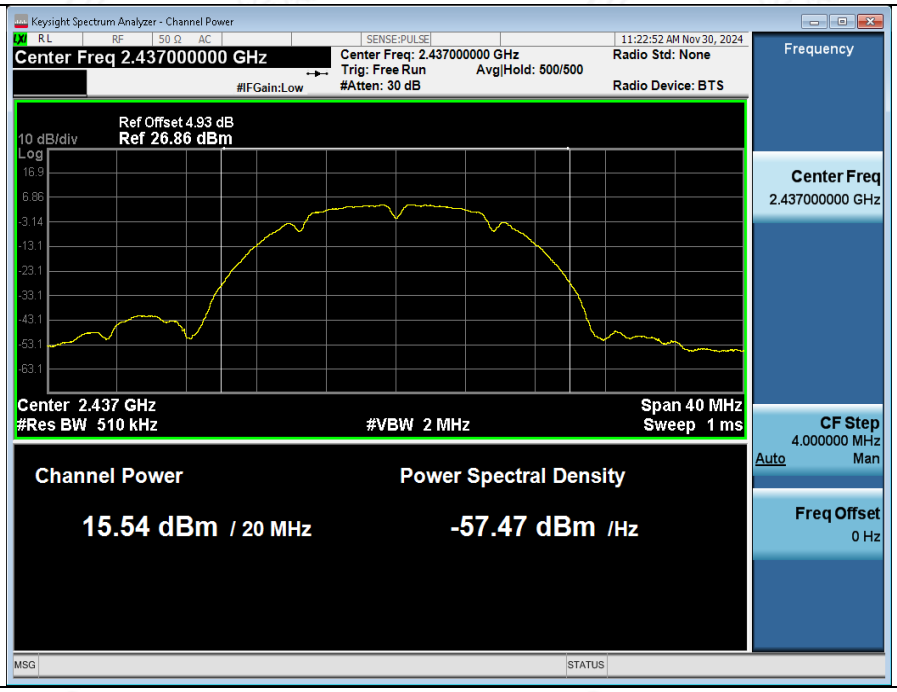
MAX__Output_Power_NVNT_ANT2_802_11b_2412



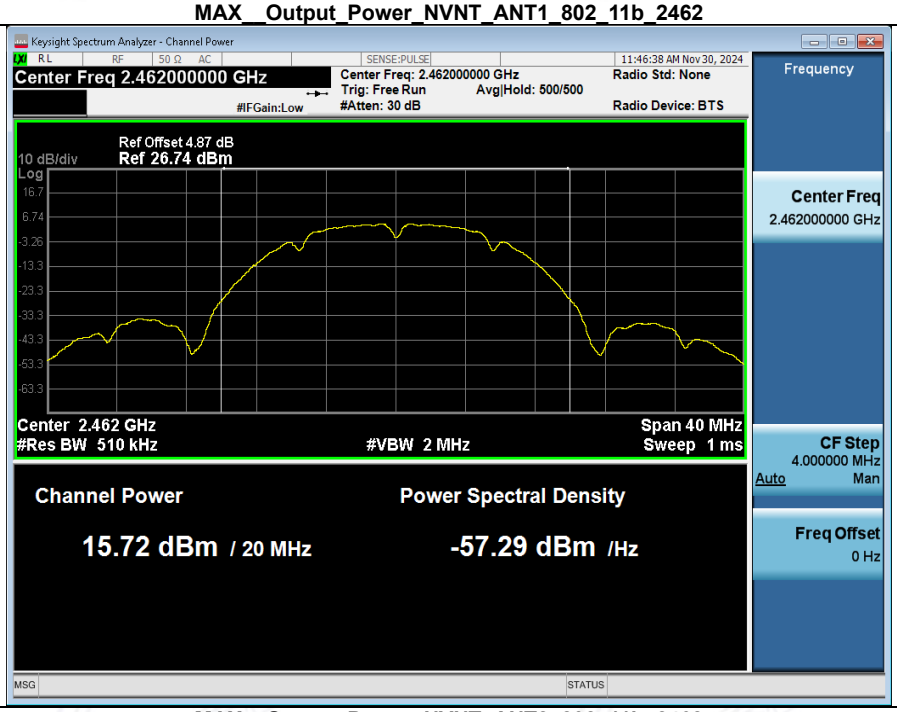
MAX__Output_Power_NVNT_ANT1_802_11b_2437



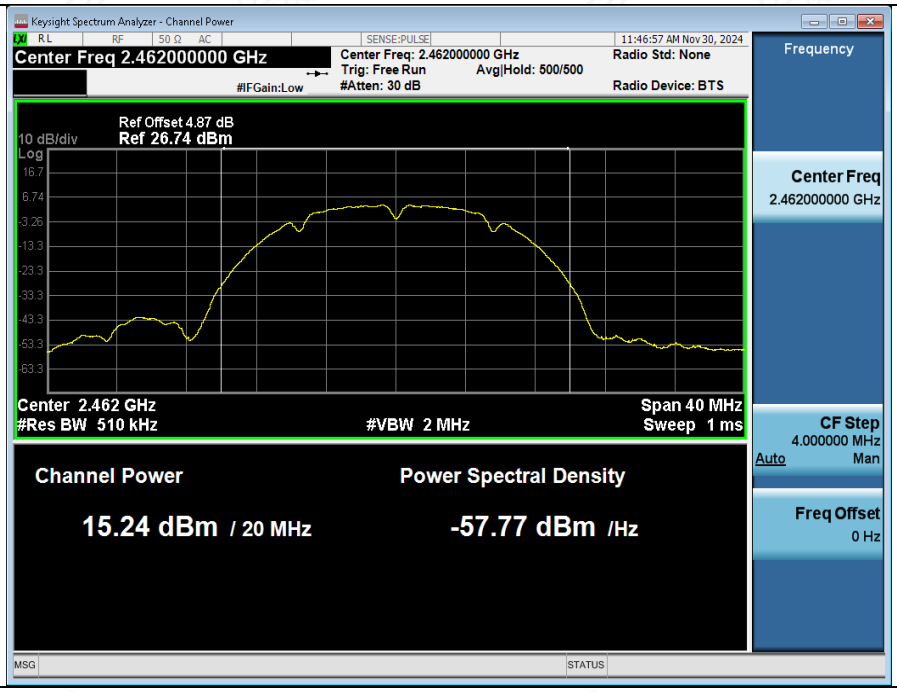
MAX__Output_Power_NVNT_ANT2_802_11b_2437



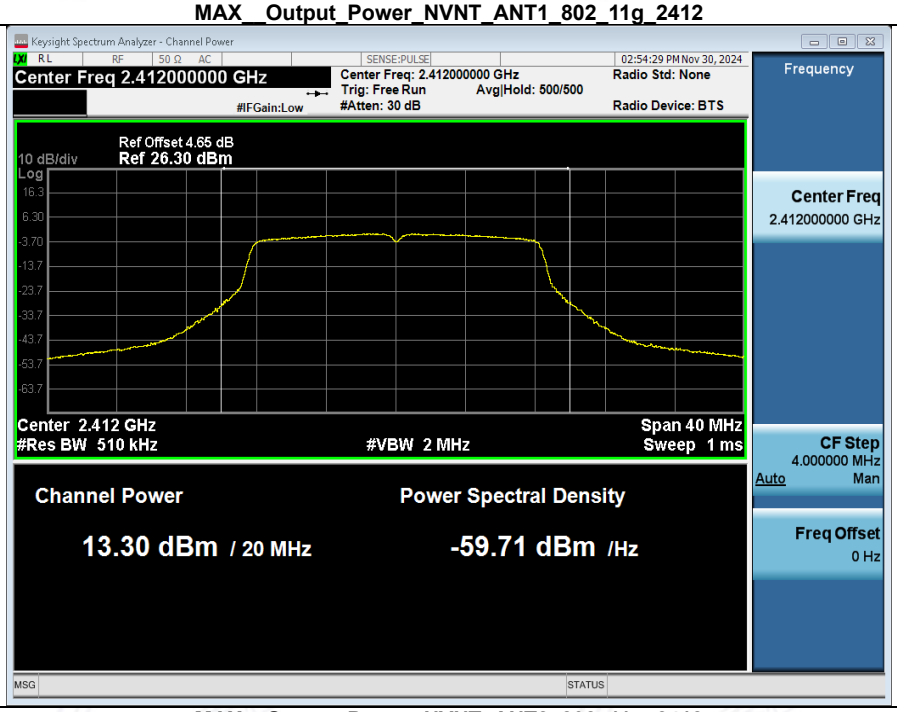
MAX__Output_Power_NVNT_ANT1_802_11b_2462



