Appendix for Testreport

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.

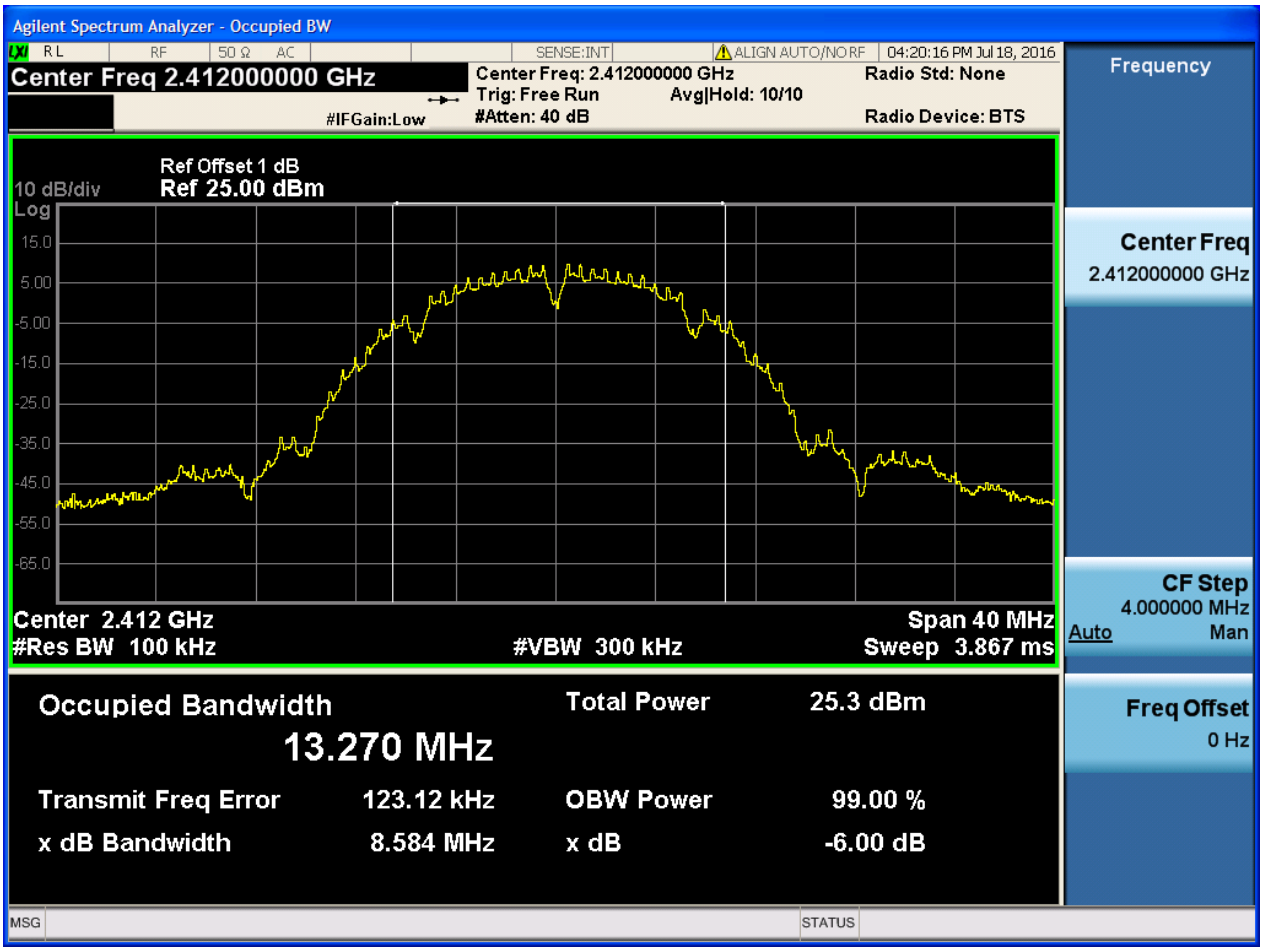
For measurements on smart antenna systems (devices with multiple transmit chains), the test is performed at each chain, and used as respective results for each chain.

Part I - Test Results

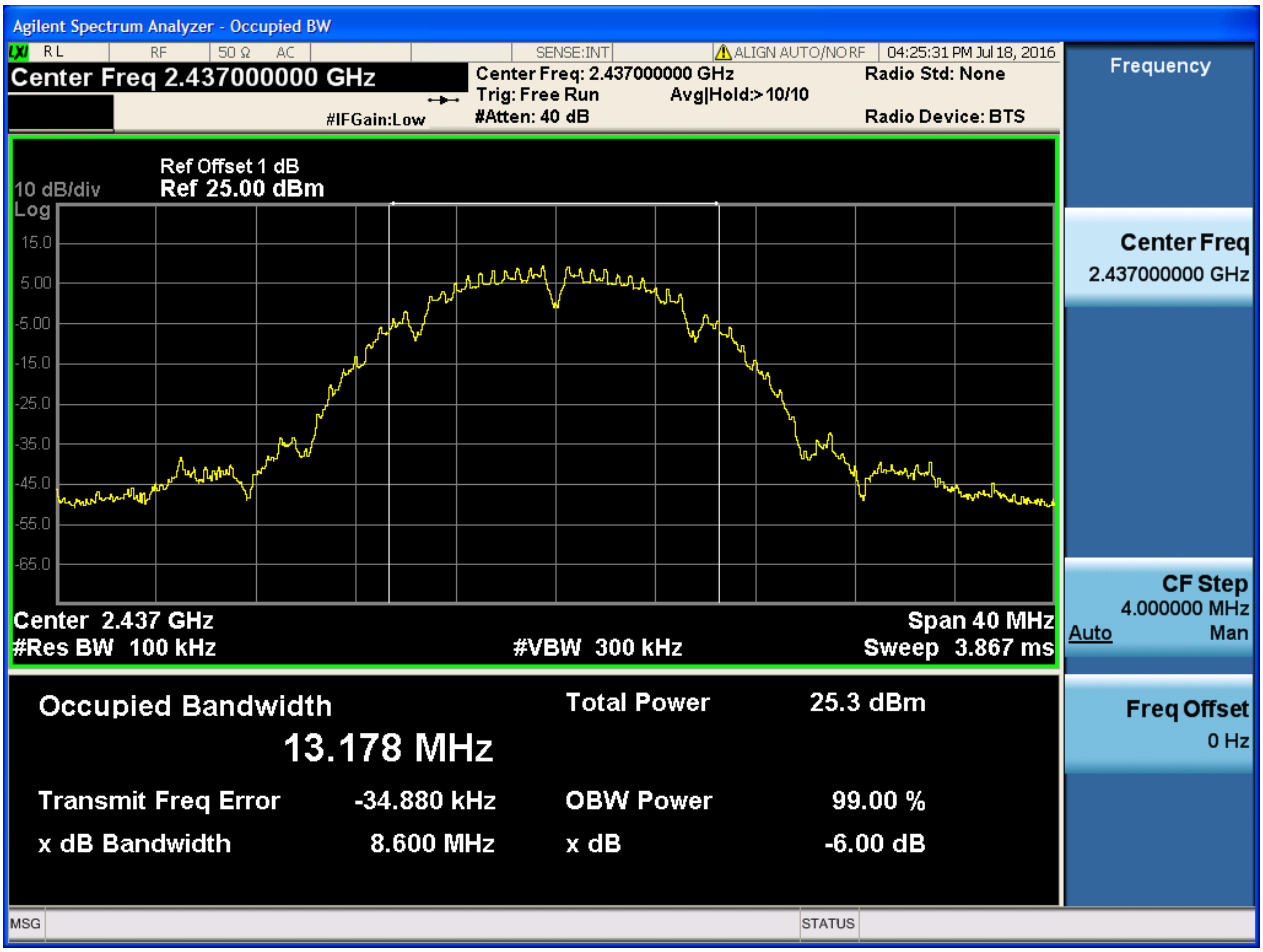
Test Mode	Test Channel	Frequency[MHz]	Ant	DTS6dBBW[MHz]	Verdict
11B	L	2412	Ant 1	8.58	pass
11B	M	2437	Ant 1	9.07	pass
11B	H	2462	Ant 1	8.58	pass
11G	L	2412	Ant 1	16.38	pass
11G	M	2437	Ant 1	16.41	pass
11G	H	2462	Ant 1	16.39	pass
11N20	L	2412	Ant 1	17.61	pass
11N20	M	2437	Ant 1	17.65	pass
11N20	H	2462	Ant 1	17.60	pass

Part II - Test Plots

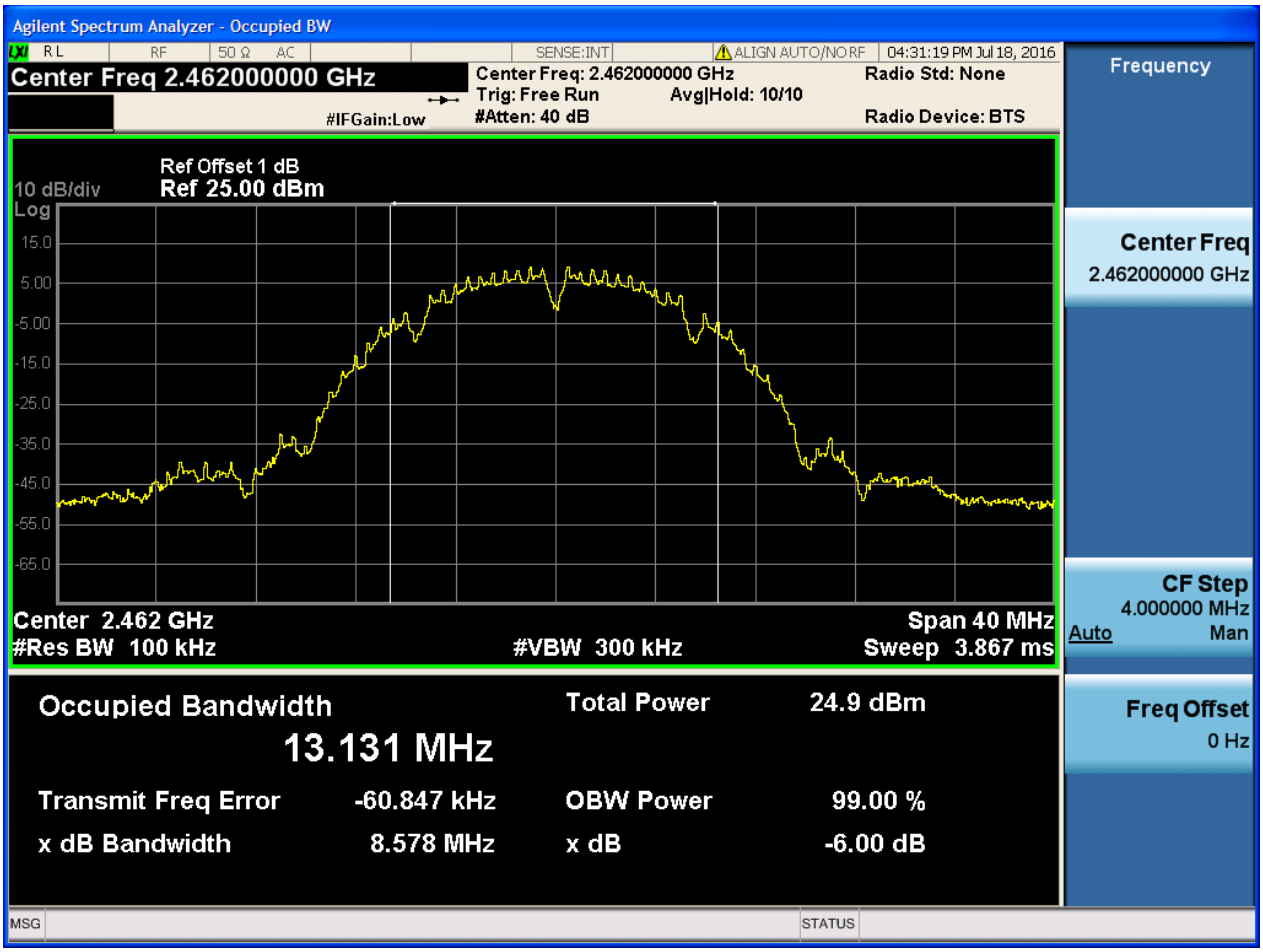
2.1 11B_L@Ant 1



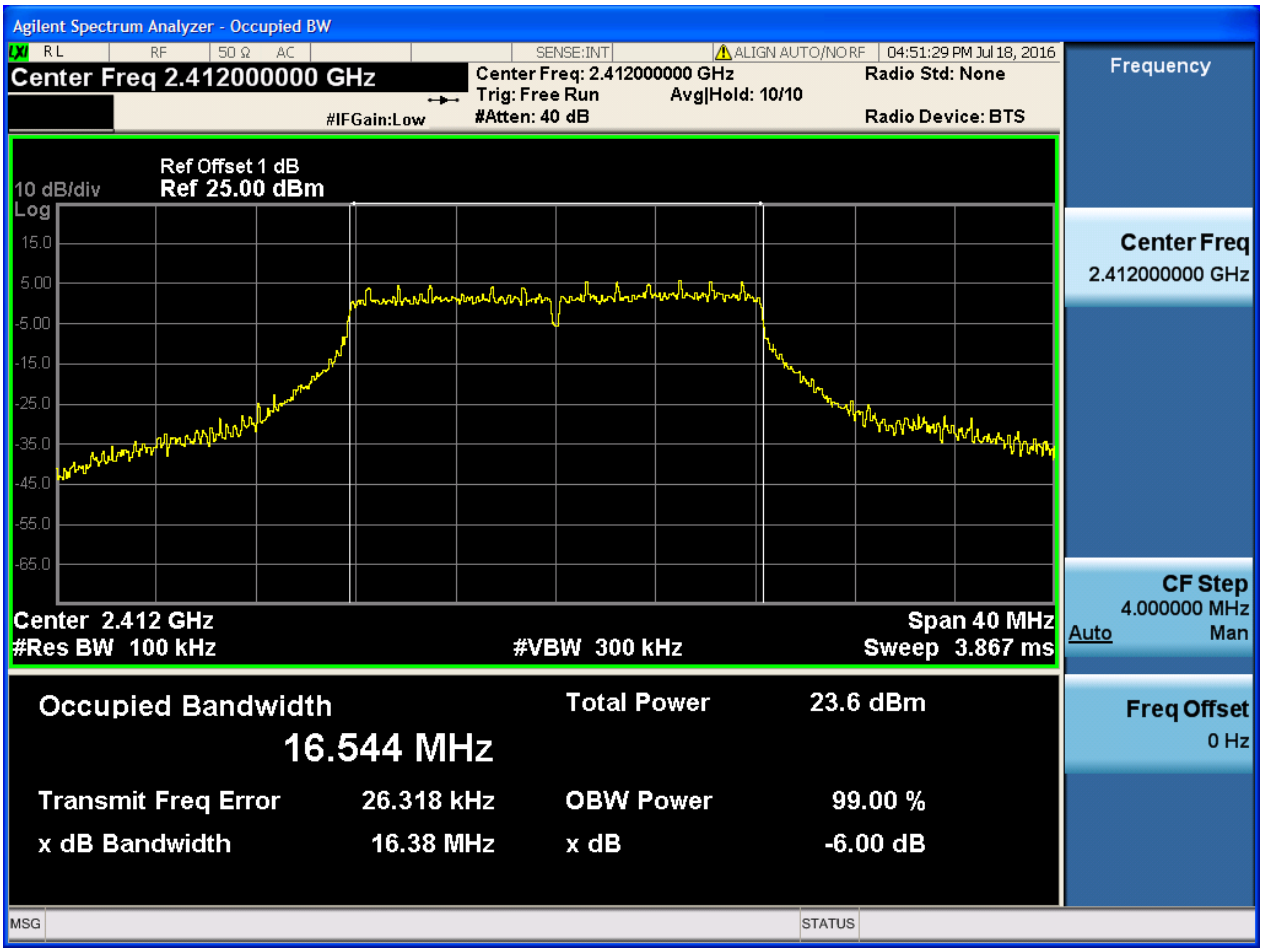
2.3 11B_M@Ant 1



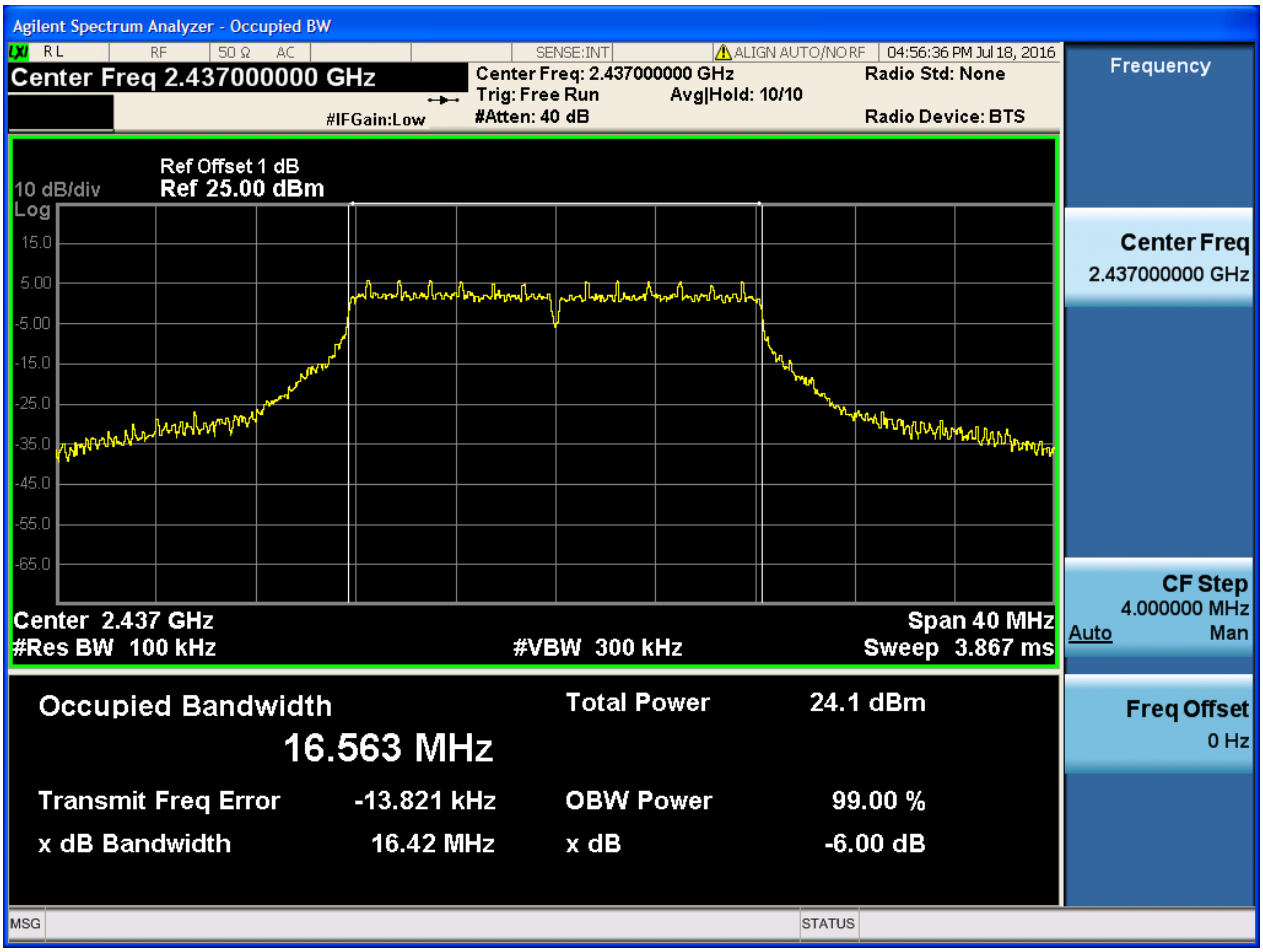
2.5 11B_H@Ant 1



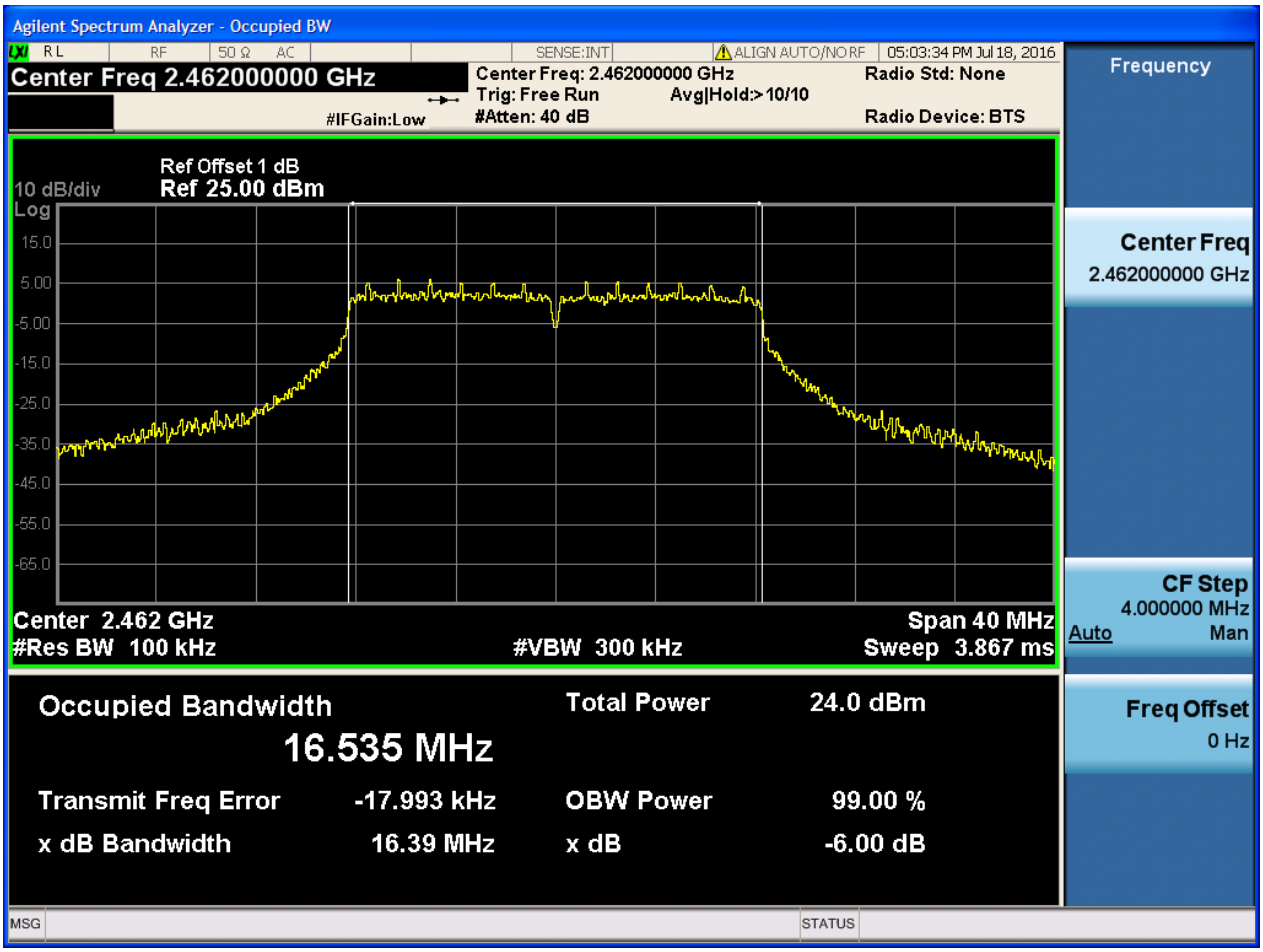
2.7 11G_L@Ant 1



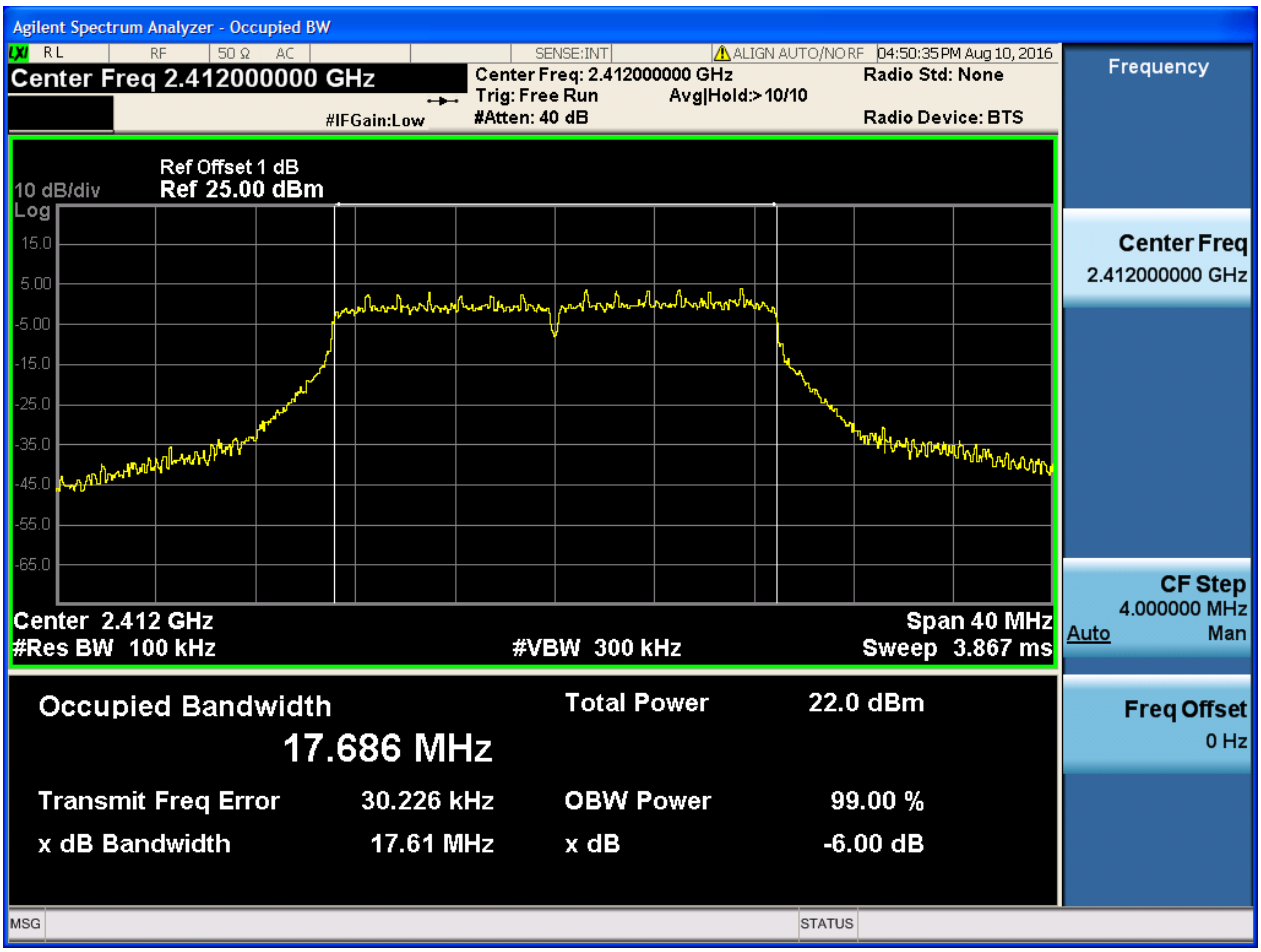
2.9 11G_M@Ant 1



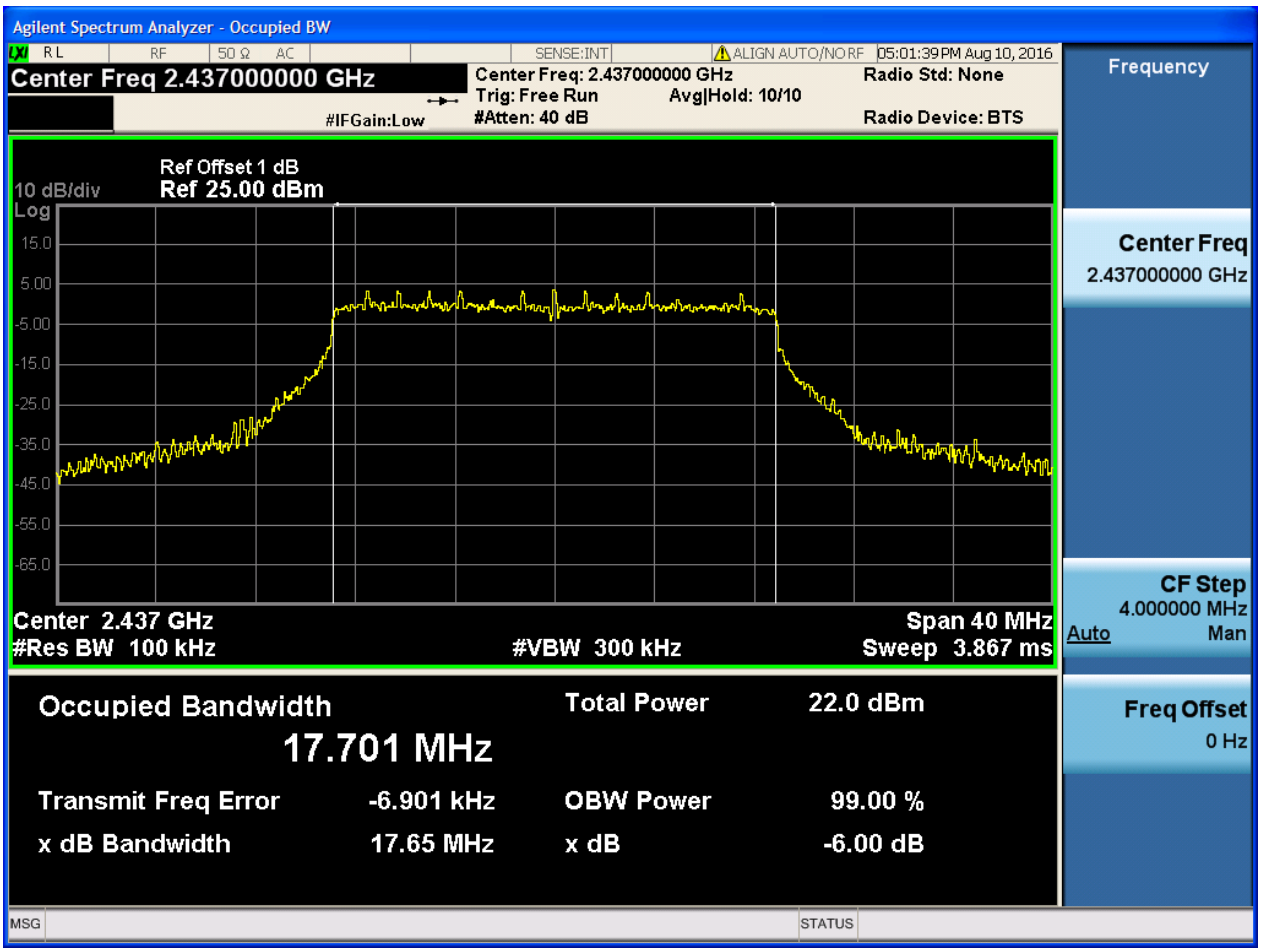
2.11 11G_H@Ant 1



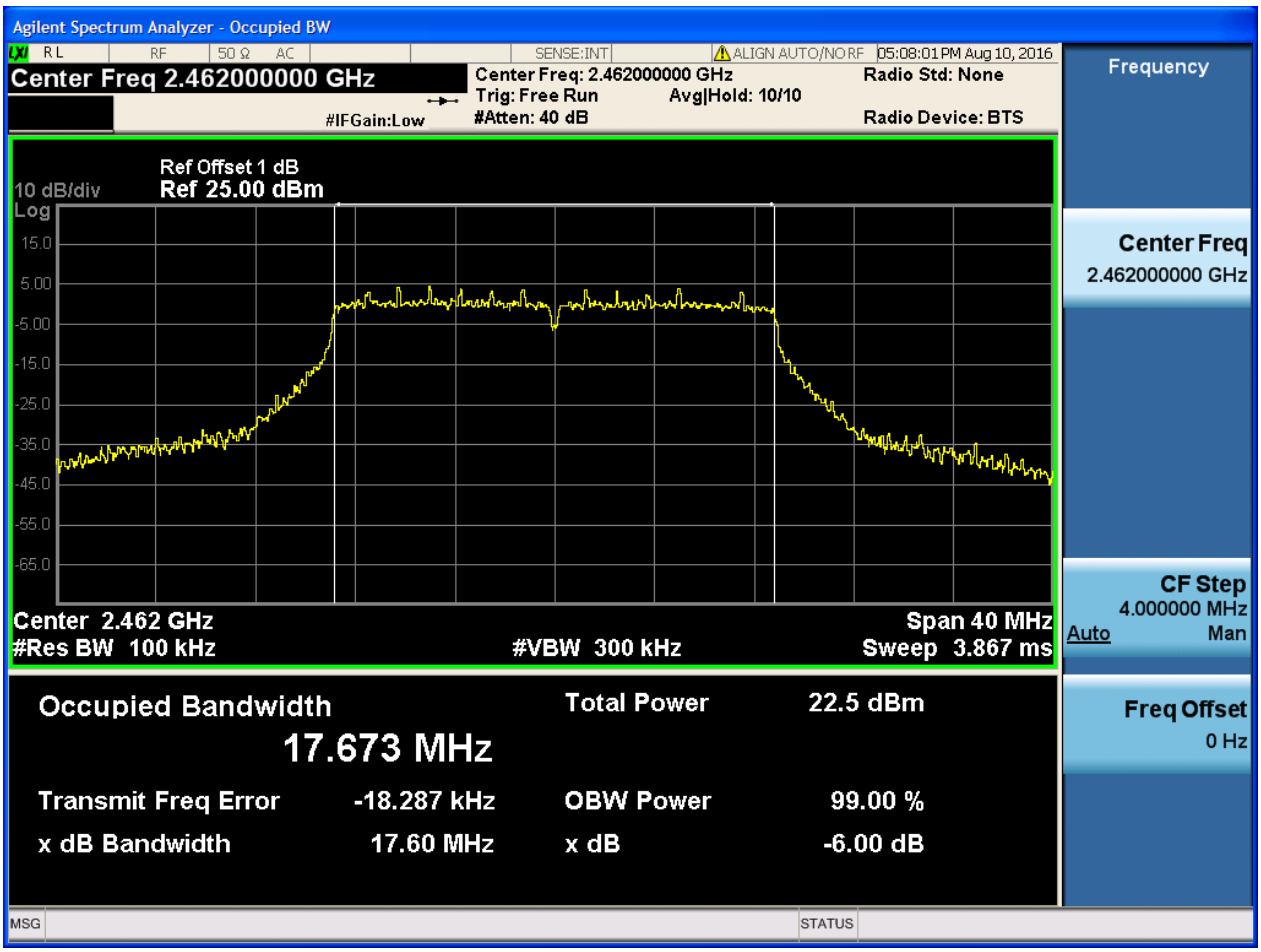
2.13 11N20_L@Ant 1



2.15 11N20_M@Ant 1



2.17 11N20_H@Ant 1



Appendix B: Occupied Bandwidth

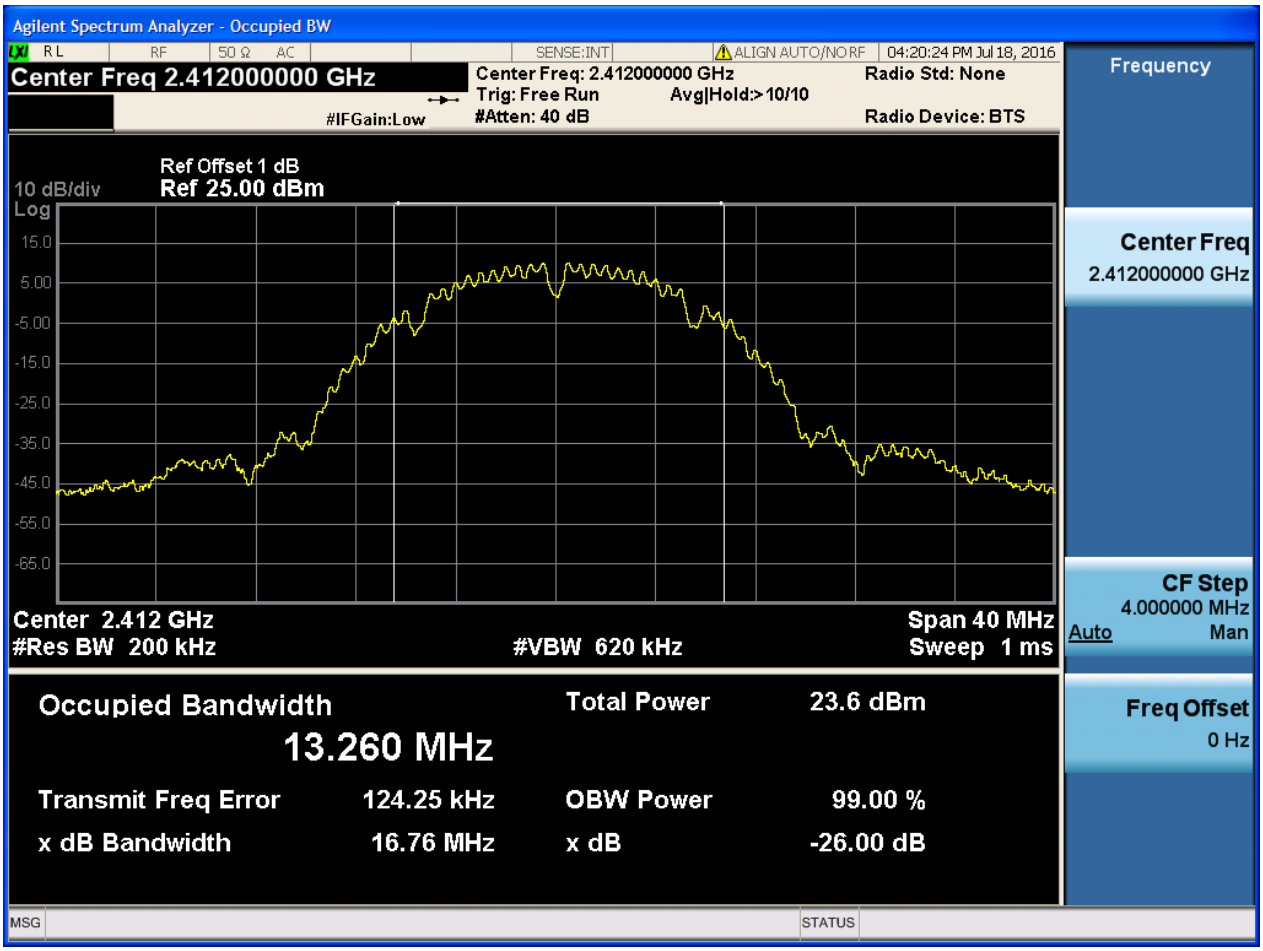
For measurements on smart antenna systems (devices with multiple transmit chains), the test is performed at each chain, and used as respective results for each chain.

Part I - Test Results

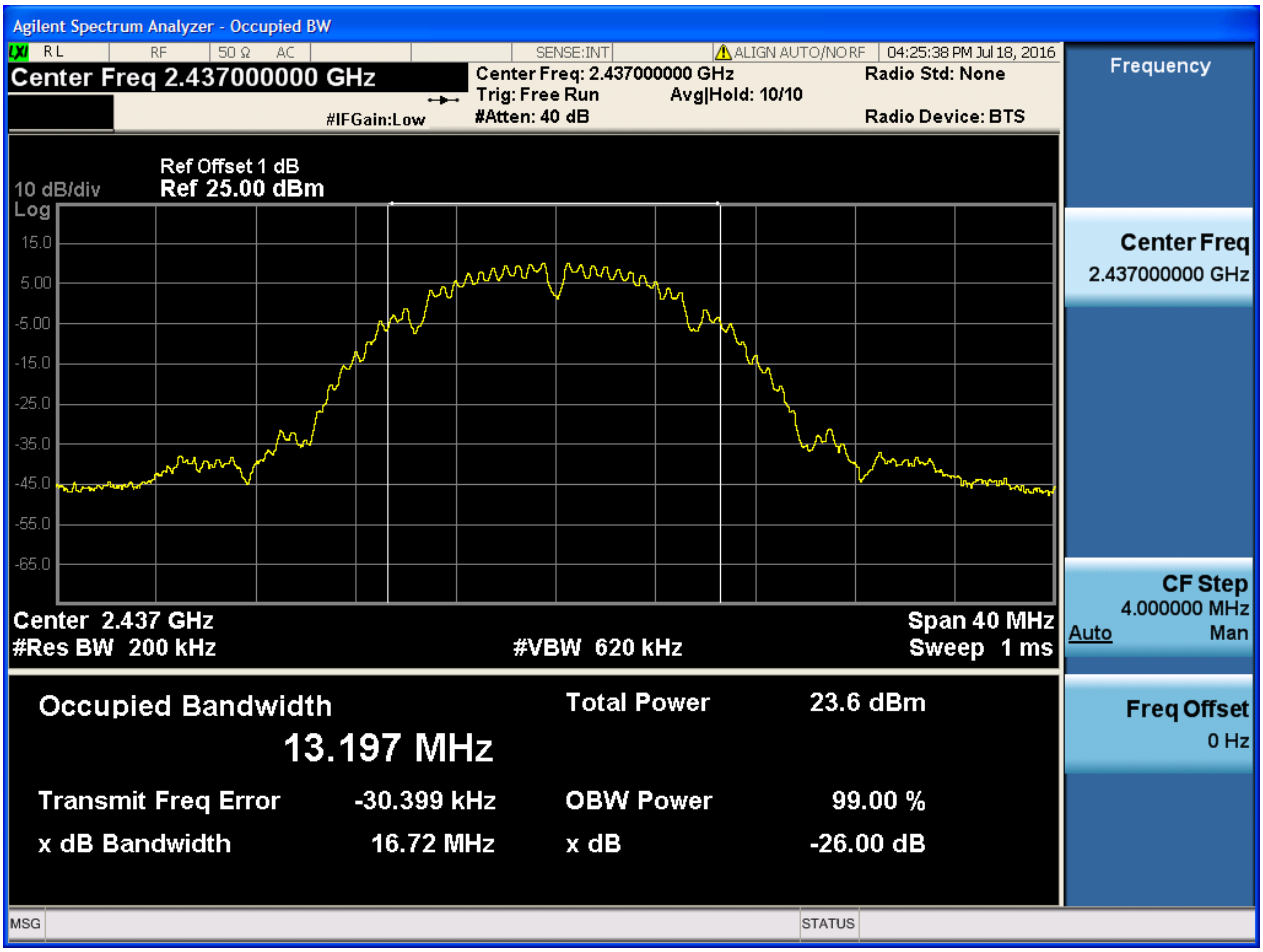
Test Mode	Test Channel	Frequency[MHz]	Ant	Occupied Bandwidth [MHz]	Verdict
11B	L	2412	Ant 1	13.26	pass
11B	M	2437	Ant 1	13.20	pass
11B	H	2462	Ant 1	13.14	pass
11G	L	2412	Ant 1	16.79	pass
11G	M	2437	Ant 1	16.84	pass
11G	H	2462	Ant 1	16.77	pass
11N20	L	2412	Ant 1	17.83	pass
11N20	M	2437	Ant 1	17.84	pass
11N20	H	2462	Ant 1	17.85	pass

