



Appendix for Test report

Appendix A: DTS (6 dB) Bandwidth

In this document, the "DTS6dBBW" refers to the measured "DTS (6 dB) Bandwidth" value. In this Appendix, the "fc(DTS6dBBW)" refers to the centre of the measured "DTS6dBBW". The introduction of the "fc(DTS6dBBW)" is due to that other measurements use it as the spectrum analyzer setting.

For measurements on smart antenna systems (devices with multiple transmit chains), the test is performed at each chain, and used as respective results for each chain.

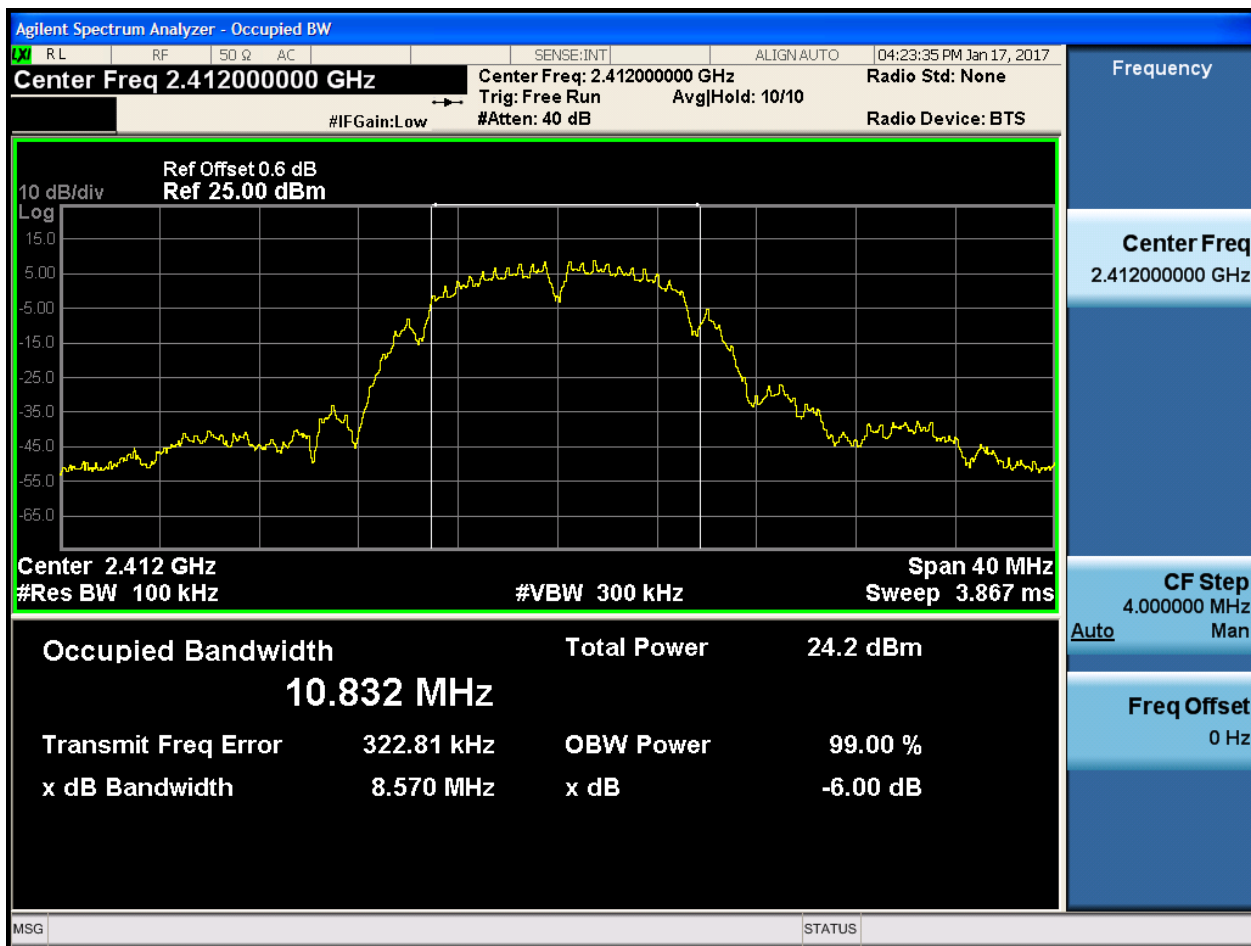
Part I - Test Results

Test Mode	Test Channel	Frequency[MHz]	Ant	DTS6dBBW[MHz]	Verdict
11B	L	2412	Ant 1	8.57	pass
11B	M	2437	Ant 1	8.58	pass
11B	H	2462	Ant 1	9.06	pass
11G	L	2412	Ant 1	15.78	pass
11G	M	2437	Ant 1	16.42	pass
11G	H	2462	Ant 1	16.41	pass
11N20	L	2412	Ant 1	16.41	pass
11N20	M	2437	Ant 1	17.64	pass
11N20	H	2462	Ant 1	17.63	pass
11N40	L	2422	Ant 1	35.69	pass
11N40	M	2437	Ant 1	35.98	pass
11N40	H	2452	Ant 1	35.84	pass