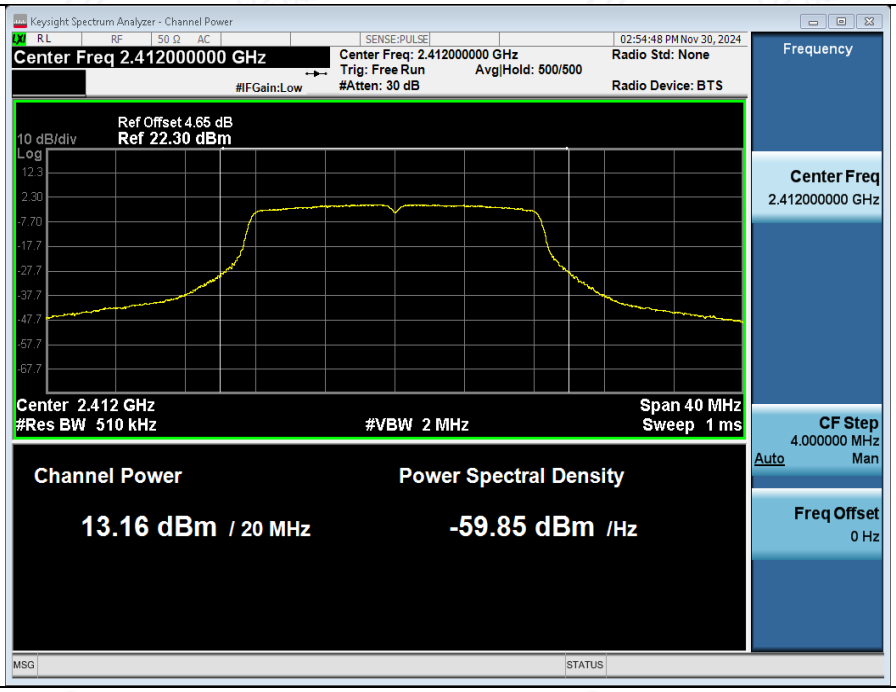
MAX__Output_Power_NVNT_ANT2_802_11b_2462



MAX__Output_Power_NVNT_ANT1_802_11g_2412



MAX__Output_Power_NVNT_ANT2_802_11g_2412



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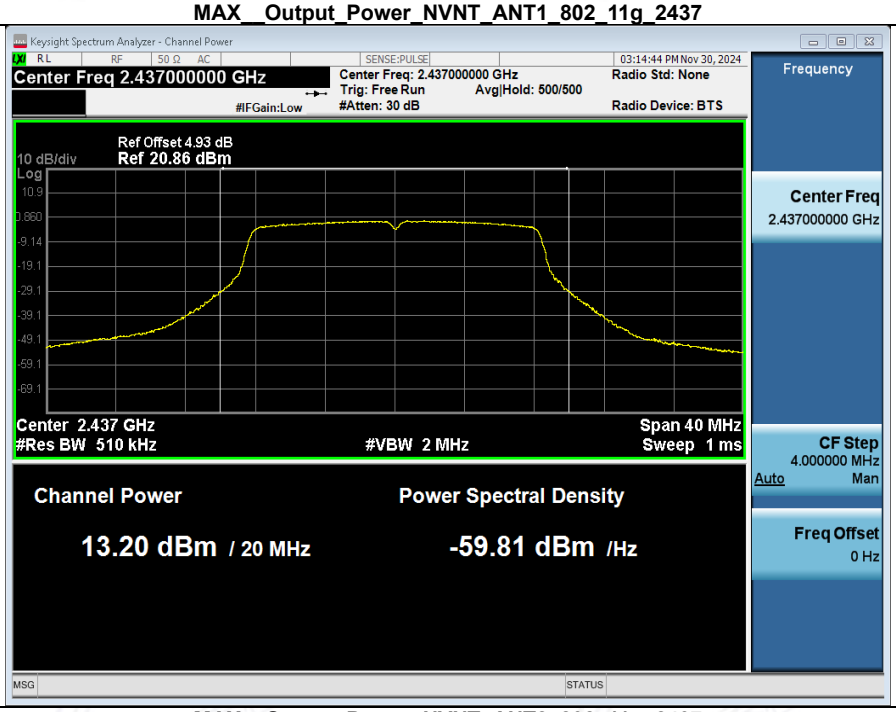
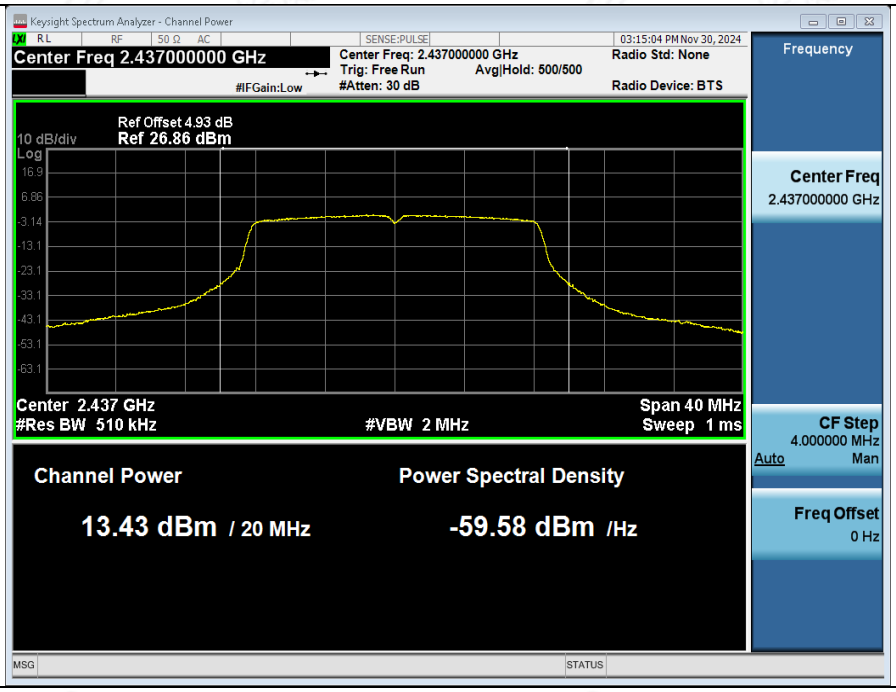
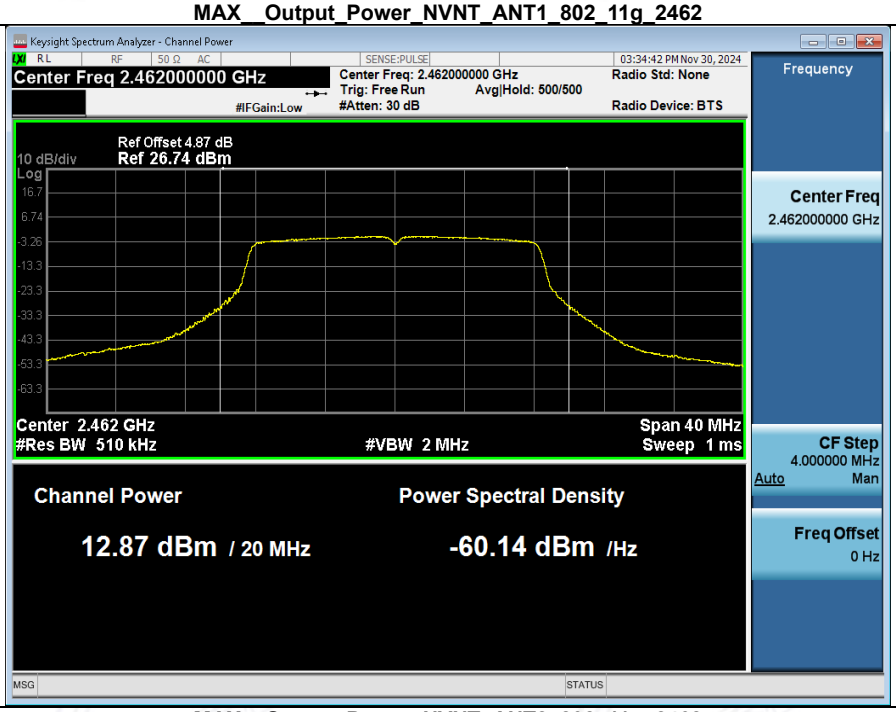


