

11N40SISO_Ant1_2422

Spectrum Analyzer 1
Swept SA

KEYSIGHT Input: RF Coupling: DC Corrections: Off #Atten: 40 dB PNO: Fast Gate: Off IF Gain: Low Sig Track: Off #Avg Type: Power (RMS) 1 2 3 4 5 6 Trng Video Trng Delay: -200.0 μ s WWW WWW P P P P P P

1 Spectrum Scale/Div 10 dB Ref Lvl Offset 8.91 dB **ΔMkr3 1.117 ms** -0.03 dB

Log 20.0 10.0 0.00 -10.0 -20.0 -30.0 -40.0 -60.0

Center 2.422000000 GHz #Video BW 8.0 MHz Span 0 Hz Res BW 9 MHz Sweep 10.1 ms (8000 pts)

5 Marker Table

	Mode	Trace	Scale	X	Y	Function	Function Width	Function Value
1	N	1	t	789.1 μ s	7.547 dBm			
2	Δ 1	1	t (Δ)	944.9 μ s (Δ)	2.608 dB			
3	Δ 1	1	t (Δ)	1.117 ms (Δ)	-0.02646 dB			
4								
5								
6								

Center Frequency 2.422000000 GHz Settings

Span 0.00000000 Hz

Sweep Span Zero Span Full Span

Start Freq 2.422000000 GHz

Stop Freq 2.422000000 GHz

AUTO TUNE

CF Step 8.000000 MHz

Auto Man

Freq Offset 0 Hz

X Axis Scale Log Lin

Signal Track Span Zoom

Apr 06, 2021 5:11:39 PM

11N40SISO_Ant2_2422

Keysight Spectrum Analyzer 1
Sweep SA

KEYSIGHT Input RF **Coasting DC** Input Z: 50 Ω #Att: 40 dB PNO: Fast #Avg Type: Power (RMS) 1 2 3 4 5 6
 R.L. → Align: Auto Corrections: Off Gate: Off Trg: Video W W W W W W W W
 Freq Ref: Int (S) IF Gain: Low Trg Delay: -200.0 μs p p p p p p p p

1 Spectrum Ref Lvl Offset 8.88 dB **ΔMkr3 1.064 ms**
 Scale/Div 10 dB Ref Level 30.00 dBm **3.10 dB**

Log
 20.0
 10.0
 0.00
 -10.0
 -20.0
 -30.0
 -40.0
 -50.0
 -60.0

Center 2.422000000 GHz #Video BW 8.0 MHz Span 0 Hz
Res BW 8 MHz Sweep 10.1 ms (8000 pts)

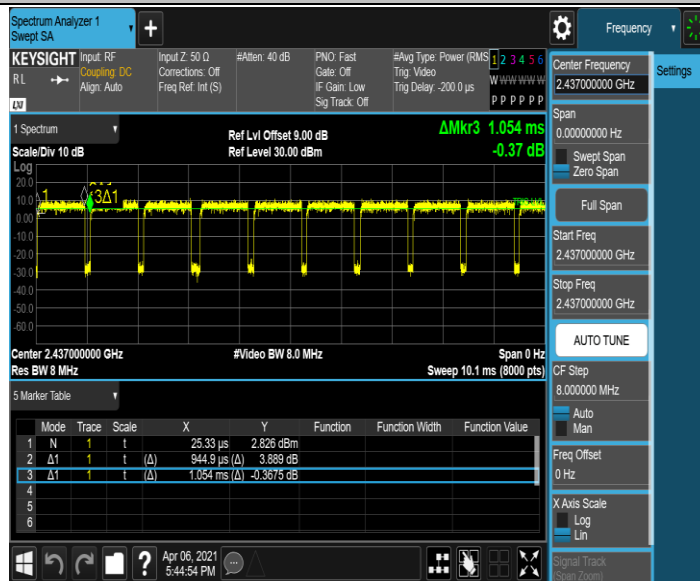
5 Marker Table

	Mode	Trace	Scale	X	Y	Function	Function Width	Function Value
1	N	1	t	176.1 μs	-0.8029 dBm			
2	Δ1	1	t (Δ)	946.2 μs (Δ)	4.577 dB			
3	Δ1	1	t (Δ)	1.064 ms (Δ)	3.096 dB			
4								
5								
6								

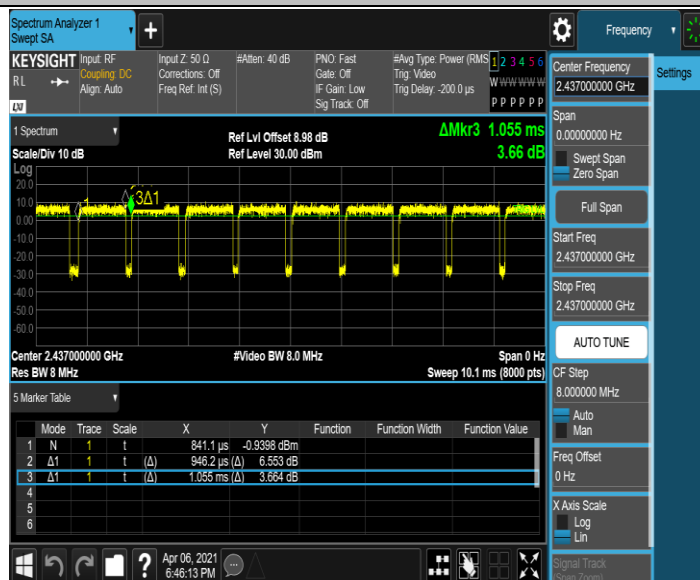
Center Frequency 2.422000000 GHz **Settings**
 Span 0.000000000 Hz
☐ Sweep Span
☐ Zero Span
☐ Full Span
 Start Freq 2.422000000 GHz
 Stop Freq 2.422000000 GHz

 CF Step 8.0000000 MHz
☐ Auto
☐ Man
 Freq Offset 0 Hz
 X Axis Scale
☐ Log
☐ Lin
 Signal Track
☐ Sweep Zoom

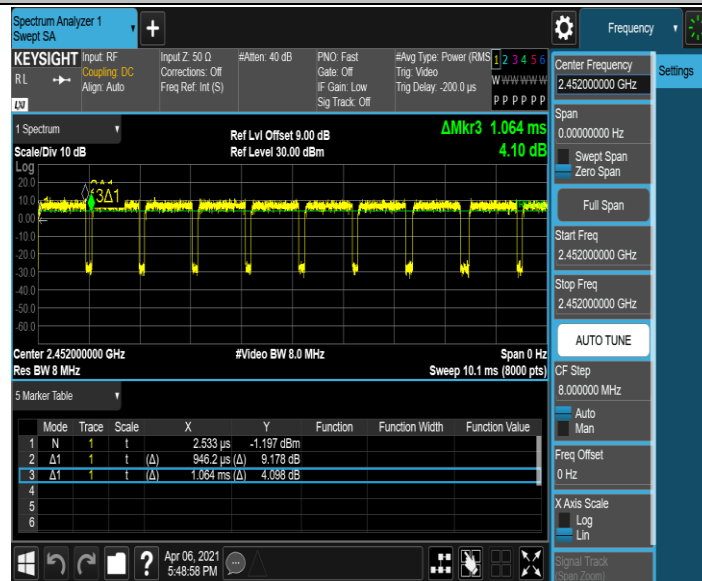
11N40SISO_Ant1_2437



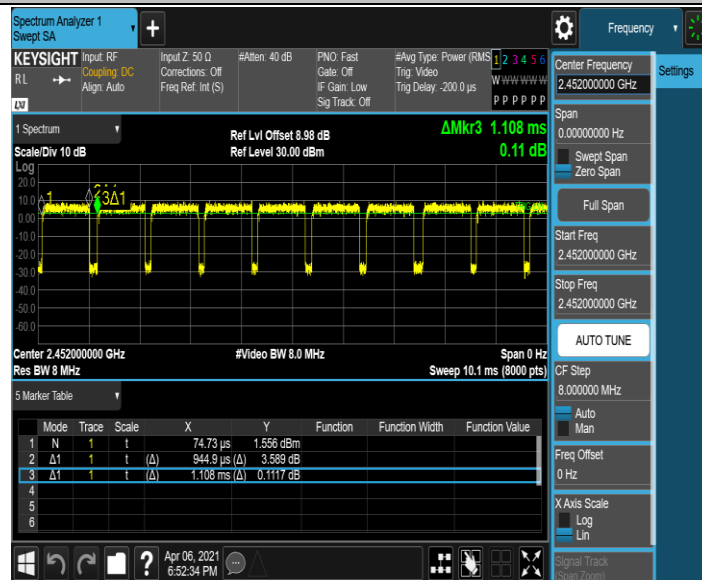
11N40SISO_Ant2_2437



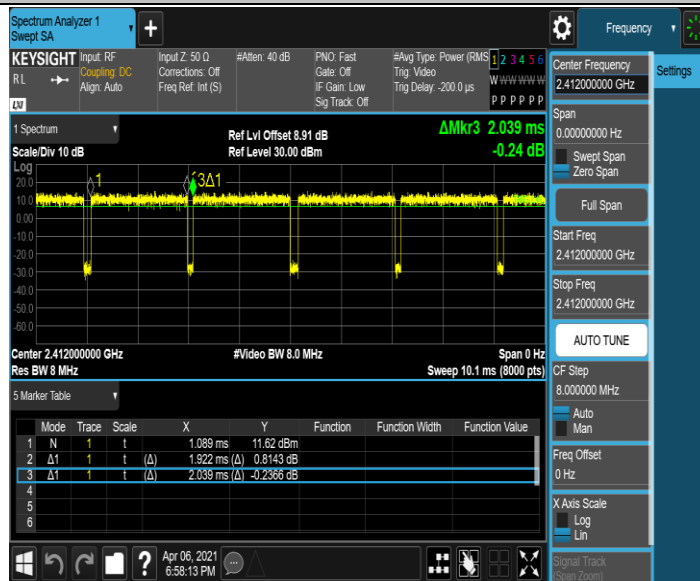
11N40SISO_Ant1_2452



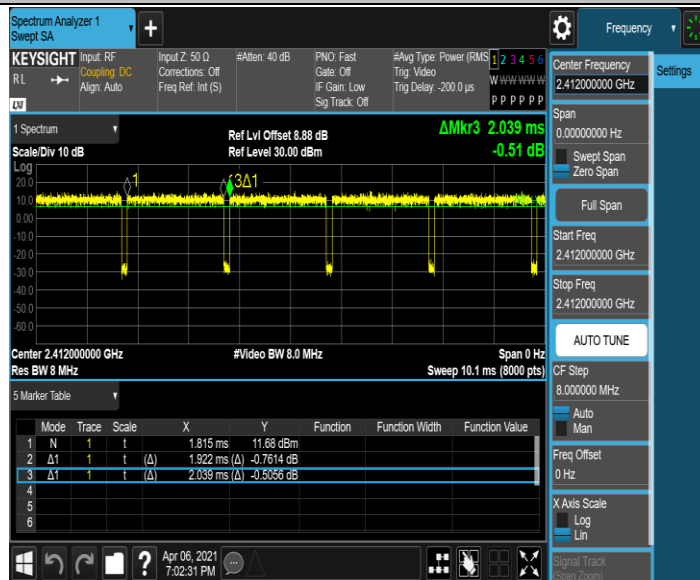
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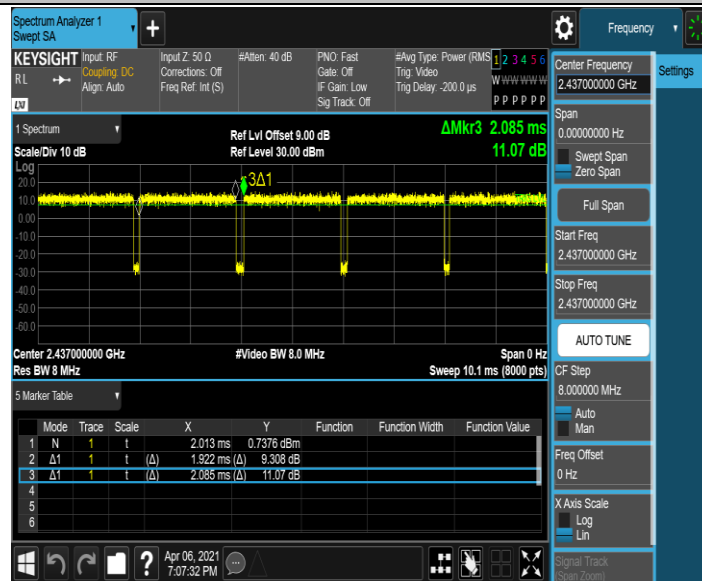
11N20MIMO_Ant1_2412