Part II - Test Plots

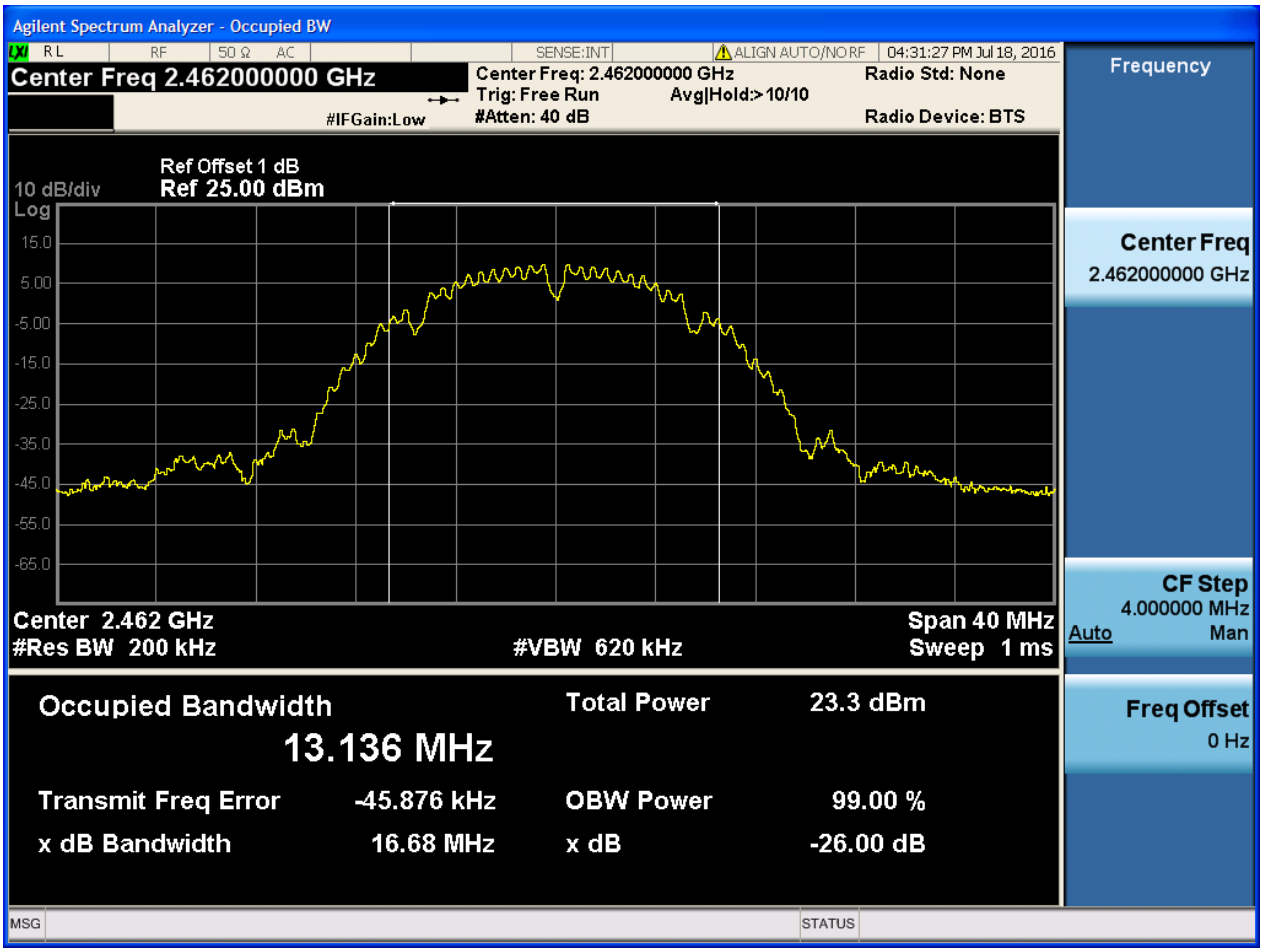
2.1 11B_L@Ant 1



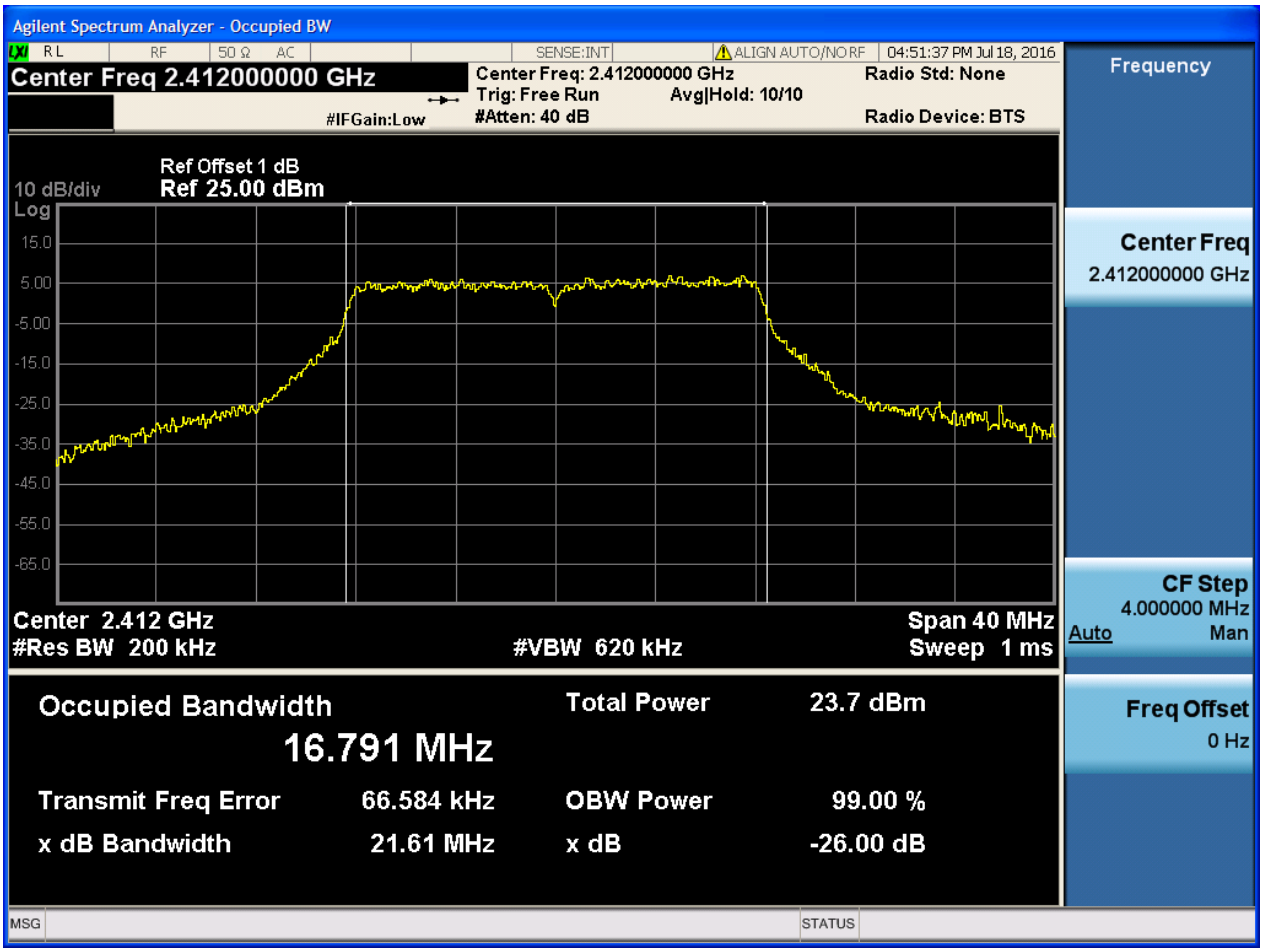
2.3 11B_M@Ant 1



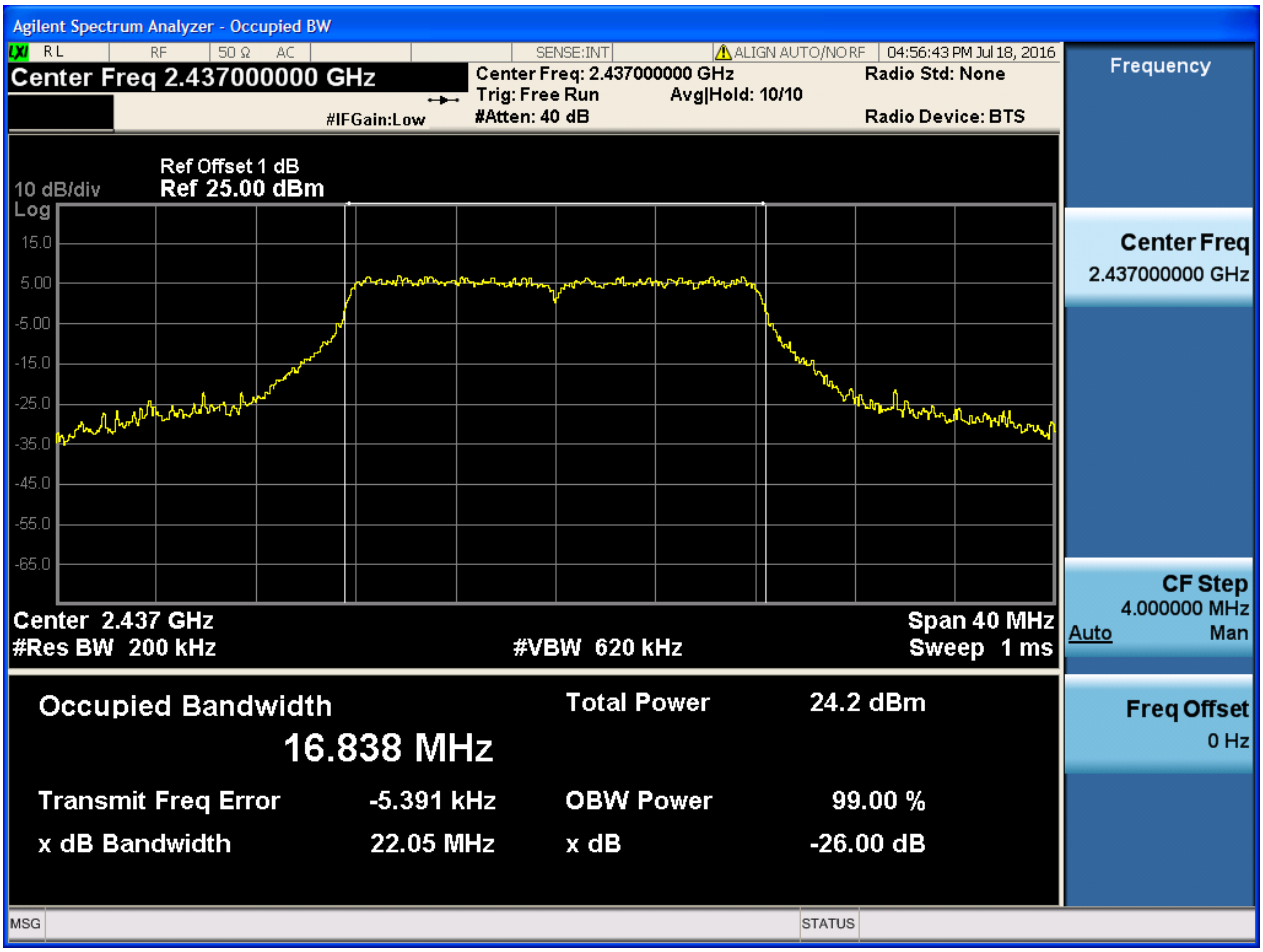
2.5 11B_H@Ant 1



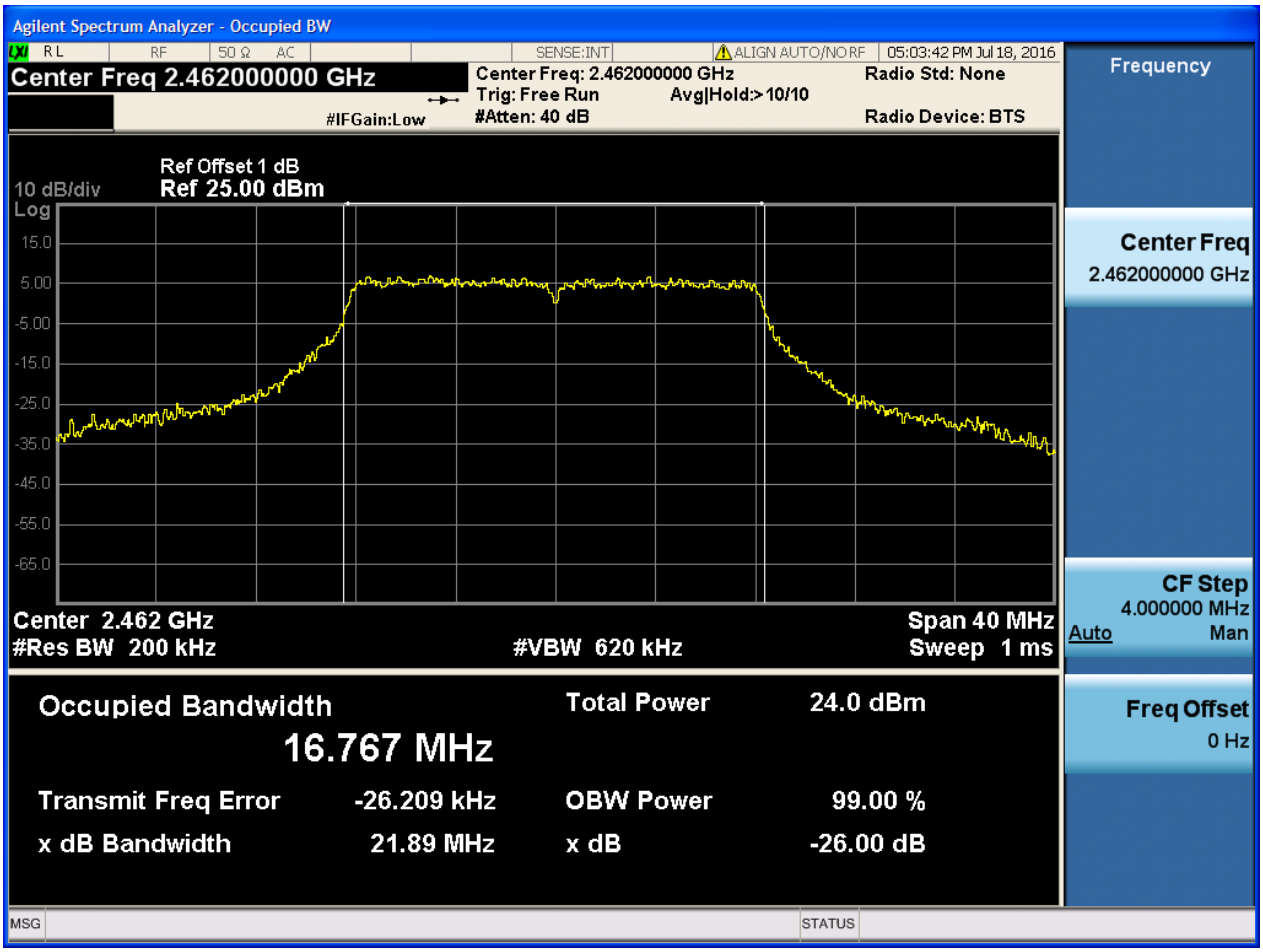
2.7 11G_L@Ant 1



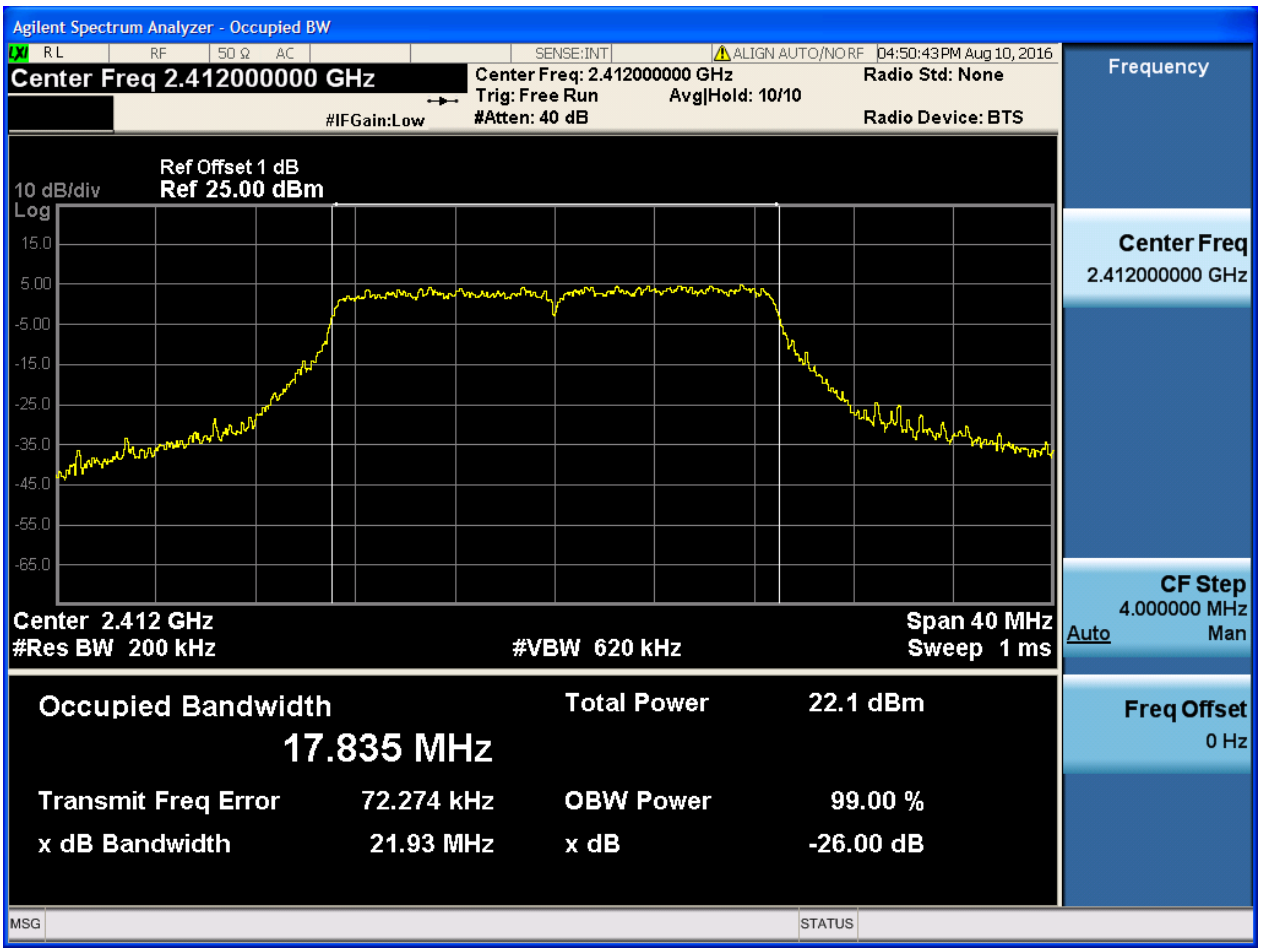
2.9 11G_M@Ant 1



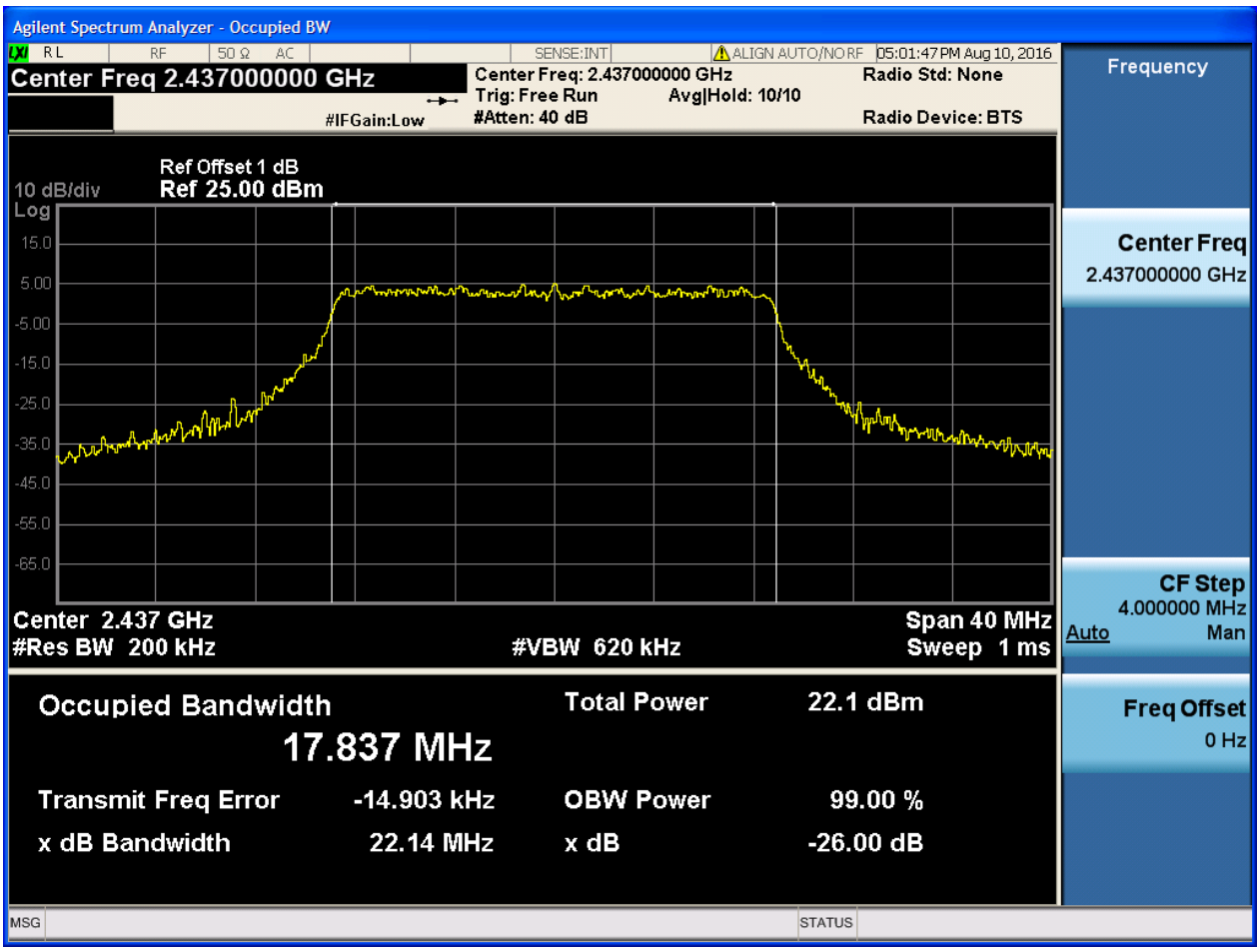
2.11 11G_H@Ant 1



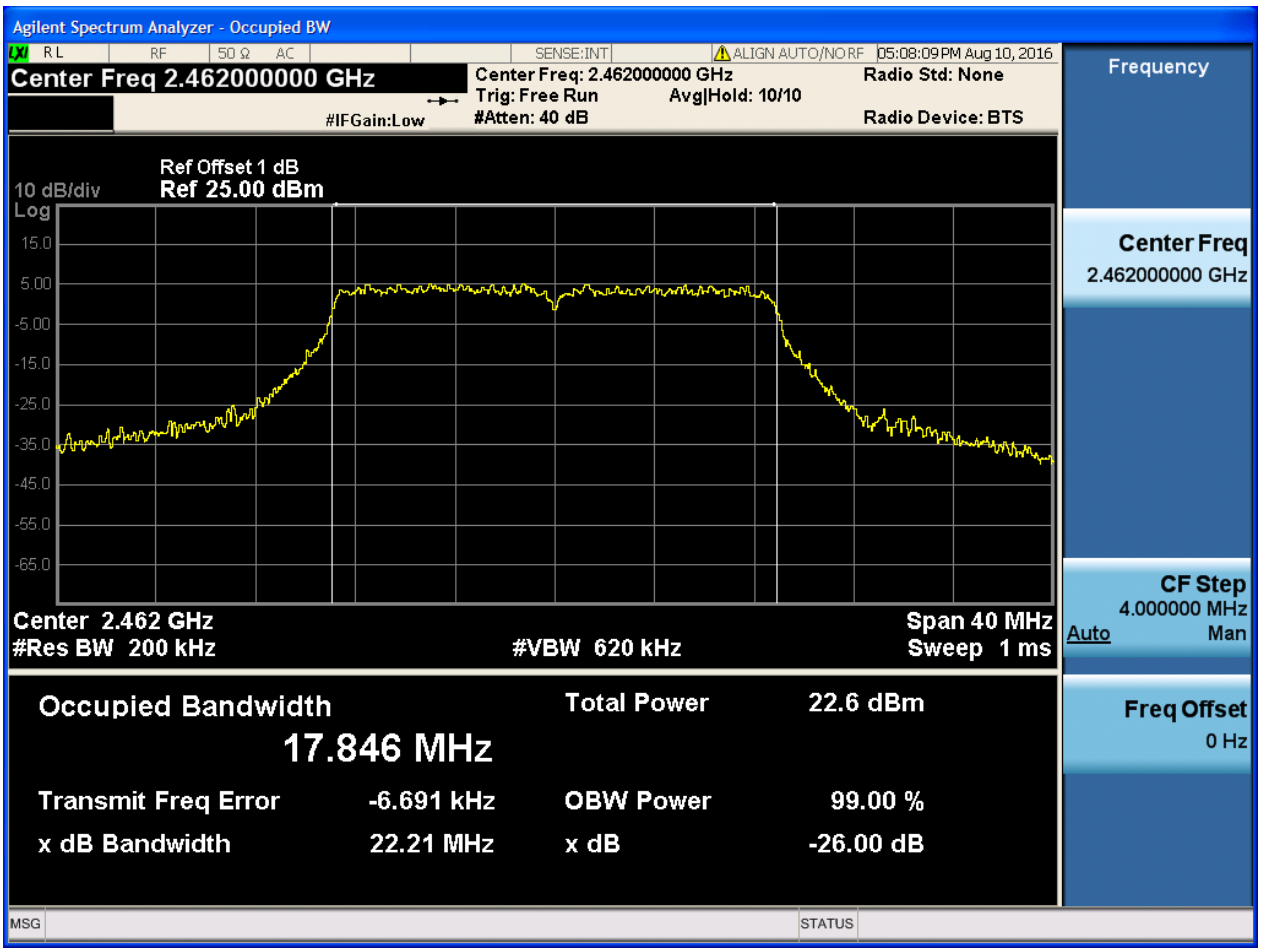
2.13 11N20_L@Ant 1



2.15 11N20_M@Ant 1



2.17 11N20_H@Ant 1



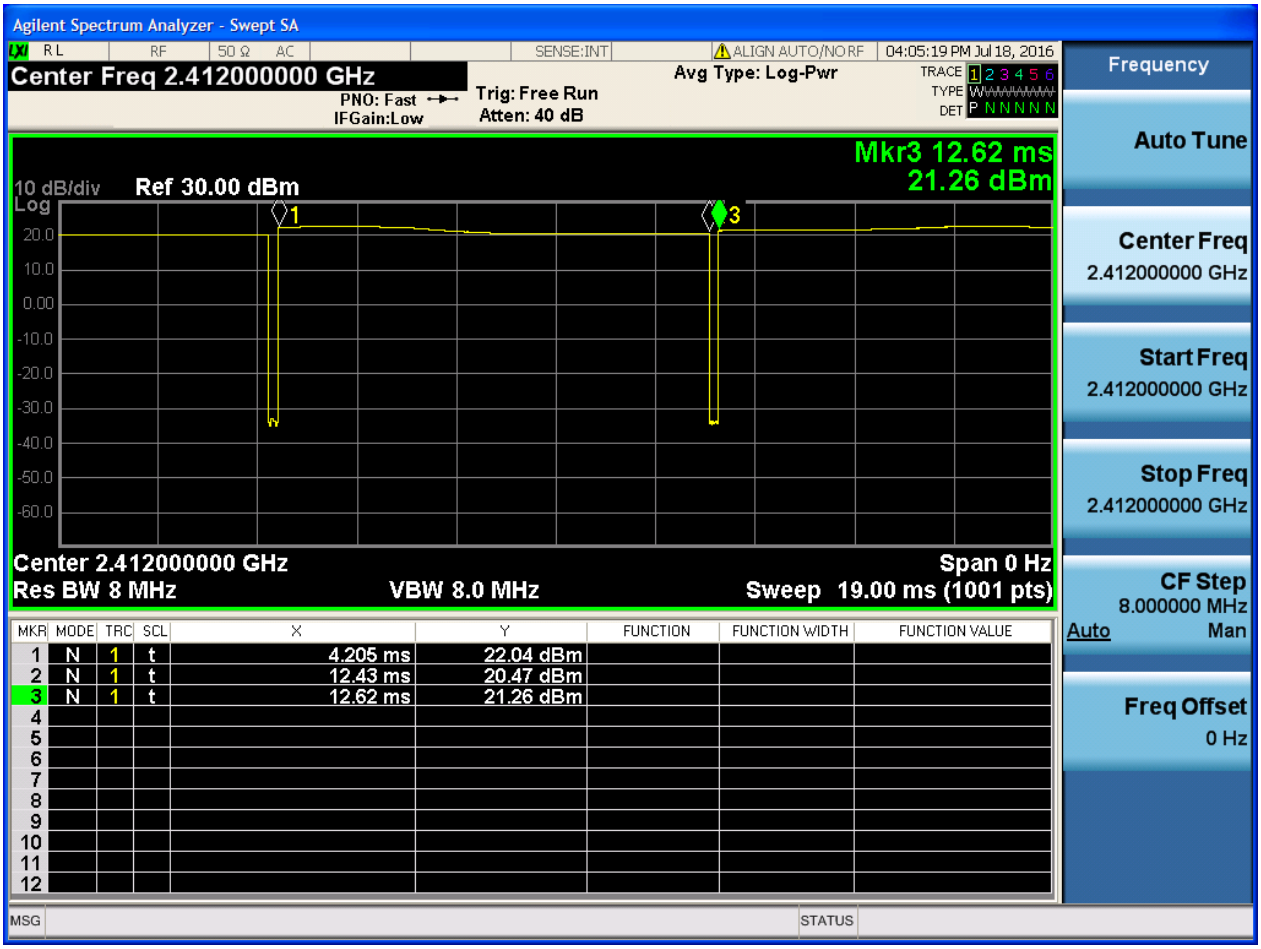
Appendix C: Duty cycle

Part I - Test Results

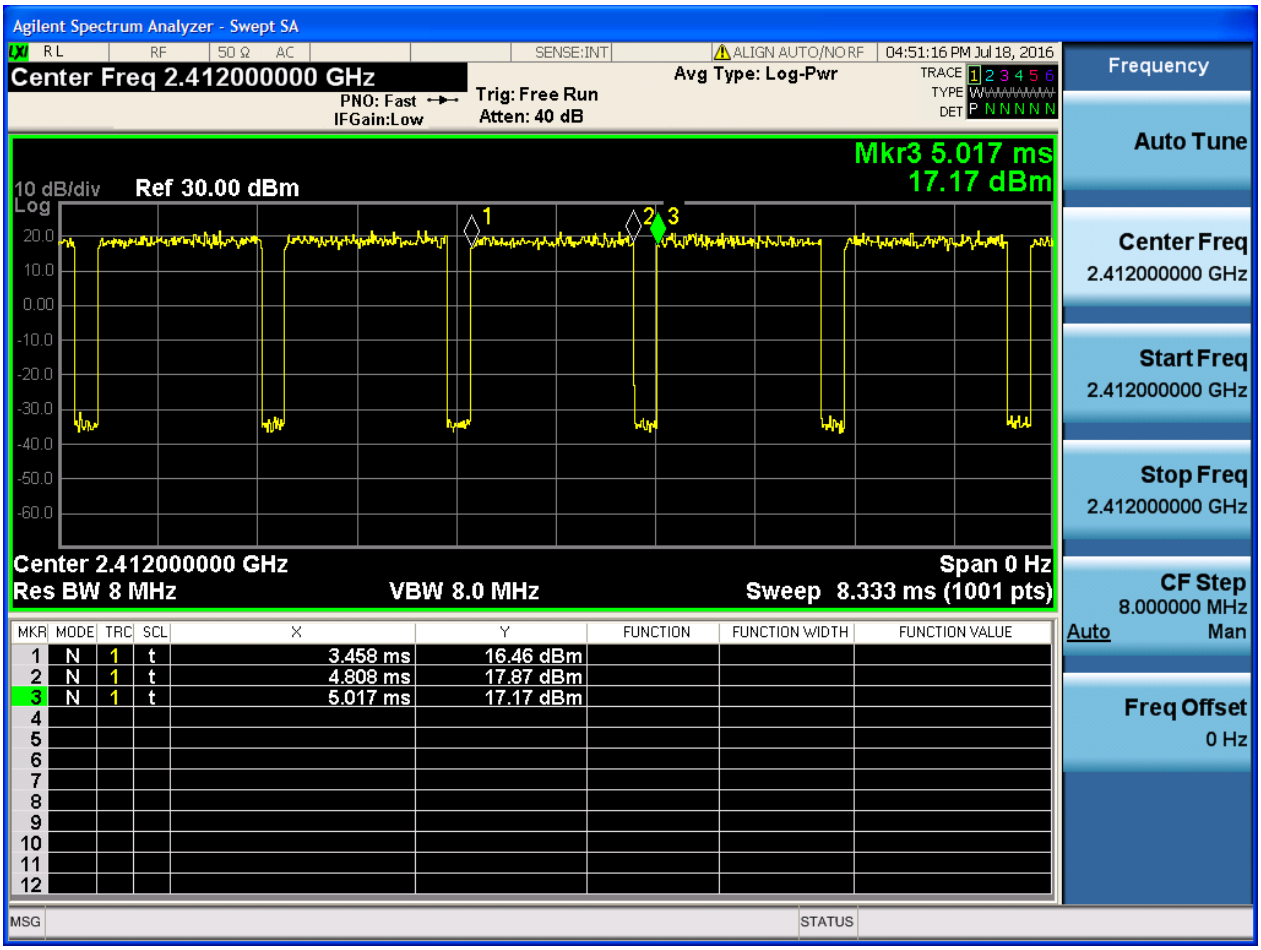
Test Mode	TX Freq. [MHz]	Ant	Duty cycle [%]
11B	CH1,CH6,CH11	Ant 1	98
11G	CH1,CH6,CH11	Ant 1	87
11N20SISO	CH1,CH6,CH11	Ant 1	86

Part II - Test Plots

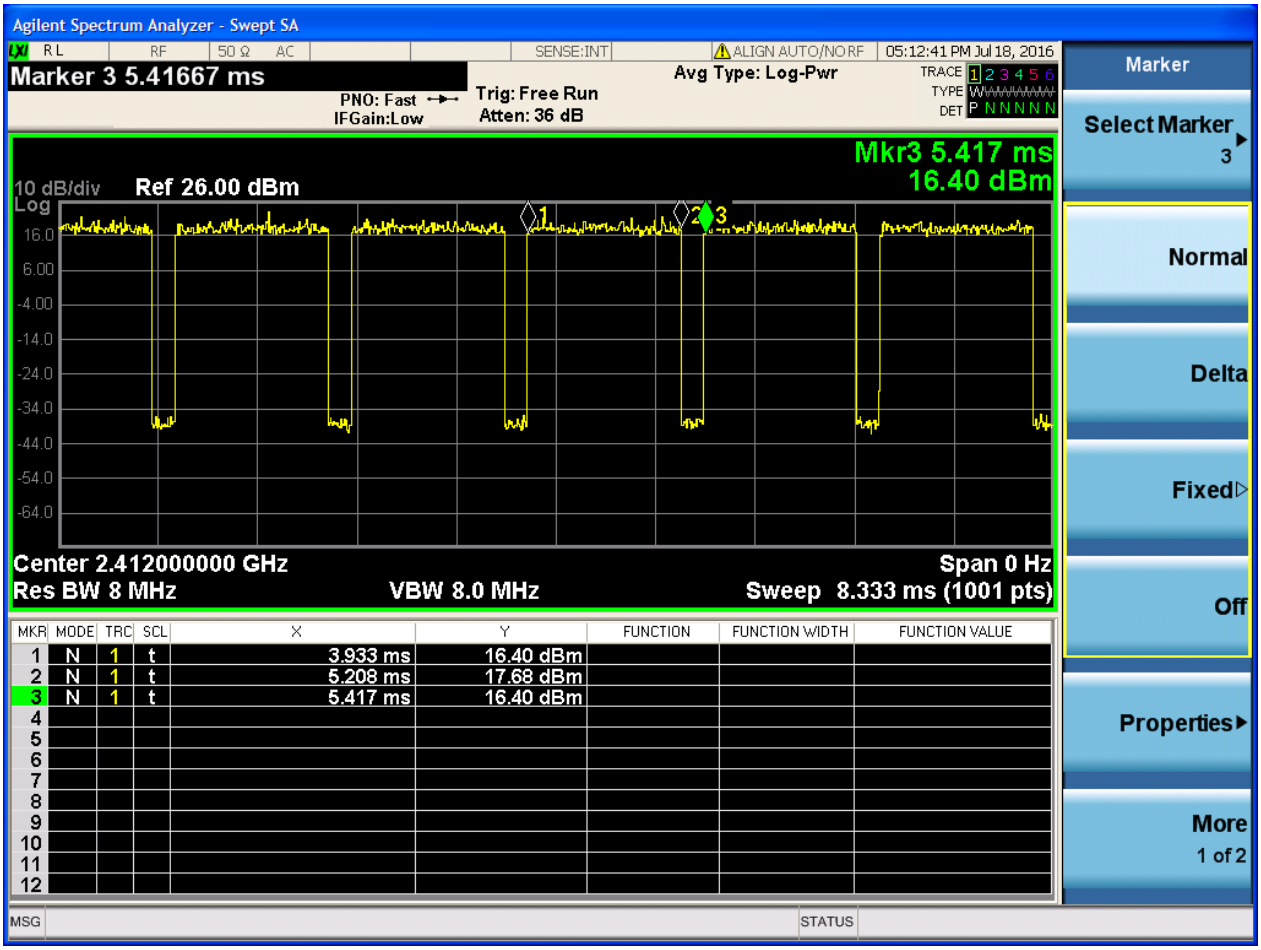
2.1 11B_M@Ant 1



2.2 11G_M@Ant 1



2.2 11N20SISO_M@Ant 1



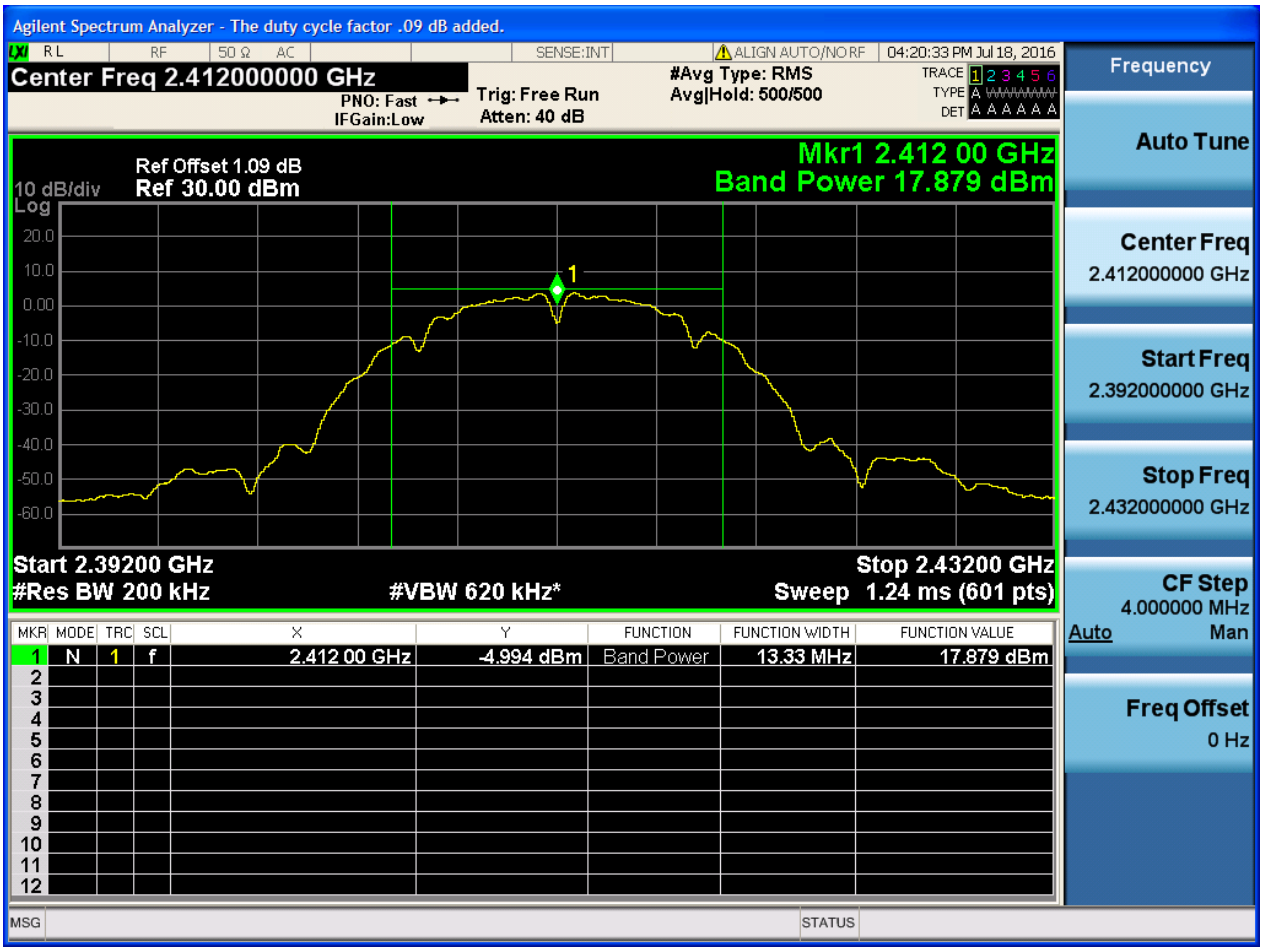
Appendix D: Maximum Conducted Average Output Power

Part I - Test Results

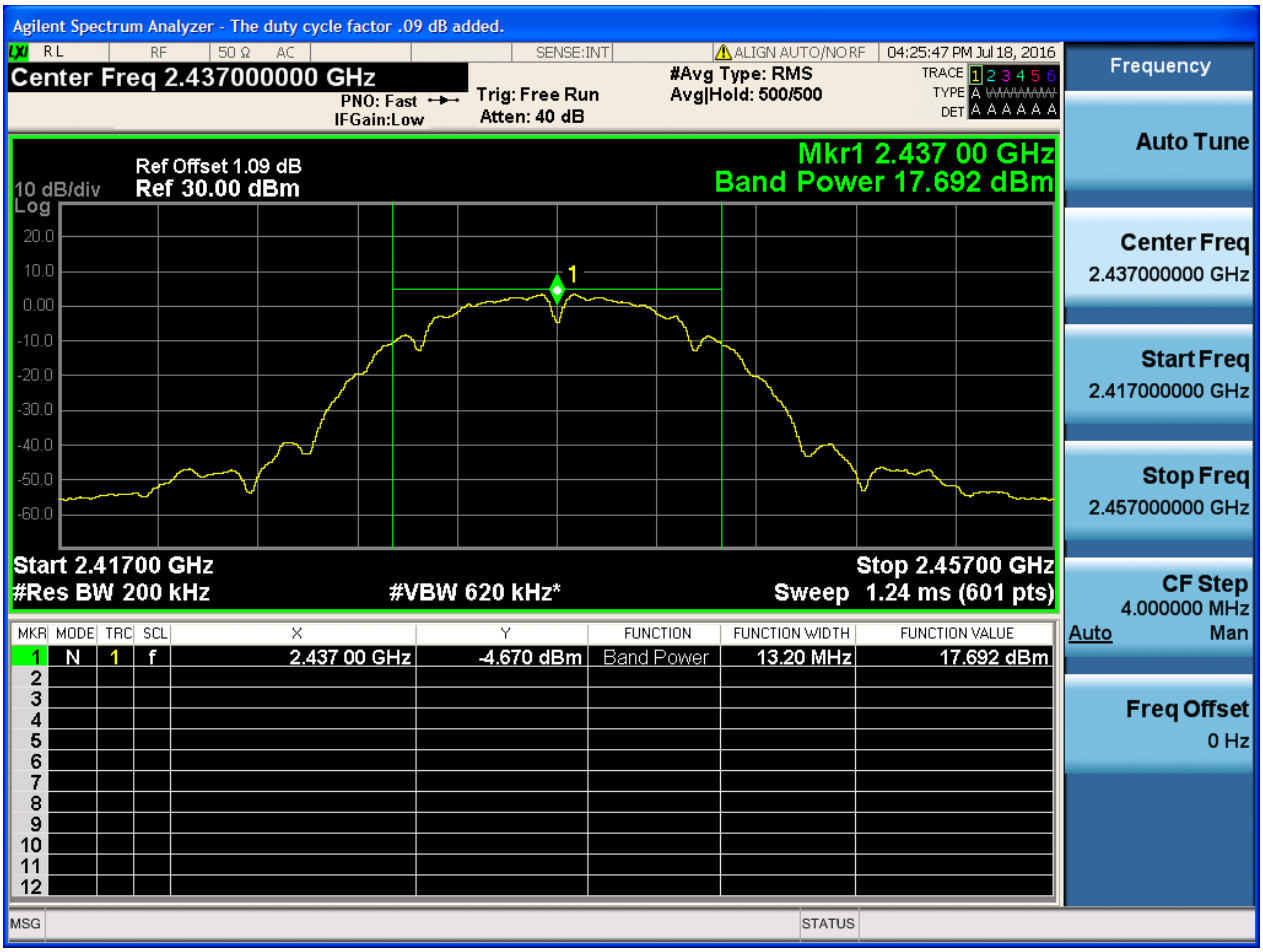
Test Mode	Test Channel	Frequency[MHz]	Ant	Power[dBm]	Verdict
11B	L	2412	Ant 1	17.88	pass
11B	M	2437	Ant 1	17.69	pass
11B	H	2462	Ant 1	17.39	pass
11G	L	2412	Ant 1	16.46	pass
11G	M	2437	Ant 1	16.87	pass
11G	H	2462	Ant 1	16.77	pass
11N20	L	2412	Ant 1	14.68	pass
11N20	M	2437	Ant 1	15.04	pass
11N20	H	2462	Ant 1	15.44	pass