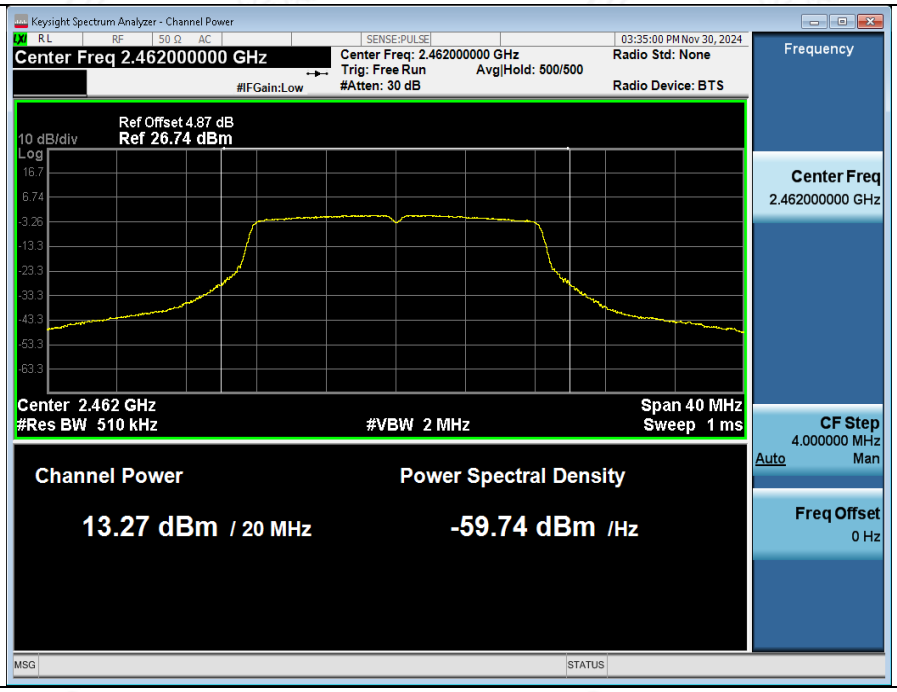
MAX__Output_Power_NVNT_ANT2_802_11g_2437



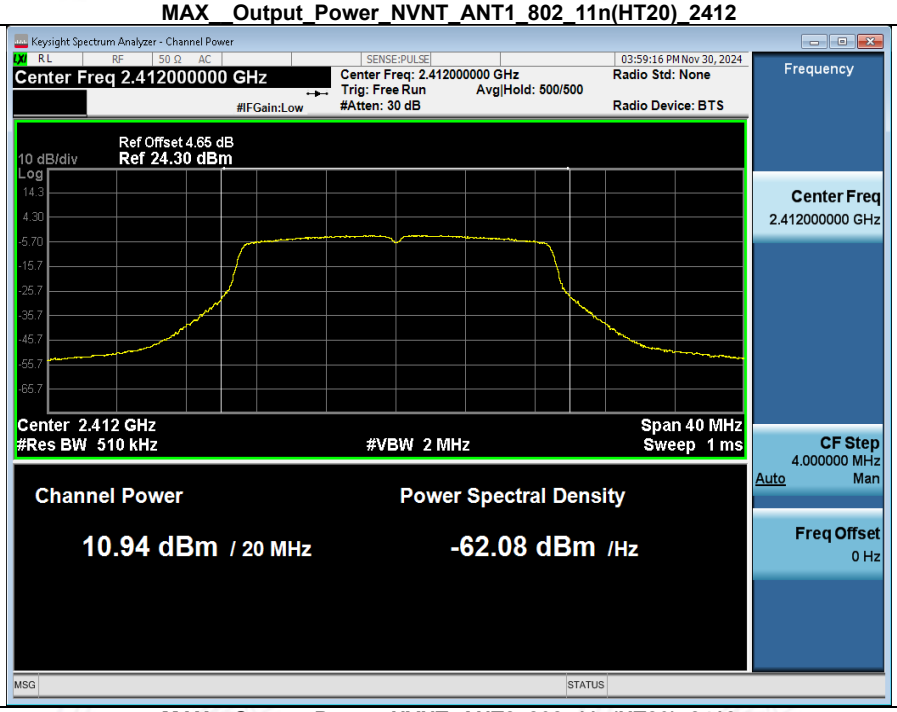
MAX__Output_Power_NVNT_ANT1_802_11g_2462



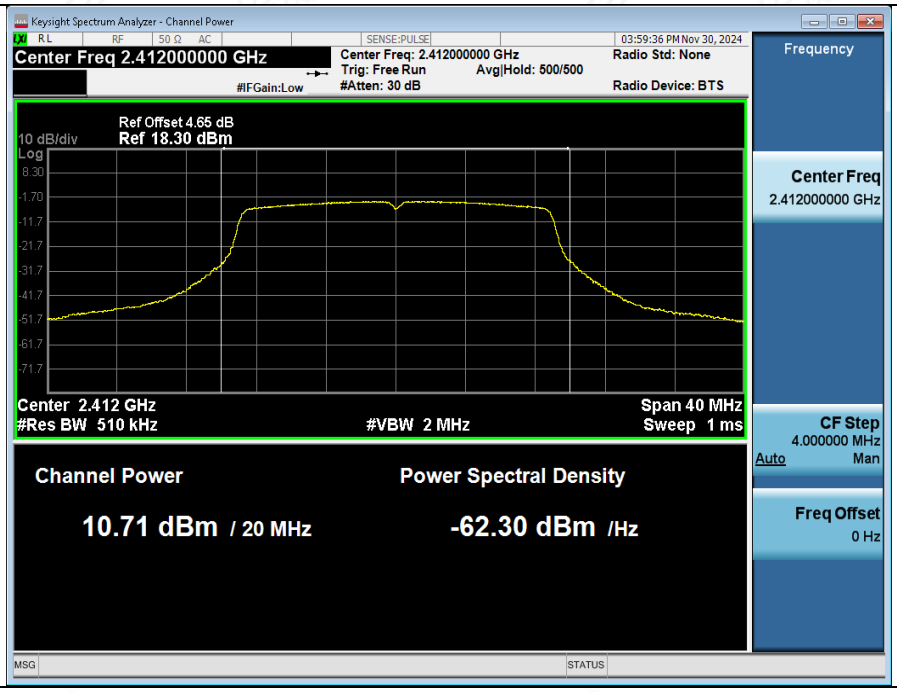
MAX__Output_Power_NVNT_ANT2_802_11g_2462



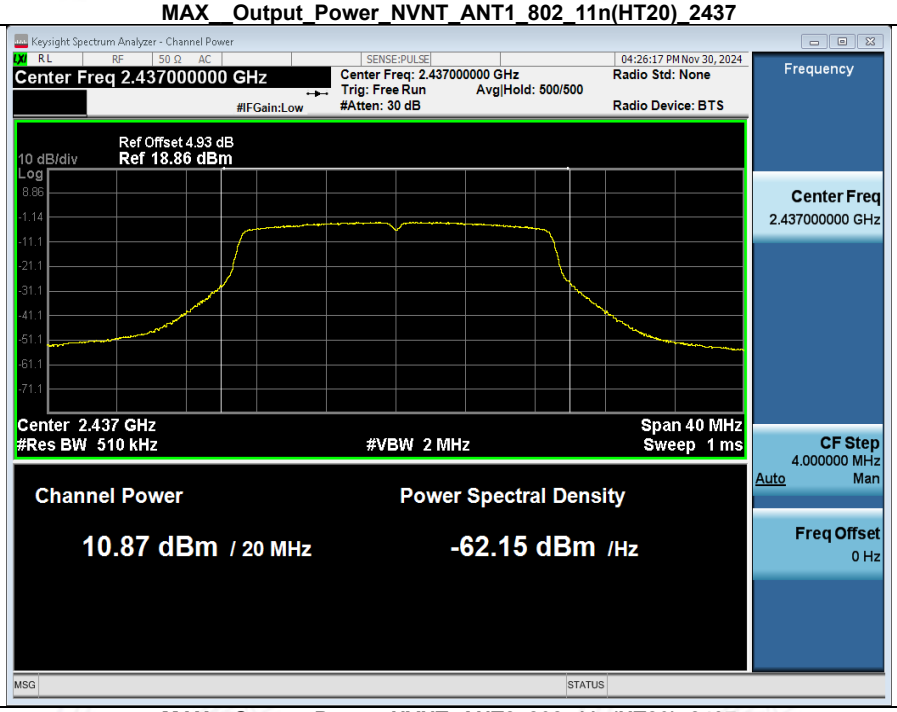
MAX__Output_Power_NVNT_ANT1_802_11n(HT20)_2412