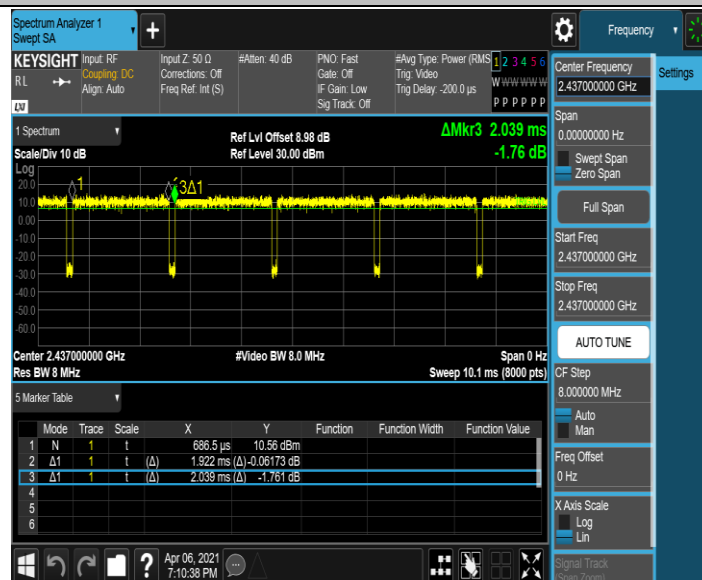
11N20MIMO_Ant2_2412



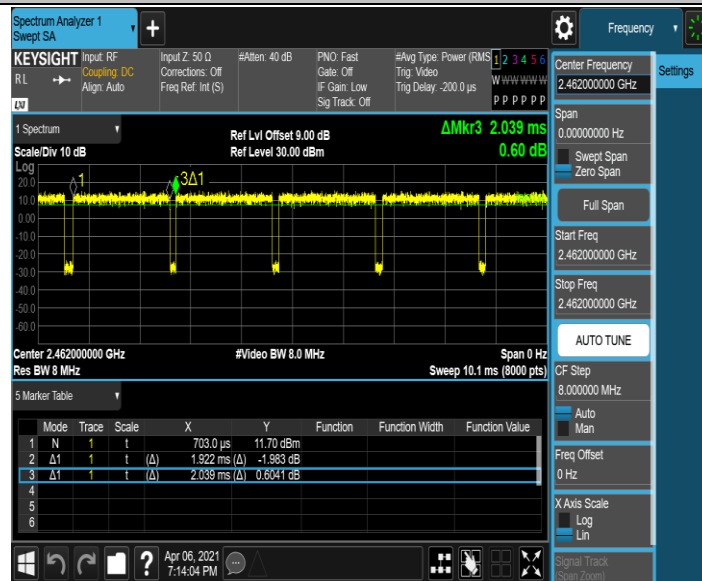
11N20MIMO_Ant1_2437



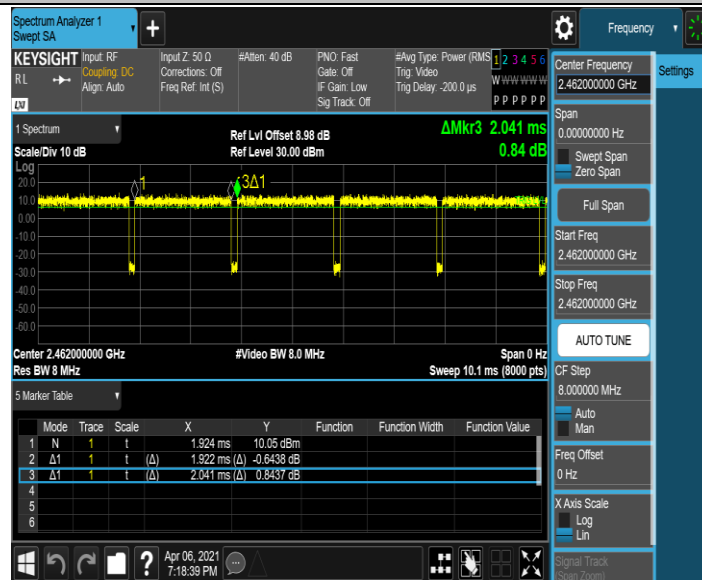
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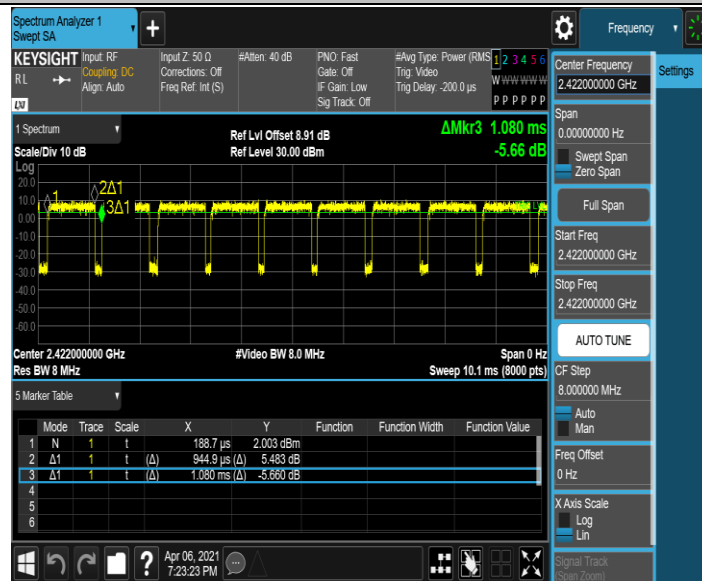
11N20MIMO_Ant1_2462



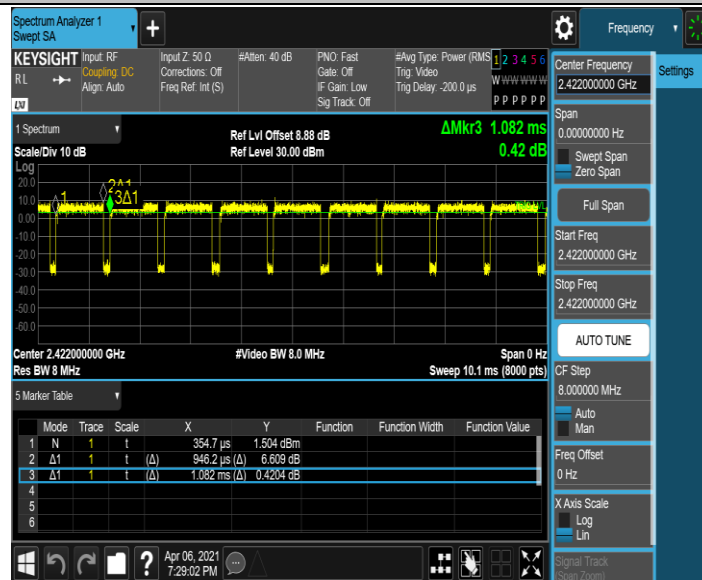
11N20MIMO_Ant2_2462



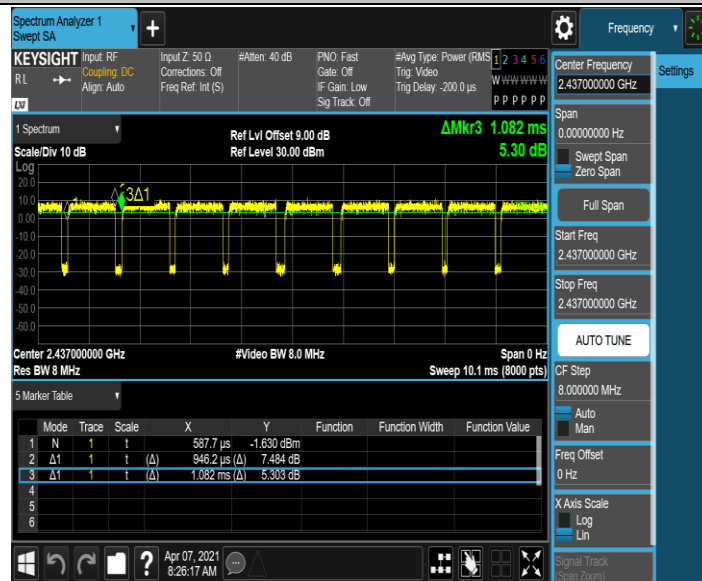
11N40MIMO_Ant1_2422



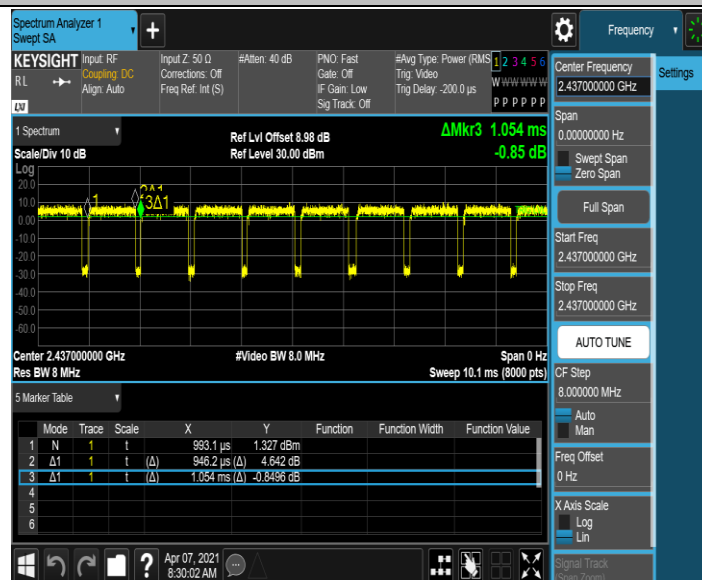
11N40MIMO_Ant2_2422



11N40MIMO_Ant1_2437



11N40MIMO_Ant2_2437



The screenshot displays a Spectrum Analyzer interface for a signal at 2.45 GHz. The main display shows a spectrum plot with a peak at 2.45 GHz, labeled '3Δ1'. The plot is centered at 2.452000000 GHz with a span of 8.0 MHz. The frequency offset is 9.00 dB, and the reference level is 30.00 dBm. The signal is identified as 'Mkr3 1.099 ms' with a width of 2.40 dB.

5 Marker Table

Mode	Trace	Scale	X	Y	Function	Function Width	Function Value
1	N	1	t	621.9 μs	-1.730 dBm		
2	Δ1	1	t (Δ)	946.2 μs (Δ)	7.420 dB		
3	Δ1	1	t (Δ)	1.099 ms (Δ)	2.396 dB		
4							
5							
6							

The screenshot displays a Spectrum Analyzer 1 interface. The main display shows a signal trace with three markers labeled 1, 2, and 3. The trace is centered at 2.452000000 GHz. The scale is 10 dB, and the video bandwidth is 8.0 MHz. The span is 0 Hz. The center frequency is 2.452000000 GHz. The reference level is 30.00 dBm. The reference level offset is 8.98 dB. The marker 1 is at 2.452000000 GHz, marker 2 is at 2.452000000 GHz, and marker 3 is at 2.452000000 GHz. The marker 3 is at 2.452000000 GHz. The marker 3 is at 2.452000000 GHz. The marker 3 is at 2.452000000 GHz.

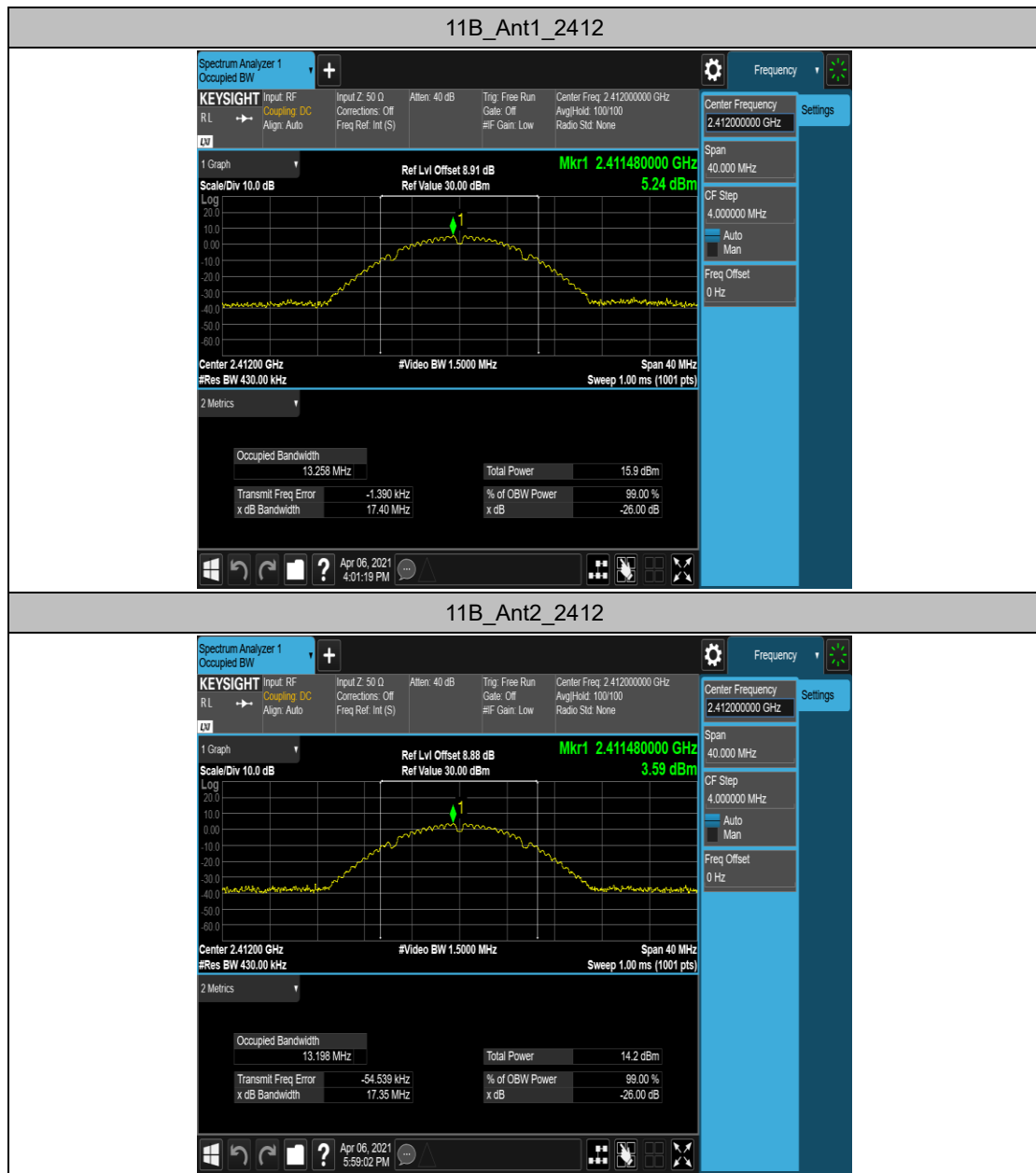
Mode	Trace	Scale	X	Y	Function	Function Width	Function Value
1	N	1	t	418.0 μ s	1.305 dBm		
2	Δ 1	1	t	(Δ)	944.9 μ s (Δ)	4.207 dB	
3	Δ 1	1	t	(Δ)	1.126 ms (Δ)	-0.3351 dB	
4							
5							
6							