Part II - Test Plots

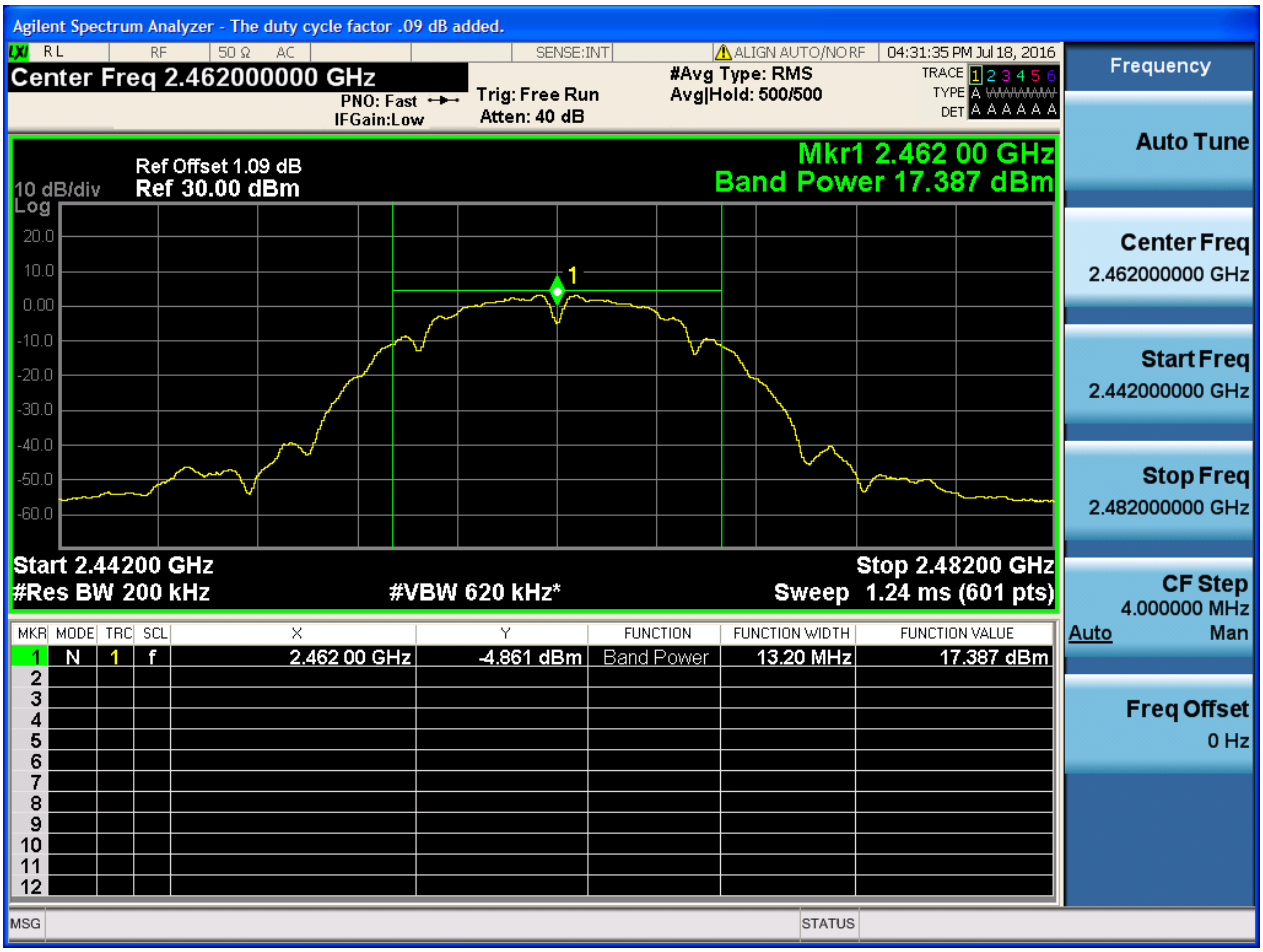
2.1 11B_L@Ant 1



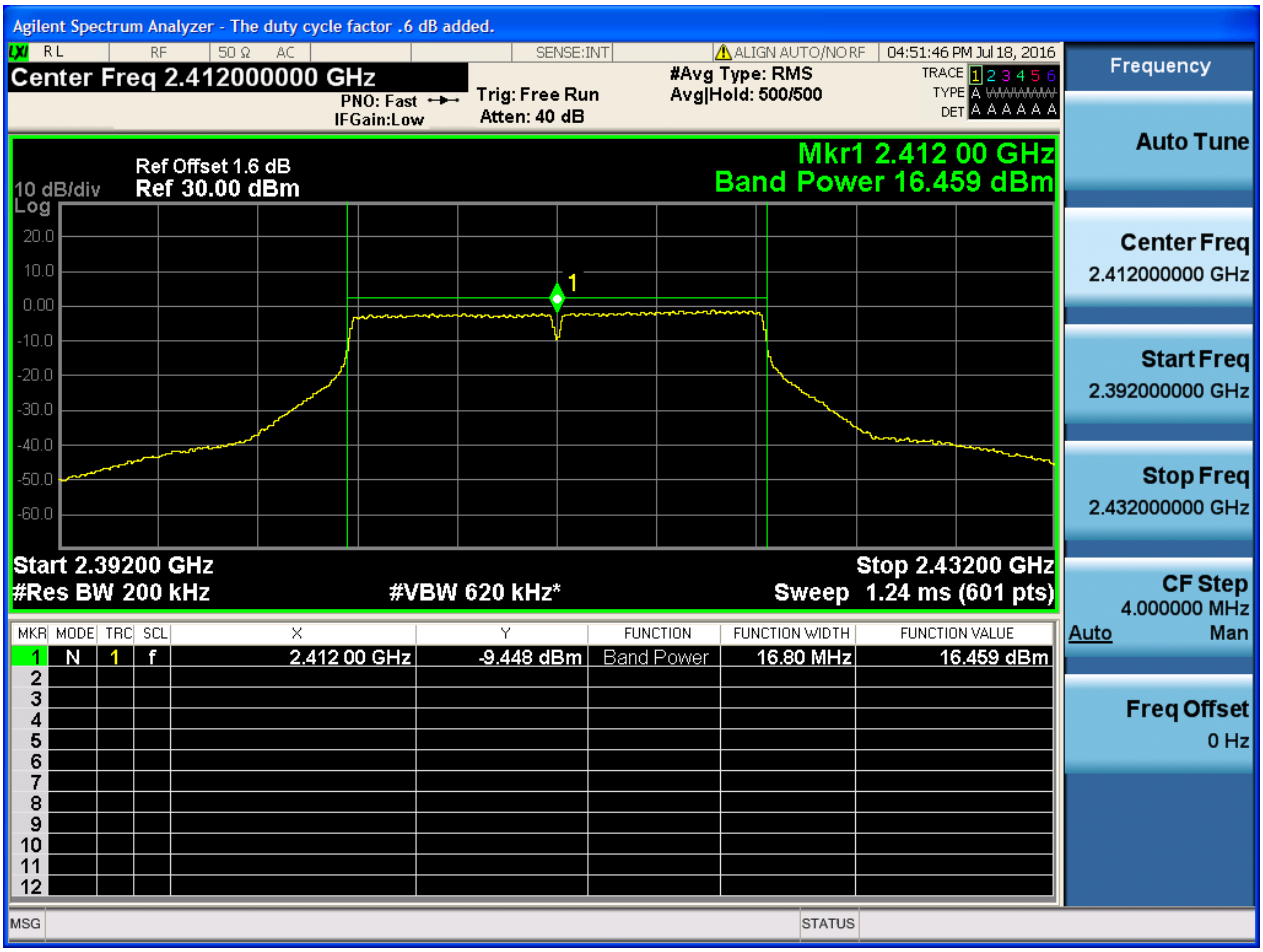
2.3 11B_M@Ant 1



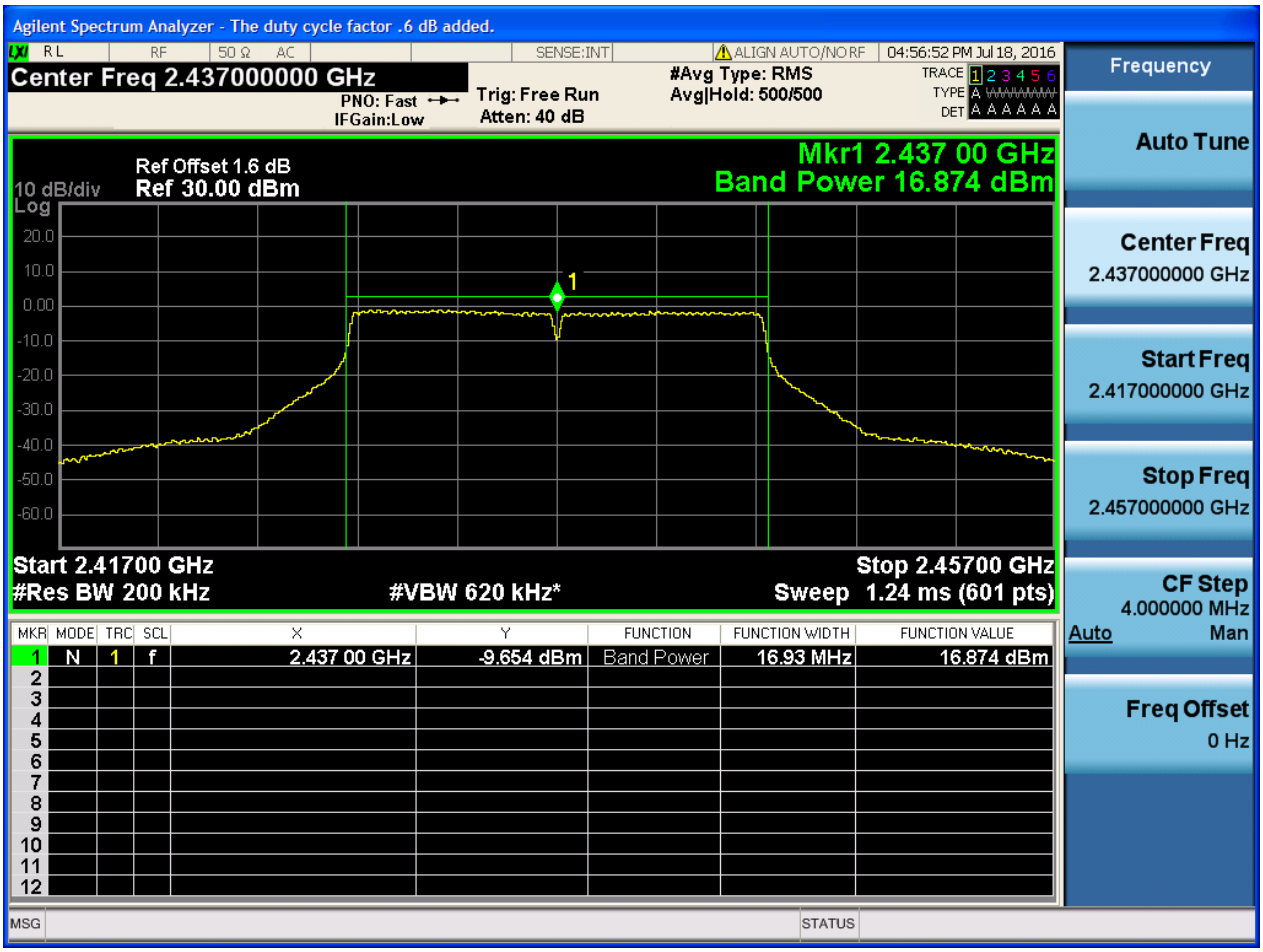
2.5 11B_H@Ant 1



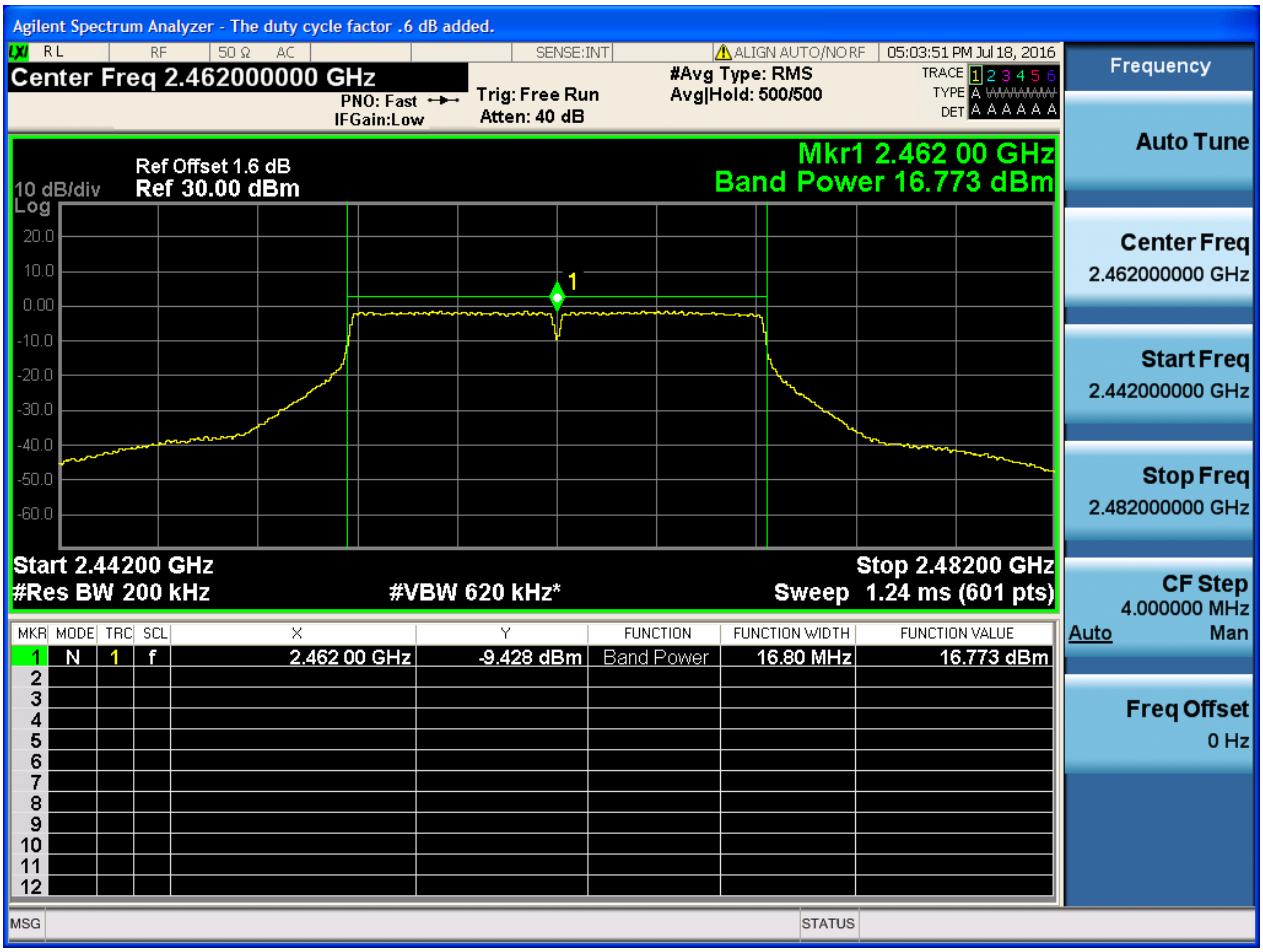
2.7 11G_L@Ant 1



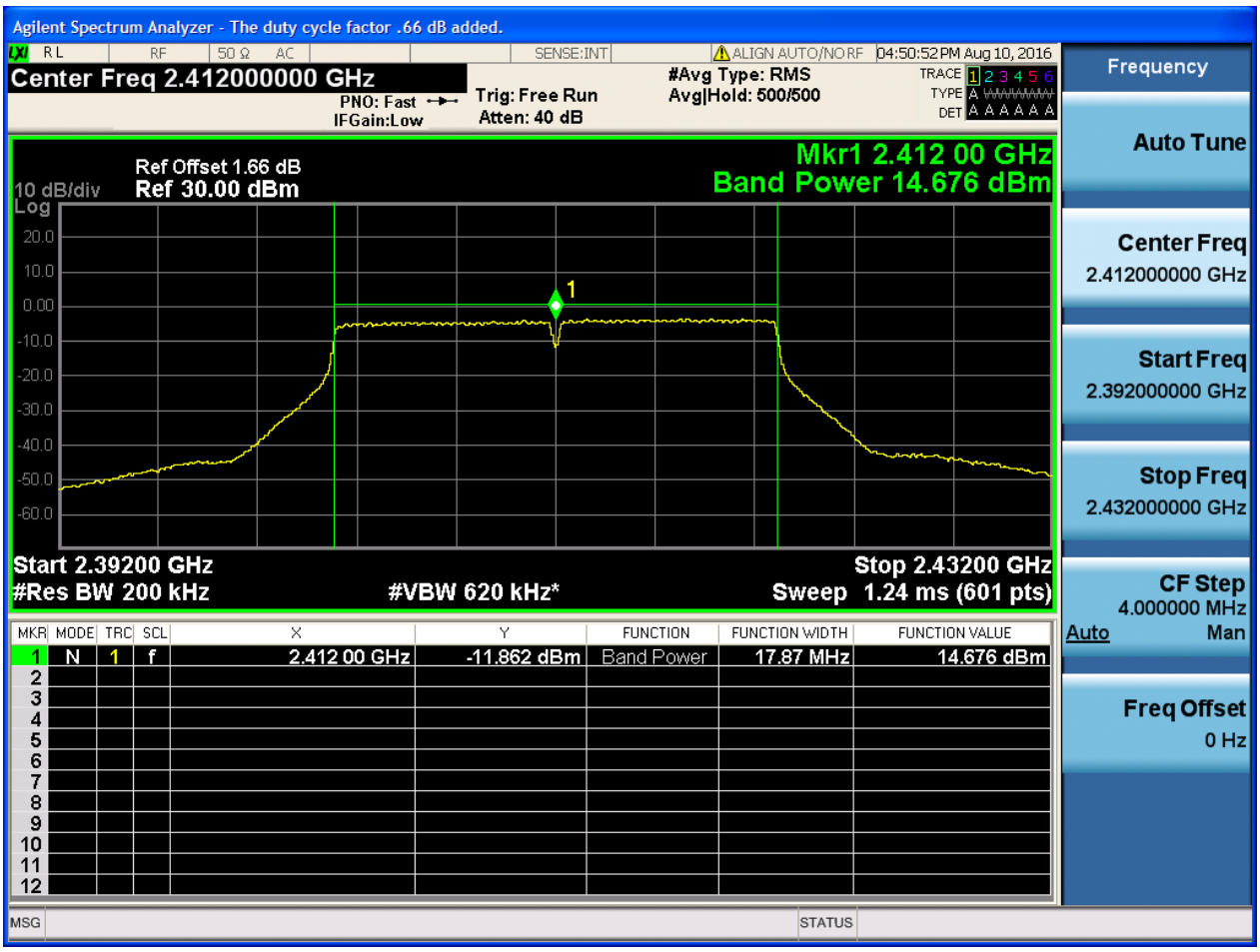
2.9 11G_M@Ant 1



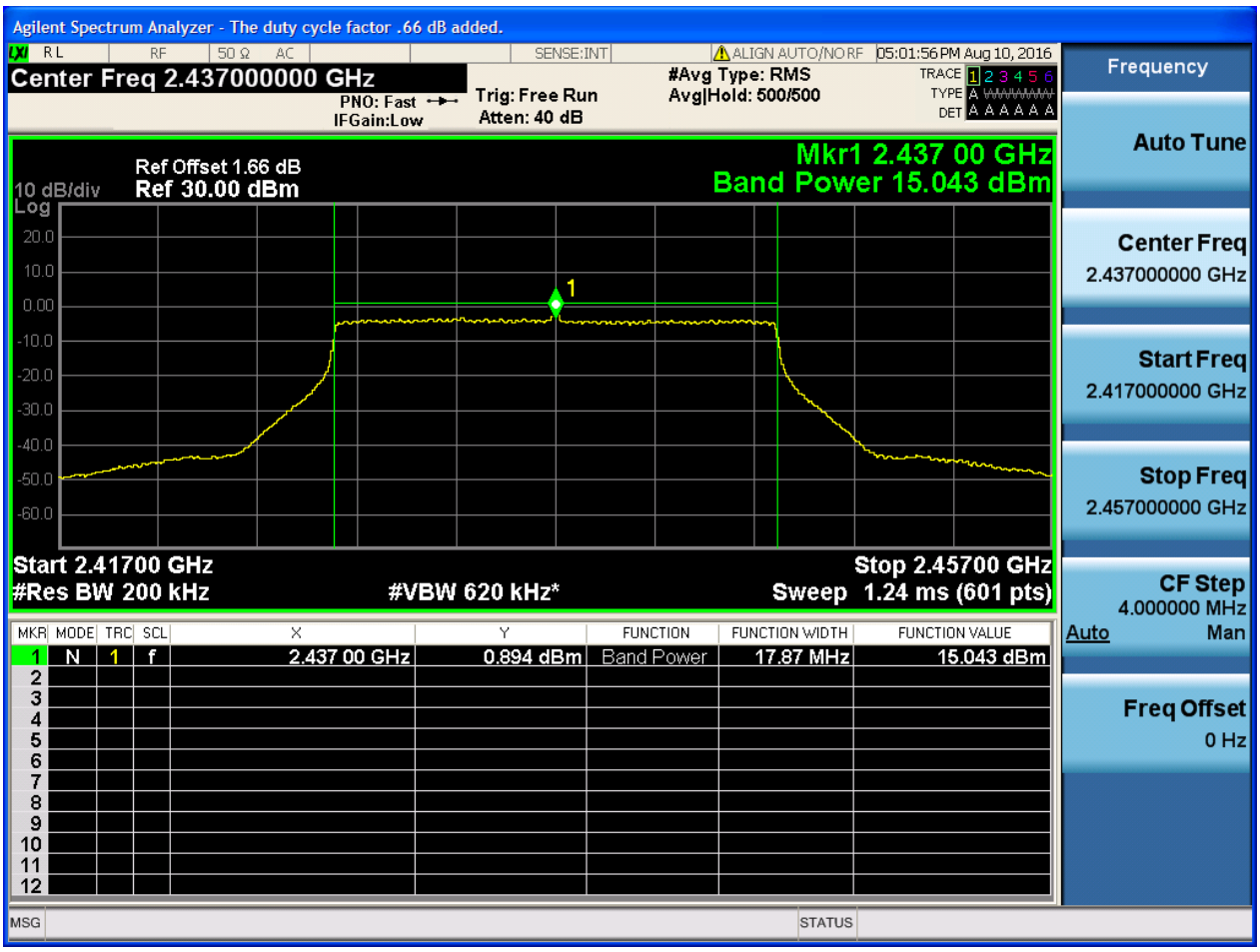
2.11 11G_H@Ant 1



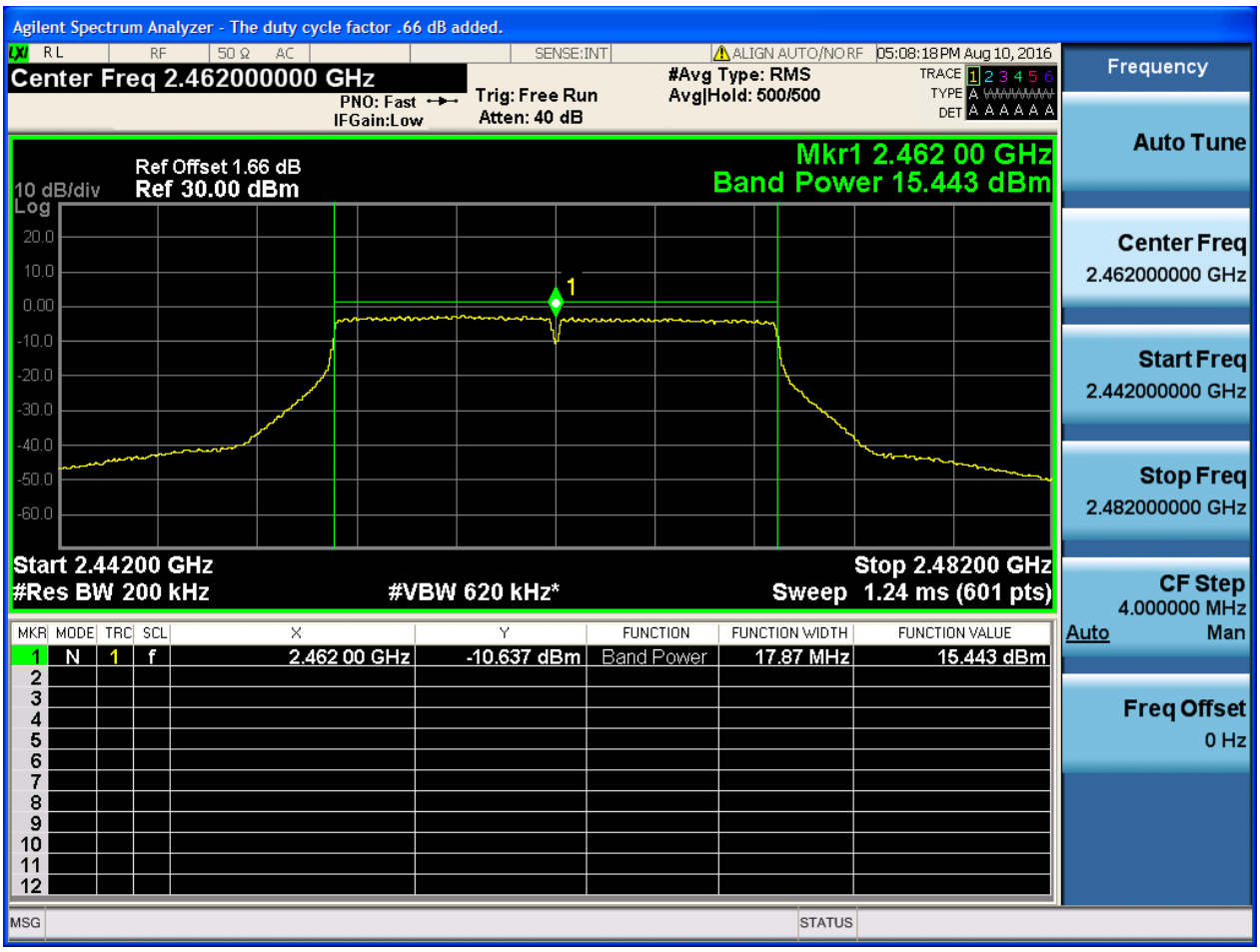
2.13 11N20_L@Ant 1



2.15 11N20_M@Ant 1



2.17 11N20_H@Ant 1



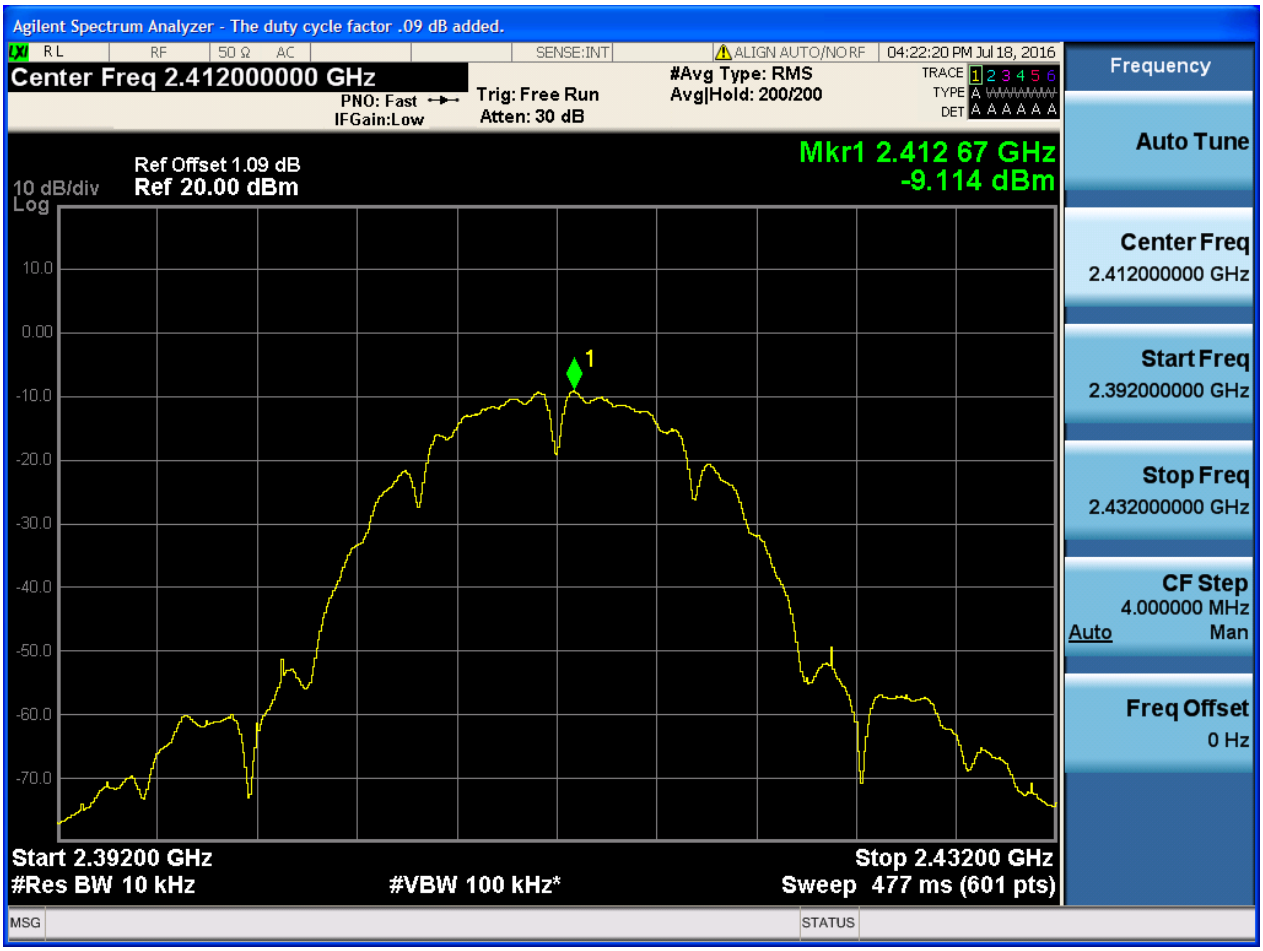
Appendix E: Maximum Power Spectral Density Level

Part I - Test Results

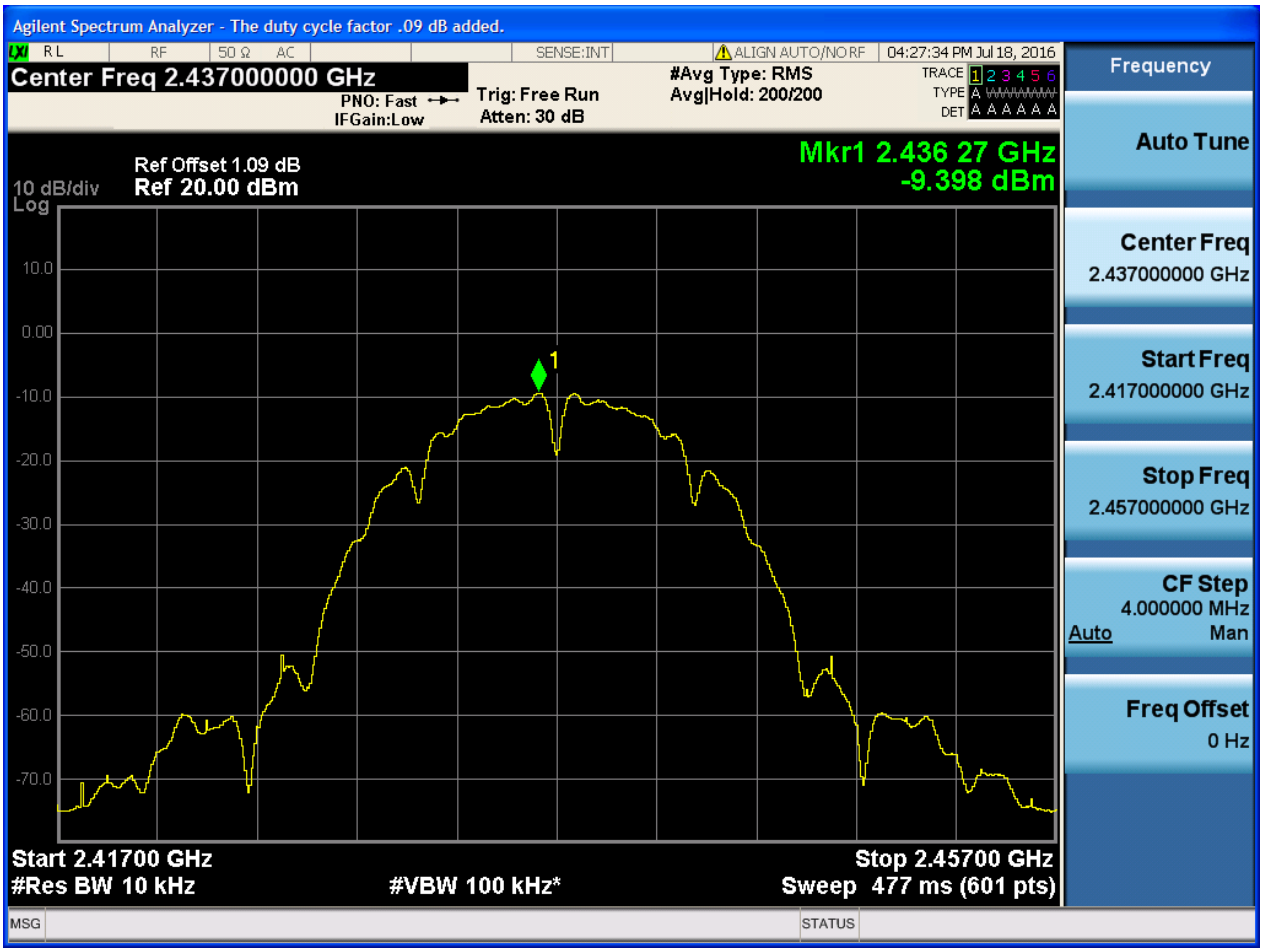
Test Mode	Test Channel	Frequency[MHz]	Ant	PD[MHz]	Verdict
11B	L	2412	Ant 1	-9.11	pass
11B	M	2437	Ant 1	-9.40	pass
11B	H	2462	Ant 1	-9.58	pass
11G	L	2412	Ant 1	-13.26	pass
11G	M	2437	Ant 1	-13.01	pass
11G	H	2462	Ant 1	-13.03	pass
11N20	L	2412	Ant 1	-13.81	pass
11N20	M	2437	Ant 1	-13.76	pass
11N20	H	2462	Ant 1	-13.67	pass

Part II - Test Plots

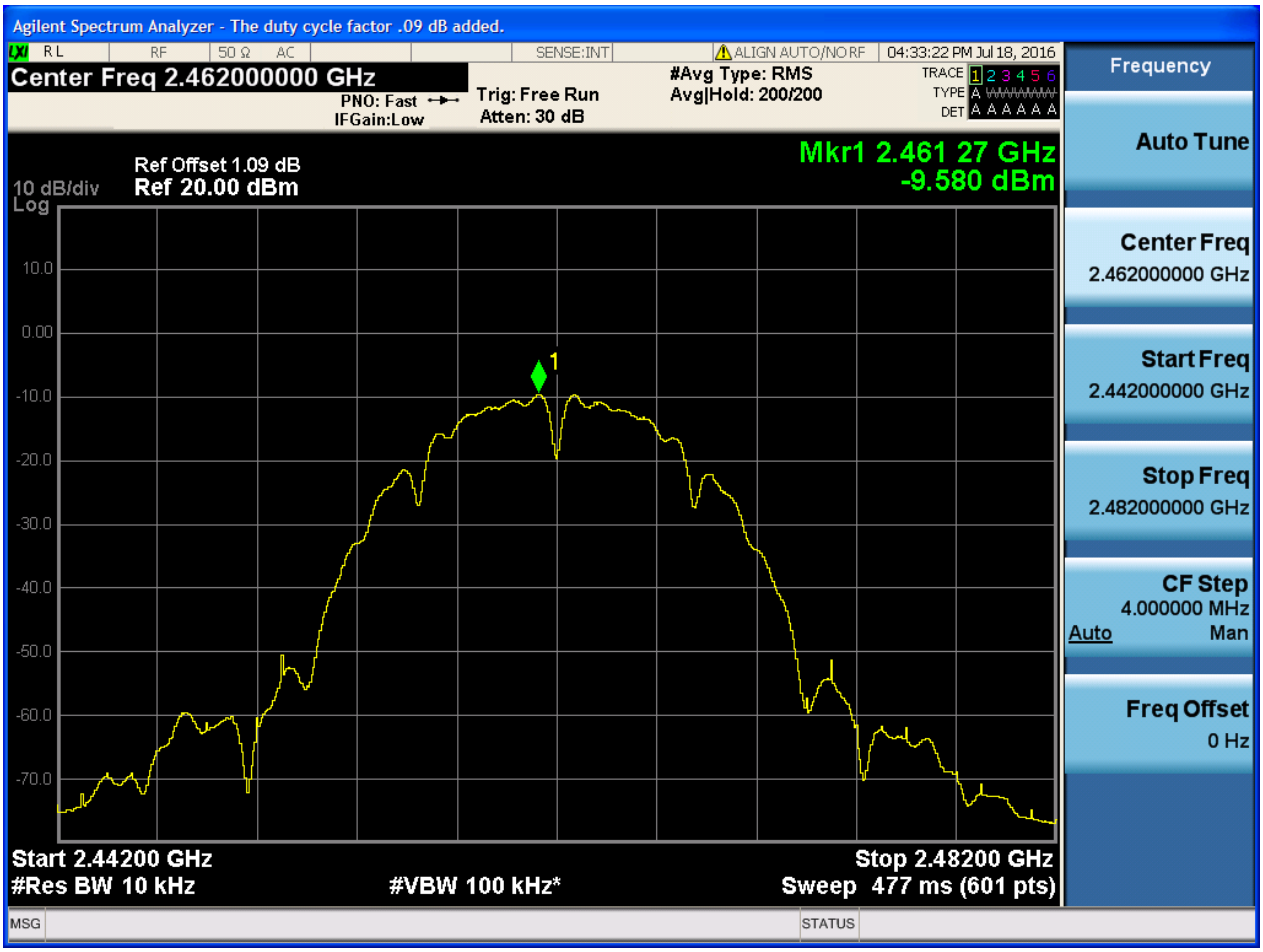
2.1 11B_L@Ant 1



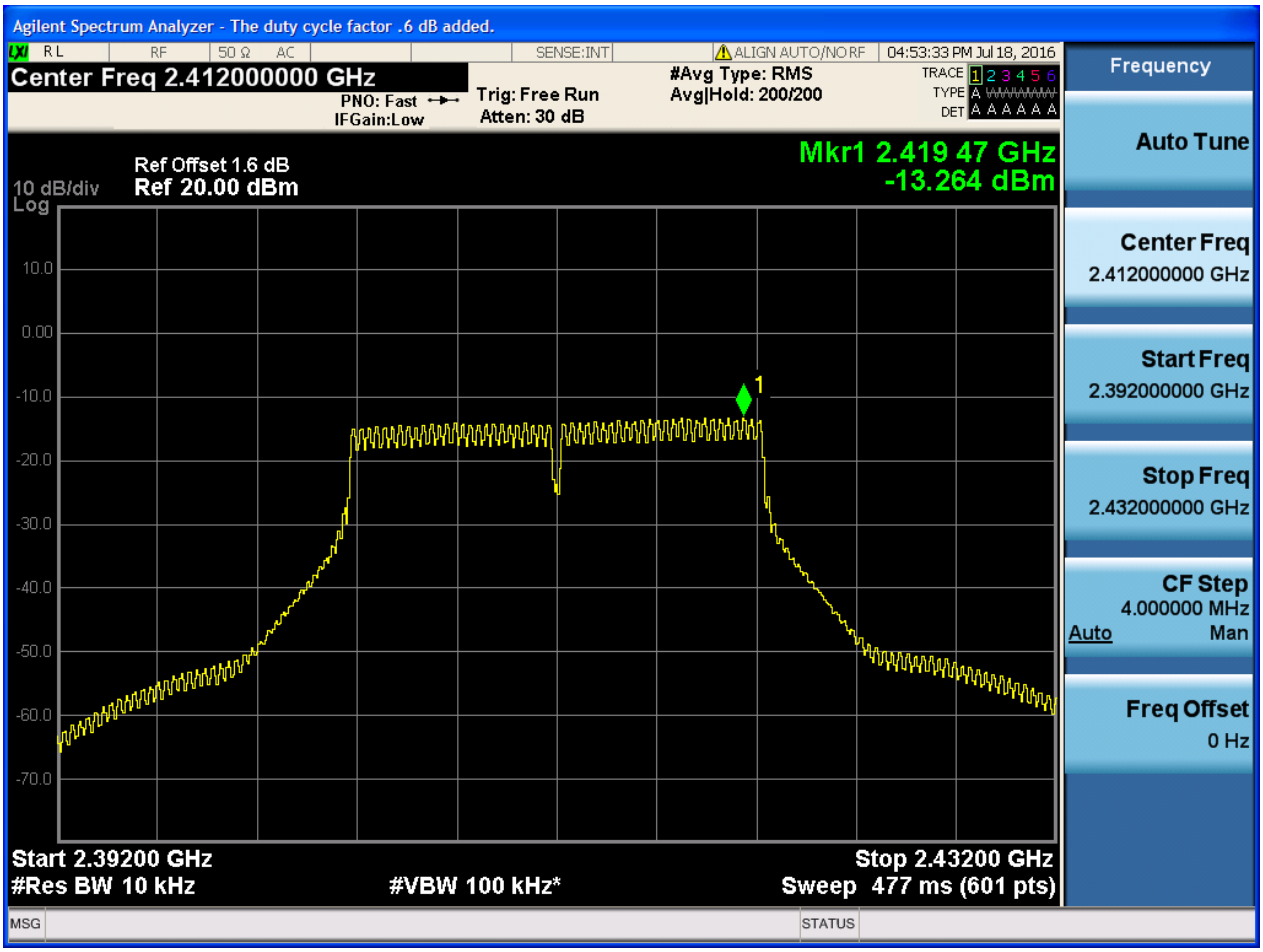
2.3 11B_M@Ant 1



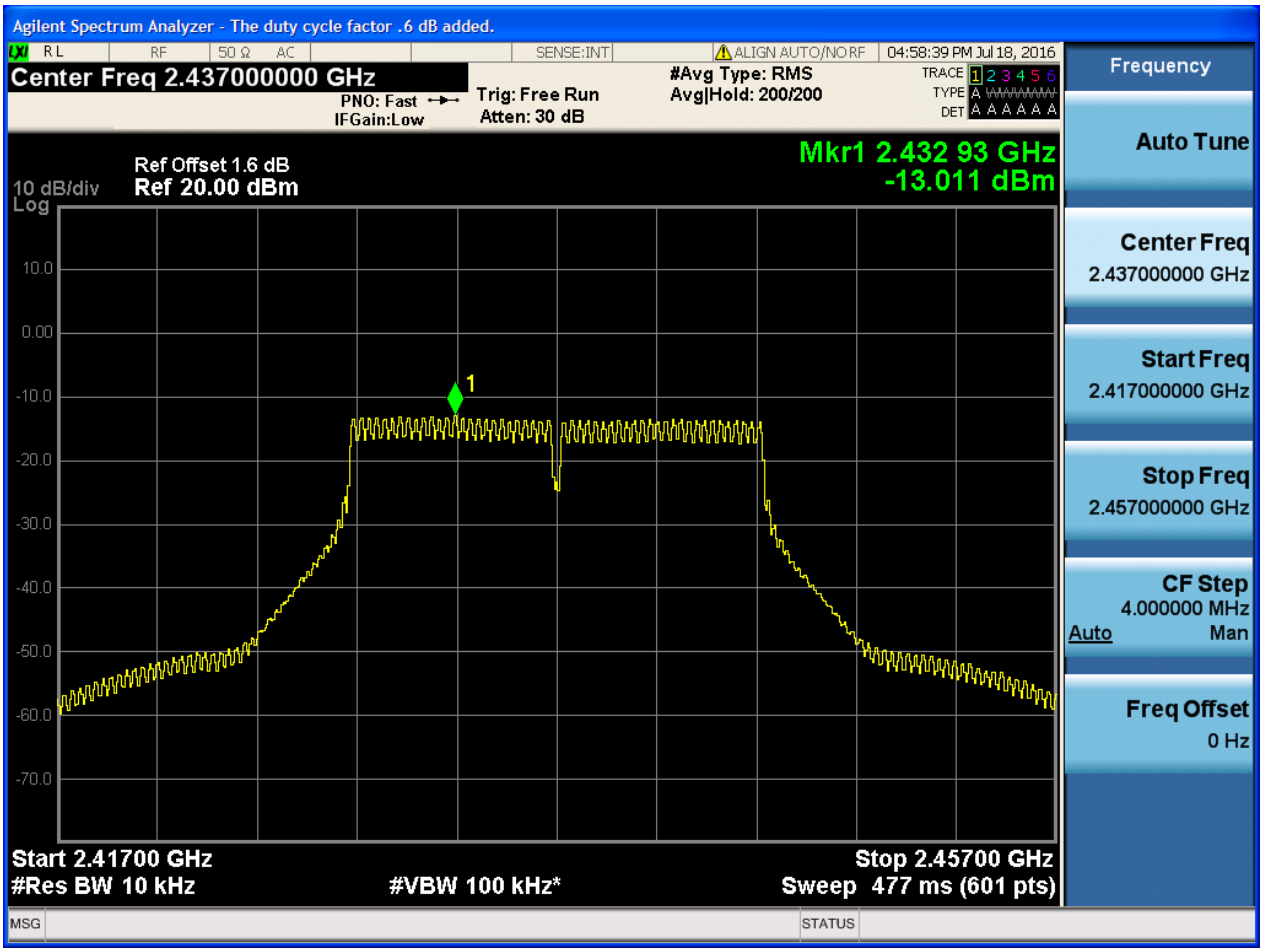
2.5 11B_H@Ant 1



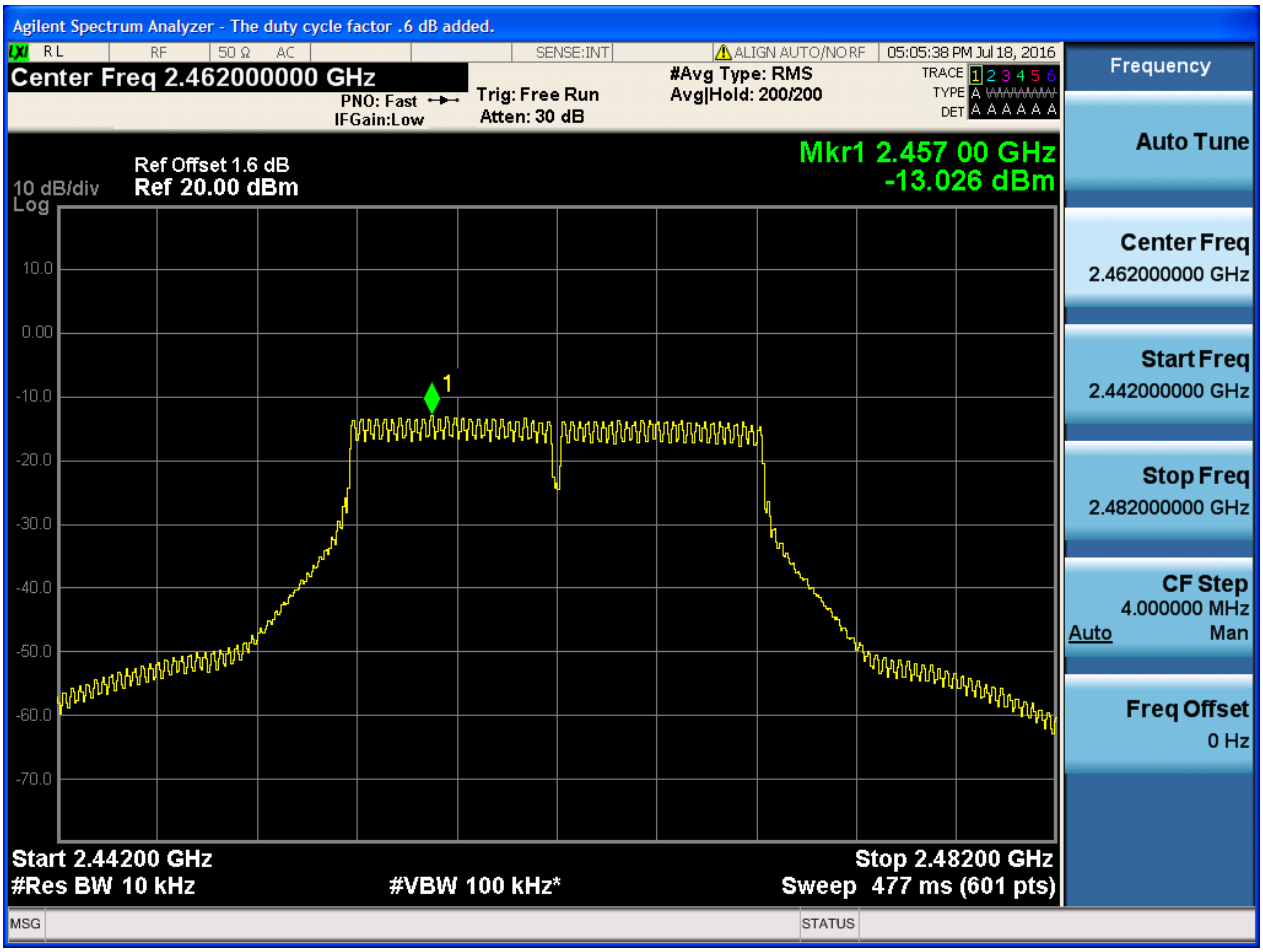
2.7 11G_L@Ant 1



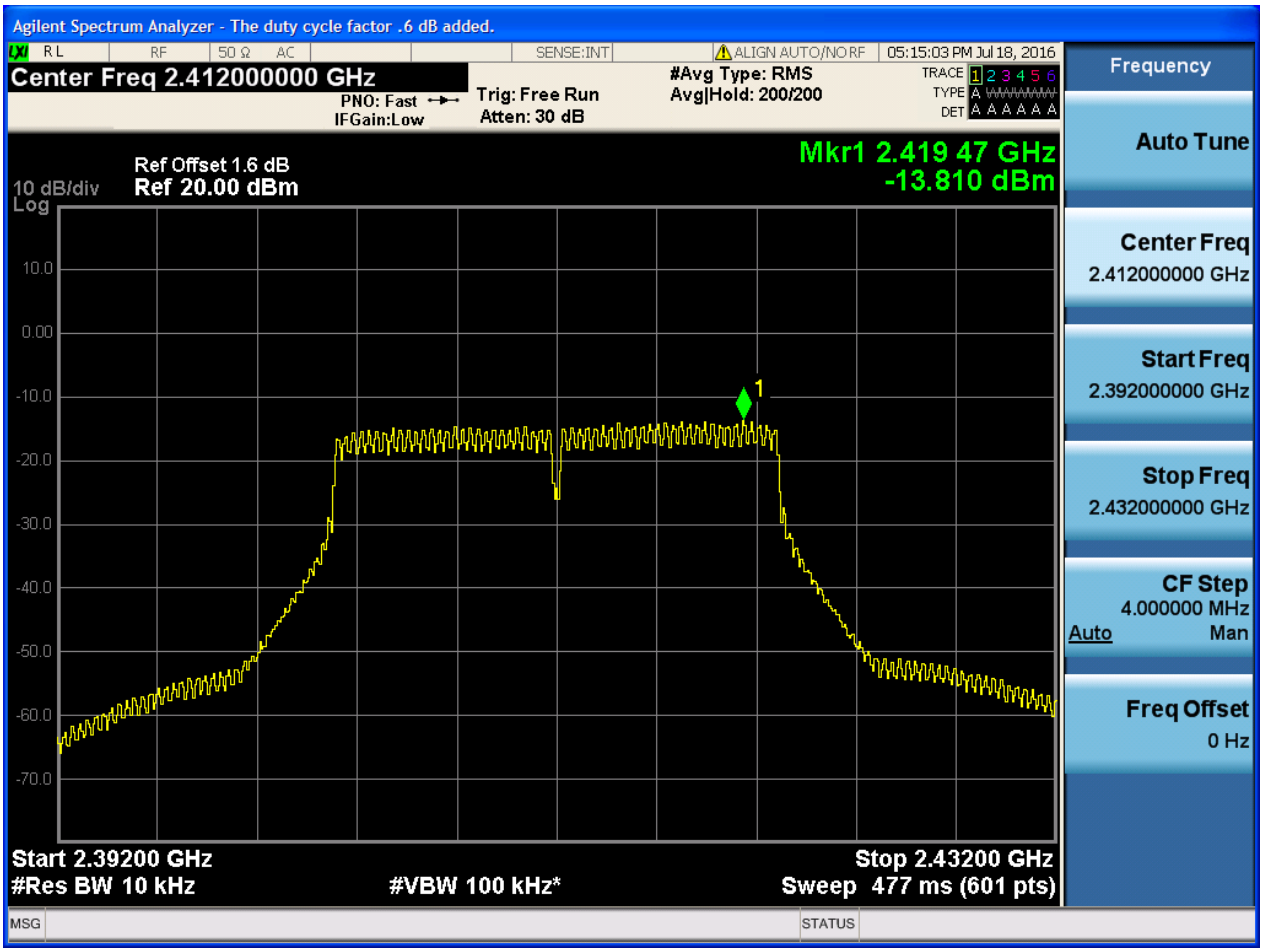
2.9 11G_M@Ant 1



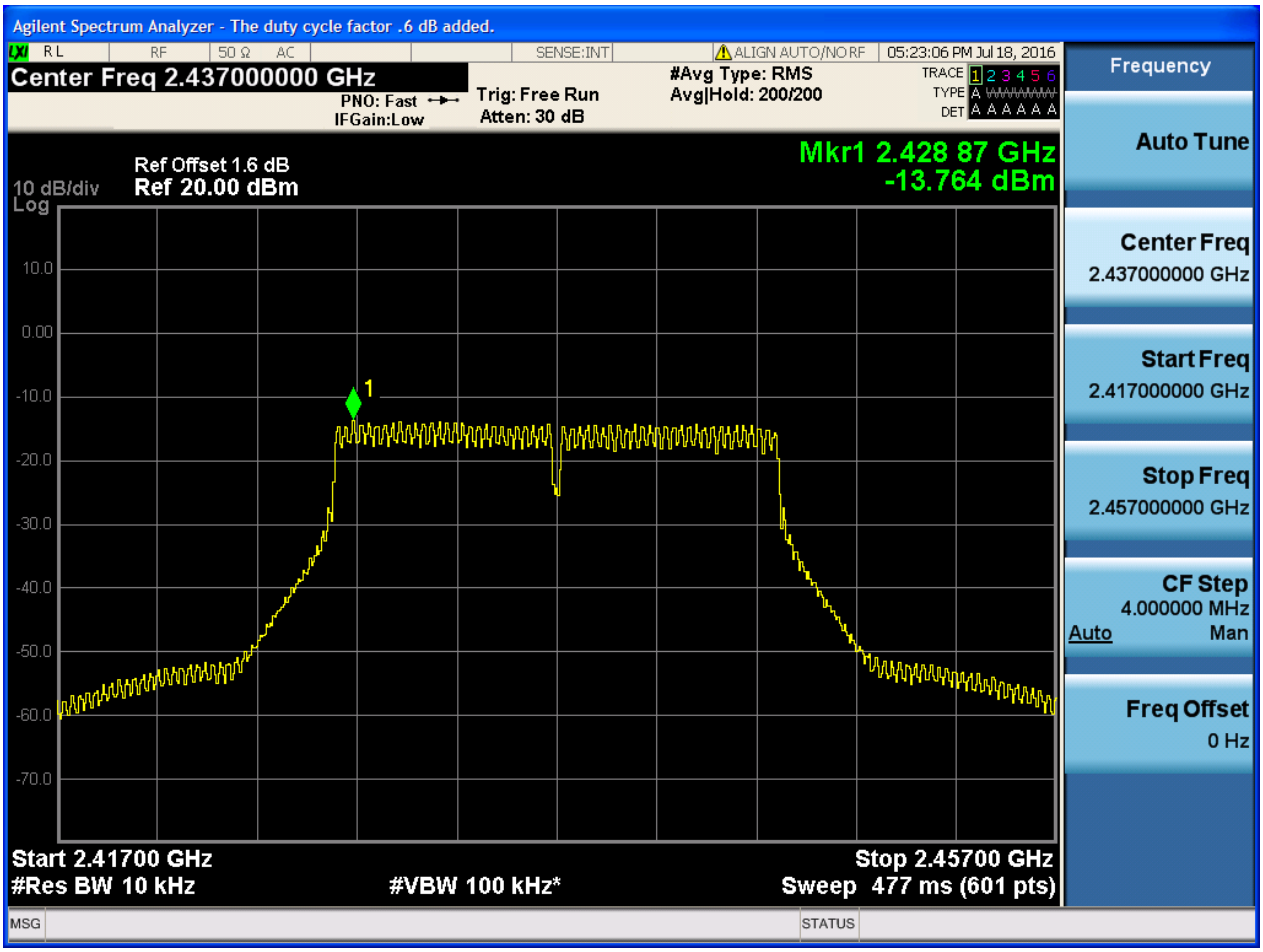
2.11 11G_H@Ant 1



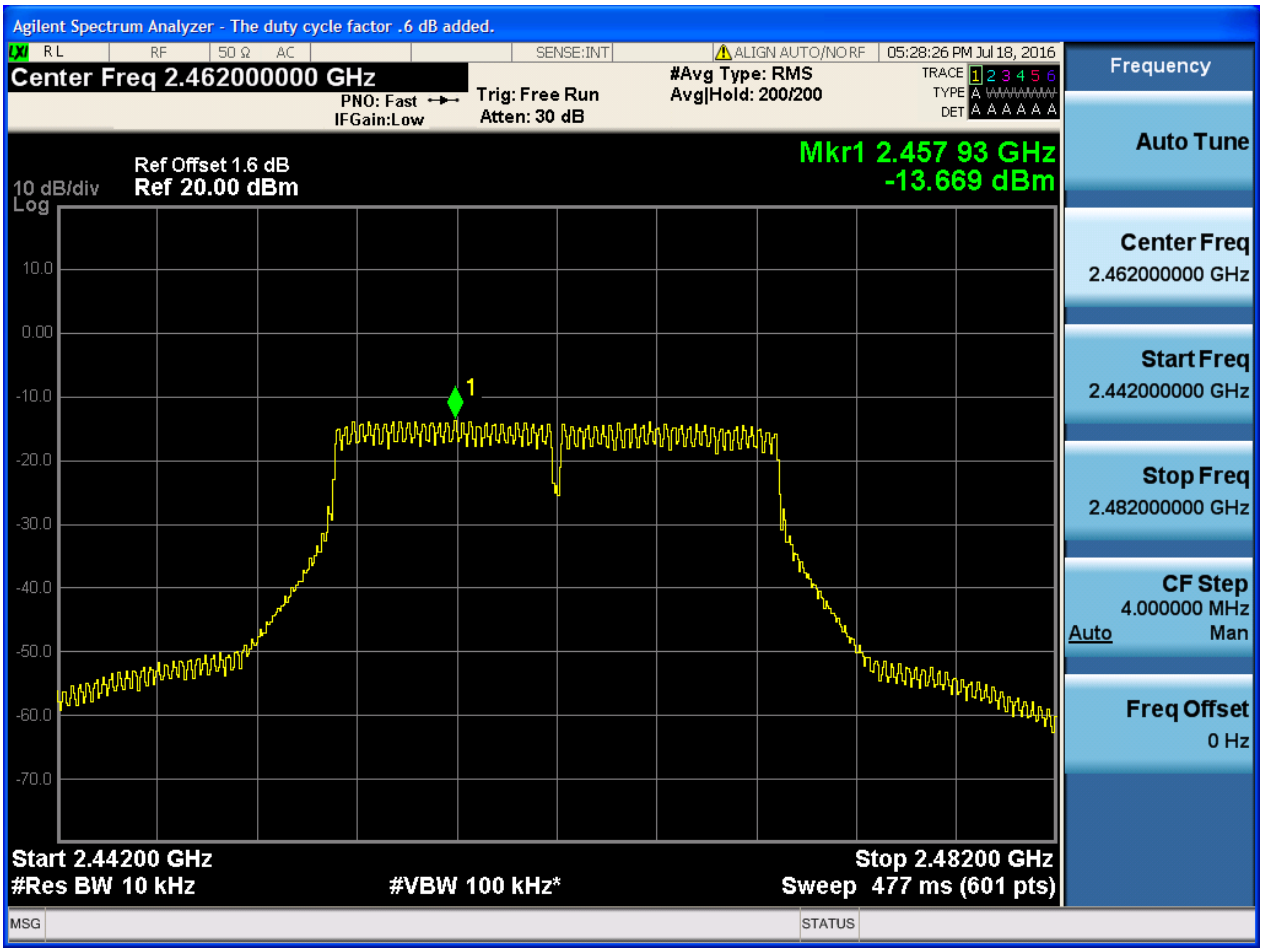
2.13 11N20_L@Ant 1



2.15 11N20_M@Ant 1



2.17 11N20_H@Ant 1



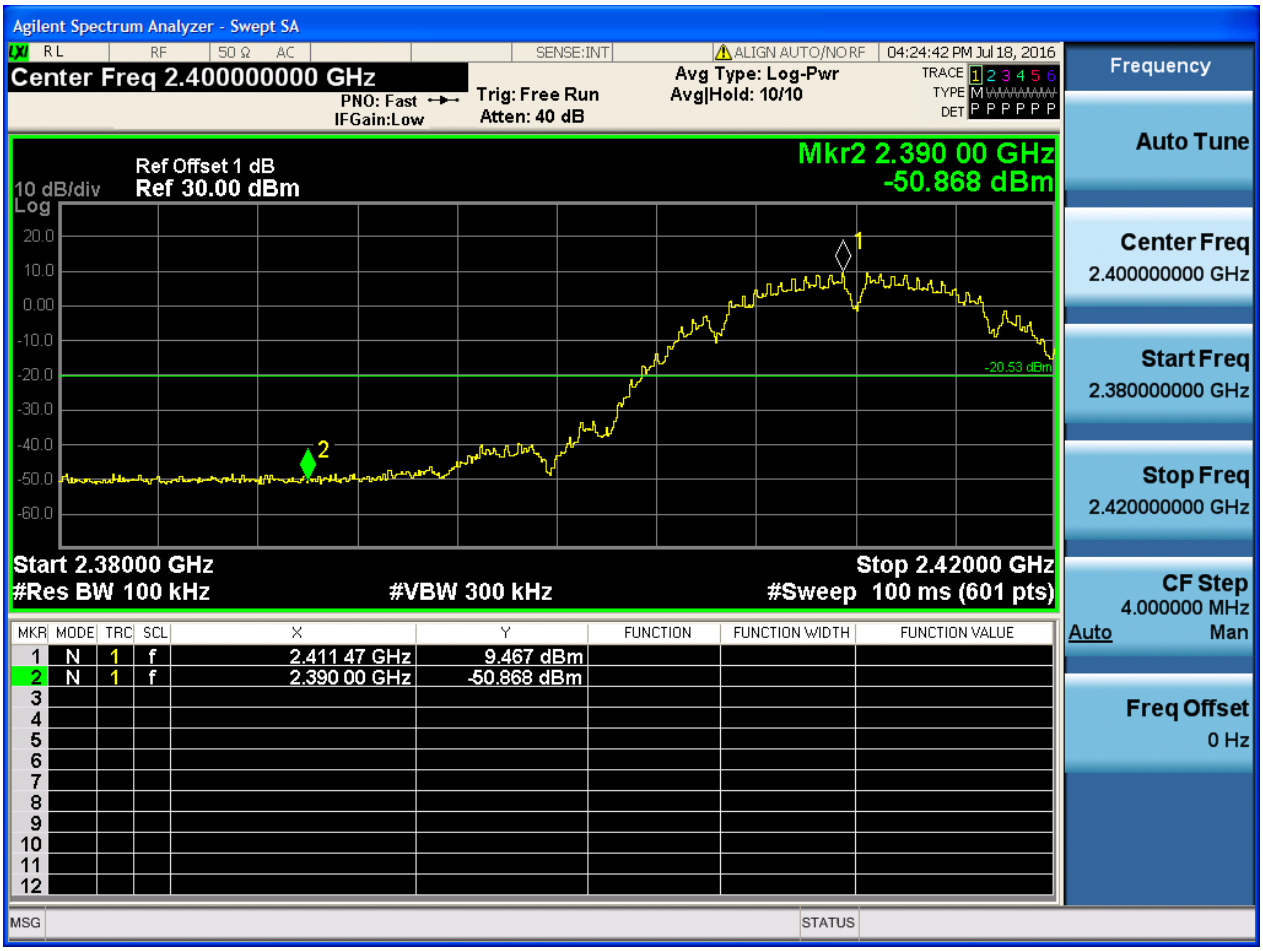
Appendix F: Band Edges Compliance

Part I - Test Results

Test Mode	Test Channel	Frequency[MHz]	Ant	Carrier Power[dBm]	Max.Spurious Level[dBm]	Verdict
11B	L	2412	Ant 1	9.47	-50.87	pass
11B	H	2462	Ant 1	9.38	-48.62	pass
11G	L	2412	Ant 1	5.86	-48.26	pass
11G	H	2462	Ant 1	5.64	-43.19	pass
11N20	L	2412	Ant 1	5.08	-46.16	pass
11N20	H	2462	Ant 1	5.20	-41.87	pass