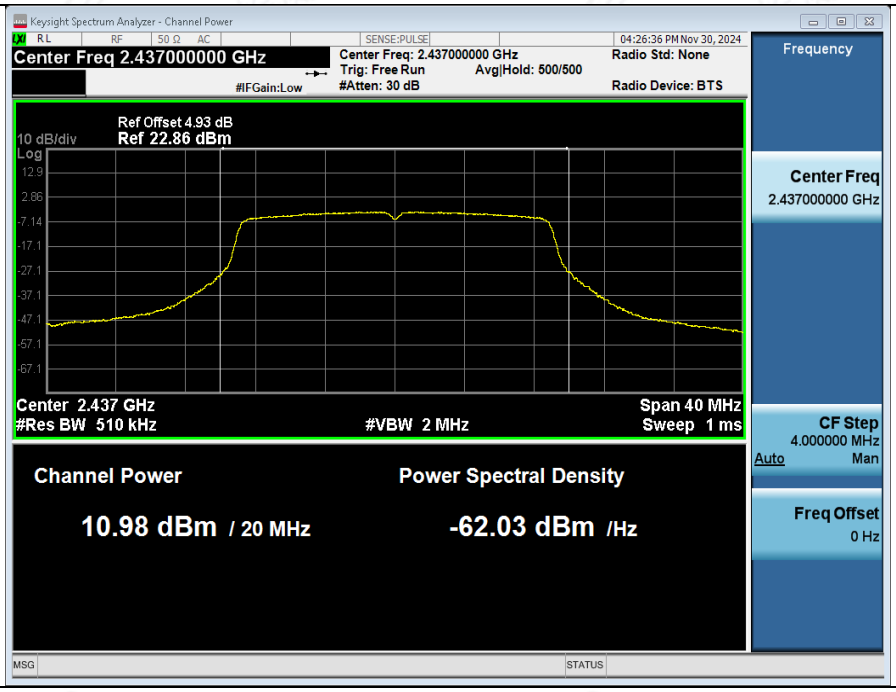
MAX__Output_Power_NVNT_ANT2_802_11n(HT20)_2412



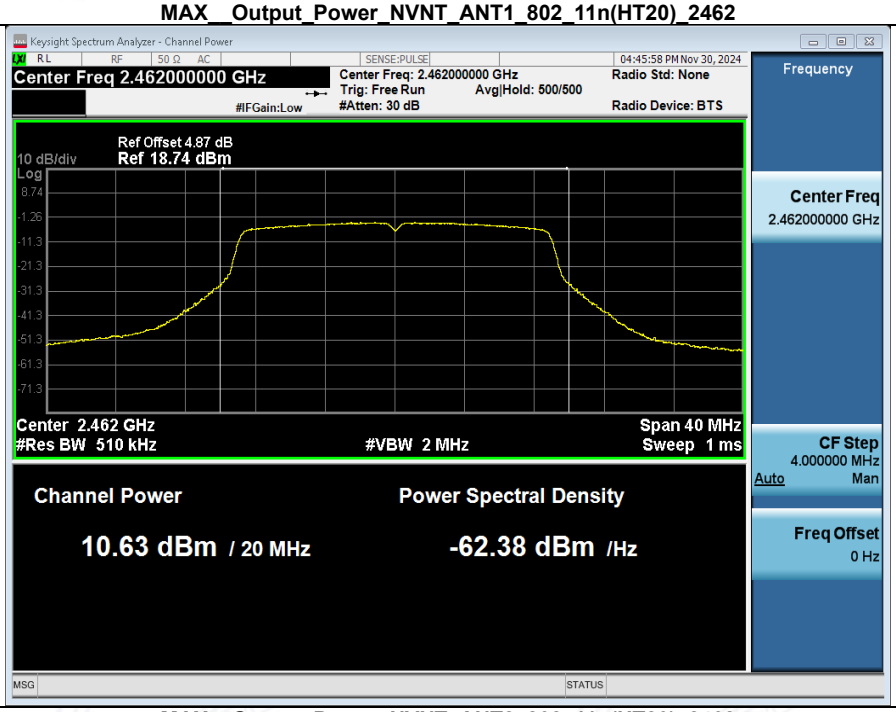
MAX__Output_Power_NVNT_ANT1_802_11n(HT20)_2437



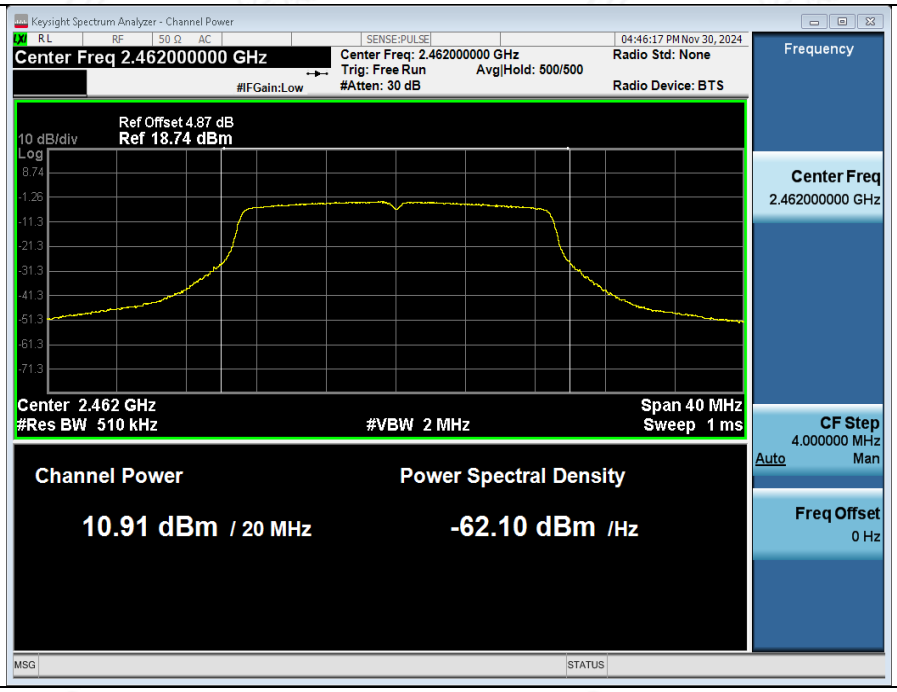
MAX__Output_Power_NVNT_ANT2_802_11n(HT20)_2437



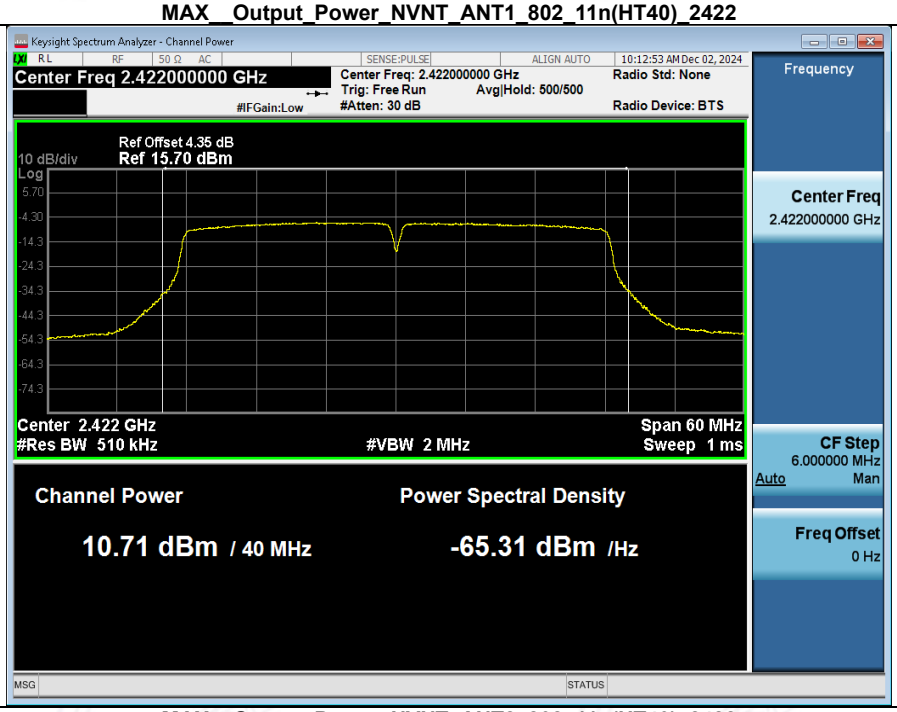
MAX__Output_Power_NVNT_ANT1_802_11n(HT20)_2462