Appendix H: Transmitter frequency stability

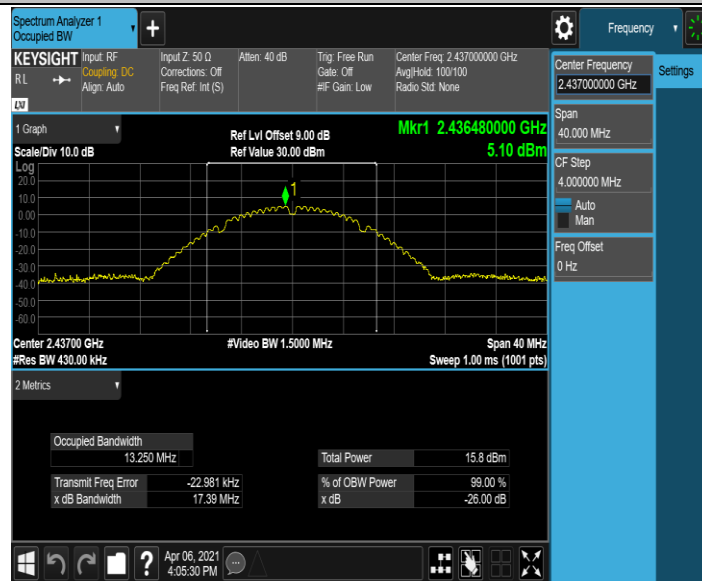
Test Result

TestMode	Antenna	Channel	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11B	Ant1	2412	2405.370	2418.628	$\pm 80\%$ of Permitted operating frequency	PASS
	Ant2	2412	2405.346	2418.544		PASS
	Ant1	2437	2430.352	2443.602		PASS
	Ant2	2437	2430.324	2443.527		PASS
	Ant1	2462	2455.321	2468.633		PASS
	Ant2	2462	2455.314	2468.577		PASS
11G	Ant1	2412	2403.632	2420.329		PASS
	Ant2	2412	2403.655	2420.233		PASS
	Ant1	2437	2428.684	2445.282		PASS
	Ant2	2437	2428.626	2445.243		PASS
	Ant1	2462	2453.652	2470.297		PASS
	Ant2	2462	2453.613	2470.279		PASS
11N20SISO	Ant1	2412	2403.110	2420.844		PASS
	Ant2	2412	2403.091	2420.824		PASS
	Ant1	2437	2428.111	2445.873		PASS
	Ant2	2437	2428.080	2445.774		PASS
	Ant1	2462	2453.102	2470.868		PASS
	Ant2	2462	2453.090	2470.819		PASS
11N40SISO	Ant1	2422	2403.845	2440.264		PASS
	Ant2	2422	2403.823	2440.101		PASS
	Ant1	2437	2418.842	2455.219		PASS
	Ant2	2437	2418.775	2455.058		PASS
	Ant1	2452	2433.812	2470.278		PASS
	Ant2	2452	2433.747	2470.114		PASS
11N20MIMO	Ant1	2412	2403.133	2420.890		PASS
	Ant2	2412	2403.146	2420.858		PASS
	Ant1	2437	2428.132	2445.882		PASS
	Ant2	2437	2428.128	2445.839		PASS
	Ant1	2462	2453.120	2470.890		PASS
	Ant2	2462	2453.113	2470.854		PASS
11N40MIMO	Ant1	2422	2403.858	2440.228		PASS
	Ant2	2422	2403.761	2440.129		PASS
	Ant1	2437	2418.783	2455.227		PASS
	Ant2	2437	2418.773	2455.075		PASS
	Ant1	2452	2433.807	2470.224		PASS
	Ant2	2452	2433.759	2470.153		PASS

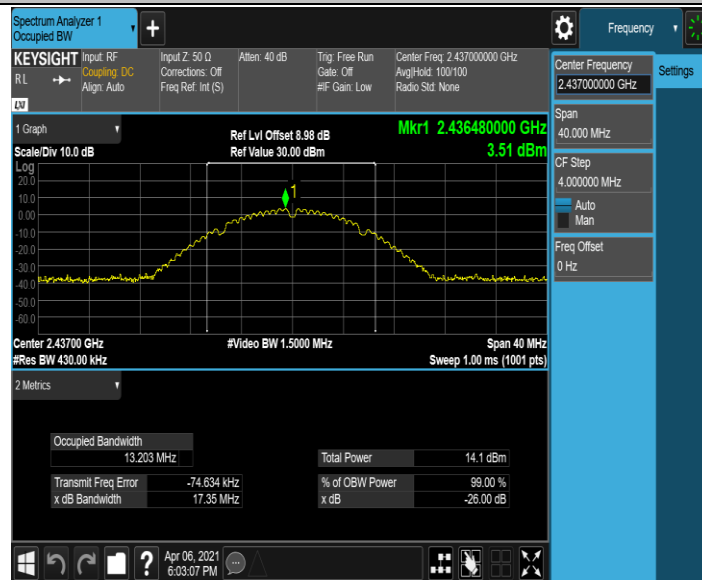
Test Graphs



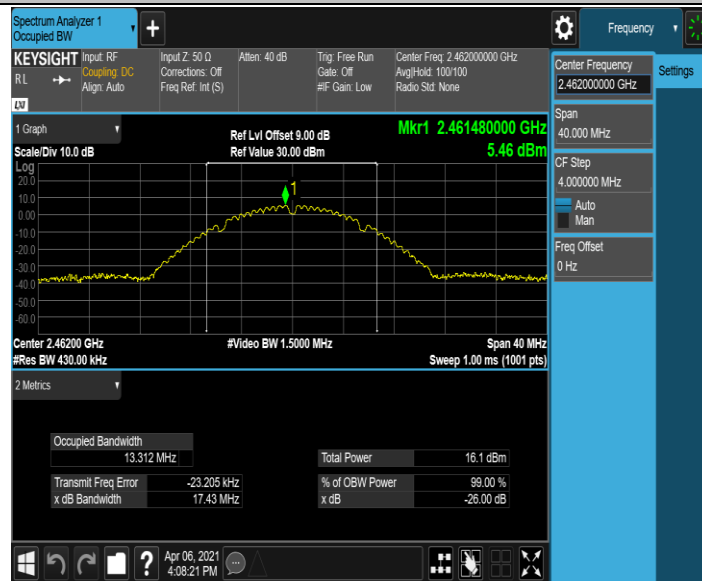
11B_Ant1_2437



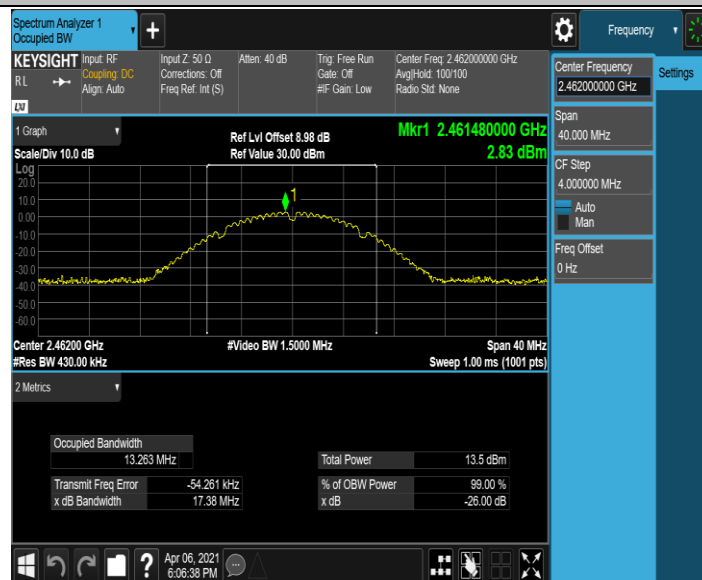
11B_Ant2_2437



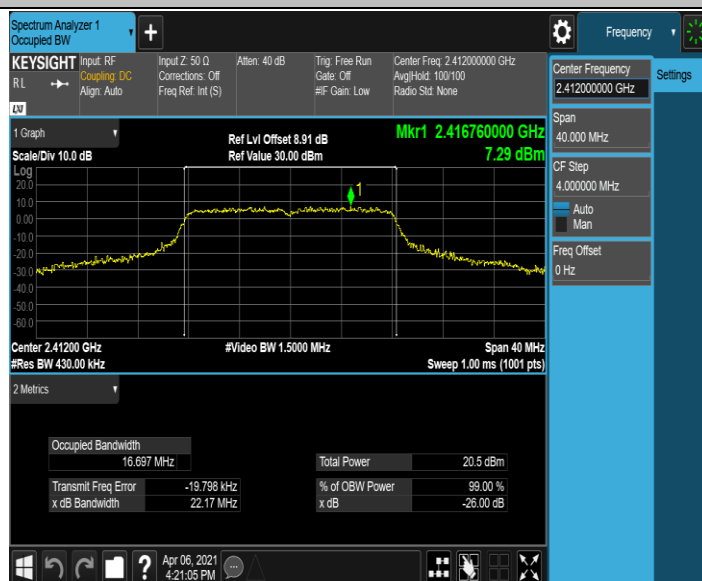
11B_Ant1_2462



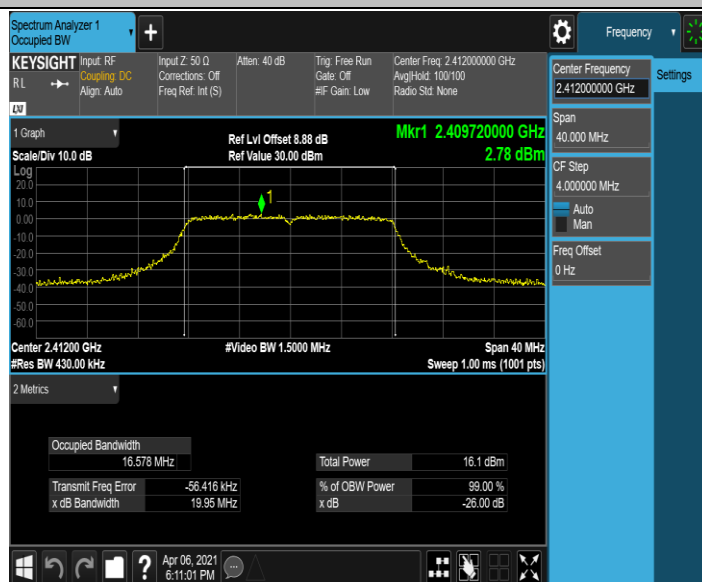
11B_Ant2_2462



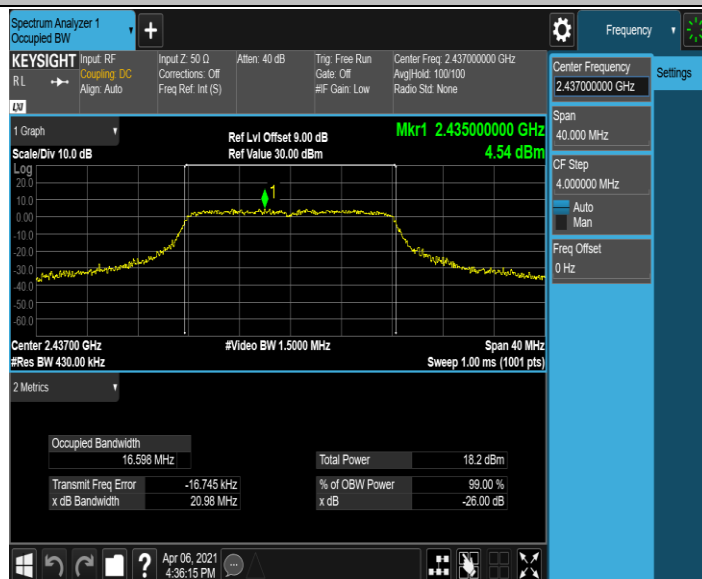
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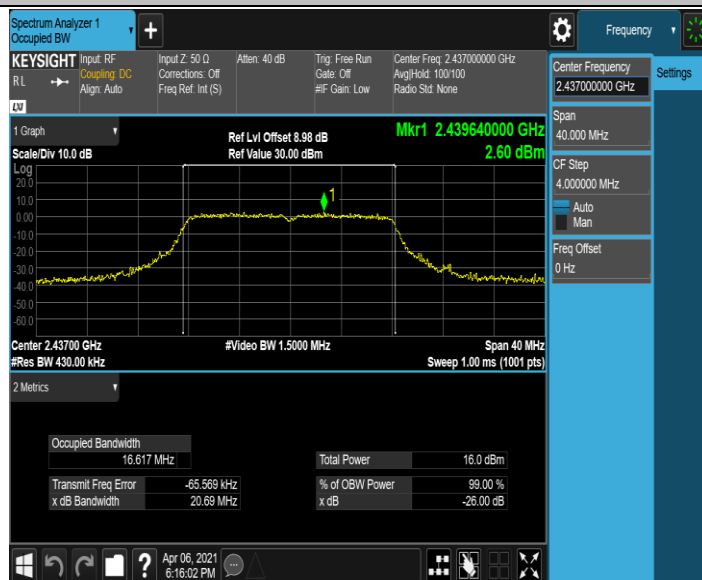
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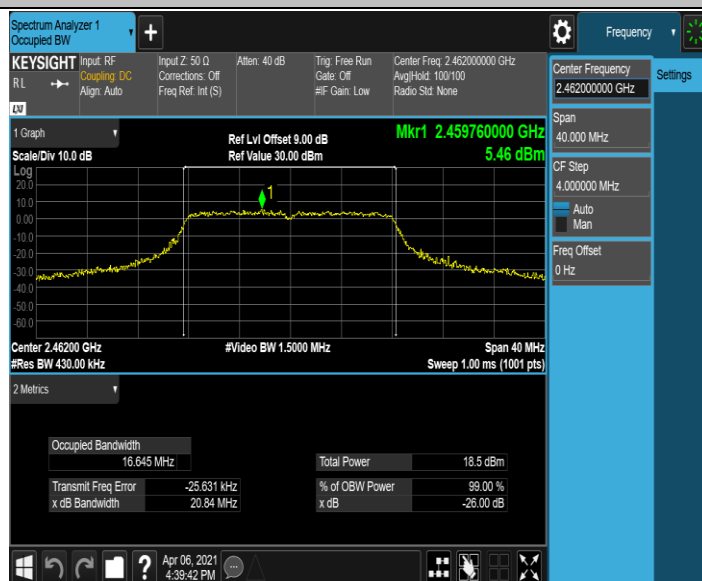
11G_Ant1_2437