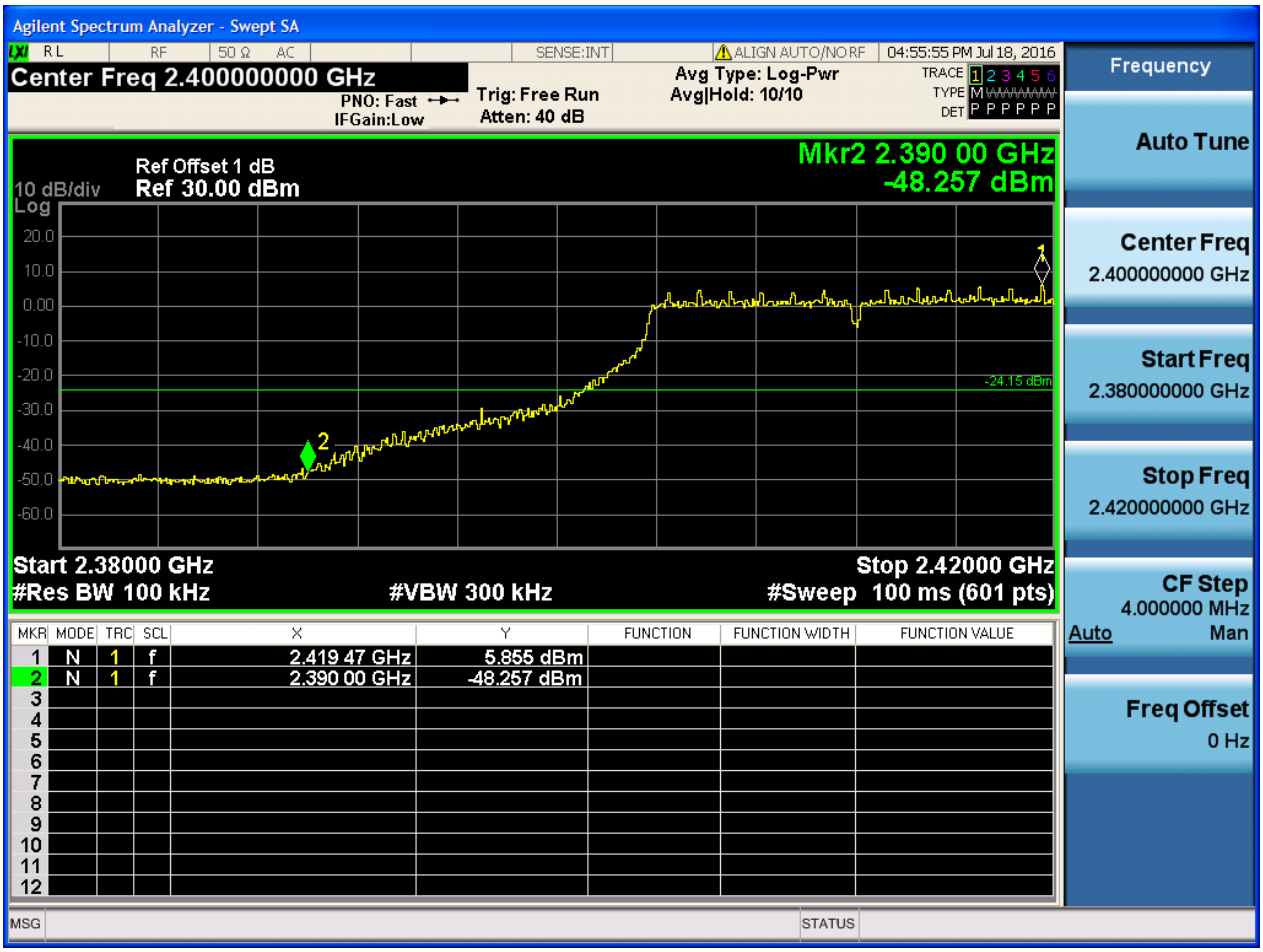
Part II - Test Plots

2.1 11B_L@Ant 1



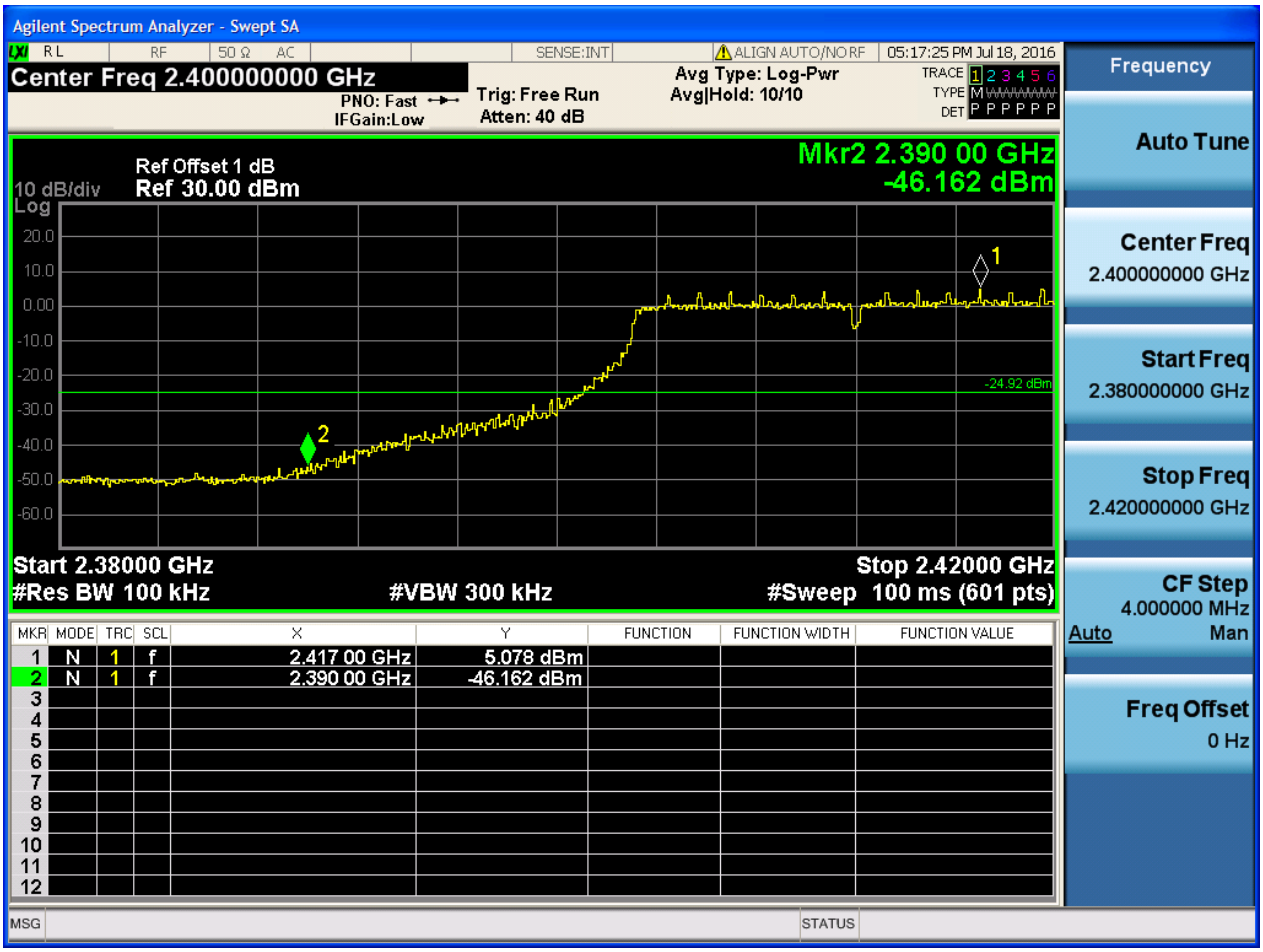
2.3 11B_H@Ant 1

2.5 11G_L@Ant 1

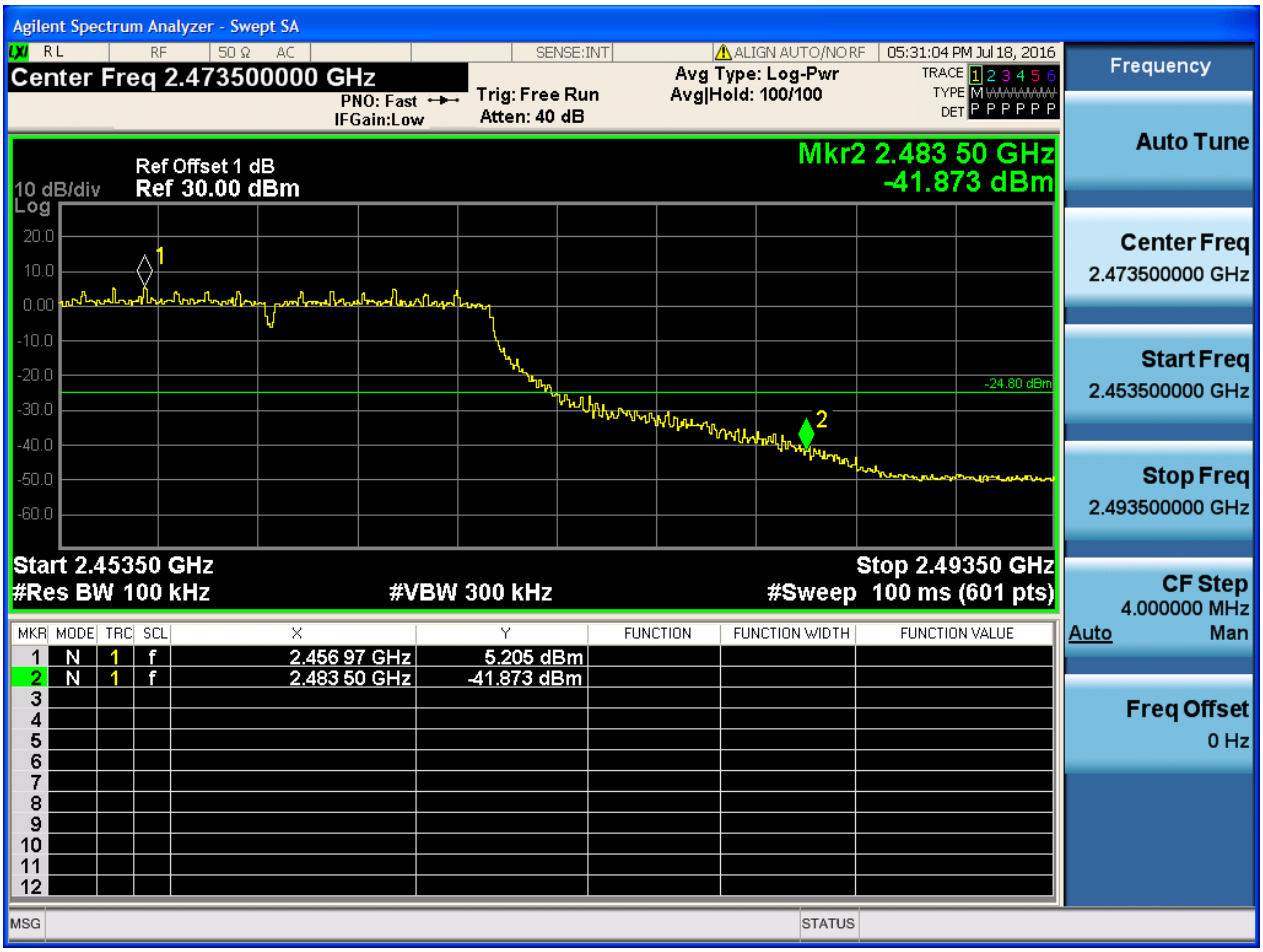


2.7 11G_H@Ant 1

2.9 11N20_L@Ant 1



2.11 11N20_H@Ant 1



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" referrers 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 x lg(100 [kHz]/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]-20[dBm],see test plots for detailed".

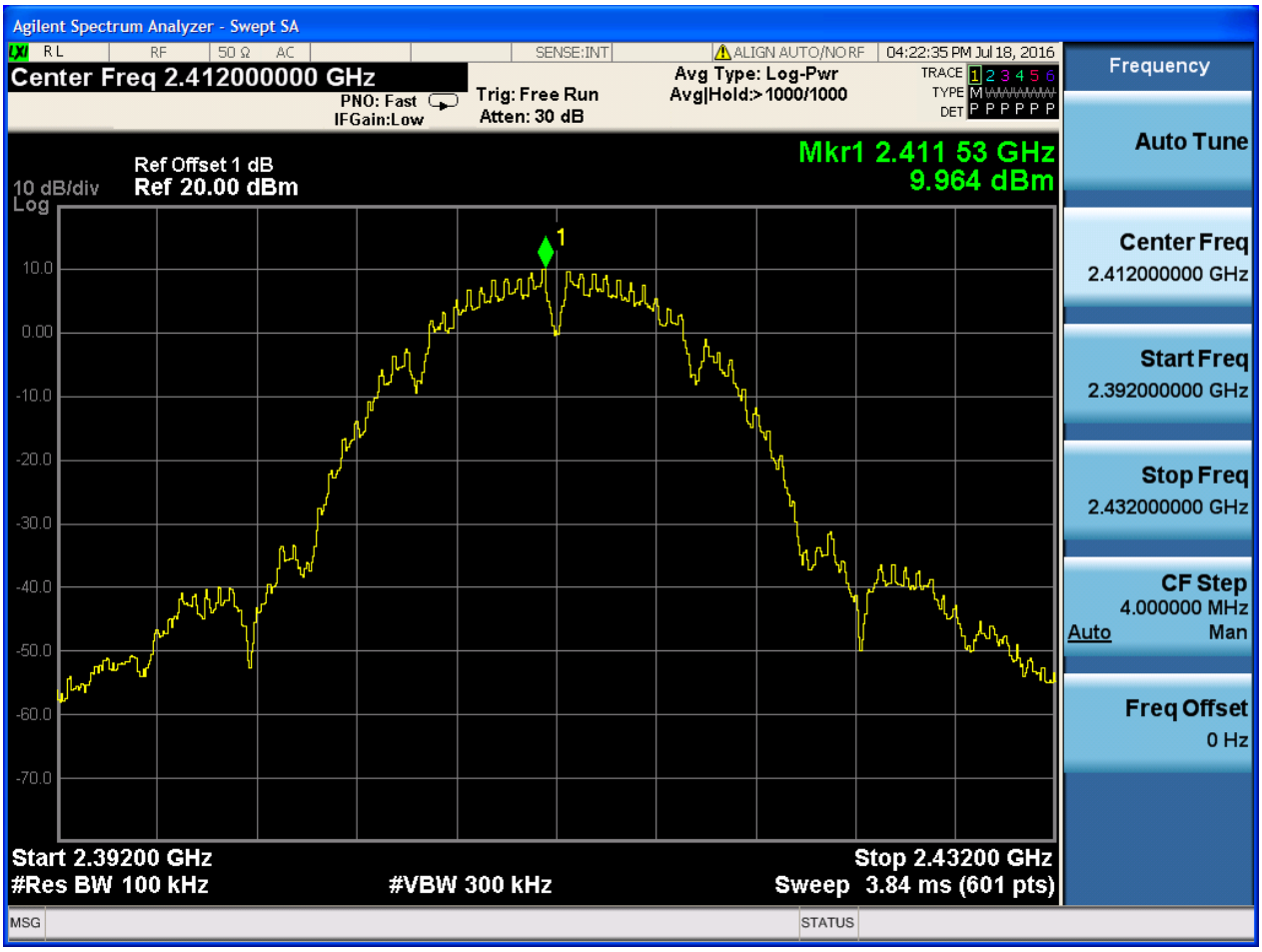
Part I - Test Results

Test Mode	Test Channel	Frequency[MHz]	Ant	Pref[dBm]	Puw[dBm]	Verdict
11B	L	2412	Ant 1	9.96	<limit	pass
11B	M	2437	Ant 1	9.86	<limit	pass
11B	H	2462	Ant 1	9.19	<limit	pass
11G	L	2412	Ant 1	6.10	<limit	pass
11G	M	2437	Ant 1	6.24	<limit	pass
11G	H	2462	Ant 1	6.06	<limit	pass
11N20	L	2412	Ant 1	4.95	<limit	pass
11N20	M	2437	Ant 1	5.40	<limit	pass
11N20	H	2462	Ant 1	5.53	<limit	pass

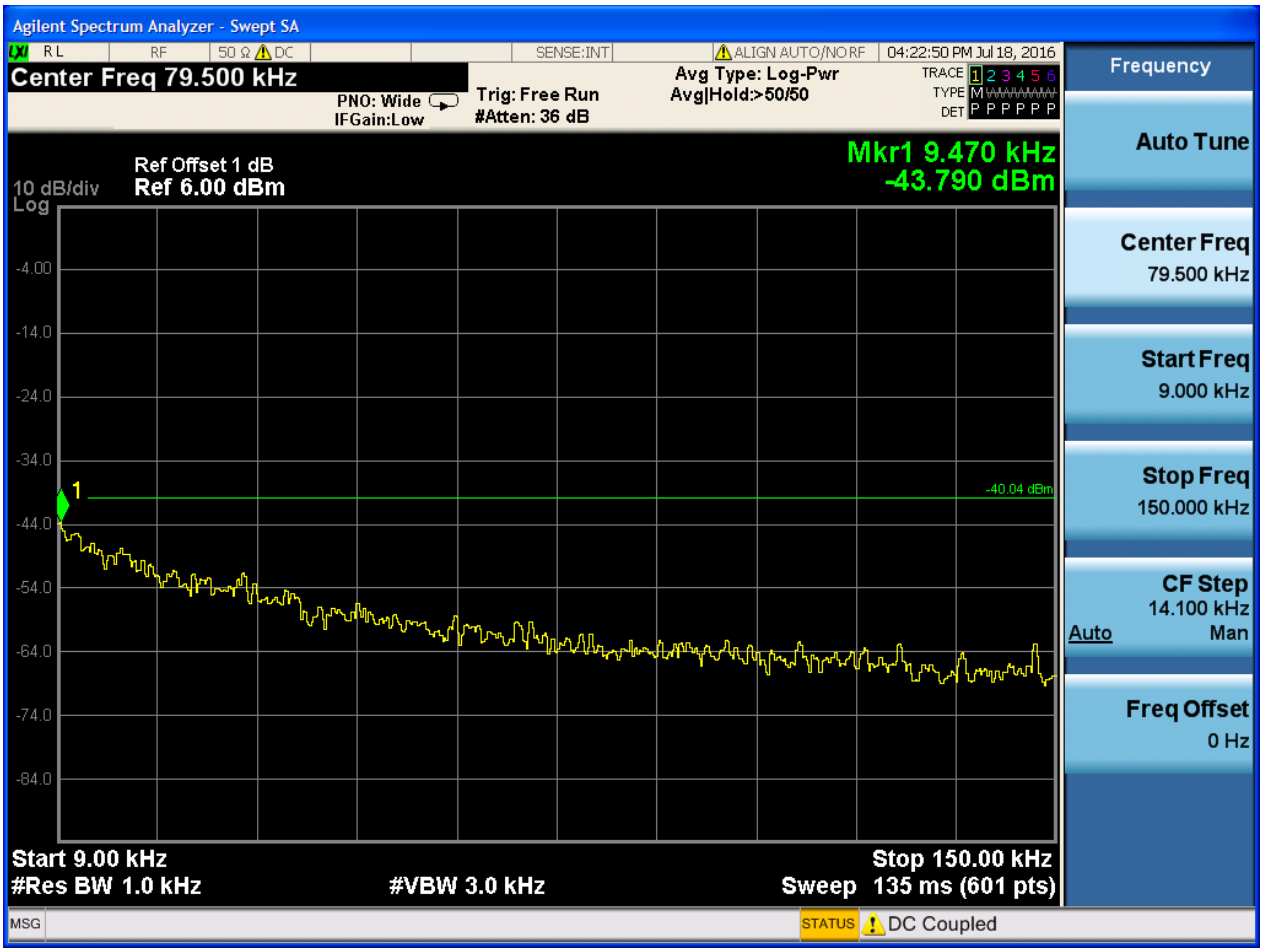
Part II - Test Plots

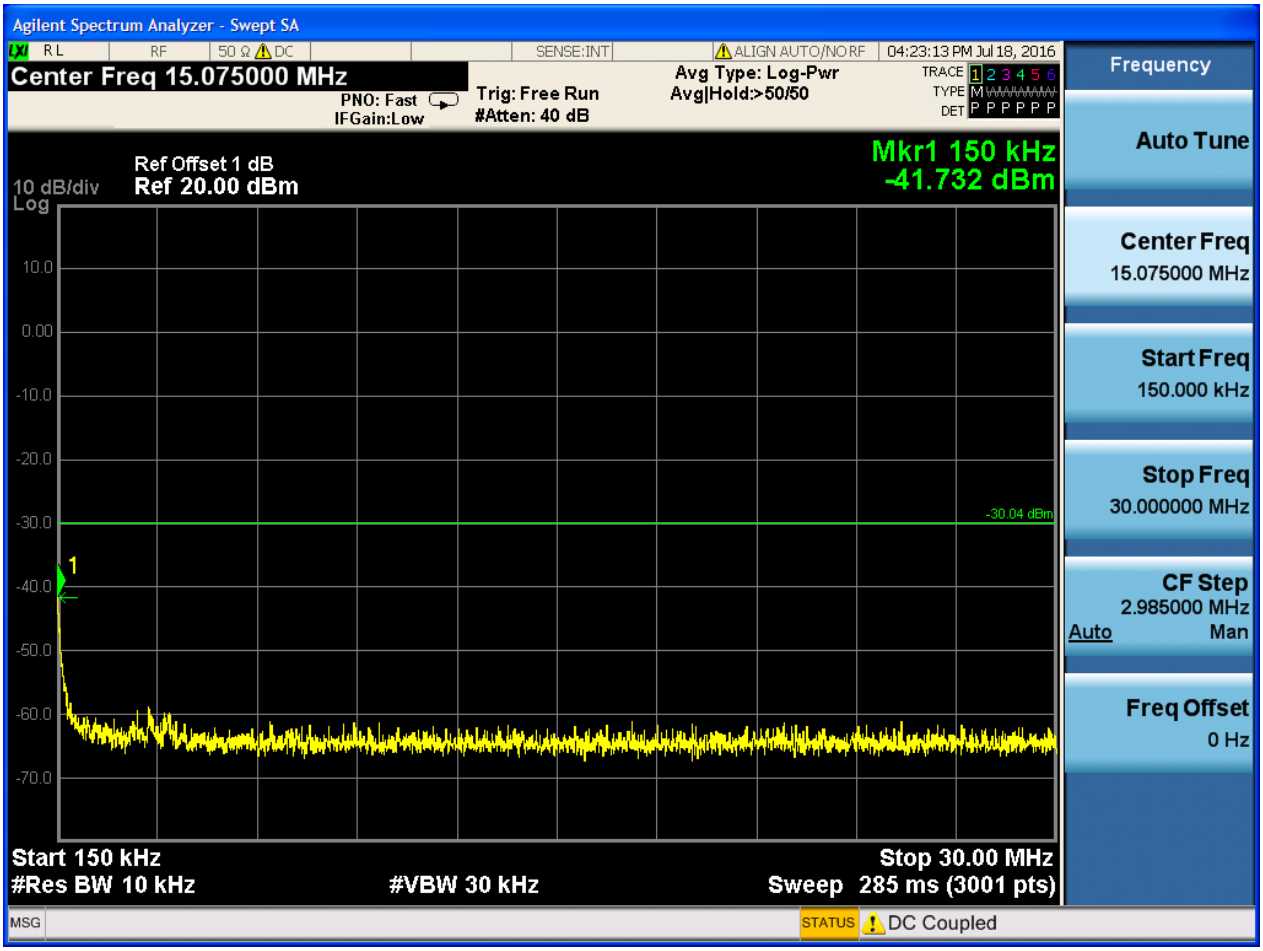
2.1 11B_L@Ant 1

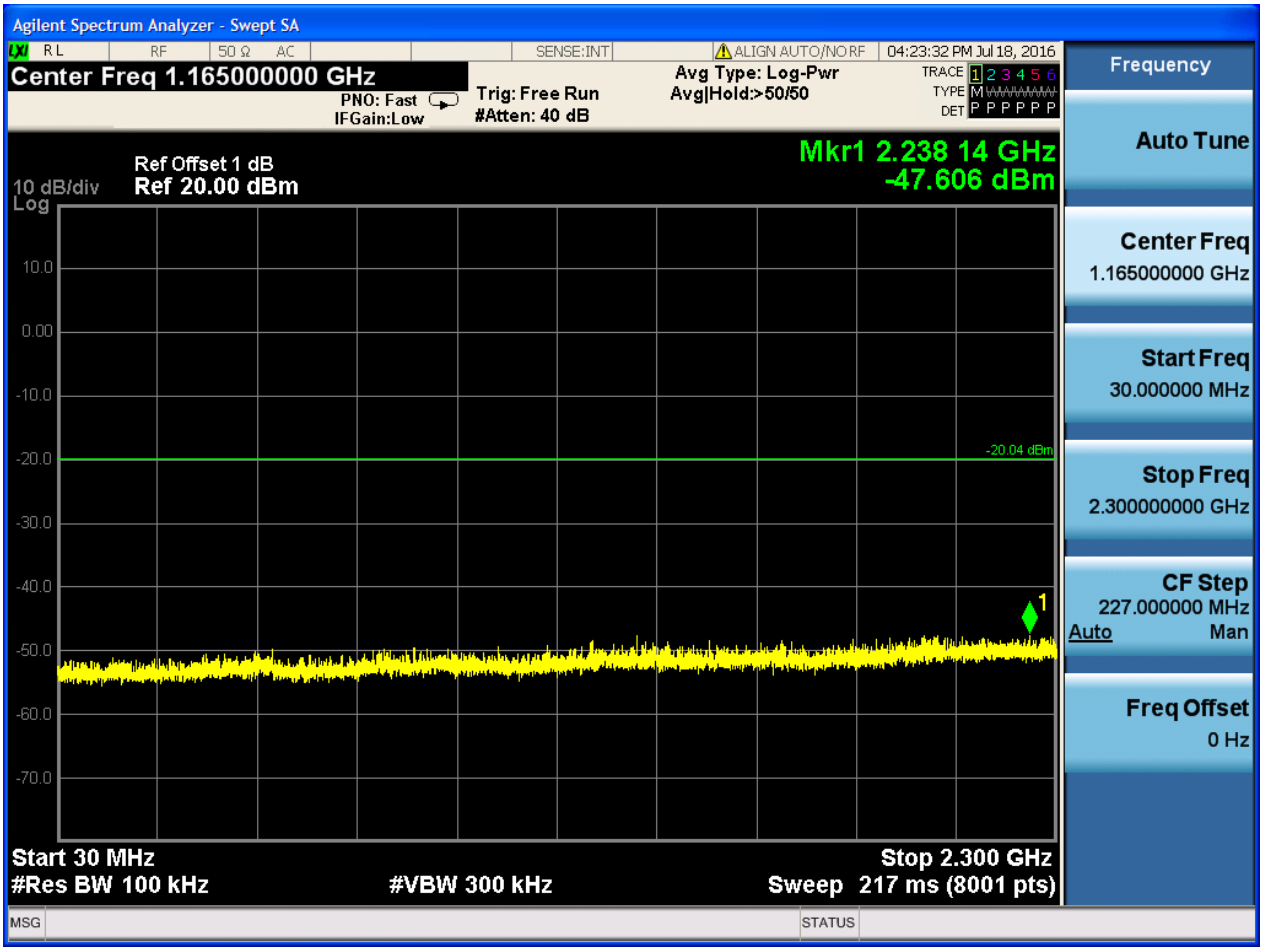
Pref:

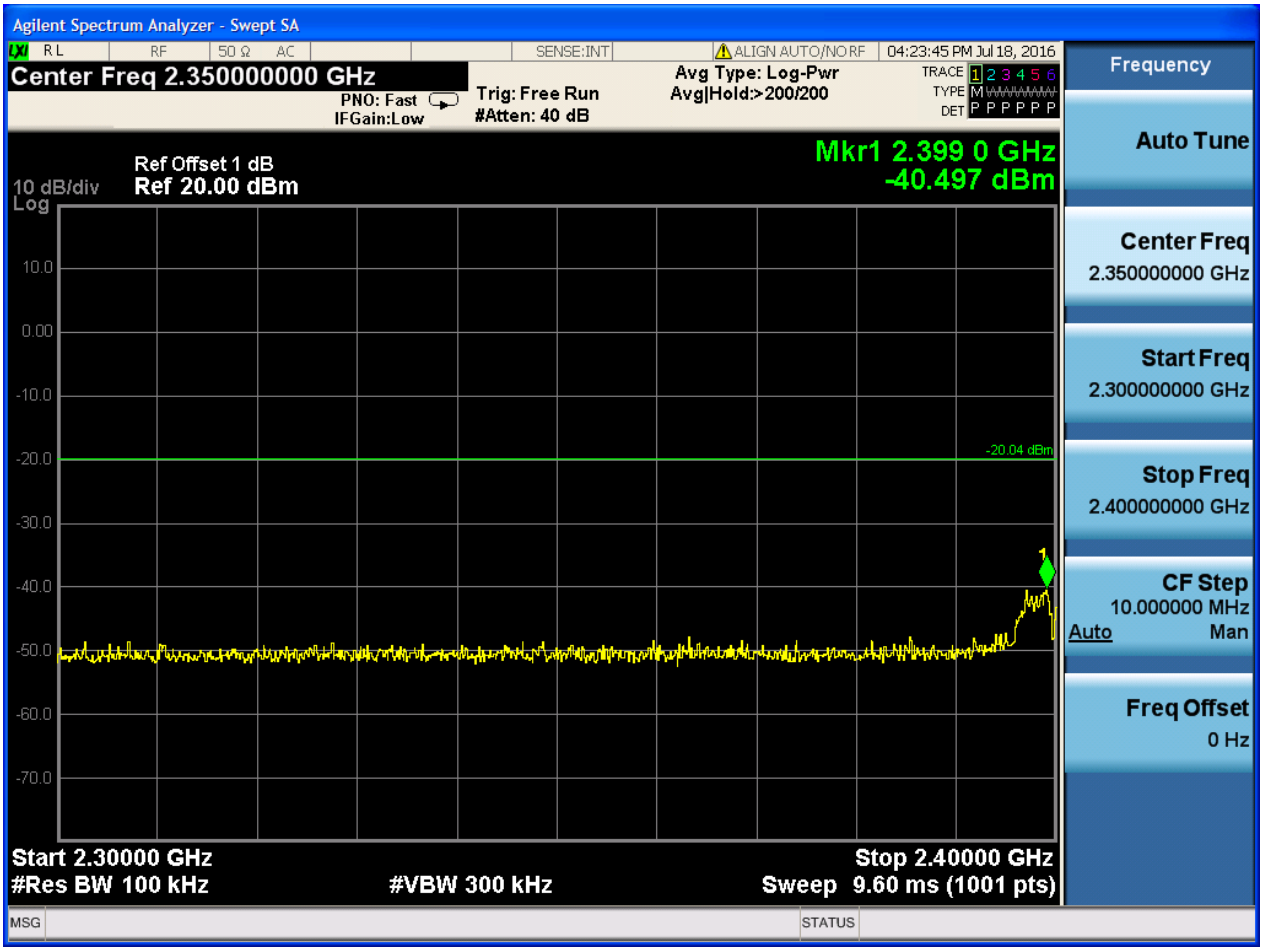


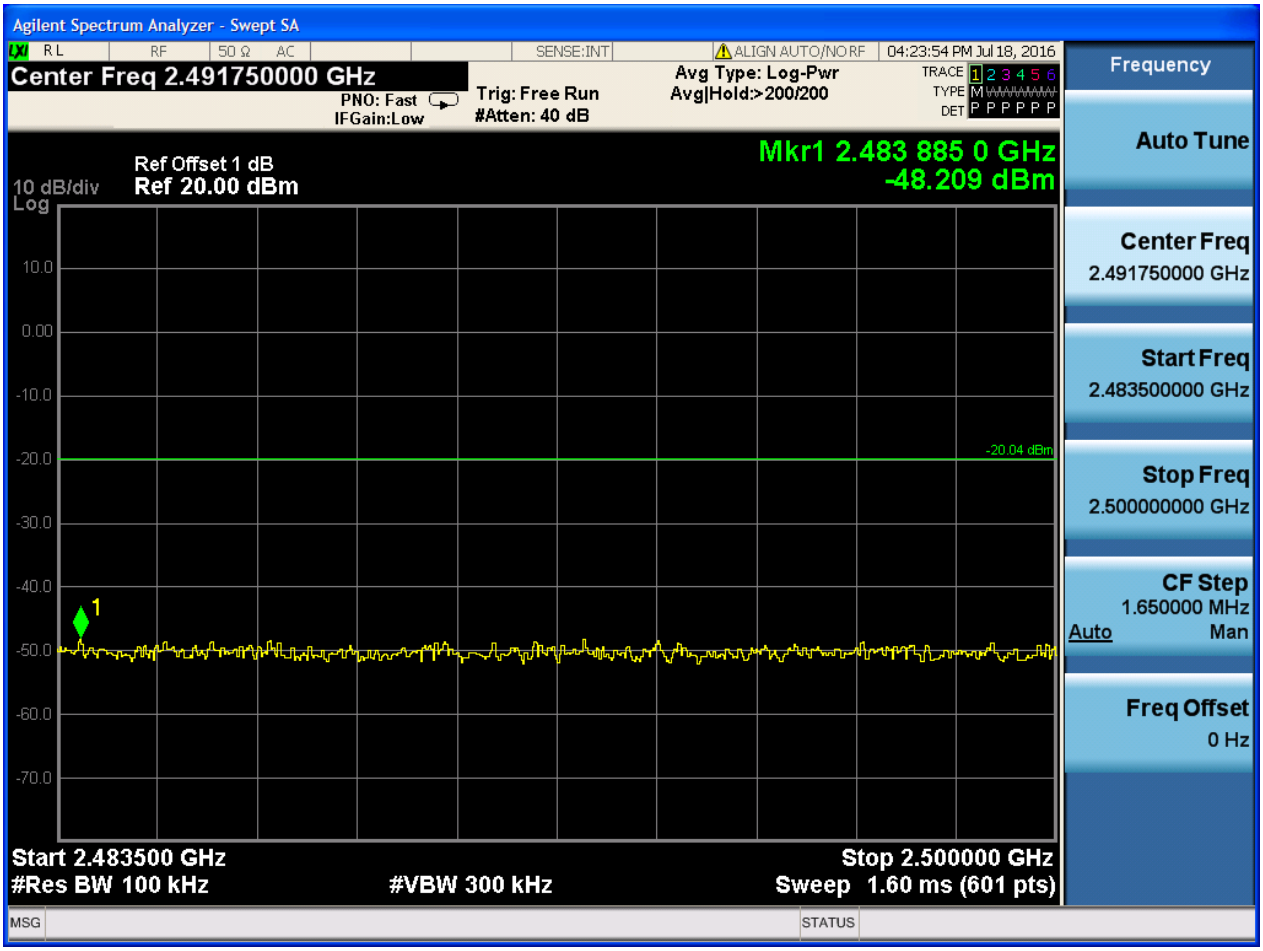
Puw:

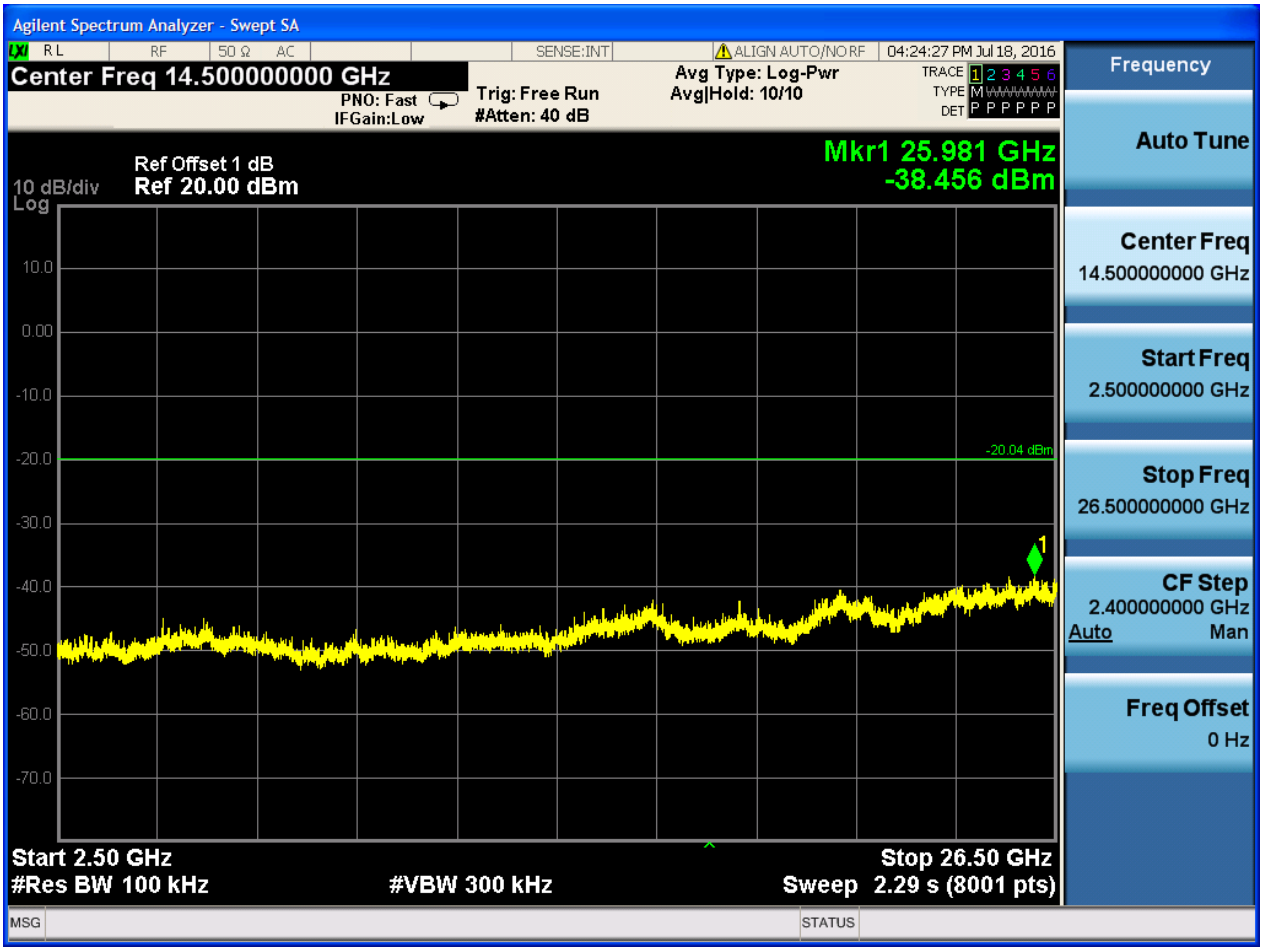






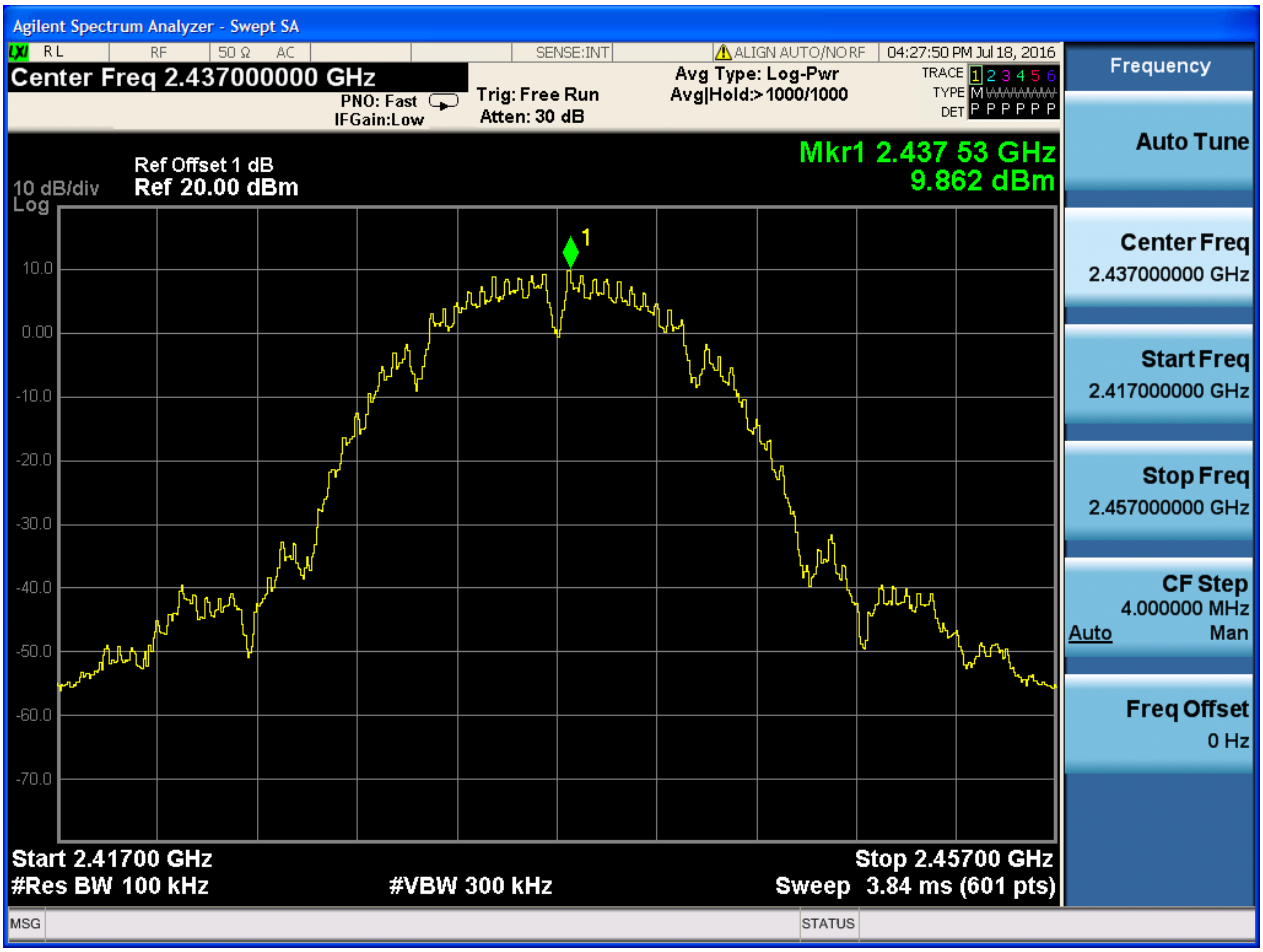

Agilent Spectrum Analyzer - Swept SA
RL
RF
50 Ω AC
SENSE:INT
ALIGN AUTO/NO RF
04:23:45 PM Jul 18, 2016
Center Freq 2.350000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 40 dB
Avg Type: Log-Pwr
Avg|Hold:>200/200
TRACE 1 2 3 4 5 6
TYPE M
DET P P P P P P
Ref Offset 1 dB
10 dB/div
Log
Ref 20.00 dBm
Mkr1 2.399 0 GHz
-40.497 dBm
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
-20.04 dBm
Start 2.30000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 2.40000 GHz
Sweep 9.60 ms (1001 pts)
MSG
STATUS
Frequency
Auto Tune
Center Freq
2.350000000 GHz
Start Freq
2.300000000 GHz
Stop Freq
2.400000000 GHz
CF Step
10.000000 MHz
Auto
Man
Freq Offset
0 Hz



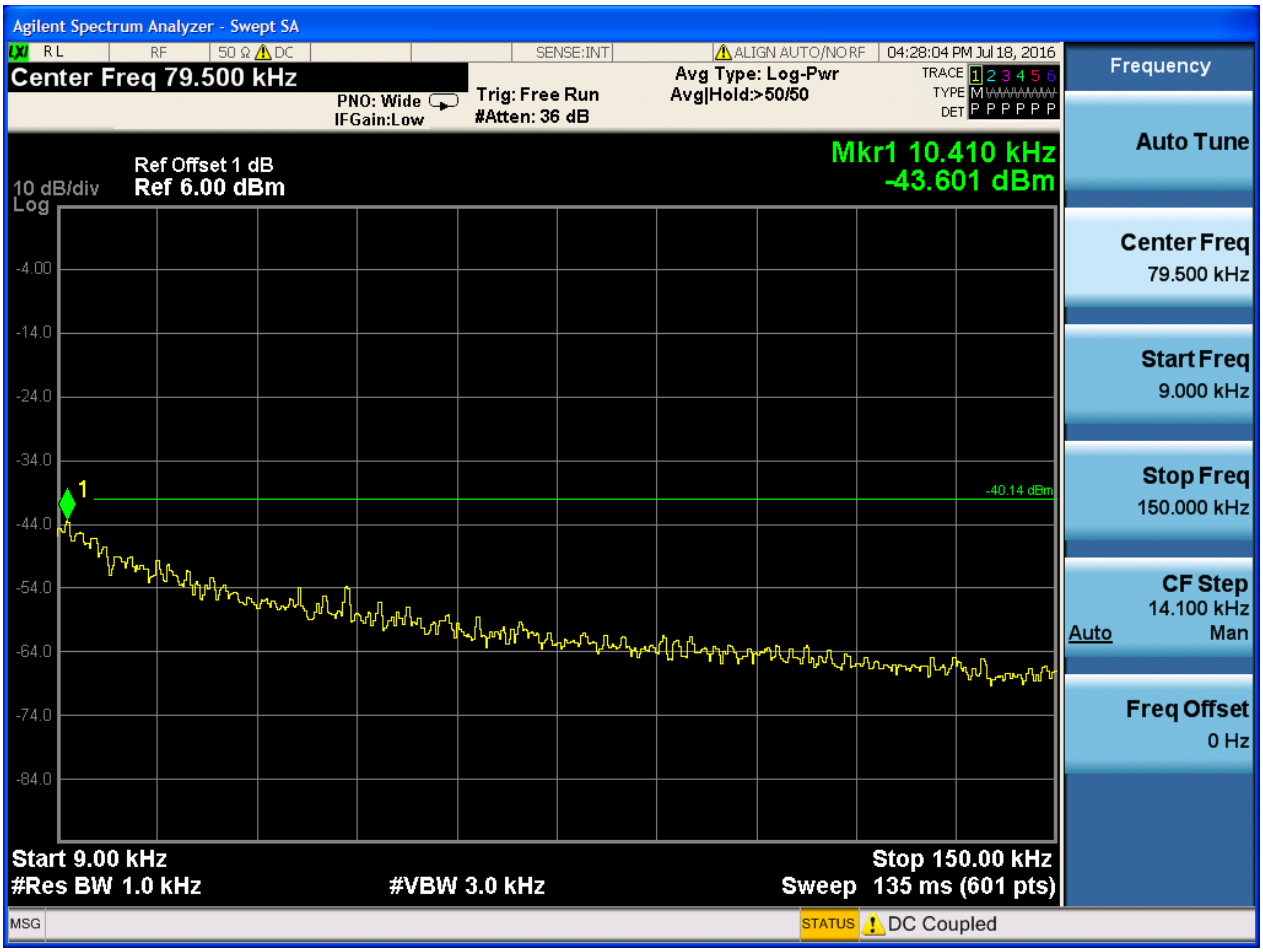

Agilent Spectrum Analyzer - Swept SA
RL
RF
50 Ω AC
SENSE:INT
ALIGN AUTO/NO RF
04:24:27 PM Jul 18, 2016
Center Freq 14.500000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 40 dB
Avg Type: Log-Pwr
Avg|Hold: 10/10
TRACE 1 2 3 4 5 6
TYPE M
DET P P P P P P
Ref Offset 1 dB
10 dB/div
Log
Ref 20.00 dBm
Mkr1 25.981 GHz
-38.456 dBm
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
-20.04 dBm
1
Start 2.50 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 26.50 GHz
Sweep 2.29 s (8001 pts)
MSG
STATUS
Frequency
Auto Tune
Center Freq
14.500000000 GHz
Start Freq
2.500000000 GHz
Stop Freq
26.500000000 GHz
CF Step
2.400000000 GHz
Auto
Man
Freq Offset
0 Hz