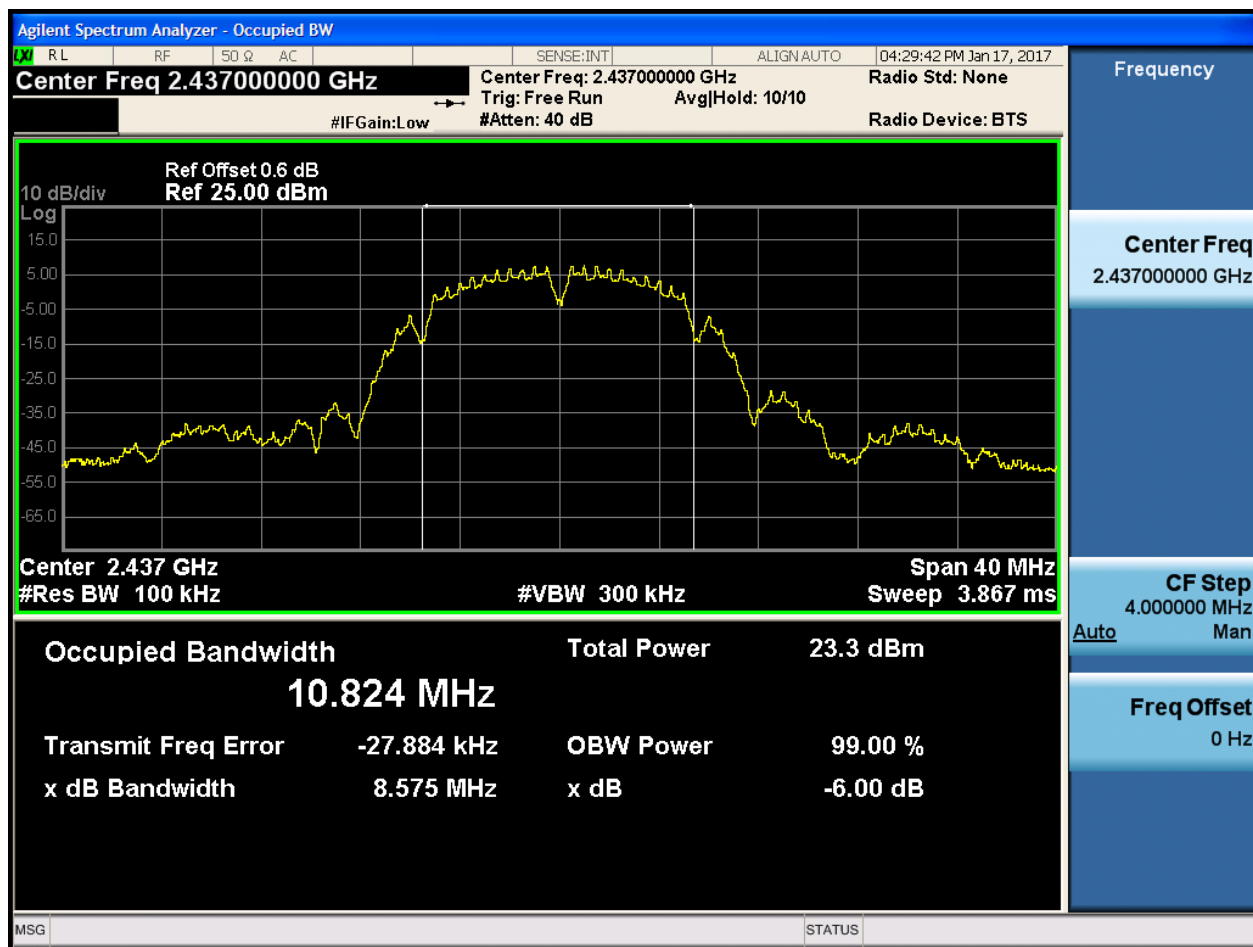
Part II - Test Plots

1.1 11B_L@Ant 1



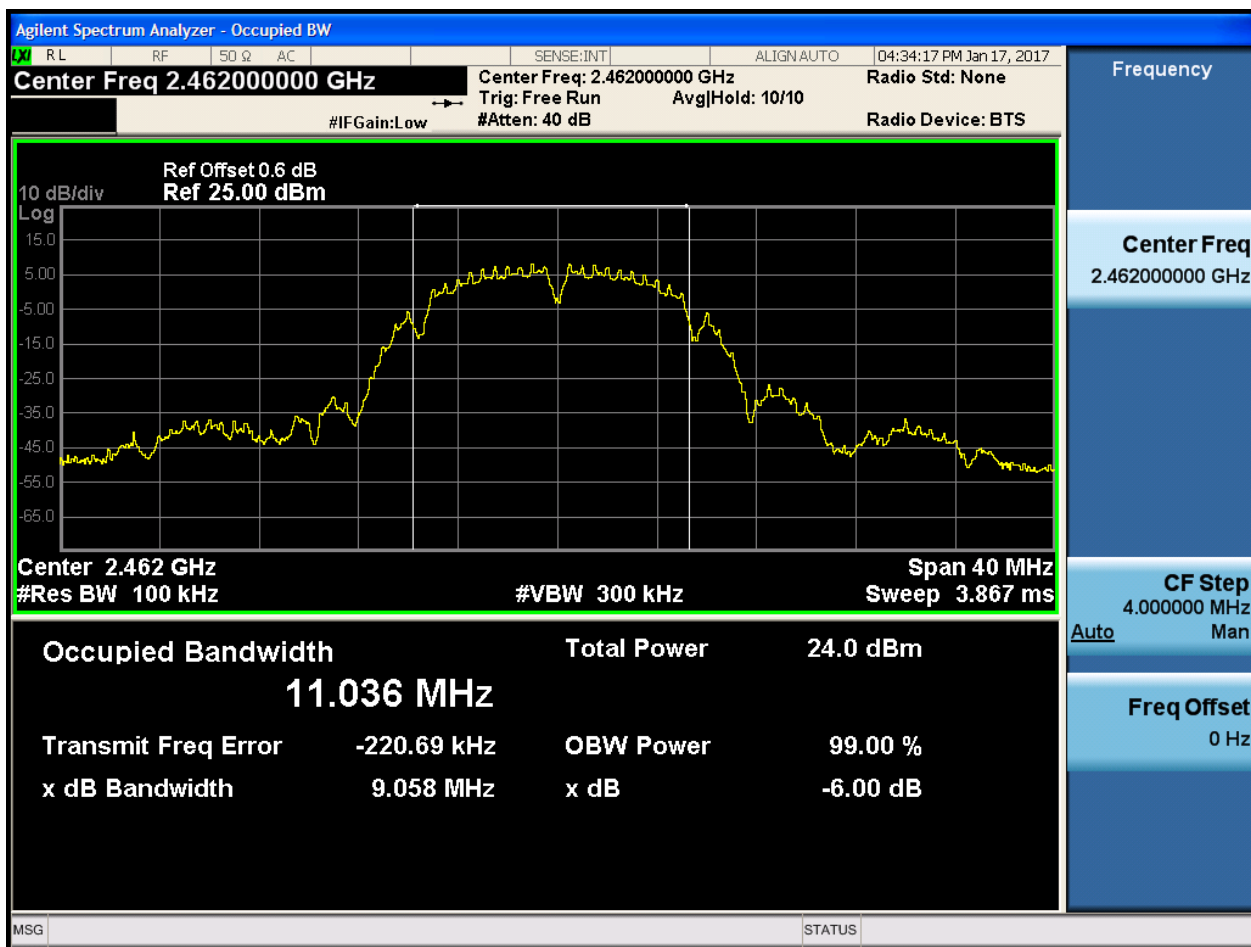


1.2 11B_M@Ant 1



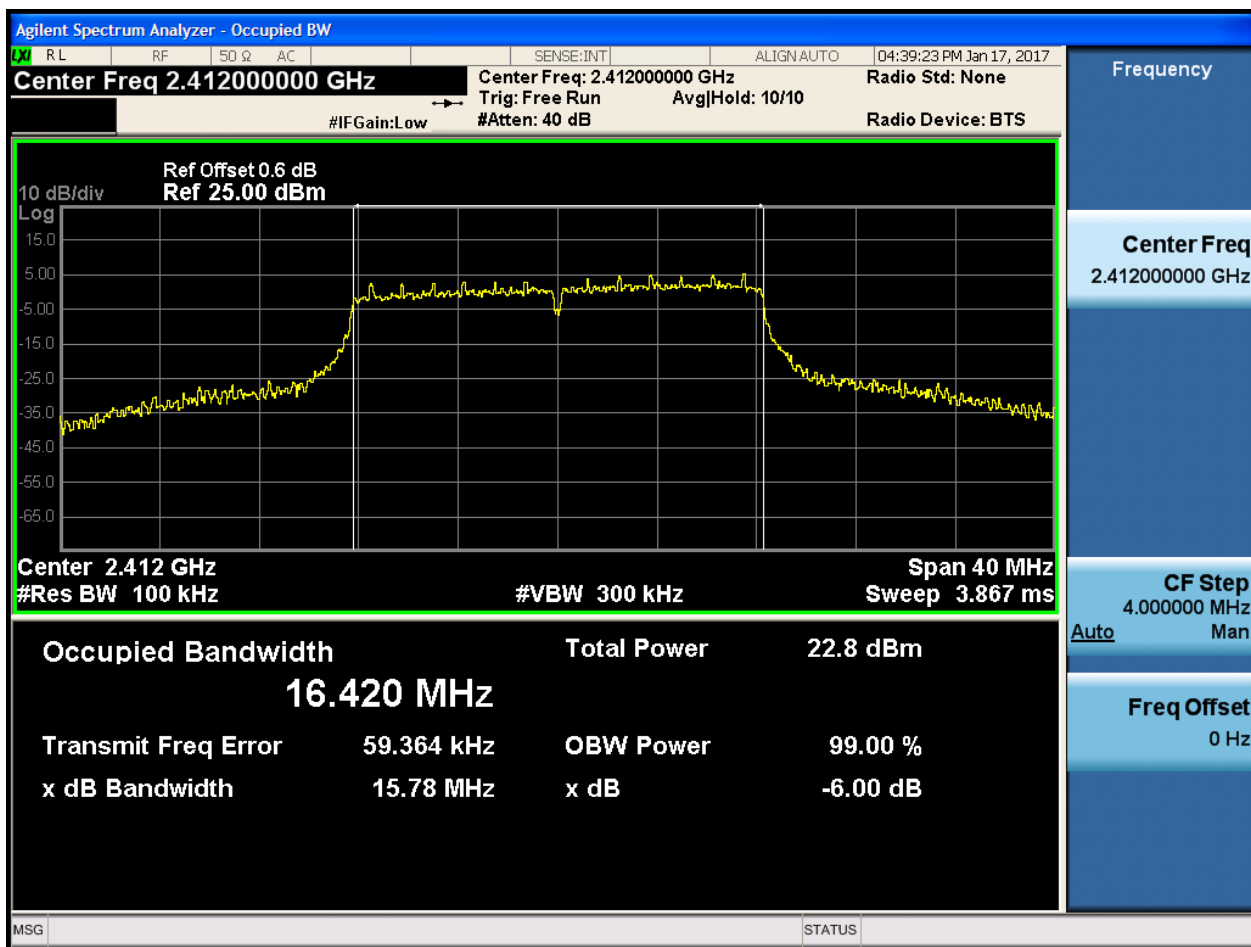


1.3 11B_H@Ant 1



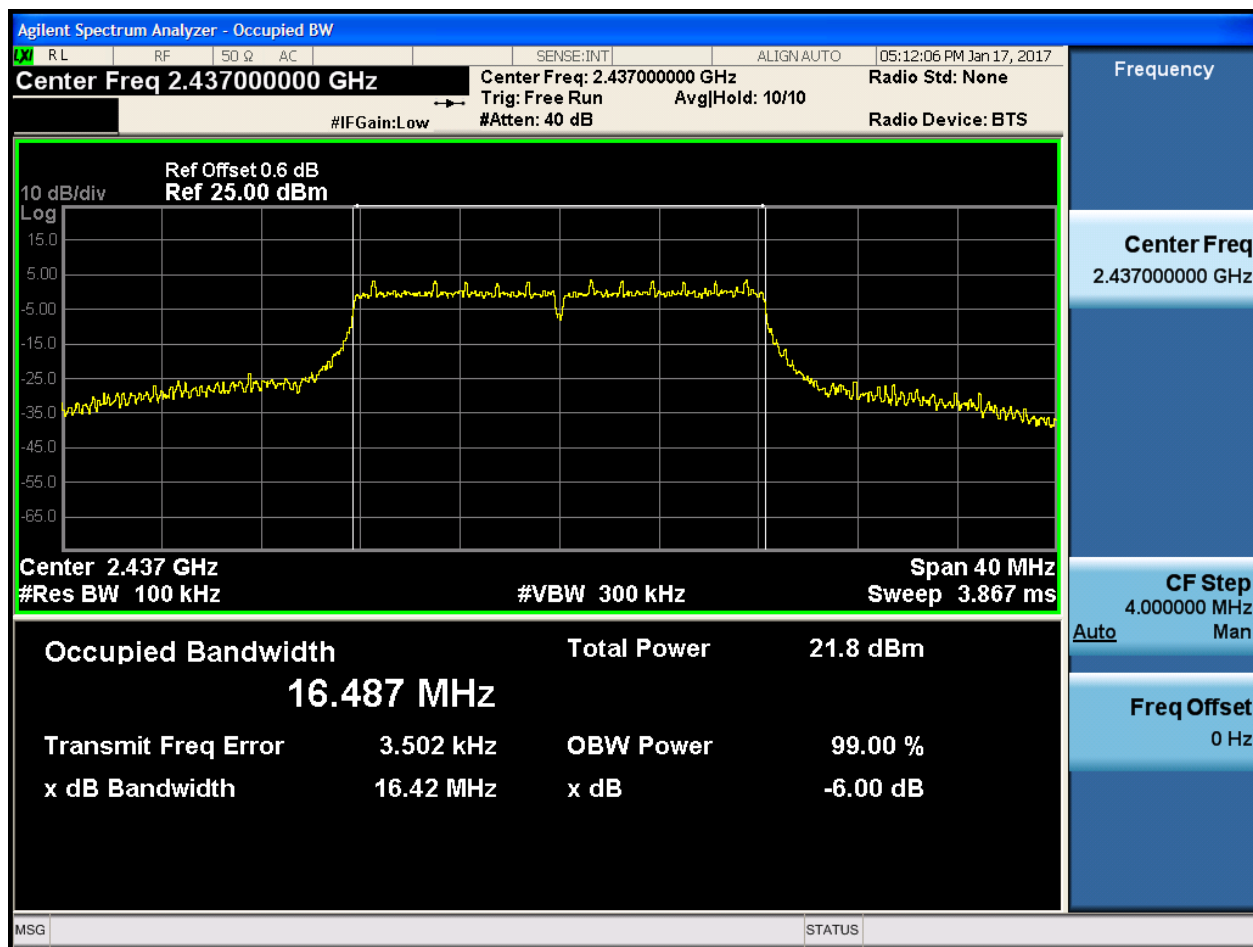


1.4 11G_L@Ant 1



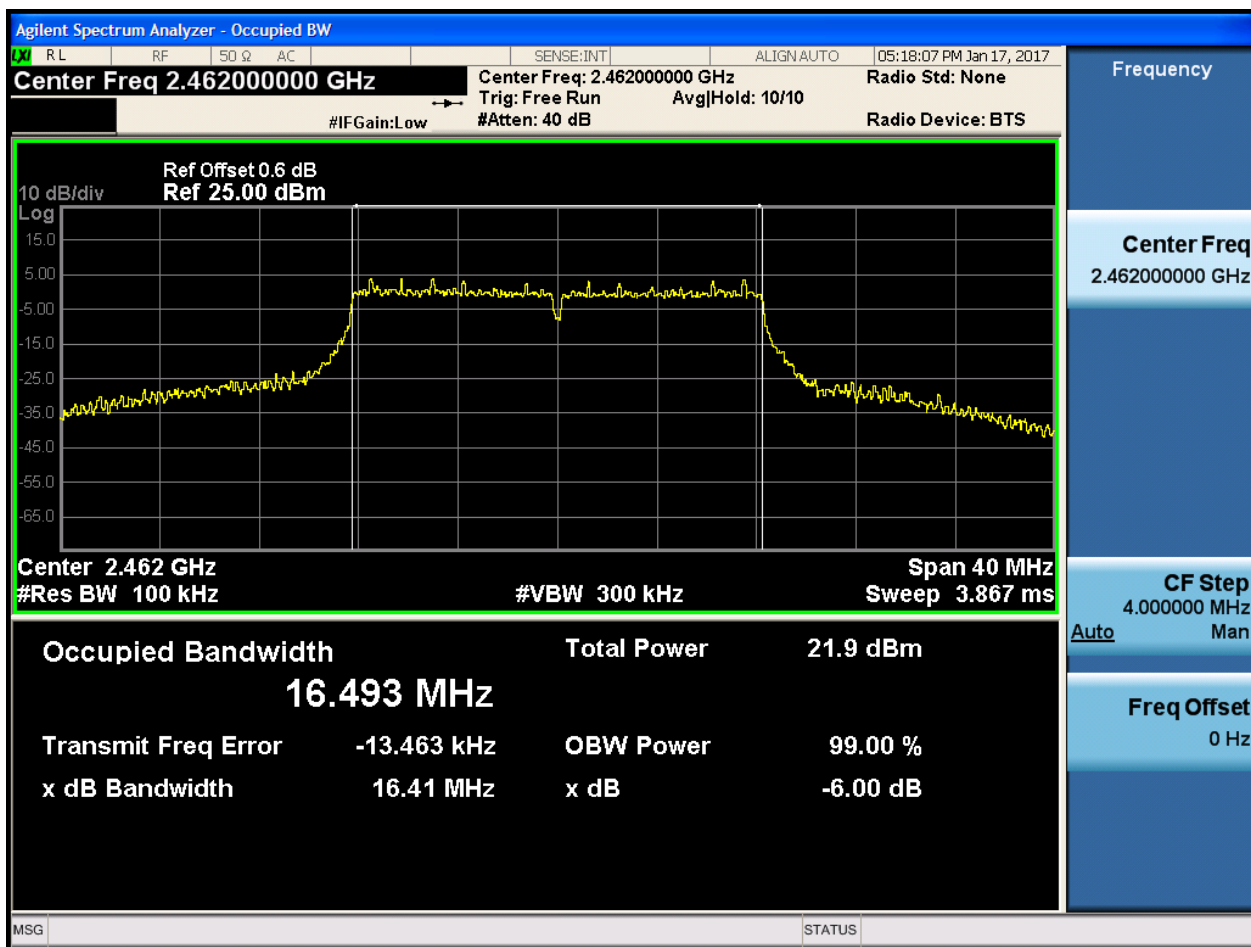


1.5 11G_M@Ant 1



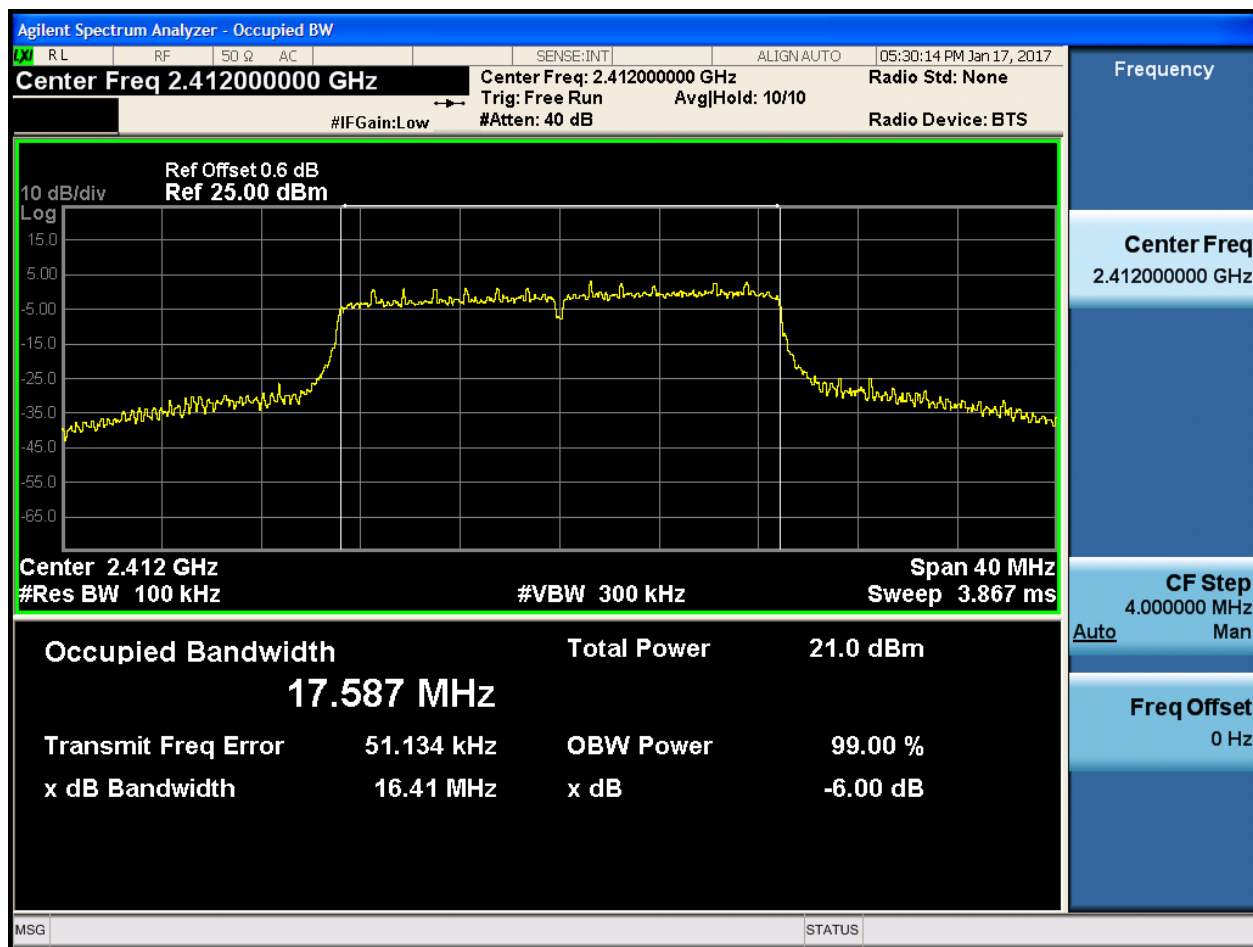


1.6 11G_H@Ant 1



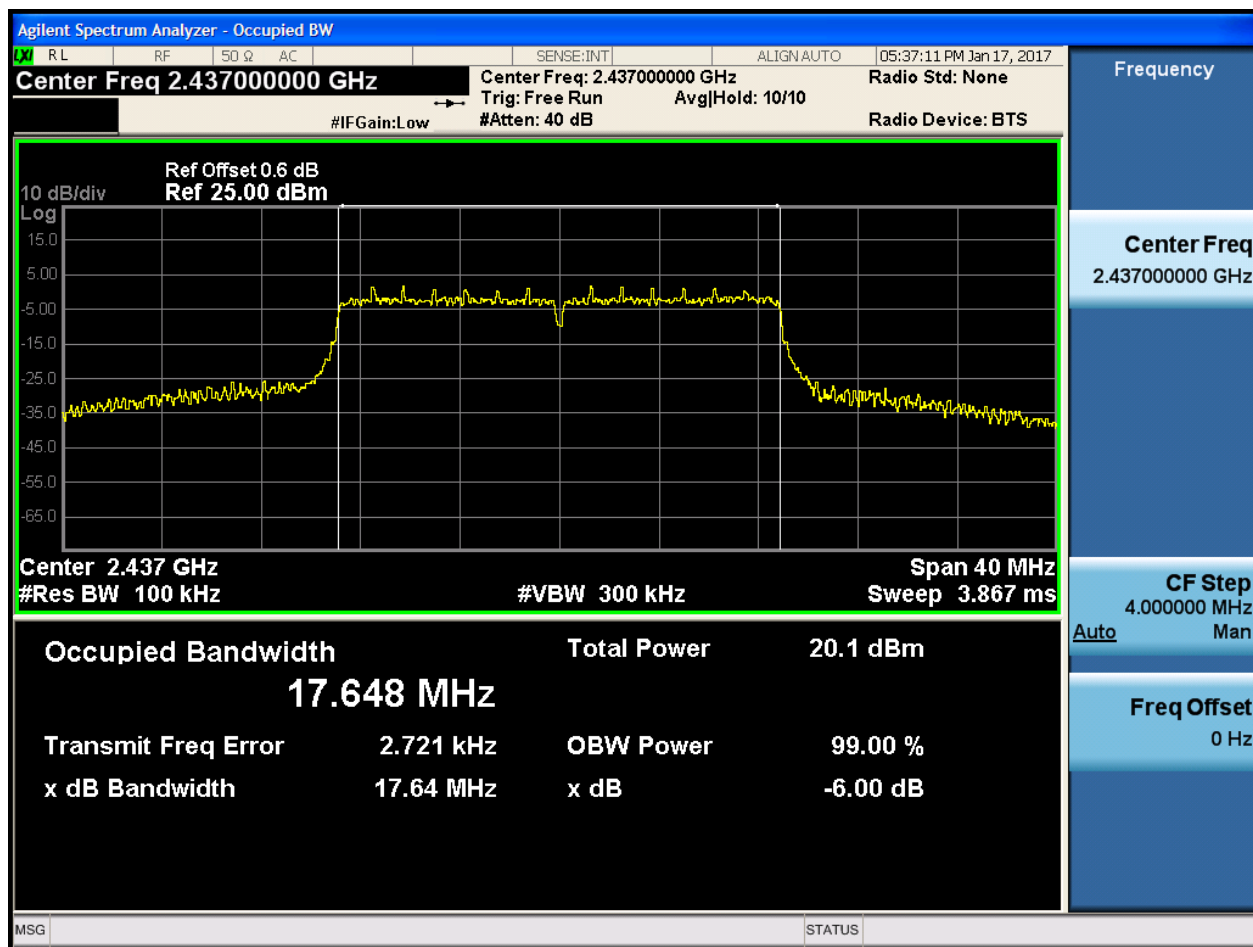


1.7 11N20_L@Ant 1



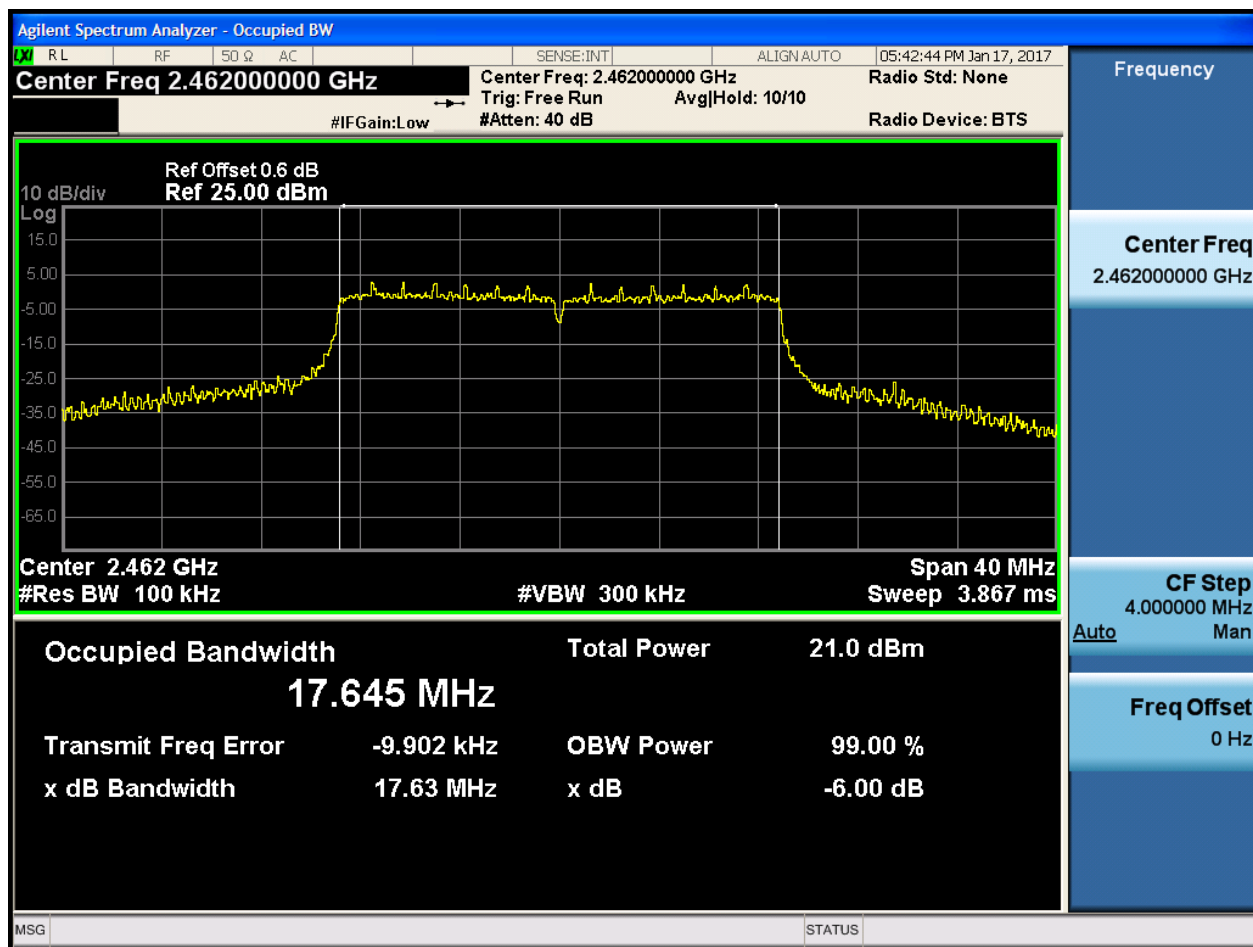


1.8 11N20_M@Ant 1



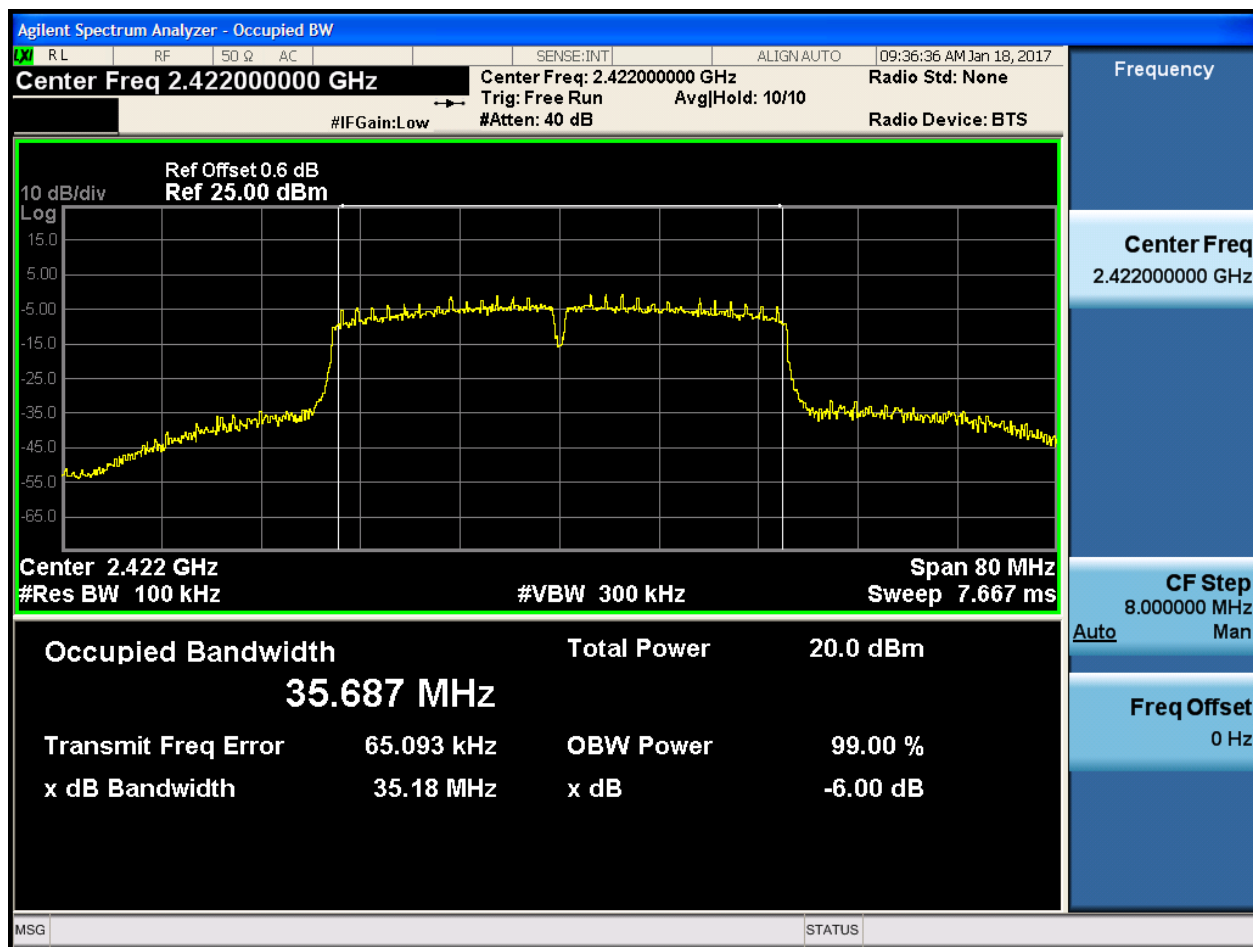


1.9 11N20_H@Ant 1



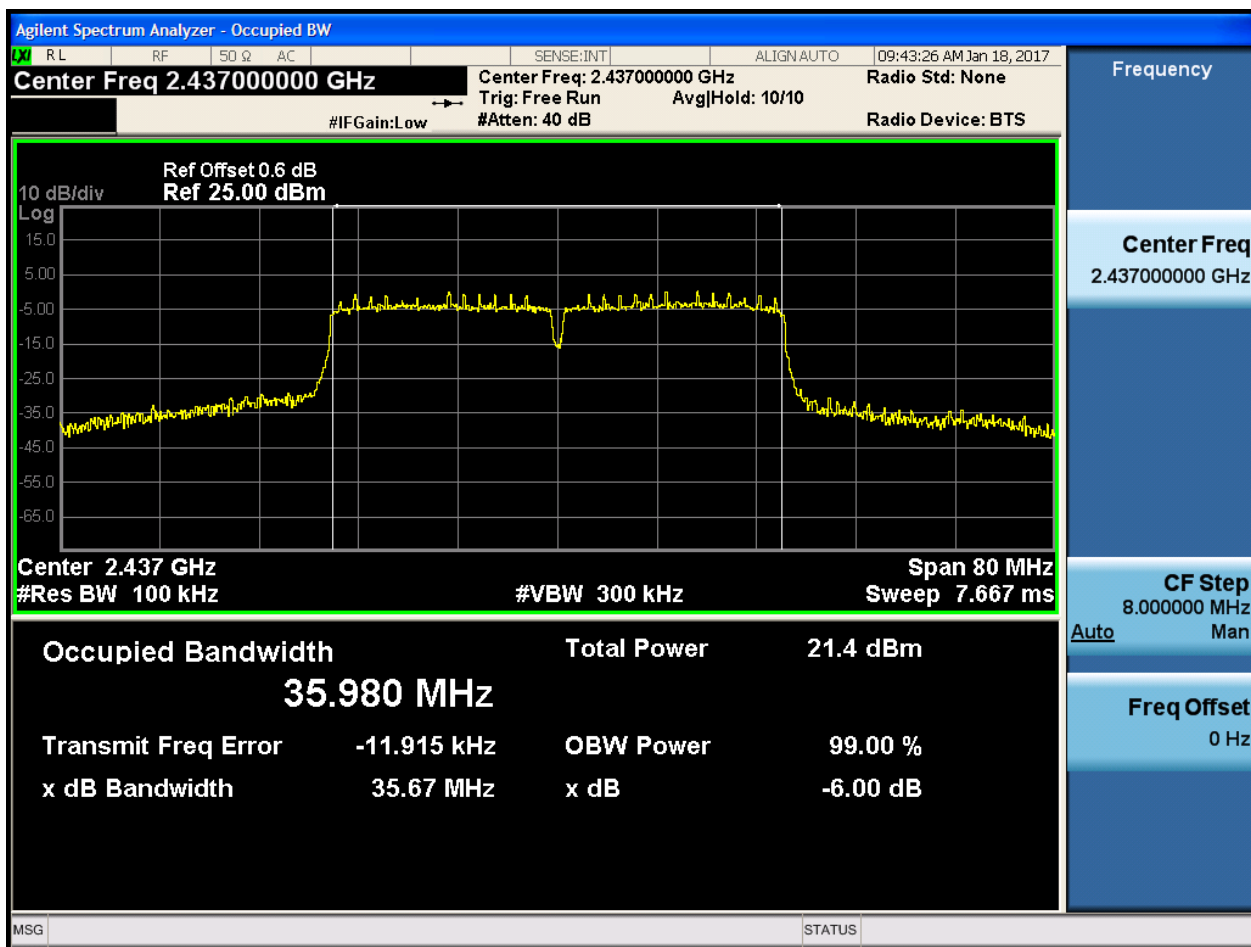


1.10 11N40_L@Ant 1



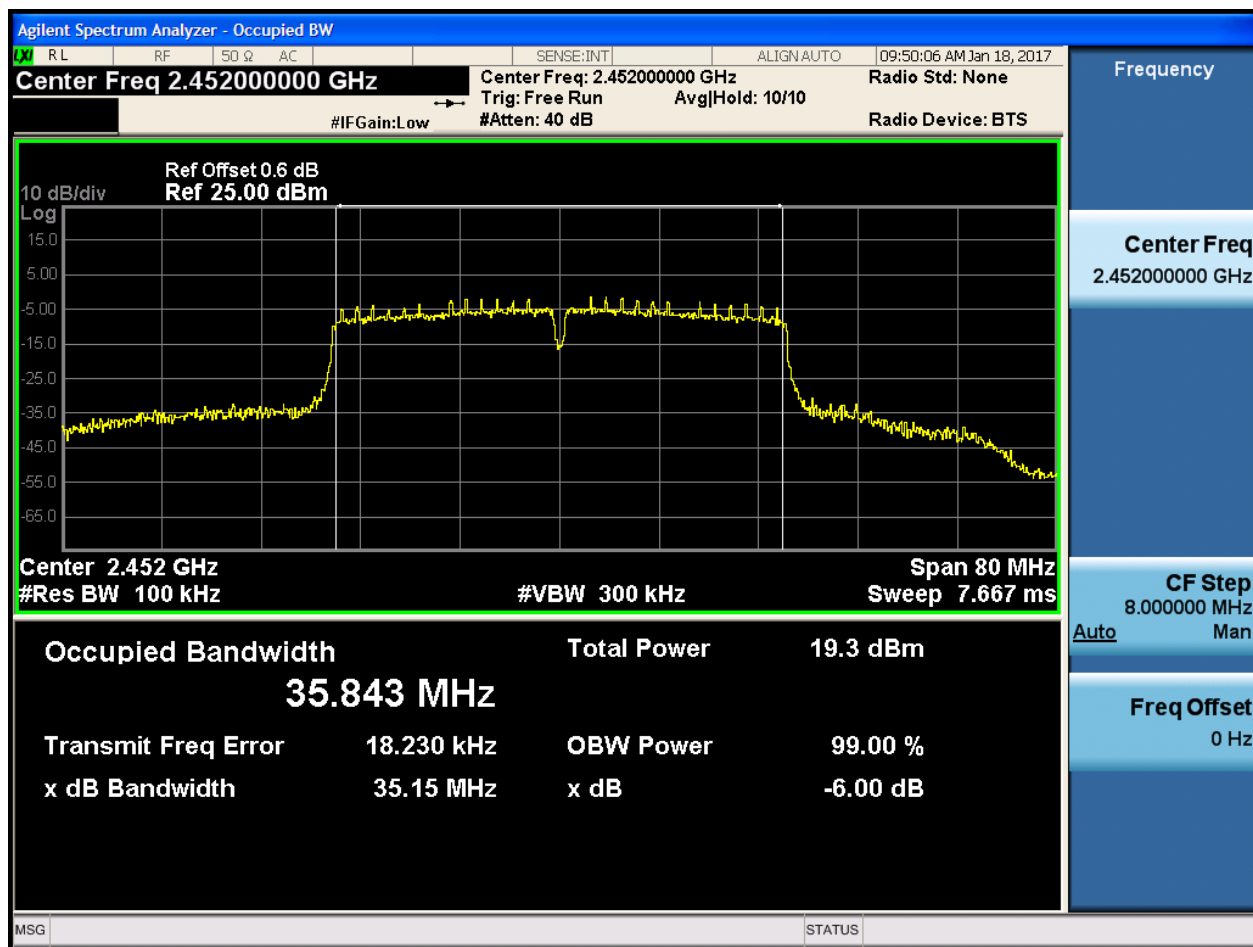


1.11 11N40_M@Ant 1





1.12 11N40_H@Ant 1



Appendix B: Occupied Bandwidth

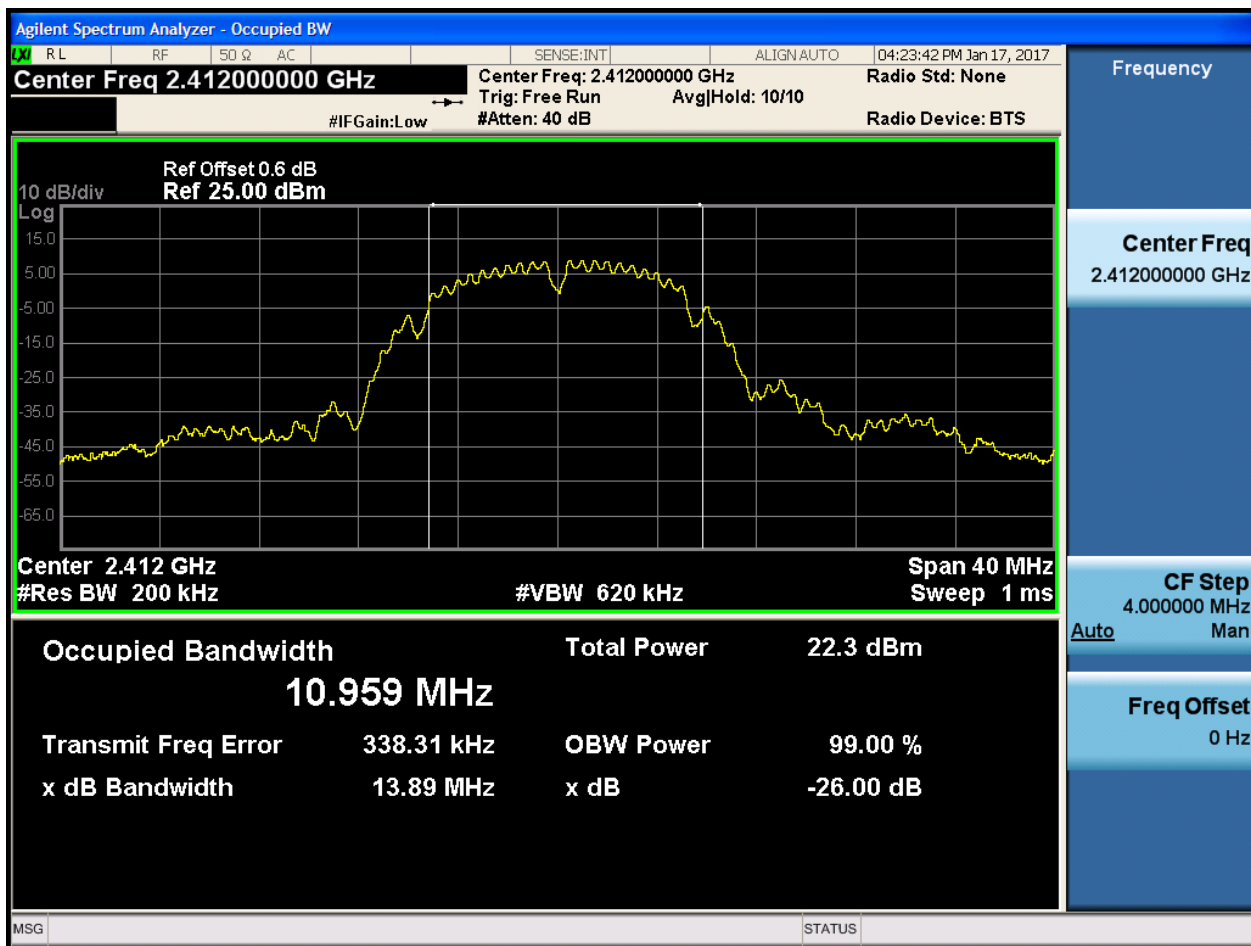
For measurements on smart antenna systems (devices with multiple transmit chains), the test is performed at each chain, and used as respective results for each chain.

Part I - Test Results

Test Mode	Test Channel	Frequency[MHz]	Ant	Occupied Bandwidth [MHz]	Verdict
11B	L	2412	Ant 1	10.96	pass
11B	M	2437	Ant 1	11.02	pass
11B	H	2462	Ant 1	11.10	pass
11G	L	2412	Ant 1	16.52	pass
11G	M	2437	Ant 1	16.62	pass
11G	H	2462	Ant 1	16.64	pass
11N20	L	2412	Ant 1	17.59	pass
11N20	M	2437	Ant 1	17.70	pass
11N20	H	2462	Ant 1	17.71	pass
11N40	L	2422	Ant 1	35.71	pass
11N40	M	2437	Ant 1	36.03	pass
11N40	H	2452	Ant 1	35.89	pass

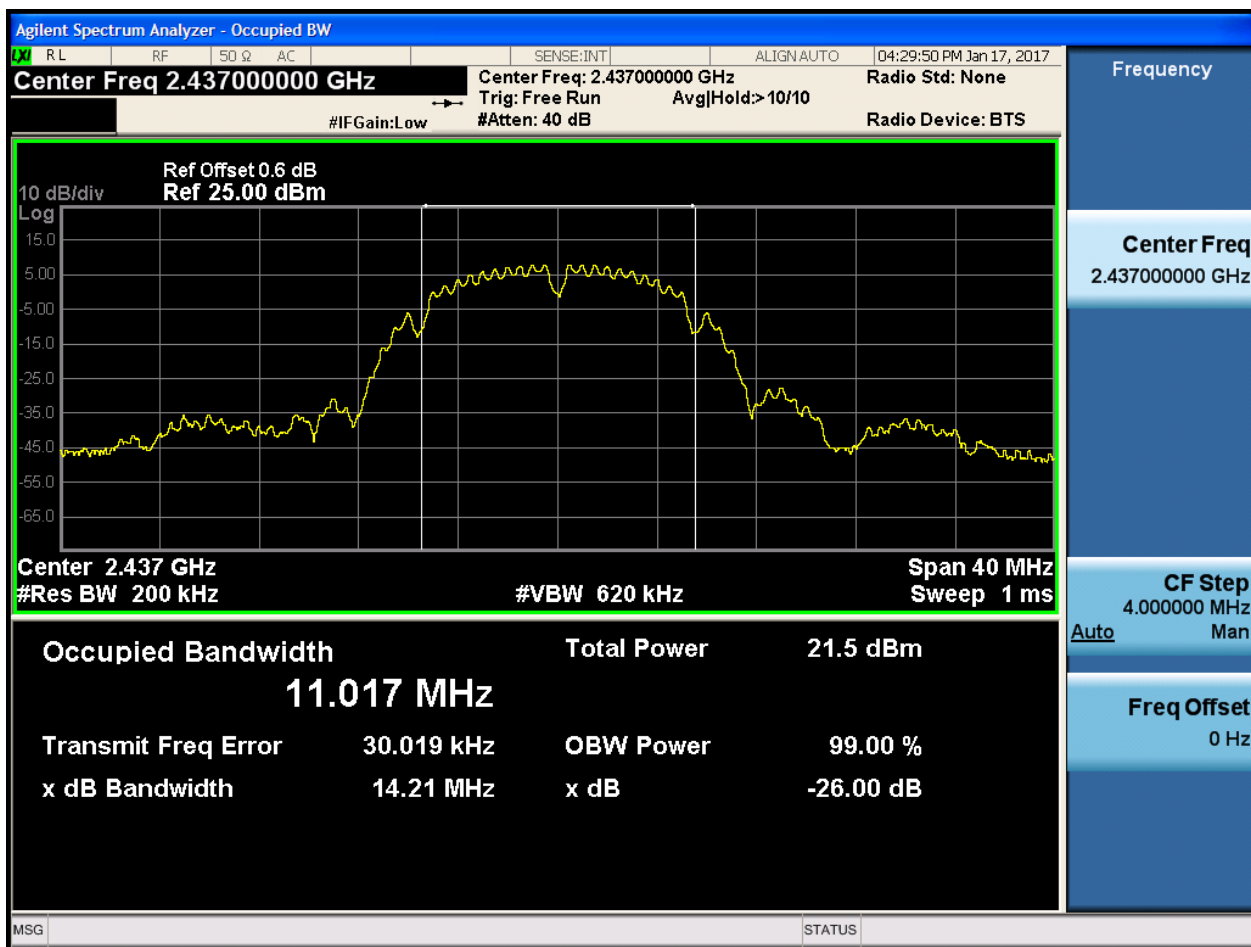
Part II - Test Plots

2.1 11B_L@Ant 1



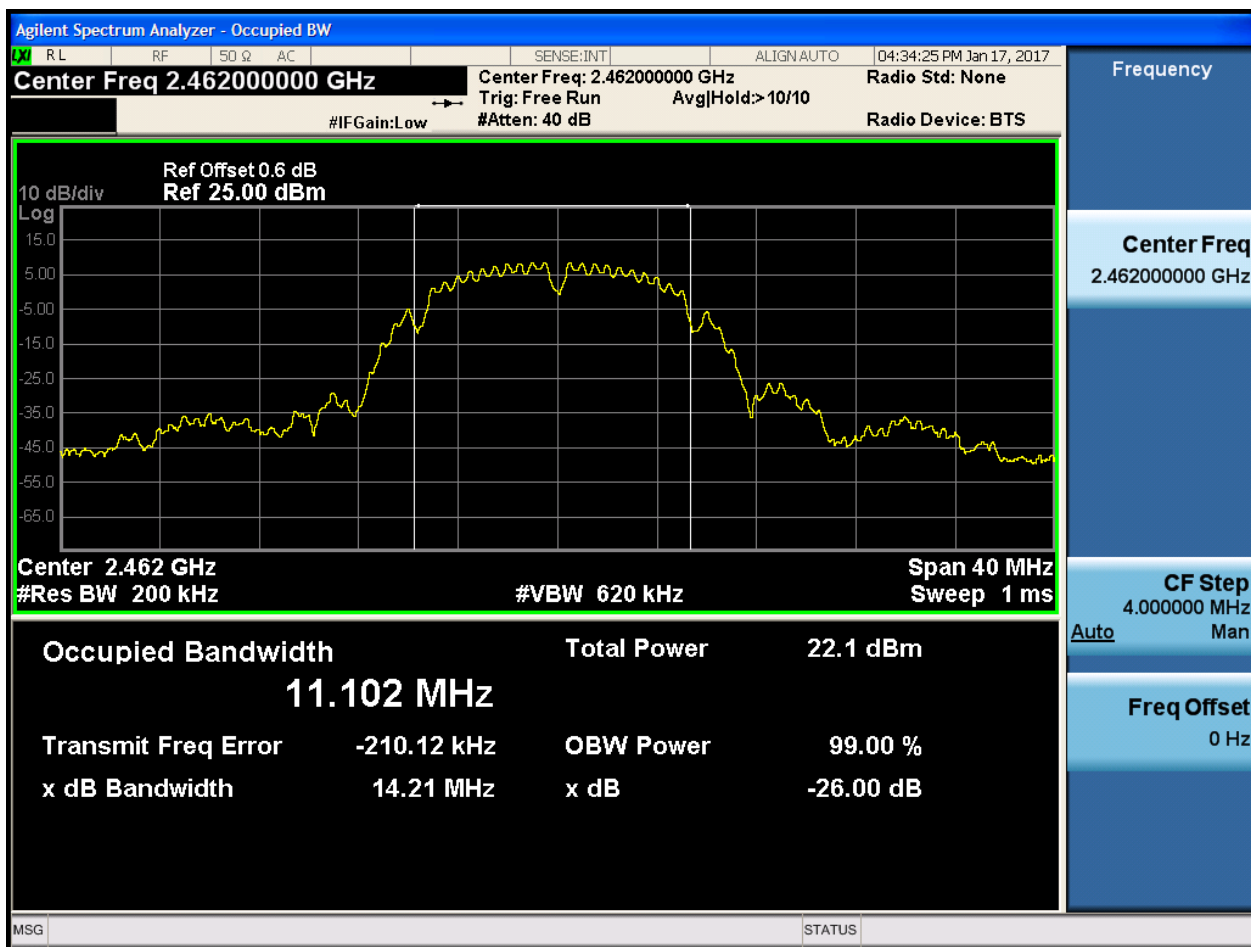


2.2 11B_M@Ant 1



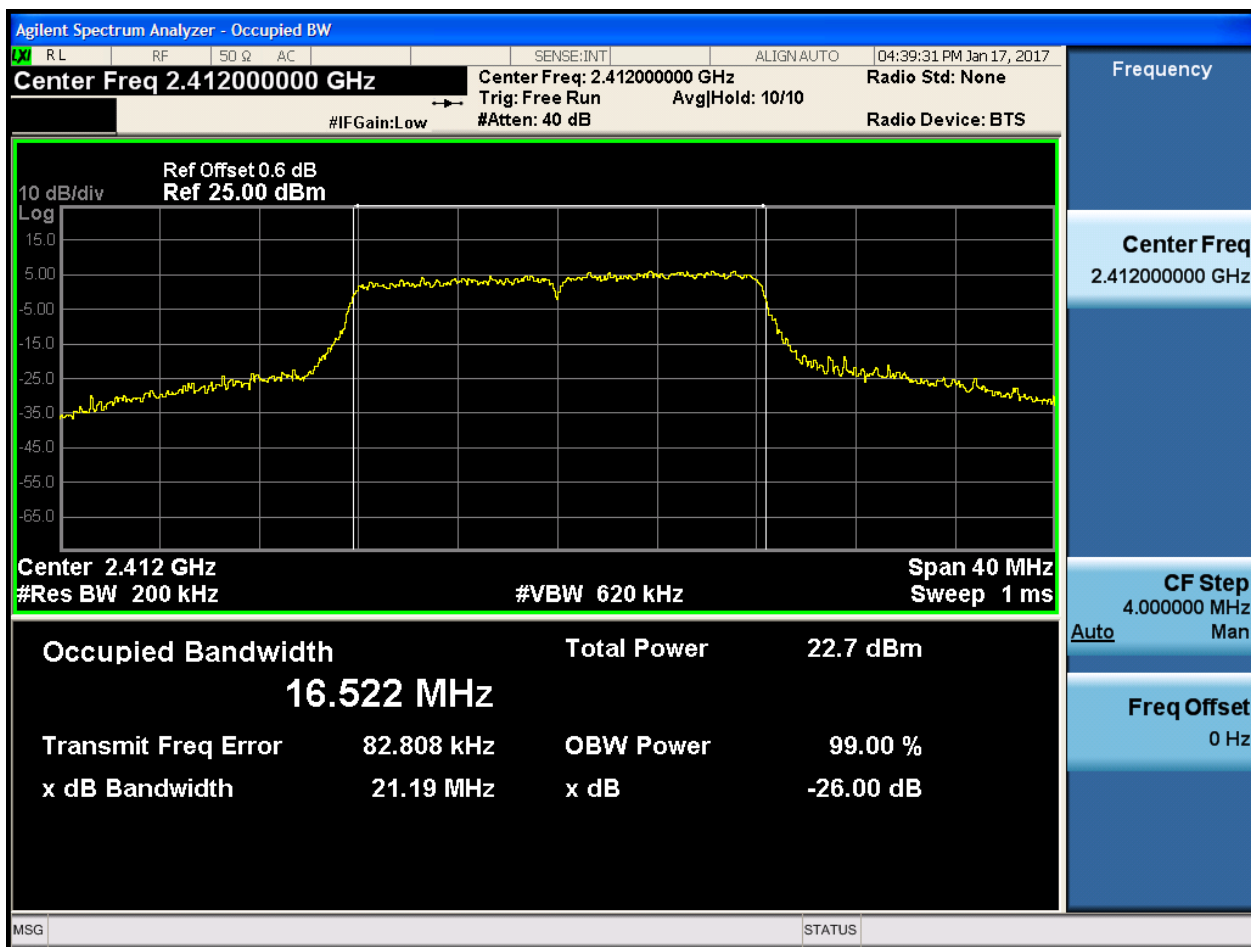


2.3 11B_H@Ant 1



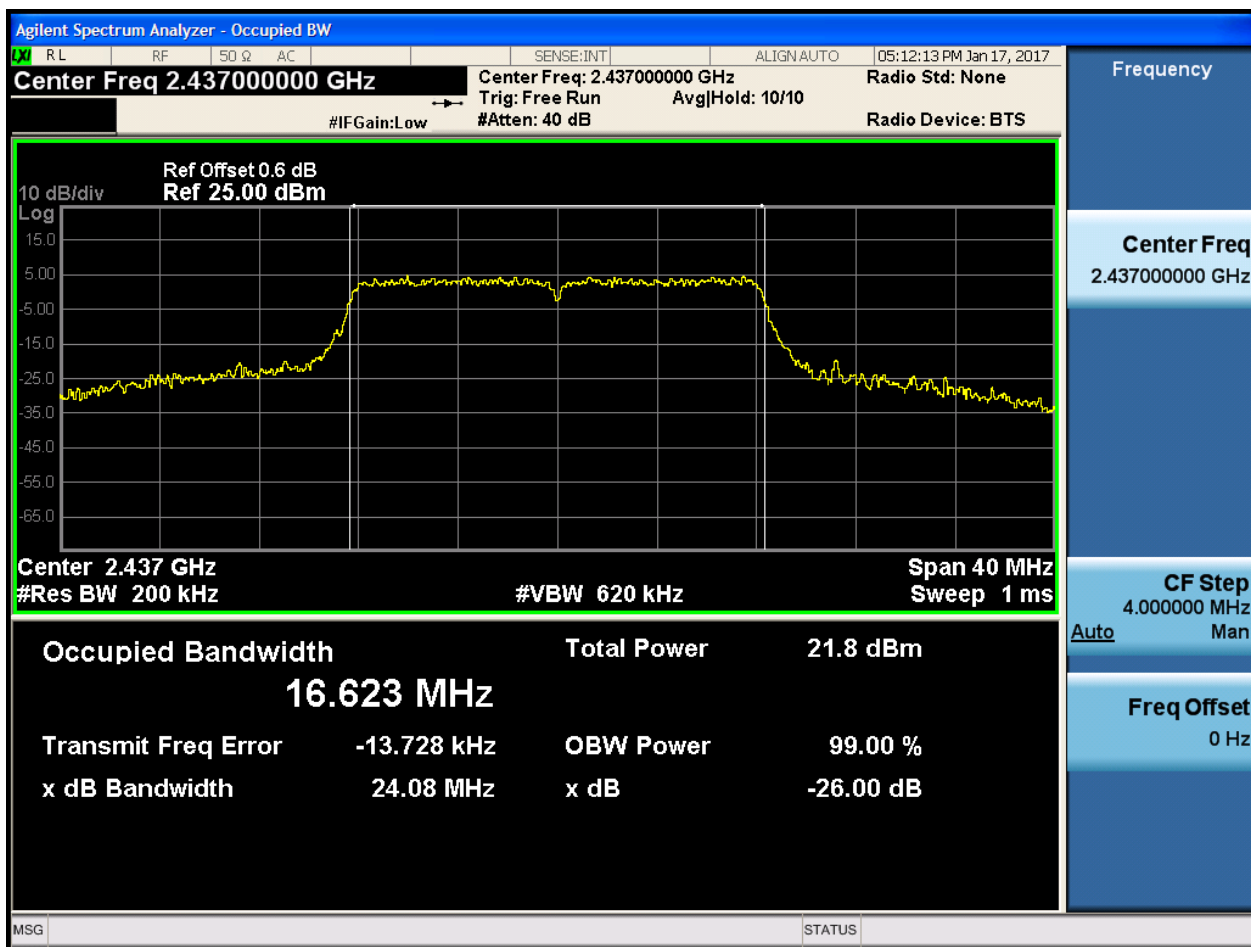


2.4 11G_L@Ant 1



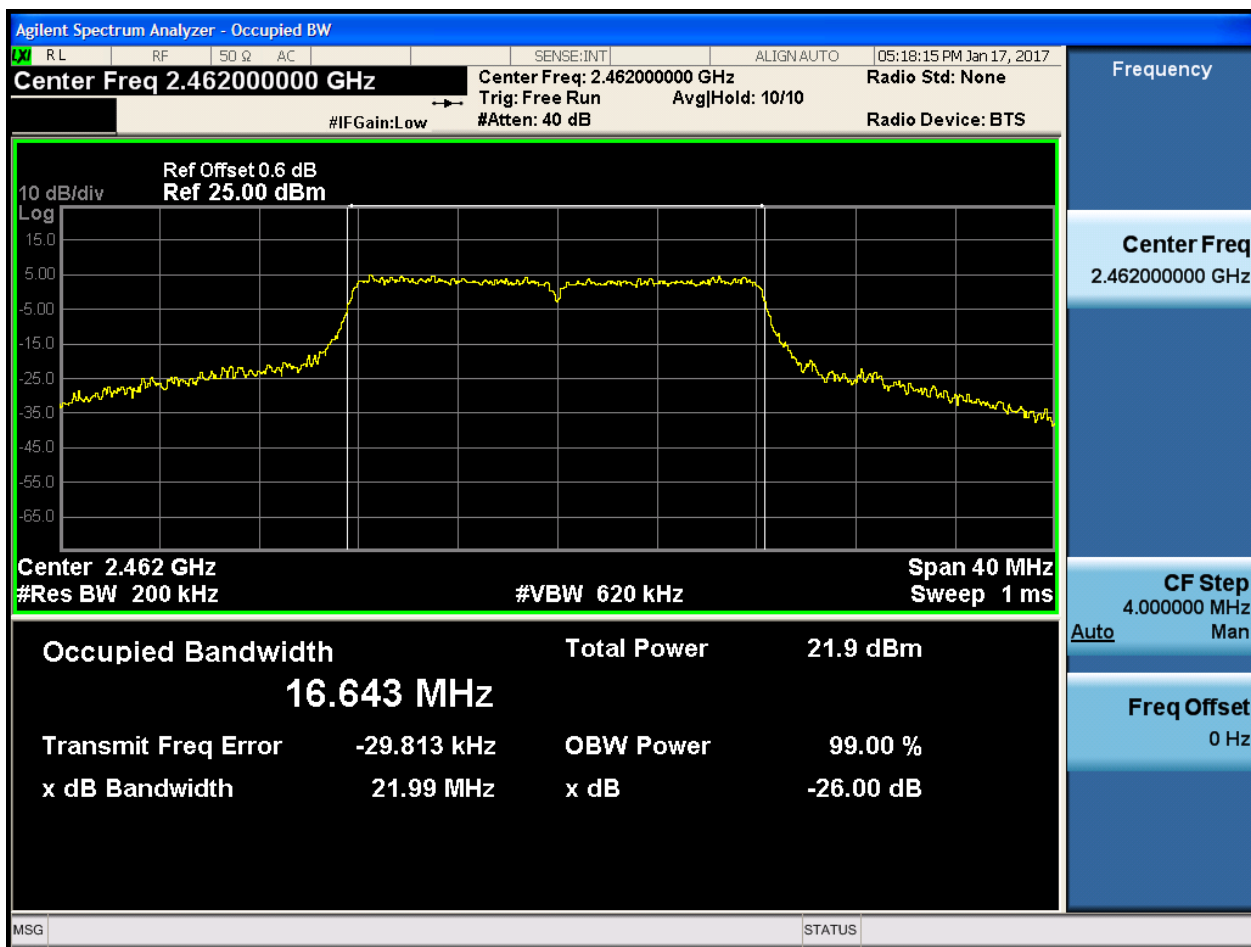


2.5 11G_M@Ant 1



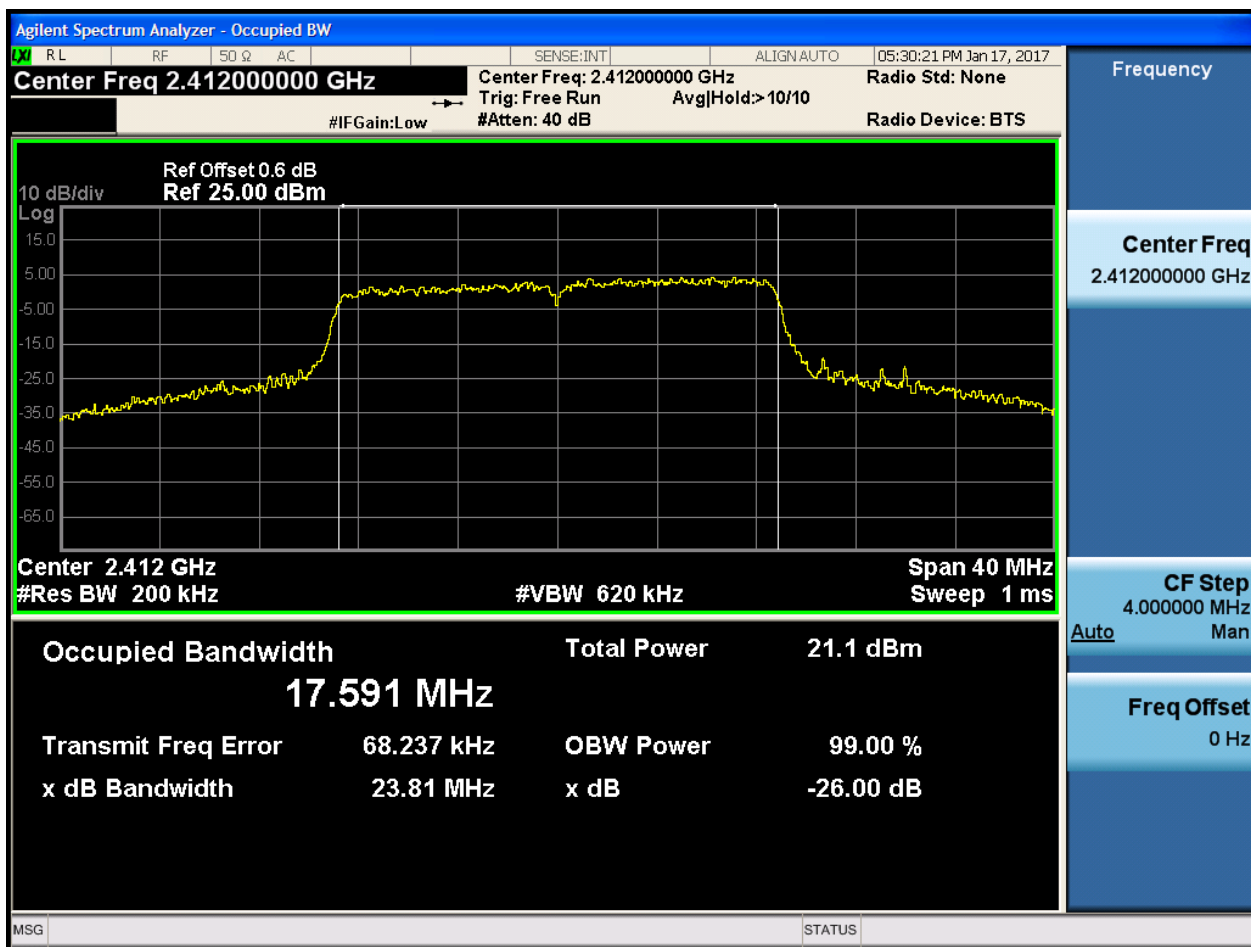


2.6 11G_H@Ant 1



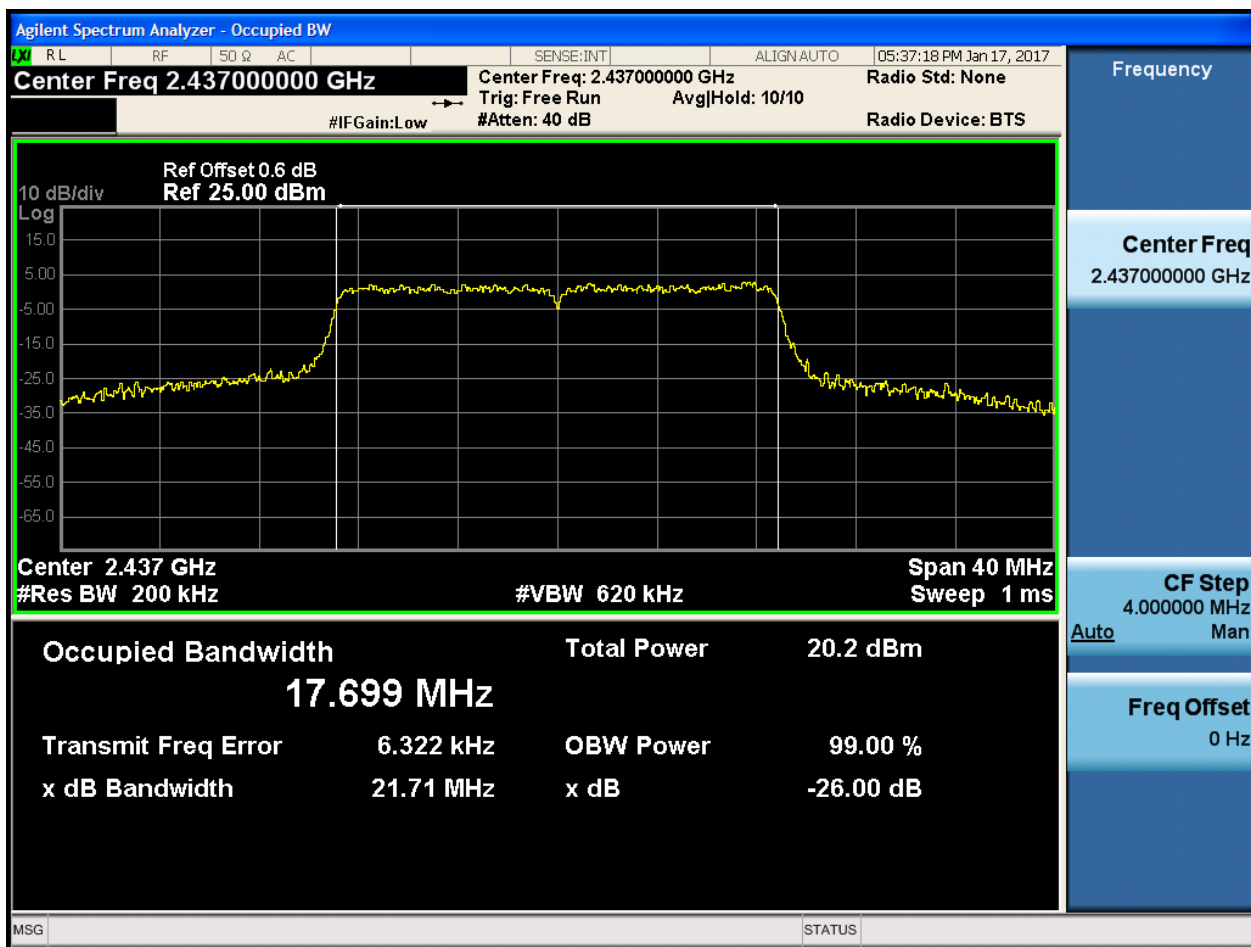


2.7 11N20_L@Ant 1



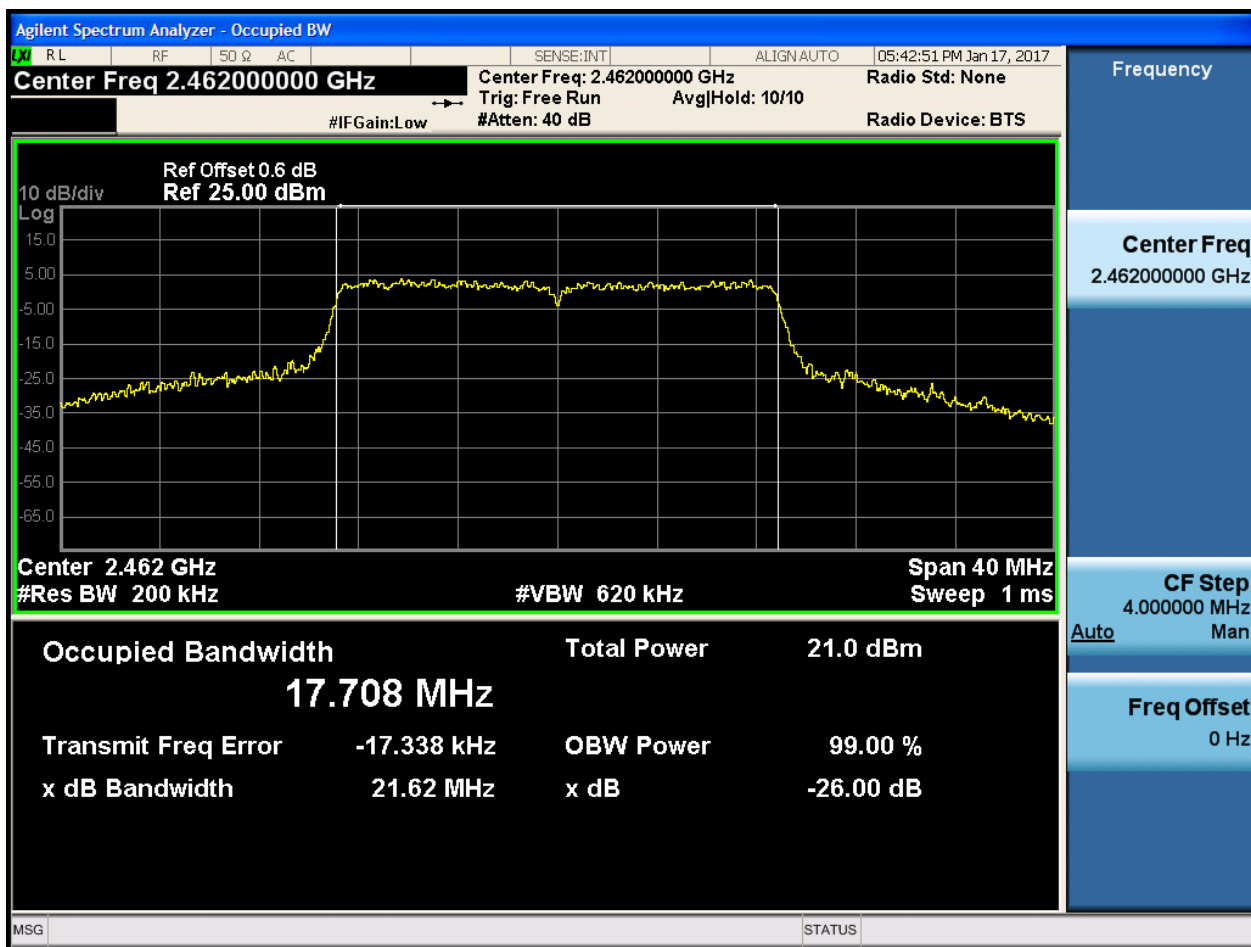


2.8 11N20_M@Ant 1



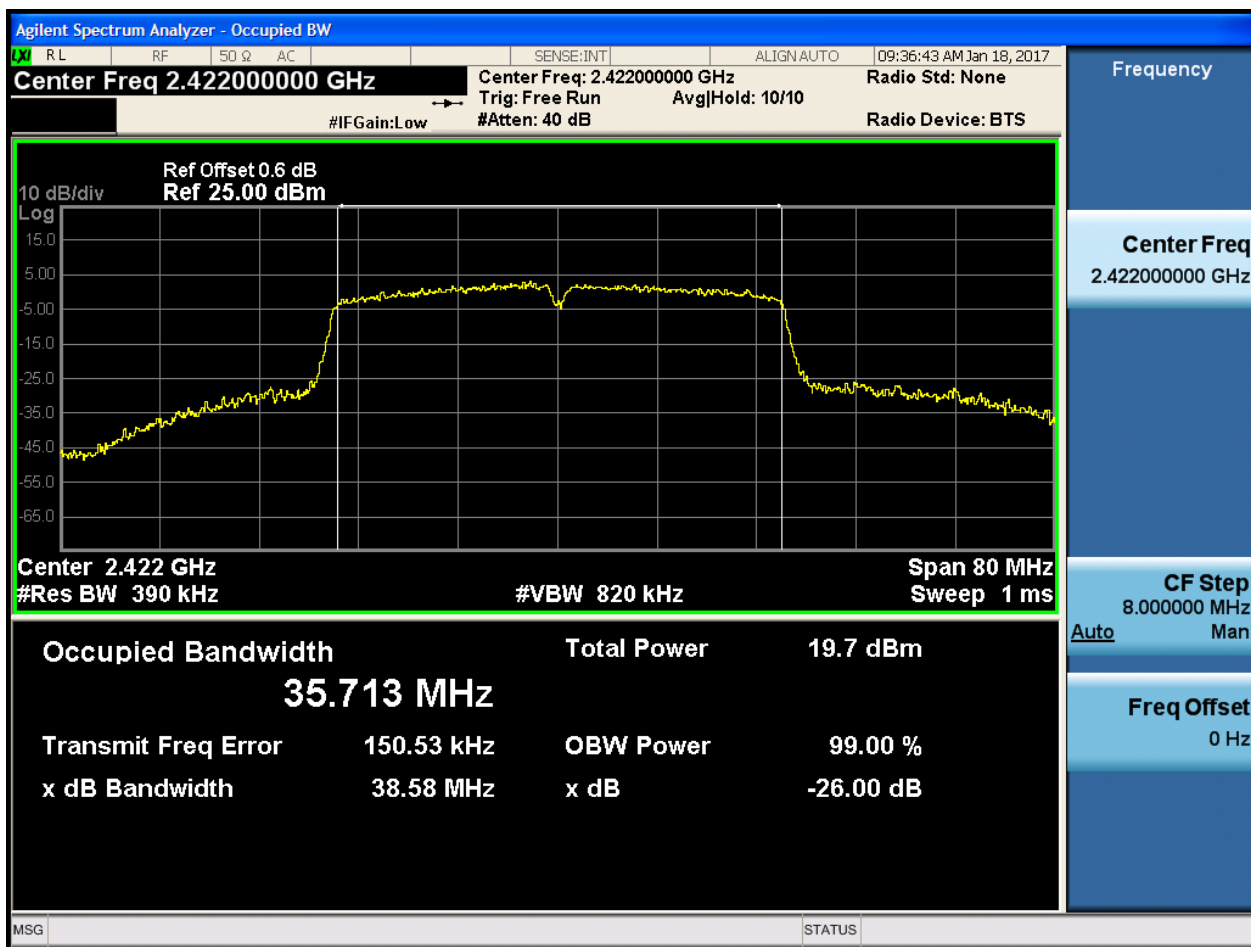


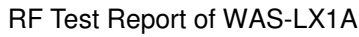
2.9 11N20_H@Ant 1





2.10 11N40_L@Ant 1





Agilent Spectrum Analyzer - Occupied BW

RL RF 50 Ω AC SENSE:INT ALIGN AUTO 09:43:33 AM Jan 18, 2017

Center Freq 2.437000000 GHz Center Freq: 2.437000000 GHz Radio Std: None
 Trig: Free Run Avg/Hold: 10/10
 #IFGain: Low #Atten: 40 dB Radio Device: BTS

Ref Offset 0.6 dB
 Ref 25.00 dBm

10 dB/div
 Log

Center Freq 2.437 GHz Span 80 MHz
 #Res BW 390 kHz #VBW 820 kHz Sweep 1 ms

Occupied Bandwidth		Total Power	
36.031 MHz		21.2 dBm	
Transmit Freq Error	60.091 kHz	OBW Power	99.00 %
x dB Bandwidth	39.41 MHz	x dB	-26.00 dB