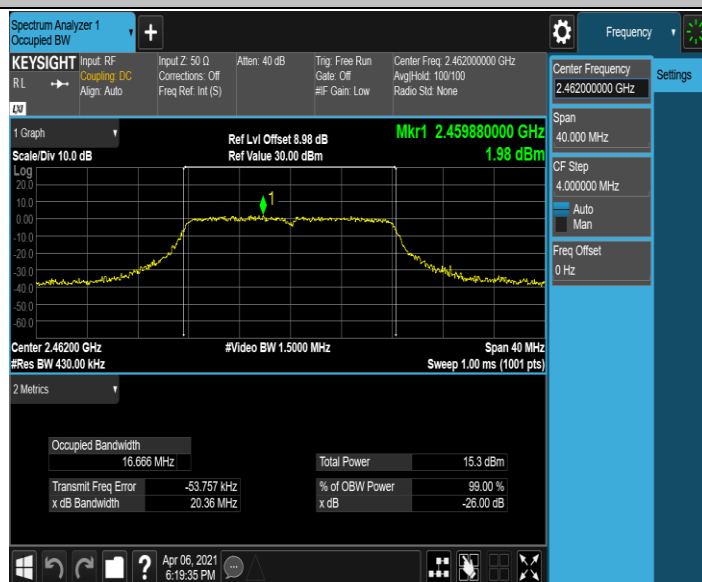
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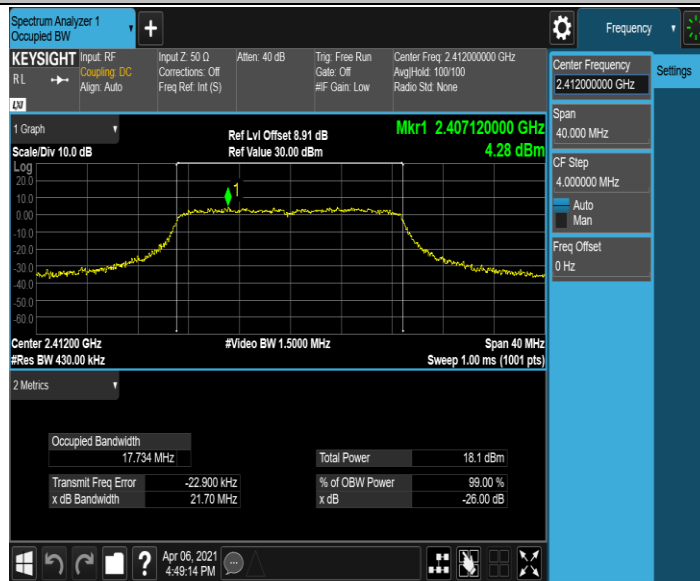
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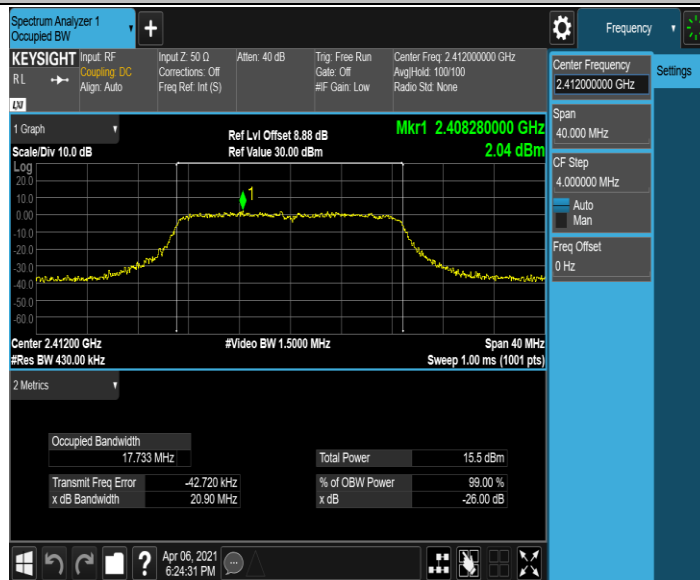
11G_Ant2_2462



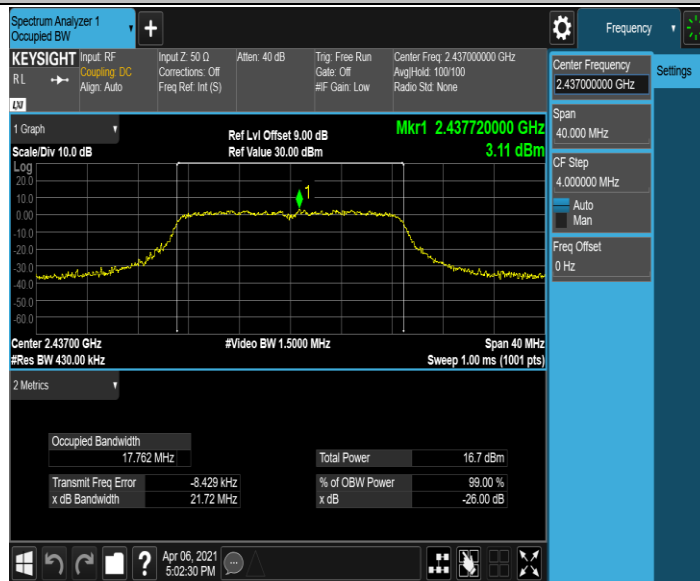
11N20SISO_Ant1_2412



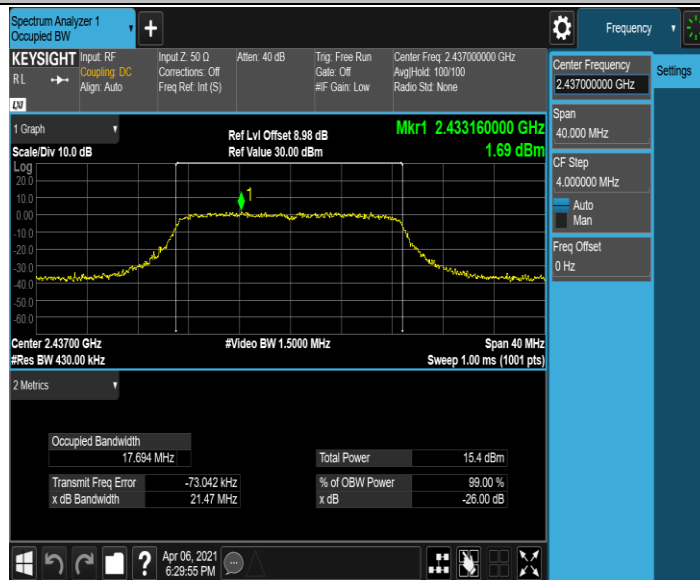
11N20SISO_Ant2_2412



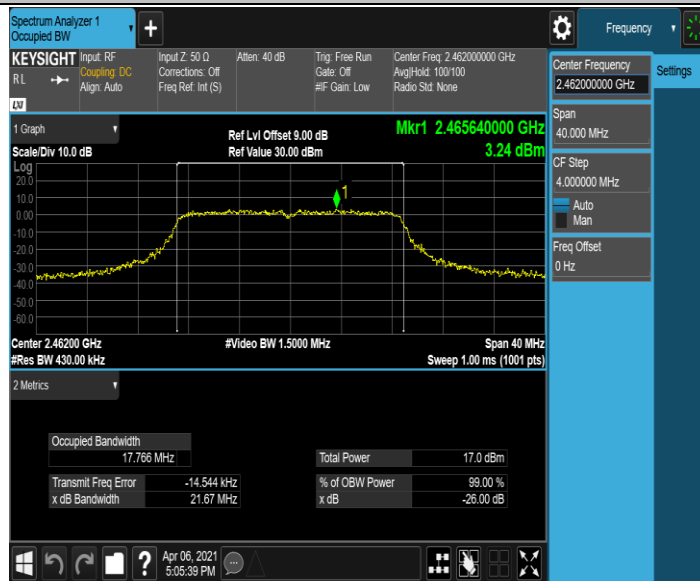
11N20SISO_Ant1_2437



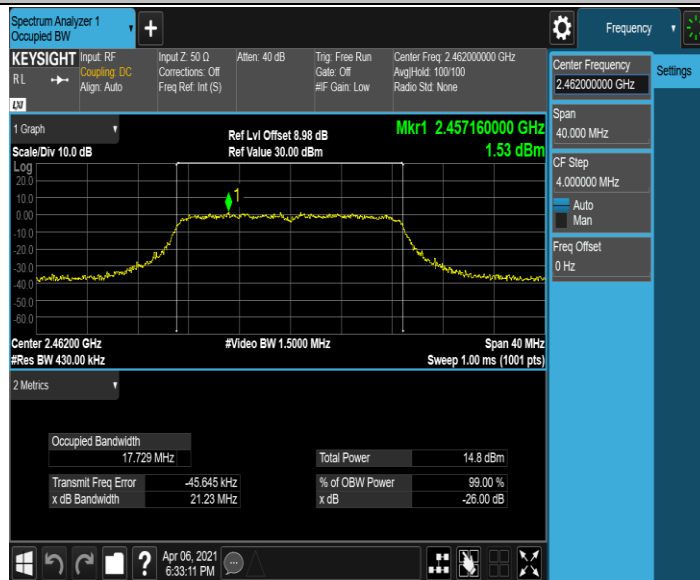
11N20SISO_Ant2_2437



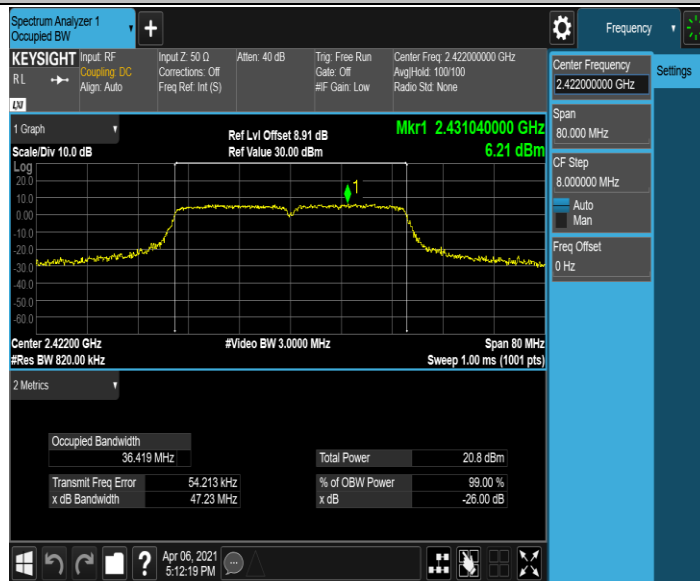
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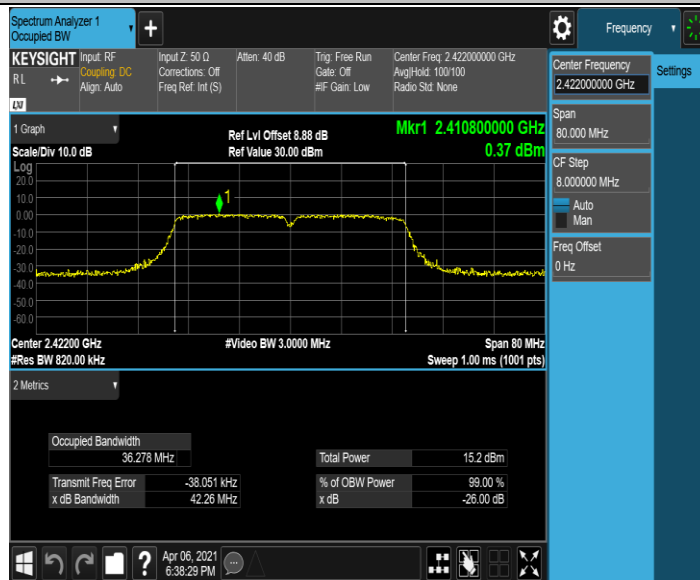
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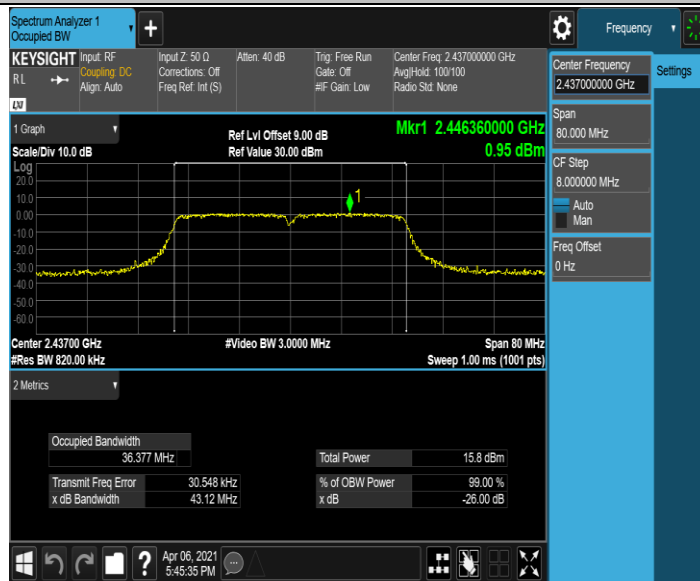
11N40SISO_Ant1_2422