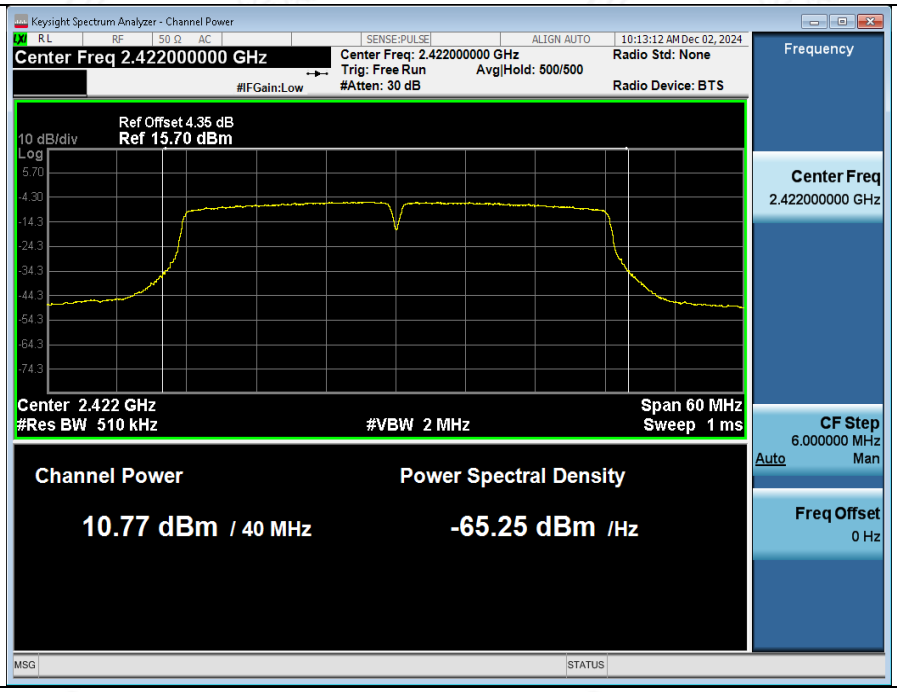
MAX__Output_Power_NVNT_ANT2_802_11n(HT20)_2462



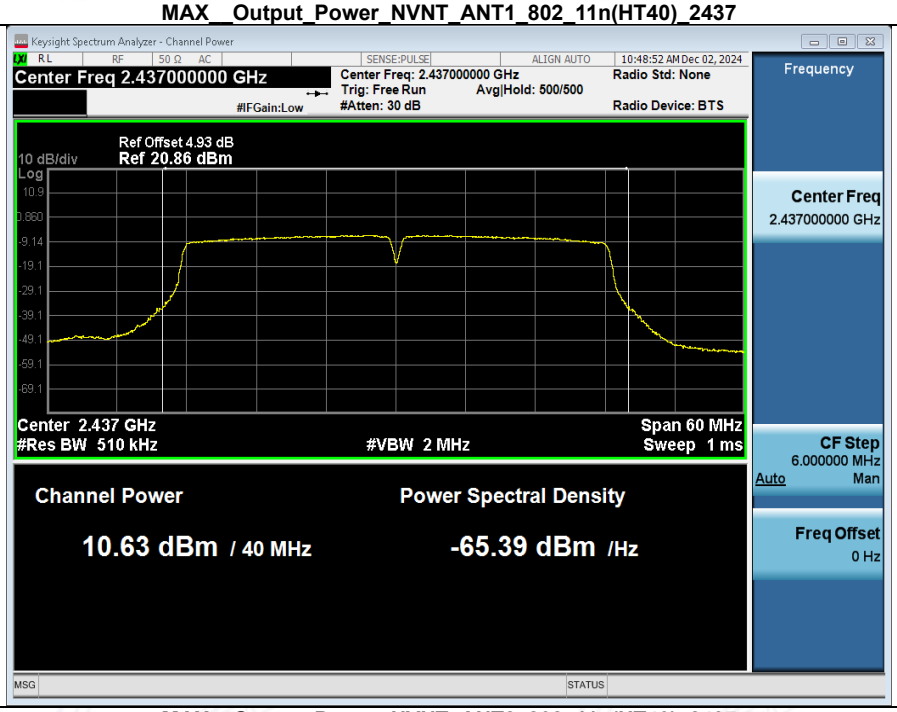
MAX__Output_Power_NVNT_ANT1_802_11n(HT40)_2422



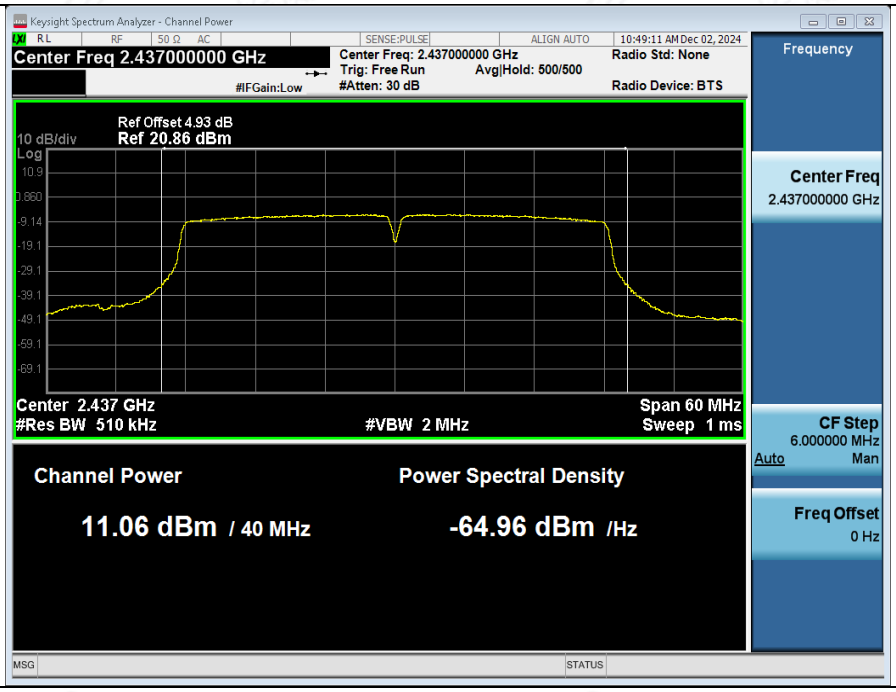
MAX__Output_Power_NVNT_ANT2_802_11n(HT40)_2422