Frequency

Center Freq
 2.437000000 GHz

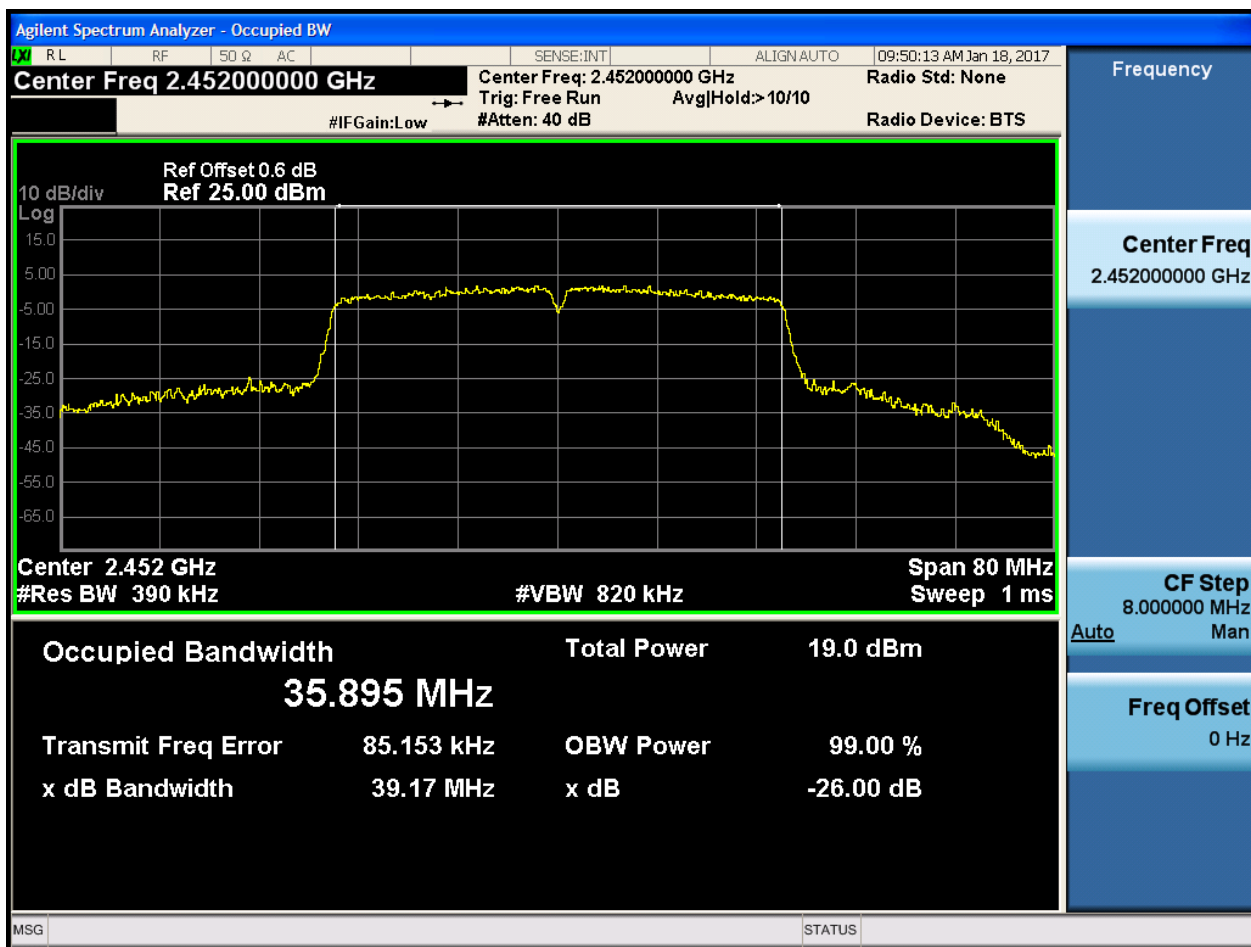
CF Step
 8.000000 MHz
 Auto Man

Freq Offset
 0 Hz

MSG STATUS



2.12 11N40_H@Ant 1



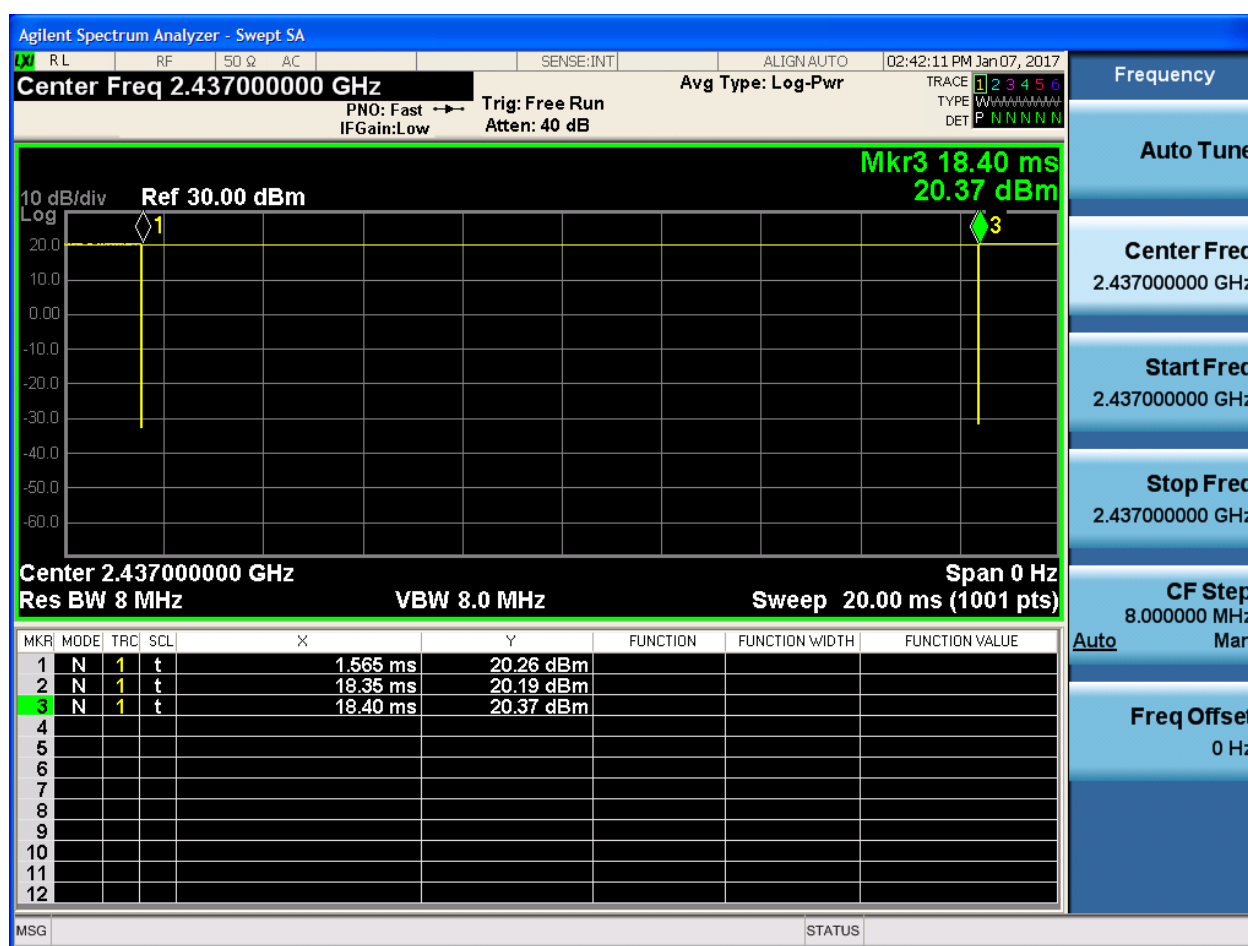
Appendix C: Duty Cycle

Part I - Test Results

Test Mode	TX Freq. [MHz]	Ant	Duty cycle [%]
11B	CH1,CH6,CH11	Ant 1	99.70
11G	CH1,CH6,CH11	Ant 1	98.45
11N20	CH1,CH6,CH11	Ant 1	98.15
11N40	CH3,CH6,CH9	Ant 1	96.50

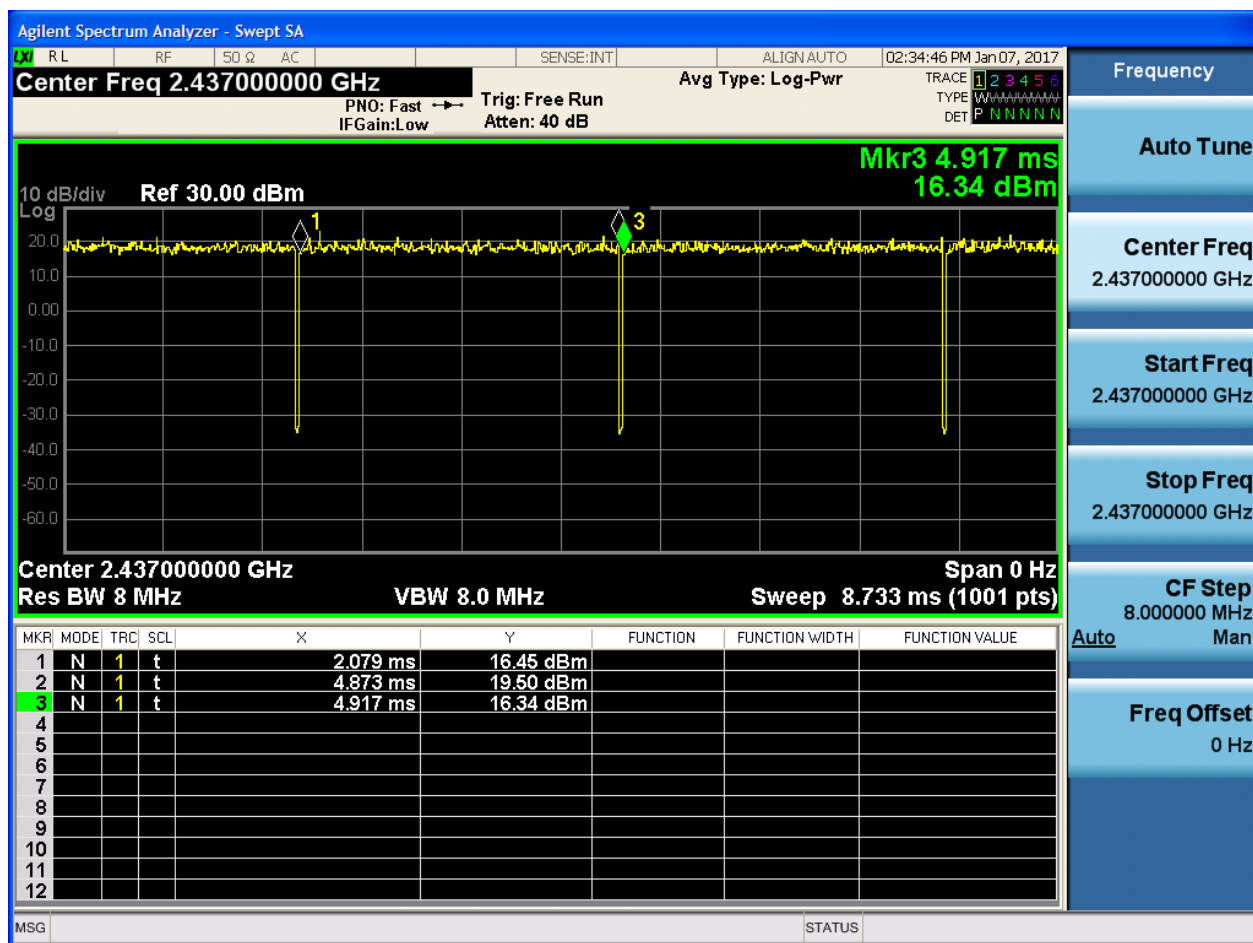
Part II - Test Plots

11B_ANT1



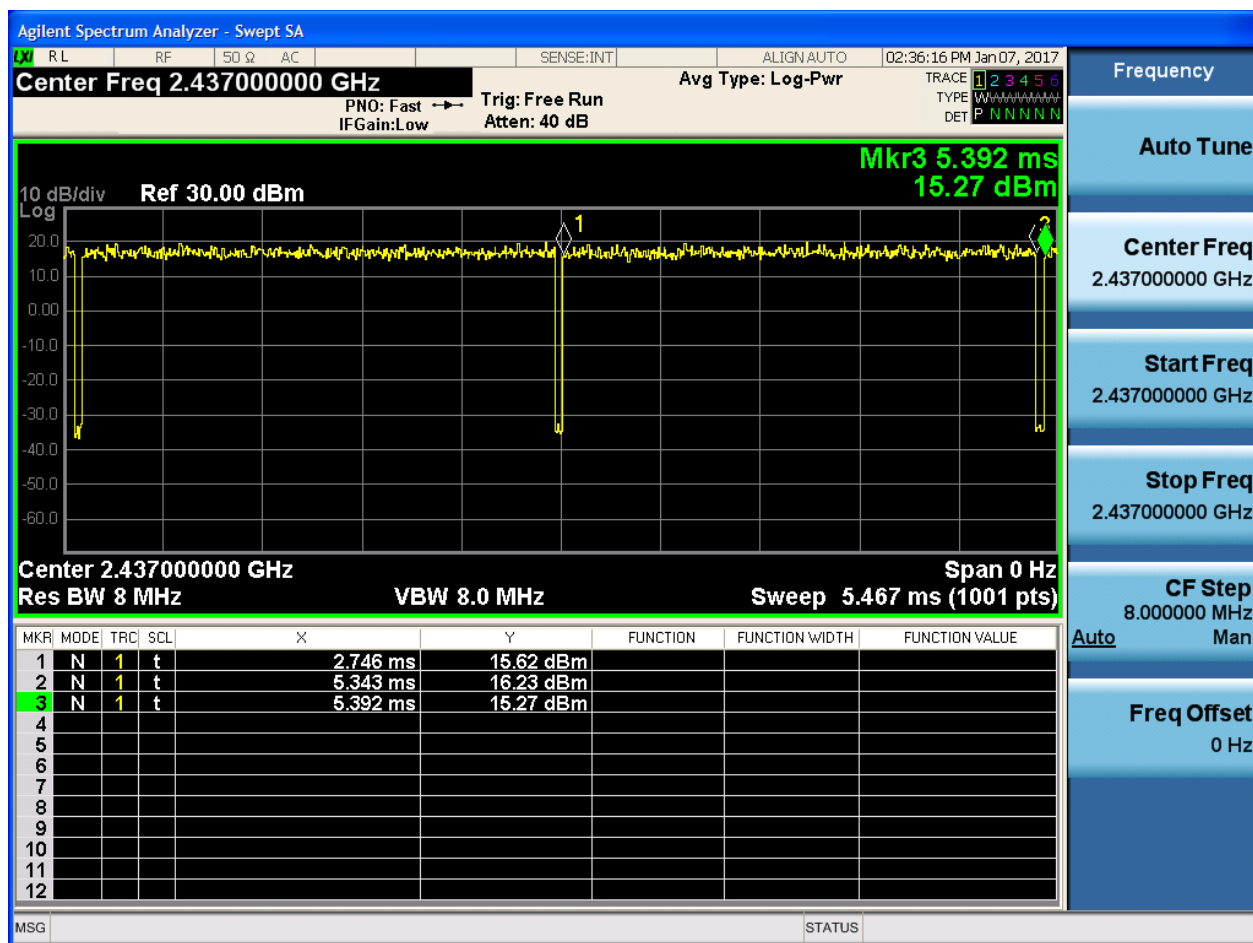


11G_ANT1



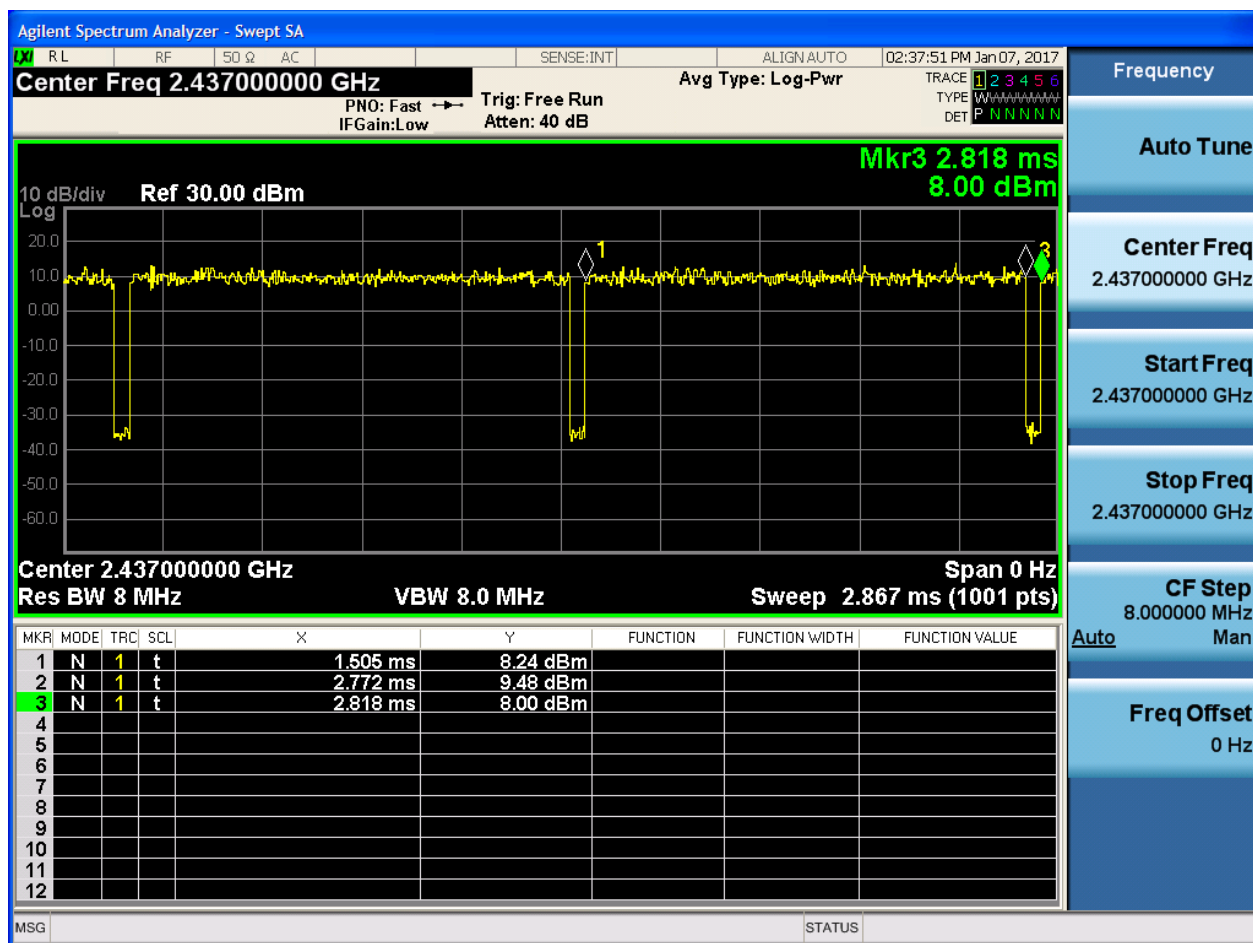


11N20_ANT1





11N40_ANT1



Appendix D: Maximum Conducted Average Output Power

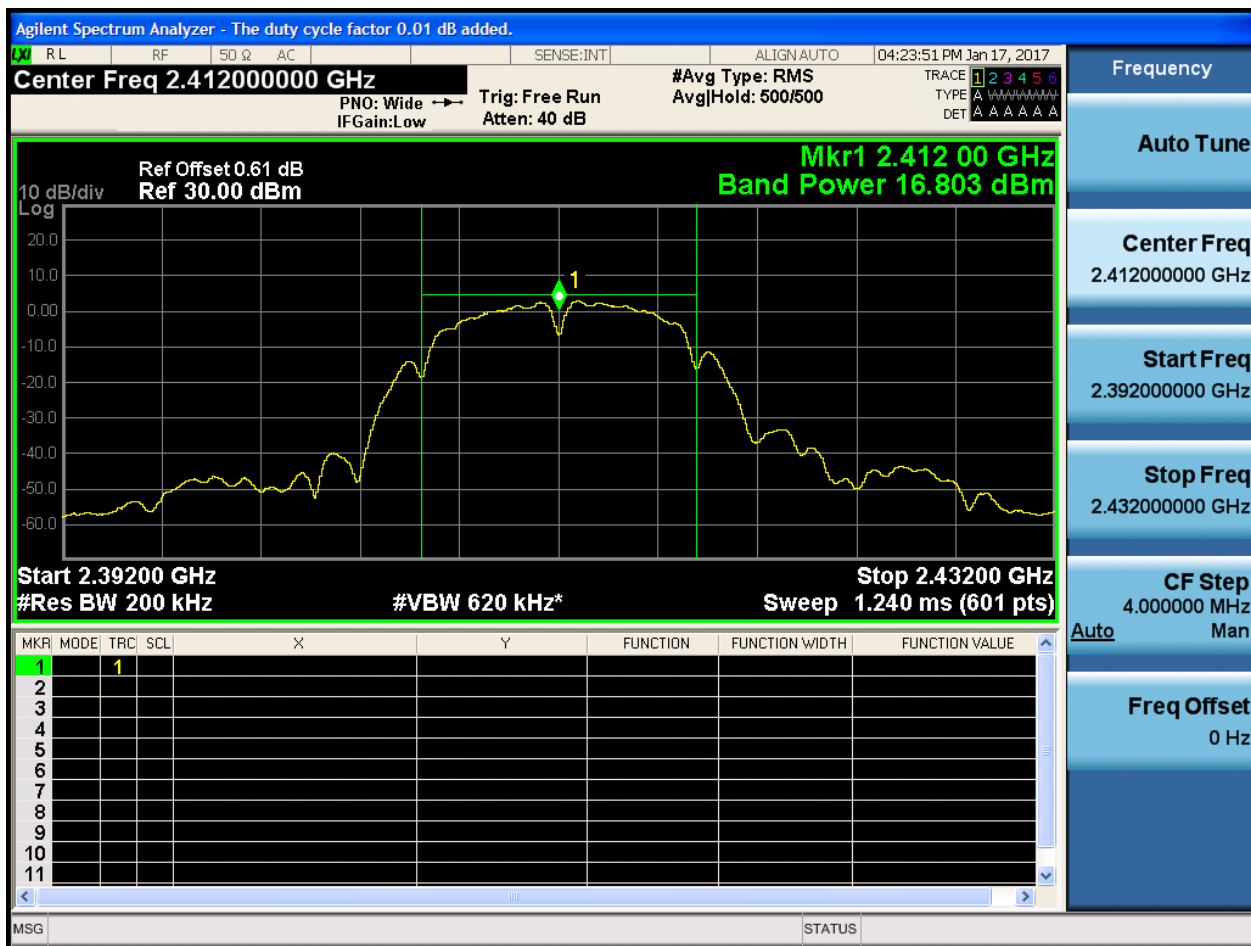
Part I - Test Results

Test Mode	Test Channel	Frequency[MHz]	Ant	Power[dBm]	Verdict
11B	L	2412	Ant 1	16.80	pass
11B	M	2437	Ant 1	15.95	pass
11B	H	2462	Ant 1	16.65	pass
11G	L	2412	Ant 1	15.71	pass
11G	M	2437	Ant 1	14.74	pass
11G	H	2462	Ant 1	14.85	pass
11N20	L	2412	Ant 1	13.87	pass
11N20	M	2437	Ant 1	12.99	pass
11N20	H	2462	Ant 1	13.91	pass
11N40	L	2422	Ant 1	12.53	pass
11N40	M	2437	Ant 1	14.02	pass
11N40	H	2452	Ant 1	11.90	pass