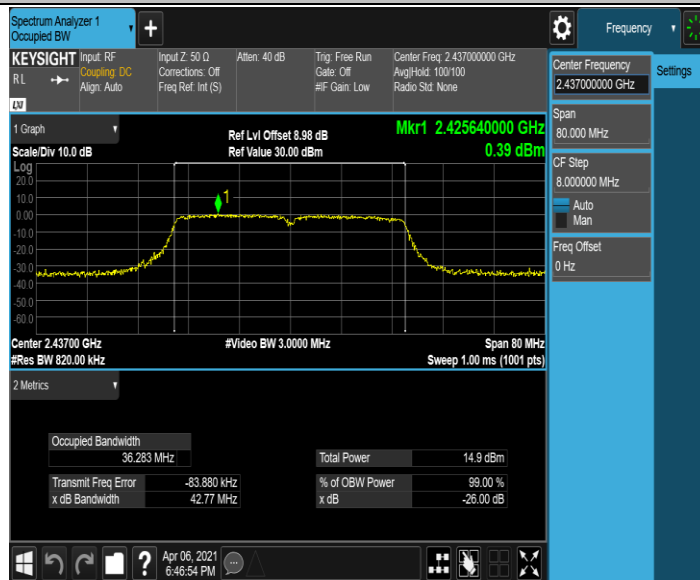
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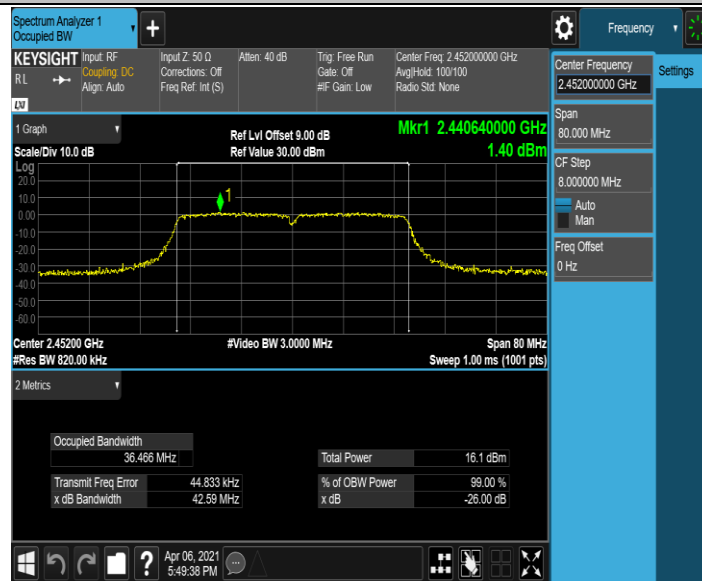
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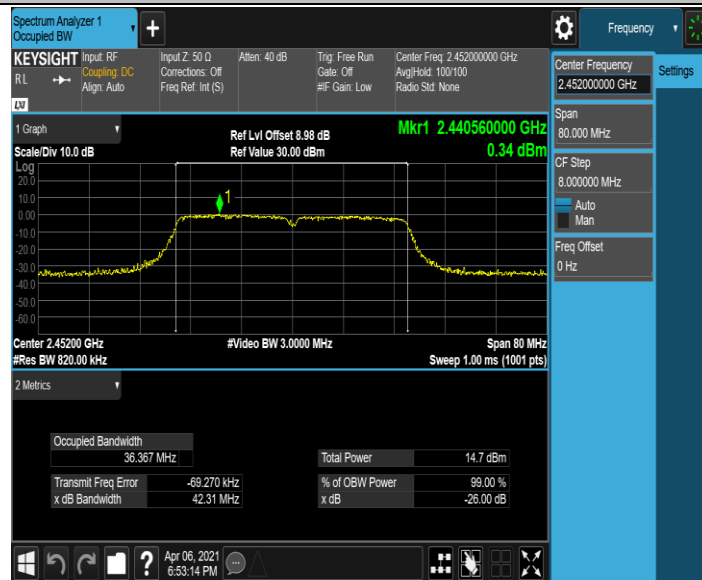
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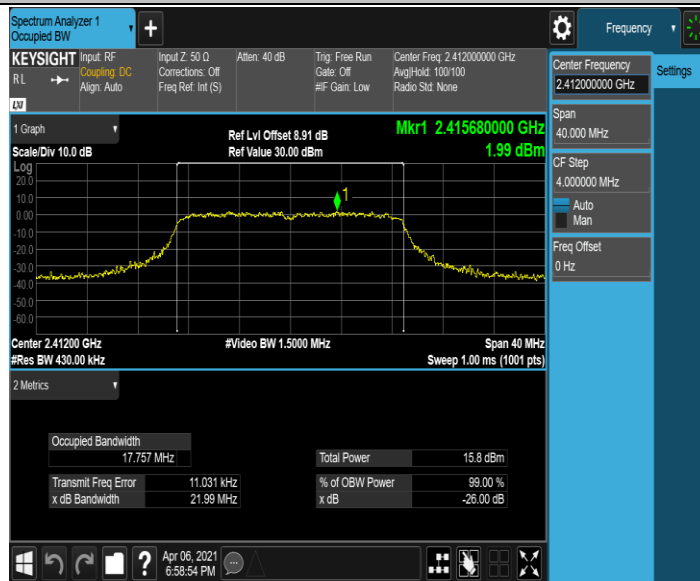
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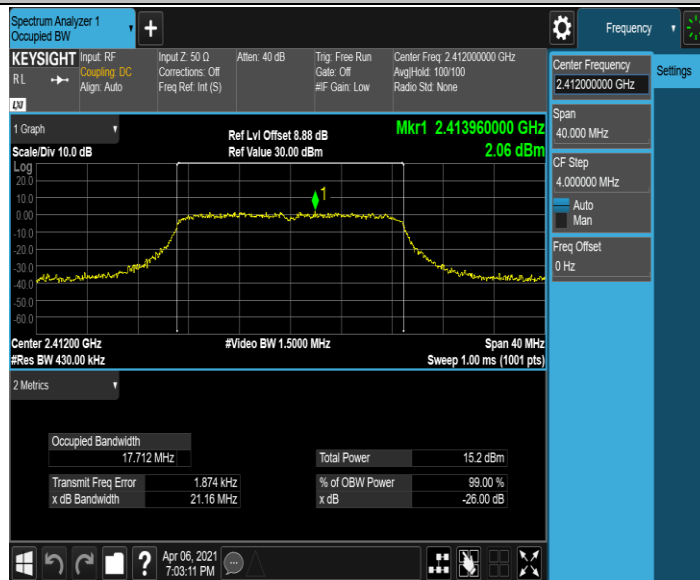
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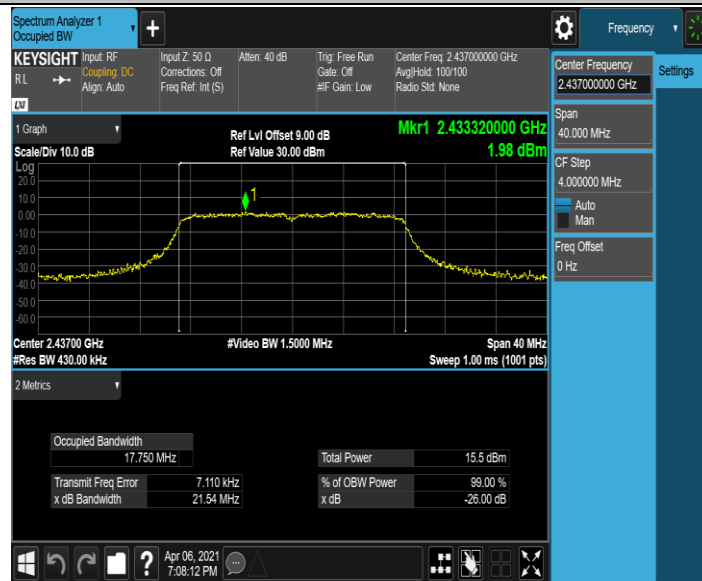
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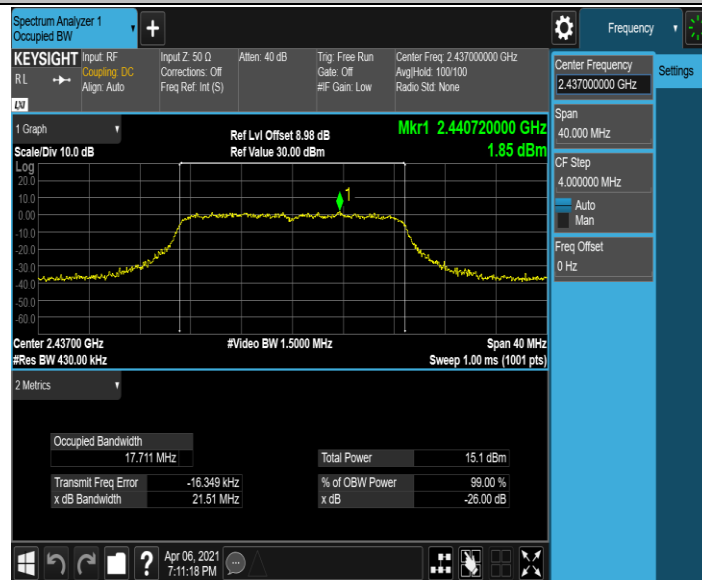
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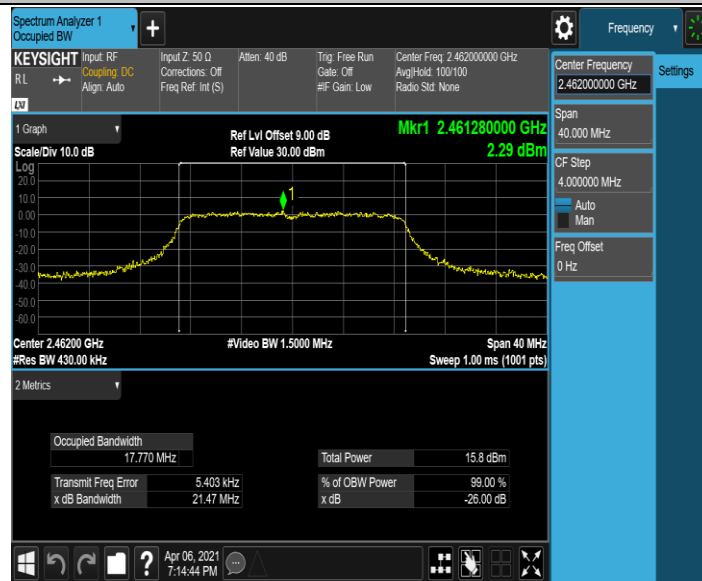
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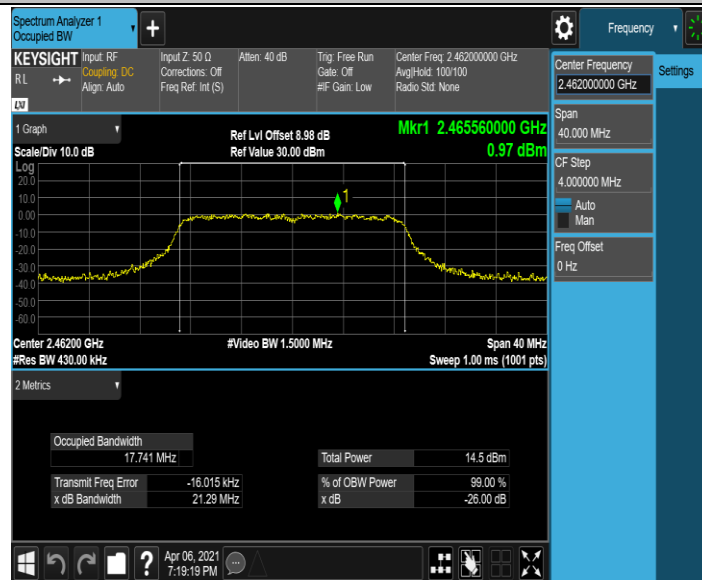
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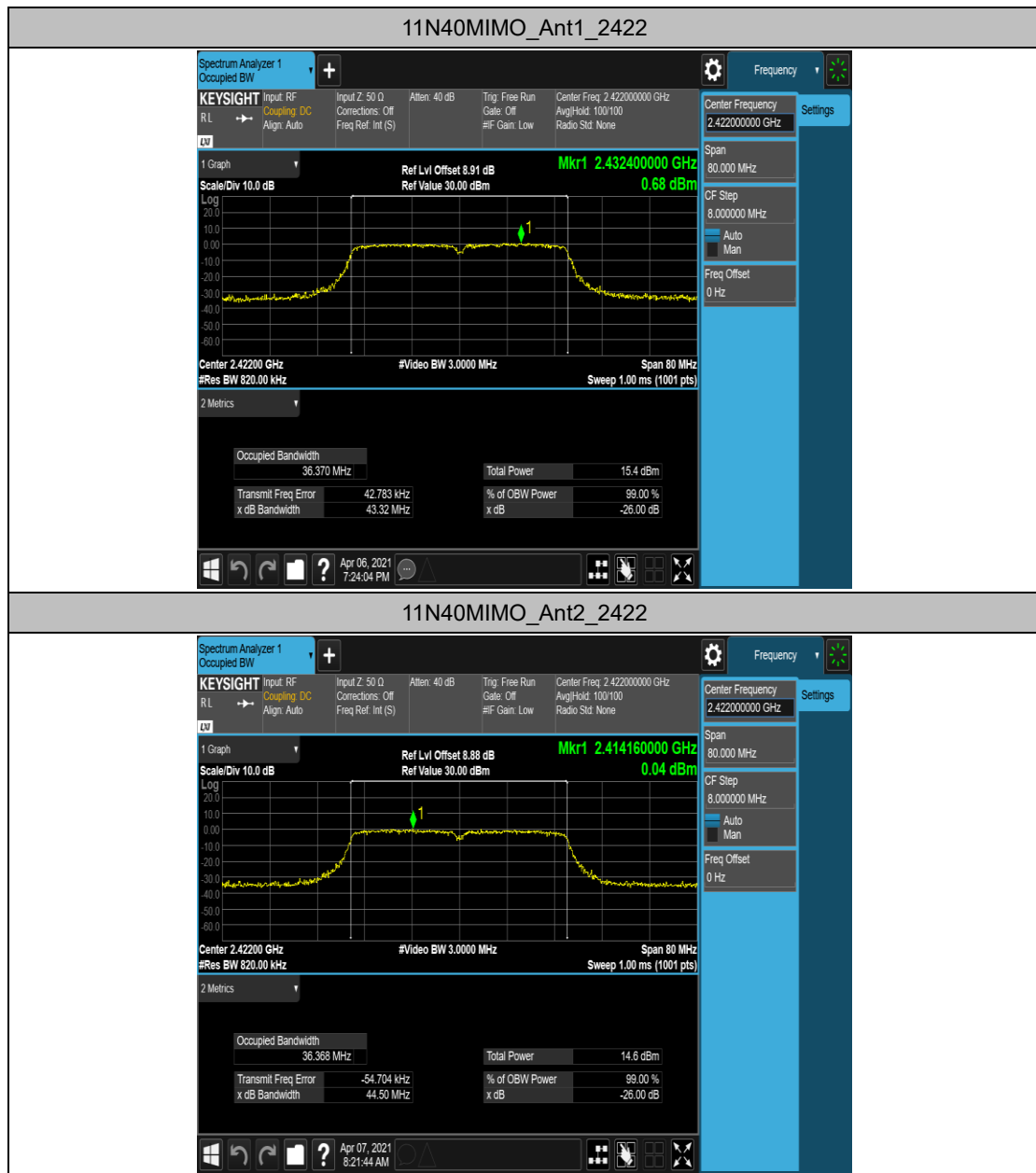