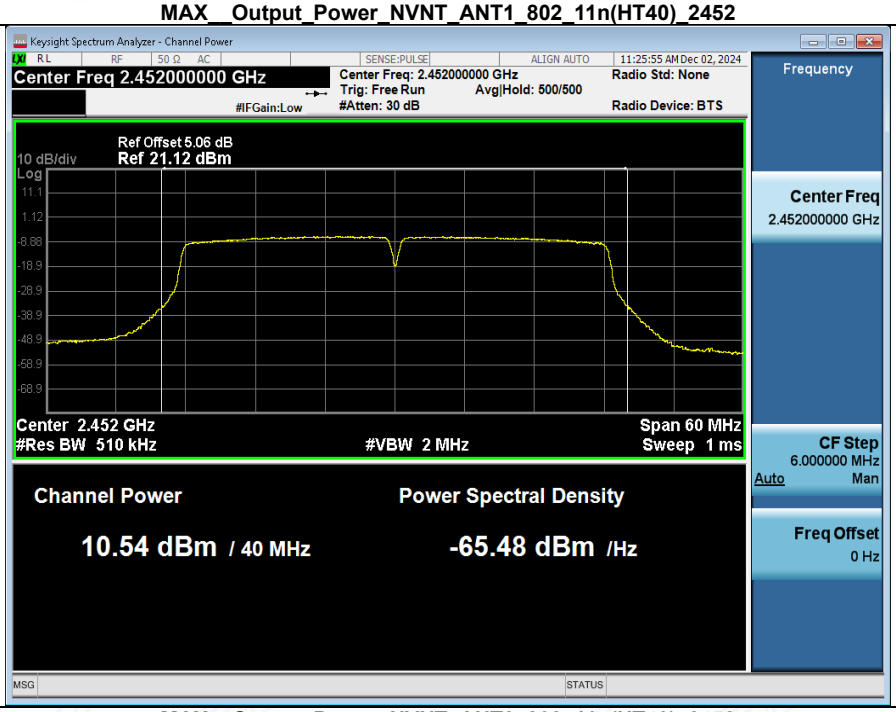
MAX__Output_Power_NVNT_ANT1_802_11n(HT40)_2437



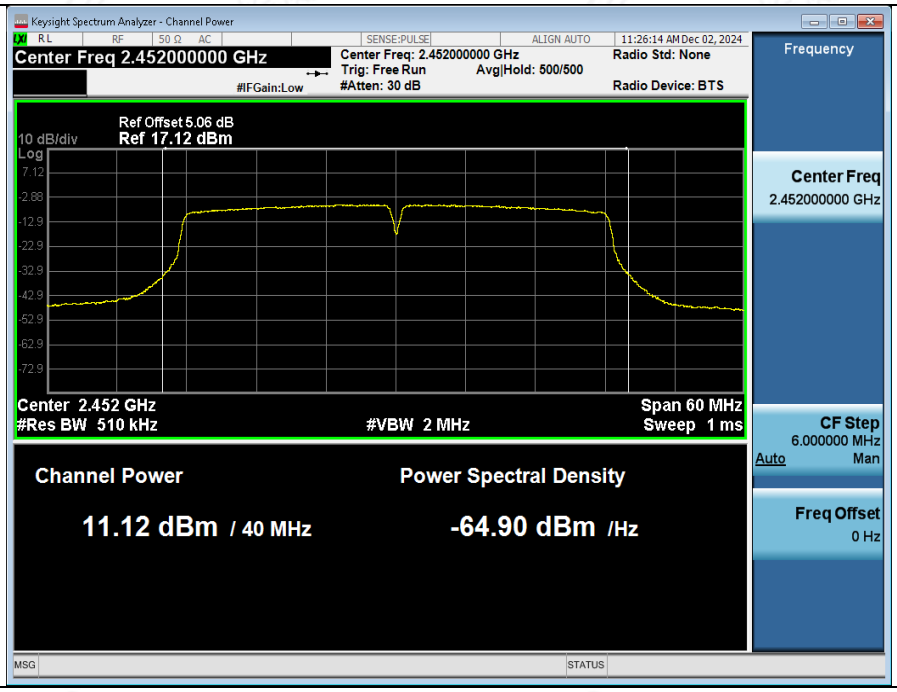
MAX__Output_Power_NVNT_ANT2_802_11n(HT40)_2437



MAX__Output_Power_NVNT_ANT1_802_11n(HT40)_2452



MAX__Output_Power_NVNT_ANT2_802_11n(HT40)_2452

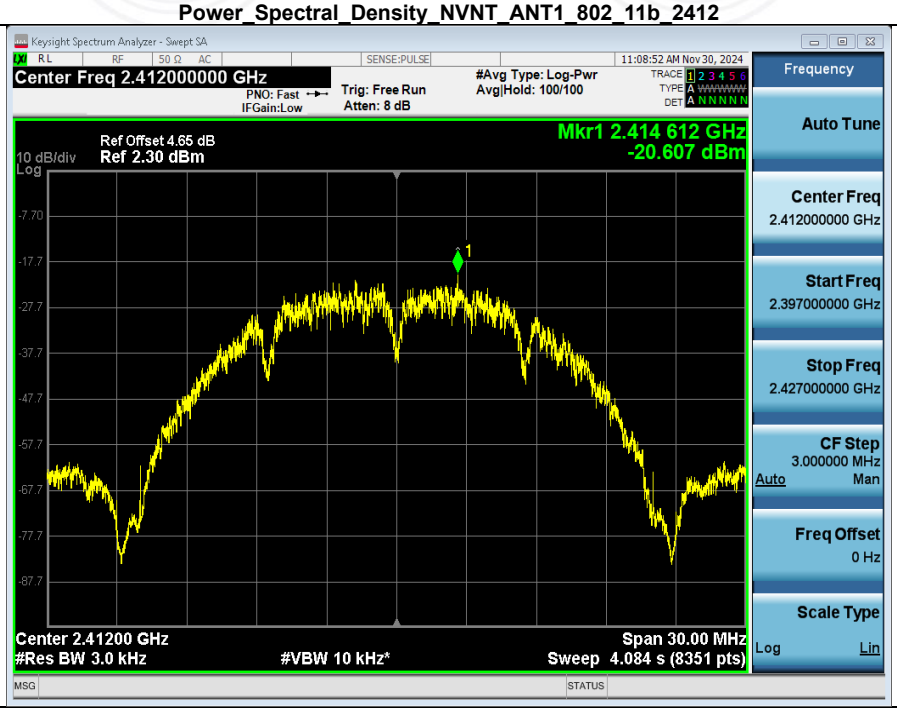


Condition	Antenna	Mode	Frequency(MHz)	MIMO_Conducted_Power(dBm)	Limit(dBm)	Result
NVNT	MIMO_TX	802.11n(HT20)	2412.00	14.16	30	Pass
NVNT	MIMO_TX	802.11n(HT20)	2437.00	14.22	30	Pass
NVNT	MIMO_TX	802.11n(HT20)	2462.00	14.08	30	Pass
NVNT	MIMO_TX	802.11n(HT40)	2422.00	14.54	30	Pass
NVNT	MIMO_TX	802.11n(HT40)	2437.00	14.33	30	Pass
NVNT	MIMO_TX	802.11n(HT40)	2452.00	14.43	30	Pass