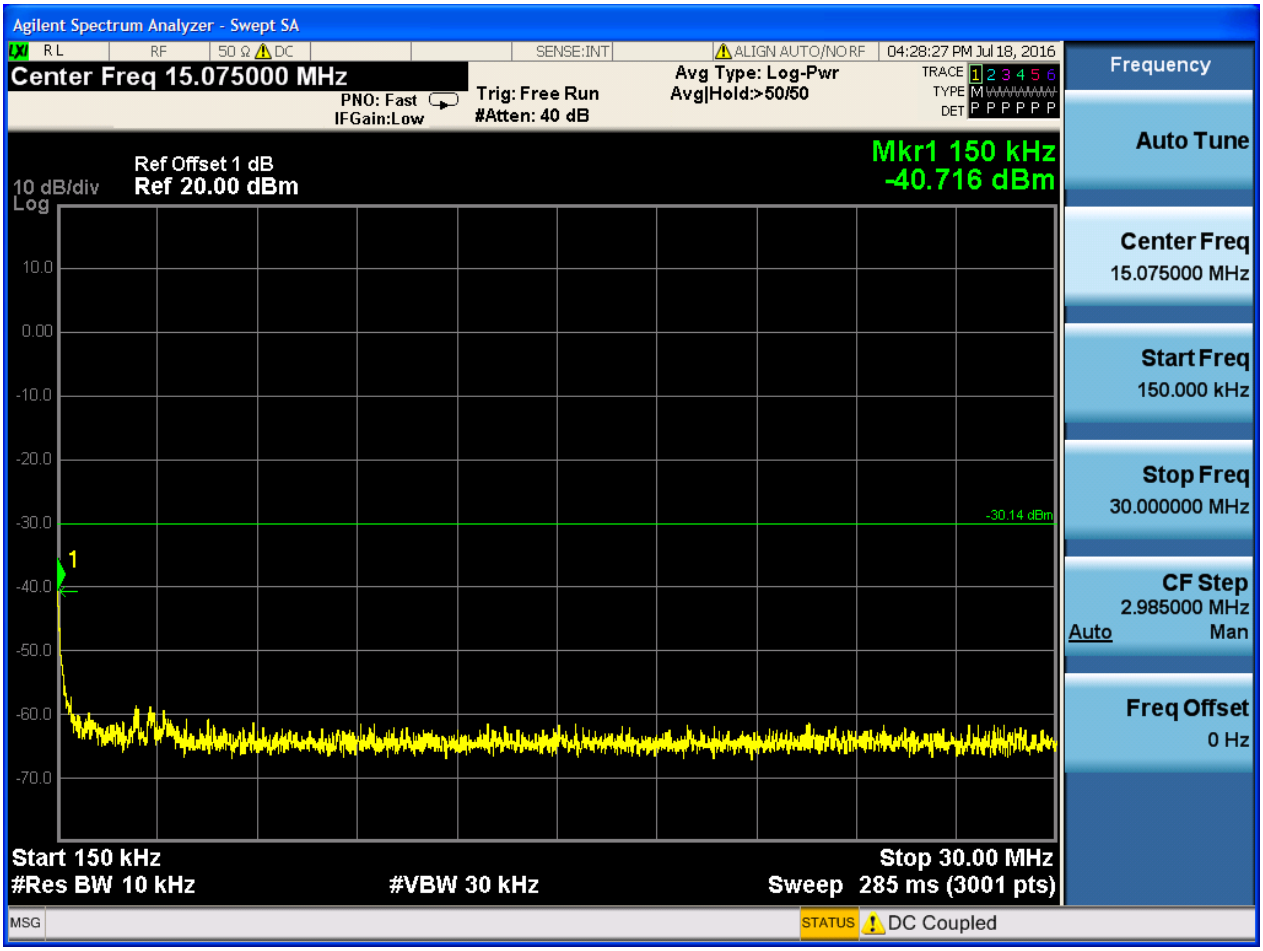
2.3 11B_M@Ant 1

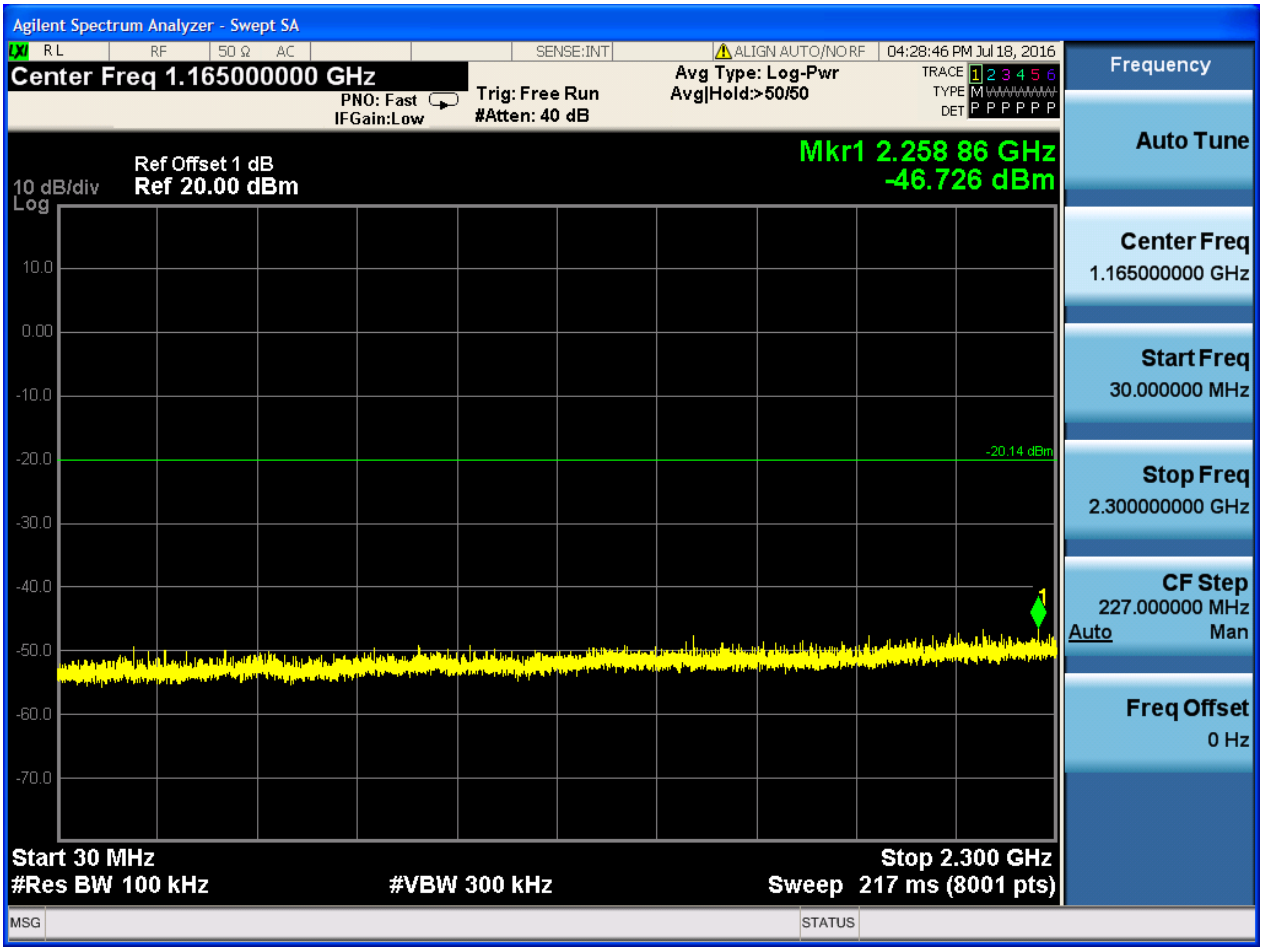
Pref:

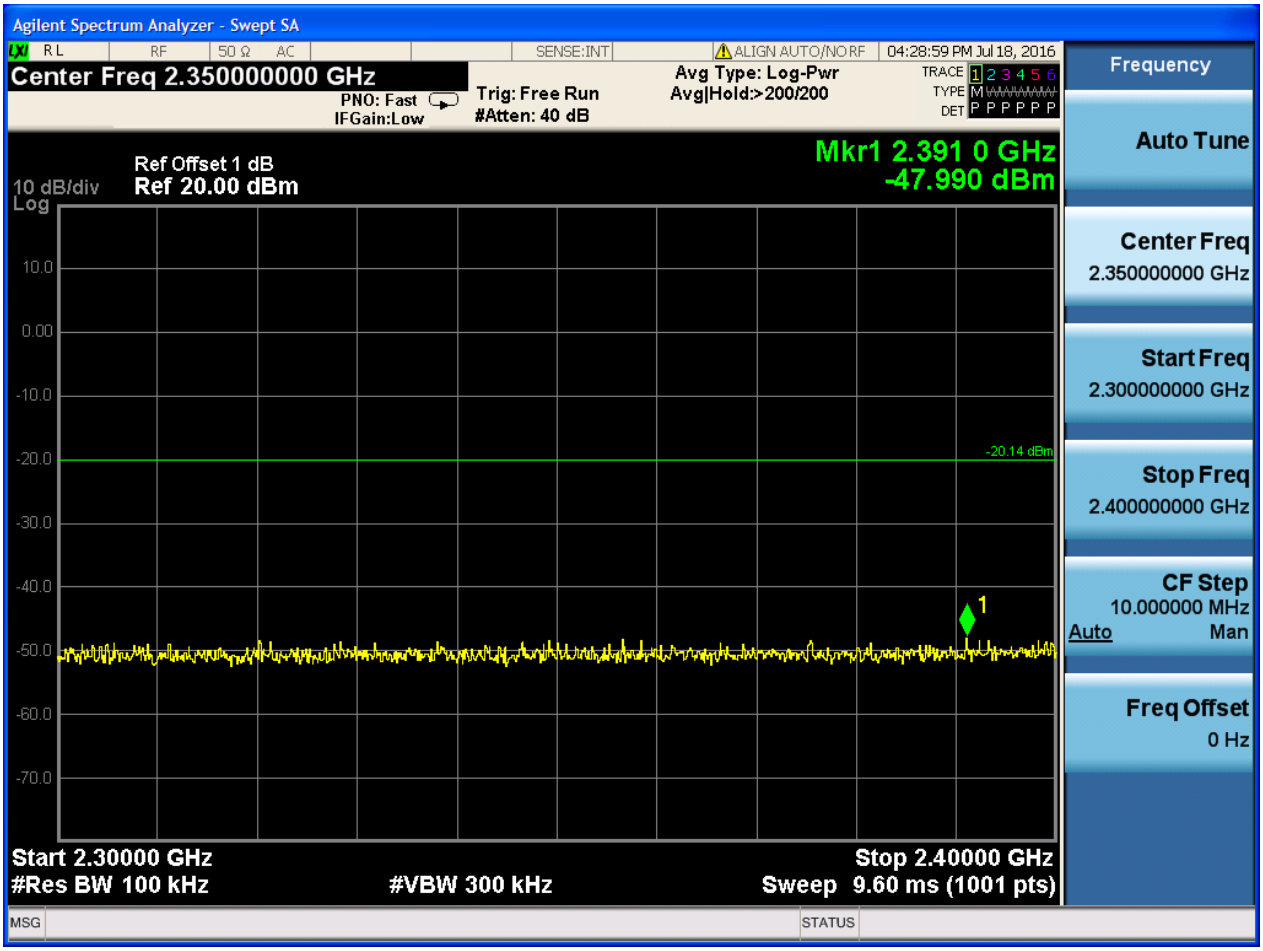


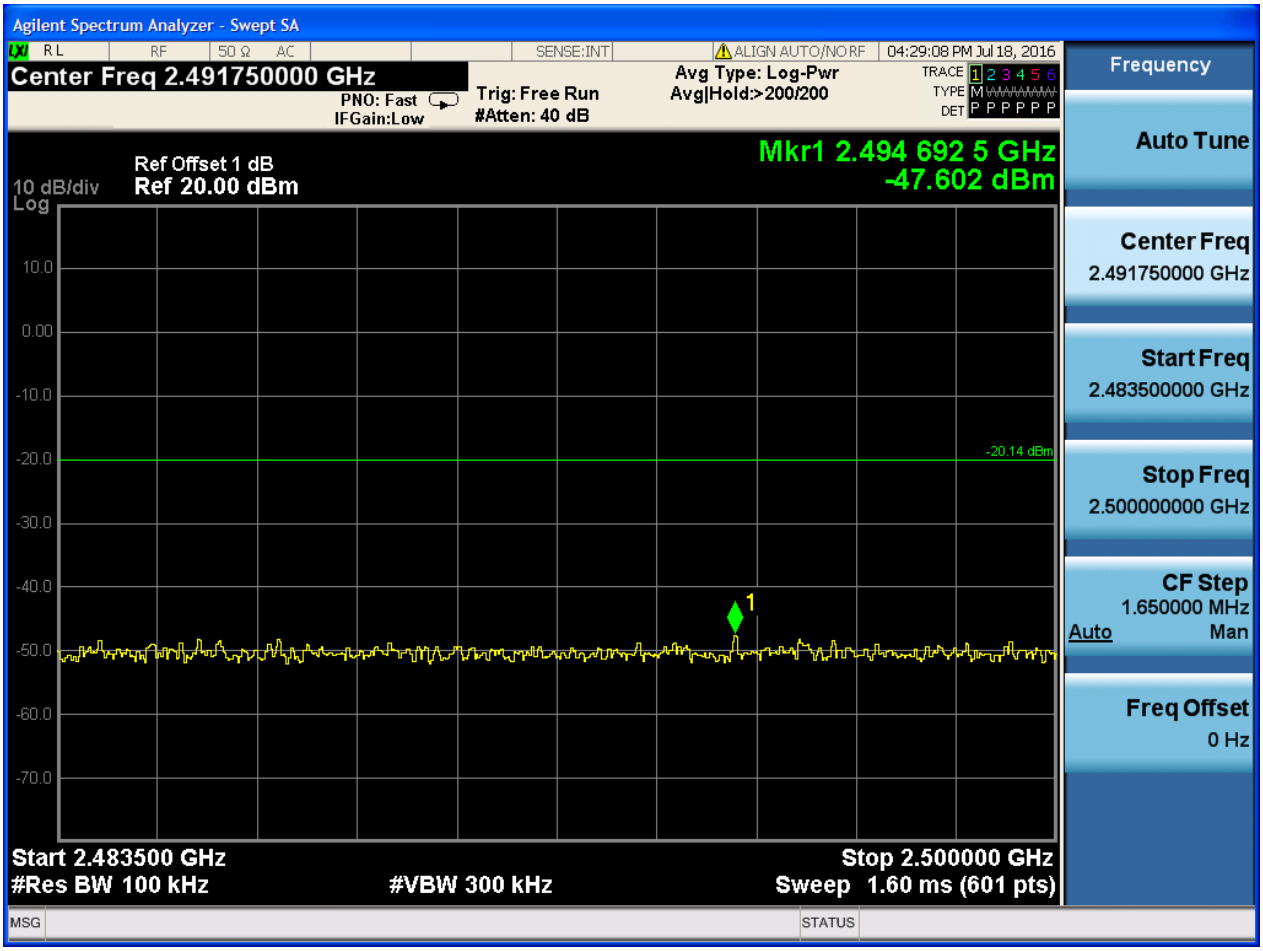
Puw:

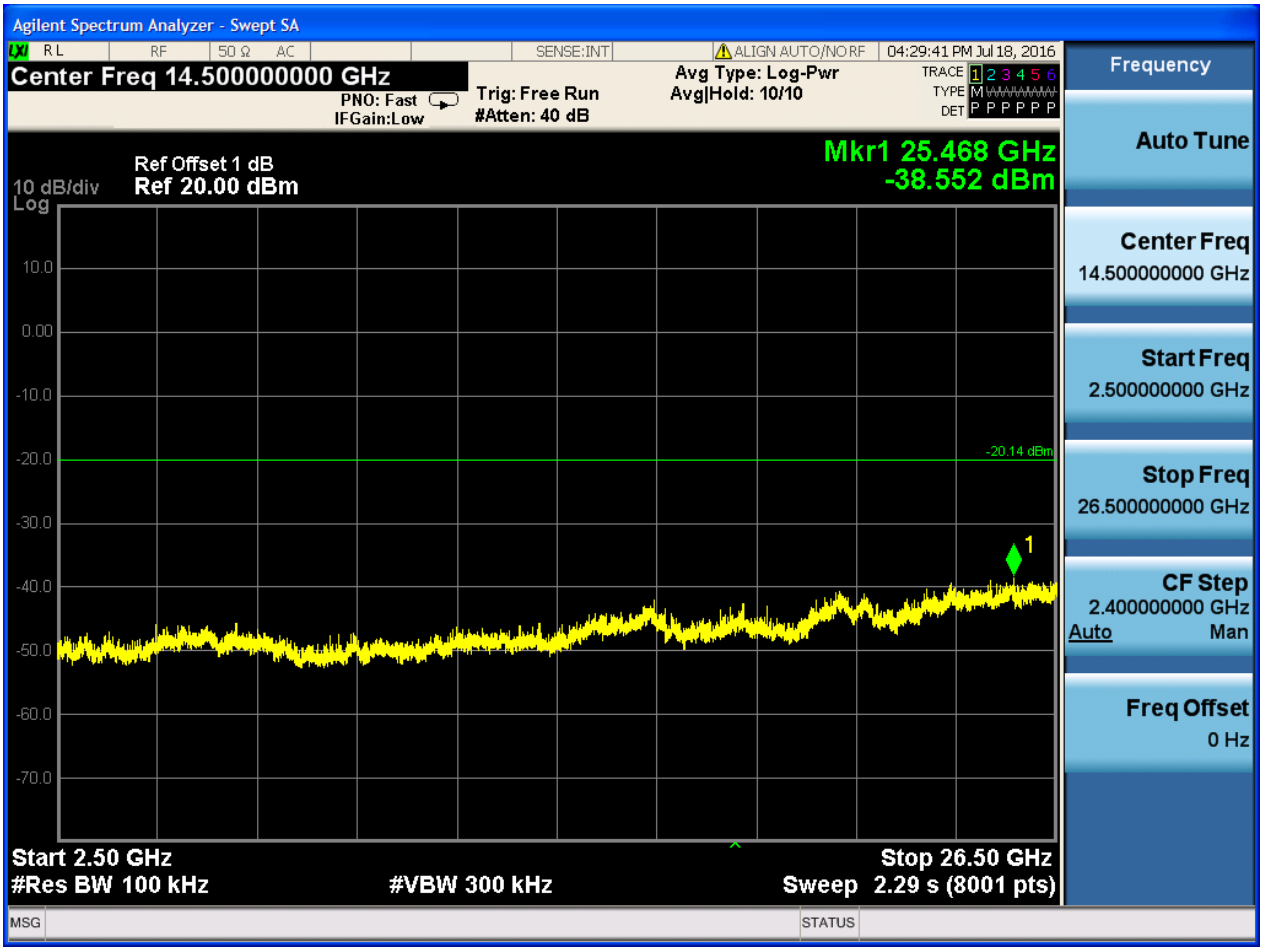






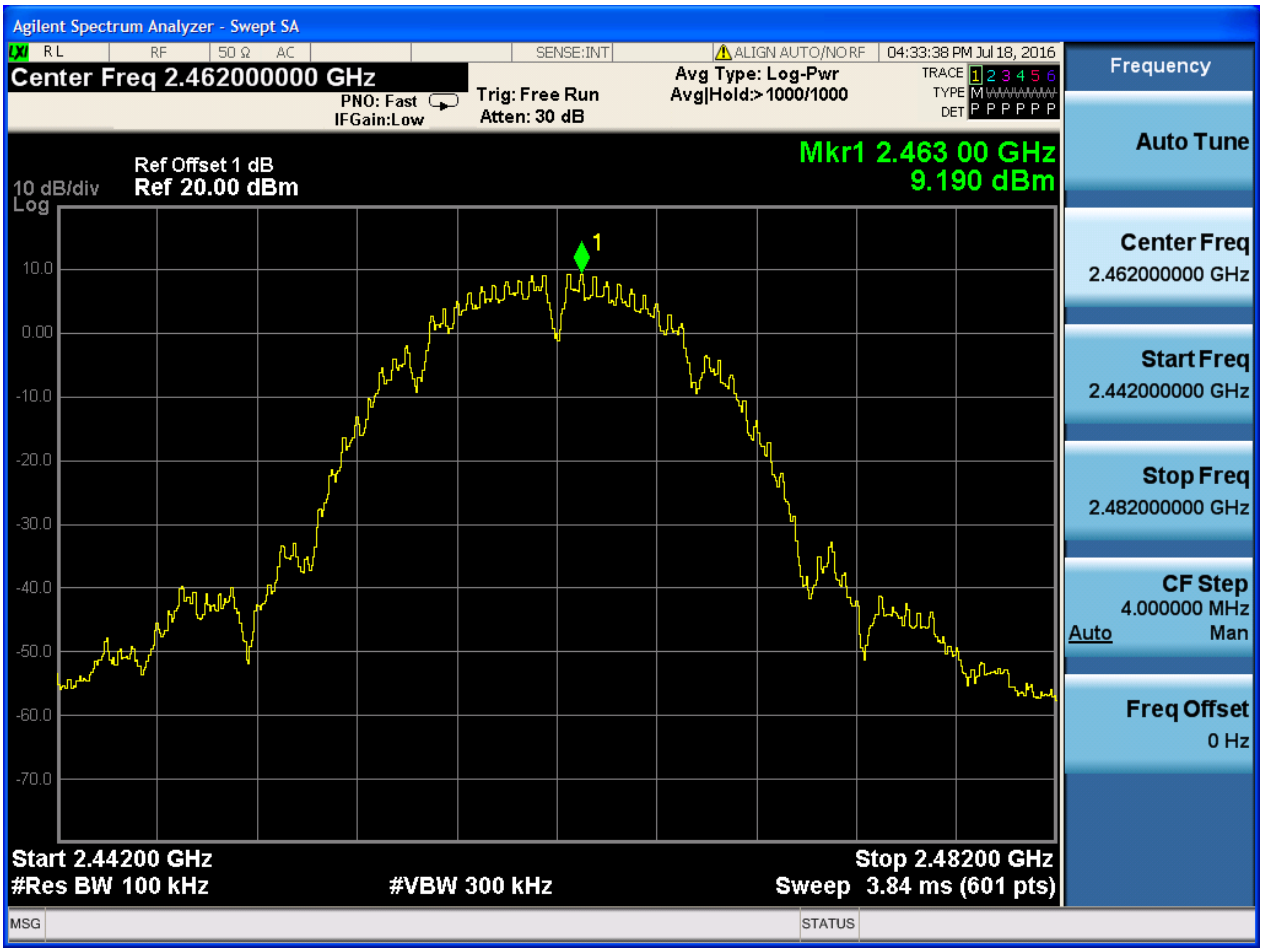




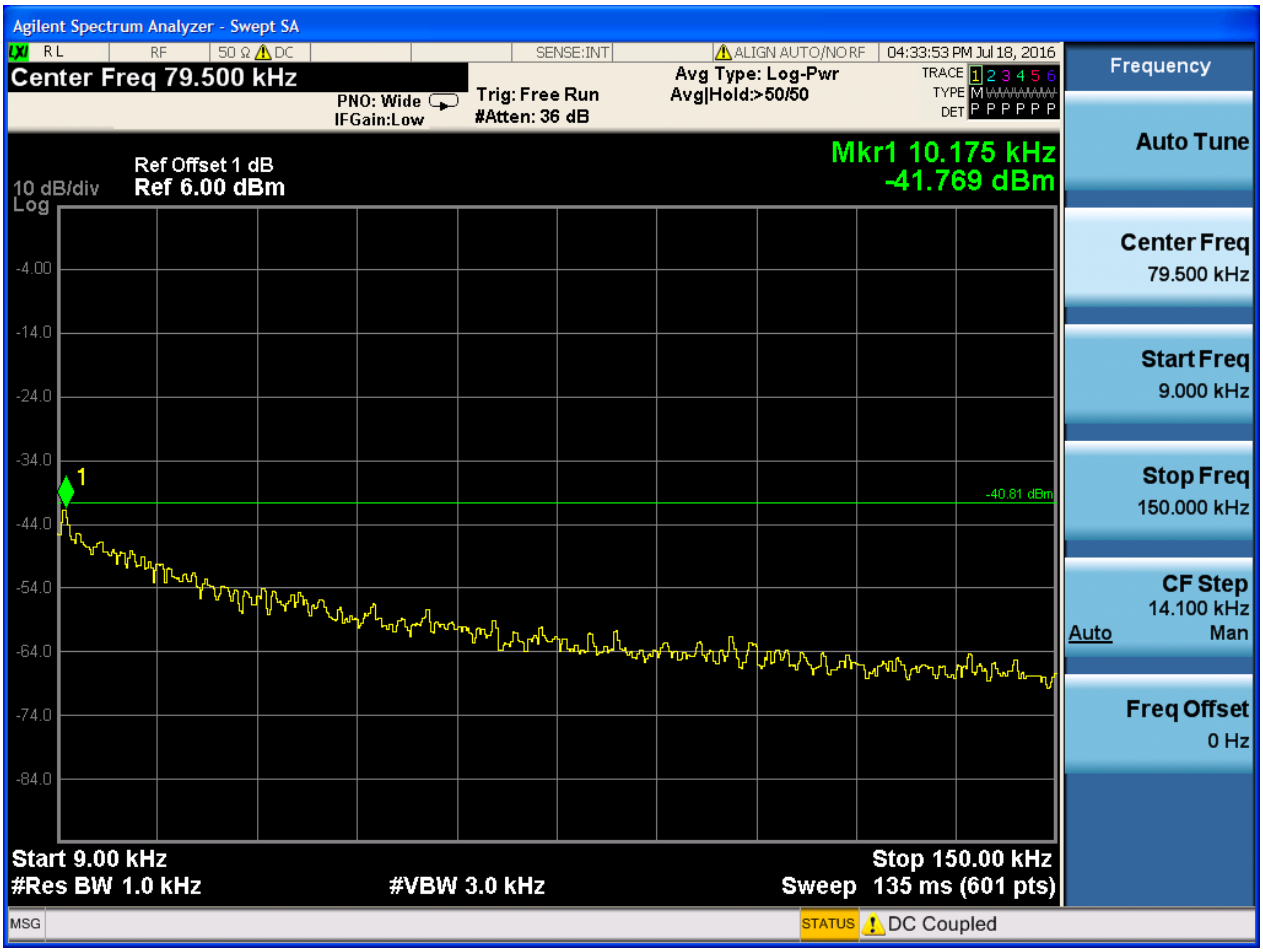


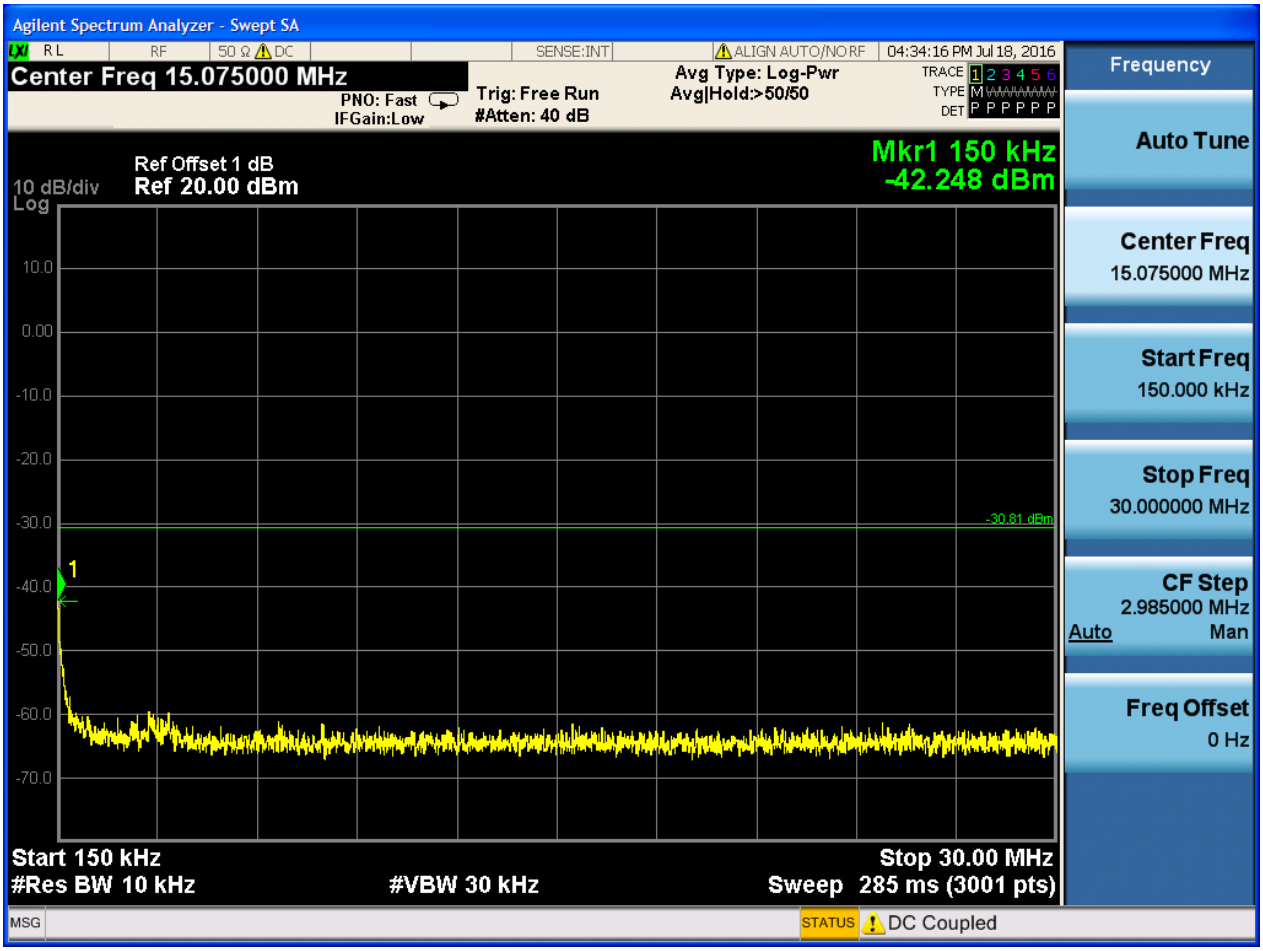
2.5 11B_H@Ant 1

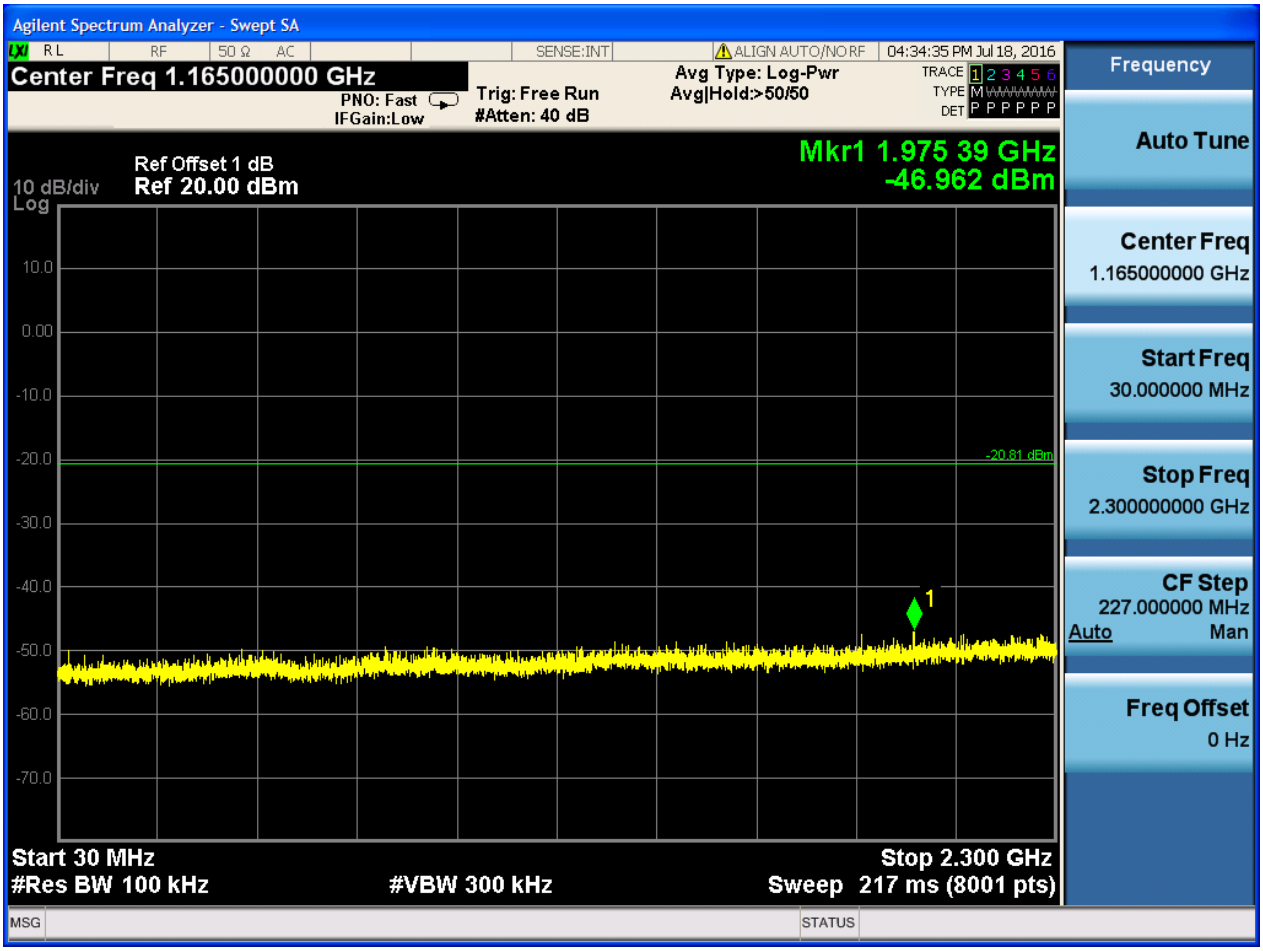
Pref:

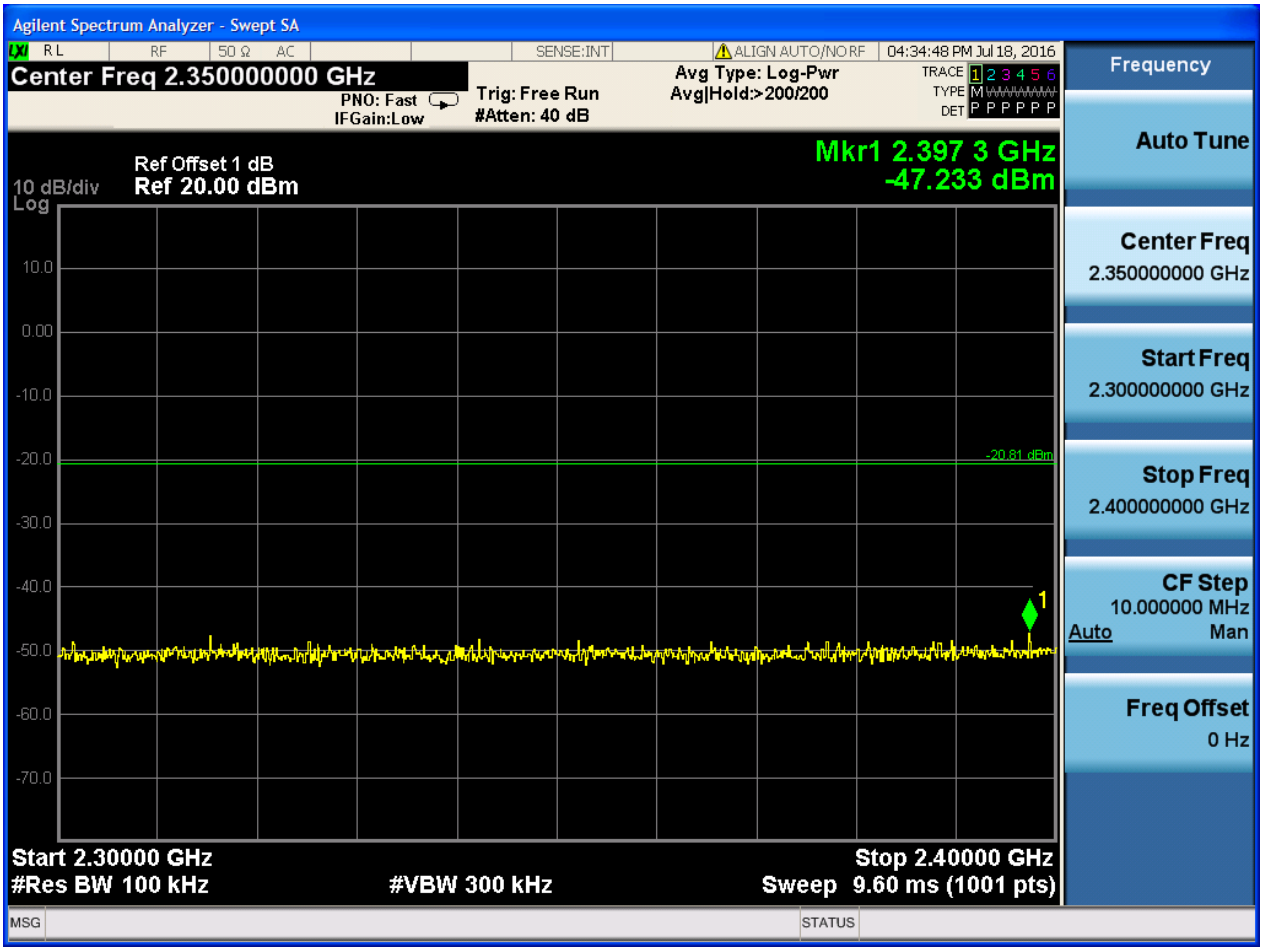


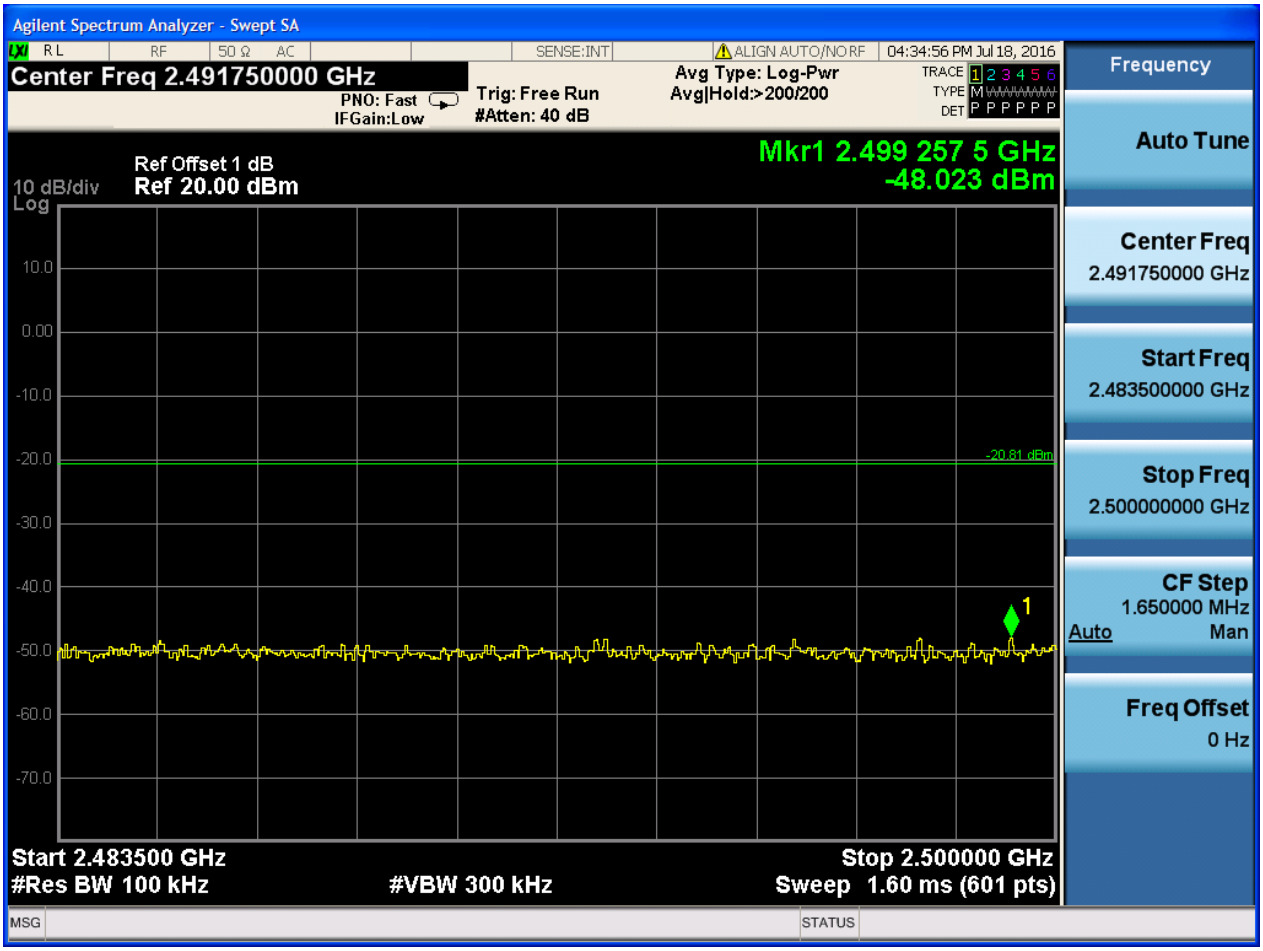
Puw:

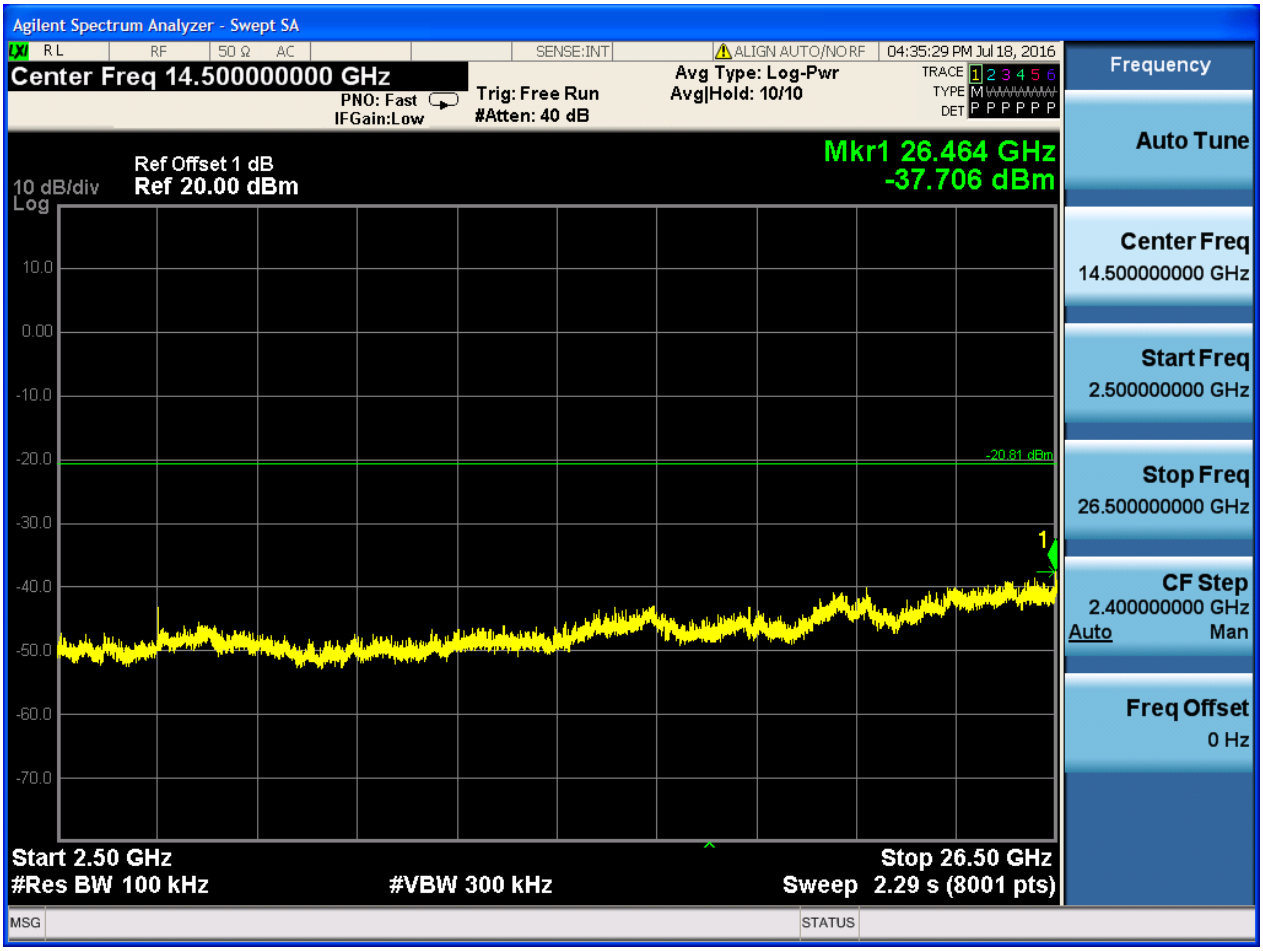






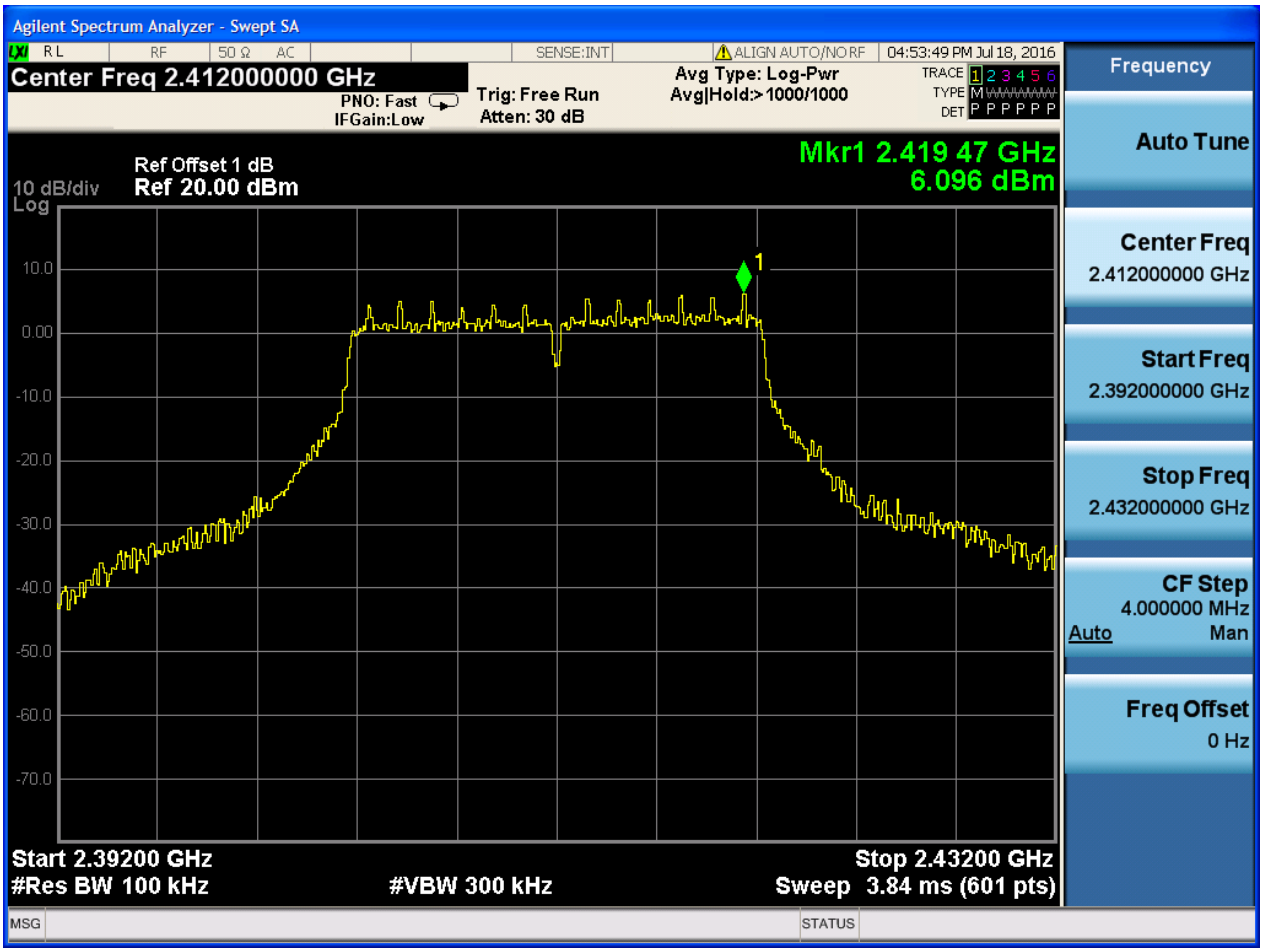




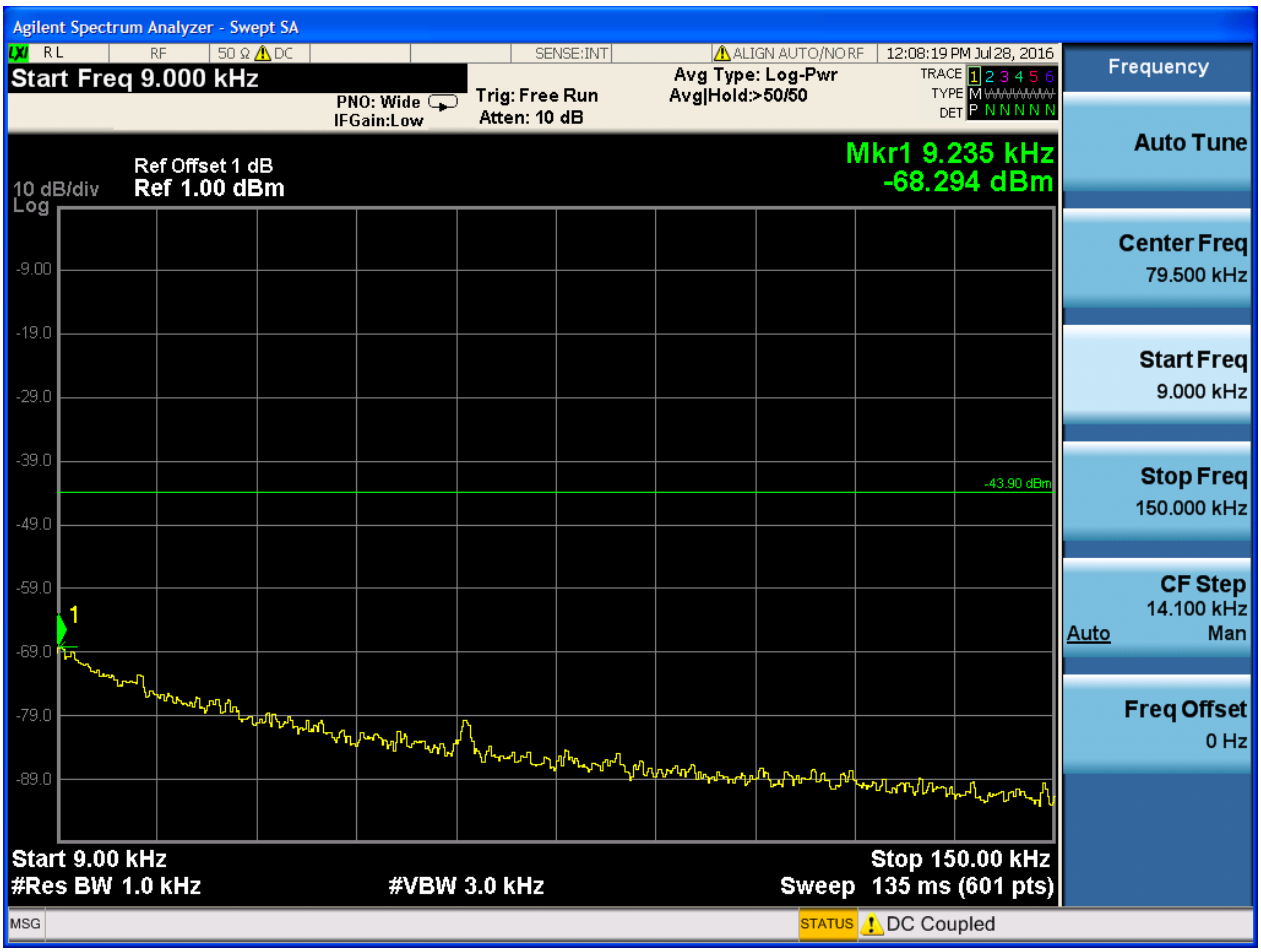


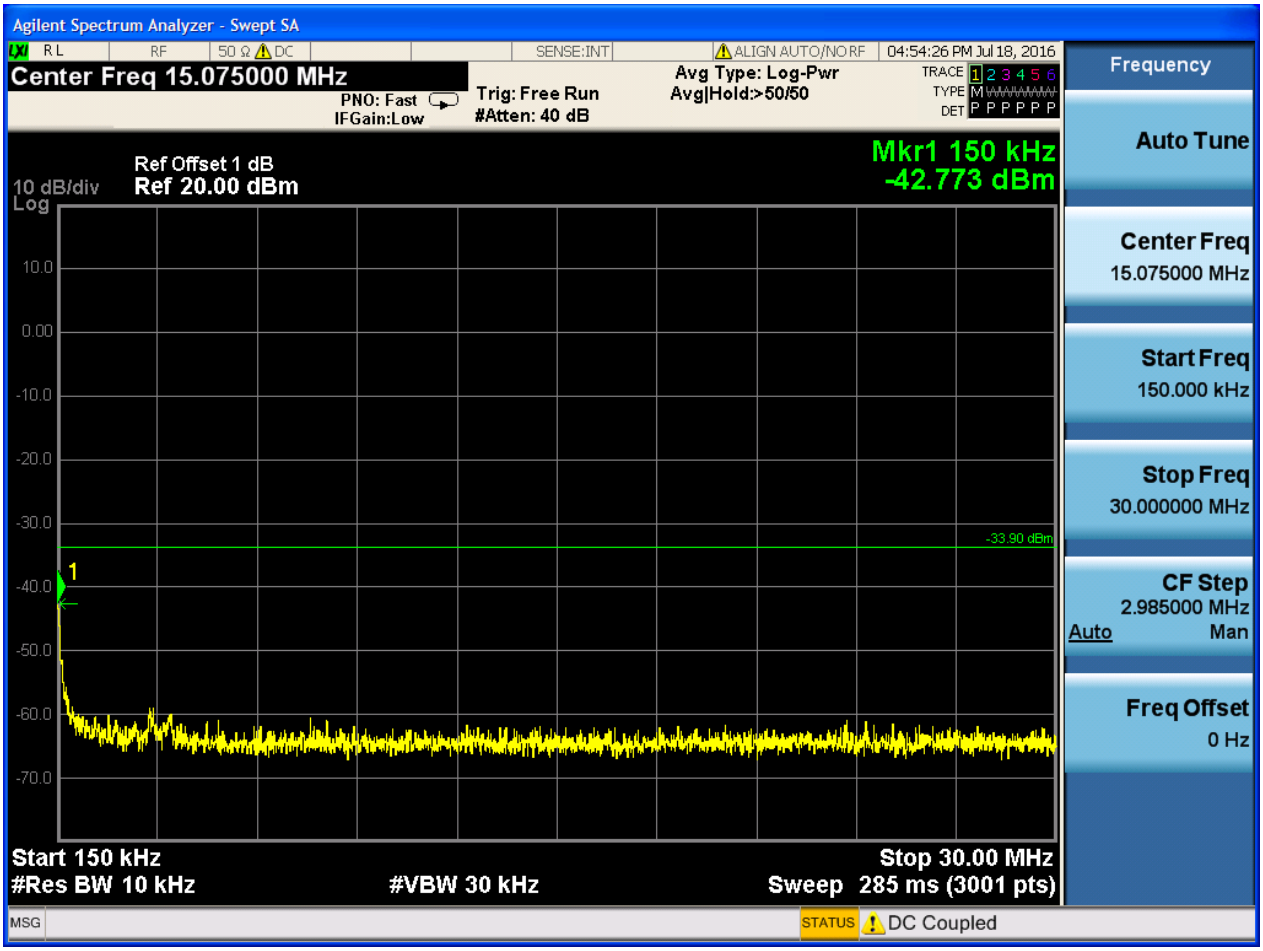
2.7 11G_L@Ant 1

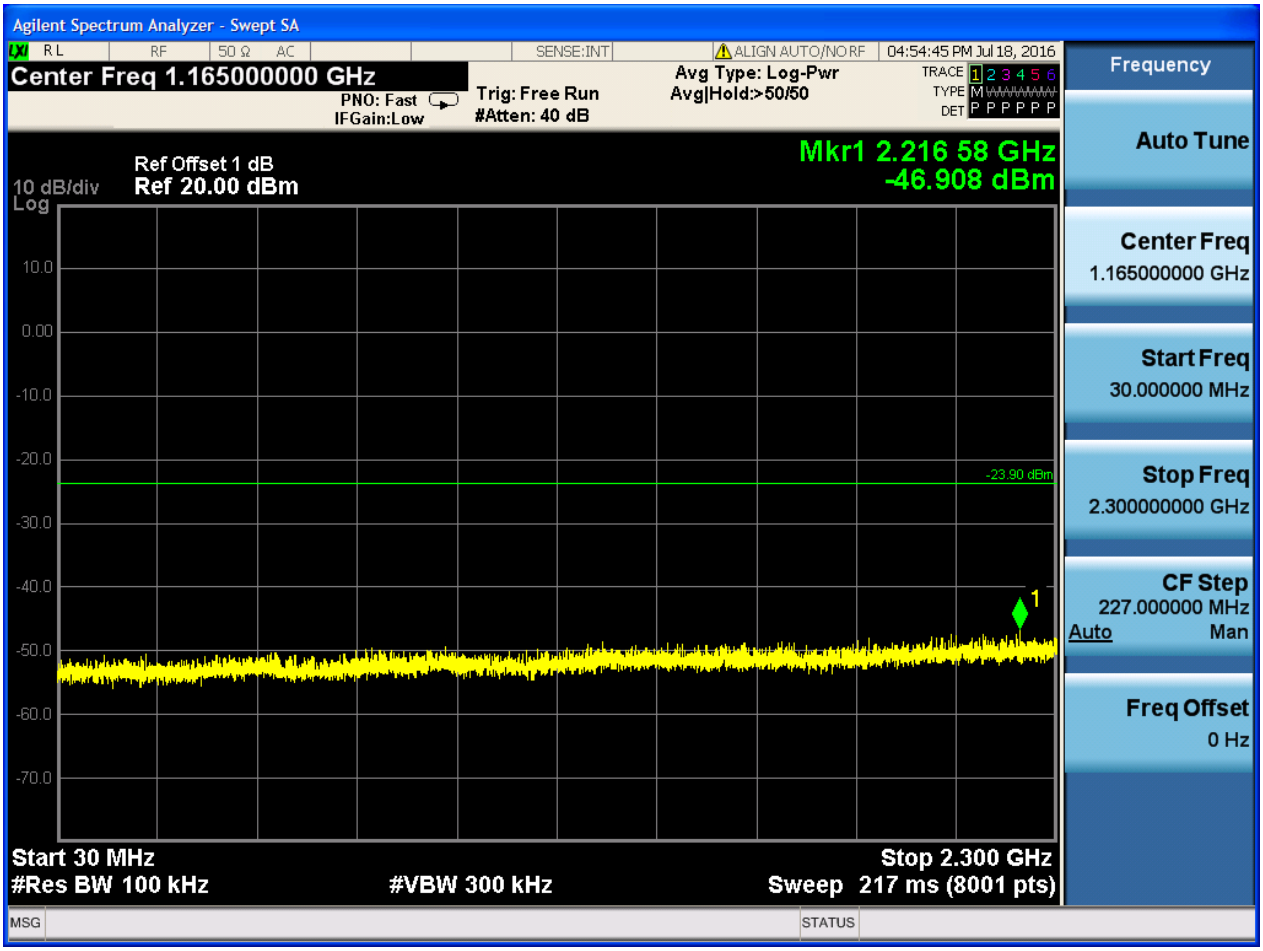
Pref:

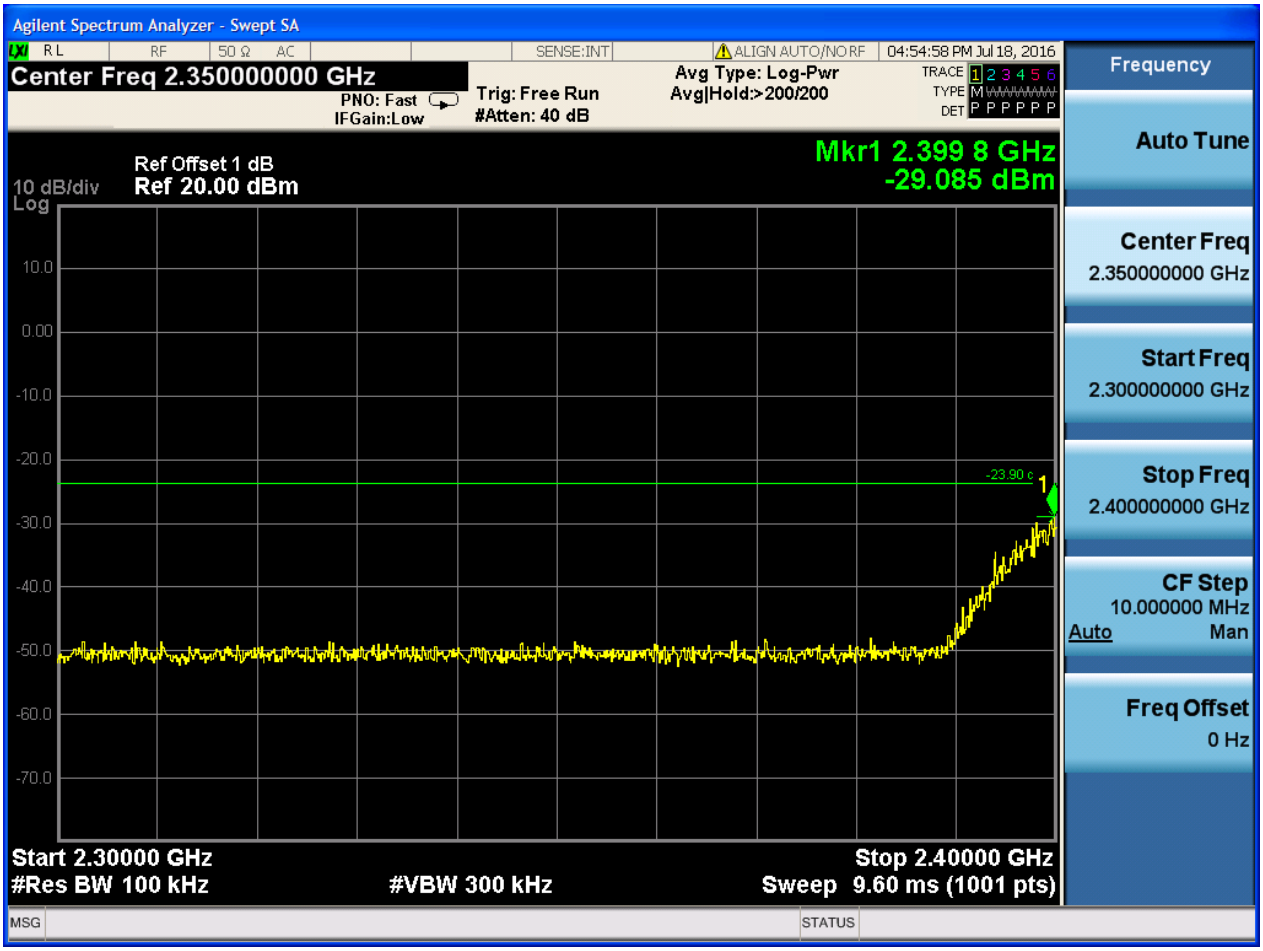


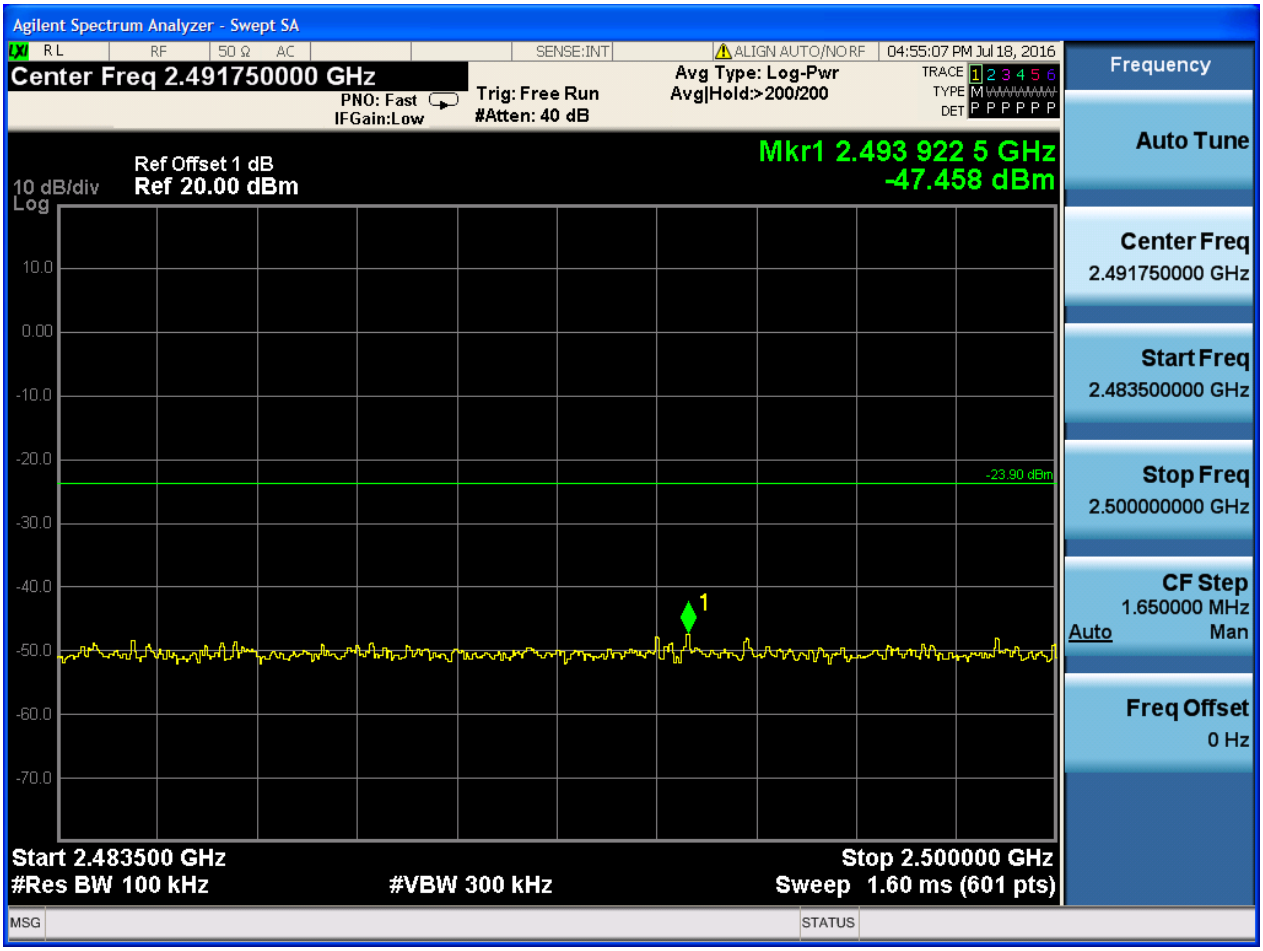
Puw:

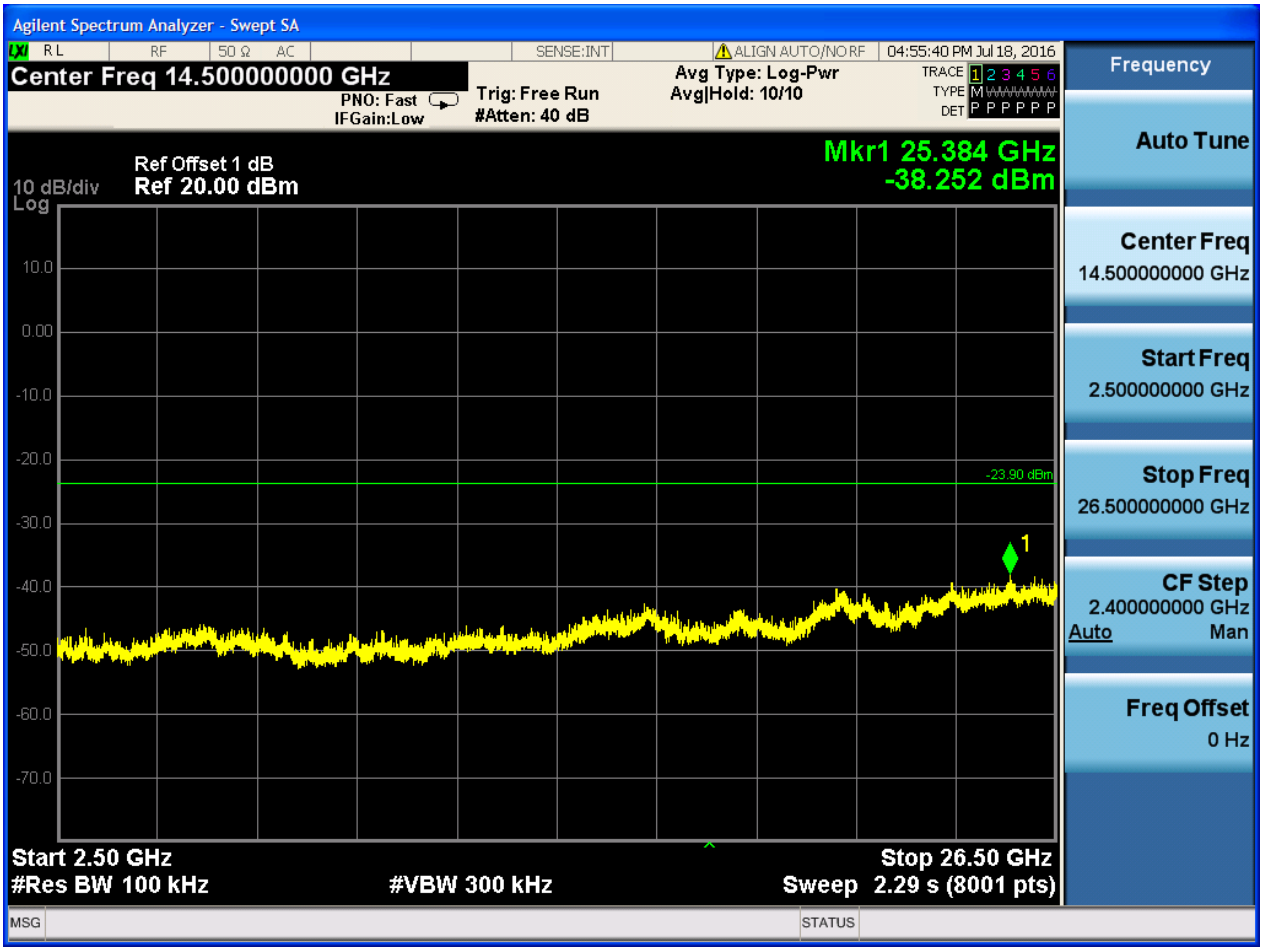

Agilent Spectrum Analyzer - Swept SA
RL
RF
50 Ω DC
SENSE:INT
ALIGN AUTO/NO RF
12:08:19 PM Jul 28, 2016
Start Freq 9.000 kHz
PNO: Wide
IFGain:Low
Trig: Free Run
Atten: 10 dB
Avg Type: Log-Pwr
Avg|Hold:>50/50
TRACE 1 2 3 4 5 6
TYPE M
DET P N N N N N
Ref Offset 1 dB
10 dB/div
Log
Ref 1.00 dBm
Mkr1 9.235 kHz
-68.294 dBm
-9.00
-19.0
-29.0
-39.0
-43.90 dBm
-49.0
-59.0
-69.0
-79.0
-89.0
1
Start 9.00 kHz
#Res BW 1.0 kHz
#VBW 3.0 kHz
Stop 150.00 kHz
Sweep 135 ms (601 pts)
Frequency
Auto Tune
Center Freq
79.500 kHz
Start Freq
9.000 kHz
Stop Freq
150.000 kHz
CF Step
14.100 kHz
Auto
Man
Freq Offset
0 Hz
MSG
STATUS
DC Coupled





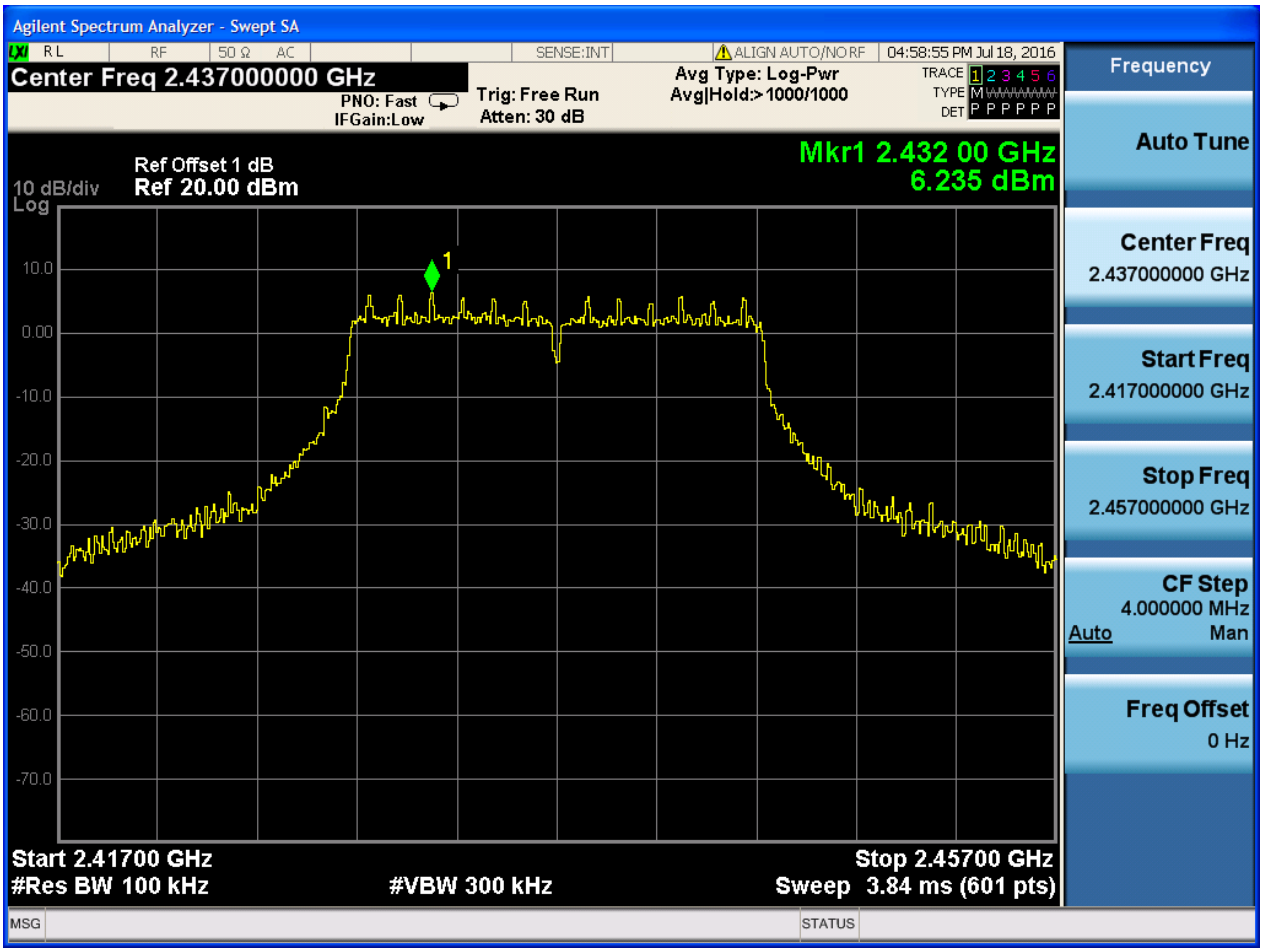






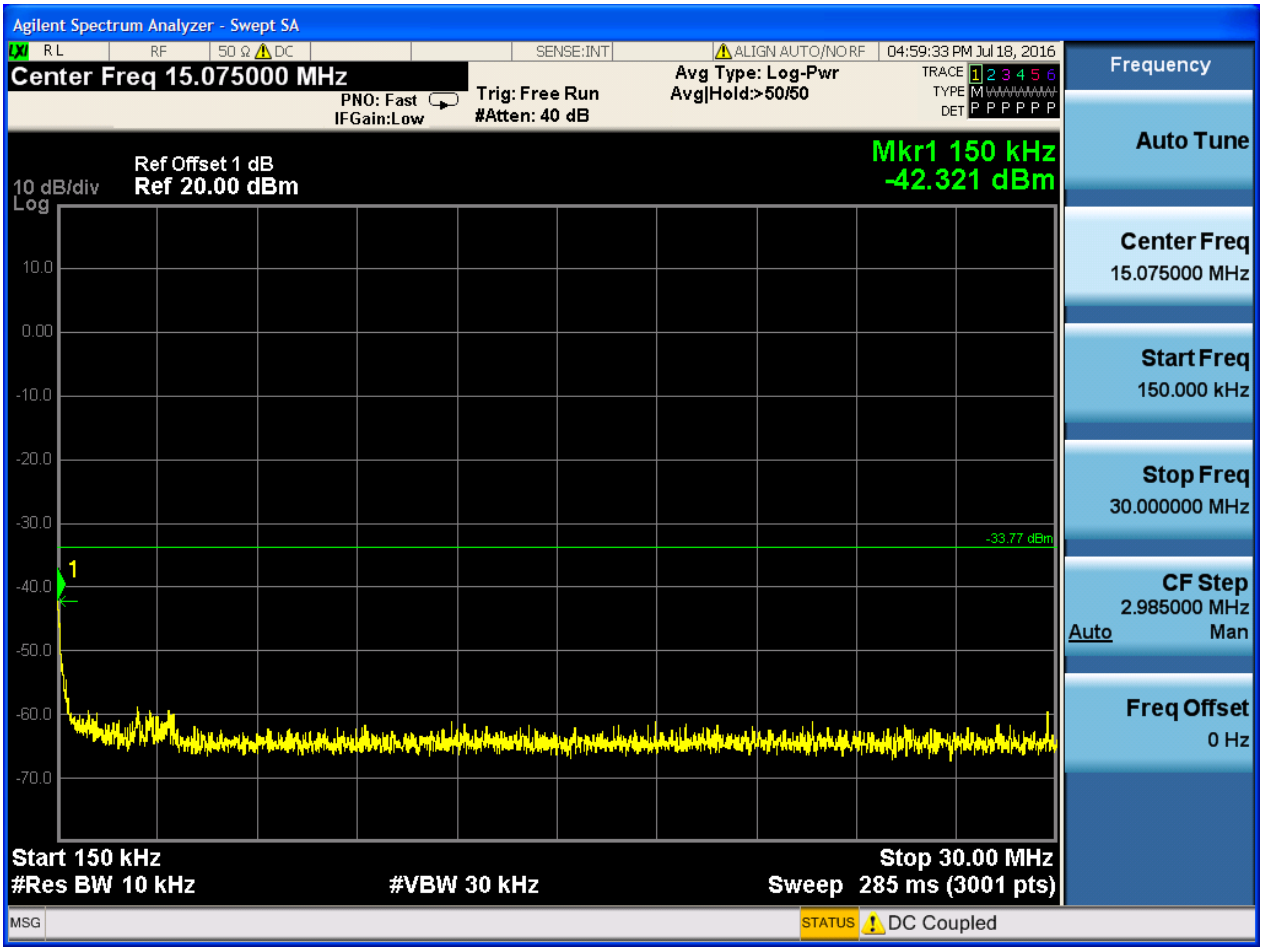
2.9 11G_M@Ant 1

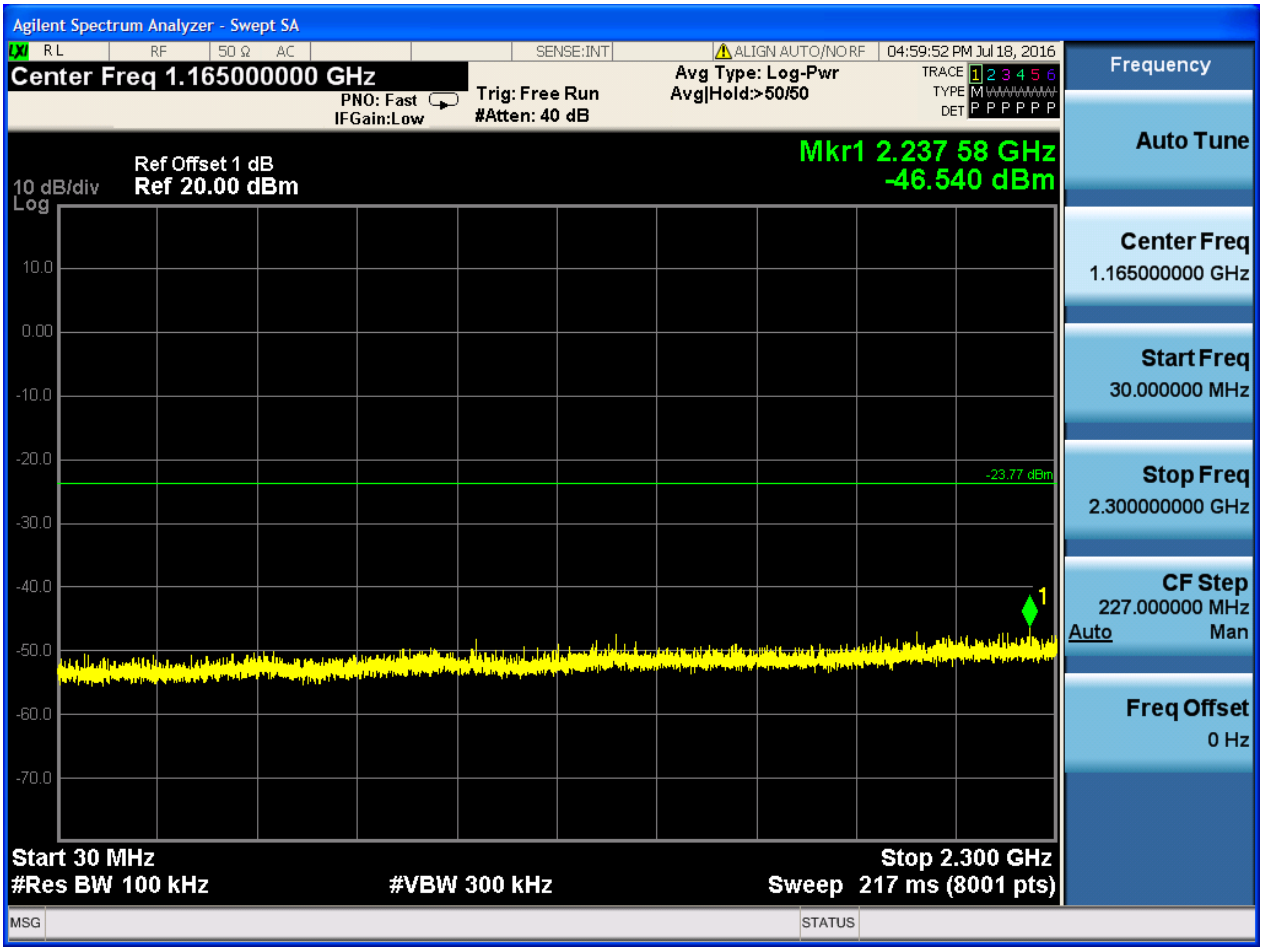
Pref:

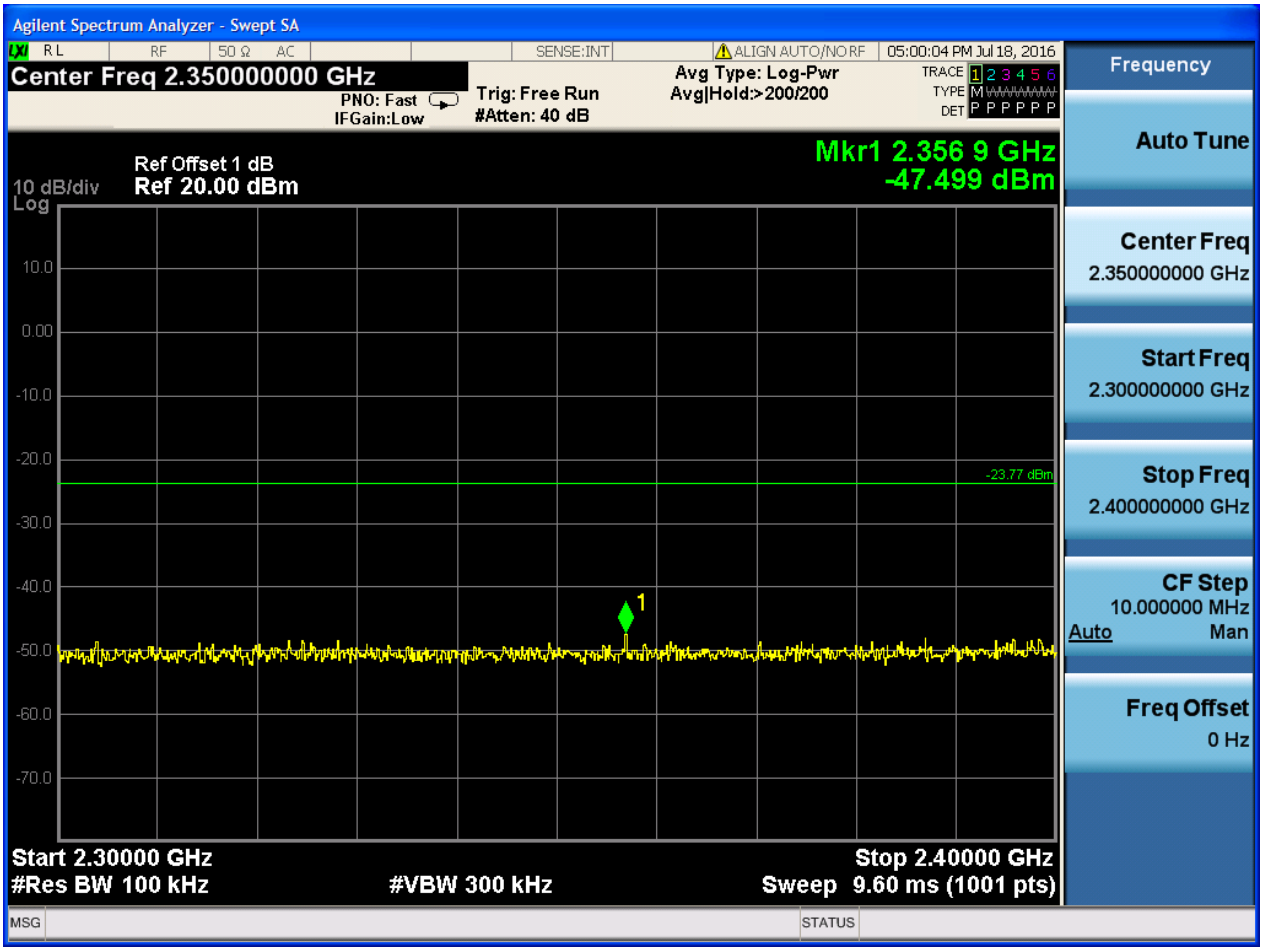


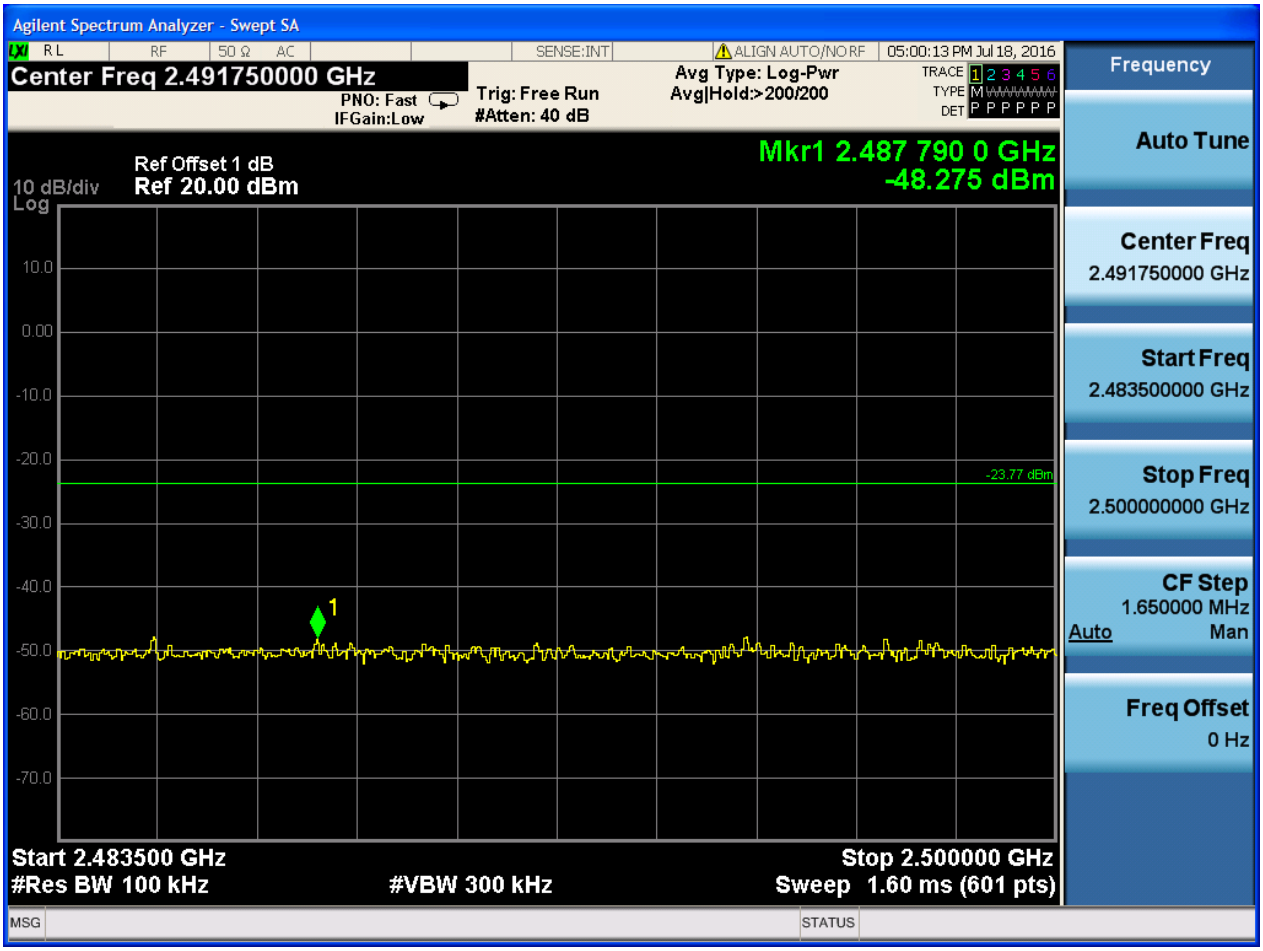
Puw:

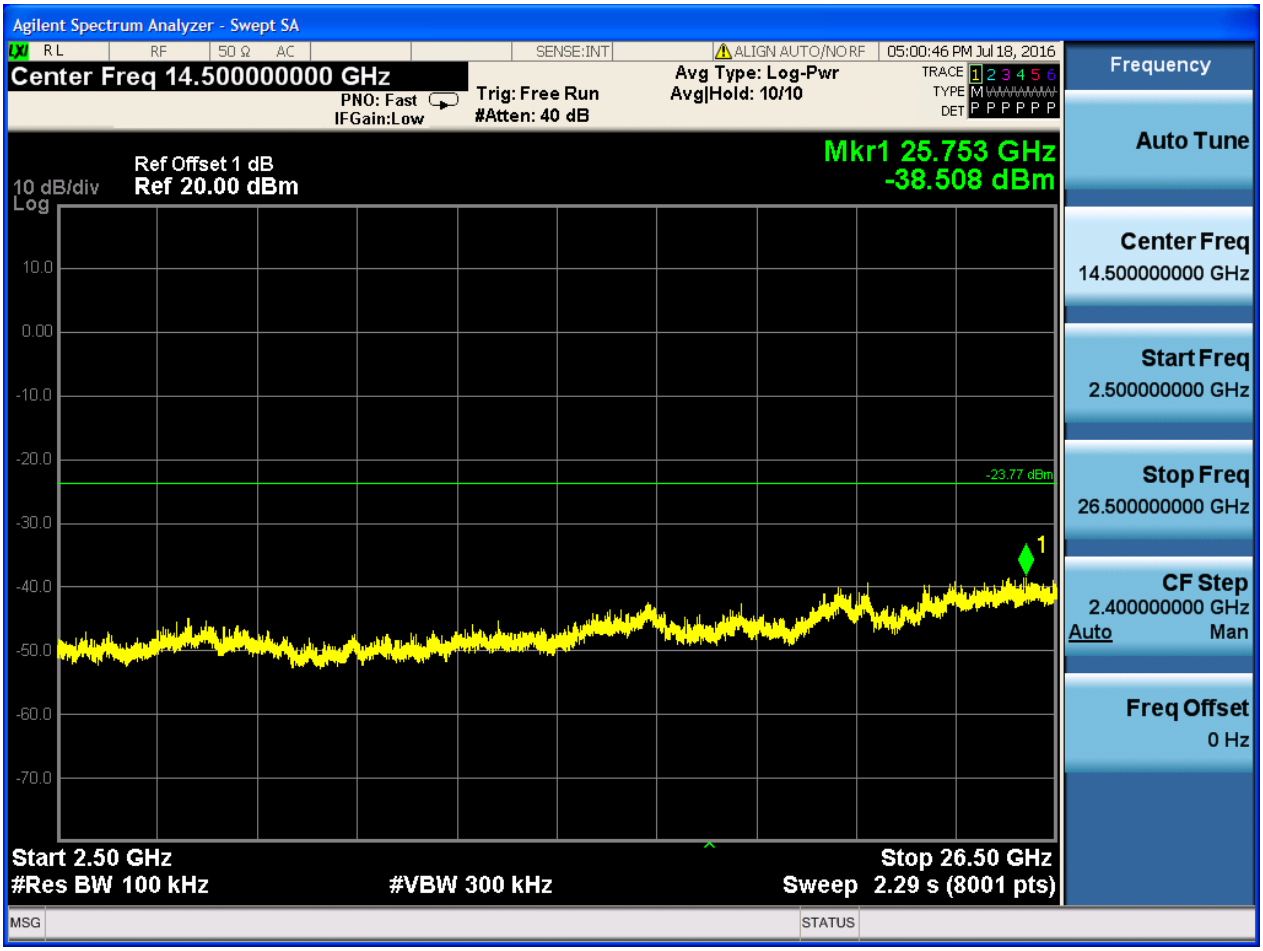

Agilent Spectrum Analyzer - Swept SA
RL
RF
50 Ω DC
SENSE:INT
ALIGN AUTO/NO RF
12:09:40 PM Jul 28, 2016
Start Freq 9.000 kHz
PNO: Wide
IFGain:Low
Trig: Free Run
Atten: 22 dB
Avg Type: Log-Pwr
Avg|Hold:>50/50
TRACE 1 2 3 4 5 6
TYPE M
DET P N N N N N
Ref Offset 1 dB
10 dB/div
Log
Ref 13.00 dBm
Mkr1 11.585 kHz
-56.939 dBm
3.00
-7.00
-17.0
-27.0
-37.0
-47.0
-57.0
-67.0
-77.0
-43.77 dBm
1
Start 9.00 kHz
#Res BW 1.0 kHz
#VBW 3.0 kHz
Stop 150.00 kHz
Sweep 135 ms (601 pts)
MSG
STATUS
DC Coupled
Frequency
Auto Tune
Center Freq
79.500 kHz
Start Freq
9.000 kHz
Stop Freq
150.000 kHz
CF Step
14.100 kHz
Auto
Man
Freq Offset
0 Hz