11N20MIMO_Ant1_2462

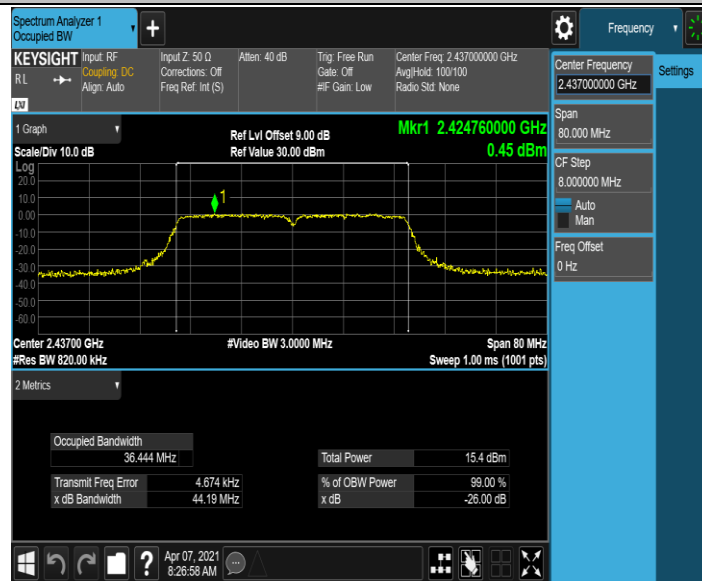


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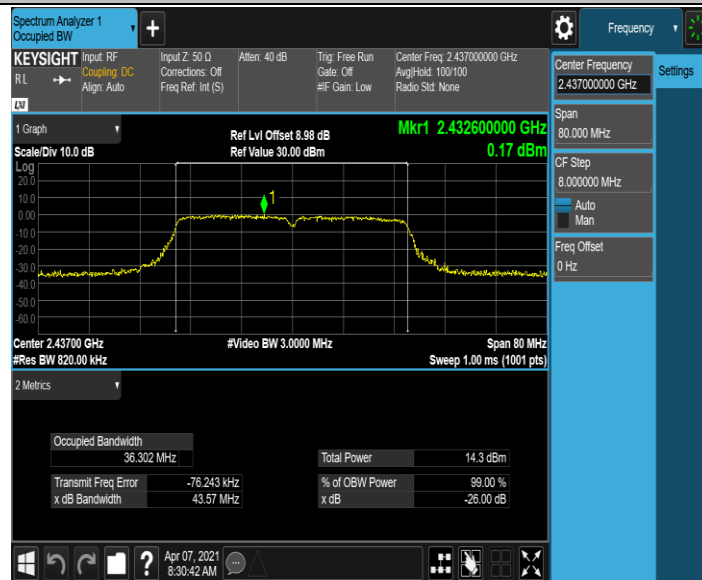


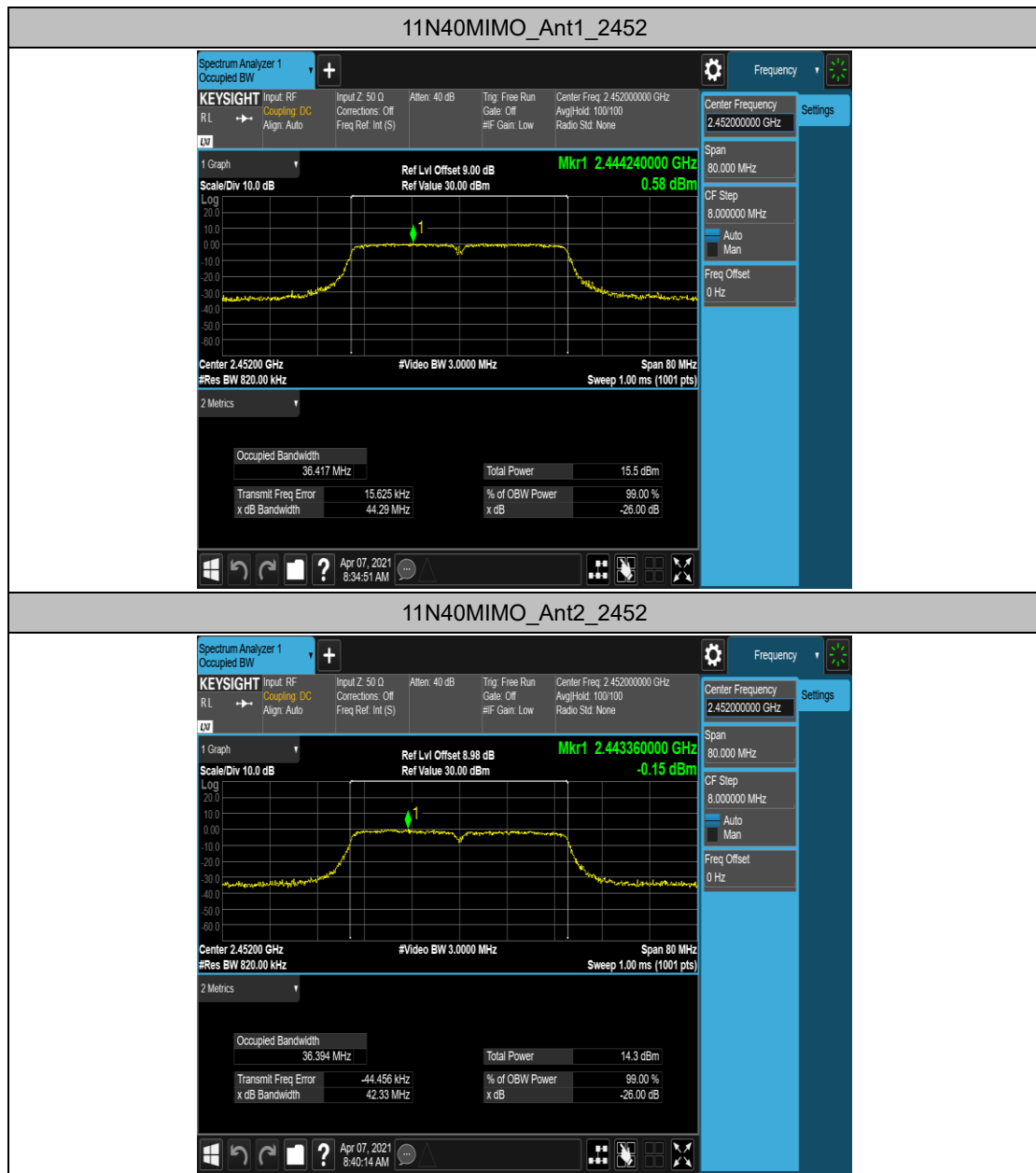


11N40MIMO_Ant1_2437



11N40MIMO_Ant2_2437

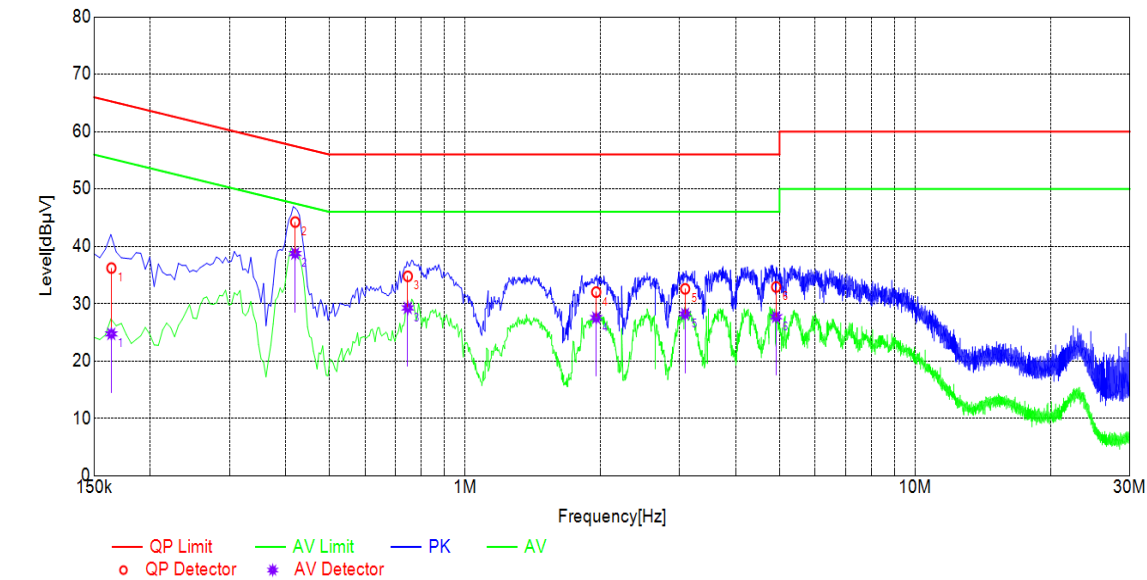




Appendix I: Conducted emission AC power port

Mode:	2.4G WIFI	Voltage:	120V~
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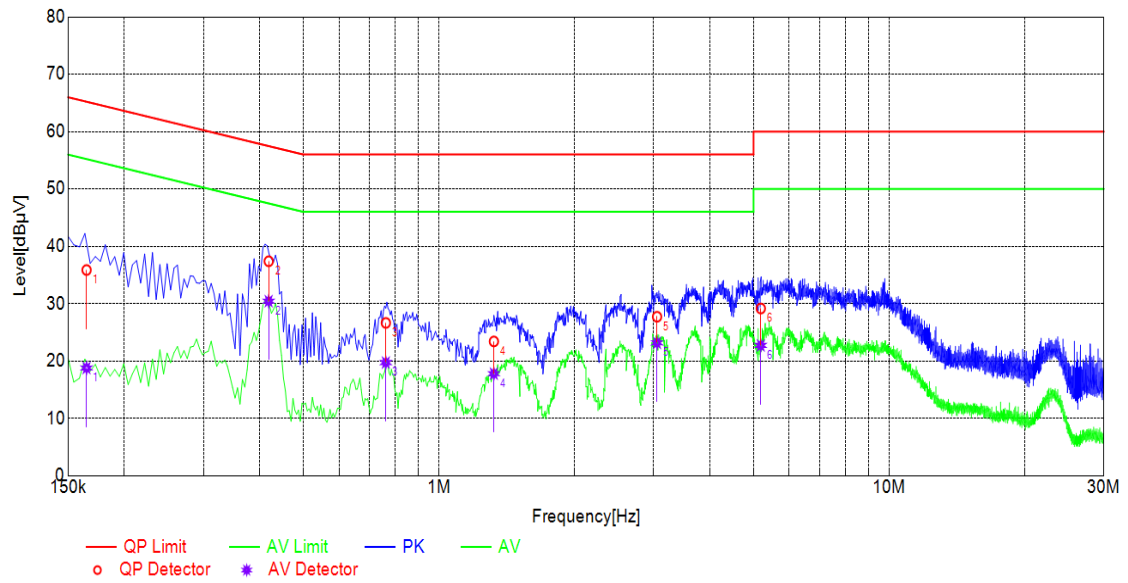
Test Graph



Final Data List										
NO.	Freq. [MHz]	Factor [dB]	QP Value [dBμV]	QP Limit [dBμV]	QP Margin [dB]	AV Value [dBμV]	AV Limit [dBμV]	AV Margin [dB]	Polarity	Verdict
1	0.1639	10.25	36.21	65.26	29.05	24.72	55.26	30.54	L	PASS
2	0.4197	10.27	44.23	57.45	13.22	38.74	47.45	8.71	L	PASS
3	0.7466	10.28	34.76	56.00	21.24	29.26	46.00	16.74	L	PASS
4	1.9570	10.35	32.01	56.00	23.99	27.55	46.00	18.45	L	PASS
5	3.0844	10.37	32.57	56.00	23.43	28.20	46.00	17.80	L	PASS
6	4.9128	10.41	32.91	56.00	23.09	27.70	46.00	18.30	L	PASS

Mode:	2.4G WIFI	Voltage:	120V~
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Test Graph



Final Data List										
NO.	Freq. [MHz]	Factor [dB]	QP Value [dBμV]	QP Limit [dBμV]	QP Margin [dB]	AV Value [dBμV]	AV Limit [dBμV]	AV Margin [dB]	Polarity	Verdict
1	0.1649	10.24	35.86	65.21	29.35	18.77	55.21	36.44	N	PASS
2	0.4186	10.27	37.39	57.48	20.09	30.43	47.48	17.05	N	PASS
3	0.7623	10.27	26.64	56.00	29.36	19.72	46.00	26.28	N	PASS
4	1.3245	10.28	23.41	56.00	32.59	17.78	46.00	28.22	N	PASS
5	3.0512	10.32	27.71	56.00	28.29	23.16	46.00	22.84	N	PASS
6	5.1870	10.36	29.16	60.00	30.84	22.71	50.00	27.29	N	PASS

Appendix J: Spurious radiated emissions for transmitter

The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line per 15.31(o) was not reported.