5. Power Spectral Density

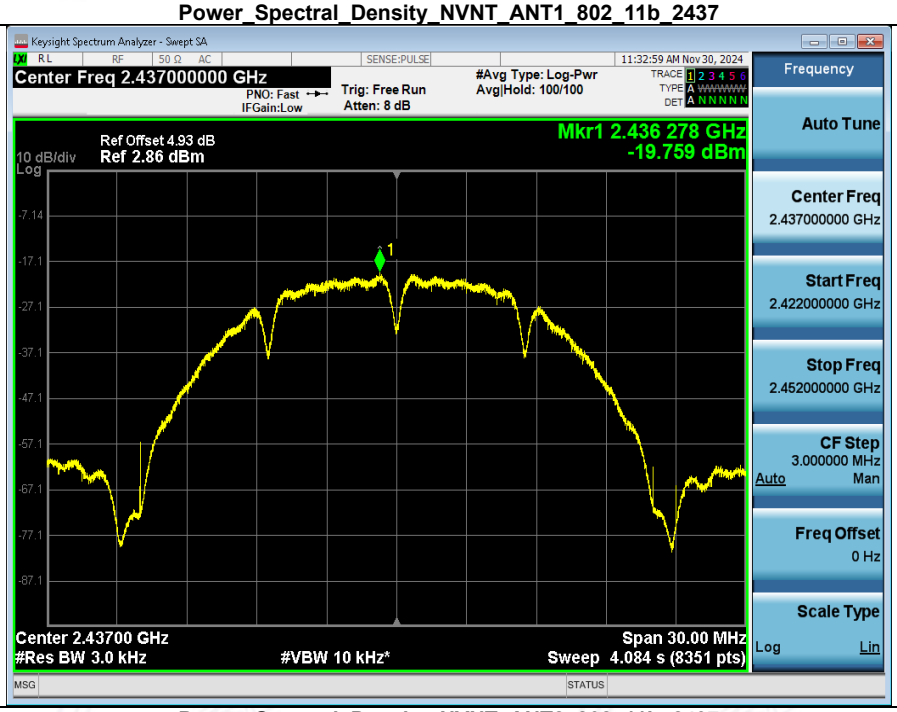
Condition	Antenna	Modulation	Frequency (MHz)	SA_PSD(dBm/3kHz)	Duty factor(dB)	RB factor(dB)	PSD(dBm/3kHz)	limit(dBm/3kHz)	Result
NVNT	ANT1	802.11b	2412.00	-20.61	0.10	0.00	-20.51	8	Pass
NVNT	ANT2	802.11b	2412.00	-20.02	0.10	0.00	-19.92	8	Pass
NVNT	ANT1	802.11b	2437.00	-19.76	0.10	0.00	-19.66	8	Pass
NVNT	ANT2	802.11b	2437.00	-19.92	0.14	0.00	-19.78	8	Pass
NVNT	ANT1	802.11b	2462.00	-19.92	0.00	0.00	-19.92	8	Pass
NVNT	ANT2	802.11b	2462.00	-19.90	0.14	0.00	-19.76	8	Pass
NVNT	ANT1	802.11g	2412.00	-21.88	0.28	0.00	-21.60	8	Pass
NVNT	ANT2	802.11g	2412.00	-22.20	0.24	0.00	-21.96	8	Pass
NVNT	ANT1	802.11g	2437.00	-20.51	0.20	0.00	-20.31	8	Pass
NVNT	ANT2	802.11g	2437.00	-20.04	0.28	0.00	-19.76	8	Pass
NVNT	ANT1	802.11g	2462.00	-21.43	0.40	0.00	-21.03	8	Pass
NVNT	ANT2	802.11g	2462.00	-20.56	0.36	0.00	-20.20	8	Pass
NVNT	ANT1	802.11n(HT20)	2412.00	-23.58	0.22	0.00	-23.36	8	Pass
NVNT	ANT2	802.11n(HT20)	2412.00	-24.23	0.43	0.00	-23.80	8	Pass
NVNT	ANT1	802.11n(HT20)	2437.00	-23.23	0.18	0.00	-23.05	8	Pass
NVNT	ANT2	802.11n(HT20)	2437.00	-23.19	0.39	0.00	-22.80	8	Pass
NVNT	ANT1	802.11n(HT20)	2462.00	-24.08	0.34	0.00	-23.74	8	Pass
NVNT	ANT2	802.11n(HT20)	2462.00	-23.71	0.26	0.00	-23.45	8	Pass
NVNT	ANT1	802.11n(HT40)	2422.00	-26.54	0.67	0.00	-25.87	8	Pass
NVNT	ANT2	802.11n(HT40)	2422.00	-25.53	0.90	0.00	-24.63	8	Pass
NVNT	ANT1	802.11n(HT40)	2437.00	-26.29	0.51	0.00	-25.78	8	Pass
NVNT	ANT2	802.11n(HT40)	2437.00	-26.15	0.43	0.00	-25.72	8	Pass
NVNT	ANT1	802.11n(HT40)	2452.00	-29.31	0.75	0.00	-28.56	8	Pass
NVNT	ANT2	802.11n(HT40)	2452.00	-28.08	0.43	0.00	-27.65	8	Pass

Power_Spectral_Density_NVNT_ANT1_802_11b_2412



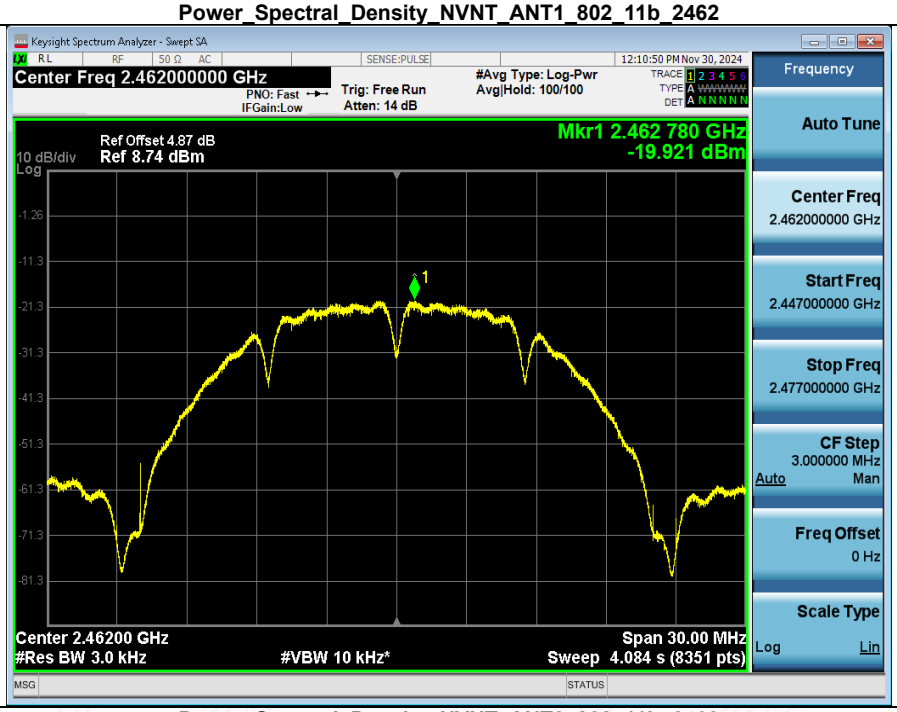
Power_Spectral_Density_NVNT_ANT2_802_11b_2412

Power_Spectral_Density_NVNT_ANT1_802_11b_2437



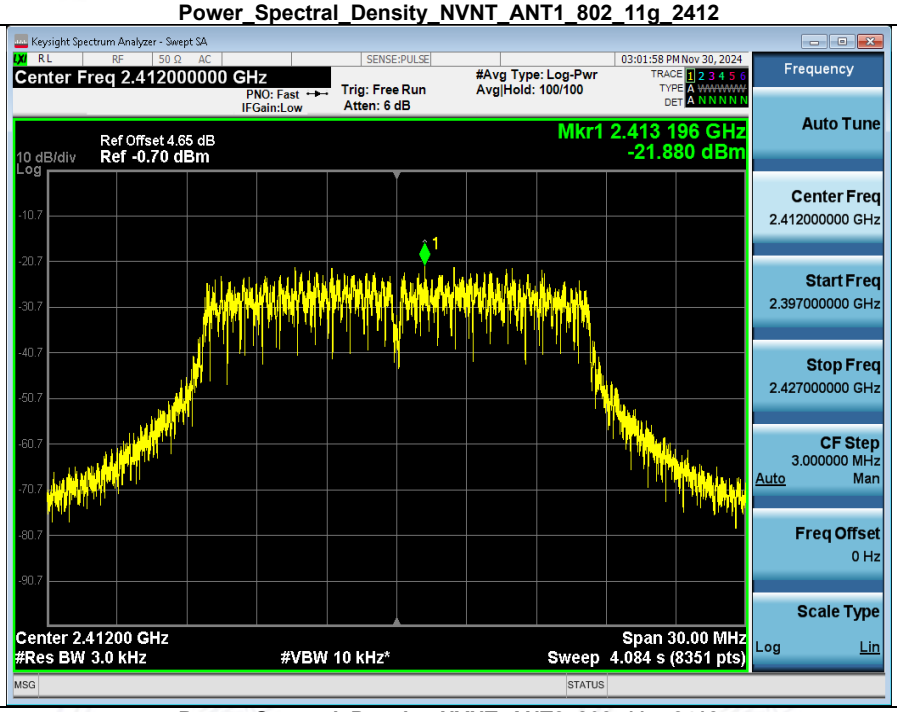
Power_Spectral_Density_NVNT_ANT2_802_11b_2437