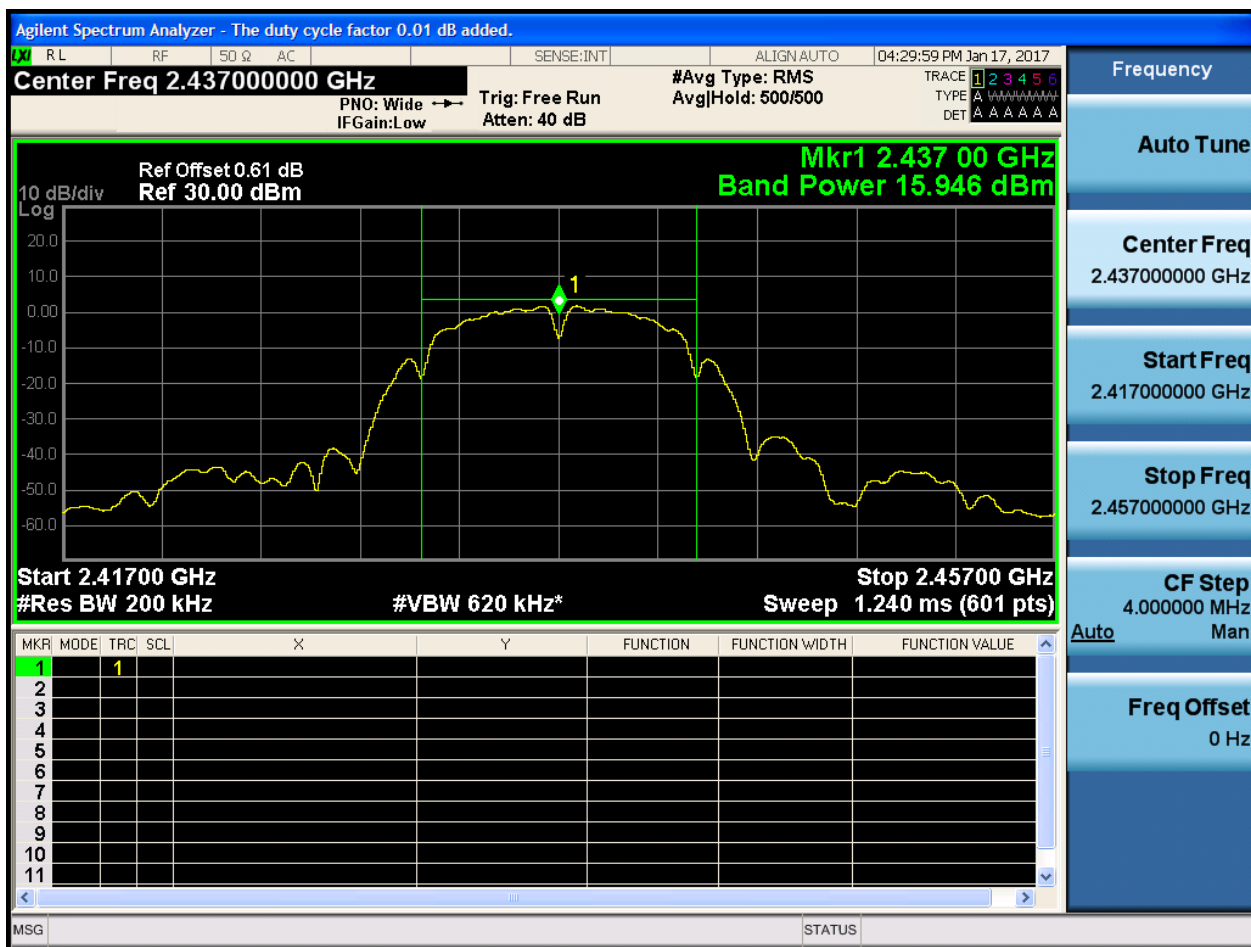
Part II - Test Plots

3.1 11B_L@Ant 1



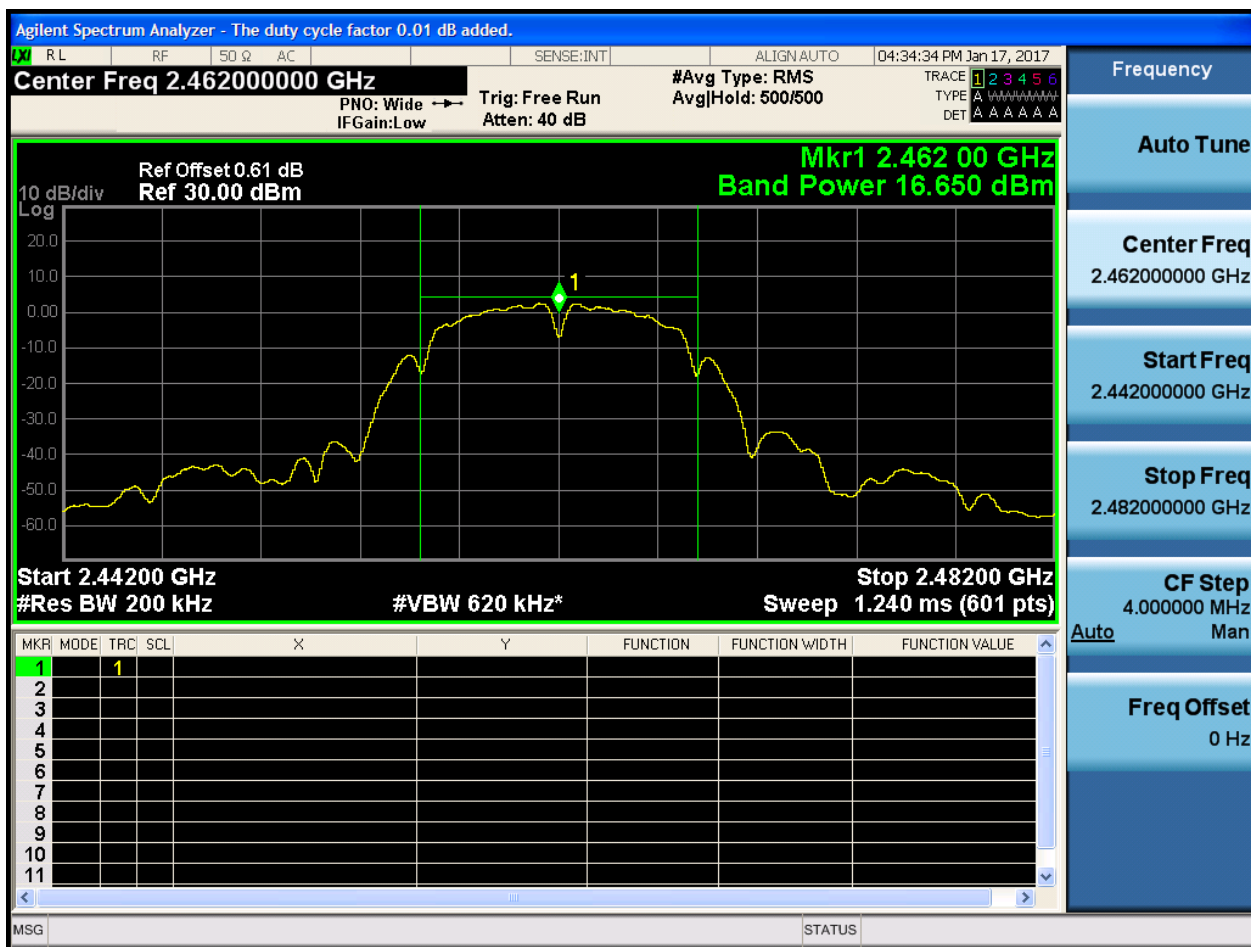


3.2 11B_M@Ant 1



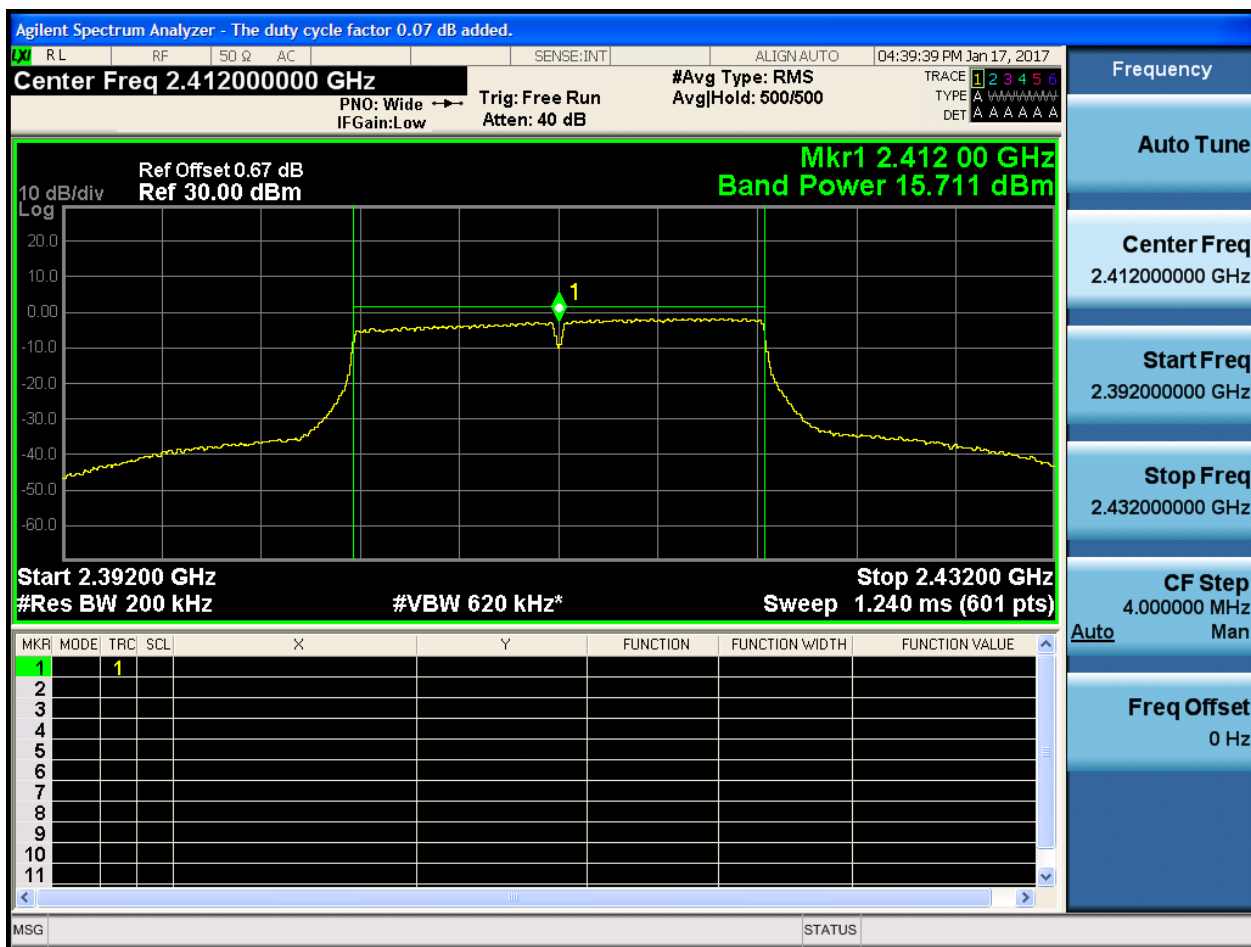


3.3 11B_H@Ant 1



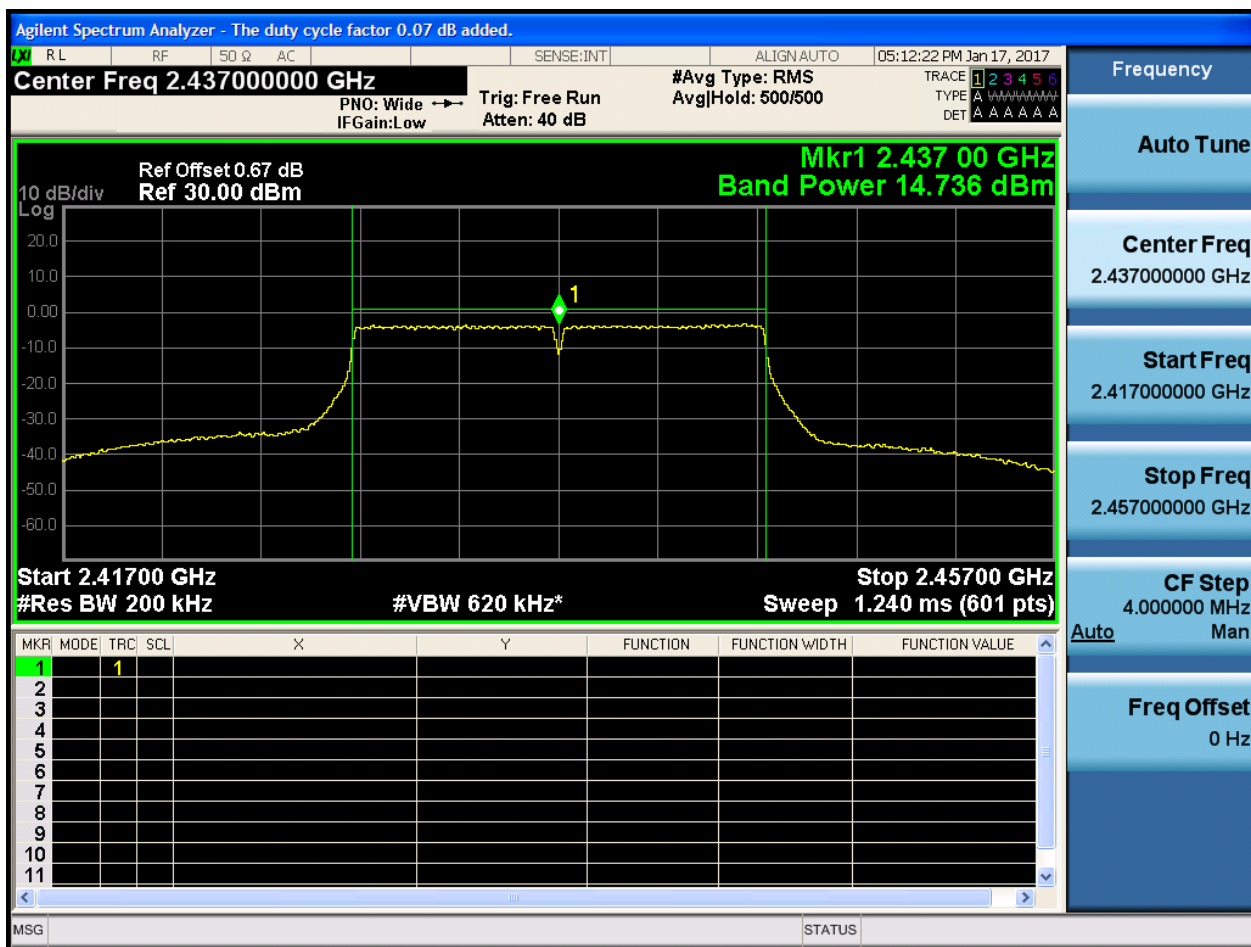


3.4 11G_L@Ant 1



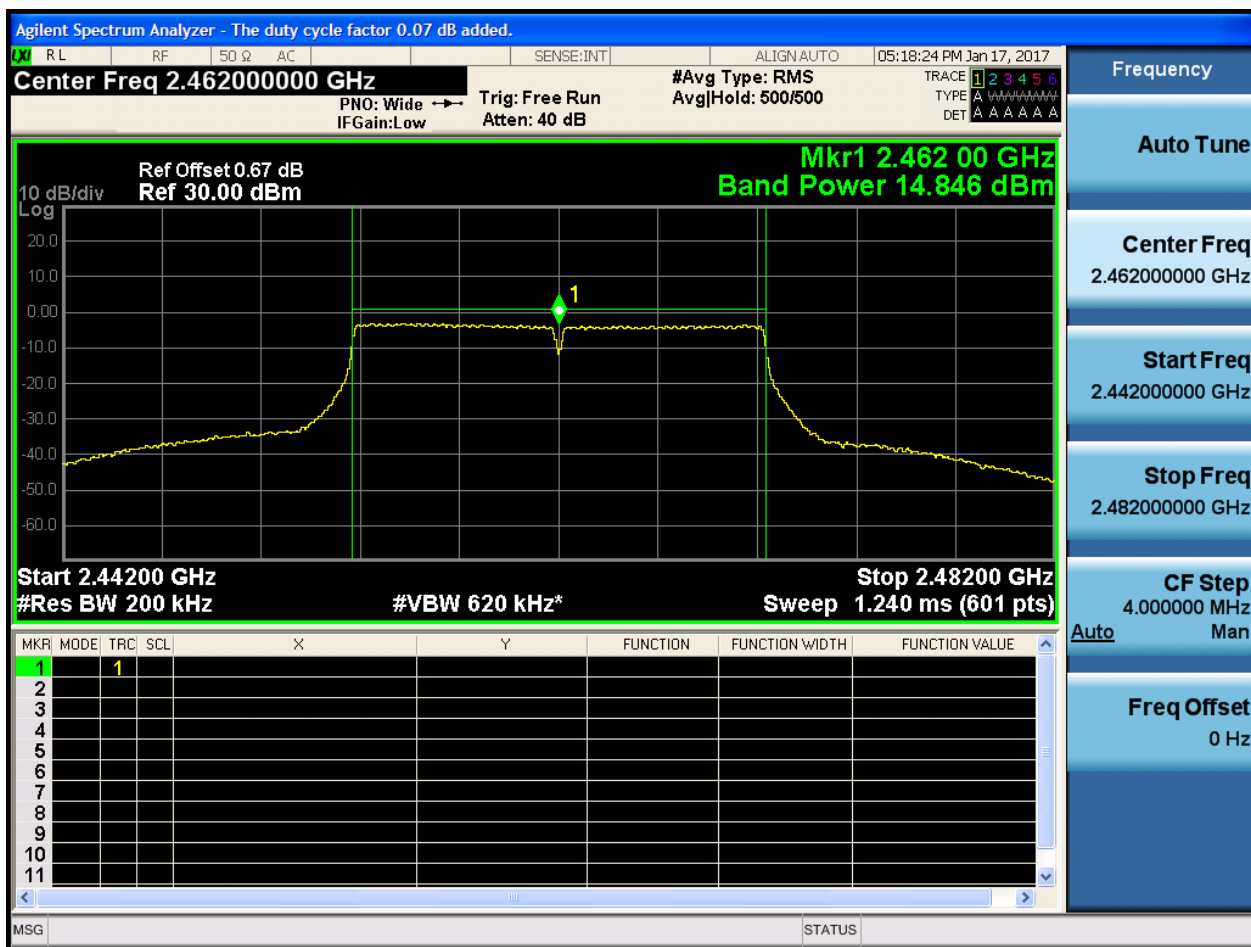


3.5 11G_M@Ant 1



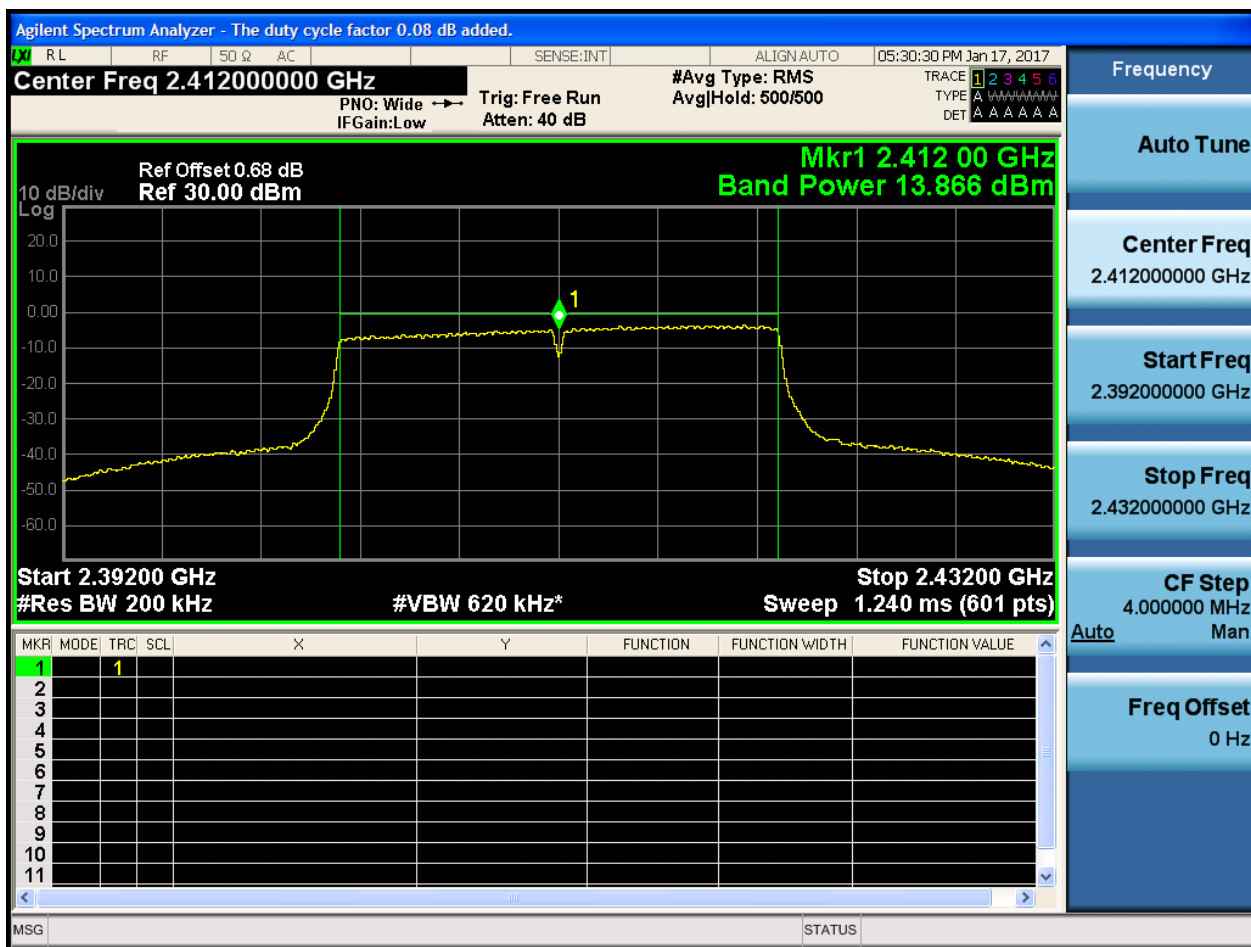


3.6 11G_H@Ant 1



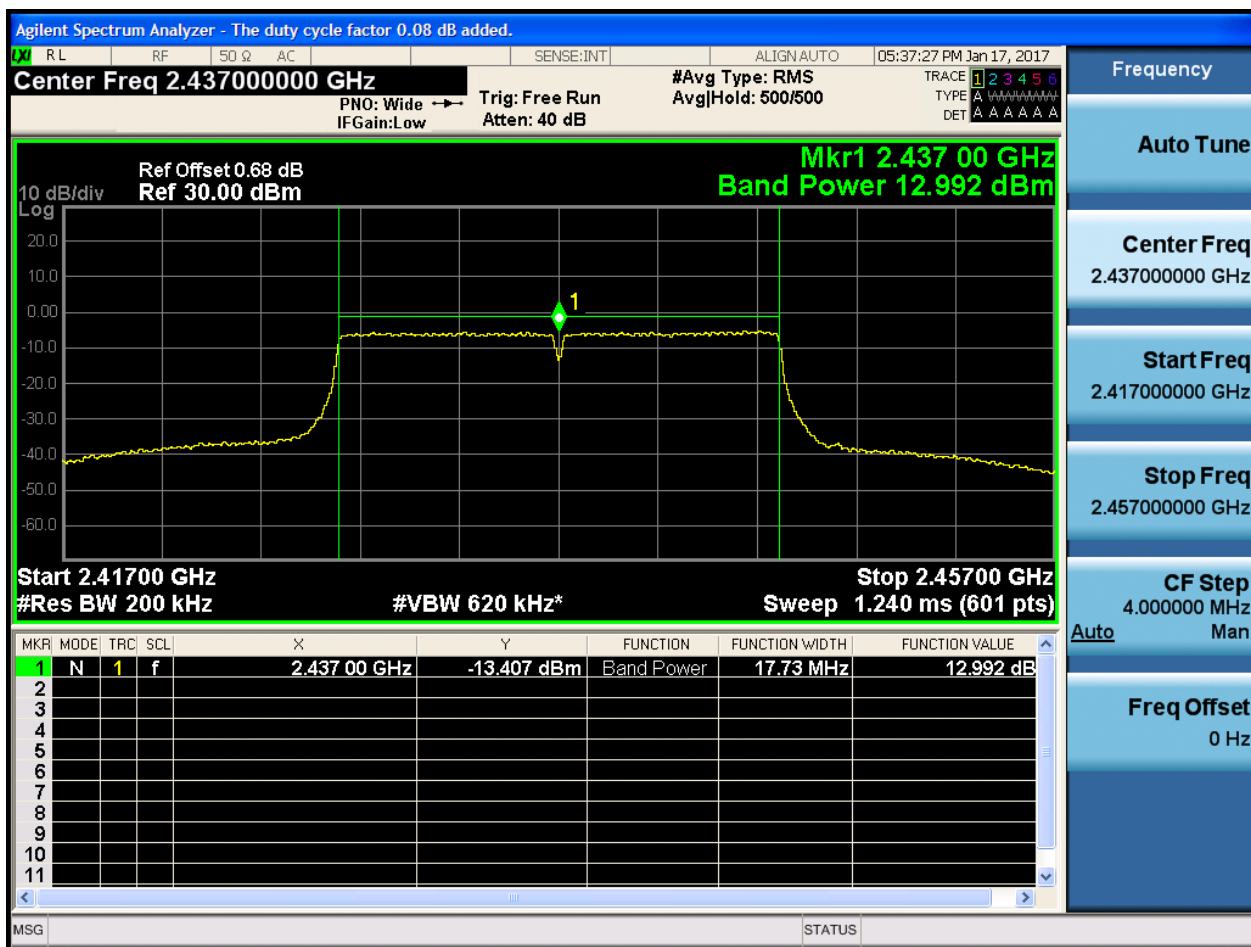


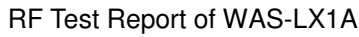
3.7 11N20_L@Ant 1





3.8 11N20_M@Ant 1





Agilent Spectrum Analyzer - The duty cycle factor 0.08 dB added.

Center Freq 2.46200000 GHz

#Avg Type: RMS
Avg|Hold: 500/500

Ref Offset 0.68 dB
Ref 30.00 dBm

Mkr1 2.462 00 GHz
Band Power 13.905 dBm

Start 2.44200 GHz
#Res BW 200 kHz

Stop 2.48200 GHz
Sweep 1.240 ms (601 pts)

MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N	1	f	2.462 00 GHz	-12.949 dBm	Band Power	17.73 MHz	13.905 dB
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								

Frequency

Auto Tune

Center Freq
2.46200000 GHz

Start Freq
2.44200000 GHz

Stop Freq
2.48200000 GHz

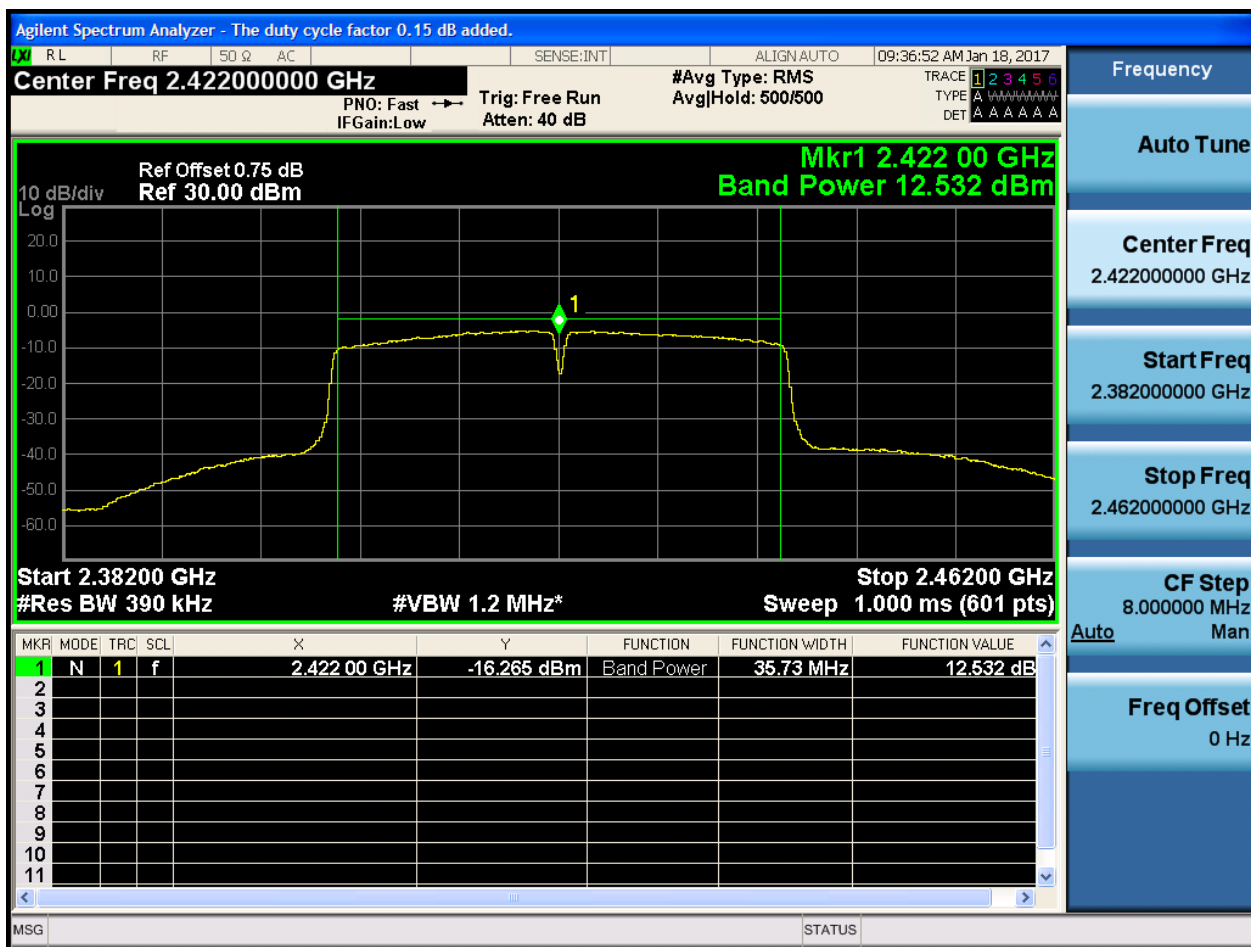
CF Step
4.000000 MHz

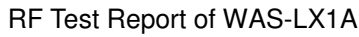
Auto

Freq Offset
0 Hz



3.10 11N40_L@Ant 1





Agilent Spectrum Analyzer - The duty cycle factor 0.15 dB added.

Center Freq 2.437000000 GHz

#Avg Type: RMS
Avg|Hold: 500/500

Ref Offset 0.75 dB
Ref 30.00 dBm

Mkr1 2.437 00 GHz
Band Power 14.018 dBm

Start 2.39700 GHz
#Res BW 390 kHz

Stop 2.47700 GHz
Sweep 1.000 ms (601 pts)

#VBW 1.2 MHz*

MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N	1	f	2.437 00 GHz	-16.339 dBm	Band Power	36.27 MHz	14.018 dB
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								

Frequency

Auto Tune

Center Freq
2.437000000 GHz

Start Freq
2.397000000 GHz

Stop Freq
2.477000000 GHz

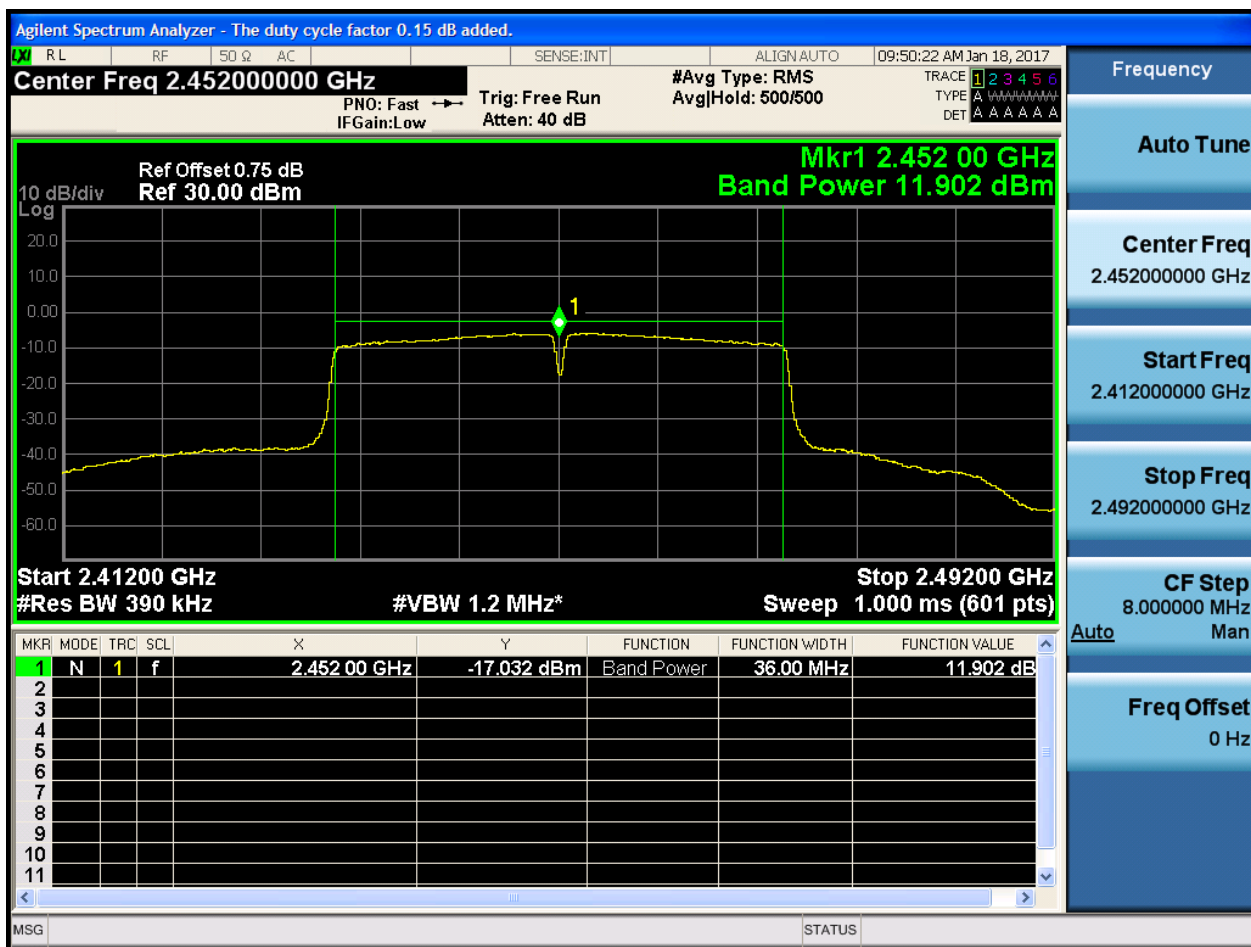
CF Step
8.000000 MHz

Auto

Freq Offset
0 Hz



3.12 11N40_H@Ant 1



Appendix E: Maximum Power Spectral Density Level

Part I - Test Results

Test Mode	Test Channel	Frequency[MHz]	Ant	PD[MHz]	Verdict
11B	L	2412	Ant 1	-10.13	pass
11B	M	2437	Ant 1	-10.98	pass
11B	H	2462	Ant 1	-10.36	pass
11G	L	2412	Ant 1	-13.56	pass
11G	M	2437	Ant 1	-15.23	pass
11G	H	2462	Ant 1	-14.93	pass
11N20	L	2412	Ant 1	-15.34	pass
11N20	M	2437	Ant 1	-16.92	pass
11N20	H	2462	Ant 1	-15.99	pass
11N40	L	2422	Ant 1	-20.21	pass
11N40	M	2437	Ant 1	-19.17	pass
11N40	H	2452	Ant 1	-20.69	pass

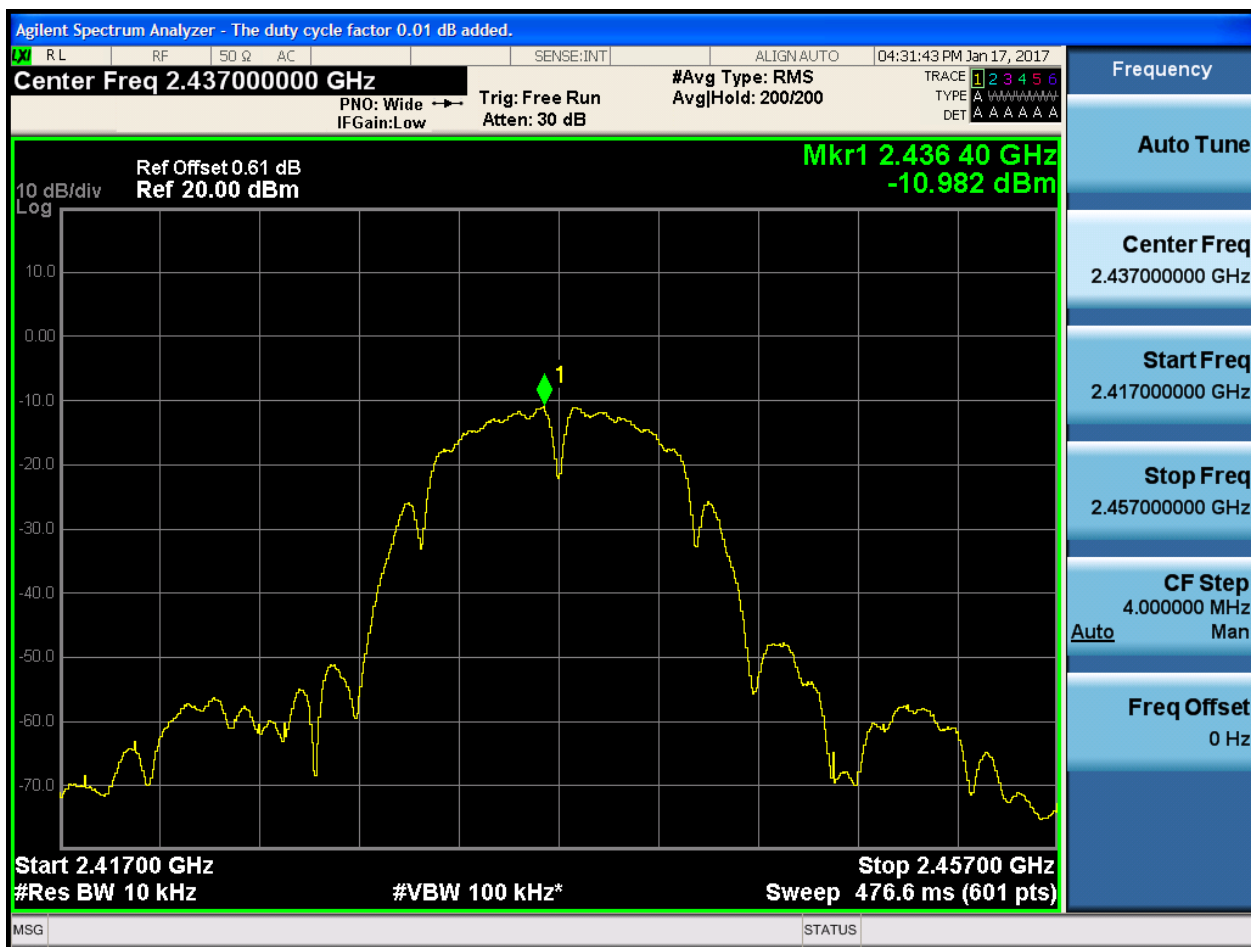
Part II - Test Plots

4.1 11B_L@Ant 1



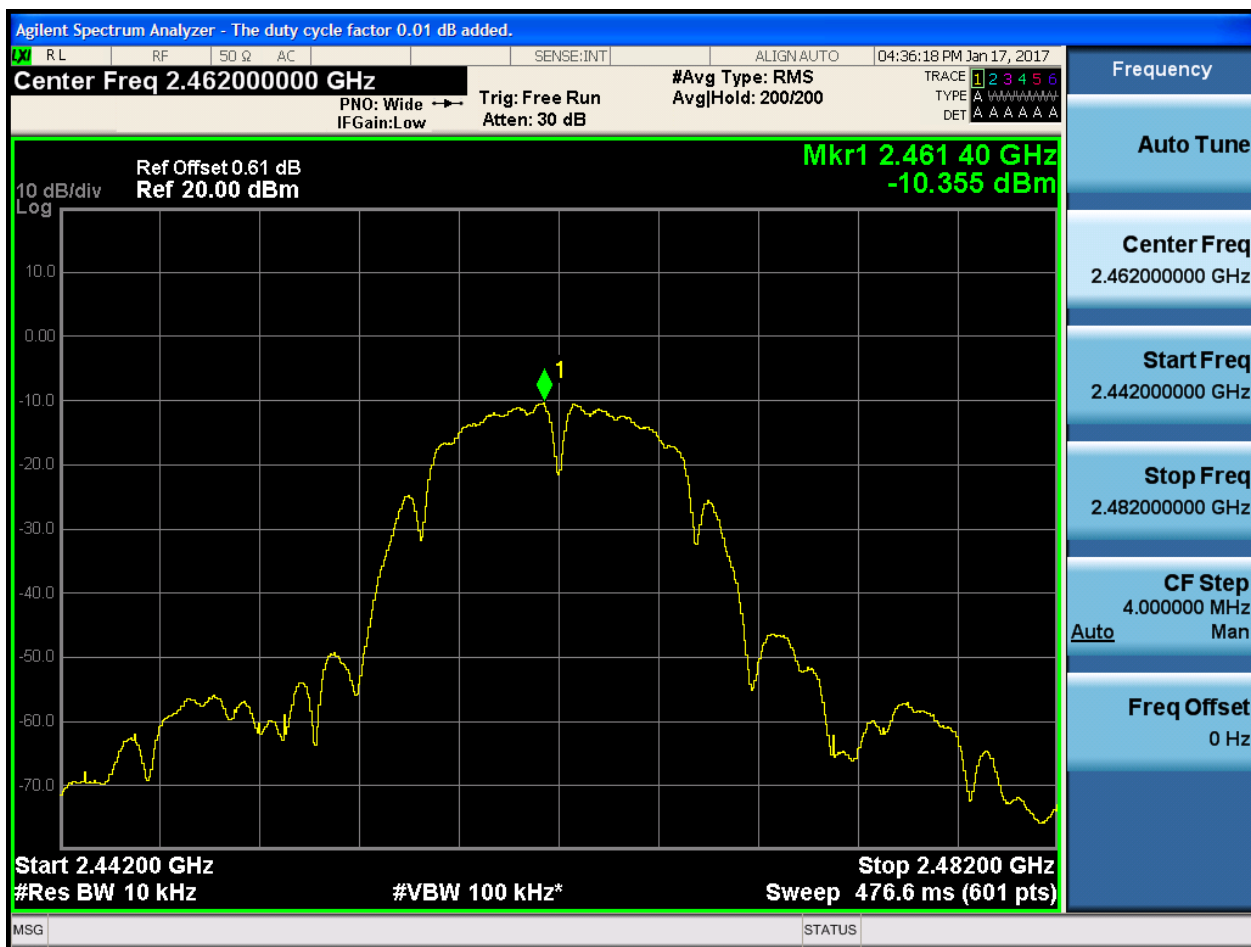


4.2 11B_M@Ant 1



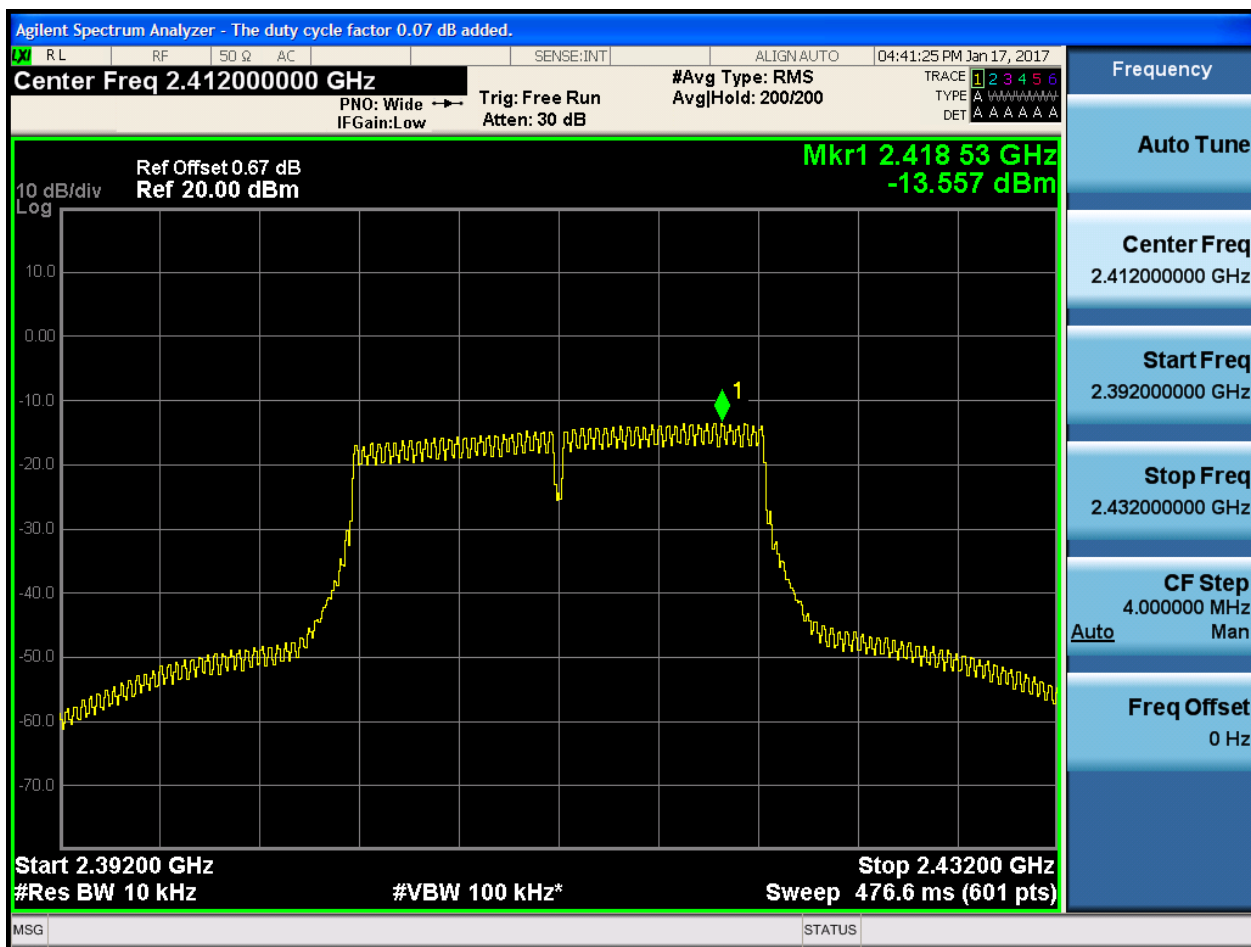


4.3 11B_H@Ant 1



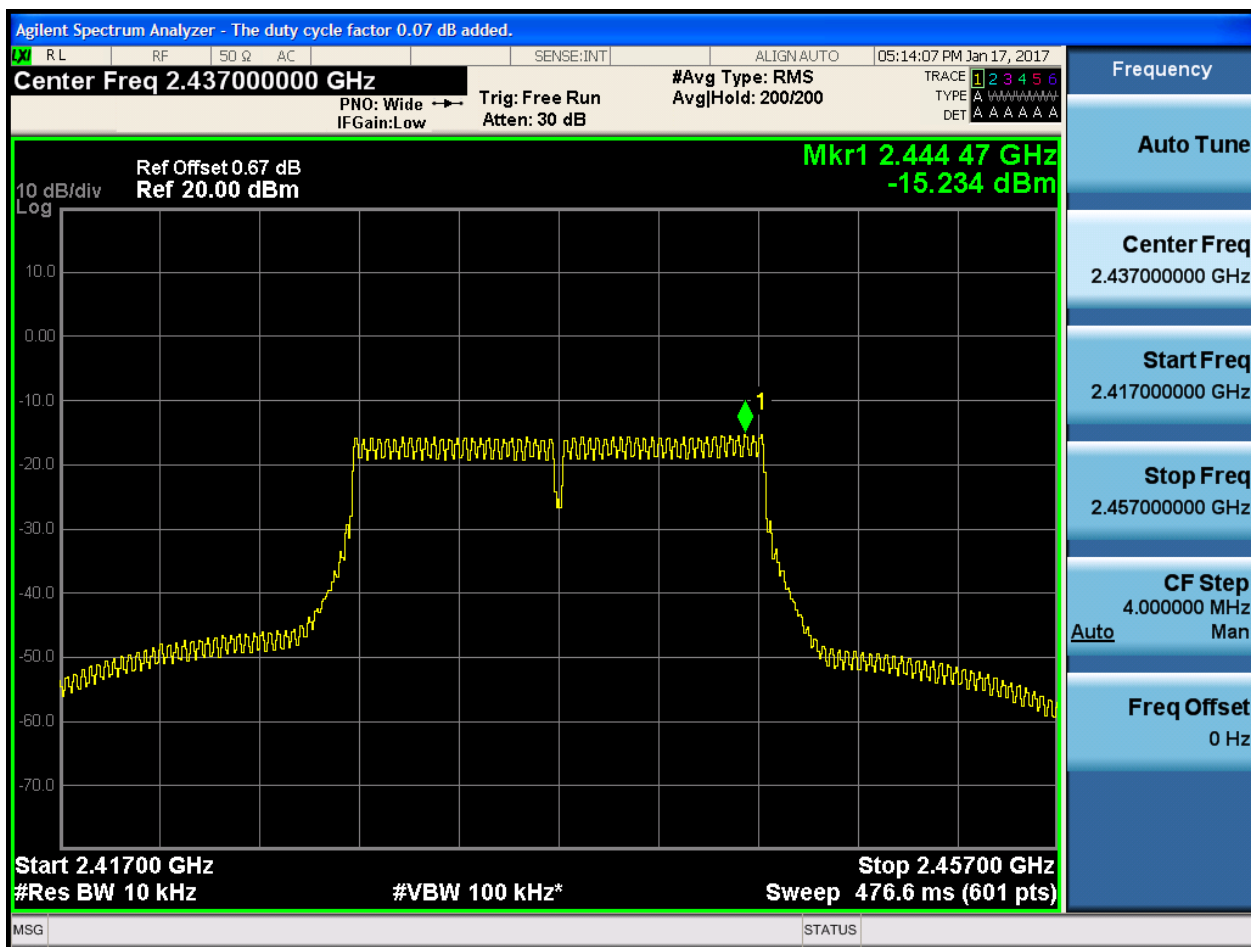


4.4 11G_L@Ant 1



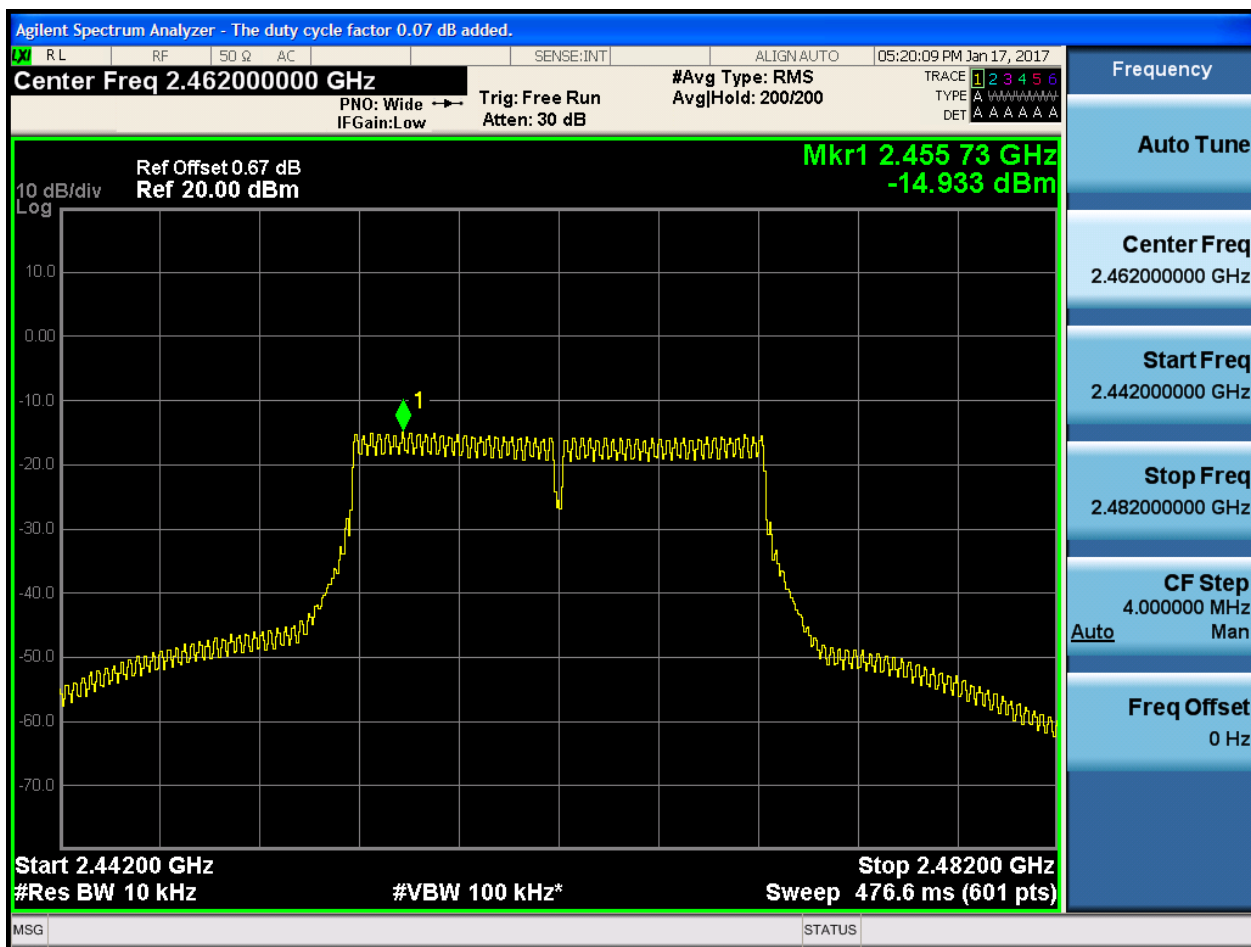


4.5 11G_M@Ant 1



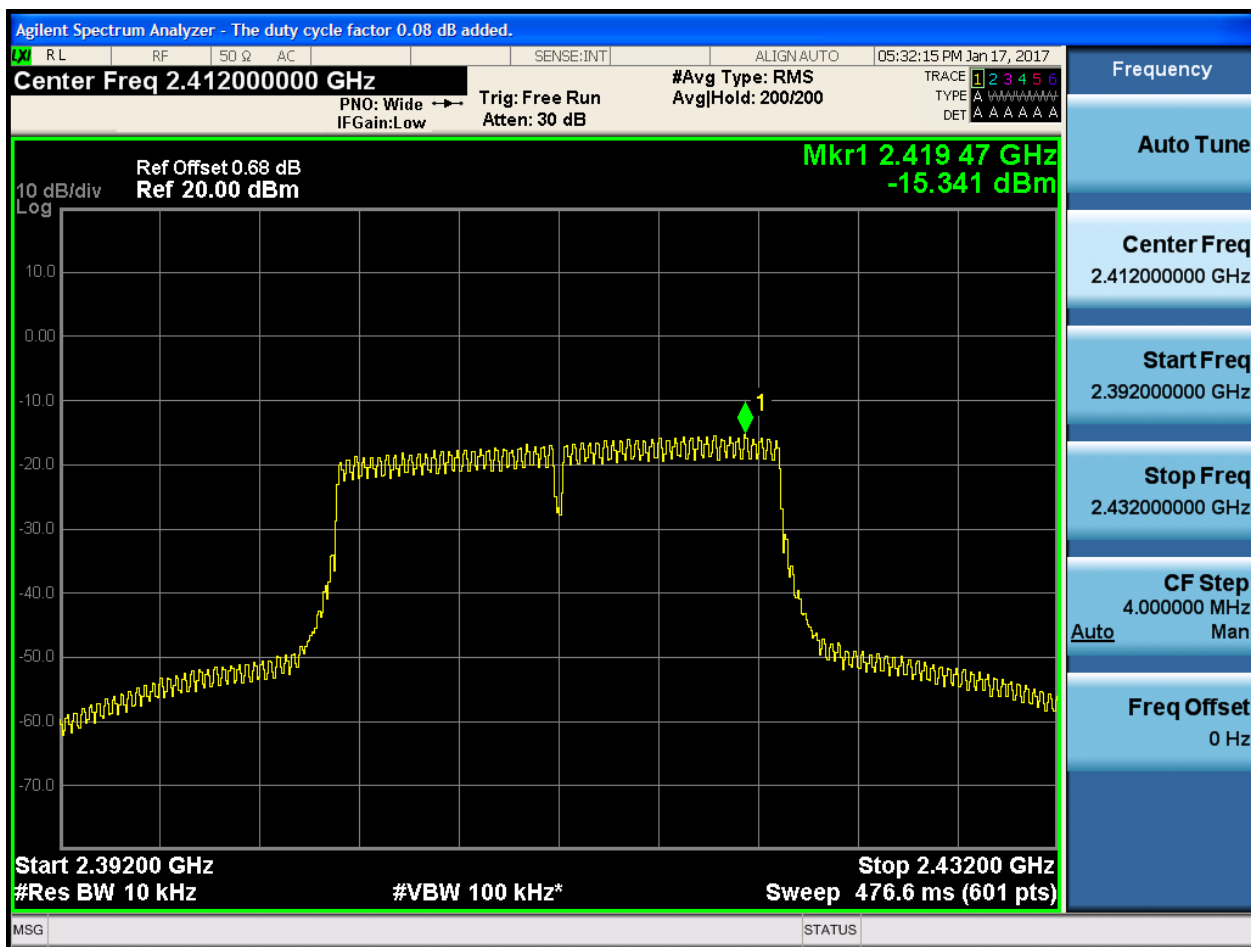


4.6 11G_H@Ant 1



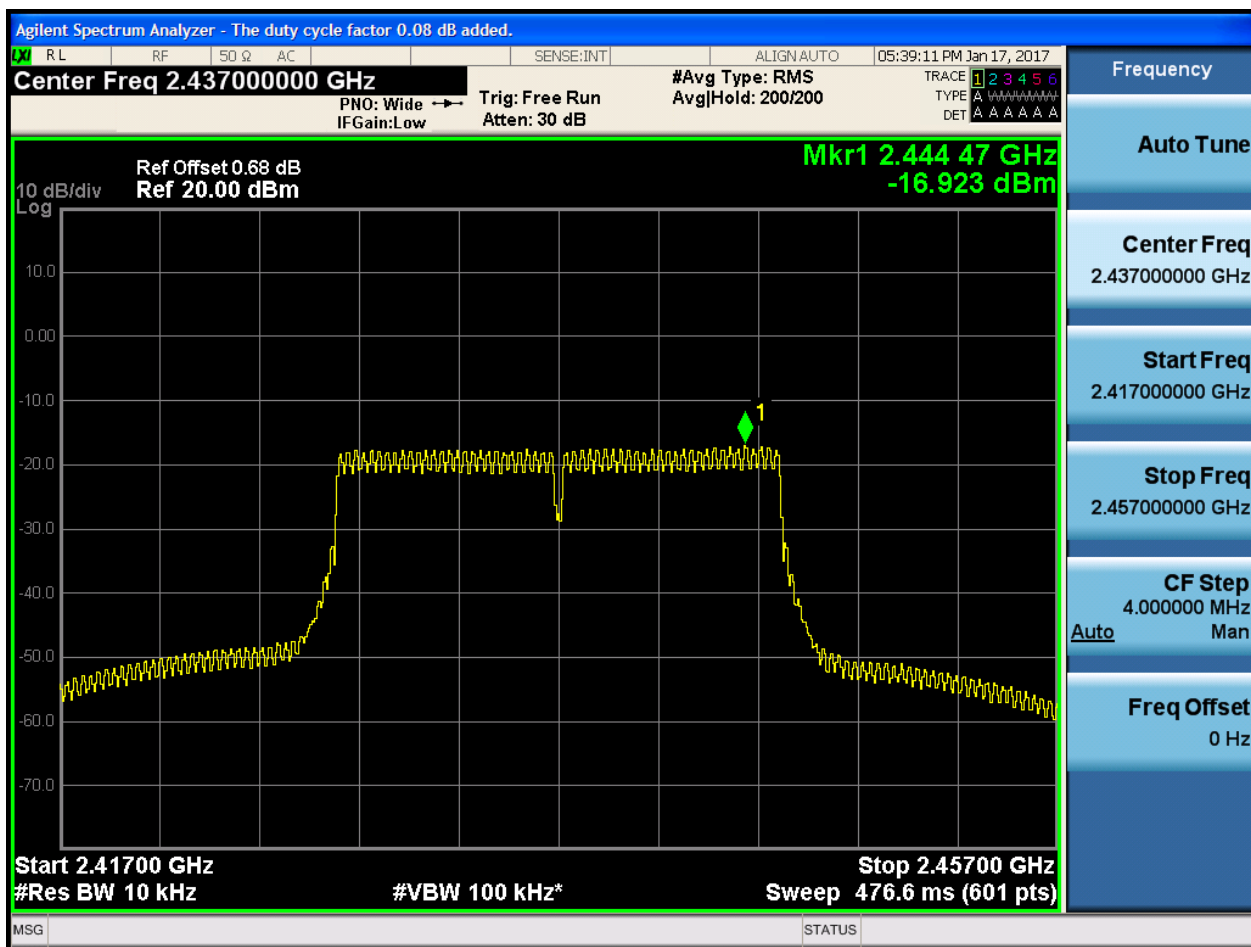


4.7 11N20_L@Ant 1



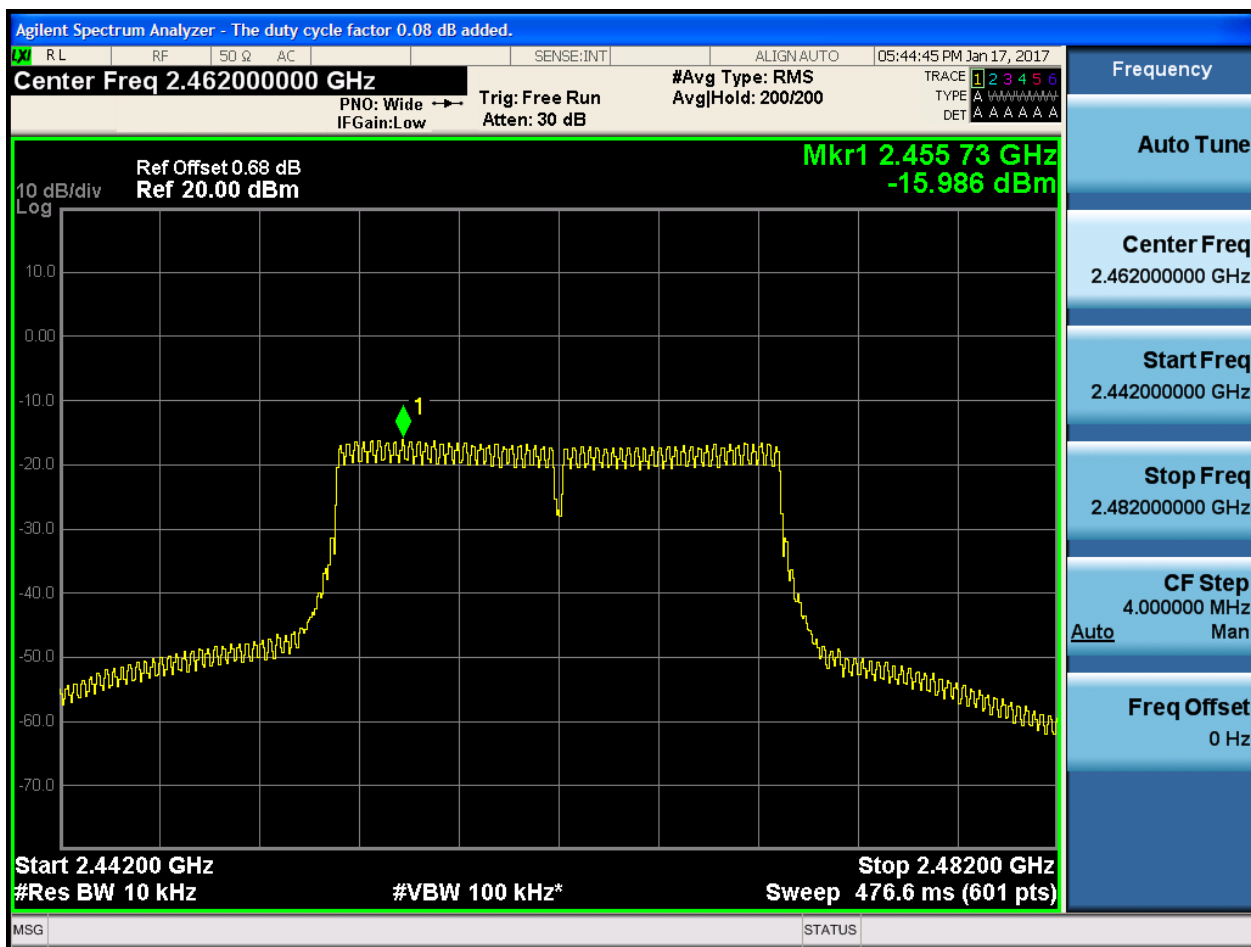


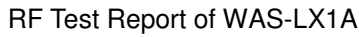
4.8 11N20_M@Ant 1





4.9 11N20_H@Ant 1





Agilent Spectrum Analyzer - The duty cycle factor 0.15 dB added.