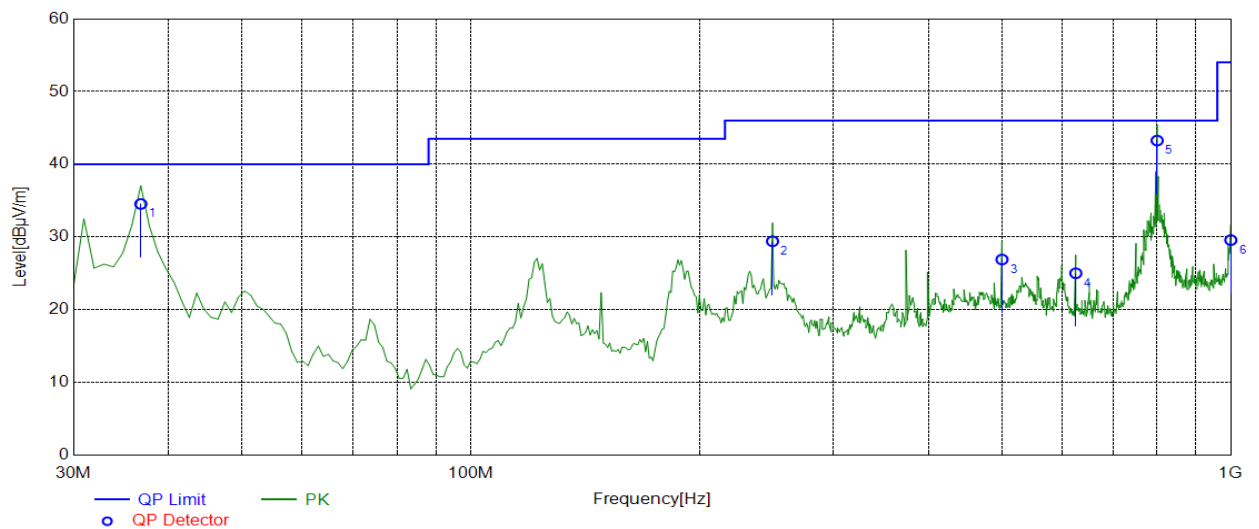
Above 1GHz, The emission level with margin less than 20db is recorded.

According to C63.10, if the peak (or quasi-peak) measured value complies with the average limit, it is unnecessary to perform an average measurement, so AV emission value did not show in below table if the peak value complies with average limit.

30MHz-1GHz

Mode:	ant1 11b 2412	Voltage:	120V/60Hz
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Test Graph

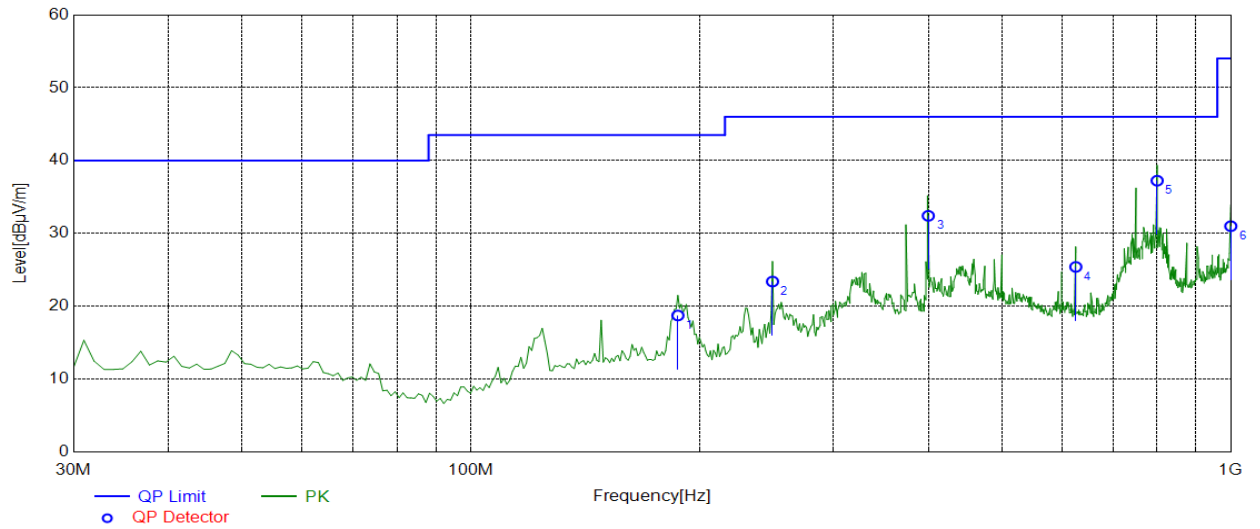


Final Data List

NO.	Freq. [MHz]	Factor [dB/m]	QP Value [dBμV/m]	QP Limit [dBμV/m]	QP Margin [dB]	Height [cm]	Angle [°]	Polarity
1	36.7968	-16.35	34.54	40.00	5.46	100	76	Vertical
2	249.439	-17.33	29.41	46.00	16.59	100	108	Vertical
3	499.950	-11.45	26.91	46.00	19.09	100	29	Vertical
4	625.205	-9.13	25.02	46.00	20.98	100	327	Vertical
5	799.980	-6.46	43.26	46.00	2.74	100	234	Vertical
6	1000.00	-4.55	29.58	54.00	24.42	100	24	Vertical

Mode:	ant1 11b 2412	Voltage:	120V/60Hz
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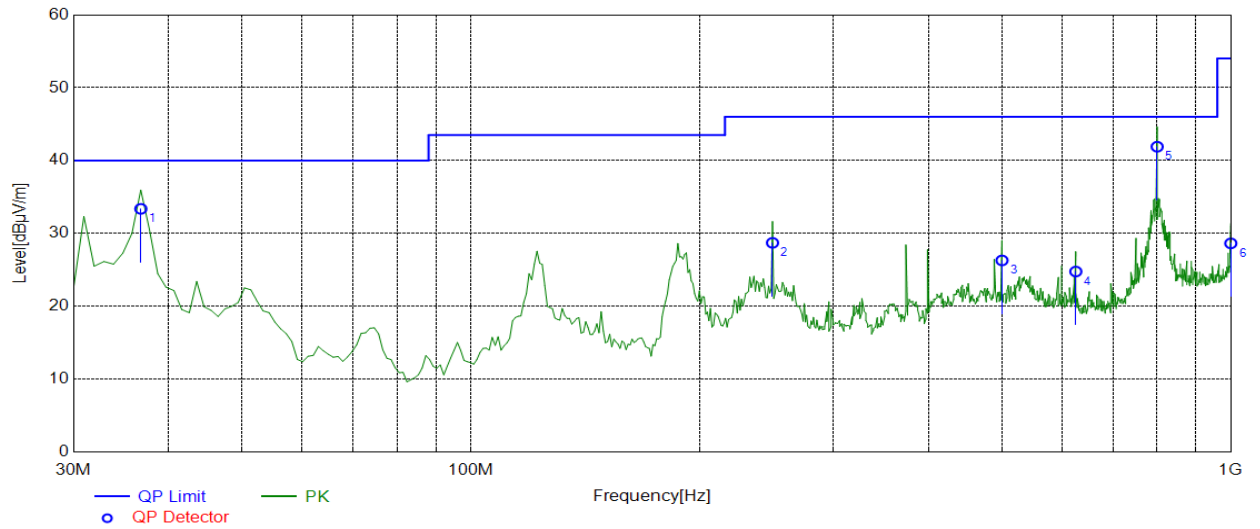
Test Graph



Final Data List								
NO.	Freq. [MHz]	Factor [dB/m]	QP Value [dBμV/m]	QP Limit [dBμV/m]	QP Margin [dB]	Height [cm]	Angle [°]	Polarity
1	187.297	-17.94	18.74	43.50	24.76	100	308	Horizontal
2	249.439	-17.33	23.40	46.00	22.60	100	284	Horizontal
3	399.939	-13.56	32.42	46.00	13.58	100	28	Horizontal
4	625.205	-9.13	25.41	46.00	20.59	100	136	Horizontal
5	799.980	-6.46	37.24	46.00	8.76	100	28	Horizontal
6	1000.00	-4.55	31.00	54.00	23.00	100	266	Horizontal

Mode:	ant1 11b 2437	Voltage:	120V/60Hz
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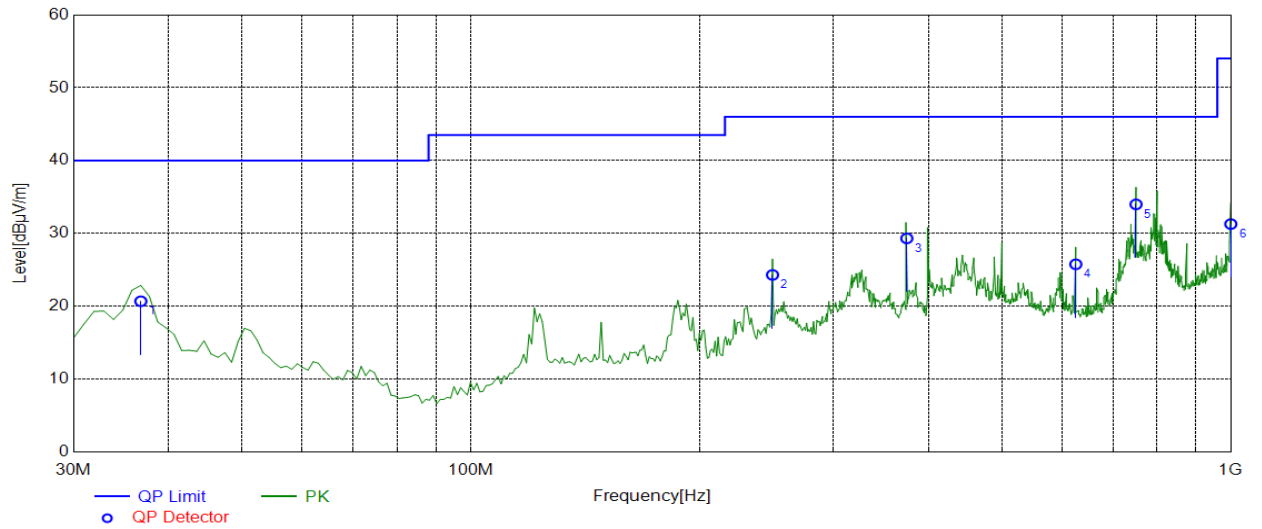
Test Graph



Final Data List								
NO.	Freq. [MHz]	Factor [dB/m]	QP Value [dBμV/m]	QP Limit [dBμV/m]	QP Margin [dB]	Height [cm]	Angle [°]	Polarity
1	36.7968	-16.35	33.38	40.00	6.62	100	62	Vertical
2	249.439	-17.33	28.71	46.00	17.29	100	109	Vertical
3	499.950	-11.45	26.30	46.00	19.70	100	44	Vertical
4	625.205	-9.13	24.77	46.00	21.23	100	326	Vertical
5	799.980	-6.46	41.90	46.00	4.10	100	332	Vertical
6	1000.00	-4.55	28.64	54.00	25.36	100	25	Vertical

Mode:	ant1 11b 2437	Voltage:	120V/60Hz
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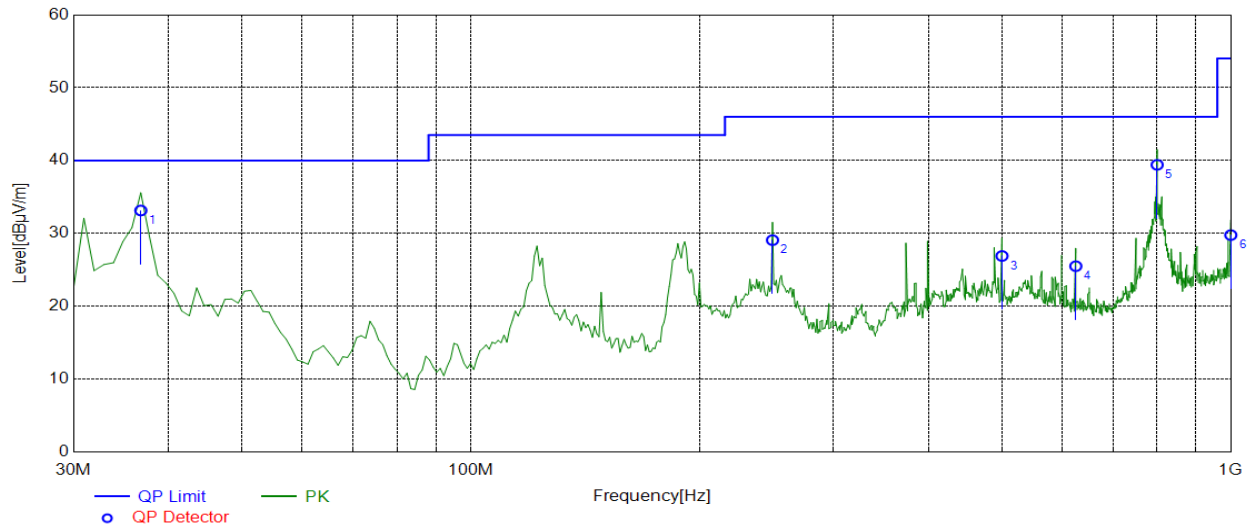
Test Graph



Final Data List								
NO.	Freq. [MHz]	Factor [dB/m]	QP Value [dBμV/m]	QP Limit [dBμV/m]	QP Margin [dB]	Height [cm]	Angle [°]	Polarity
1	36.7968	-16.35	20.69	40.00	19.31	100	28	Horizontal
2	249.439	-17.33	24.31	46.00	21.69	100	299	Horizontal
3	374.694	-14.09	29.32	46.00	16.68	100	350	Horizontal
4	625.205	-9.13	25.77	46.00	20.23	100	322	Horizontal
5	750.460	-7.42	33.99	46.00	12.01	100	28	Horizontal
6	1000.00	-4.55	31.29	54.00	22.71	100	266	Horizontal