Power_Spectral_Density_NVNT_ANT1_802_11b_2462

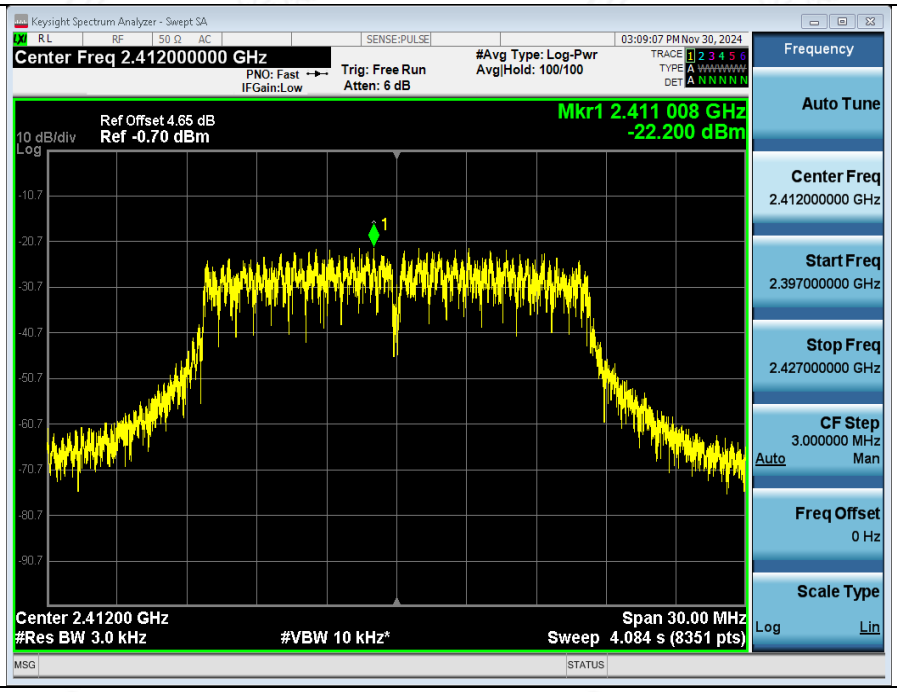


Power_Spectral_Density_NVNT_ANT2_802_11b_2462

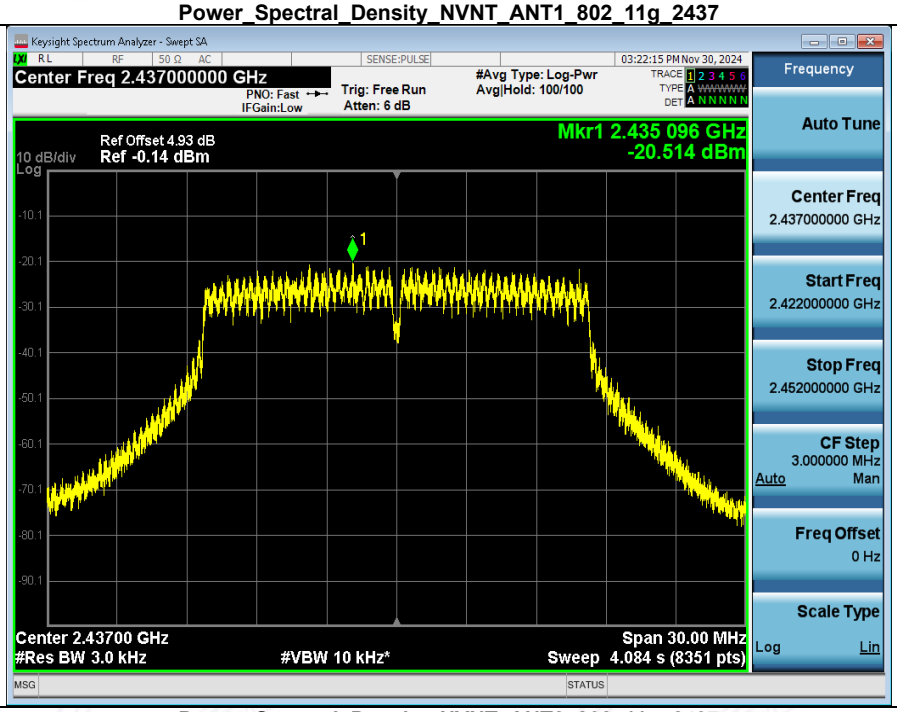
Power_Spectral_Density_NVNT_ANT1_802_11g_2412



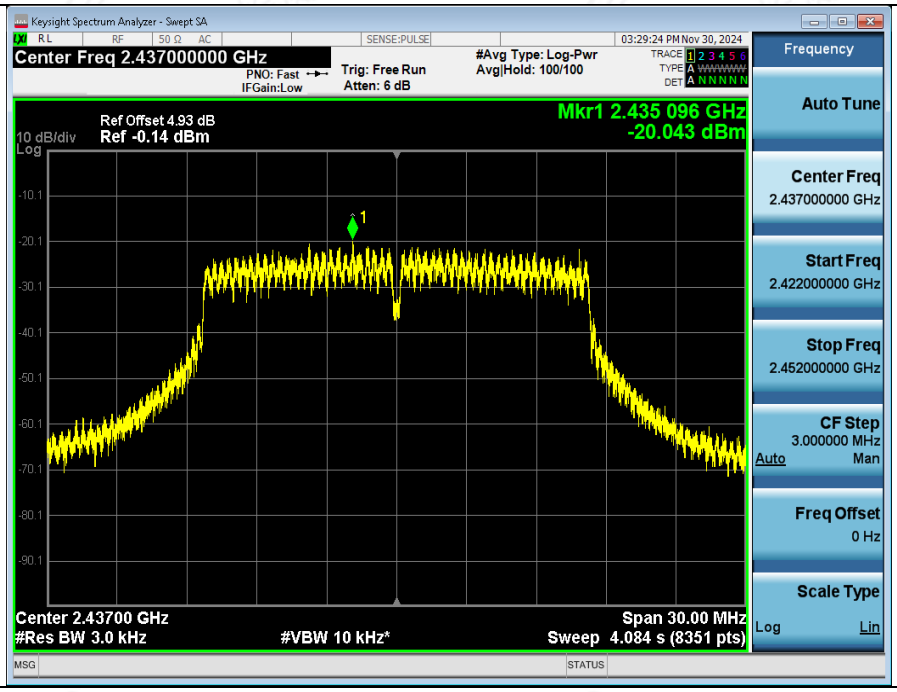
Power_Spectral_Density_NVNT_ANT2_802_11g_2412



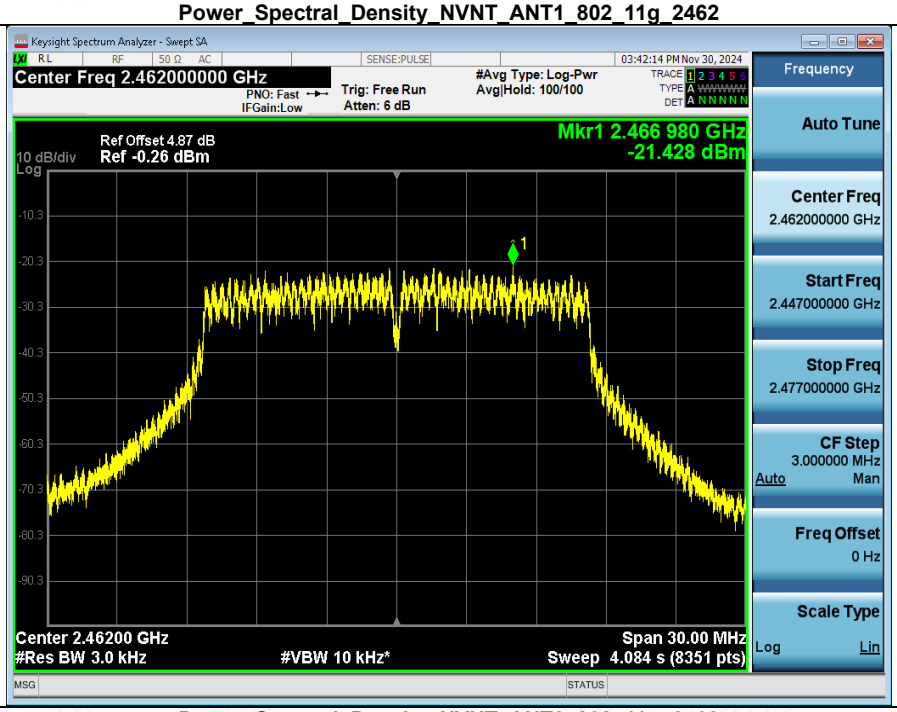
Power_Spectral_Density_NVNT_ANT1_802_11g_2437



Power_Spectral_Density_NVNT_ANT2_802_11g_2437



Power_Spectral_Density_NVNT_ANT1_802_11g_2462



Power_Spectral_Density_NVNT_ANT2_802_11g_2462