Center Freq 2.422000000 GHz

#Avg Type: RMS
Avg|Hold: 200/200

Ref Offset 0.75 dB
Ref 20.00 dBm

Mkr1 2.419 47 GHz
-20.211 dBm

Start 2.38200 GHz
#Res BW 10 kHz

Stop 2.46200 GHz
Sweep 953.3 ms (601 pts)

#VBW 100 kHz*

10 dB/div
Log

1

Start Freq 2.382000000 GHz

Stop Freq 2.462000000 GHz

CF Step 8.000000 MHz
Auto Man

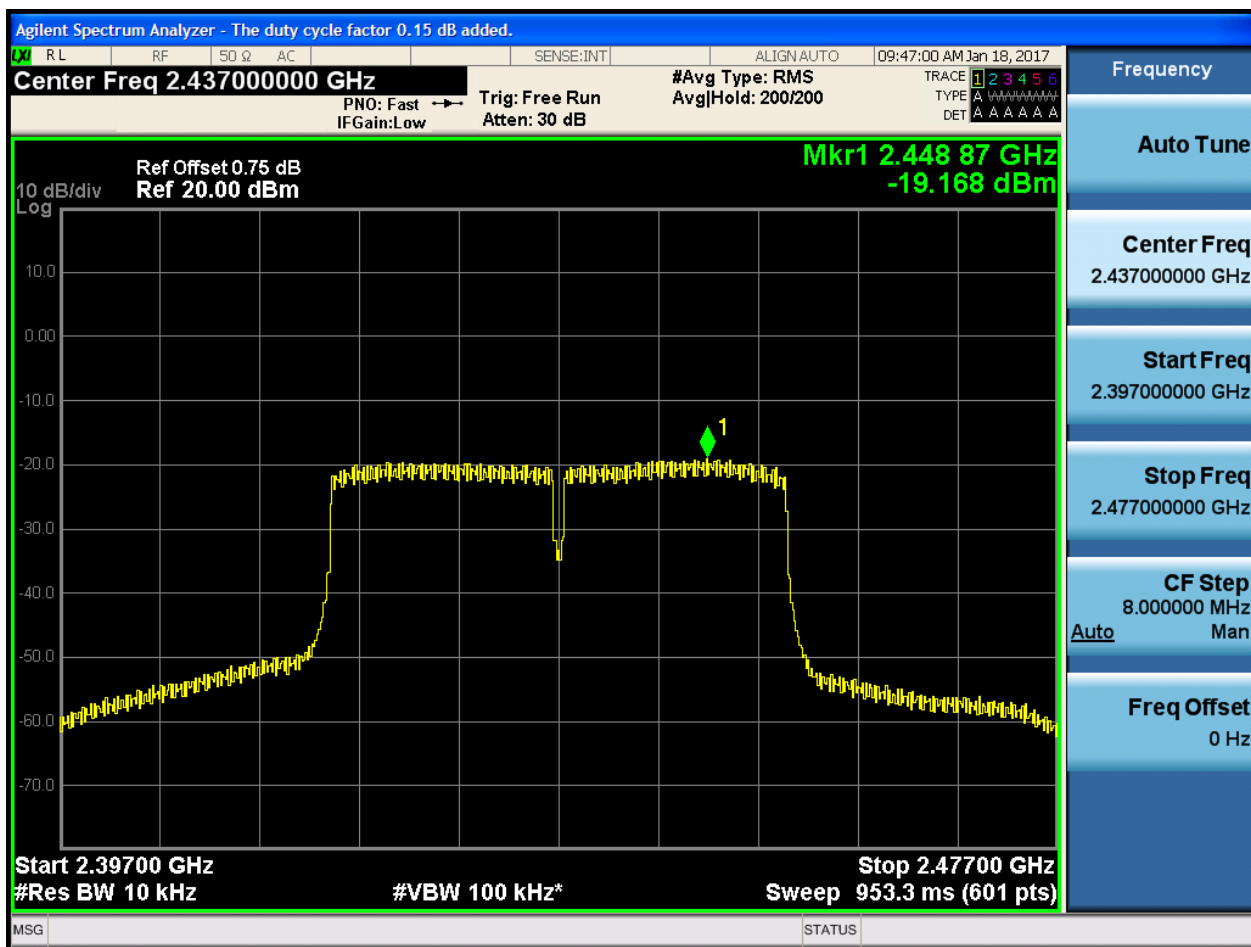
Freq Offset 0 Hz

MSG STATUS

The image shows a screenshot of an Agilent Spectrum Analyzer. The main display area shows a signal spectrum with a peak at 2.41947 GHz, marked with a yellow diamond and the number 1. The y-axis is labeled '10 dB/div Log' and ranges from -70.0 to 10.0. The x-axis is labeled 'Start 2.38200 GHz' and 'Stop 2.46200 GHz'. The center frequency is set to 2.422000000 GHz. The resolution bandwidth is 10 kHz. The video bandwidth is 100 kHz. The sweep time is 953.3 ms (601 pts). The reference level is 20.00 dBm. The reference offset is 0.75 dB. The marker level is -20.211 dBm. The marker frequency is 2.41947 GHz. The display also shows various settings like 'PNO: Fast', 'IFGain: Low', 'Trig: Free Run', 'Atten: 30 dB', '#Avg Type: RMS', and 'Avg|Hold: 200/200'. The top status bar shows 'Agilent Spectrum Analyzer - The duty cycle factor 0.15 dB added.' and the bottom status bar shows 'MSG' and 'STATUS'.

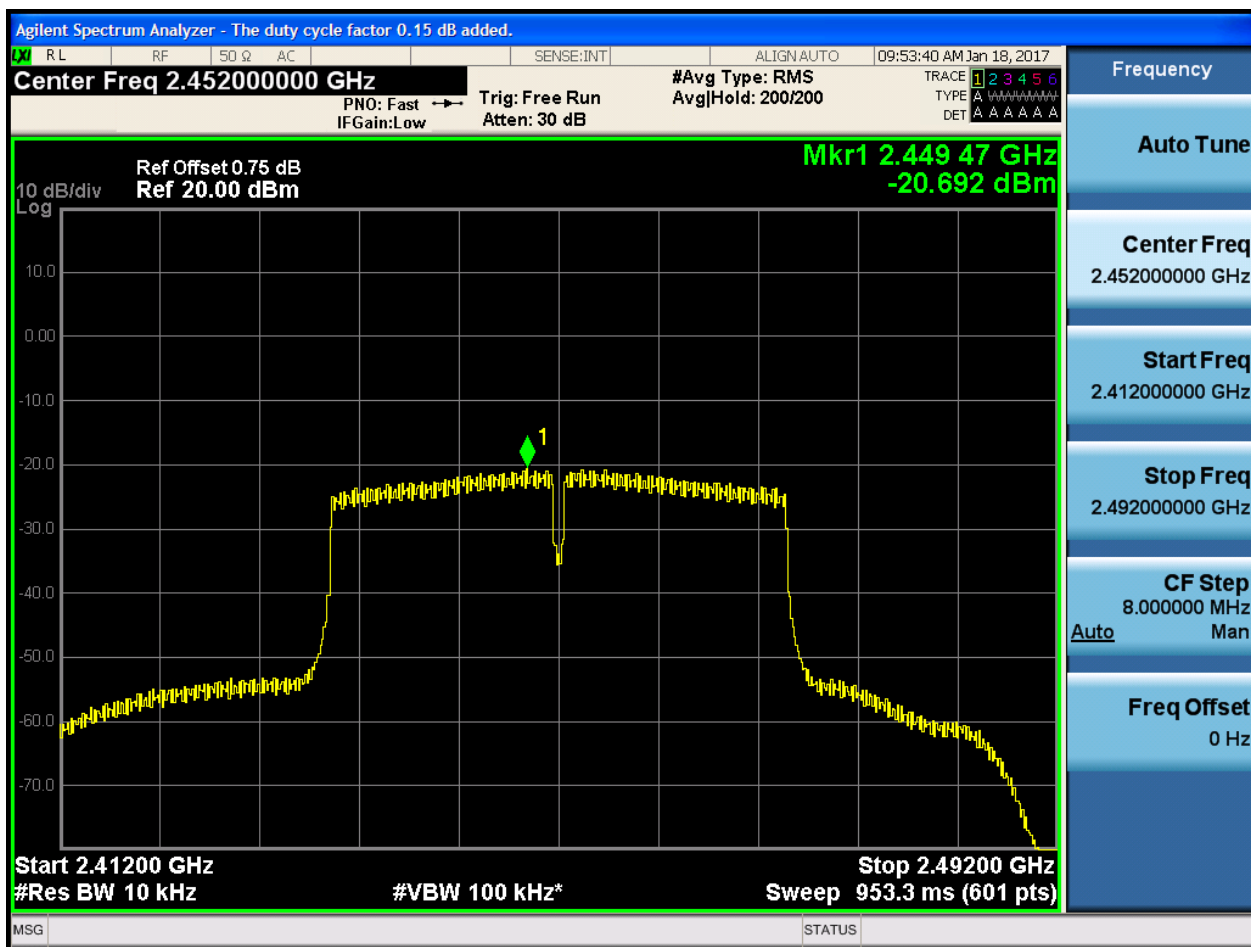


4.11 11N40_M@Ant 1





4.12 11N40_H@Ant 1



Appendix F: Band Edges Compliance

Part I - Test Results

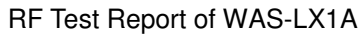
Test Mode	Test Channel	Frequency[MHz]	Ant	Carrier Power[dBm]	Max.Spurious Level[dBm]	Verdict
11B	L	2412	Ant 1	8.96	-50.64	pass
11B	H	2462	Ant 1	9.11	-47.77	pass
11G	L	2412	Ant 1	4.72	-44.87	pass
11G	H	2462	Ant 1	5.41	-38.86	pass
11N20	L	2412	Ant 1	3.33	-46.27	pass
11N20	H	2462	Ant 1	2.95	-39.11	pass
11N40	L	2422	Ant 1	-1.25	-44.694	pass
11N40	H	2452	Ant 1	-1.33	-38.390	pass



Part II - Test Plots

5.1 11B_L@Ant 1

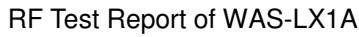


[illegible]



5.3 11G_H@Ant 1





Agilent Spectrum Analyzer - Swept SA

Center Freq 2.473500000 GHz

Ref Offset 0.6 dB
Ref 30.00 dBm

Mkr2 2.483 50 GHz
-38.856 dBm

Start 2.45350 GHz
#Res BW 100 kHz

Stop 2.49350 GHz
#Sweep 100.0 ms (601 pts)

#VBW 300 kHz

Trig: Free Run
Atten: 40 dB

Frequency

Auto Tune

Center Freq
2.473500000 GHz

Start Freq
2.453500000 GHz

Stop Freq
2.493500000 GHz

CF Step
4.000000 MHz
Man

Freq Offset
0 Hz

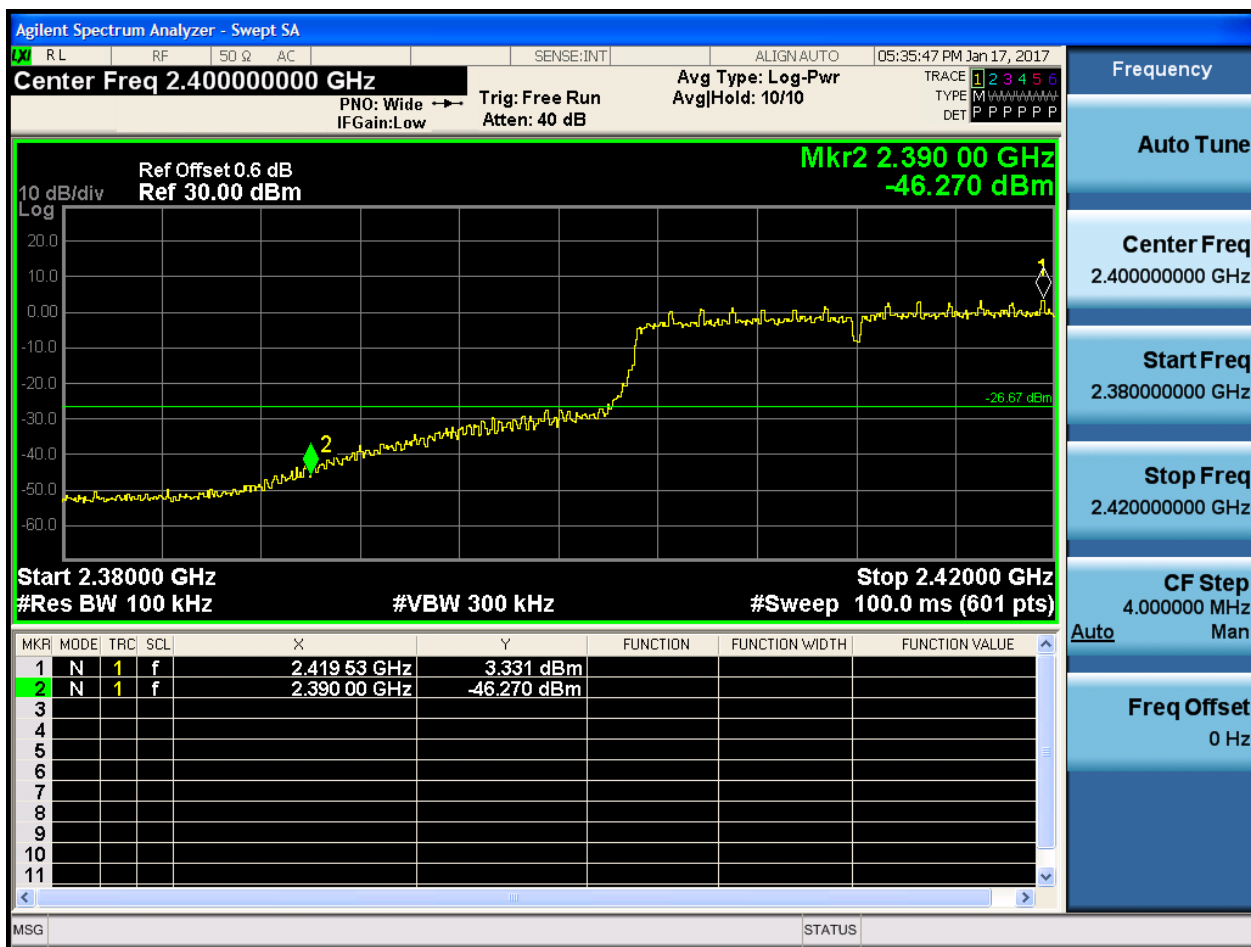
MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N	1	f	2.455 77 GHz	5.421 dBm			
2	N	1	f	2.483 50 GHz	-38.856 dBm			
3								
4								
5								
6								
7								
8								
9								
10								
11								

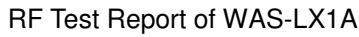
MSG

STATUS



5.5 11N20_L@Ant 1





Agilent Spectrum Analyzer - Swept SA

R L RF 50 Ω AC SENSE:INT ALIGN AUTO 05:47:10 PM Jan 17, 2017

Center Freq 2.473500000 GHz Avg Type: Log-Pwr
PNO: Wide → Trig: Free Run Attenuation: 40 dB TYPE M DET P P P P P

Ref Offset 0.6 dB Ref 30.00 dBm

Mkr2 2.483 50 GHz -39.110 dBm

10 dB/div Log

Start 2.45350 GHz #Res BW 100 kHz #VBW 300 kHz Stop 2.49350 GHz #Sweep 100.0 ms (601 pts)

MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N	1	f	2.455 77 GHz	-2.946 dBm			
2	N	1	f	2.483 50 GHz	-39.110 dBm			
3								
4								
5								
6								
7								
8								
9								
10								
11								

MSG STATUS

Frequency

Auto Tune

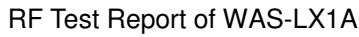
Center Freq
2.473500000 GHz

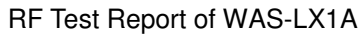
Start Freq
2.453500000 GHz

Stop Freq
2.493500000 GHz

CF Step
4.000000 MHz Man

Freq Offset
0 Hz

[illegible]



Agilent Spectrum Analyzer - Swept SA

Center Freq **2.47350000 GHz** Avg Type: Log-Pwr
 PNO: Wide → Trg: Free Run Attenuation: 40 dB
 IFGain: Low

Ref Offset 0.6 dB
 Ref 30.00 dBm

Mkr2 2.483 50 GHz
 -38.390 dBm

The spectrum plot shows a noisy signal centered around 2.4735 GHz. A green horizontal line indicates the reference level at -30.00 dBm. A yellow diamond marker labeled '1' is placed on the signal peak at approximately -1.328 dBm. Another green diamond marker labeled '2' is placed on the noise floor at approximately -38.390 dBm.

MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N	1	f	2.455 77 GHz	-1.328 dBm			
2	N	1	f	2.483 50 GHz	-38.390 dBm			

Start 2.45350 GHz Stop 2.49350 GHz
 #Res BW 100 kHz #VBW 300 kHz #Sweep 100.0 ms (601 pts)

Appendix G: Unwanted Emissions into Non-Restricted Frequency

Bands

In this Appendix, the "Pref", which is used as the reference level, refers to the peak power level in any 100 kHz bandwidth within the fundamental emission, the "Puw" refers to the maximum emission power in 100 kHz band segments outside of the authorized frequency band.

Considering that the higher ratio of RBW to the span for the frequency ranges below 30 MHz makes the results determination be complicated, a narrower RBW other than 100 kHz is used for these ranges. The measured value should add a RBW correction factor (RBWCF) where $RBWCF [dB] = 10 \times \lg(100 [kHz]/\text{narrower RBW} [kHz])$. As to this Appendix, the narrower RBW is 1 kHz and RBWCF is 20 dB for the frequency 9 kHz to 150 kHz, and the narrower RBW is 10 kHz and RBWCF is 10 dB for the frequency 150 kHz to 30 MHz.

For measurements on smart antenna systems (devices with multiple transmit chains), the test is performed at each chain and used as respective results for each chain, due to the relative-limit requirement.

In the result table, the "< Limit" denotes that "The Puw [dBm] is less than Pref[dBm]-30[dBm], see test plots for detailed".

Part I - Test Results

Test Mode	Test Channel	Frequency[MHz]	Ant	Pref[dBm]	Puw[dBm]	Verdict
11B	L	2412	Ant 1	9.31	<limit	pass
11B	M	2437	Ant 1	7.85	<limit	pass
11B	H	2462	Ant 1	8.35	<limit	pass
11G	L	2412	Ant 1	5.05	<limit	pass
11G	M	2437	Ant 1	3.60	<limit	pass
11G	H	2462	Ant 1	4.02	<limit	pass
11N20	L	2412	Ant 1	3.42	<limit	pass
11N20	M	2437	Ant 1	1.98	<limit	pass
11N20	H	2462	Ant 1	3.10	<limit	pass
11N40	L	2422	Ant 1	-1.05	<limit	pass
11N40	M	2437	Ant 1	-0.96	<limit	pass
11N40	H	2452	Ant 1	-1.18	<limit	pass

Part II - Test Plots

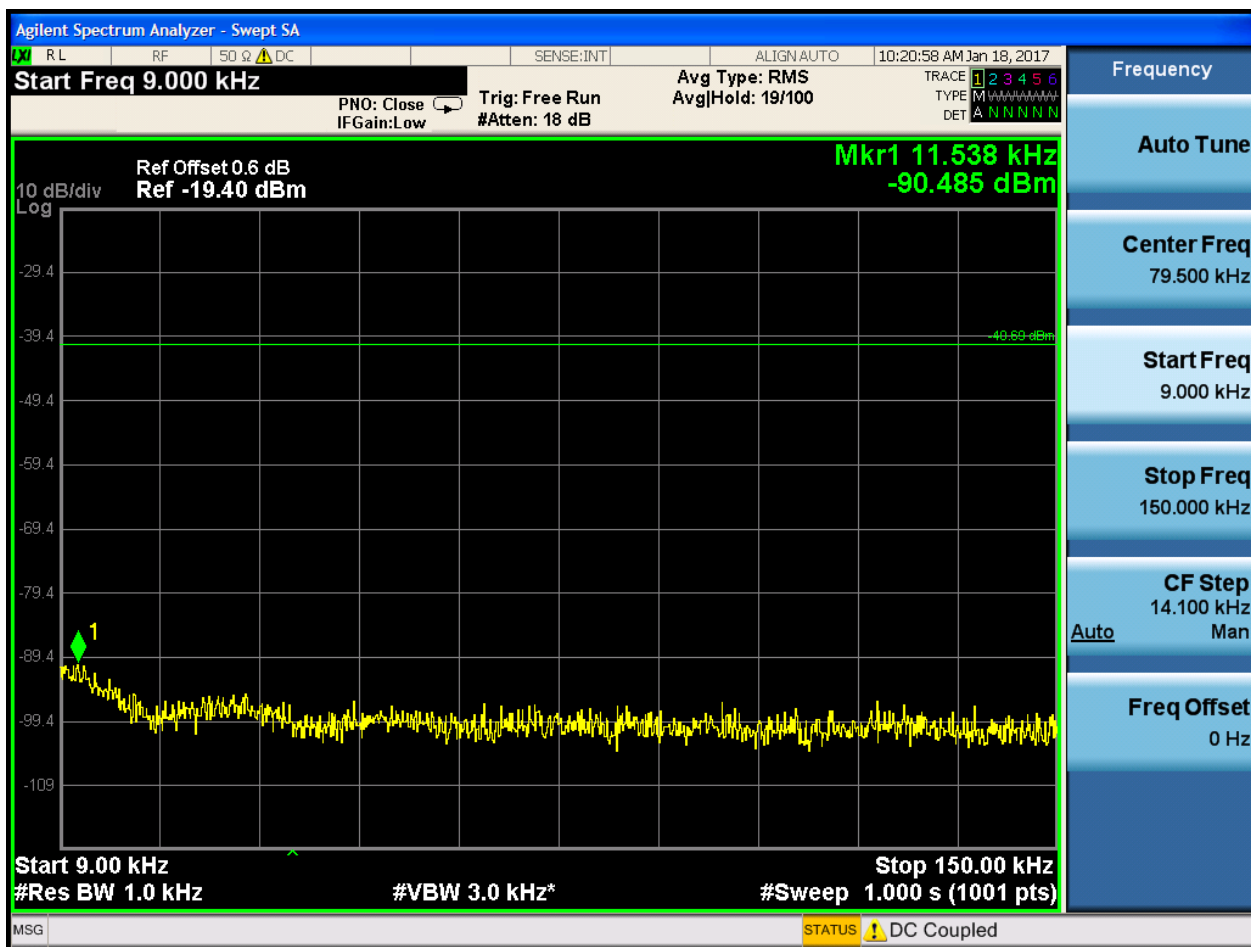
6.1 11B_L@Ant 1

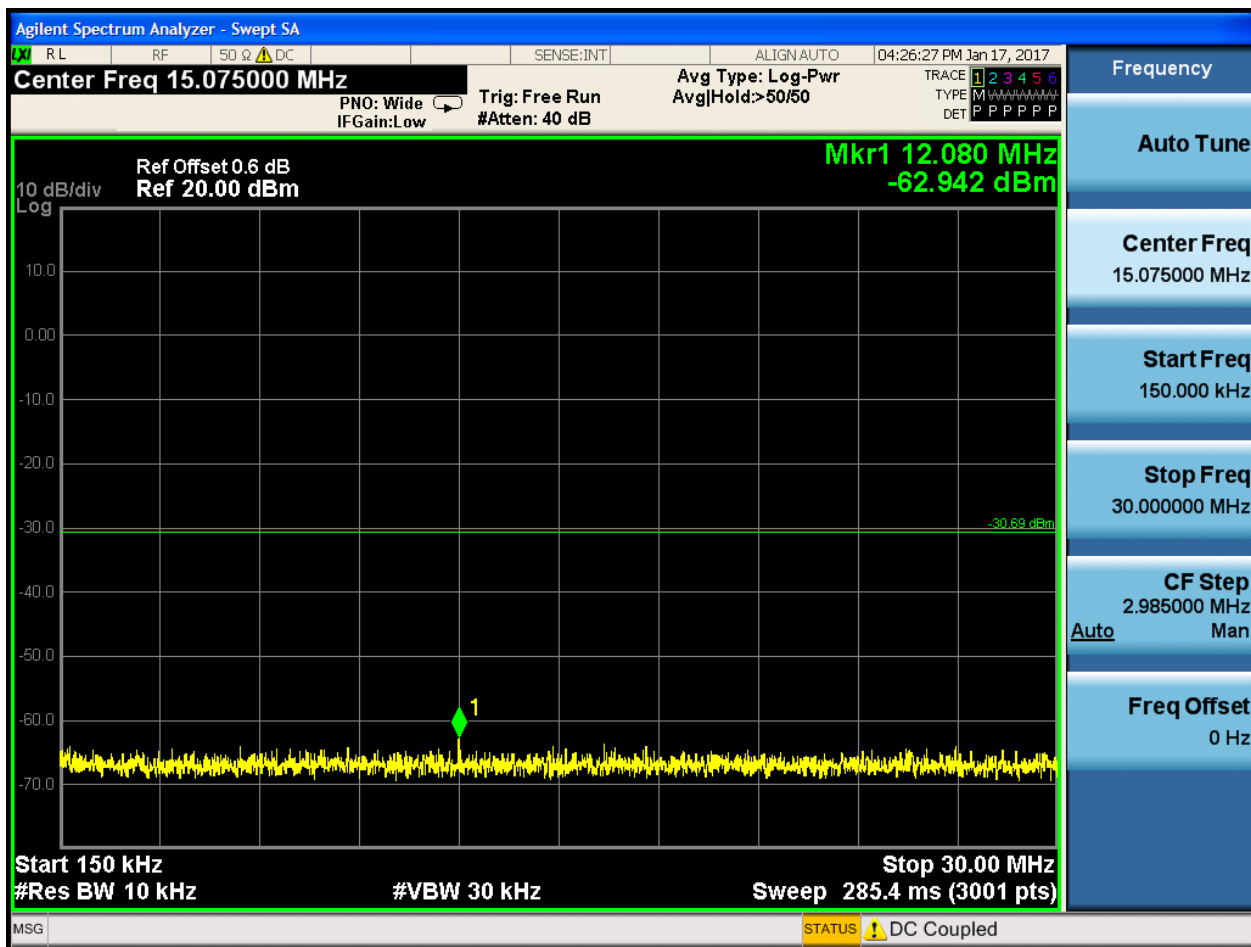
Pref:

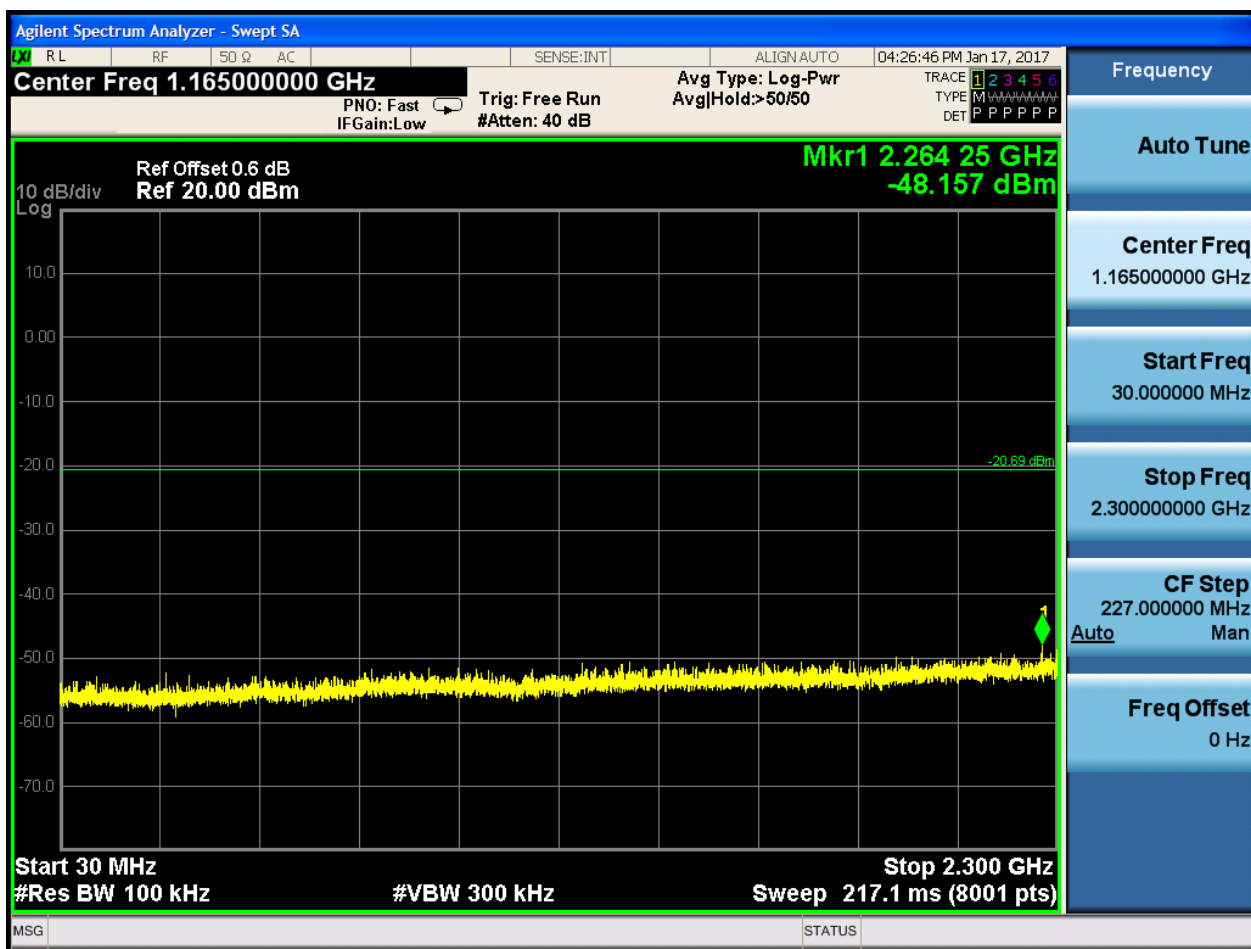


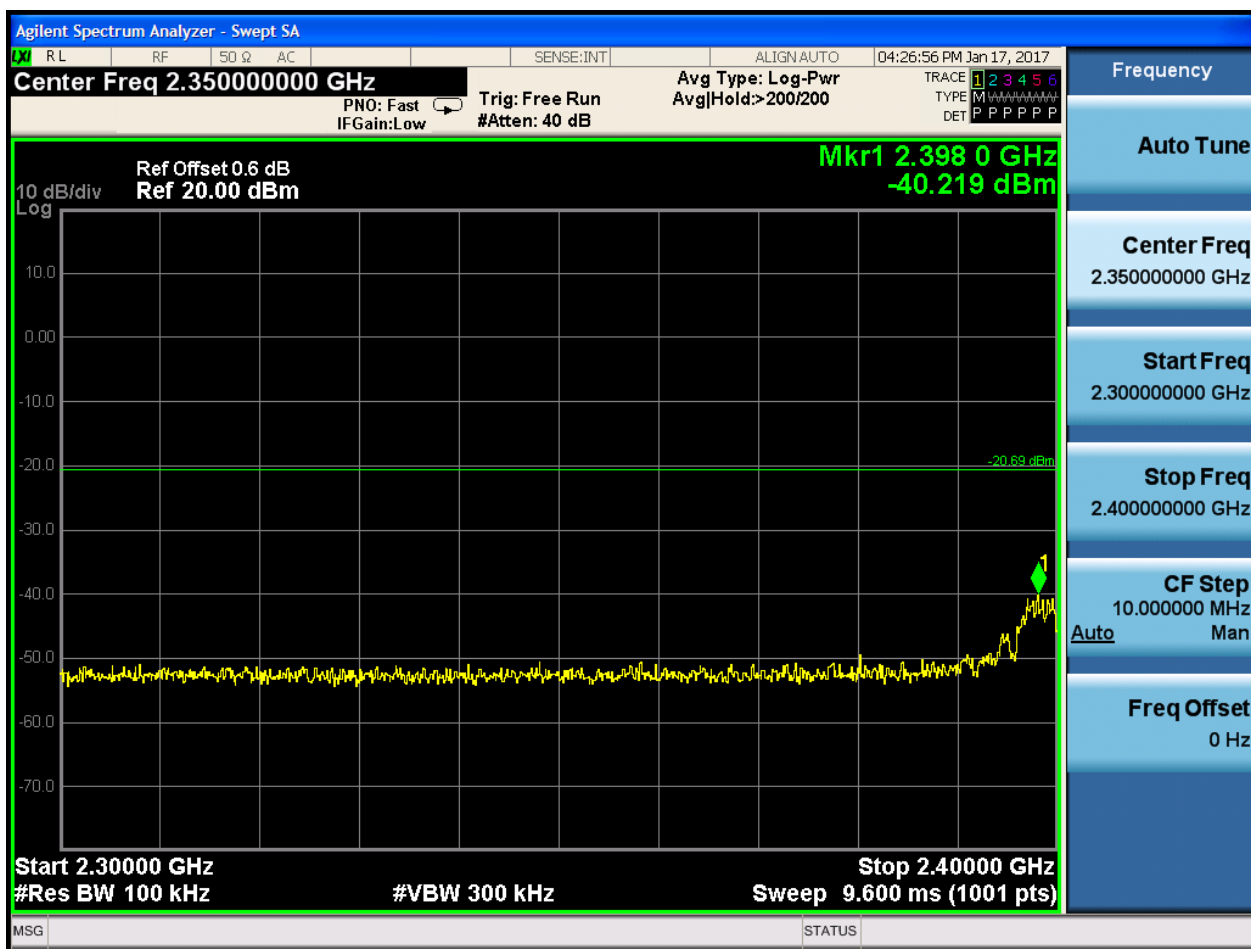


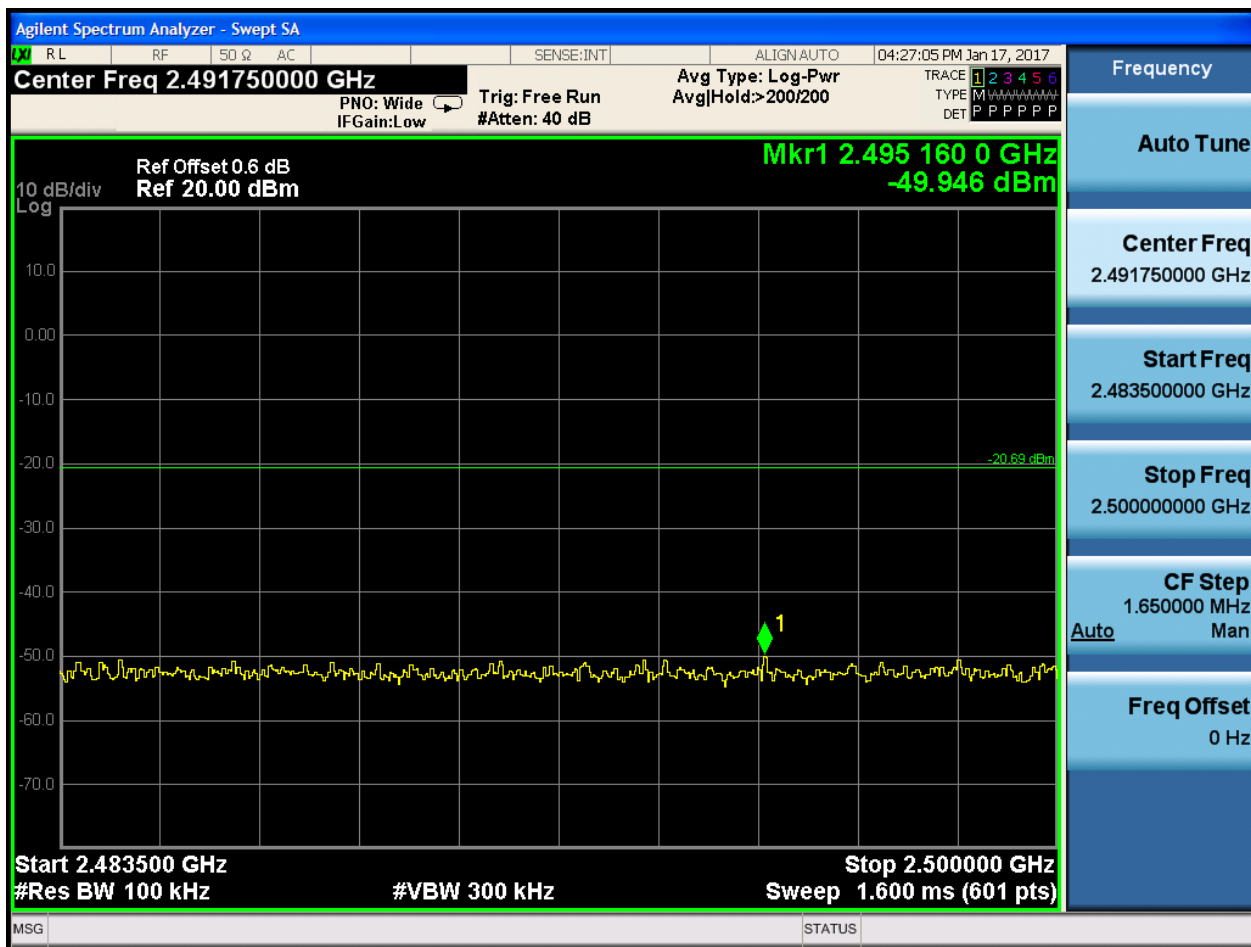
Puw:









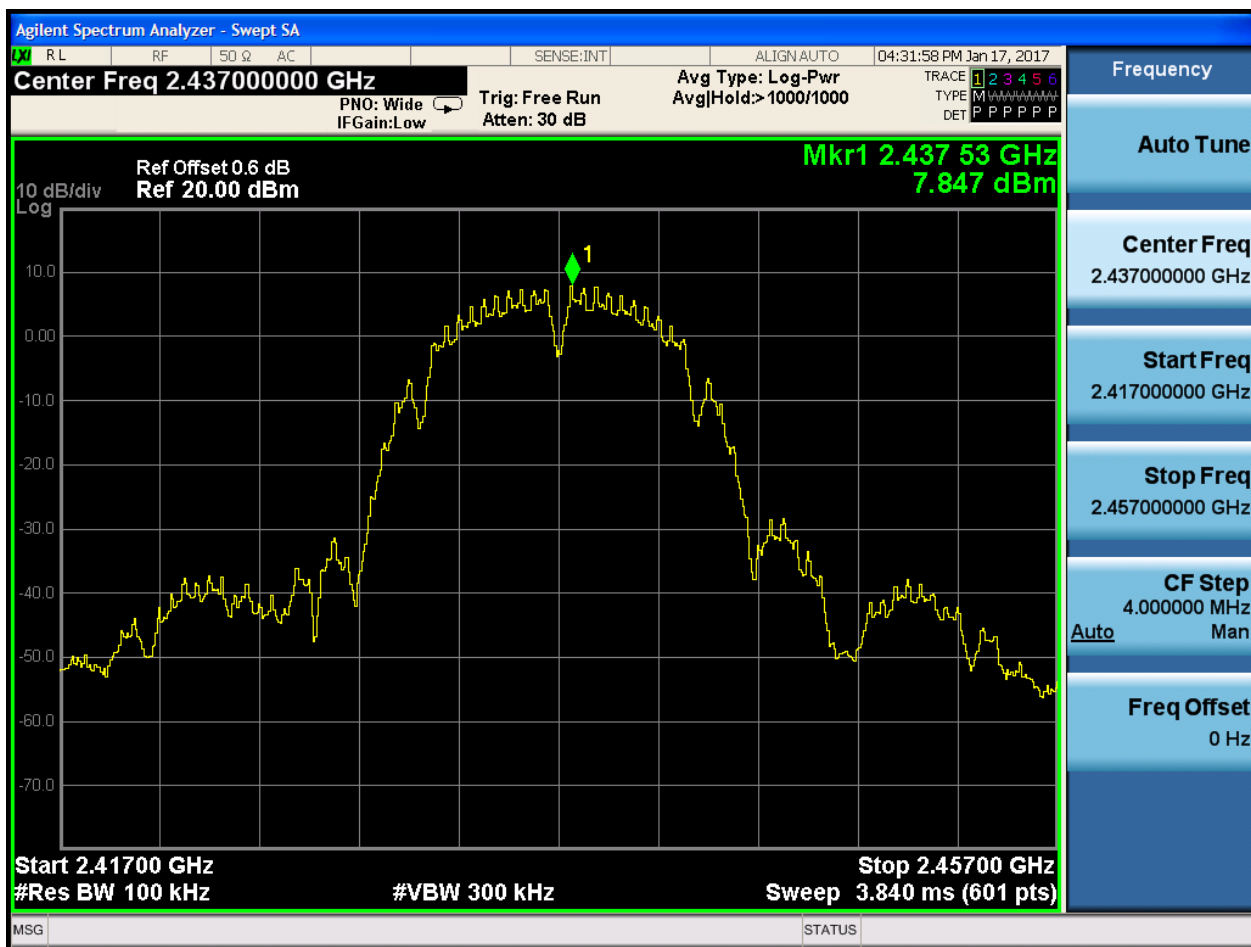






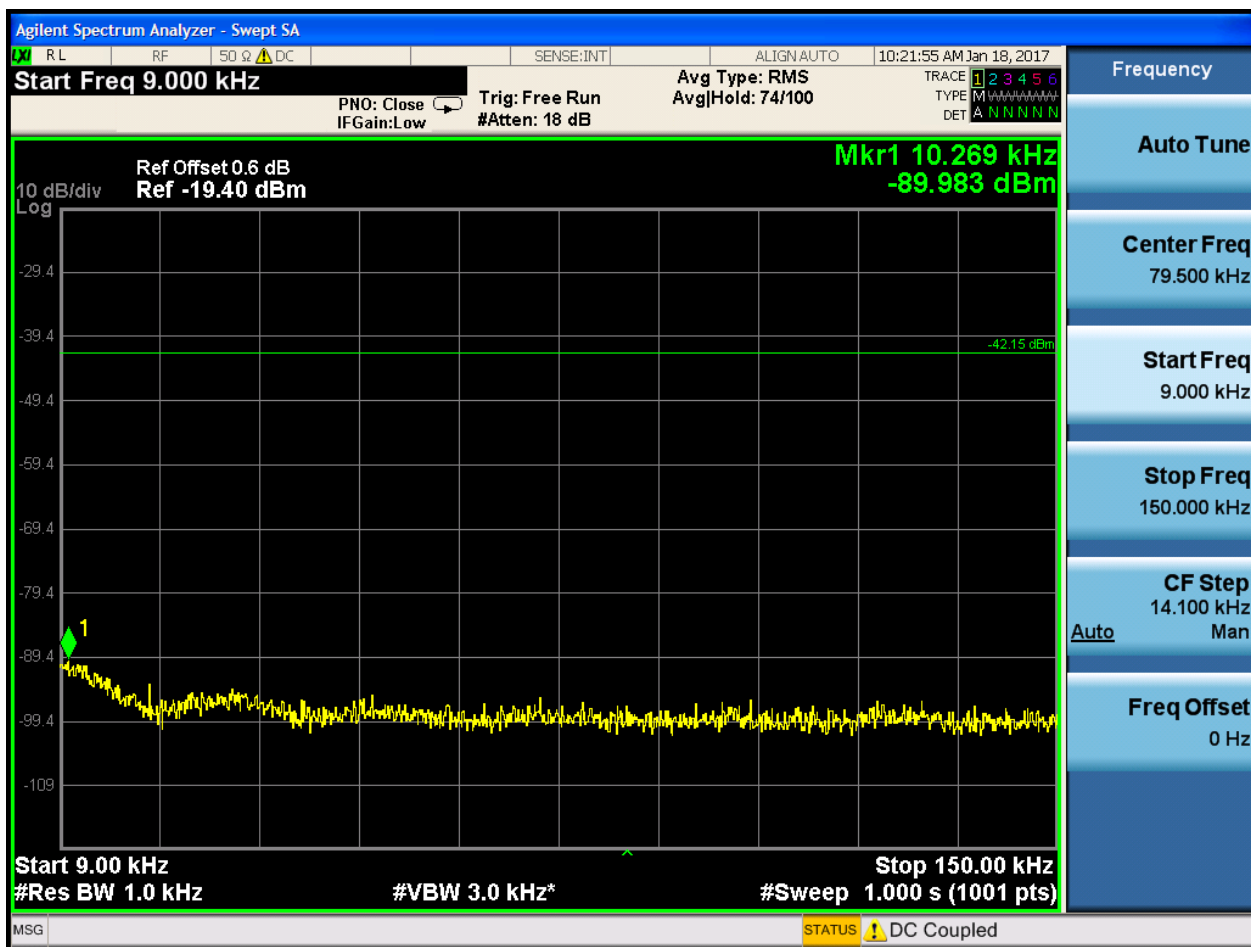
6.2 11B_M@Ant 1

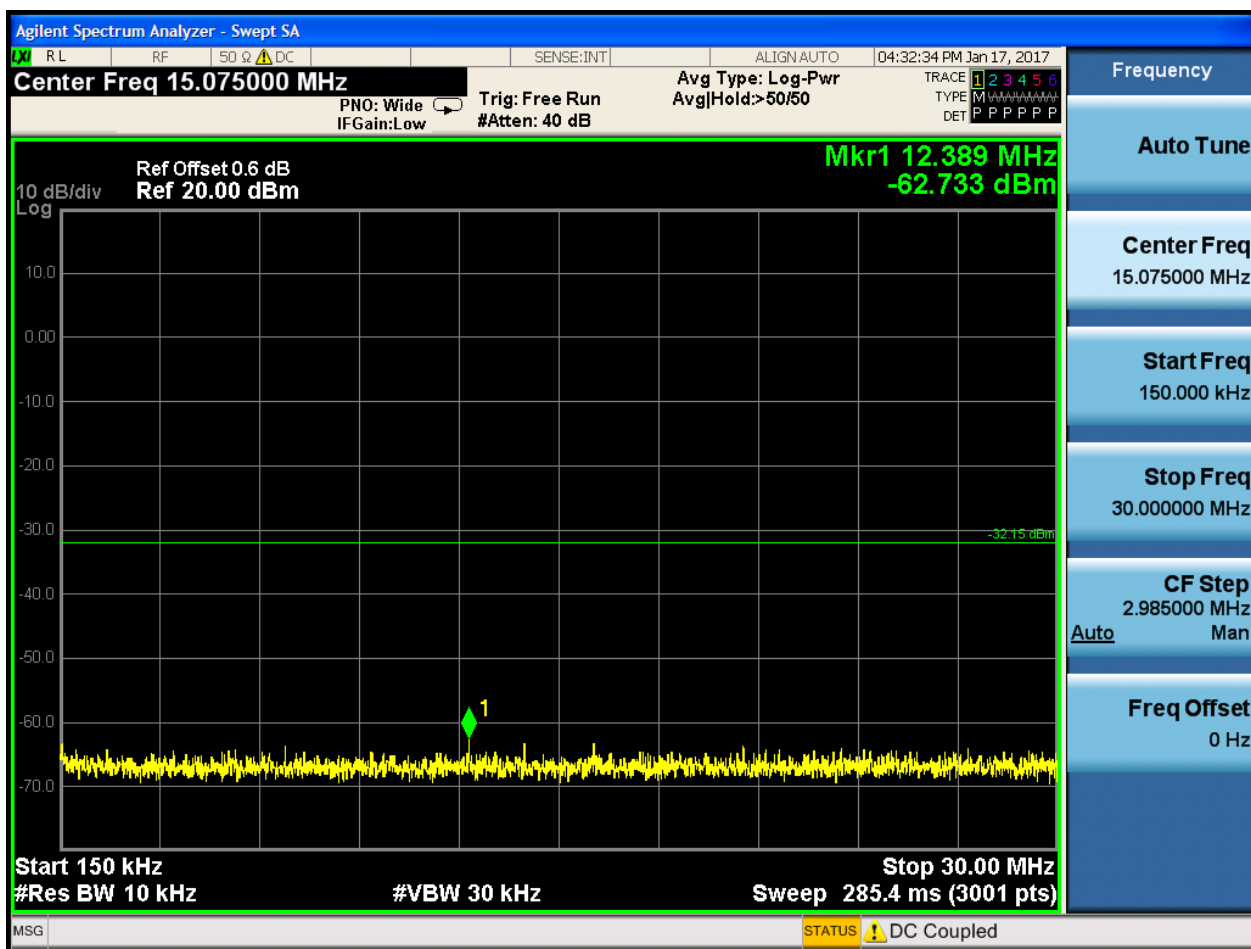
Pref:



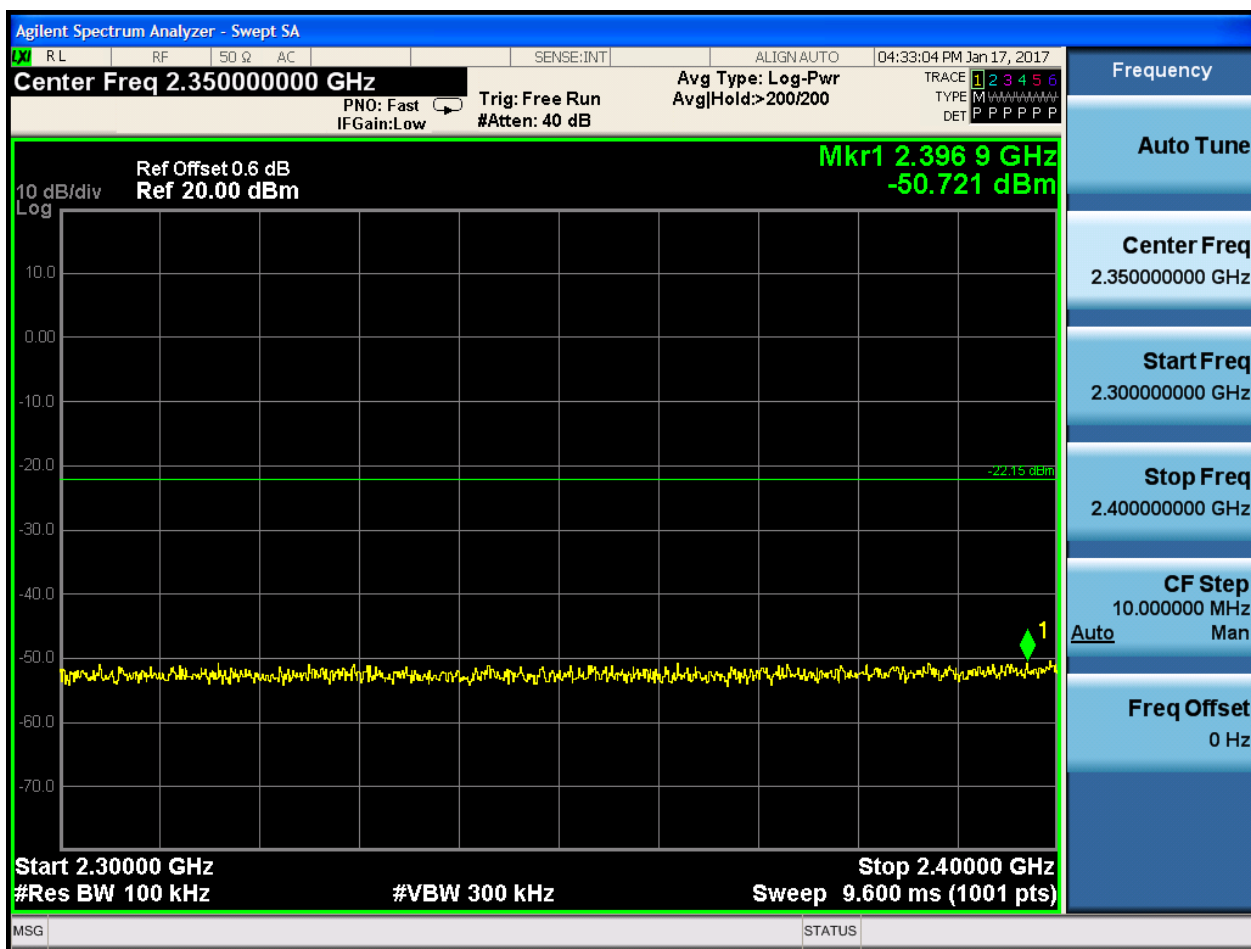


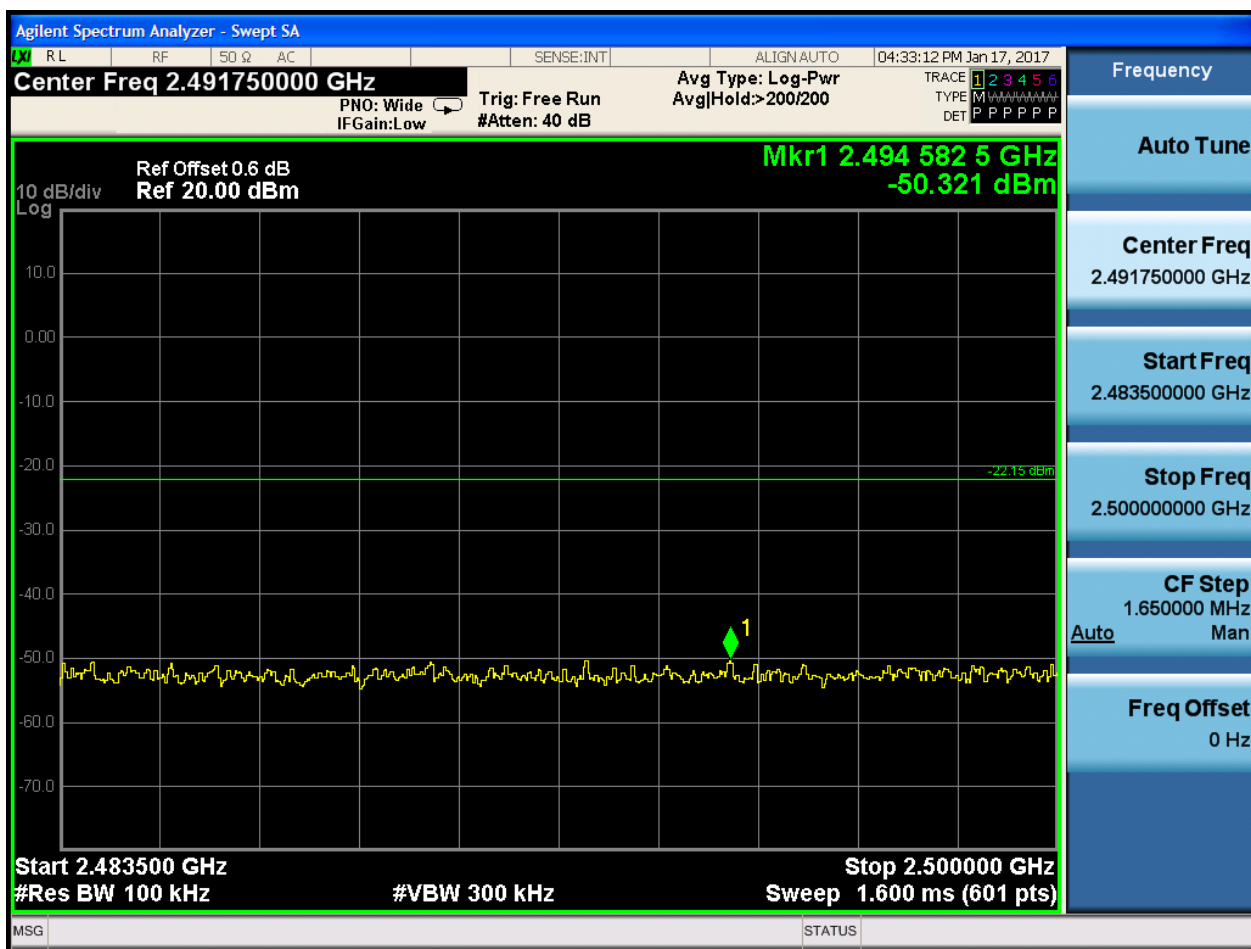
Puw:









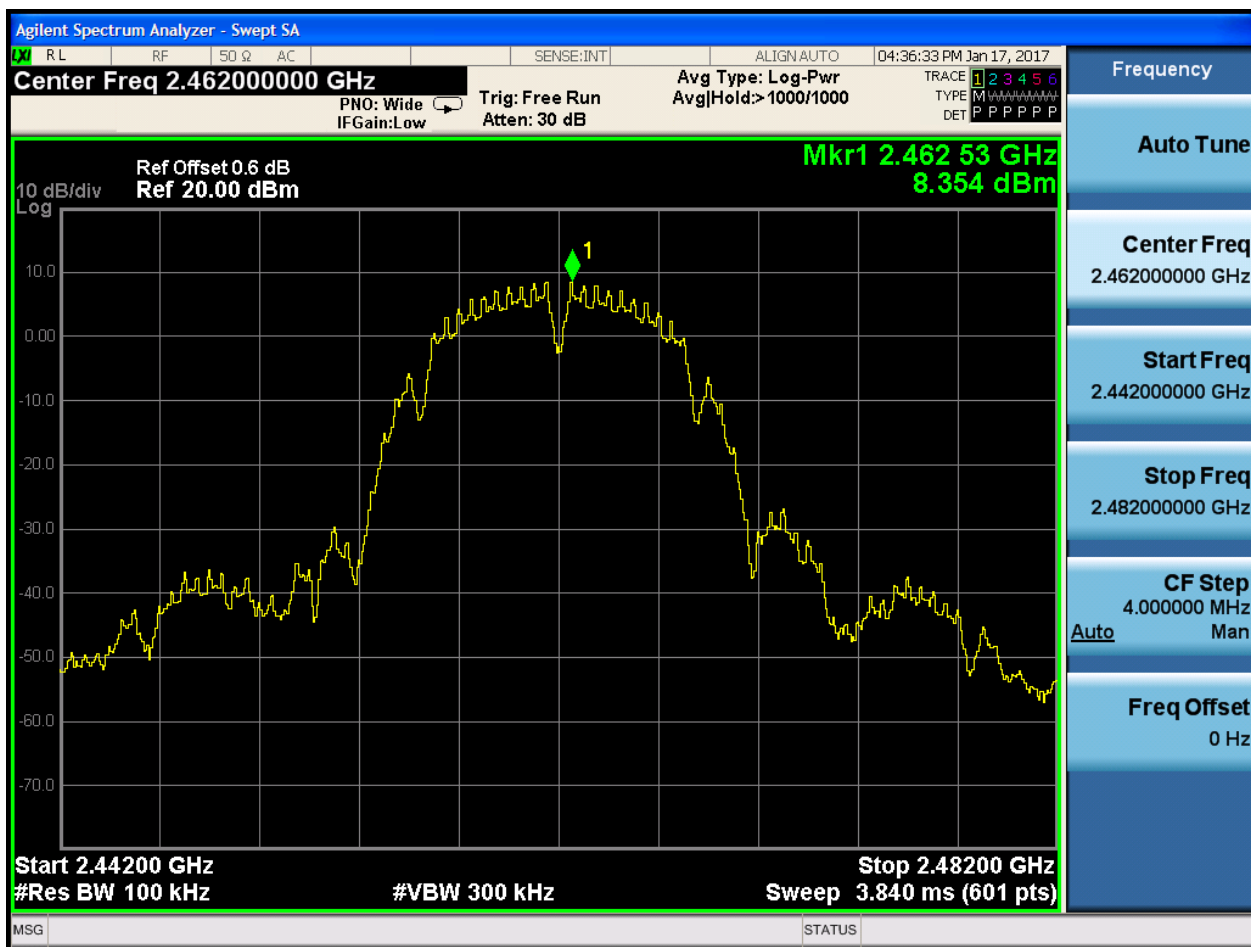






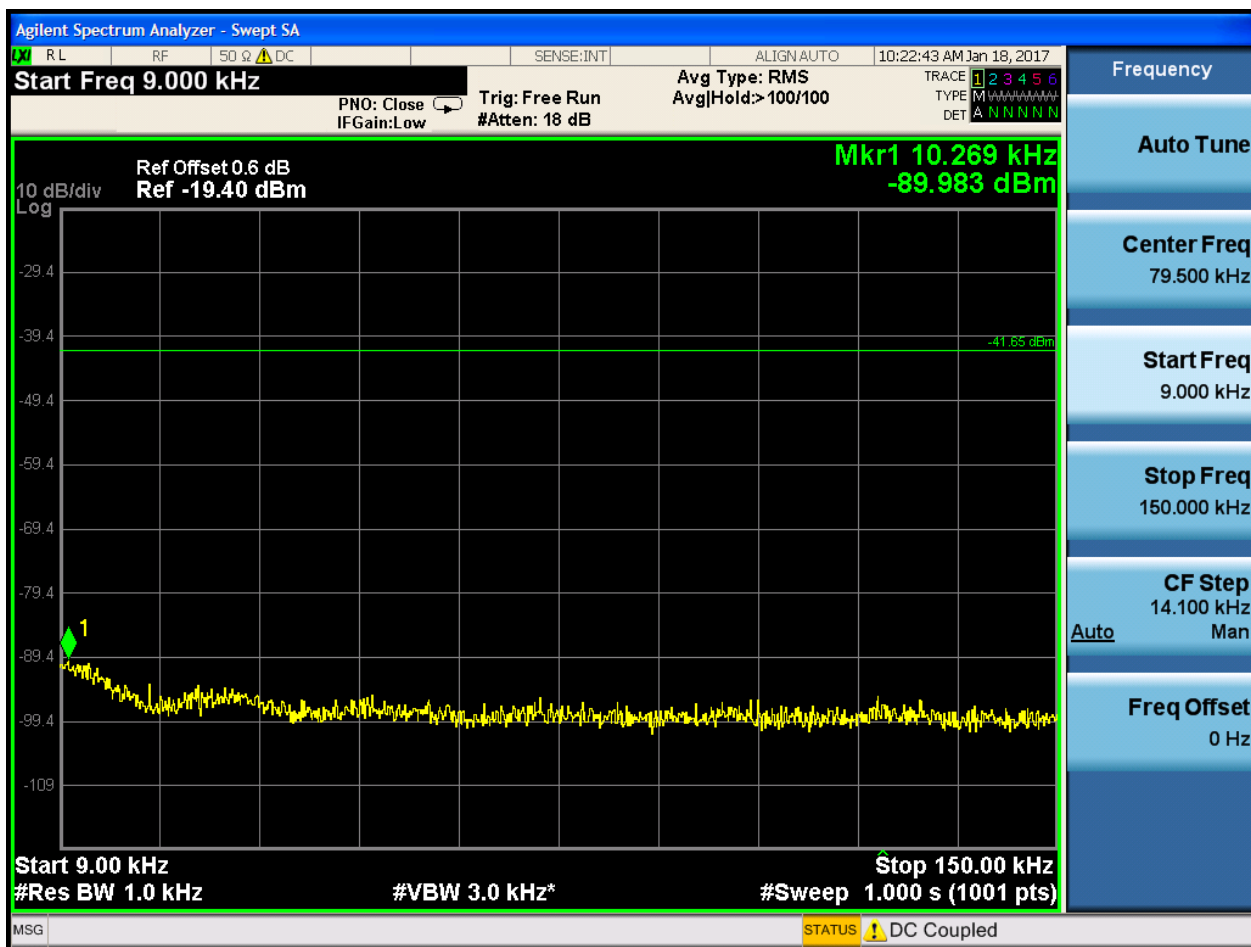
6.3 11B_H@Ant 1

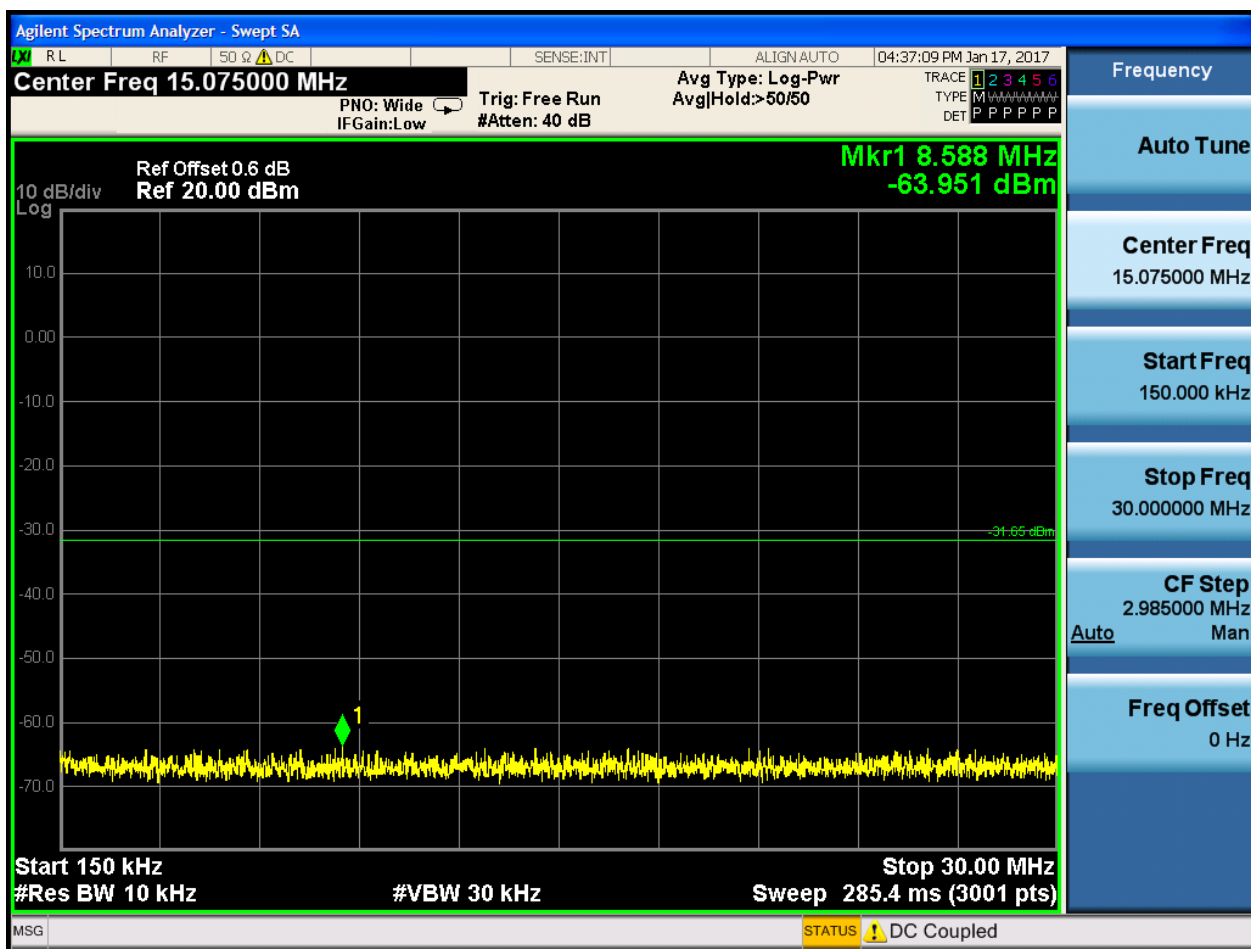
Pref:

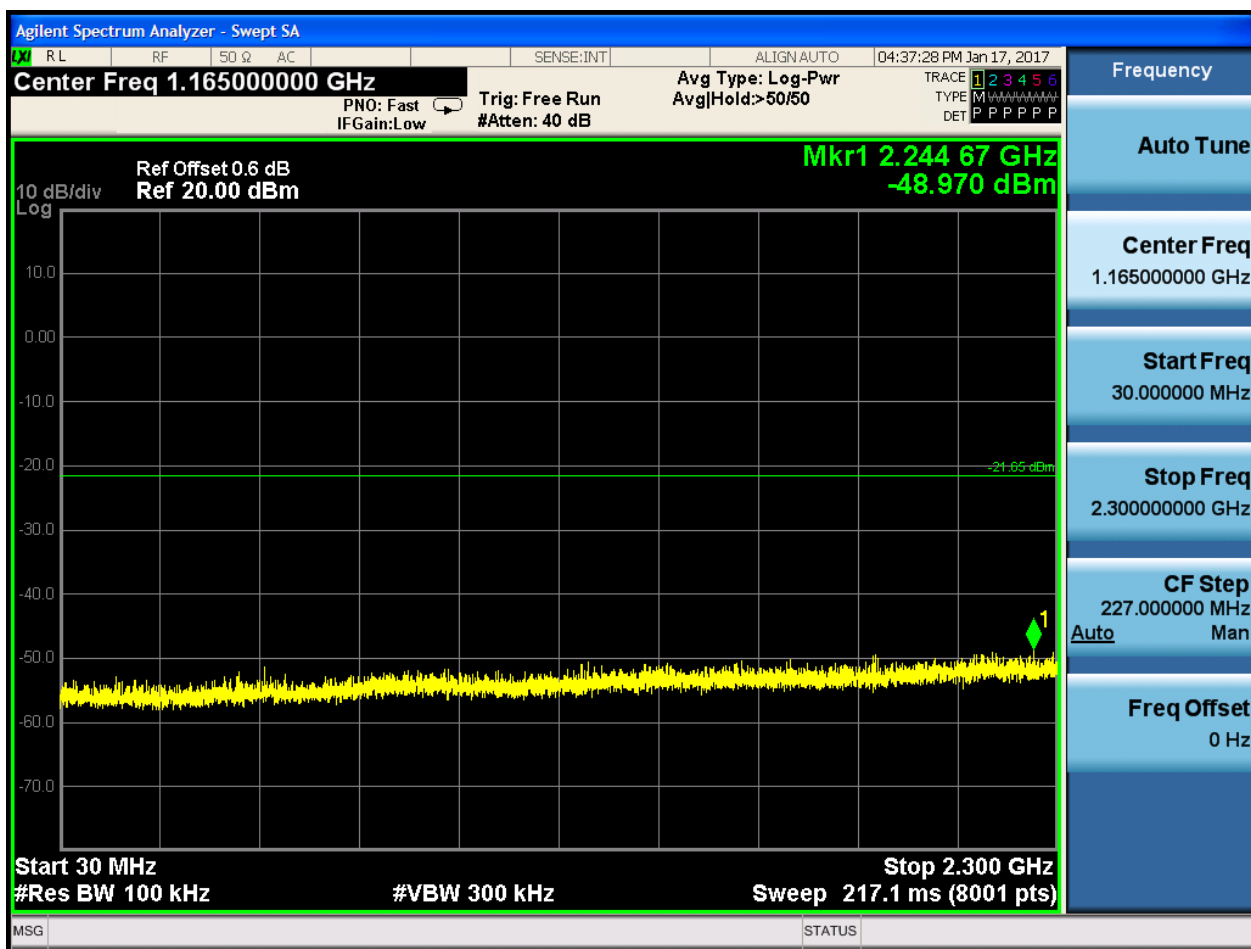


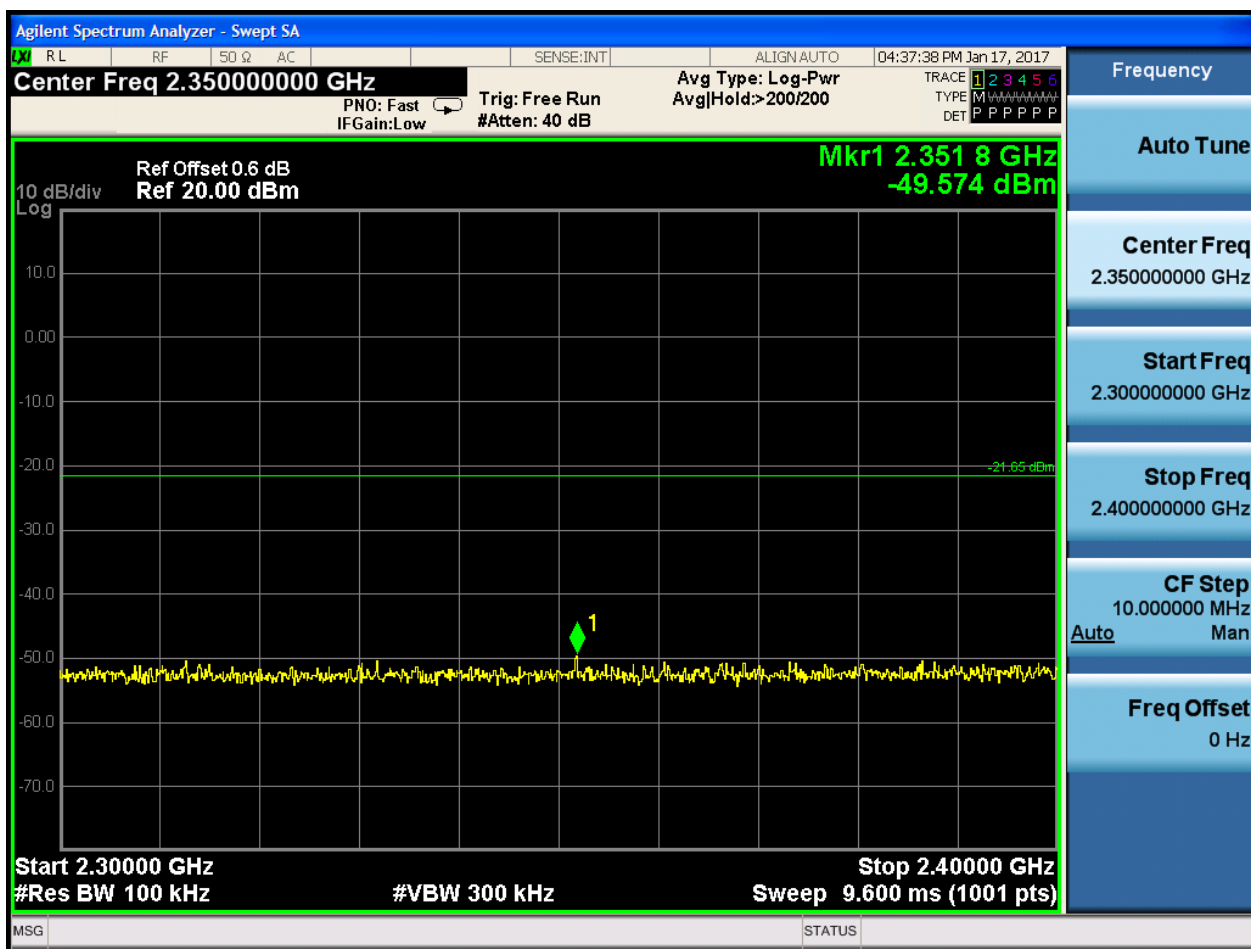


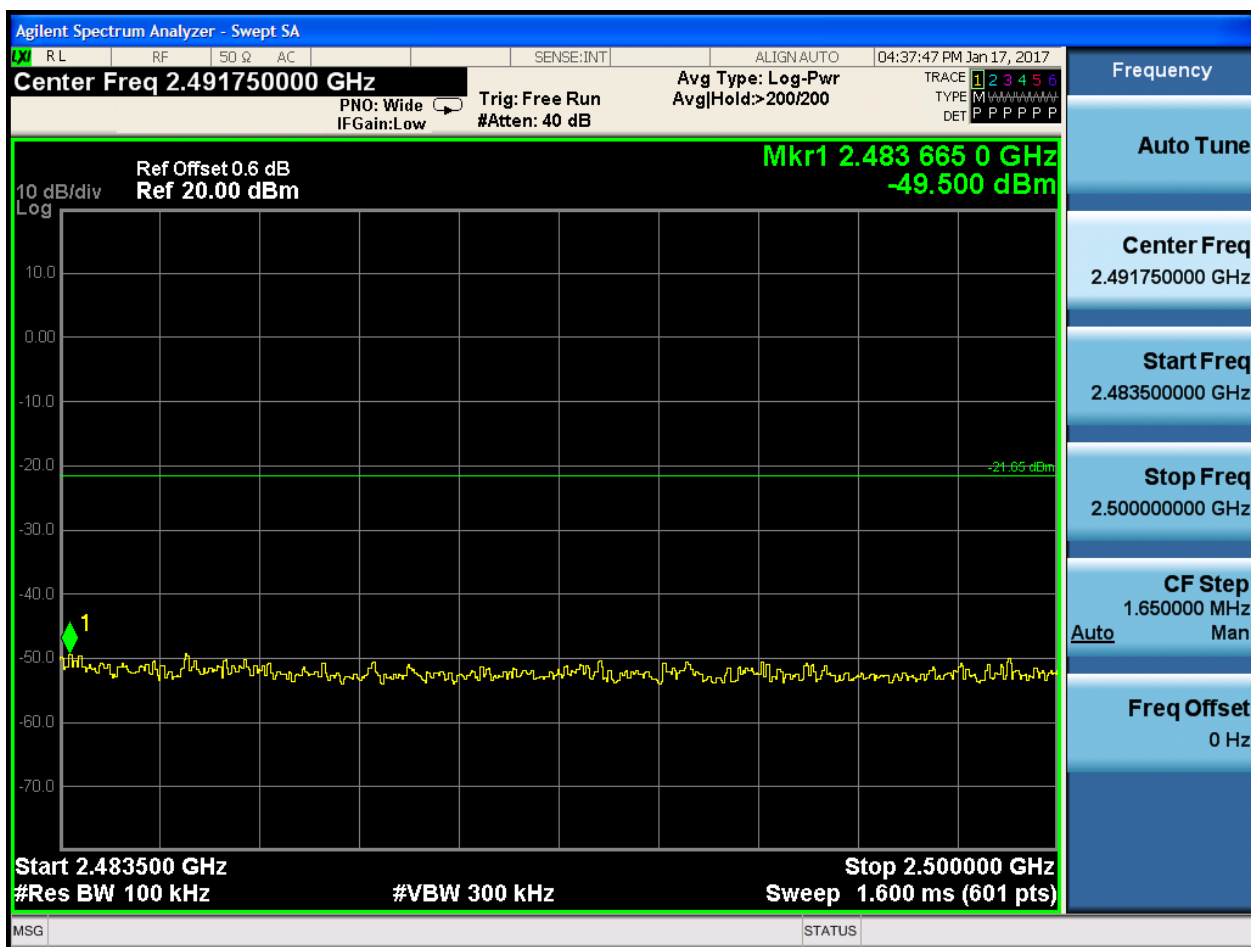
Puw:









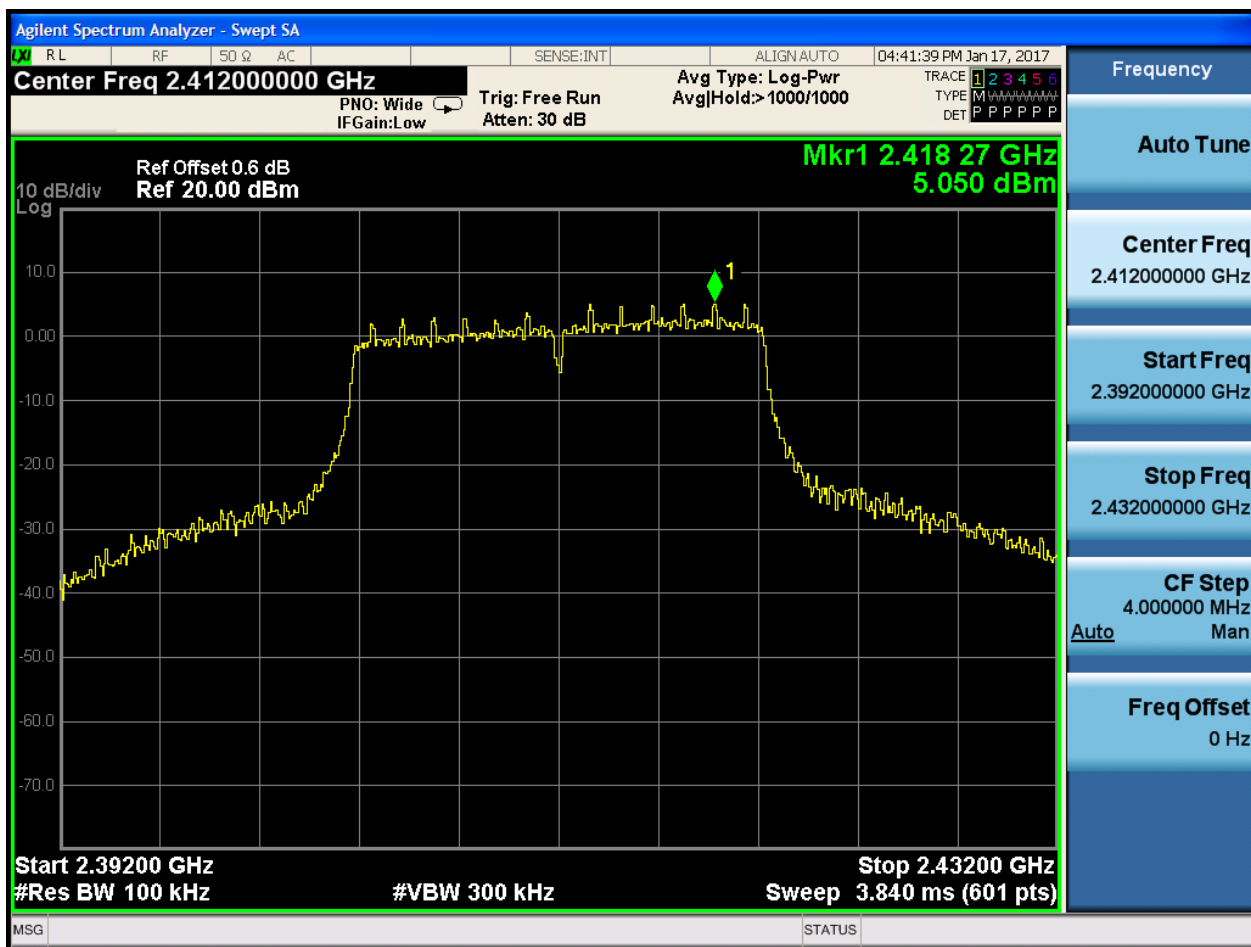






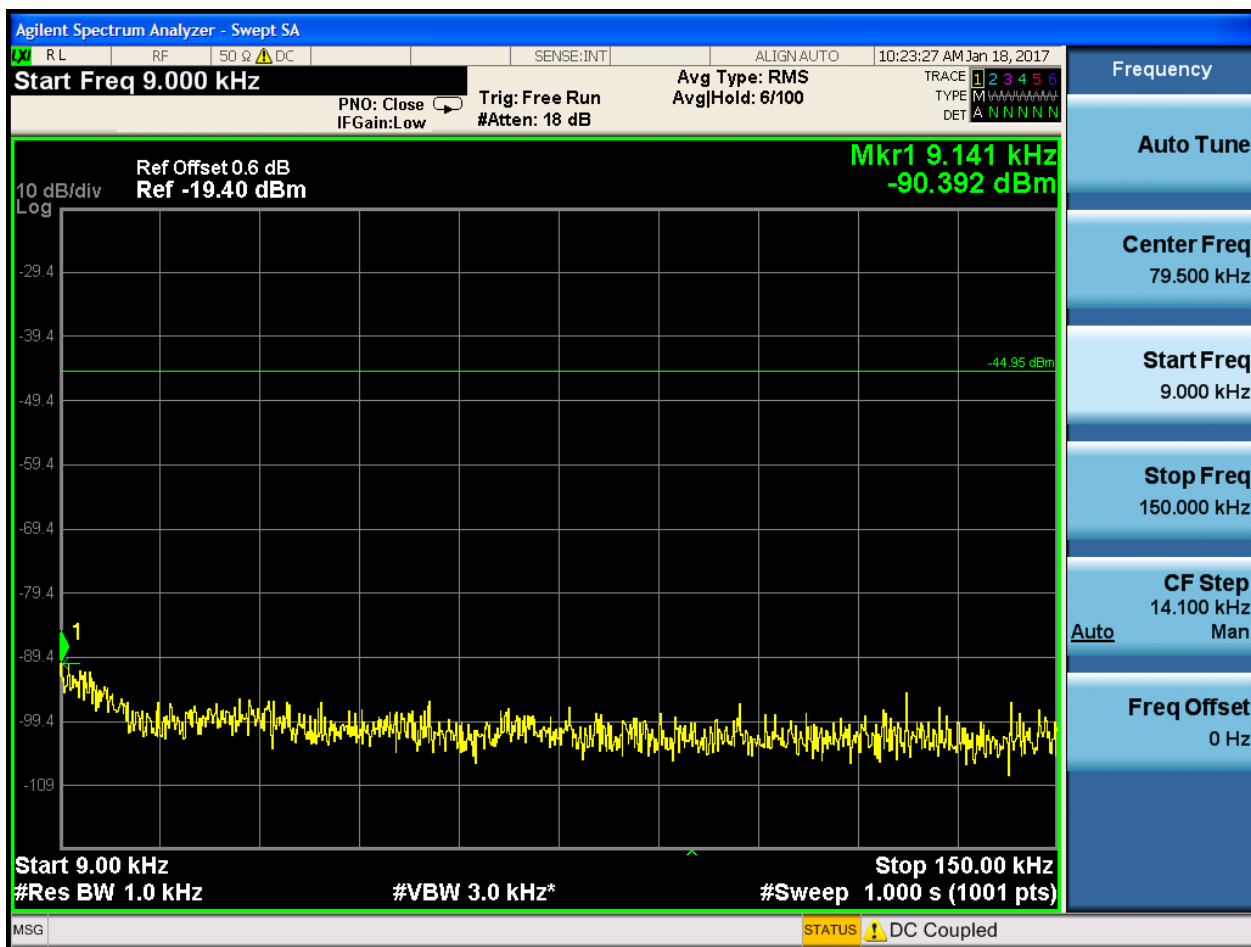
6.4 11G_L@Ant 1

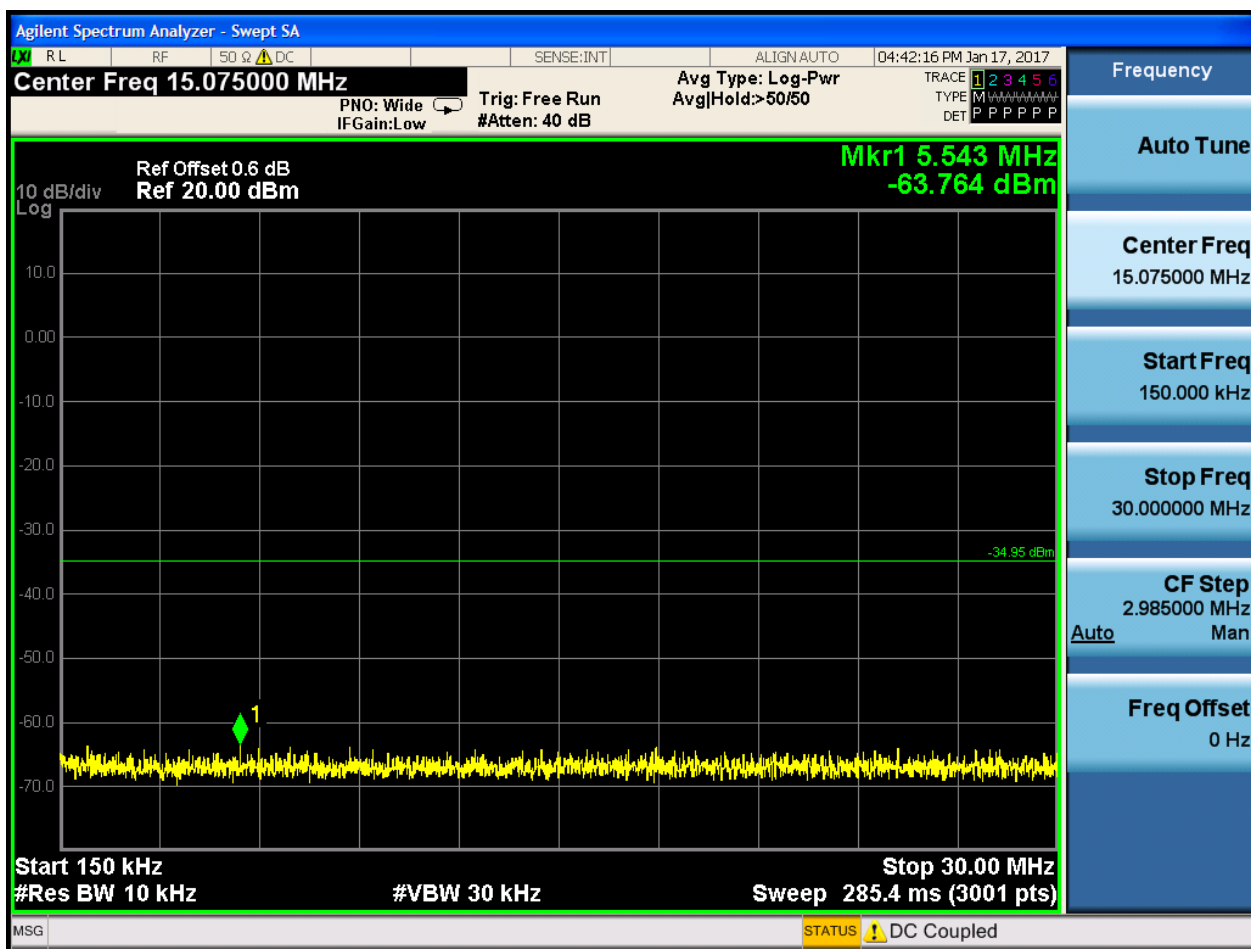
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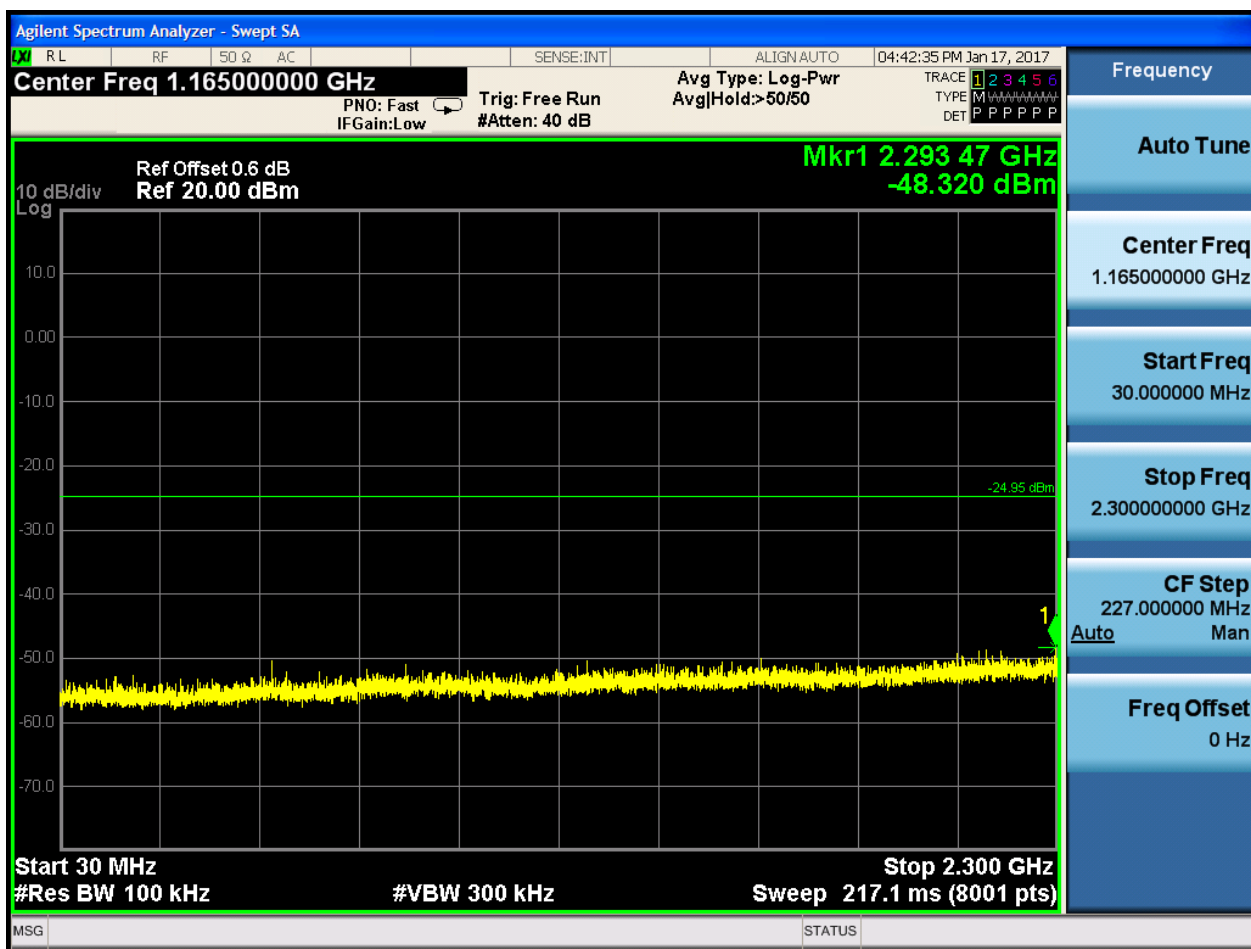


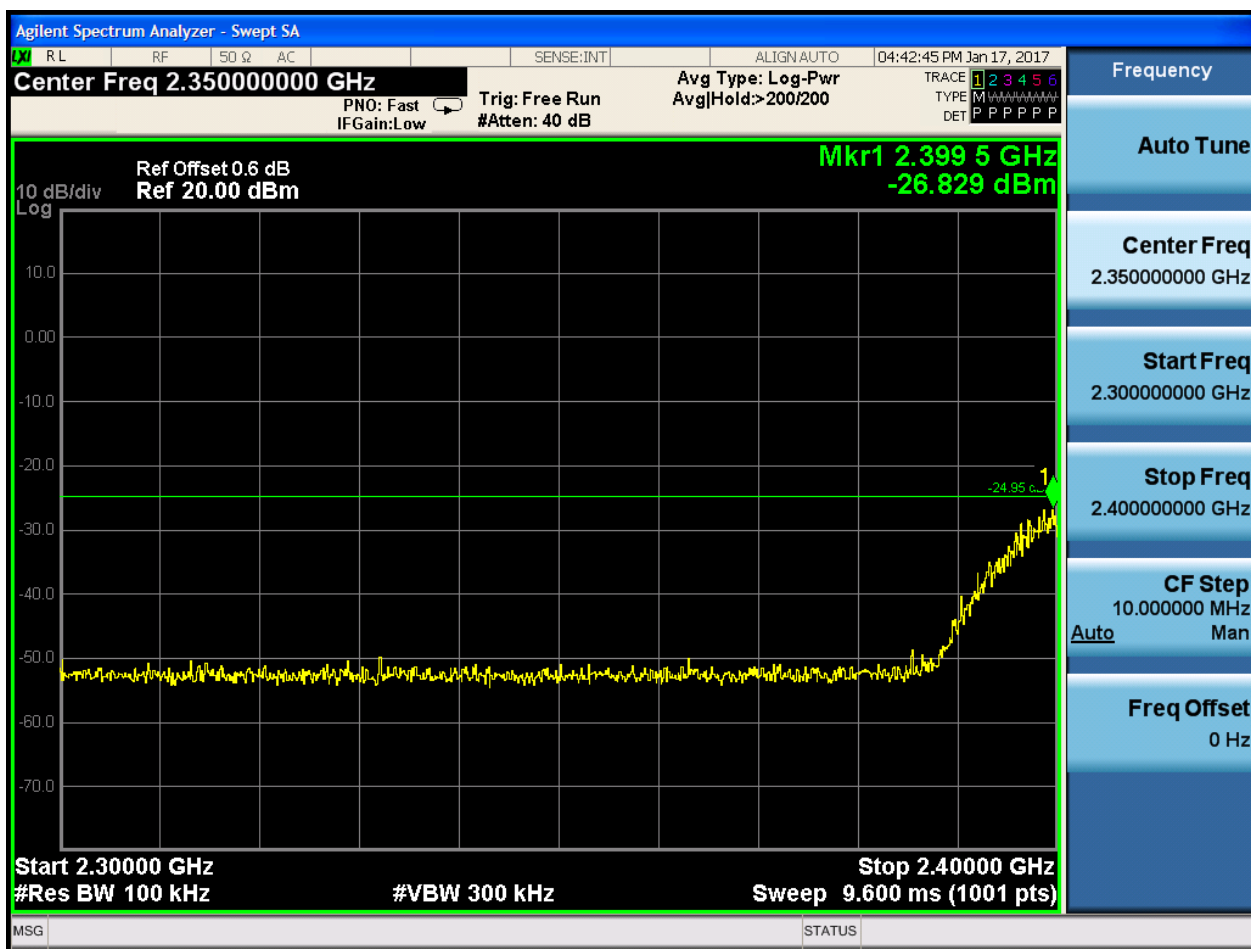


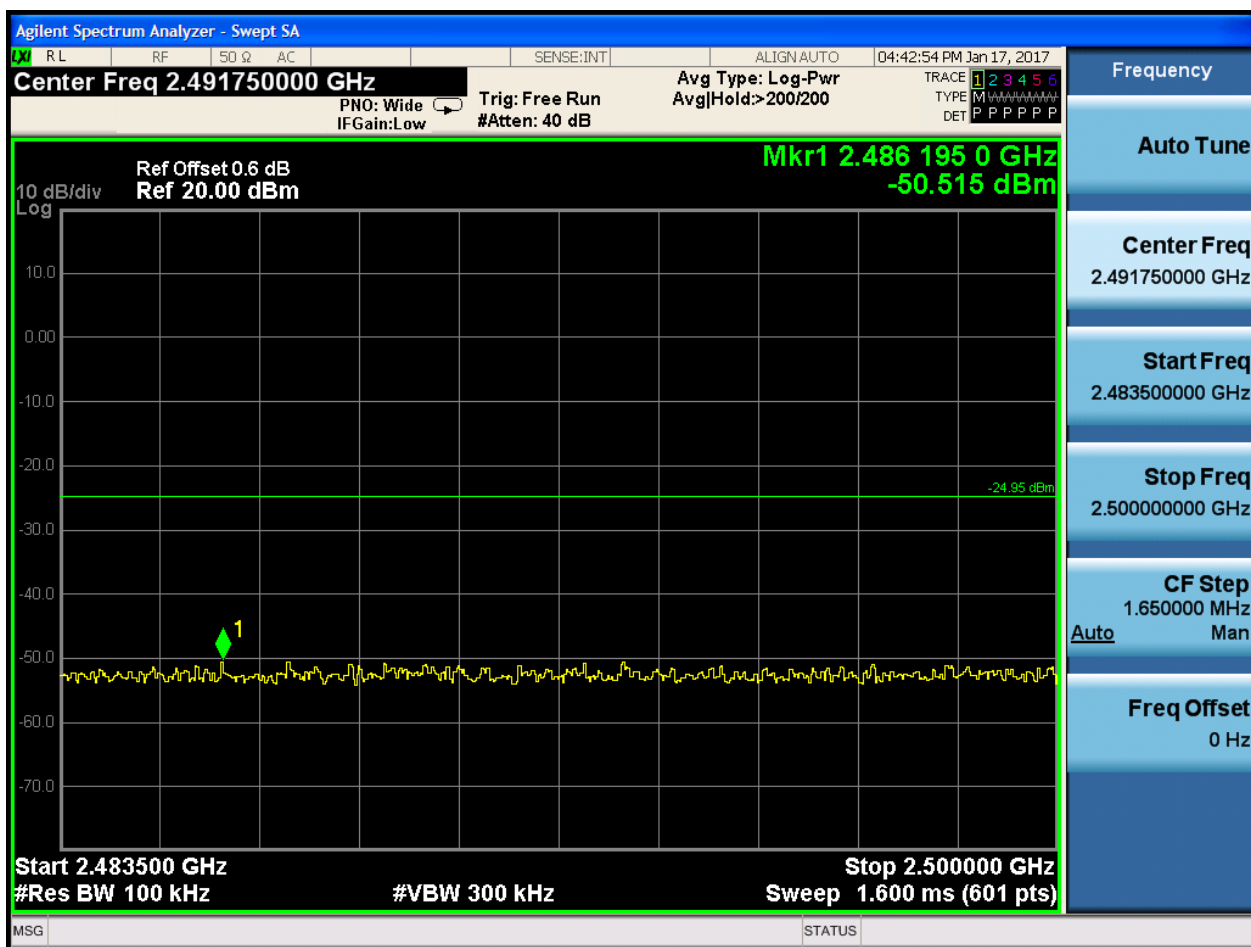
Puw:









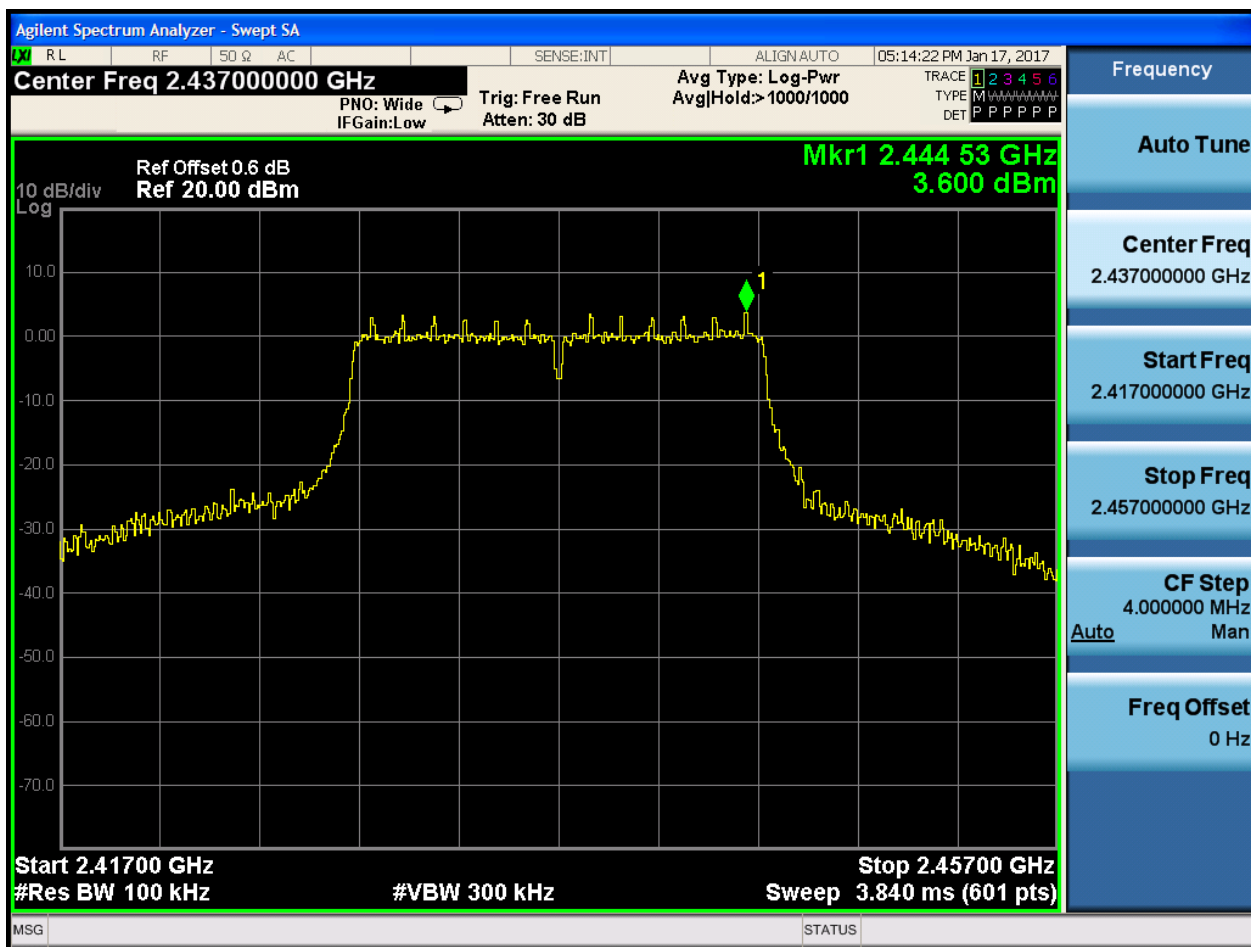






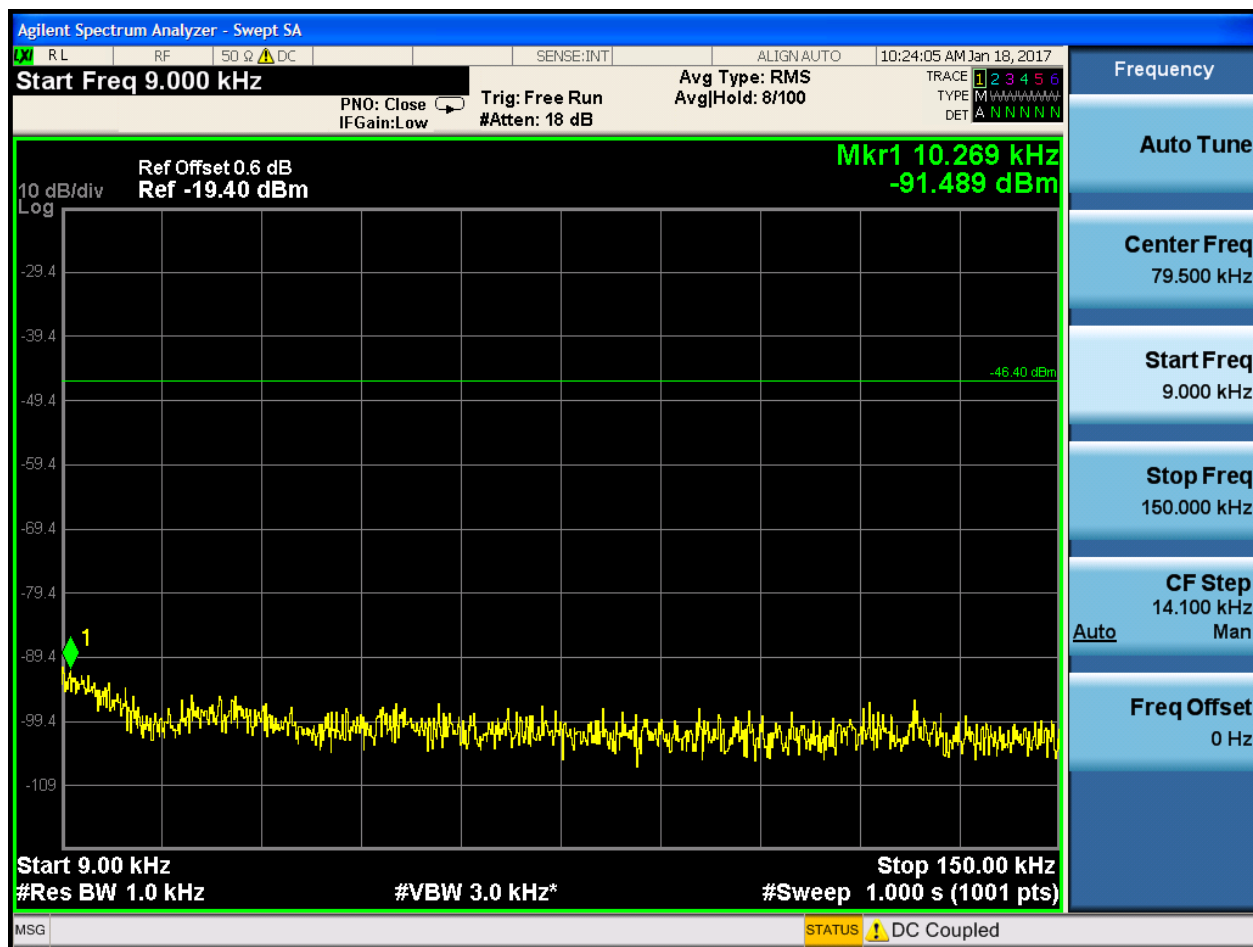
6.5 11G_M@Ant 1

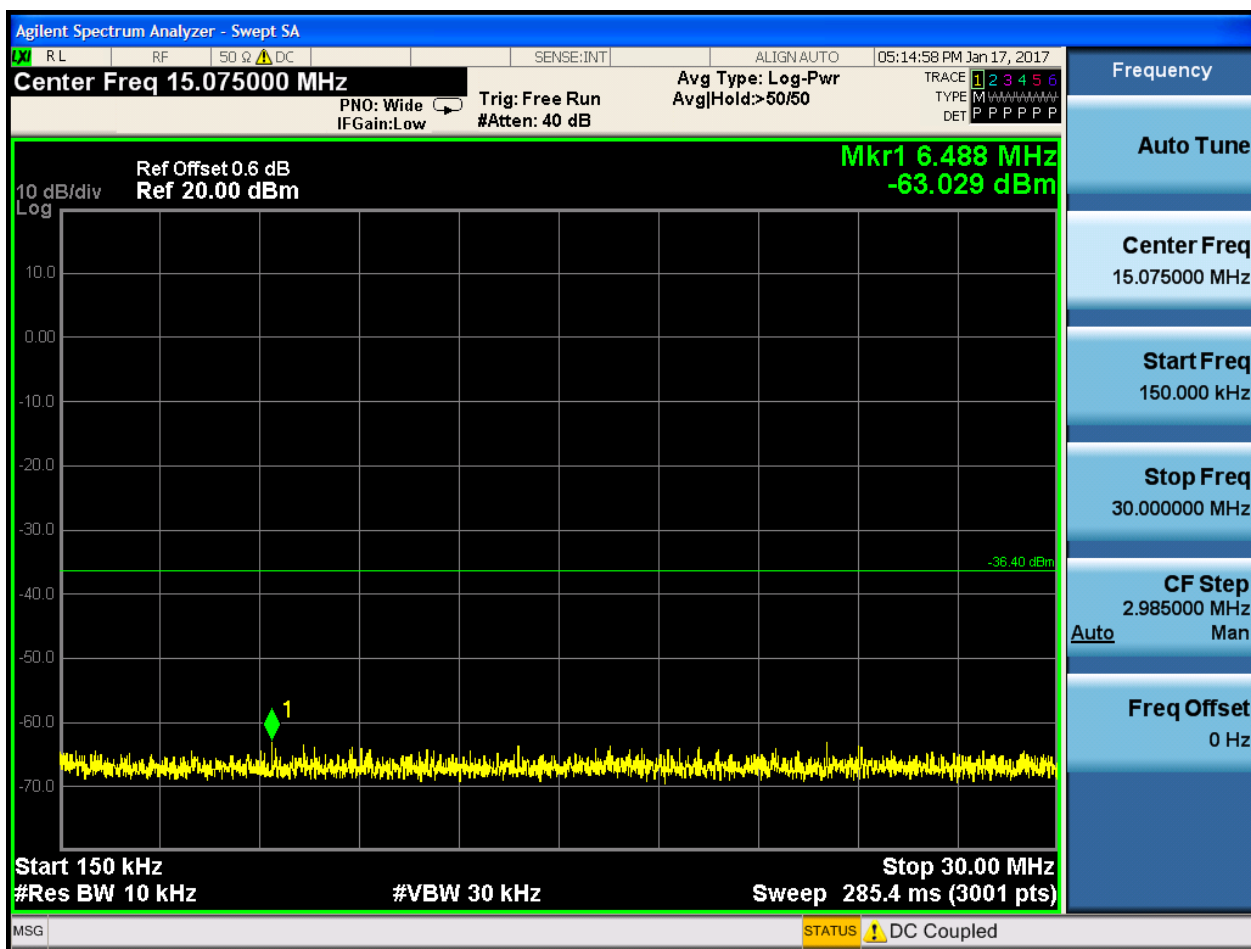
Pref:



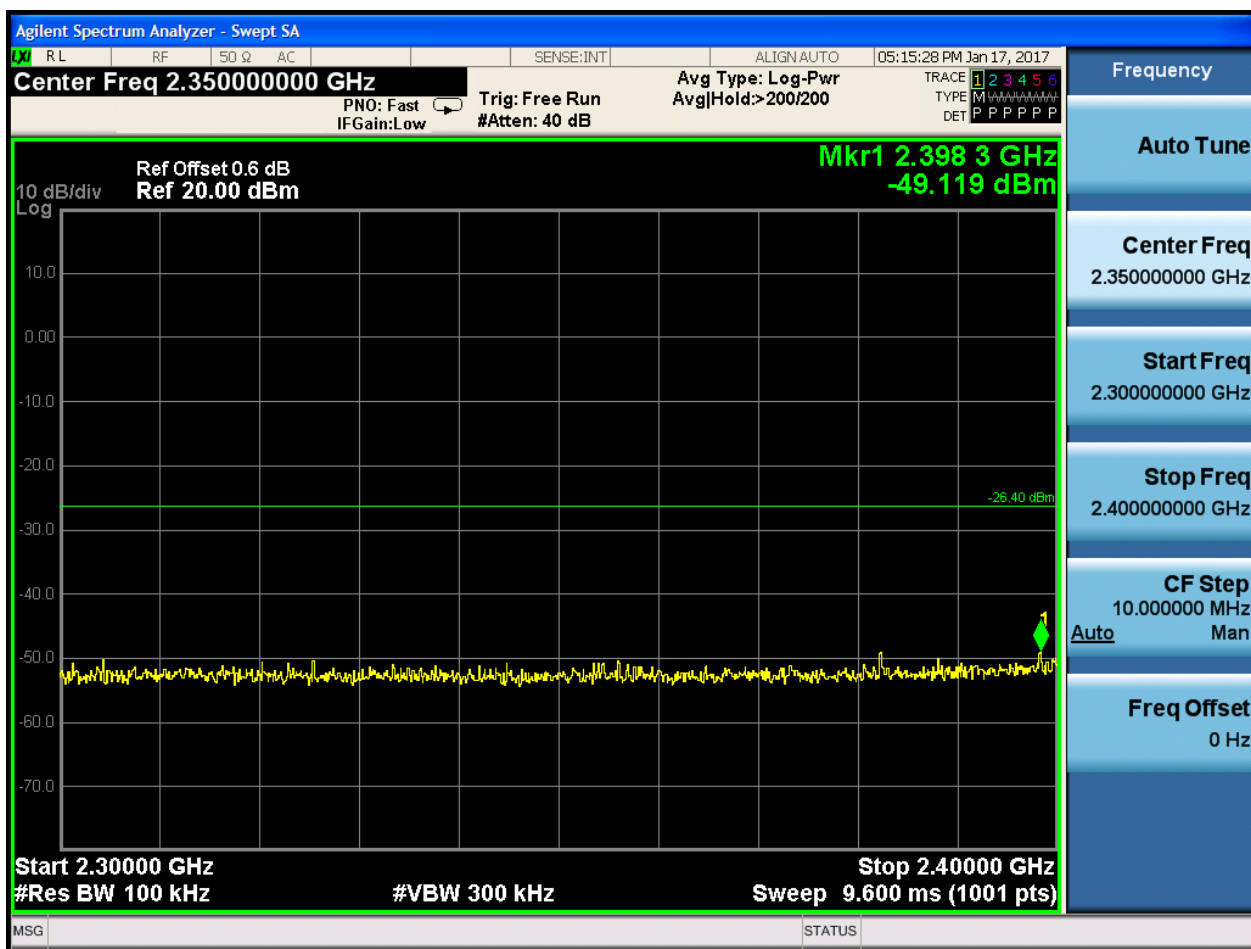


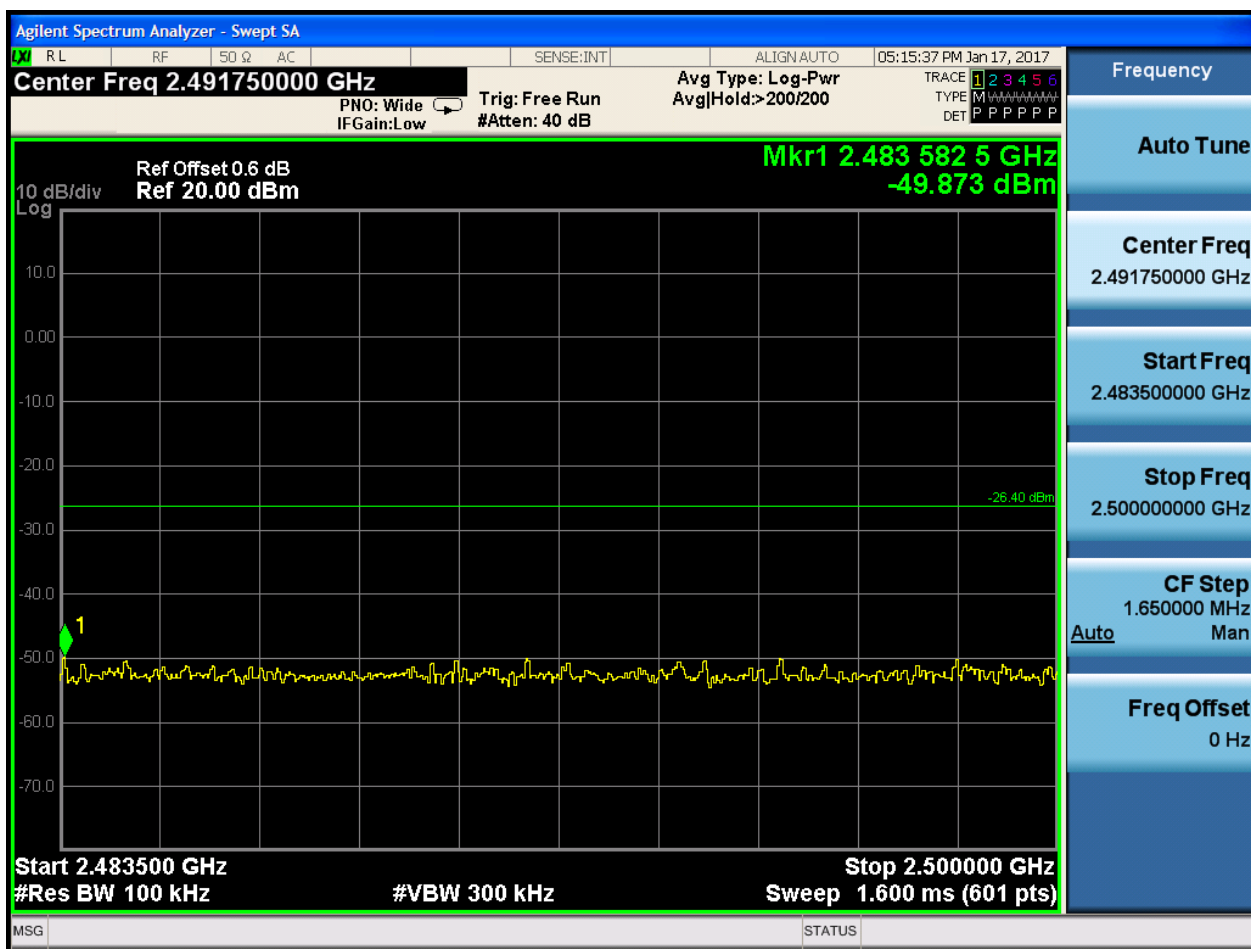
Puw:









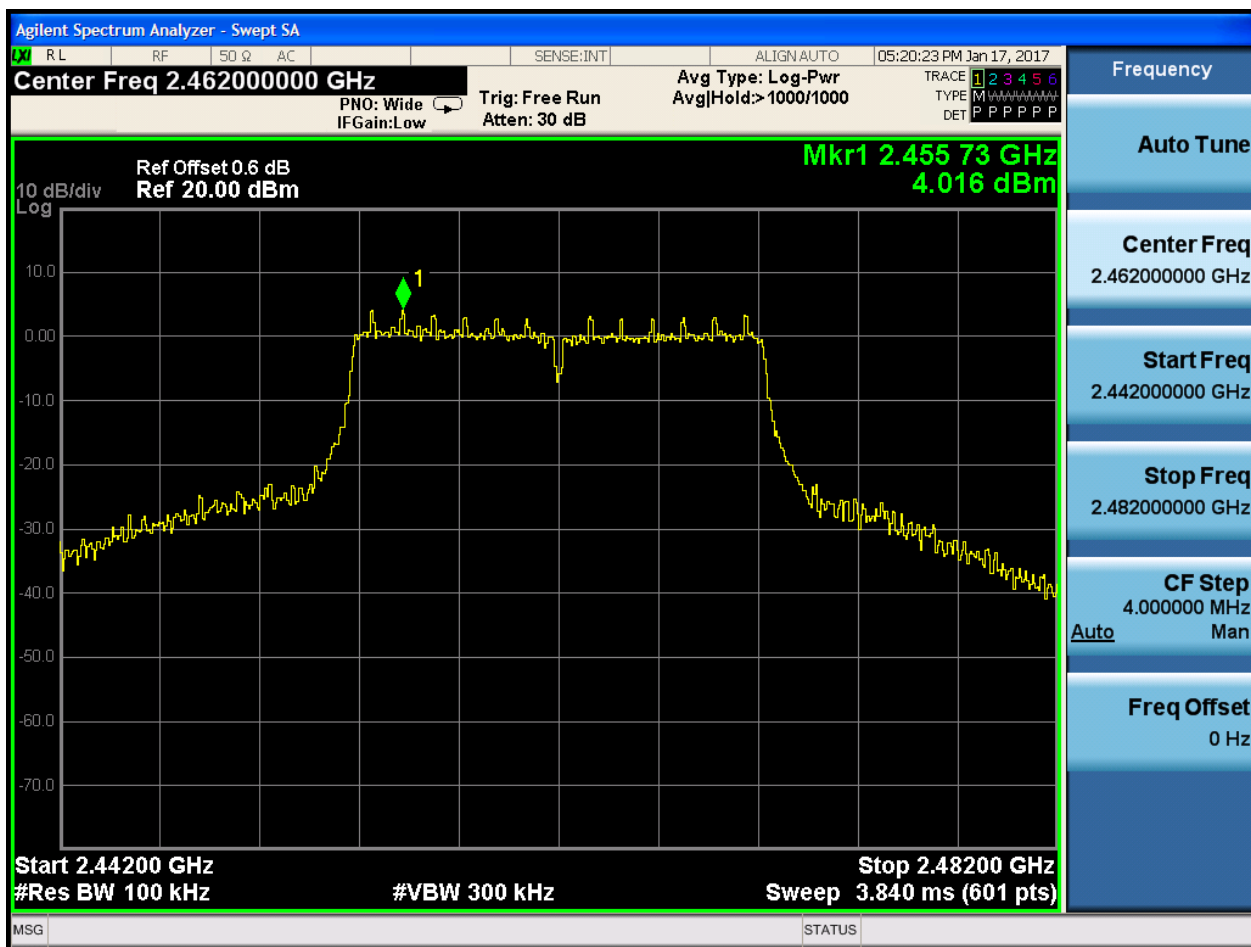






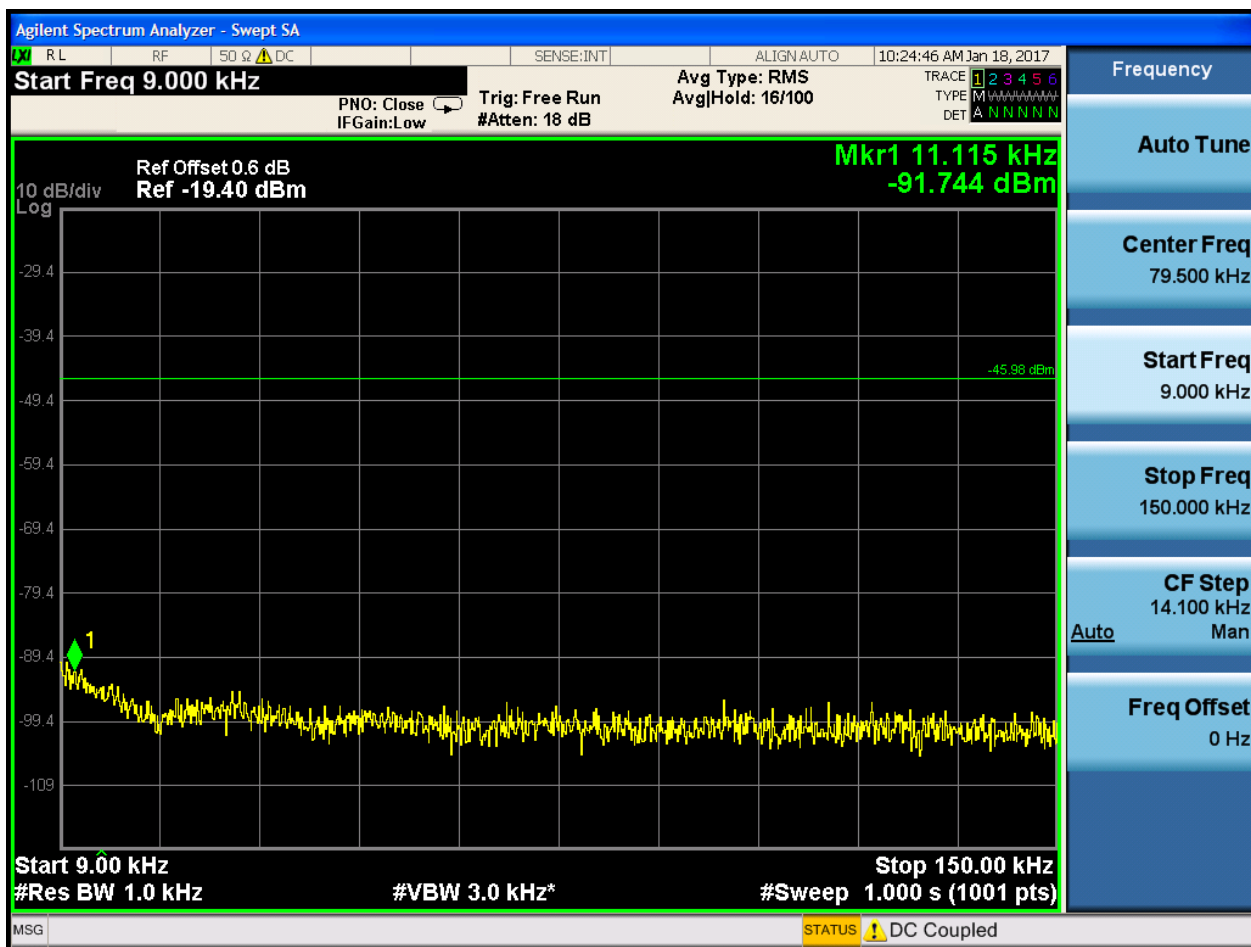
6.6 11G_H@Ant 1

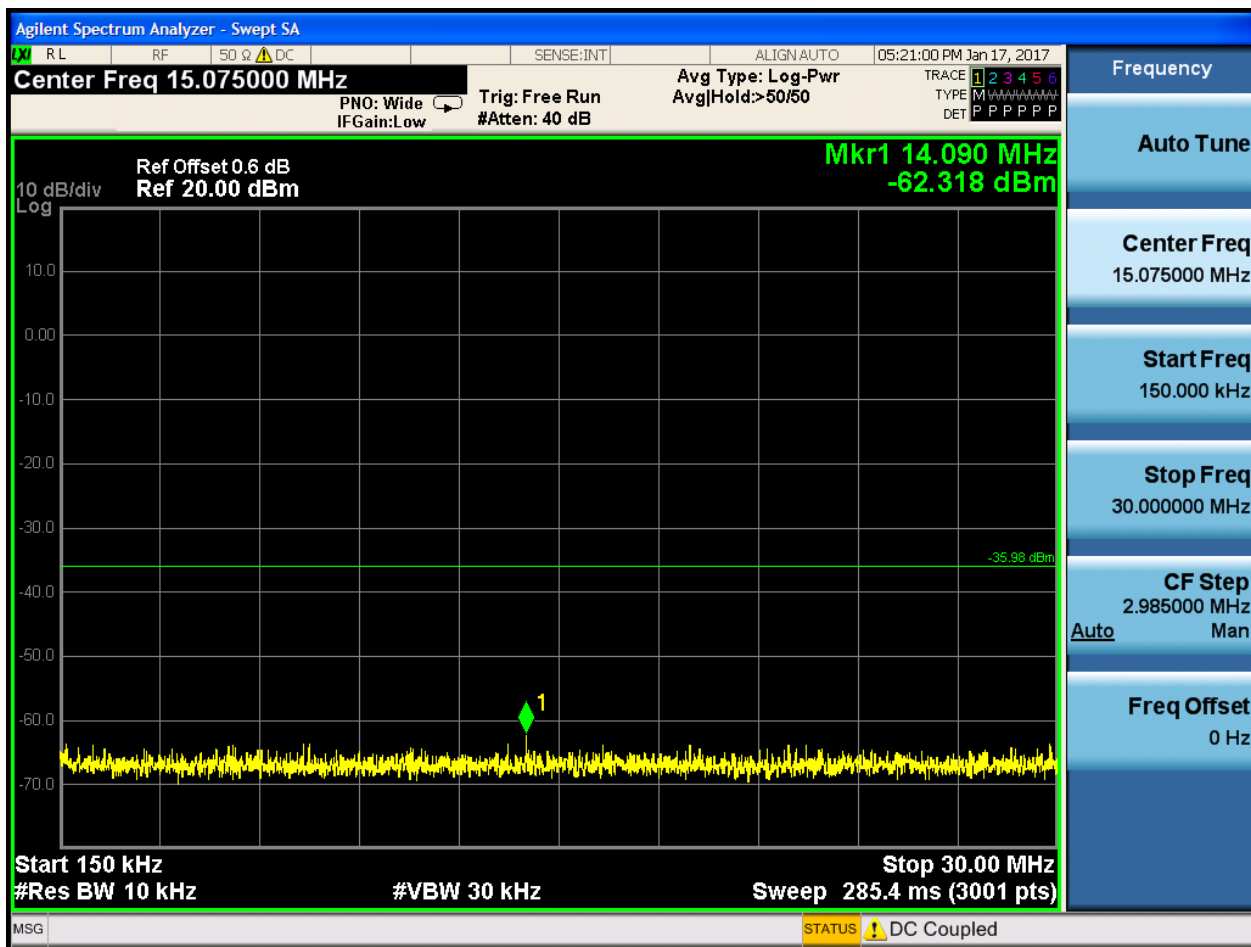
Pref:

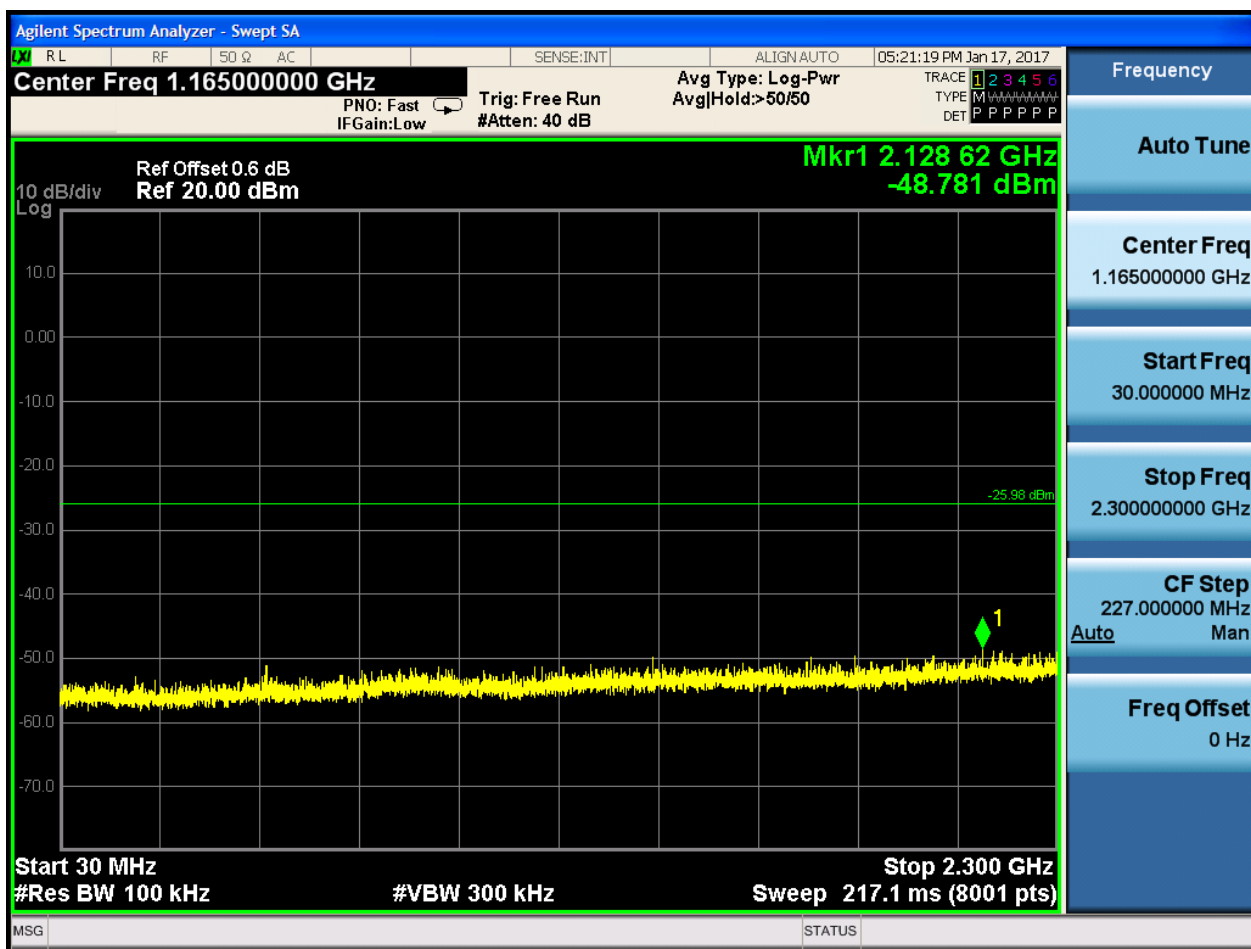


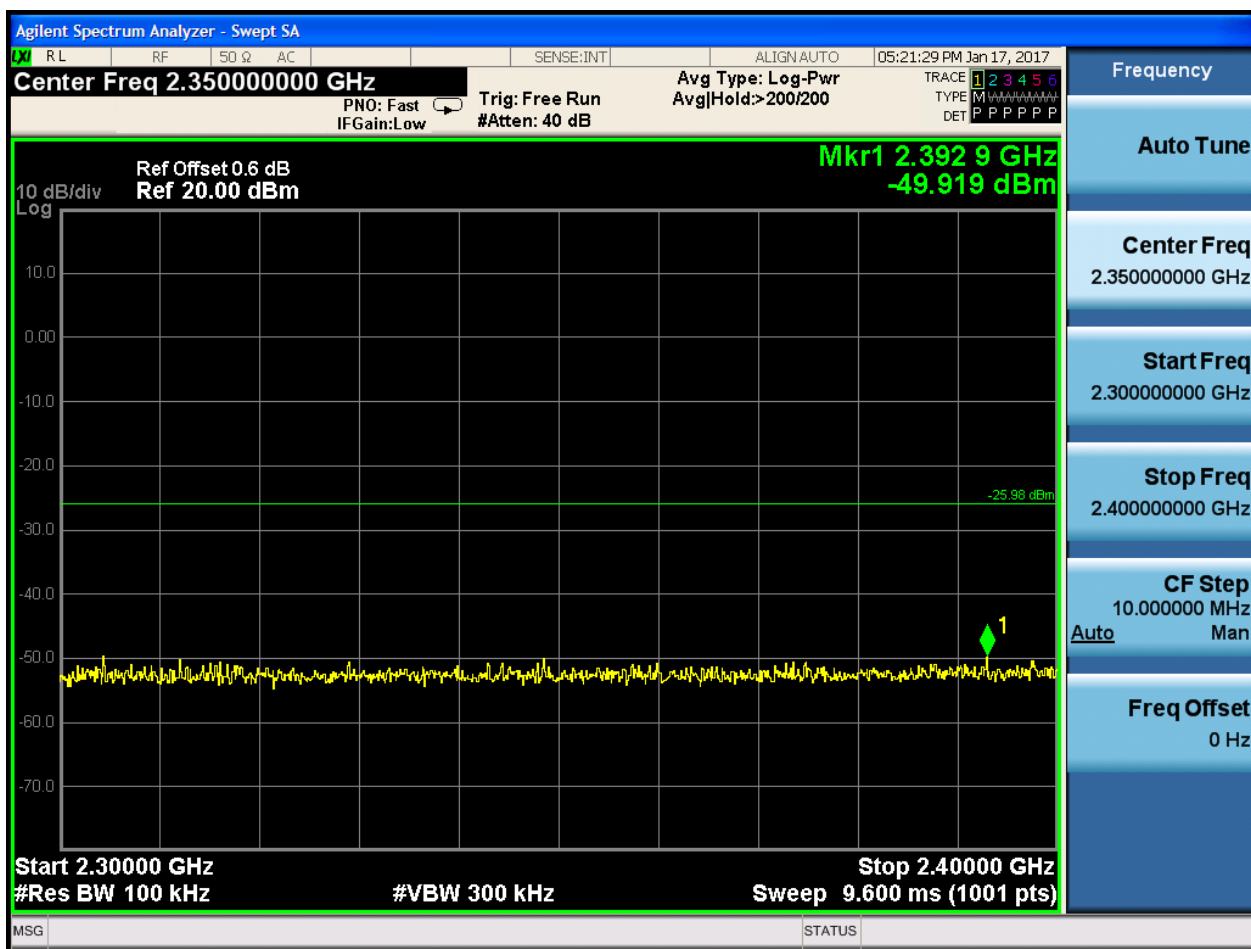


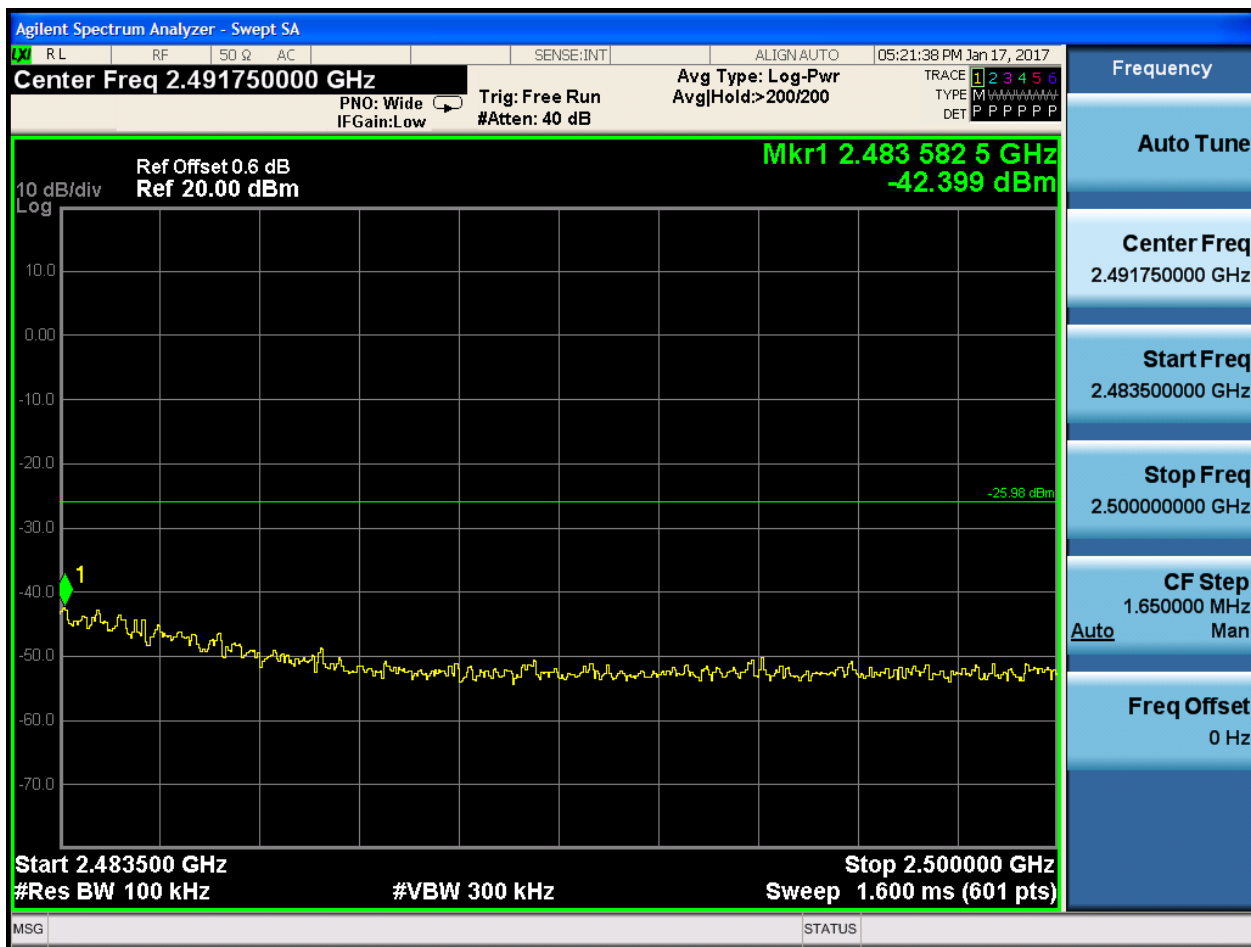
Puw:









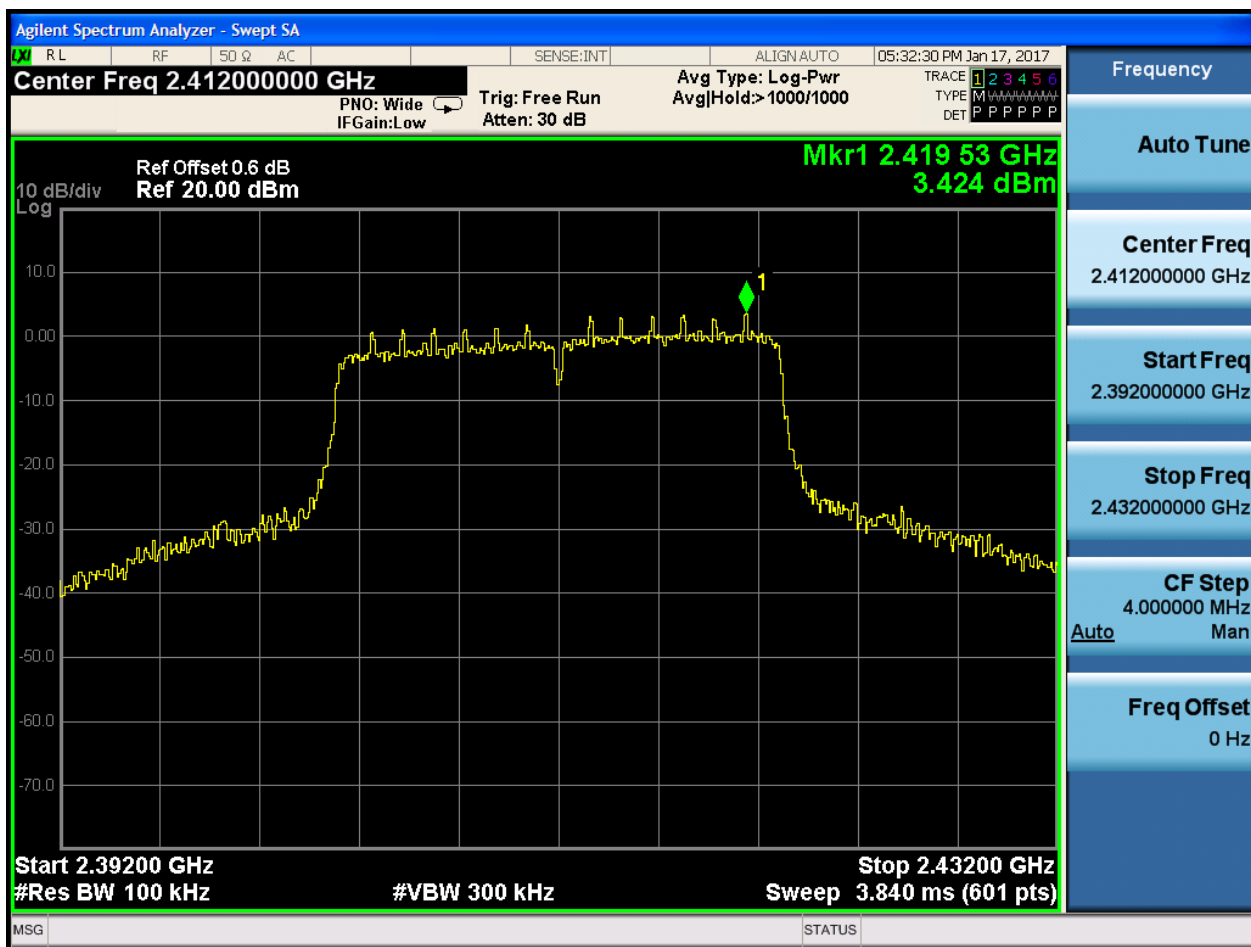






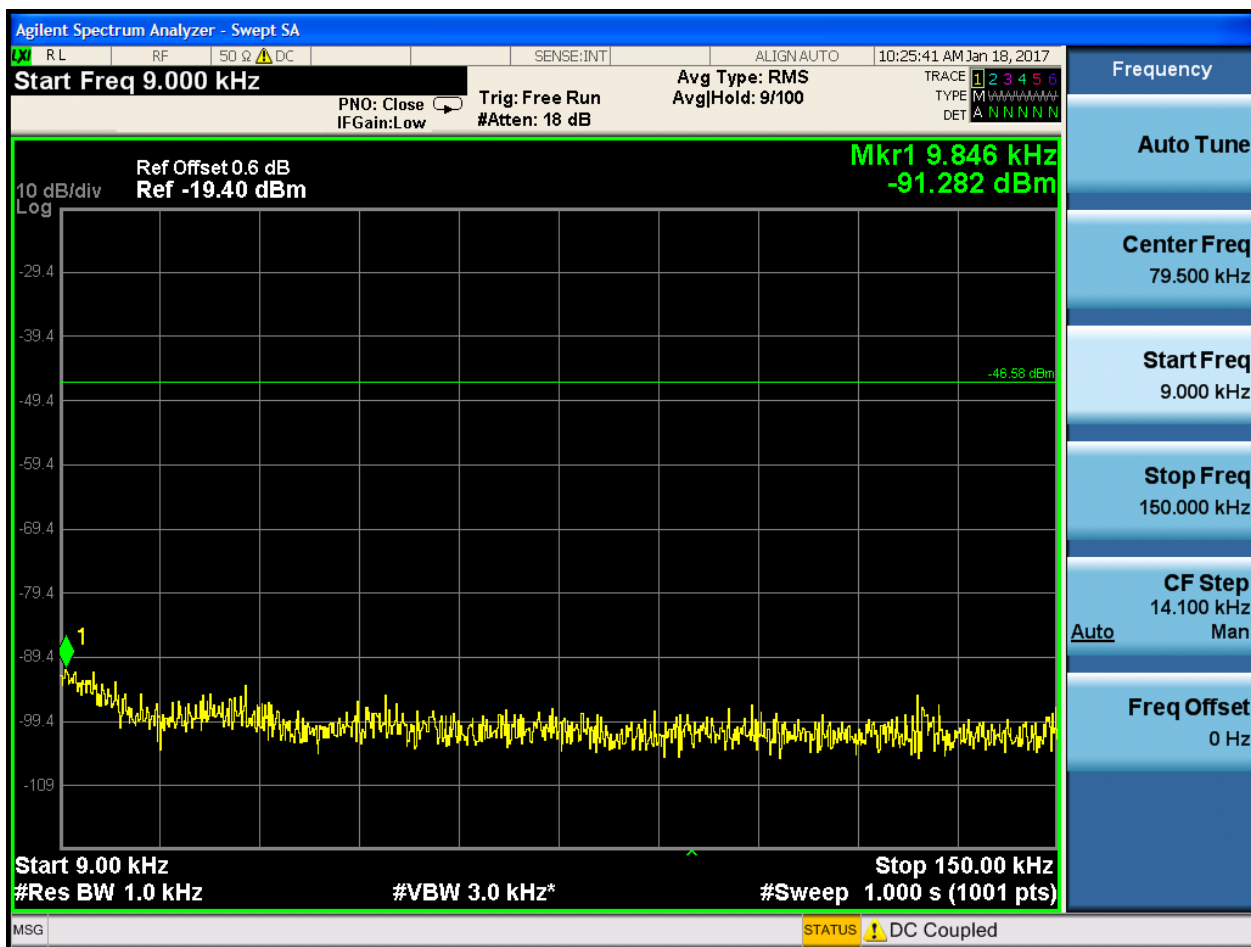
6.7 11N20_L@Ant 1

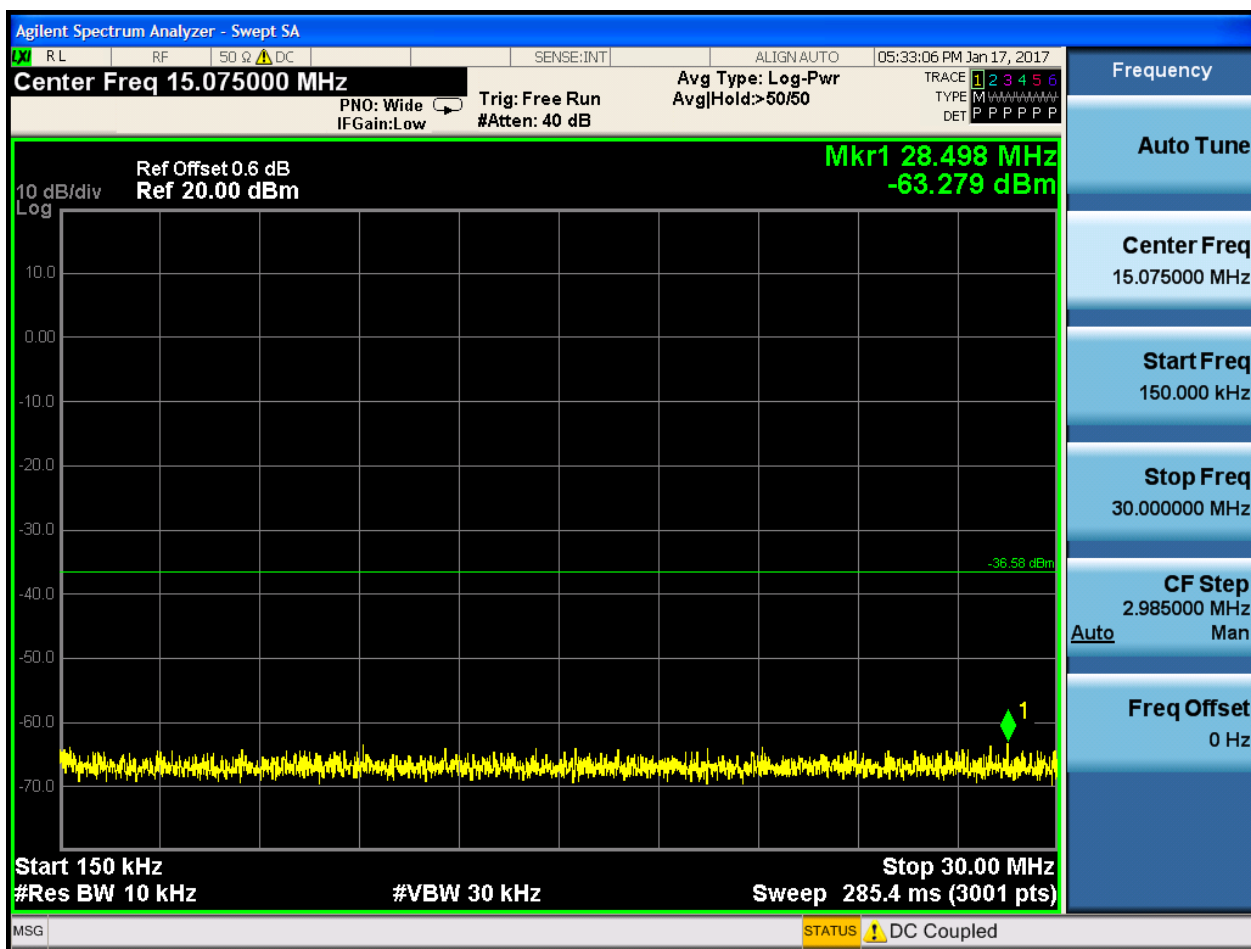
Pref:

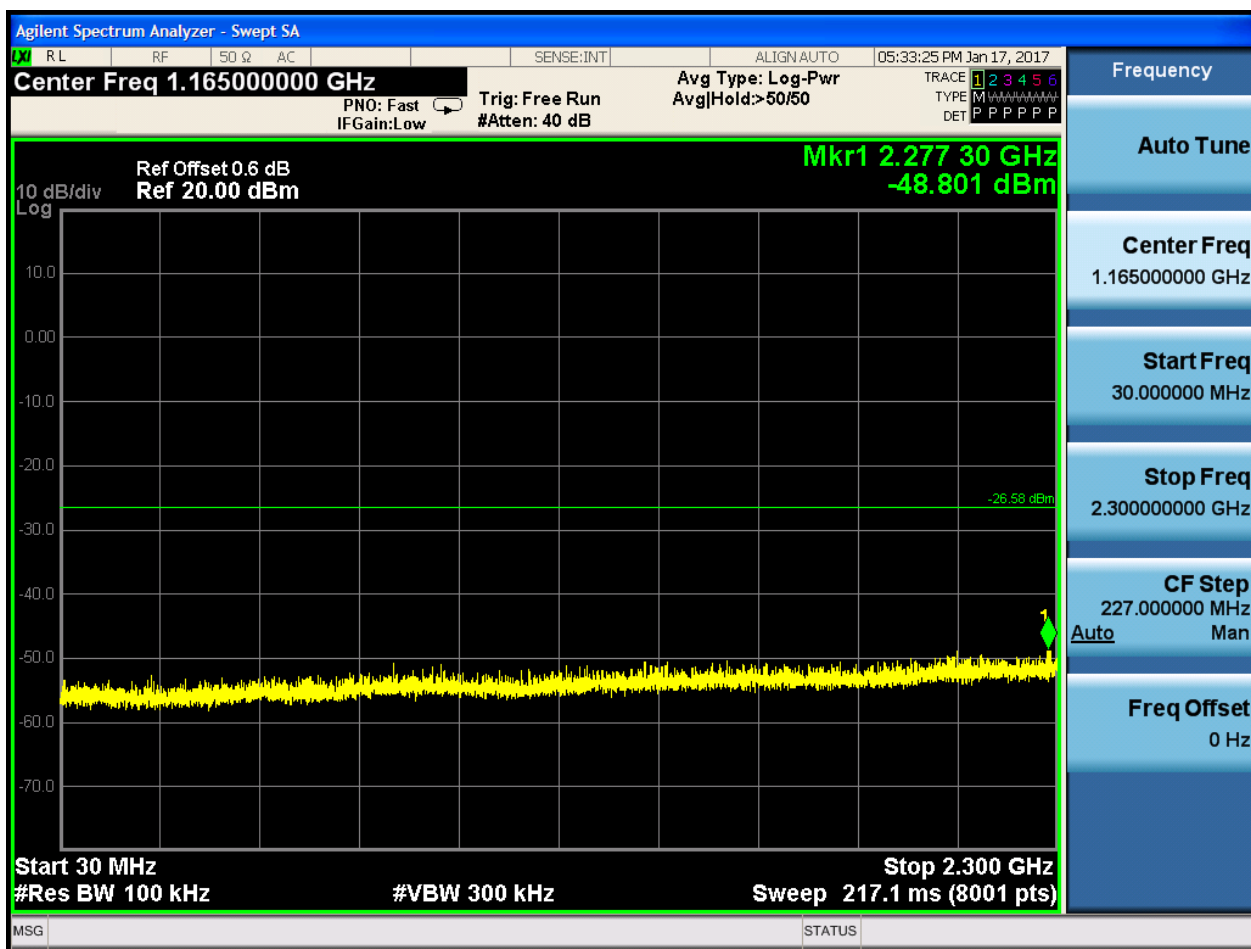


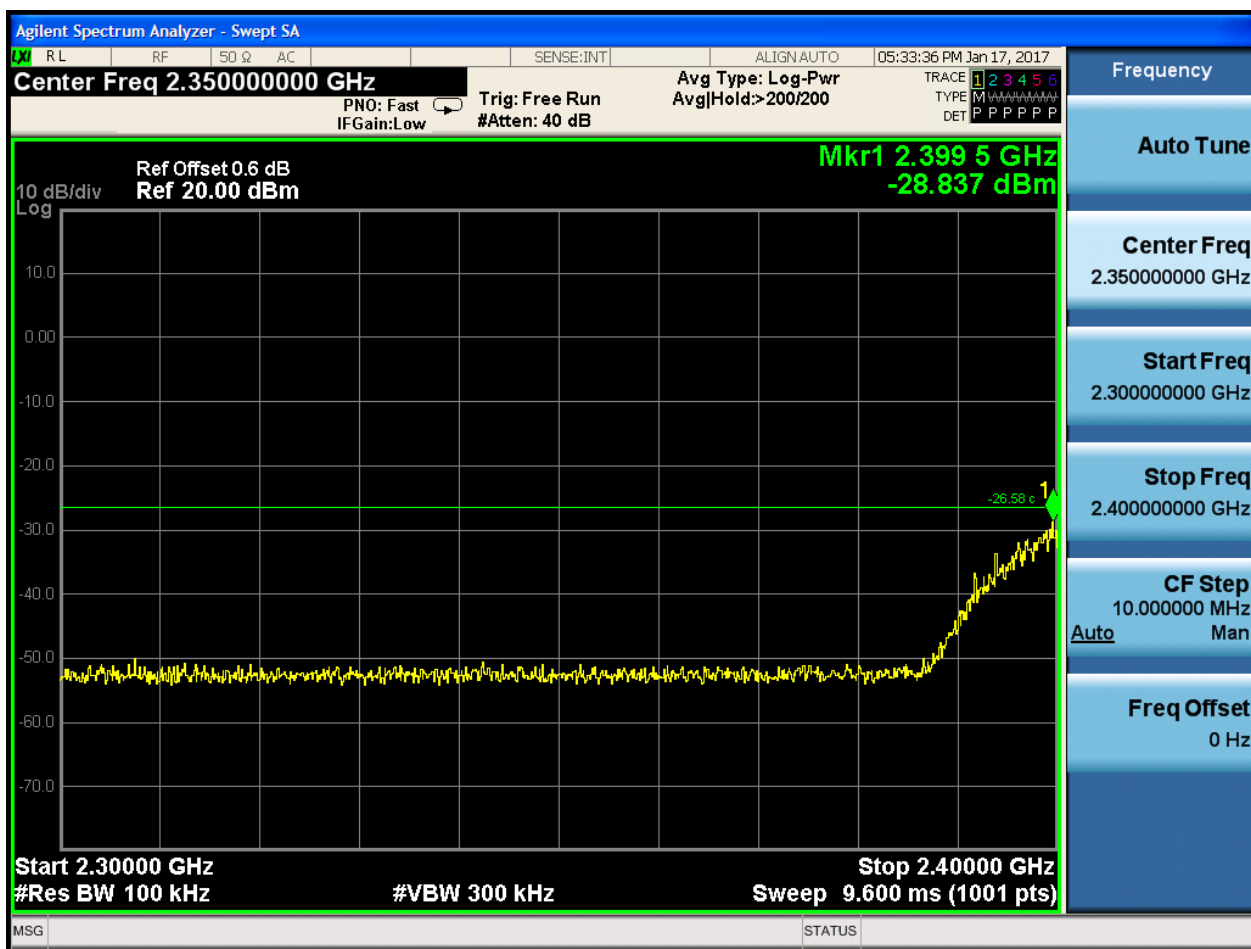


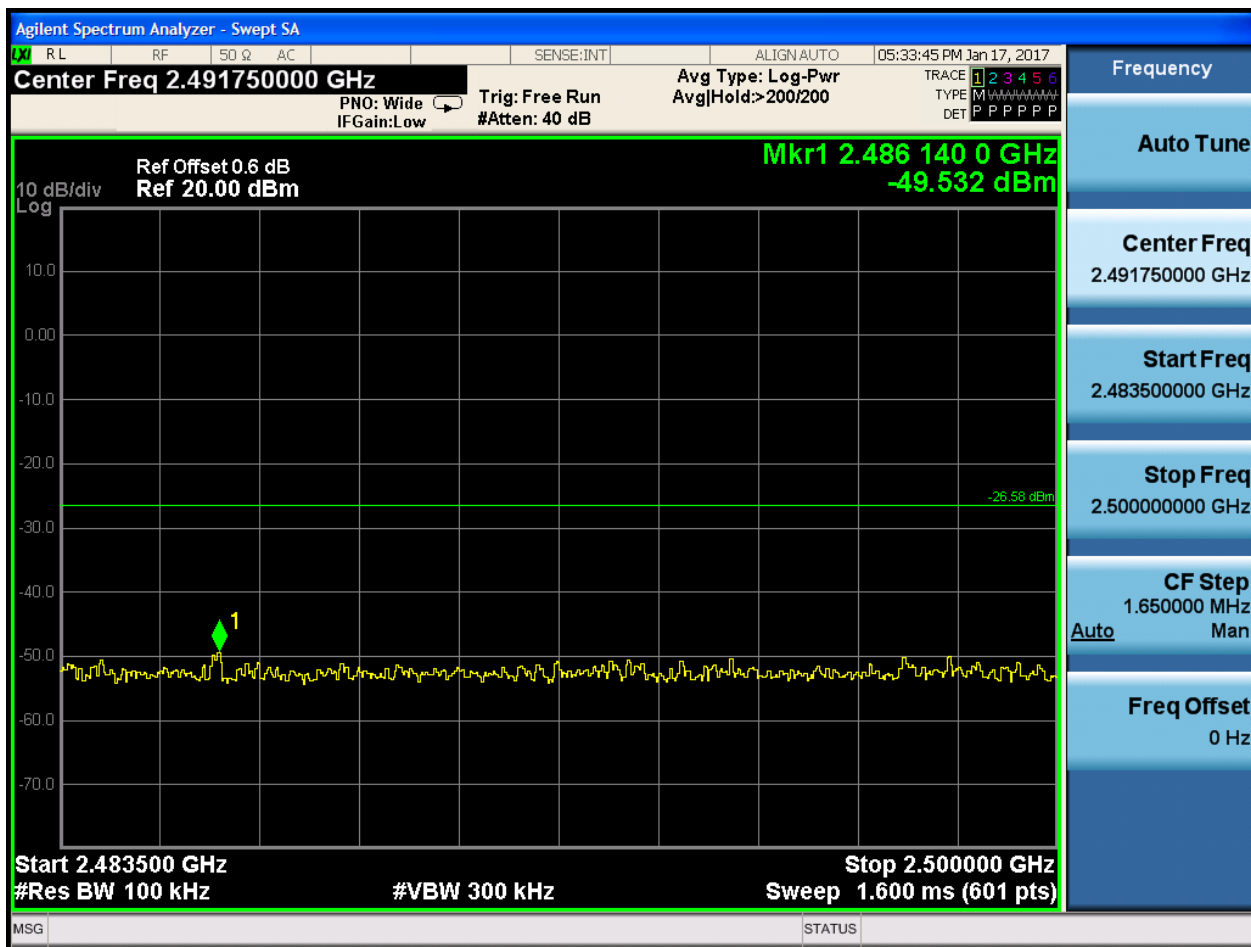
Puw:









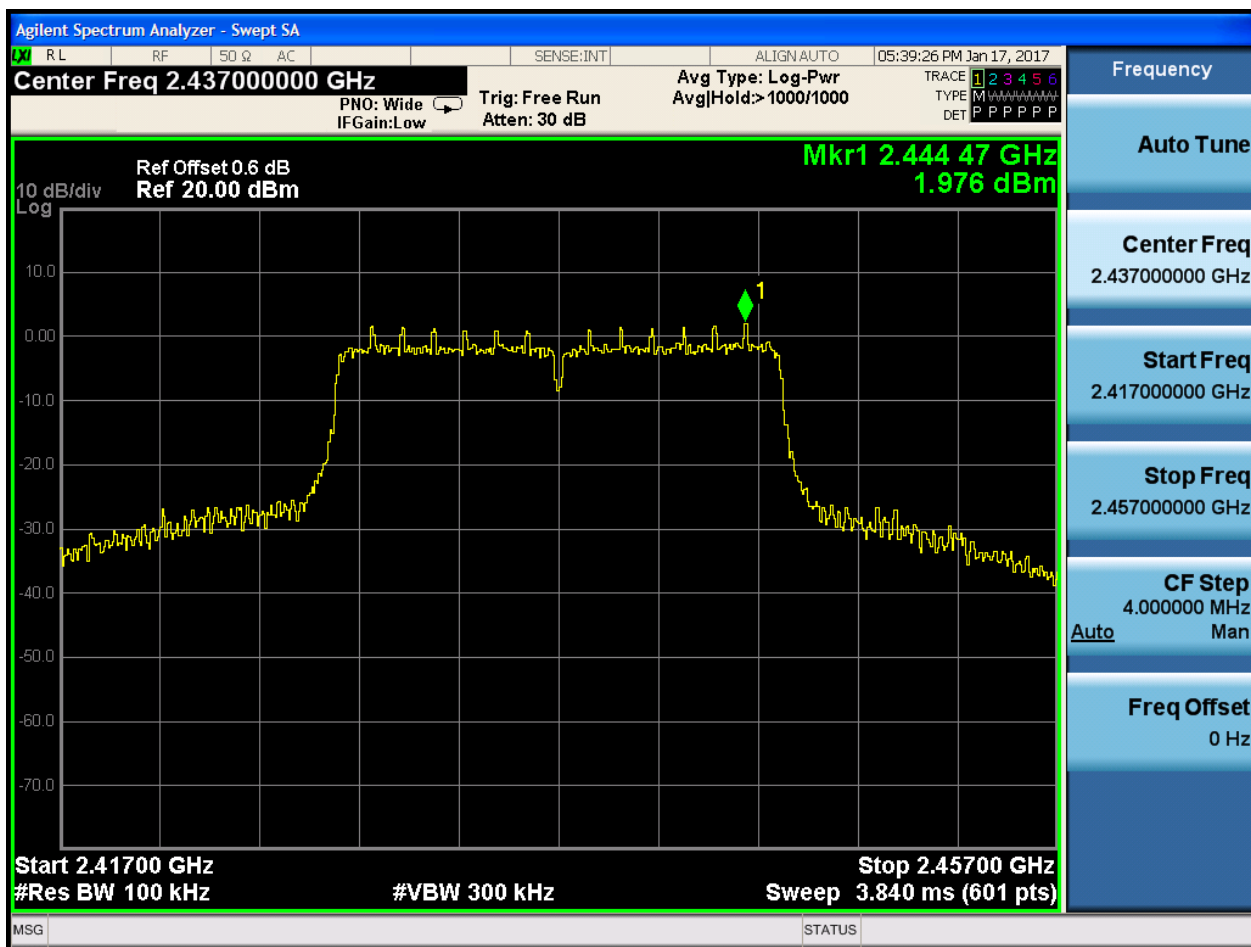


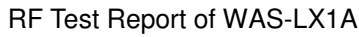




6.8 11N20_M@Ant 1

Pref:





Agilent Spectrum Analyzer - Swept SA

Start Freq 9.000 kHz

Ref Offset 0.6 dB
Ref -19.40 dBm

Mkr1 9.564 kHz
-91.832 dBm

Start 9.00 kHz
#Res BW 1.0 kHz

Stop 150.00 kHz
#Sweep 1.000 s (1001 pts)

#VBW 3.0 kHz*

10 dB/div
Log

Start Freq 9.000 kHz

Stop Freq 150.00 kHz

Center Freq 79.500 kHz

CF Step 14.100 kHz
Man

Freq Offset 0 Hz

Auto Tune

Auto

DC Coupled