Mode:	ant1 11b 2462	Voltage:	120V/60Hz
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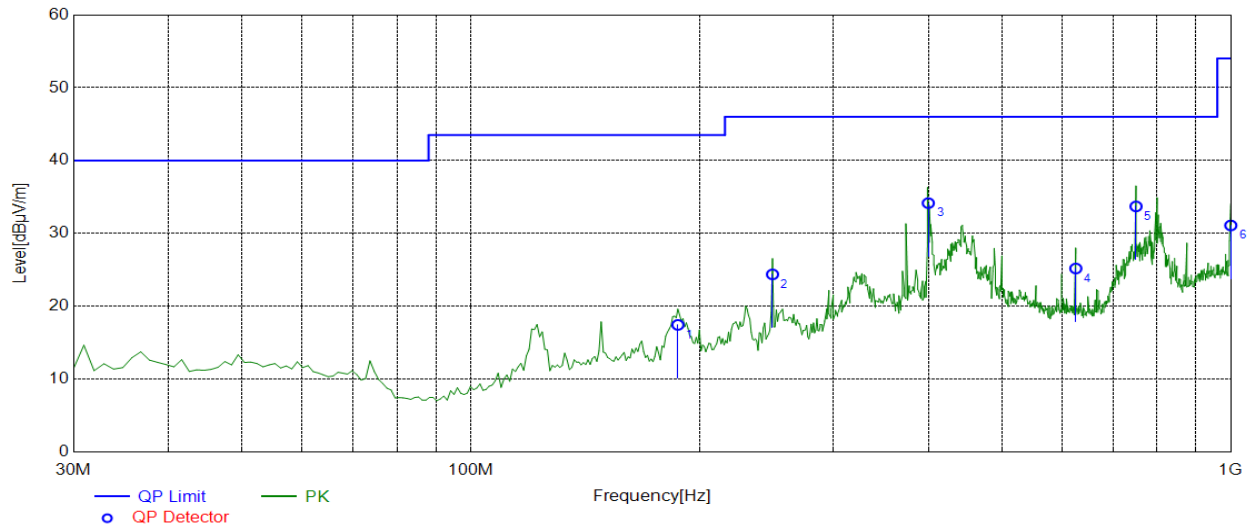
Test Graph



Final Data List								
NO.	Freq. [MHz]	Factor [dB/m]	QP Value [dBμV/m]	QP Limit [dBμV/m]	QP Margin [dB]	Height [cm]	Angle [°]	Polarity
1	36.7968	-16.35	33.15	40.00	6.85	100	81	Vertical
2	249.439	-17.33	29.08	46.00	16.92	100	89	Vertical
3	499.950	-11.45	26.91	46.00	19.09	100	20	Vertical
4	625.205	-9.13	25.51	46.00	20.49	100	318	Vertical
5	799.980	-6.46	39.42	46.00	6.58	100	20	Vertical
6	1000.00	-4.55	29.77	54.00	24.23	100	29	Vertical

Mode:	ant1 11b 2462	Voltage:	120V/60Hz
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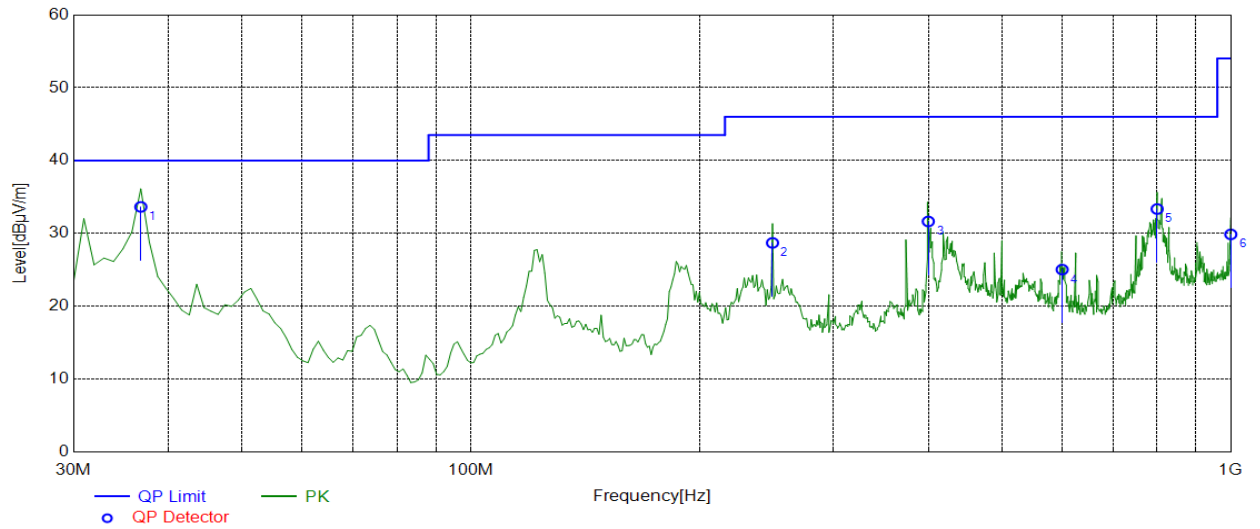
Test Graph



Final Data List								
NO.	Freq. [MHz]	Factor [dB/m]	QP Value [dBμV/m]	QP Limit [dBμV/m]	QP Margin [dB]	Height [cm]	Angle [°]	Polarity
1	187.297	-17.94	17.45	43.50	26.05	100	116	Horizontal
2	249.439	-17.33	24.38	46.00	21.62	100	309	Horizontal
3	399.939	-13.56	34.16	46.00	11.84	100	208	Horizontal
4	625.205	-9.13	25.19	46.00	20.81	100	337	Horizontal
5	750.460	-7.42	33.71	46.00	12.29	100	47	Horizontal
6	1000.00	-4.55	31.10	54.00	22.90	100	259	Horizontal

Mode:	ant1 11g 2412	Voltage:	120V/60Hz
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Test Graph

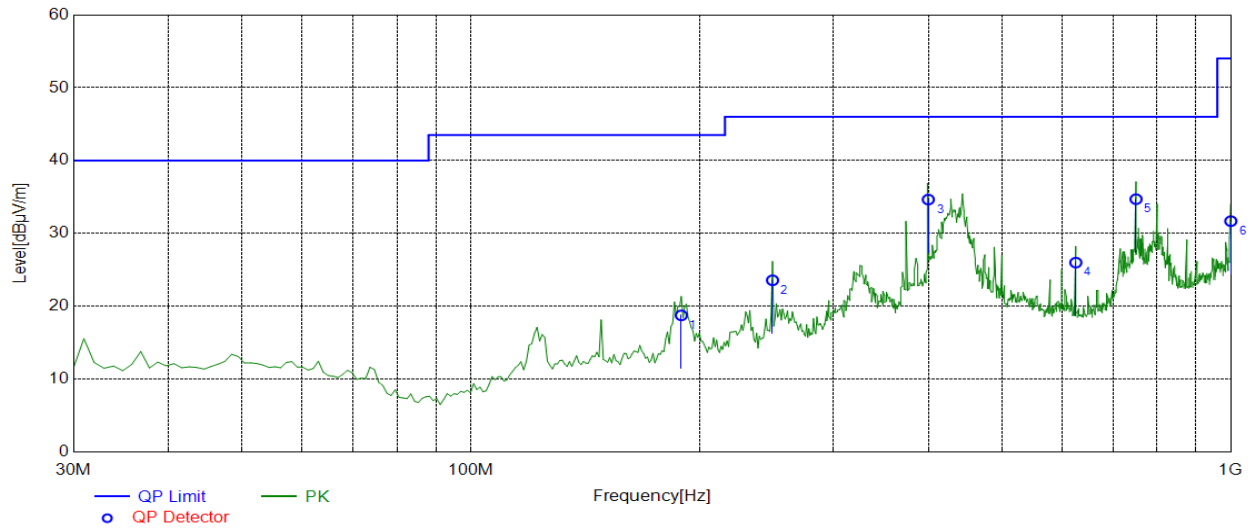


Final Data List

NO.	Freq. [MHz]	Factor [dB/m]	QP Value [dBμV/m]	QP Limit [dBμV/m]	QP Margin [dB]	Height [cm]	Angle [°]	Polarity
1	36.7968	-16.35	33.64	40.00	6.36	100	72	Vertical
2	249.439	-17.33	28.70	46.00	17.30	100	104	Vertical
3	399.939	-13.56	31.65	46.00	14.35	100	44	Vertical
4	599.960	-9.38	25.04	46.00	20.96	100	15	Vertical
5	799.980	-6.46	33.35	46.00	12.65	100	290	Vertical
6	1000.00	-4.55	29.87	54.00	24.13	100	29	Vertical

Mode:	ant1 11g 2412	Voltage:	120V/60Hz
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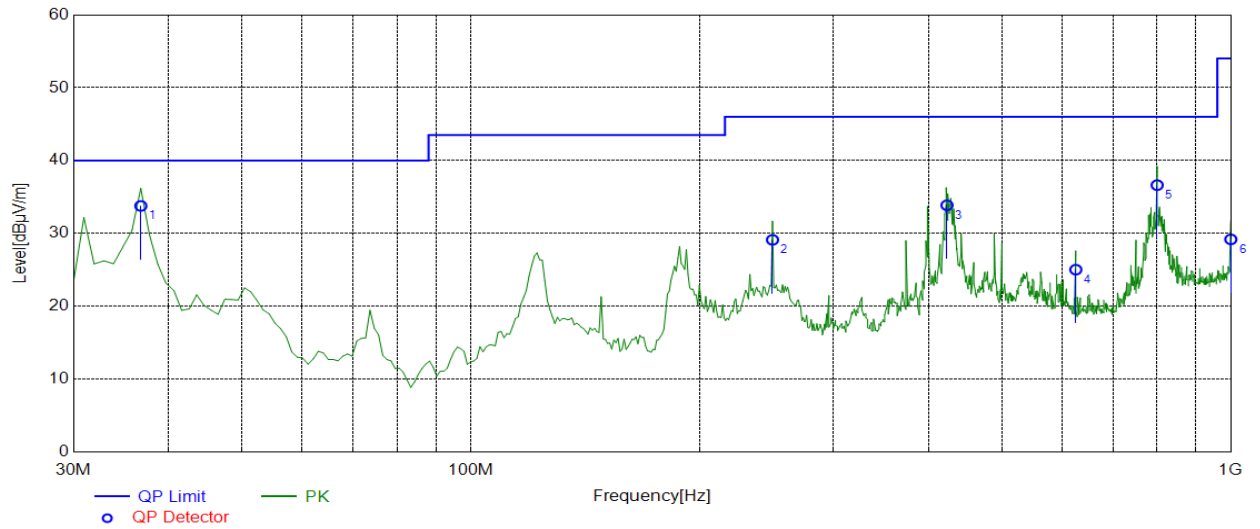
Test Graph



Final Data List								
NO.	Freq. [MHz]	Factor [dB/m]	QP Value [dBμV/m]	QP Limit [dBμV/m]	QP Margin [dB]	Height [cm]	Angle [°]	Polarity
1	189.239	-18.10	18.76	43.50	24.74	100	282	Horizontal
2	249.439	-17.33	23.57	46.00	22.43	100	291	Horizontal
3	399.939	-13.56	34.65	46.00	11.35	100	127	Horizontal
4	625.205	-9.13	26.00	46.00	20.00	100	329	Horizontal
5	750.460	-7.42	34.70	46.00	11.30	100	28	Horizontal
6	1000.00	-4.55	31.69	54.00	22.31	100	267	Horizontal

Mode:	ant1 11g 2437	Voltage:	120V/60Hz
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Test Graph

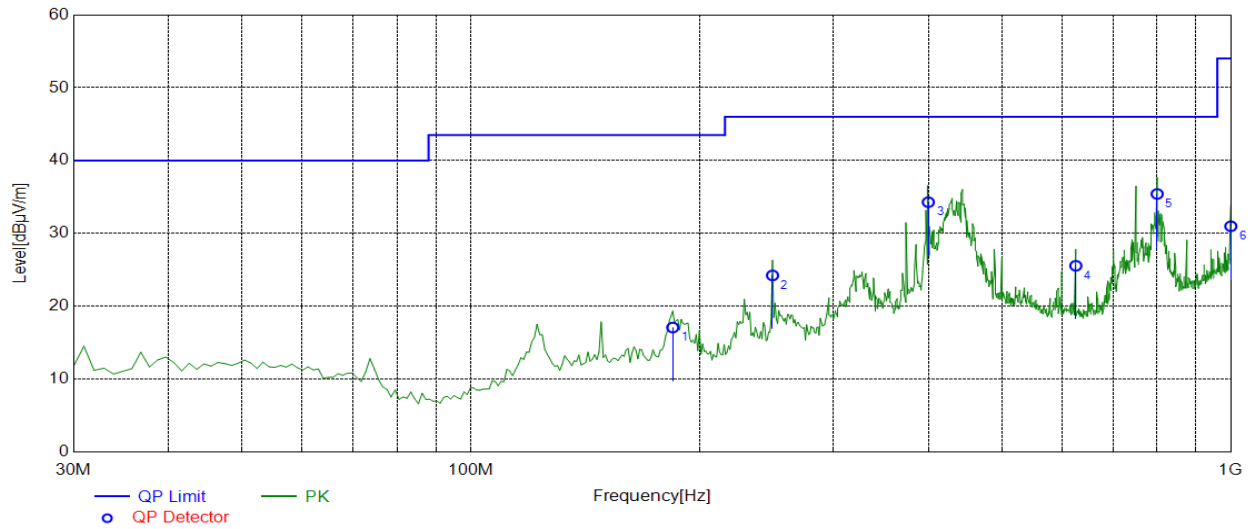


Final Data List

NO.	Freq. [MHz]	Factor [dB/m]	QP Value [dBμV/m]	QP Limit [dBμV/m]	QP Margin [dB]	Height [cm]	Angle [°]	Polarity
1	36.7968	-16.35	33.78	40.00	6.22	100	62	Vertical
2	249.439	-17.33	29.12	46.00	16.88	100	96	Vertical
3	423.243	-13.07	33.87	46.00	12.13	100	332	Vertical
4	625.205	-9.13	25.03	46.00	20.97	100	332	Vertical
5	799.980	-6.46	36.63	46.00	9.37	100	220	Vertical
6	1000.00	-4.55	29.19	54.00	24.81	100	26	Vertical

Mode:	ant1 11g 2437	Voltage:	120V/60Hz
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Test Graph



Final Data List								
NO.	Freq. [MHz]	Factor [dB/m]	QP Value [dBμV/m]	QP Limit [dBμV/m]	QP Margin [dB]	Height [cm]	Angle [°]	Polarity
1	184.384	-17.70	17.09	43.50	26.41	100	86	Horizontal
2	249.439	-17.33	24.24	46.00	21.76	100	291	Horizontal
3	399.939	-13.56	34.29	46.00	11.71	100	165	Horizontal
4	625.205	-9.13	25.57	46.00	20.43	100	133	Horizontal
5	799.980	-6.46	35.42	46.00	10.58	100	250	Horizontal
6	1000.00	-4.55	30.99	54.00	23.01	100	264	Horizontal