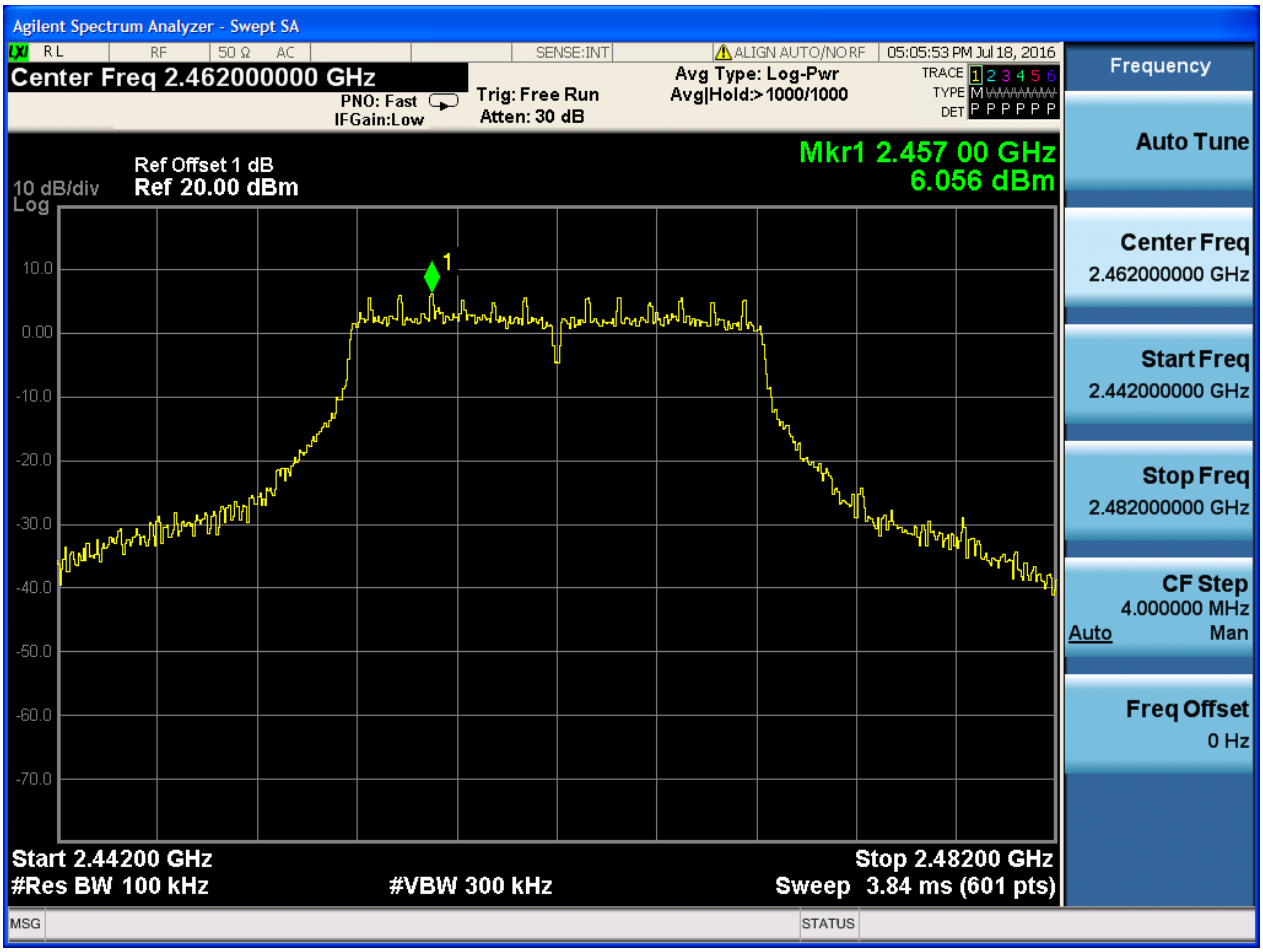






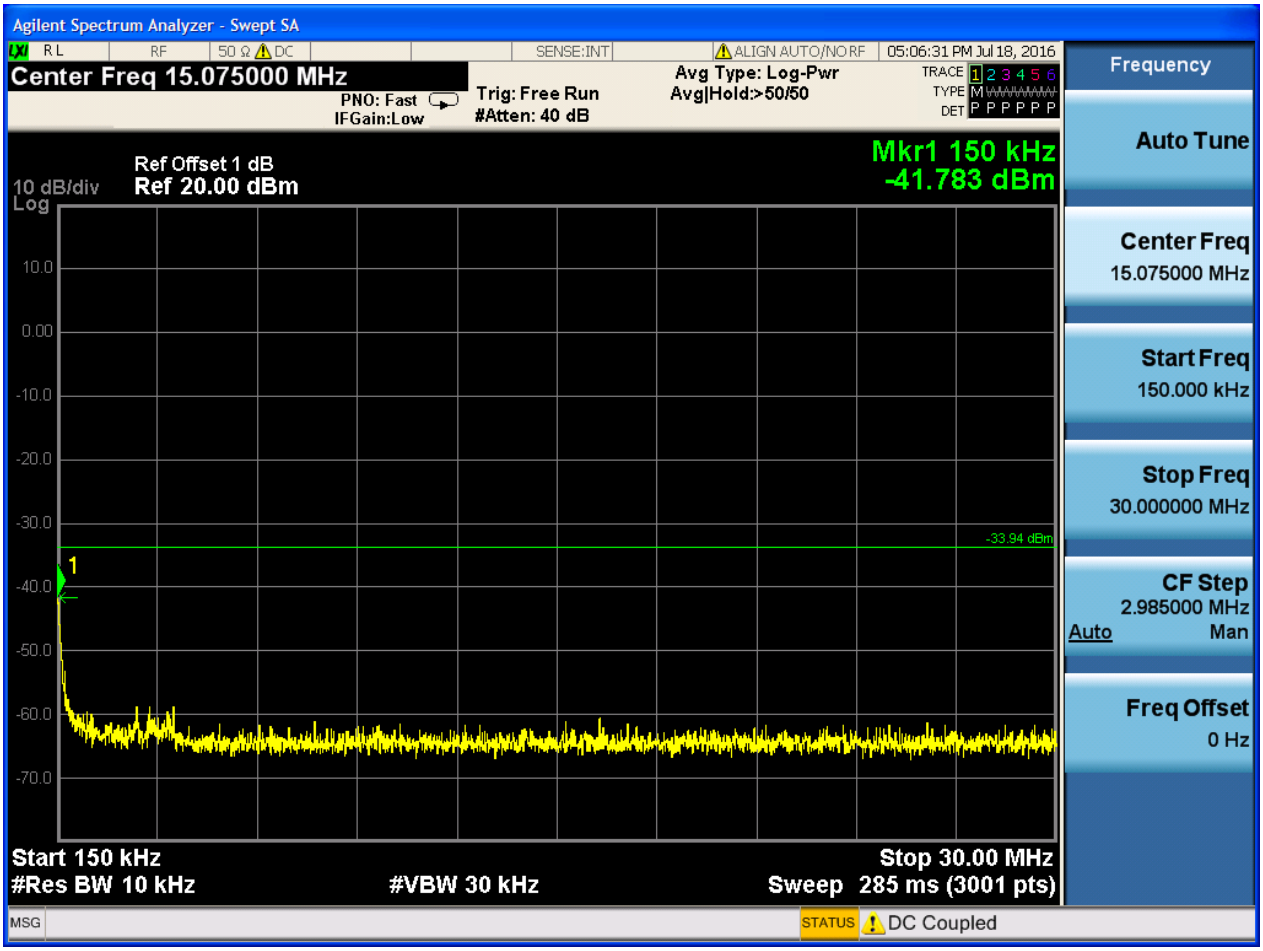
2.11 11G_H@Ant 1

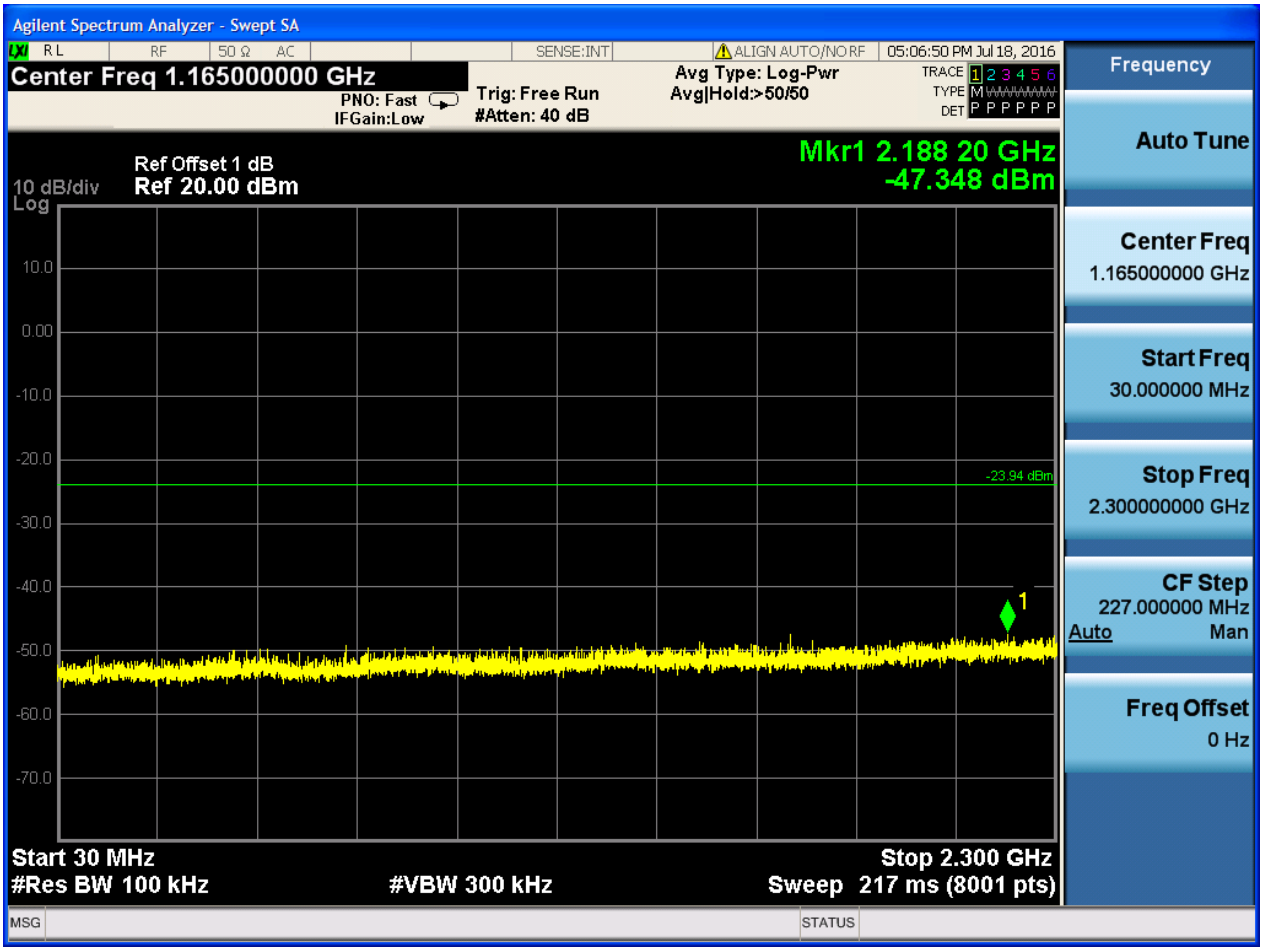
Pref:

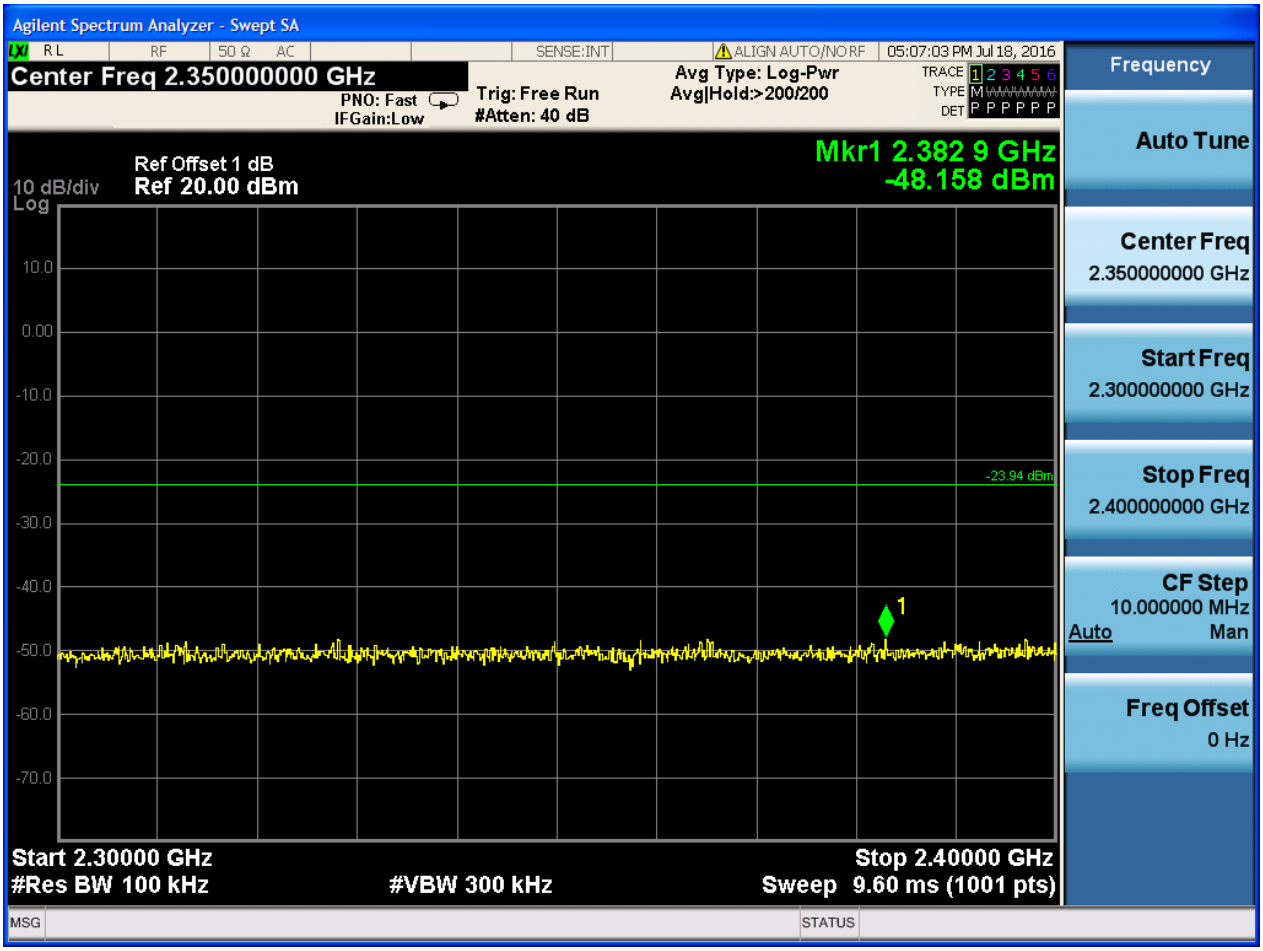


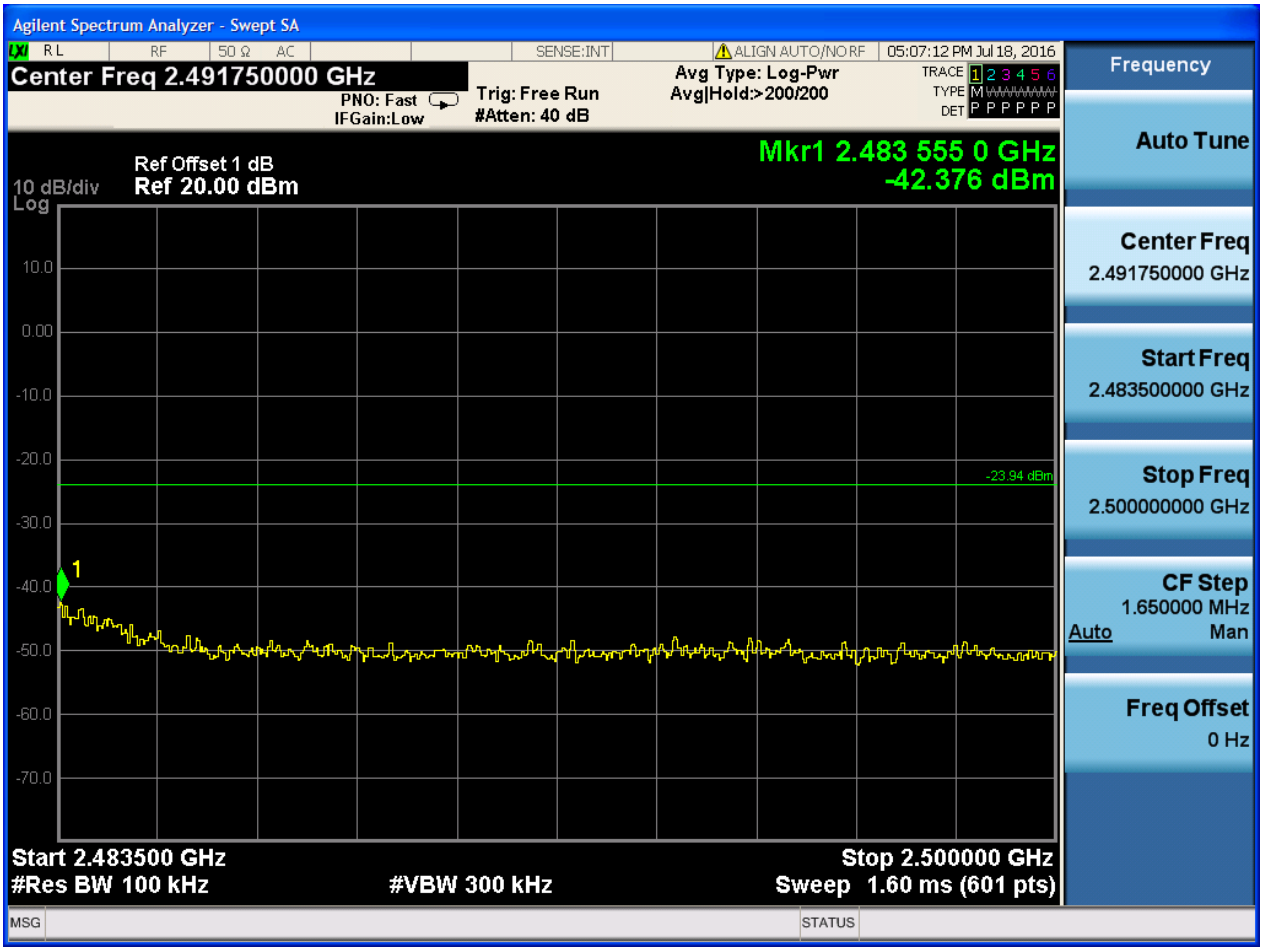
Puw:

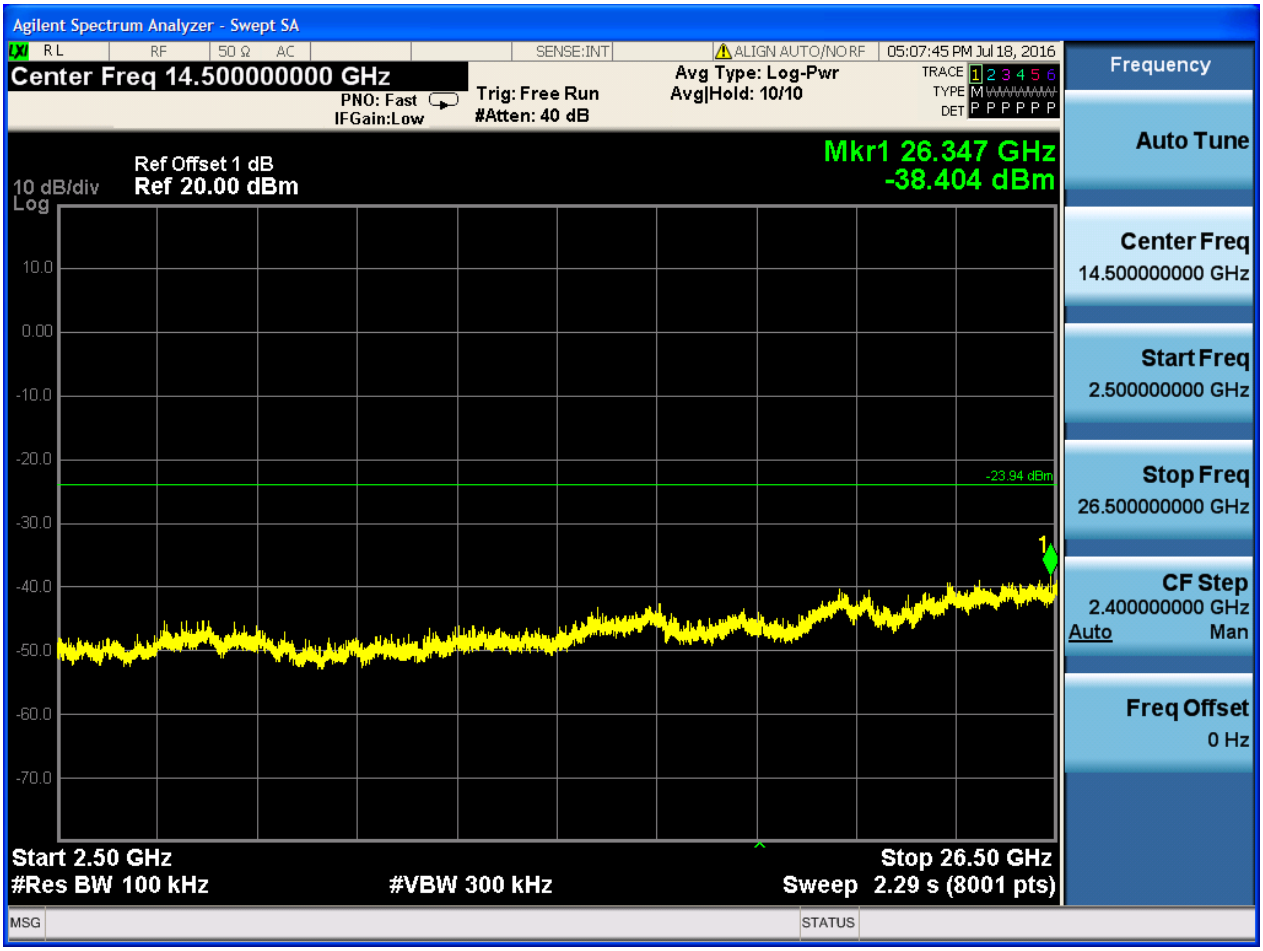

Agilent Spectrum Analyzer - Swept SA
RL
RF
50 Ω DC
SENSE:INT
ALIGN AUTO/NO RF
12:10:53 PM Jul 28, 2016
Start Freq 9.000 kHz
PNO: Wide
IFGain:Low
Trig: Free Run
Atten: 28 dB
Avg Type: Log-Pwr
Avg|Hold:>50/50
TRACE 1 2 3 4 5 6
TYPE M
DET P N N N N N
Ref Offset 1 dB
10 dB/div
Log
Ref 18.00 dBm
Mkr1 10.410 kHz
-51.941 dBm
8.00
-2.00
-12.0
-22.0
-32.0
-42.0
-52.0
-62.0
-72.0
-43.94 dBm
1
Start 9.00 kHz
#Res BW 1.0 kHz
#VBW 3.0 kHz
Stop 150.00 kHz
Sweep 135 ms (601 pts)
MSG
STATUS
DC Coupled
Frequency
Auto Tune
Center Freq
79.500 kHz
Start Freq
9.000 kHz
Stop Freq
150.000 kHz
CF Step
14.100 kHz
Auto
Man
Freq Offset
0 Hz





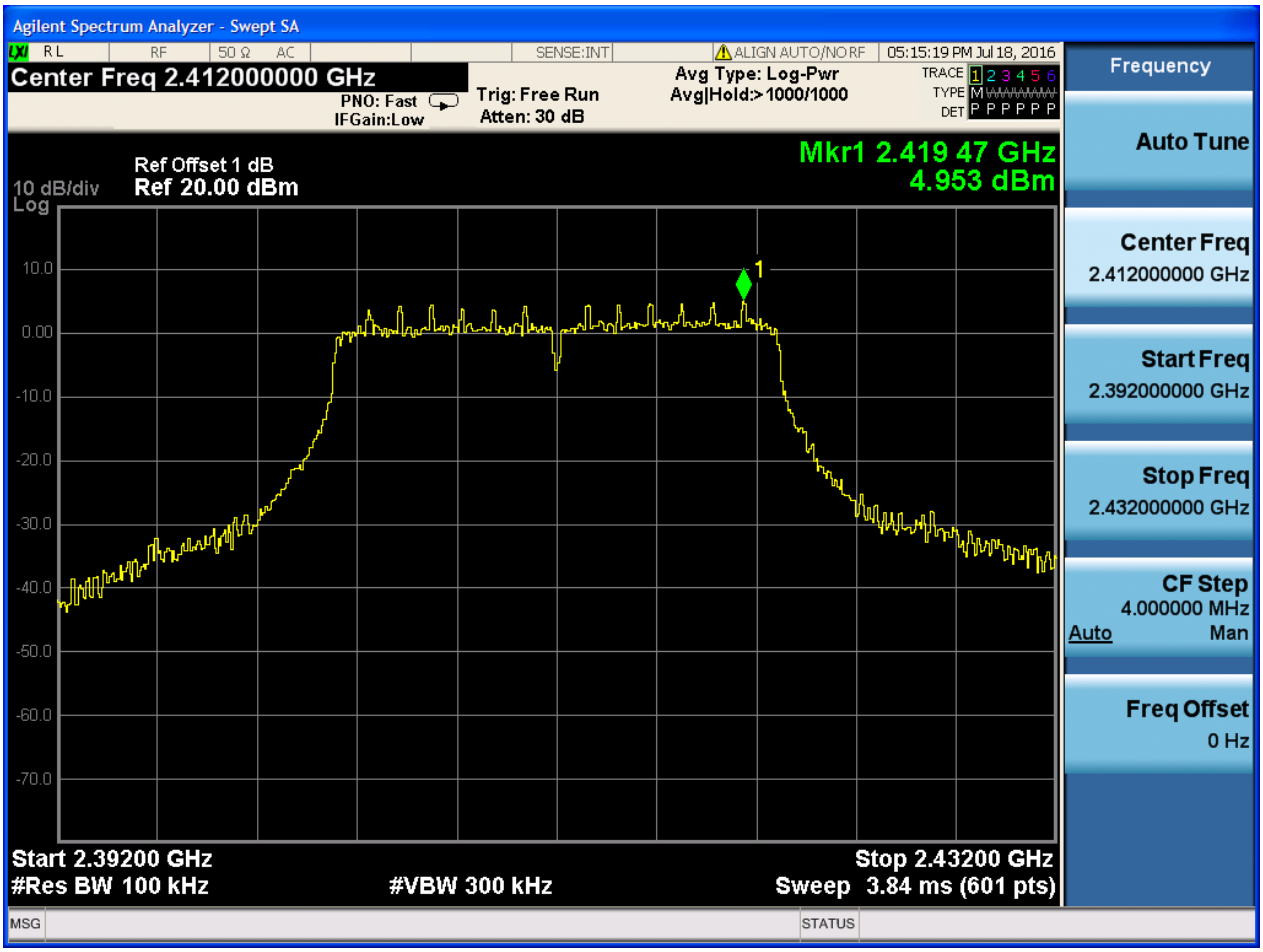




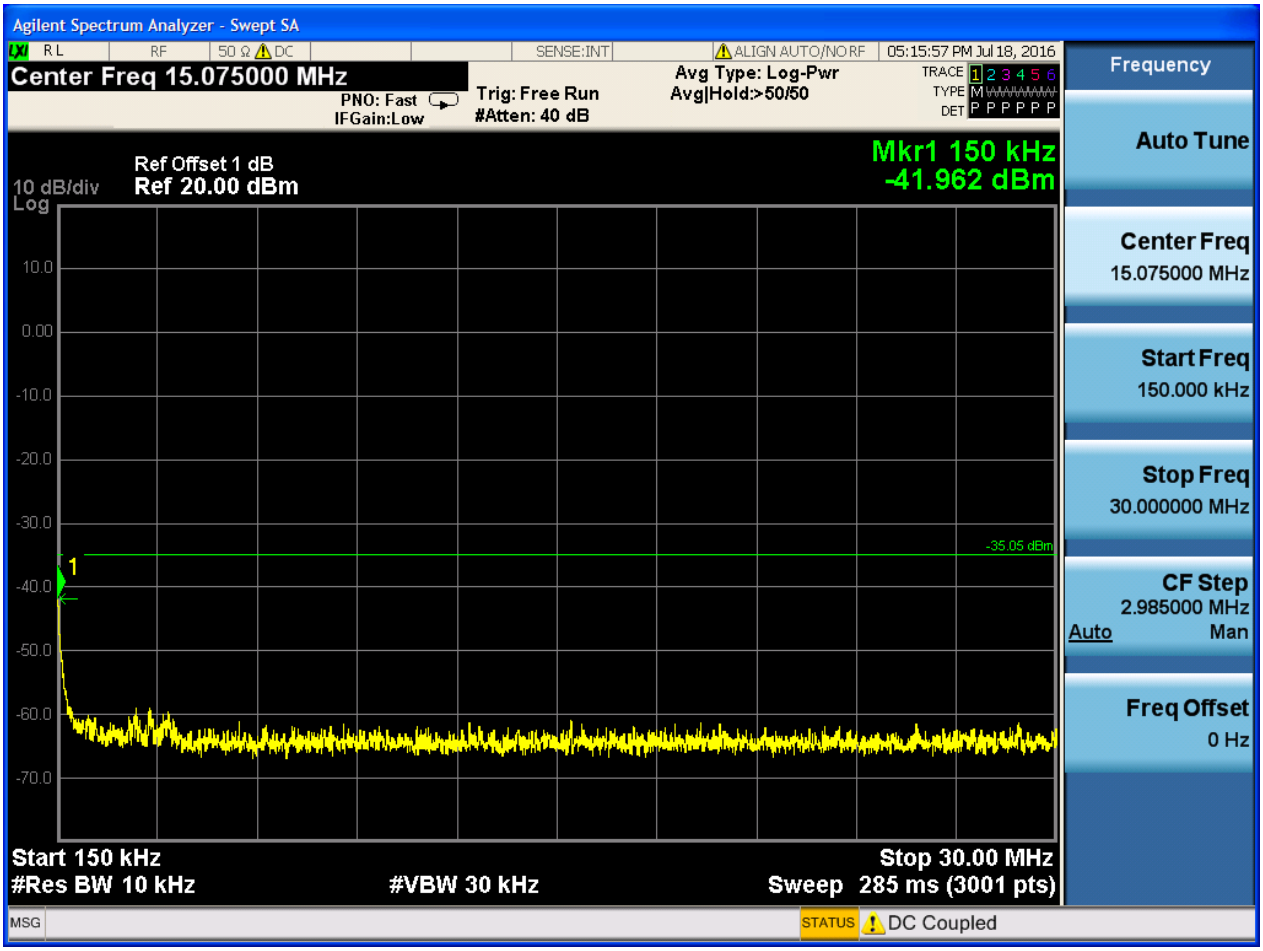


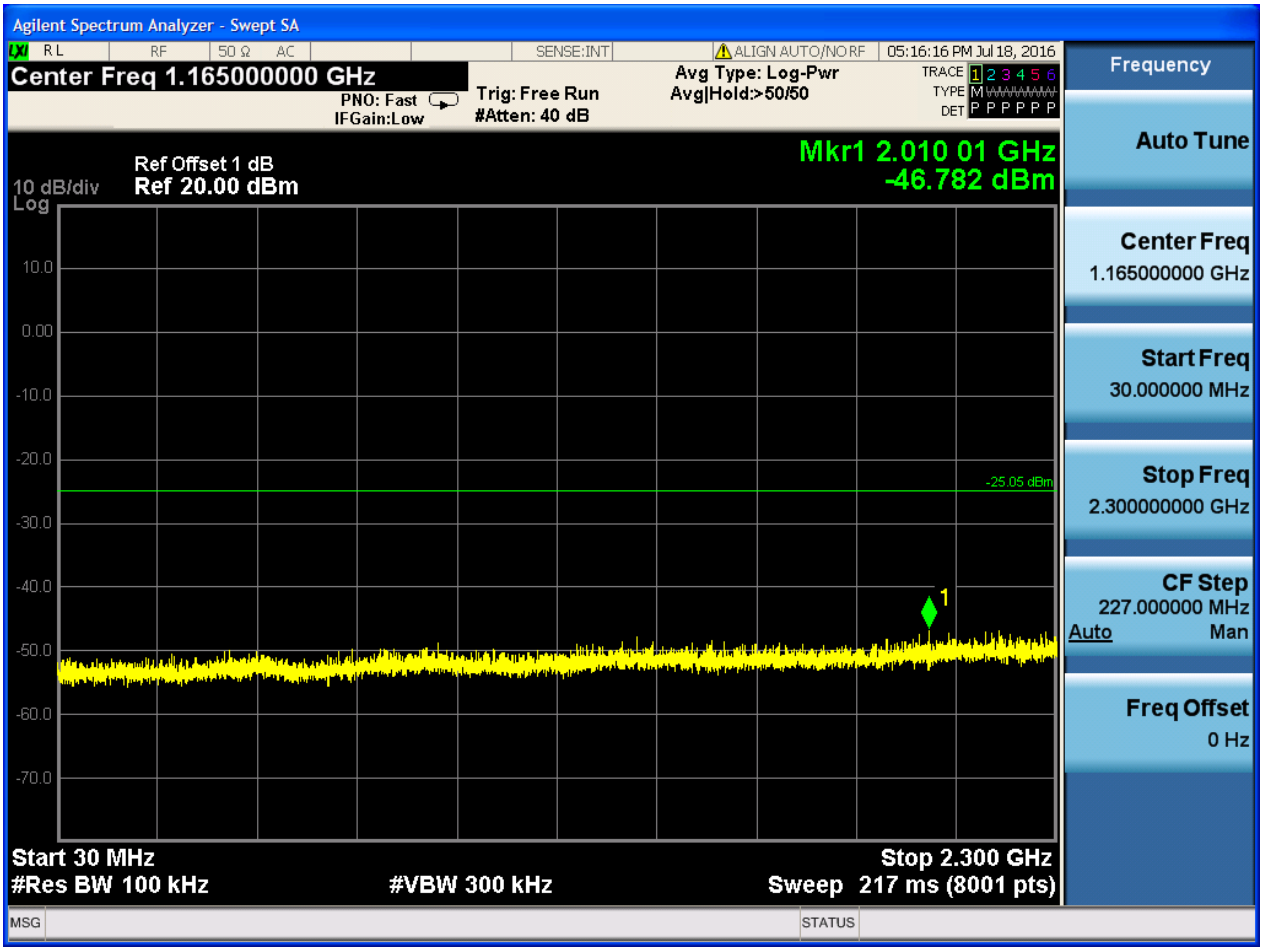
2.13 11N20_L@Ant 1

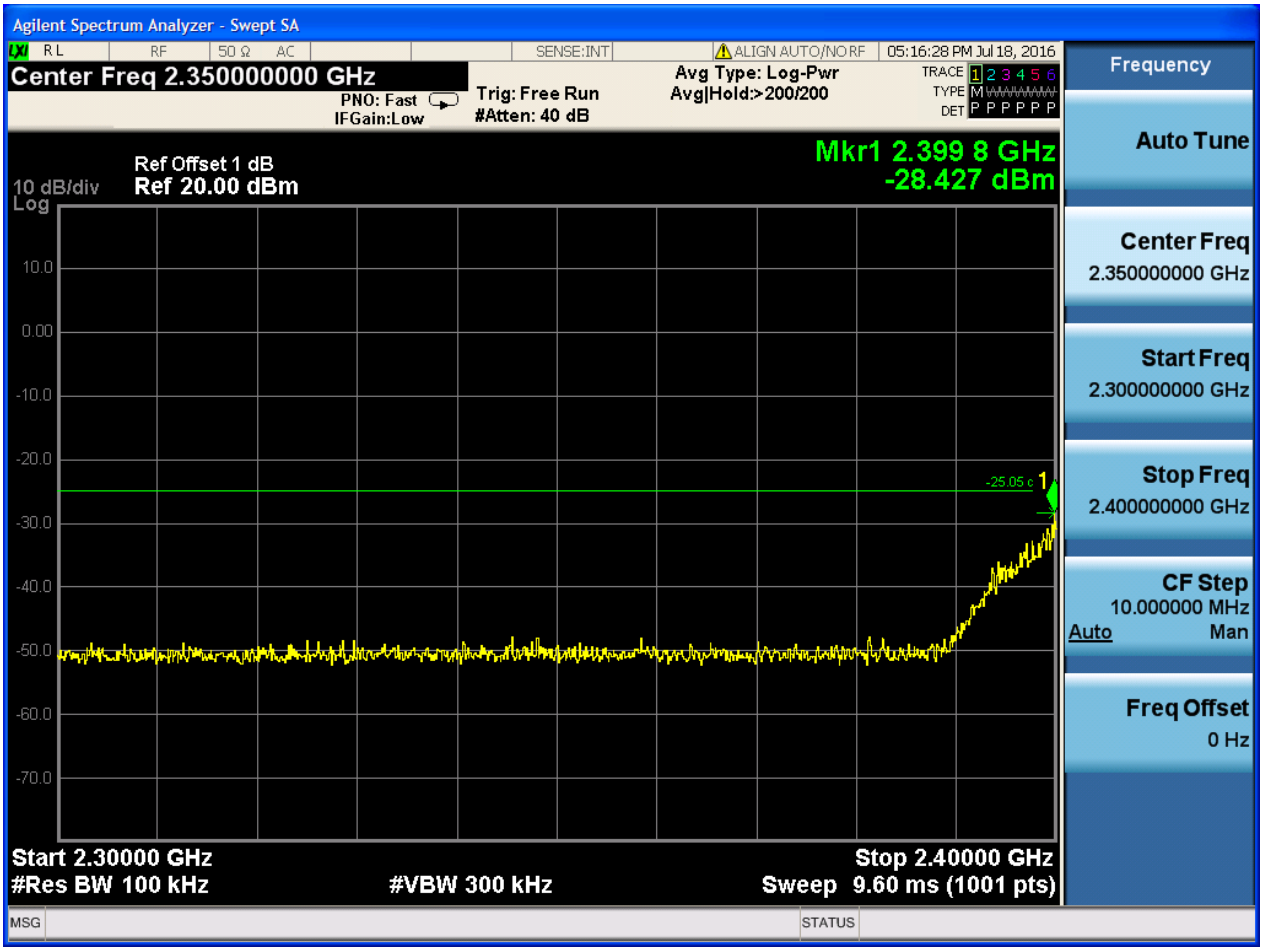
Pref:

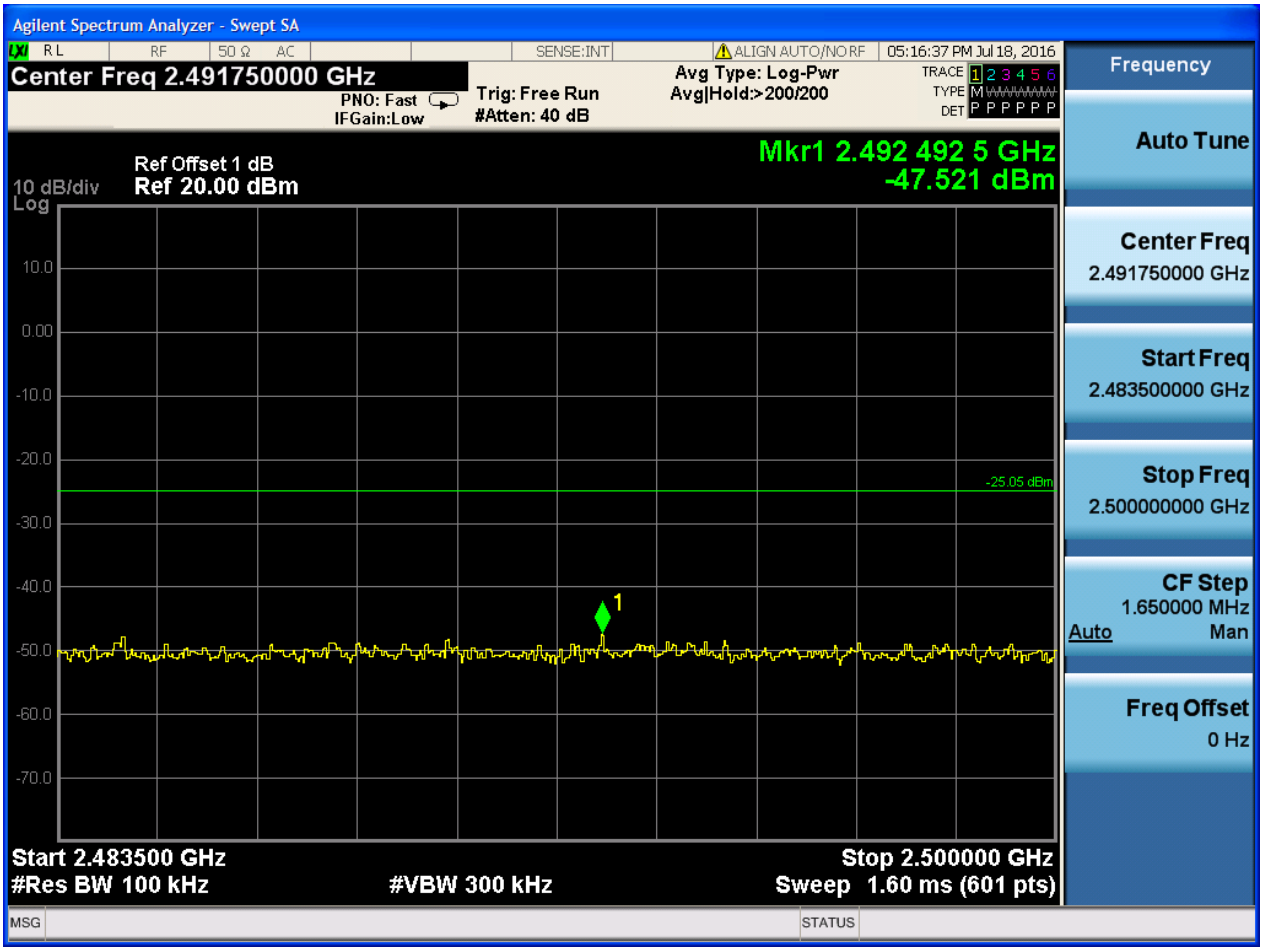


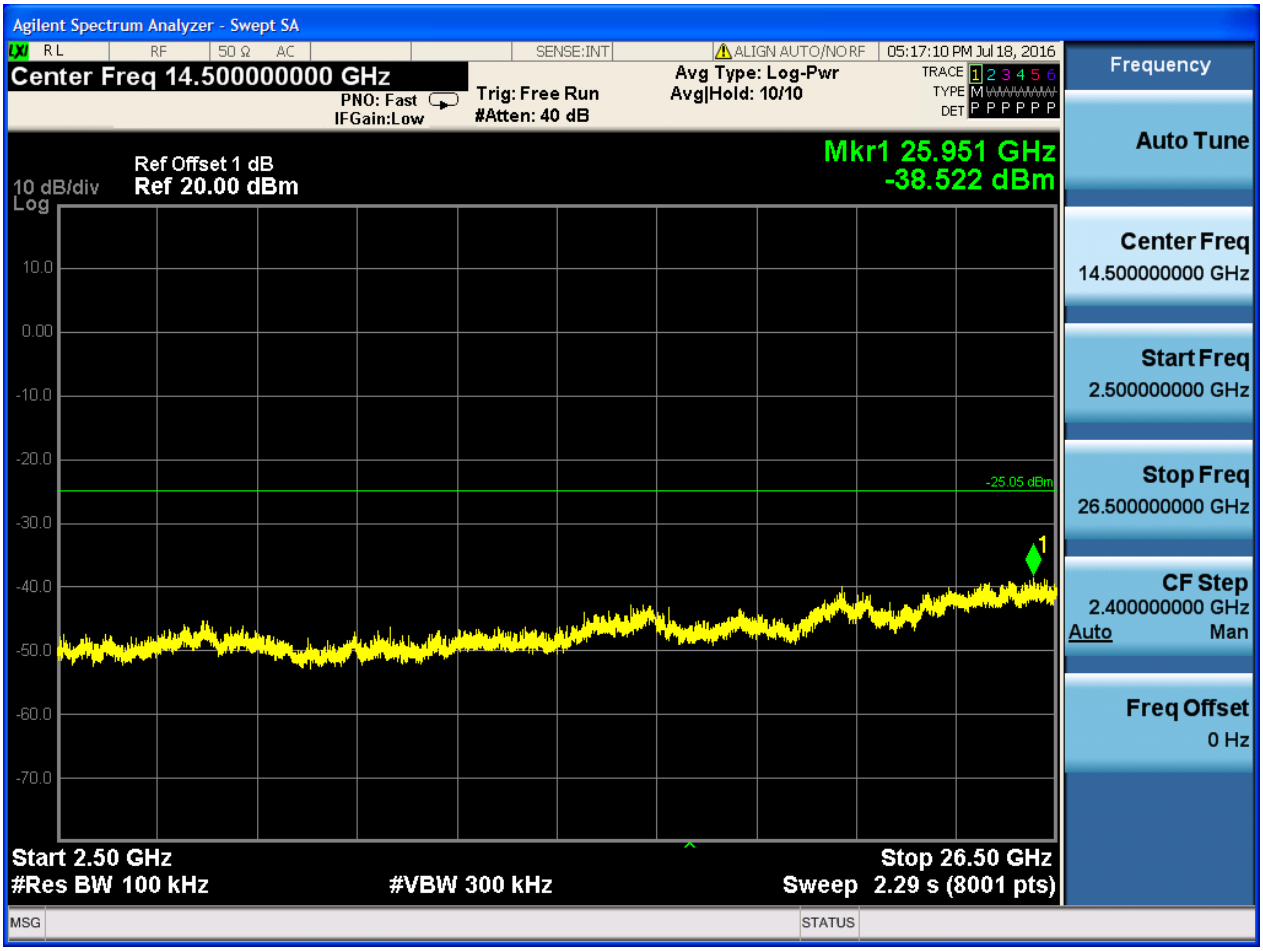
Puw:





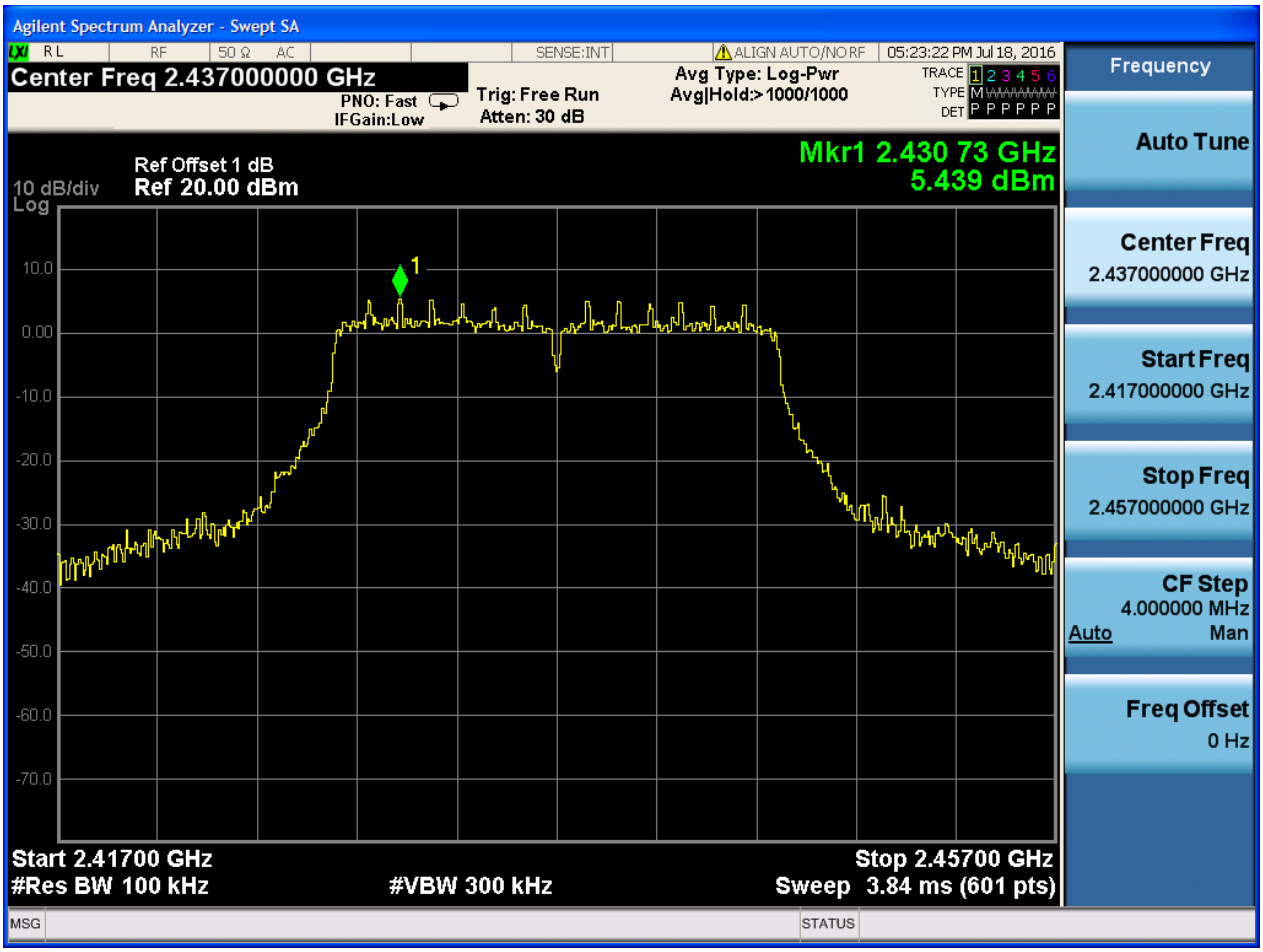




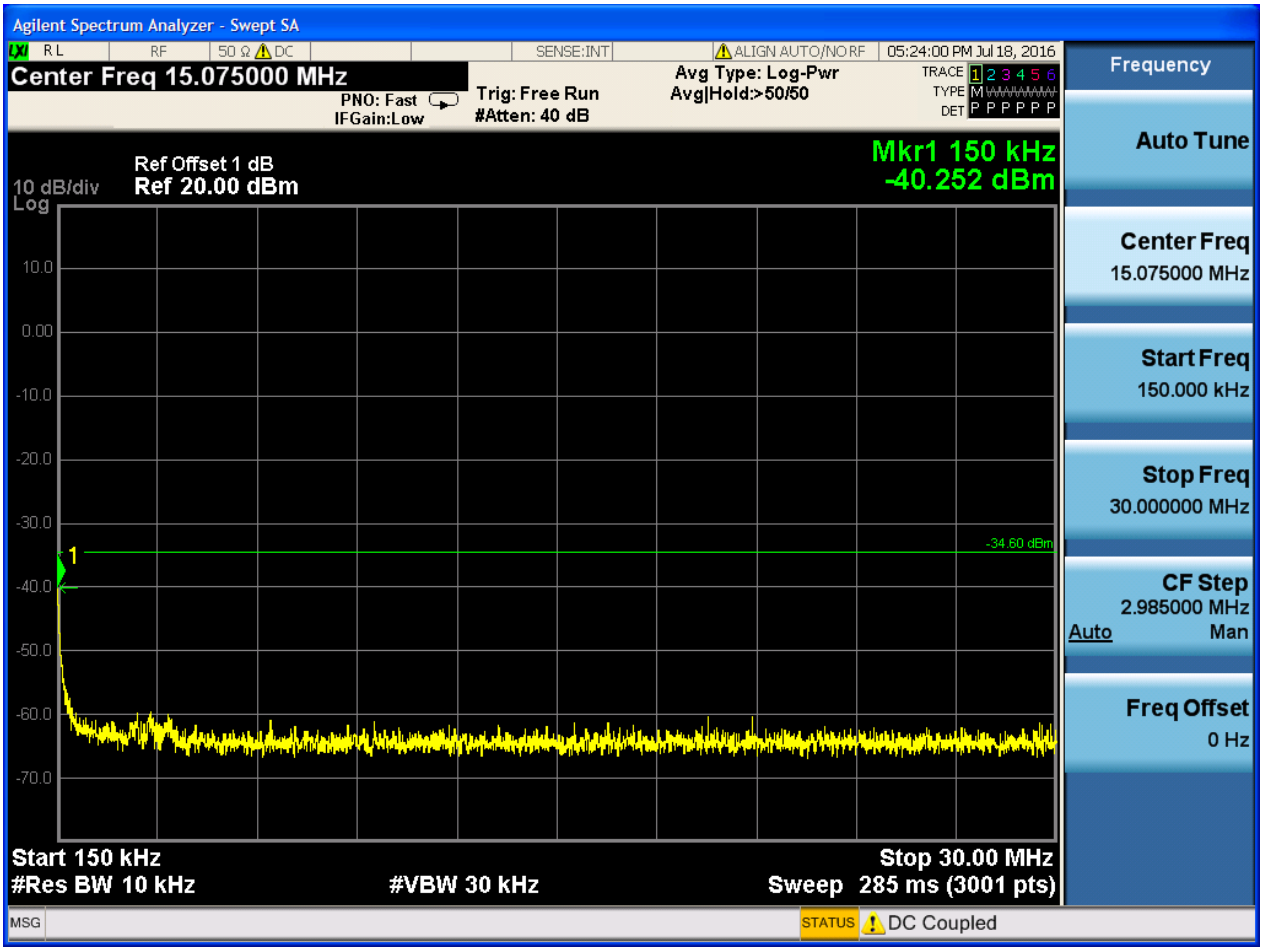


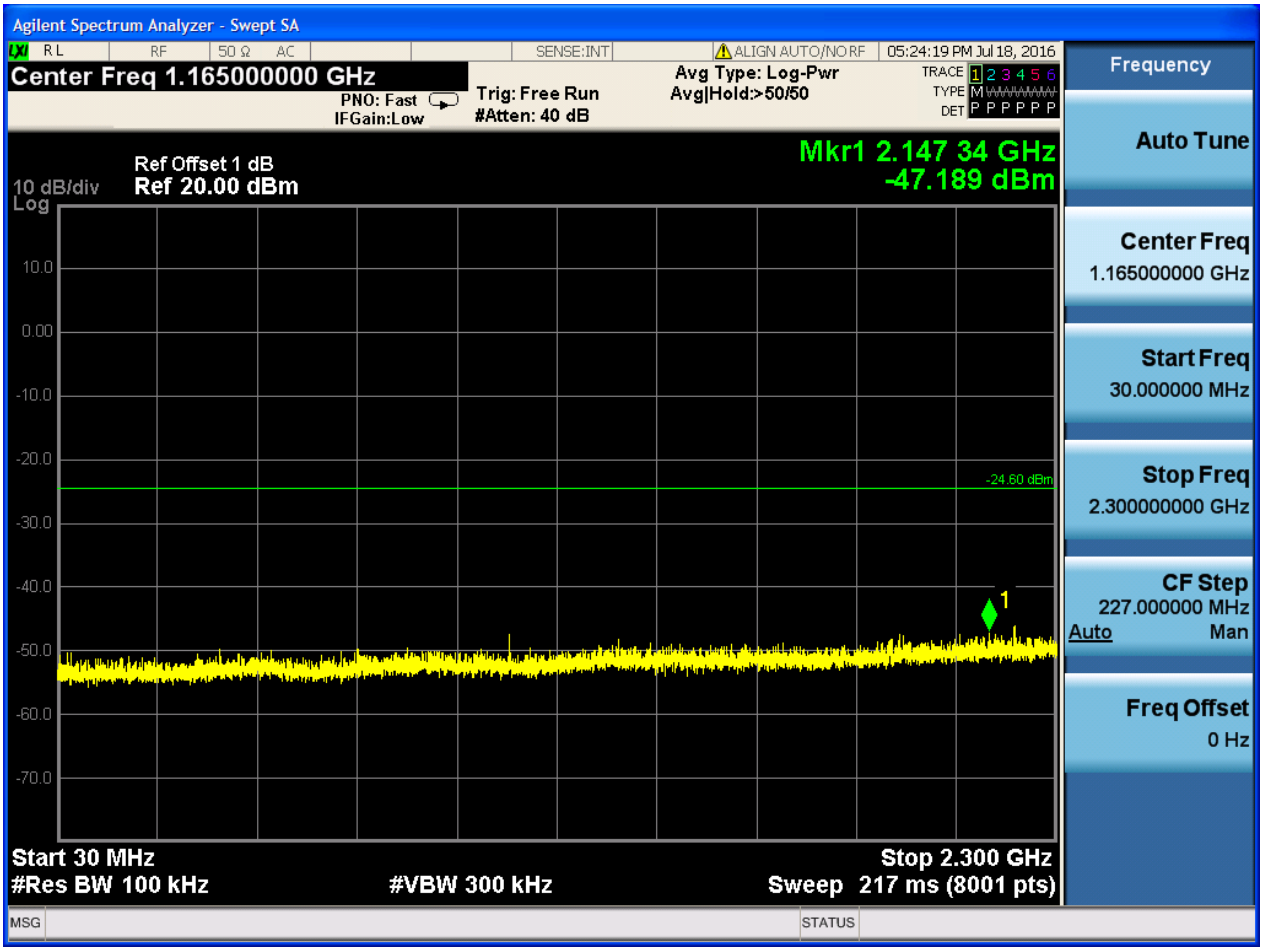
2.15 11N20_M@Ant 1

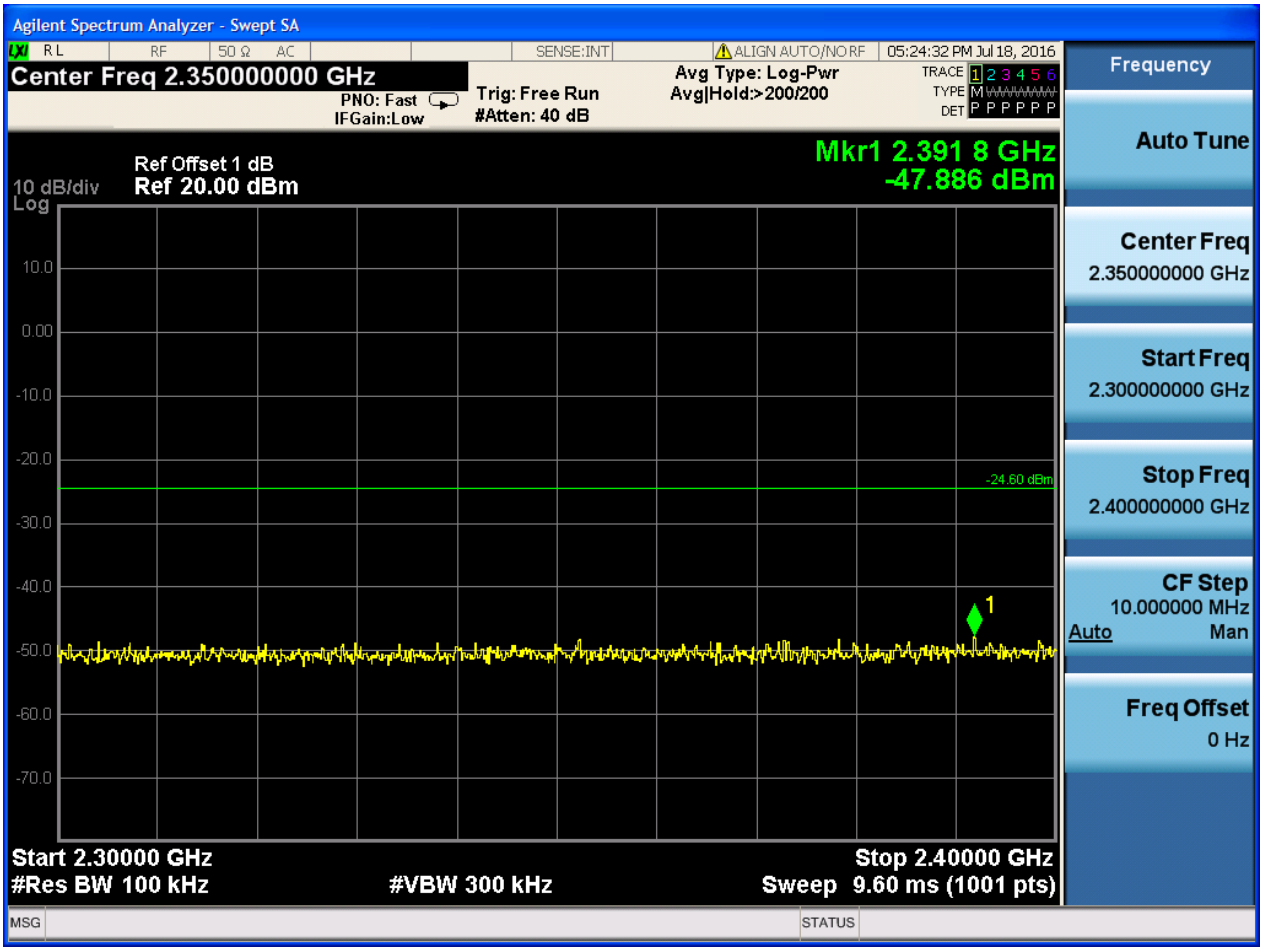
Pref:

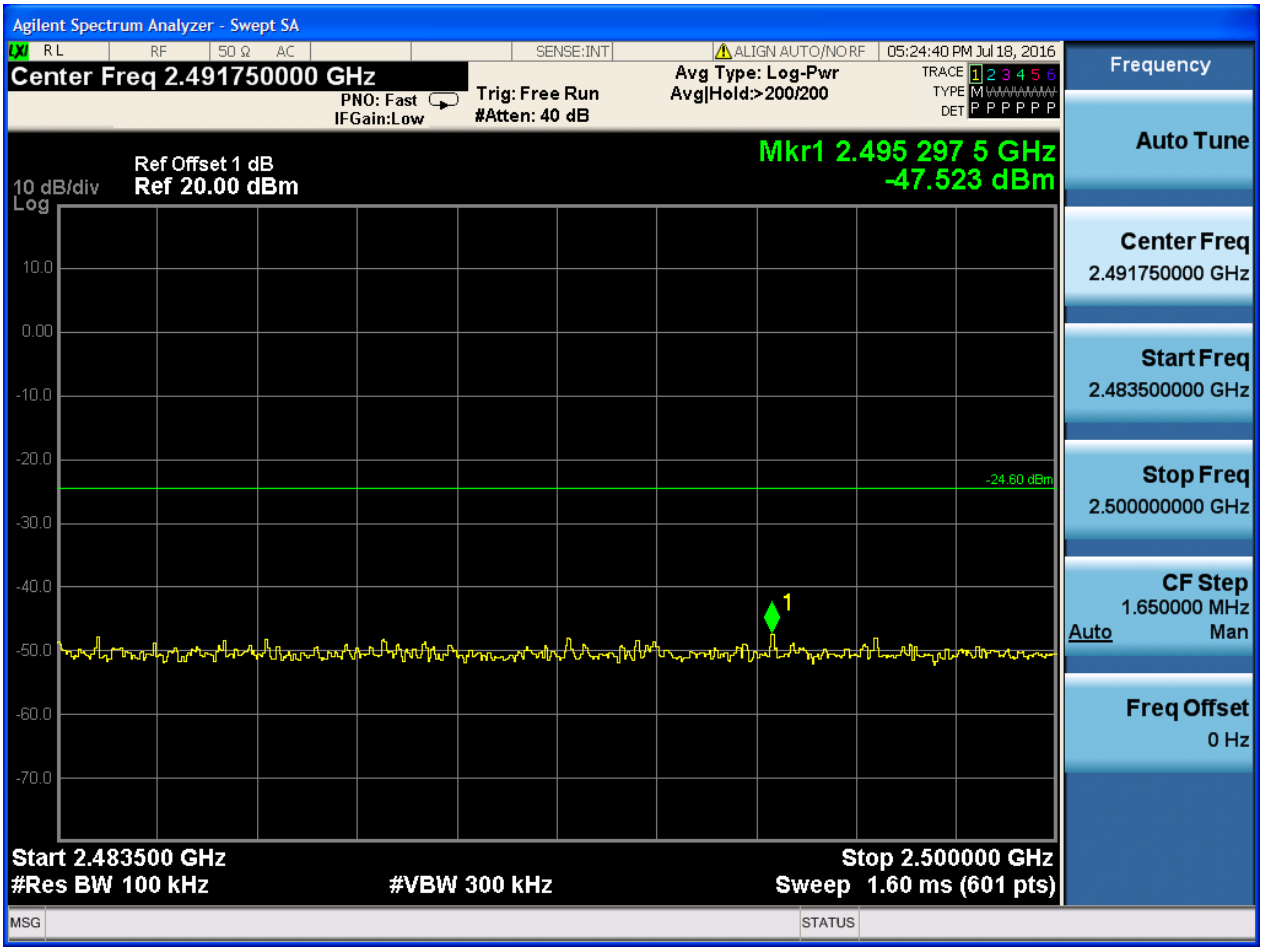


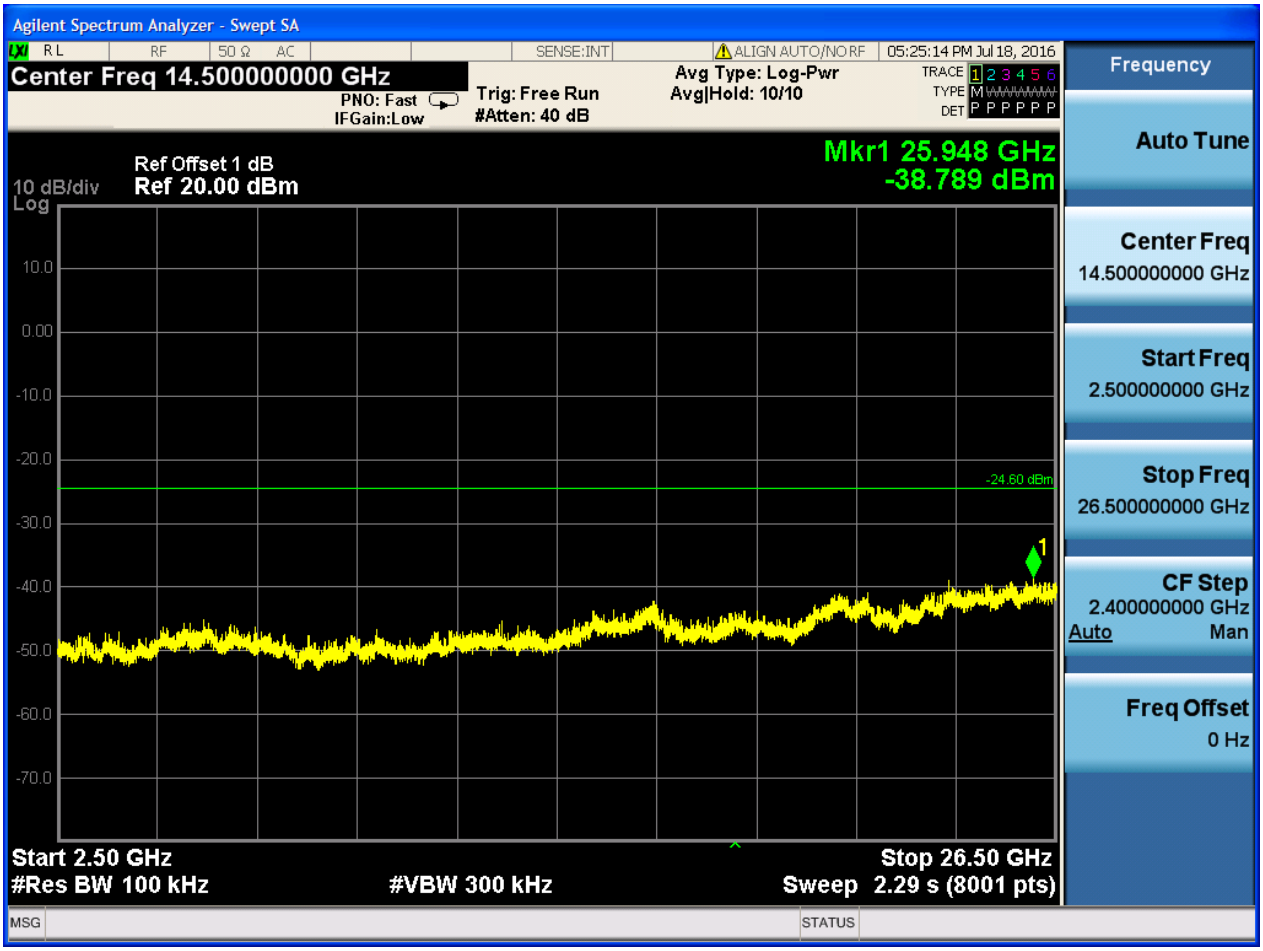
Puw:





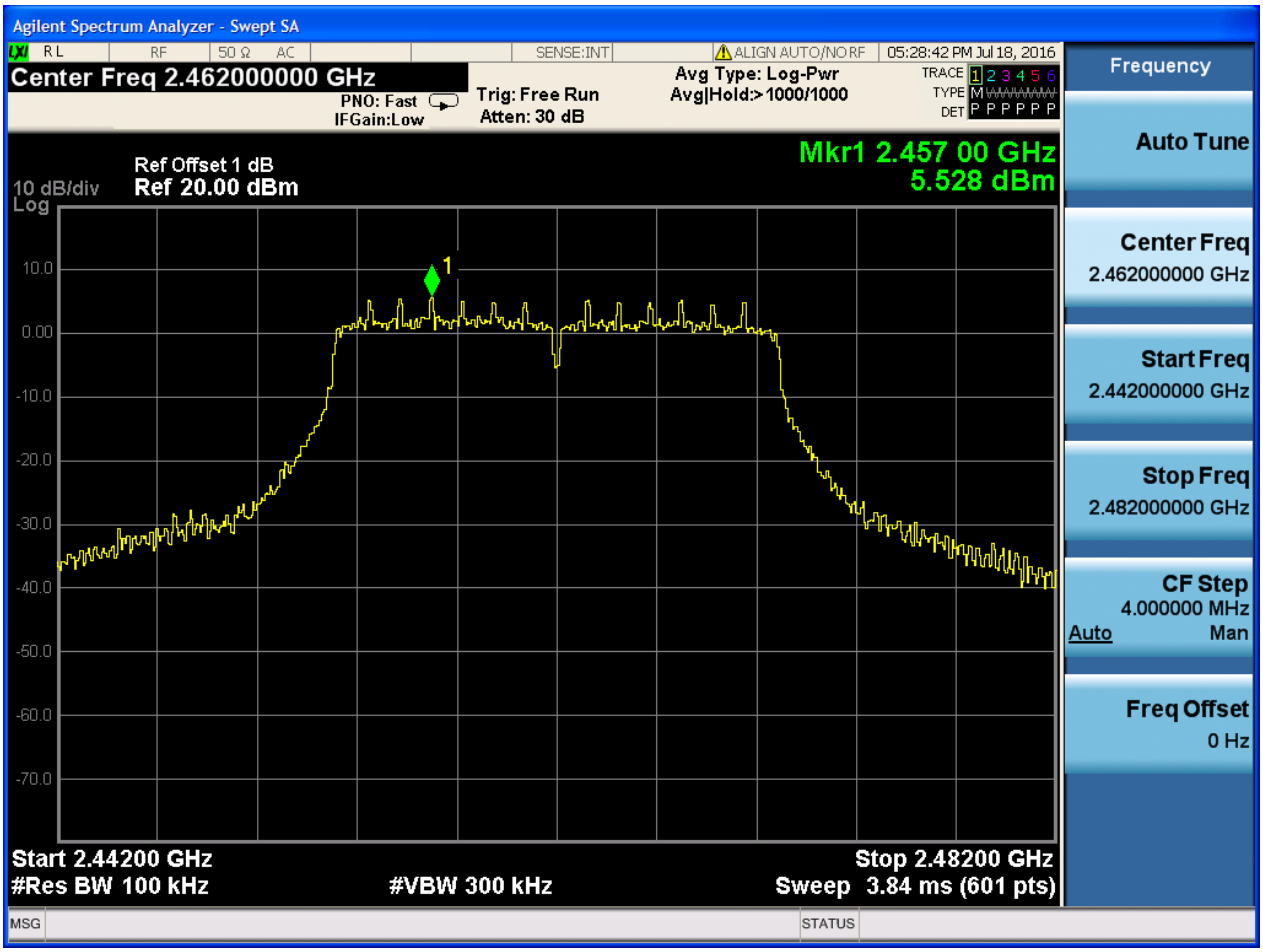




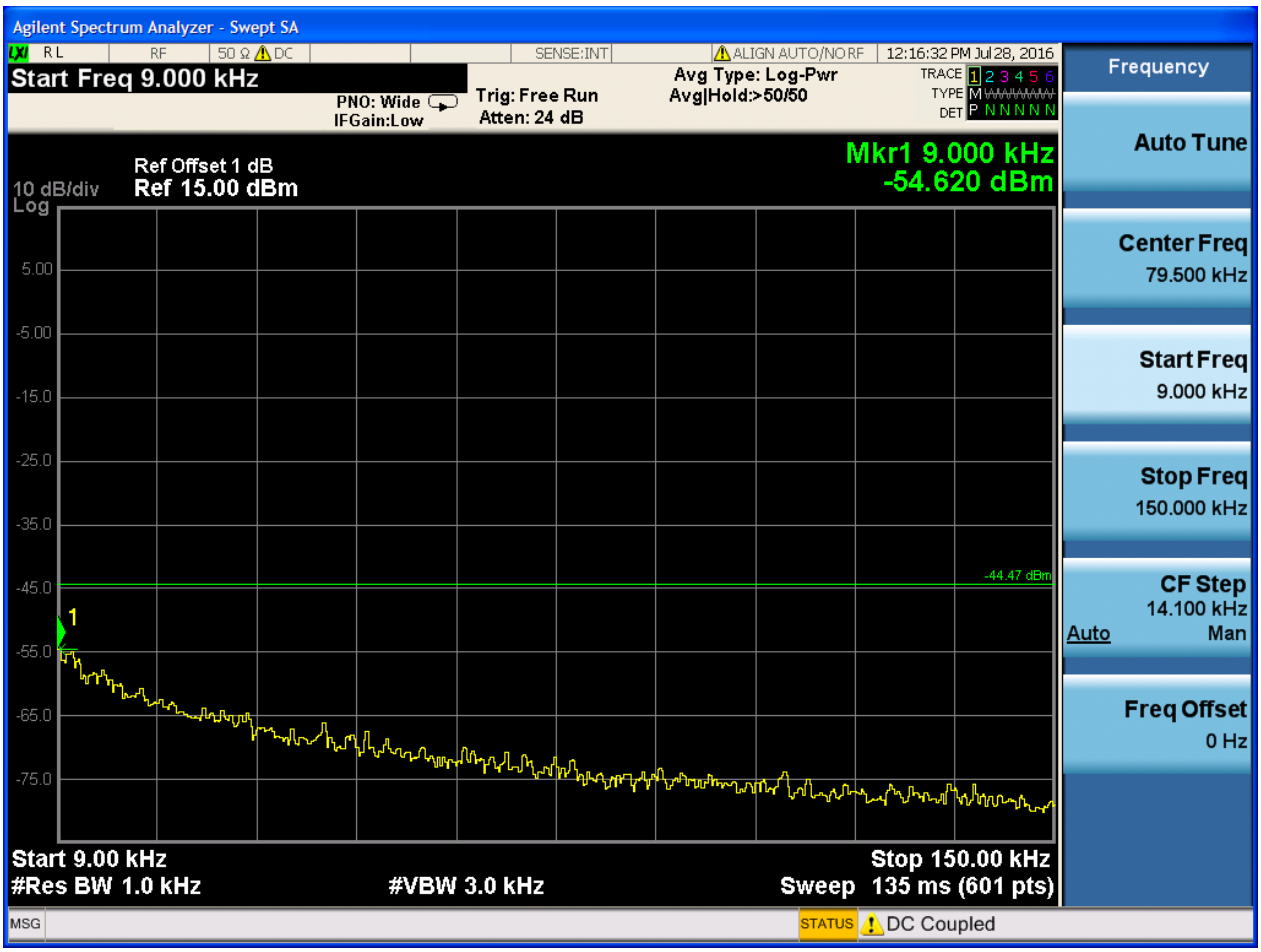


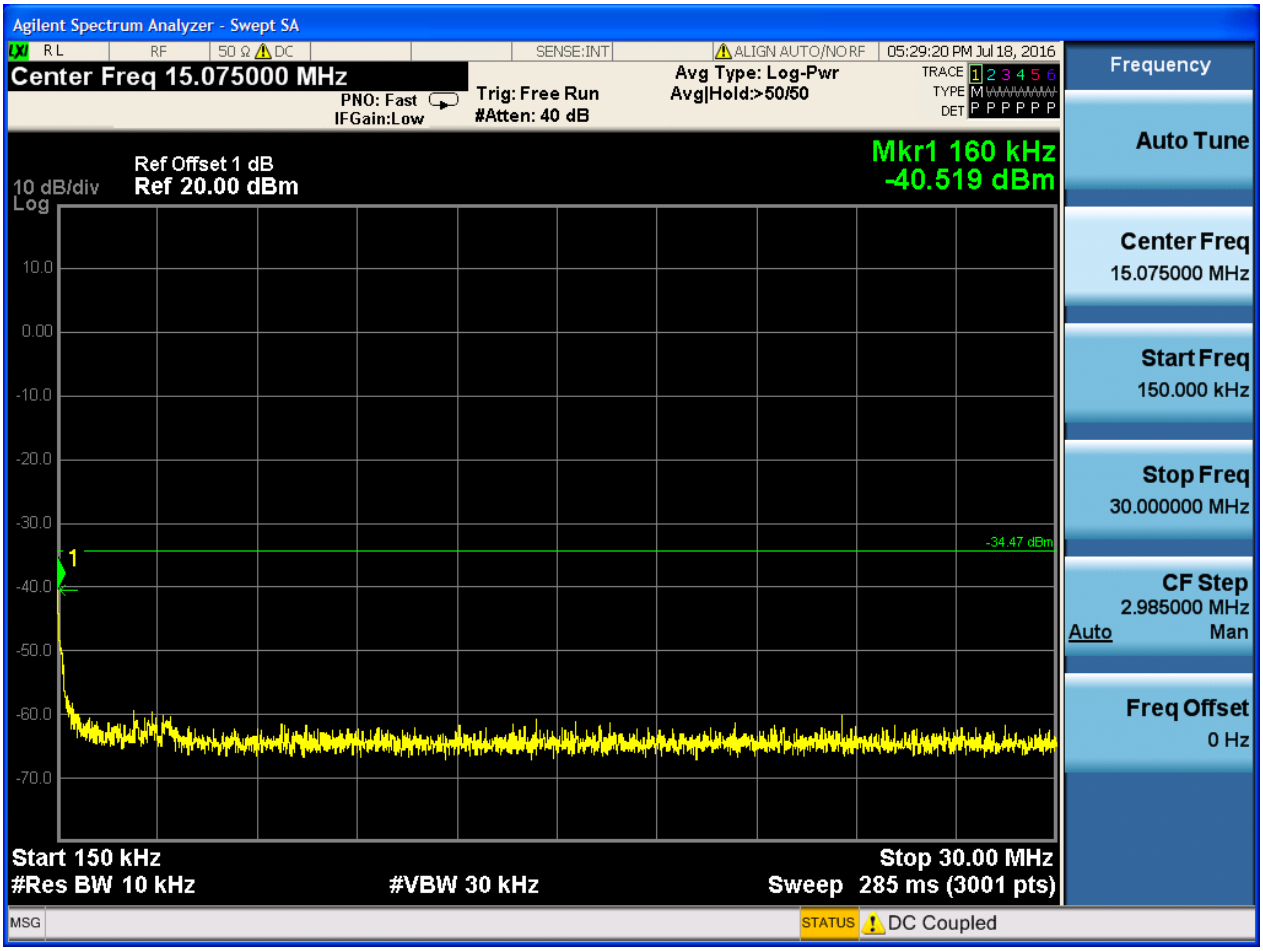
2.17 11N20_H@Ant 1

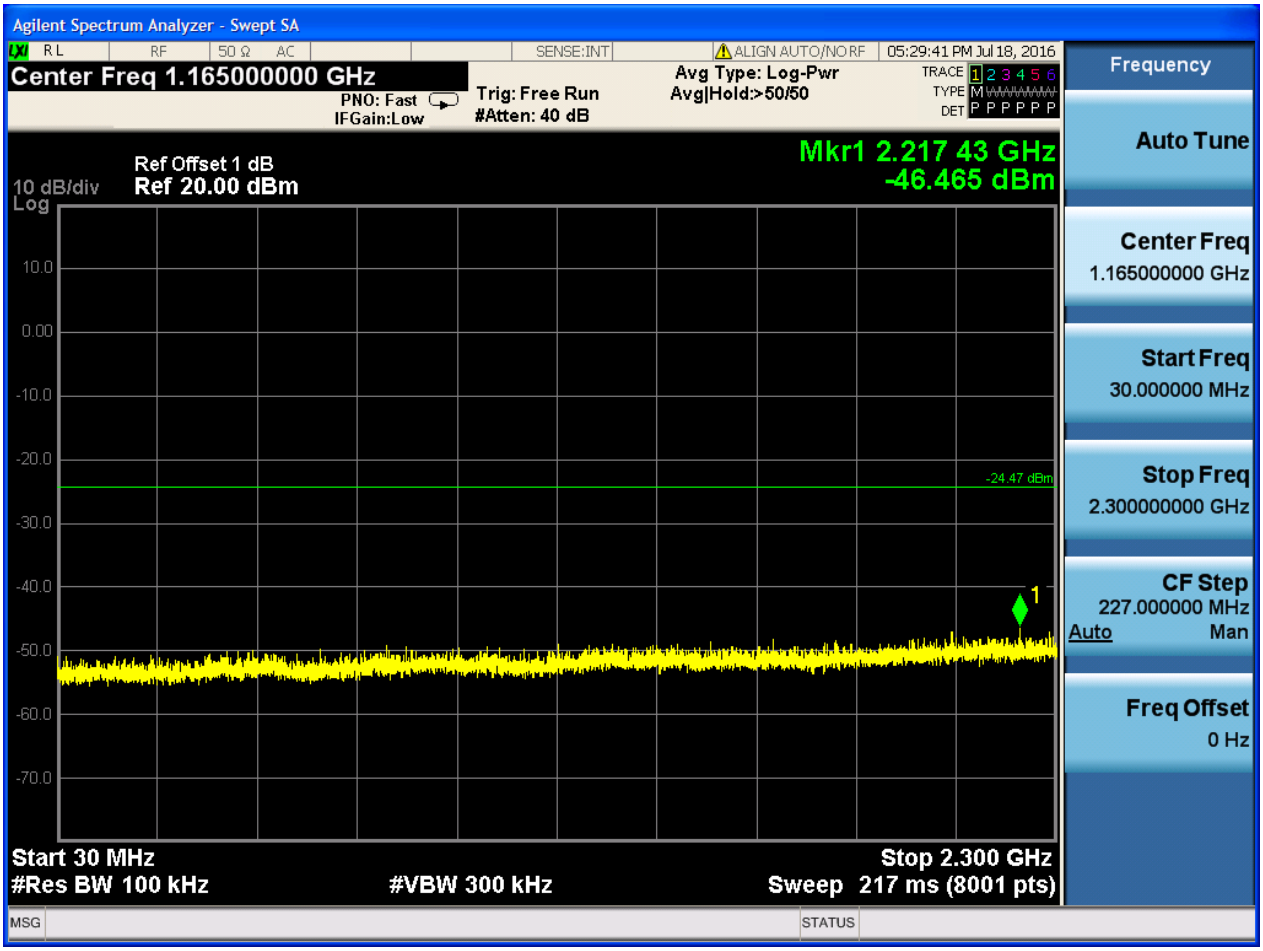
Pref:

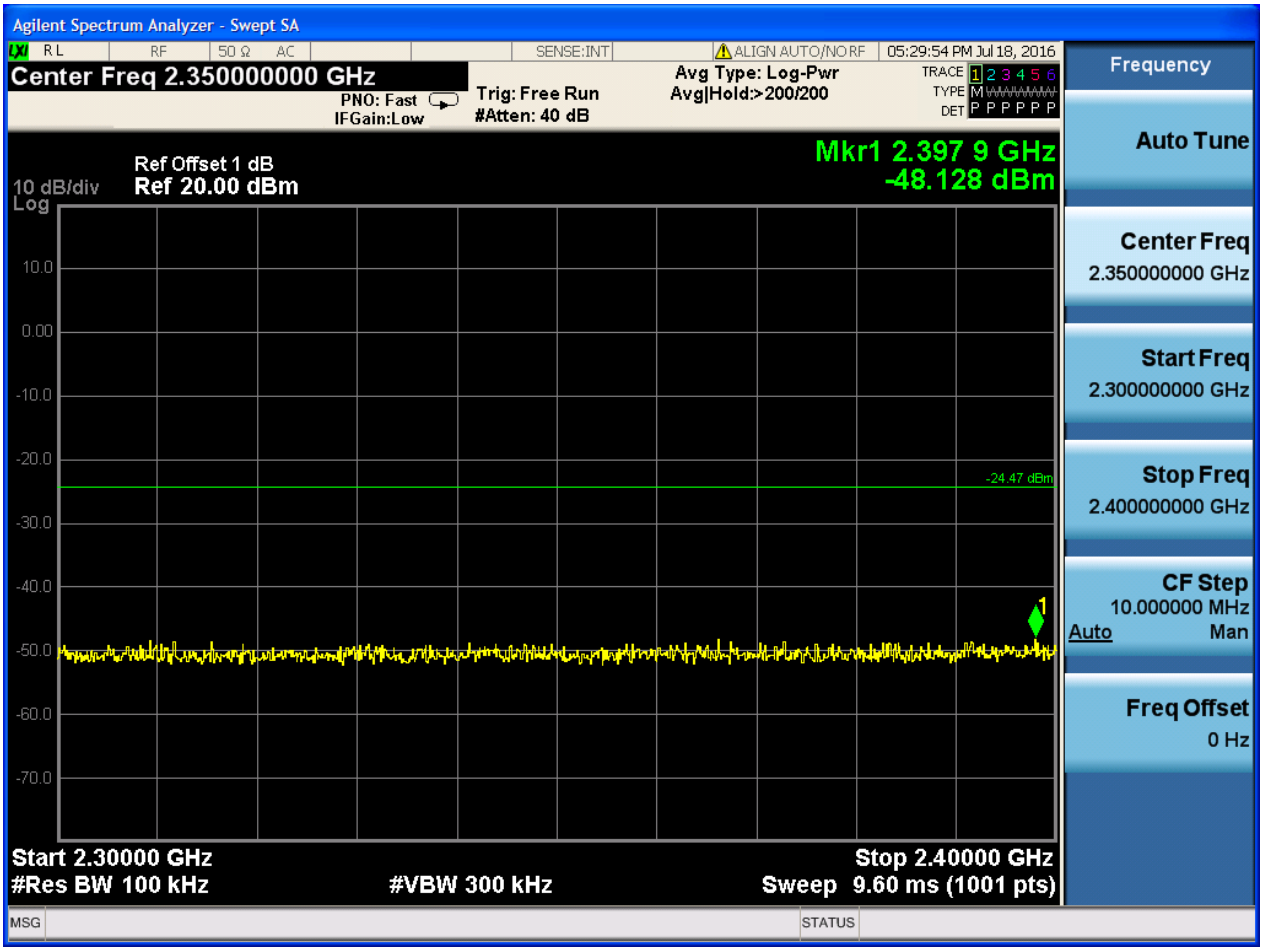


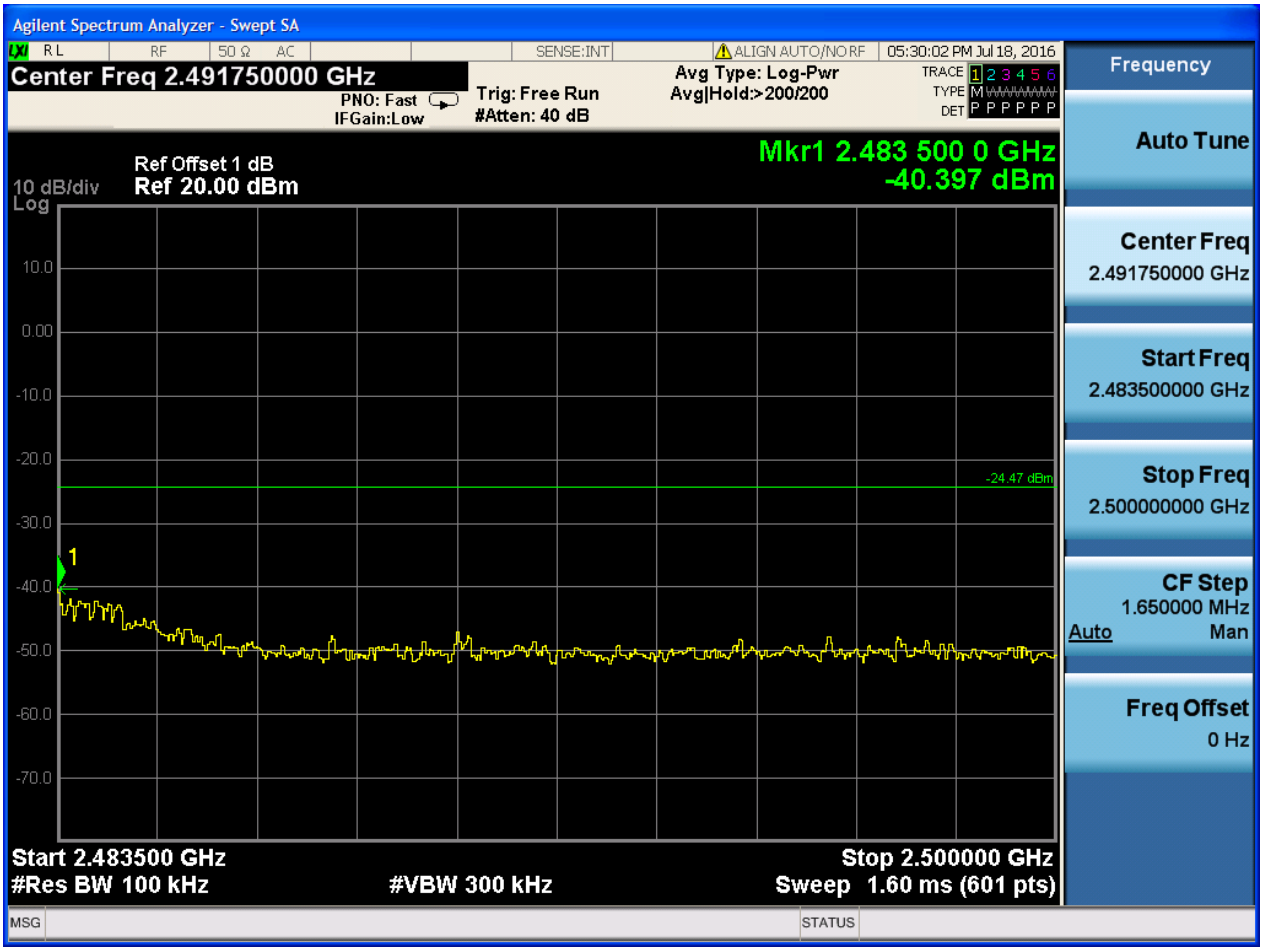
Puw:

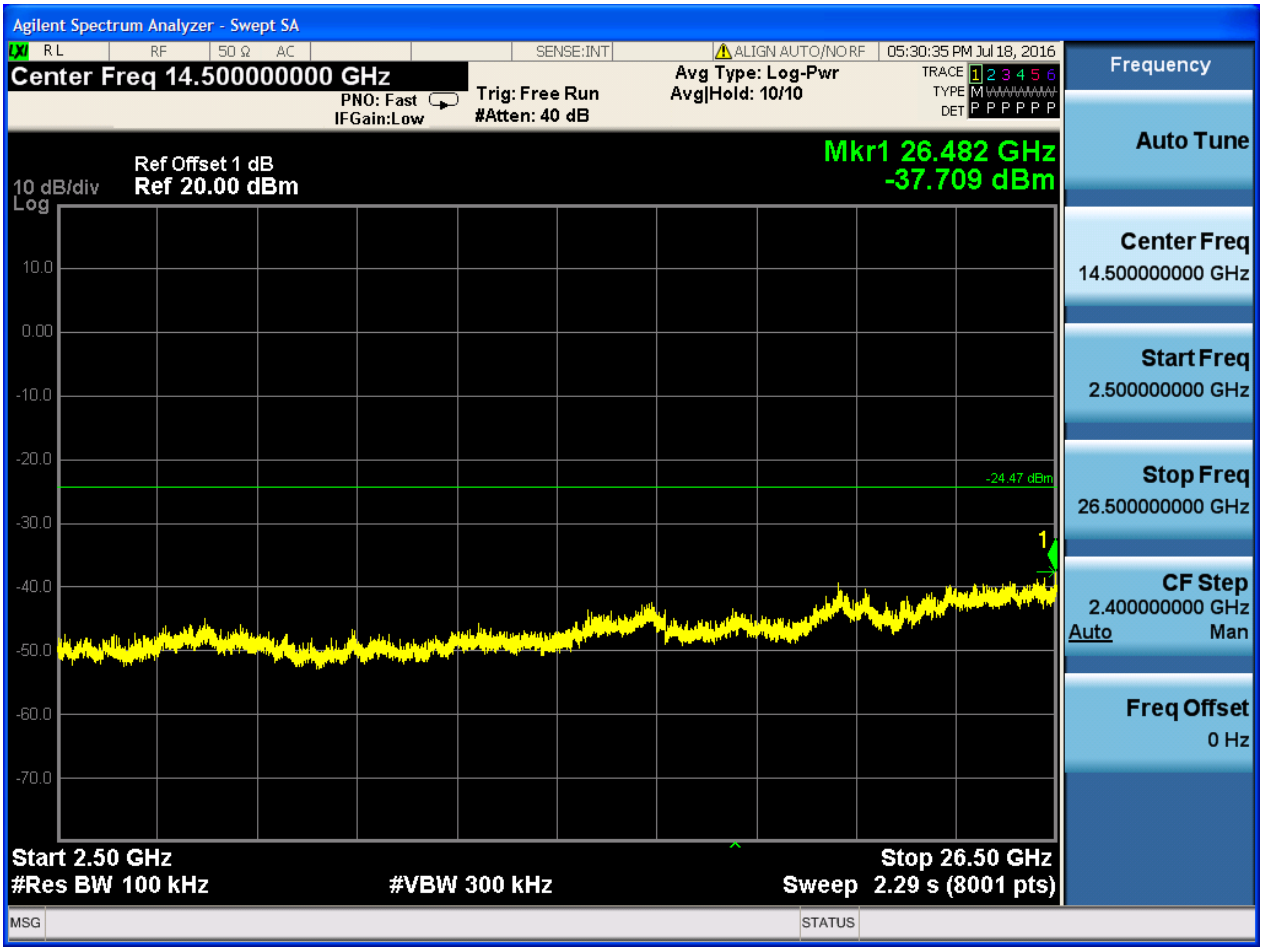

Agilent Spectrum Analyzer - Swept SA
RL
RF
50 Ω DC
SENSE:INT
ALIGN AUTO/NO RF
12:16:32 PM Jul 28, 2016
Start Freq 9.000 kHz
PNO: Wide
IFGain:Low
Trig: Free Run
Atten: 24 dB
Avg Type: Log-Pwr
Avg|Hold:>50/50
TRACE 1 2 3 4 5 6
TYPE M
DET P N N N N N
Ref Offset 1 dB
10 dB/div
Log
Ref 15.00 dBm
Mkr1 9.000 kHz
-54.620 dBm
5.00
-5.00
-15.0
-25.0
-35.0
-45.0
-55.0
-65.0
-75.0
-44.47 dBm
1
Start 9.00 kHz
#Res BW 1.0 kHz
#VBW 3.0 kHz
Stop 150.00 kHz
Sweep 135 ms (601 pts)
MSG
STATUS
DC Coupled
Frequency
Auto Tune
Center Freq
79.500 kHz
Start Freq
9.000 kHz
Stop Freq
150.000 kHz
CF Step
14.100 kHz
Auto
Man
Freq Offset
0 Hz











Appendix H: Radiated Spurious Emission & Spurious in Restricted Band

Note: We tested all modes, but the data presented below is the worst case.

Below 1GHz, RBW = 100 kHz, VBW = 300 kHz.

Above 1GHz, RBW = 1 MHz, VBW = 3 MHz.

The simultaneous transmission has been considered

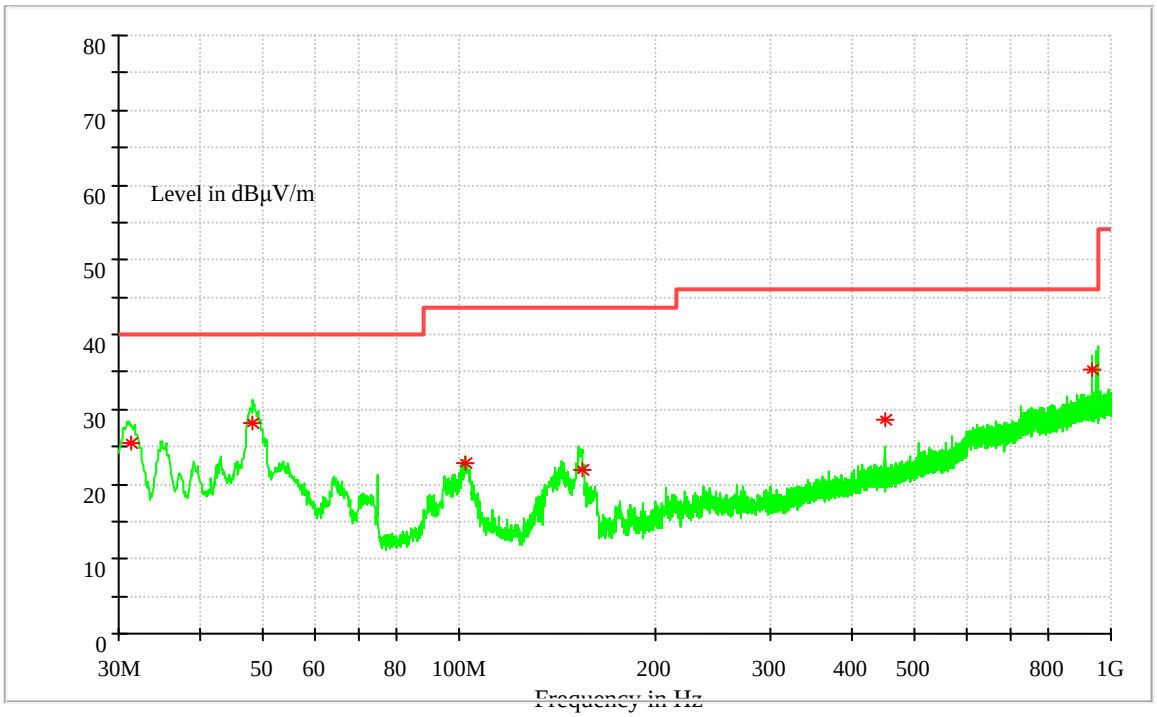
1.1 Part 1: Testing Range of “9 kHz to 30MHz”

NOTE1: No peak found in the Test Range of “9 kHz to 30MHz”

1.2 Part 2: Testing Range of “30 MHz to 1 GHz”

Note 1: The test results and plot for testing range of “30 MHz to 1 GHz” showed as below is the WORST case for all Test Modes and Channels. This range will not be presented for each Test Mode and each Channel.

Note 2: The emissions in this range are mainly from the Platform Device (Notepad PC and its ancillary components).



Frequency (MHz)	Level (dBµ V/m)	Limit (dBµ V/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Transd. (dB)
31.33875	25.36	40	14.64	161	V	239	14.7
47.95555	28.07	40	11.93	107	V	267	15.2
102.2318	22.69	43.5	20.81	100	V	120	13.8
154.94505	21.94	43.5	21.56	107	V	271	10.4
448.9825	28.6	46	17.4	107	V	168	18.9
938.8447	35.21	46	10.79	160	H	15	26.2

Note:

1, Level =Reading level by receiver + Transd (Antenna factor + cable loss – preamplifier gain)

The reading level is calculated by software which is not shown in the sheet.

2, Margin=Limit - Level

1.3Part 3: Testing Range of “1 GHz to 3 GHz”

Note 1: The testing range of “1 GHz to 3 GHz” is for checking radiated emissions located in restricted bands near the EUT operating bands.

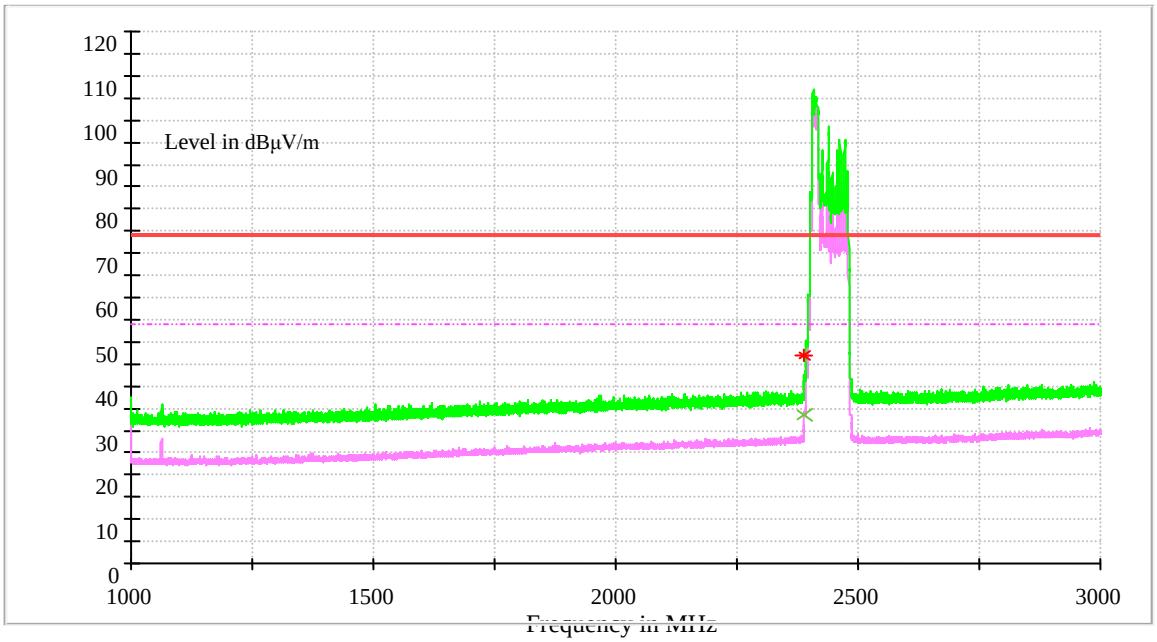
Note 2: Two limits are required in the testing range above 1 GHz, that is Peak limit (74 dBµV/m) and Average Limit (54 dBµV/m).

Note 3: The peak spike exceeds the limit line is EUT’s operating frequency.

Test Mode:

1.4.1Test Mode: 11B

1.4.1.1 Channel 1 @Ant 1



MEASUREMENT RESULT: AV Detector

Frequency (MHz)	Level (dBµ V/m)	Limit (dBµ V/m)	Margin (dB)	Height (cm)	Pol	Azimuth	Transd. (dB)
2390	33.5	54	20.5	136	H	195	-2.1

MEASUREMENT RESULT: PK Detector

Frequency (MHz)	Level (dBµ V/m)	Limit (dBµ V/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Transd. (dB)
2390	47.01	74	26.99	137	H	200	-2.1

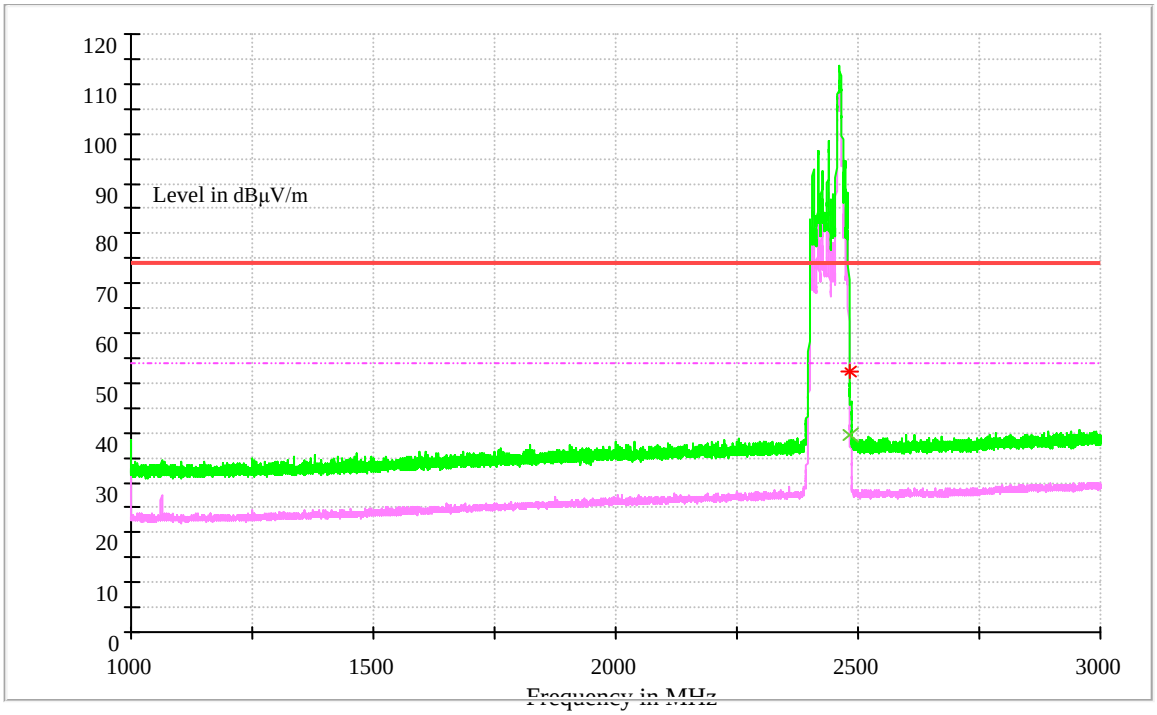
Note2:

1, Level =Reading level by receiver + Transd (Antenna factor + cable loss – preamplifier gain)

The reading level is calculated by software which is not shown in the sheet.

2, Margin=Limit - Level

1.4.1.2 Channel 11@Ant 1



MEASUREMENT RESULT: AV Detector

Frequency (MHz)	Level (dBµ V/m)	Limit (dBµ V/m)	Margin (dB)	Height (cm)	Pol	Azimuth	Transd. (dB)
2483.5	39.39	54	14.61	100	H	193	7.2

MEASUREMENT RESULT: PK Detector

Frequency (MHz)	Level (dBµ V/m)	Limit (dBµ V/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Transd. (dB)
2483.5	52.13	74	21.87	100	H	199	7.2

Note2:

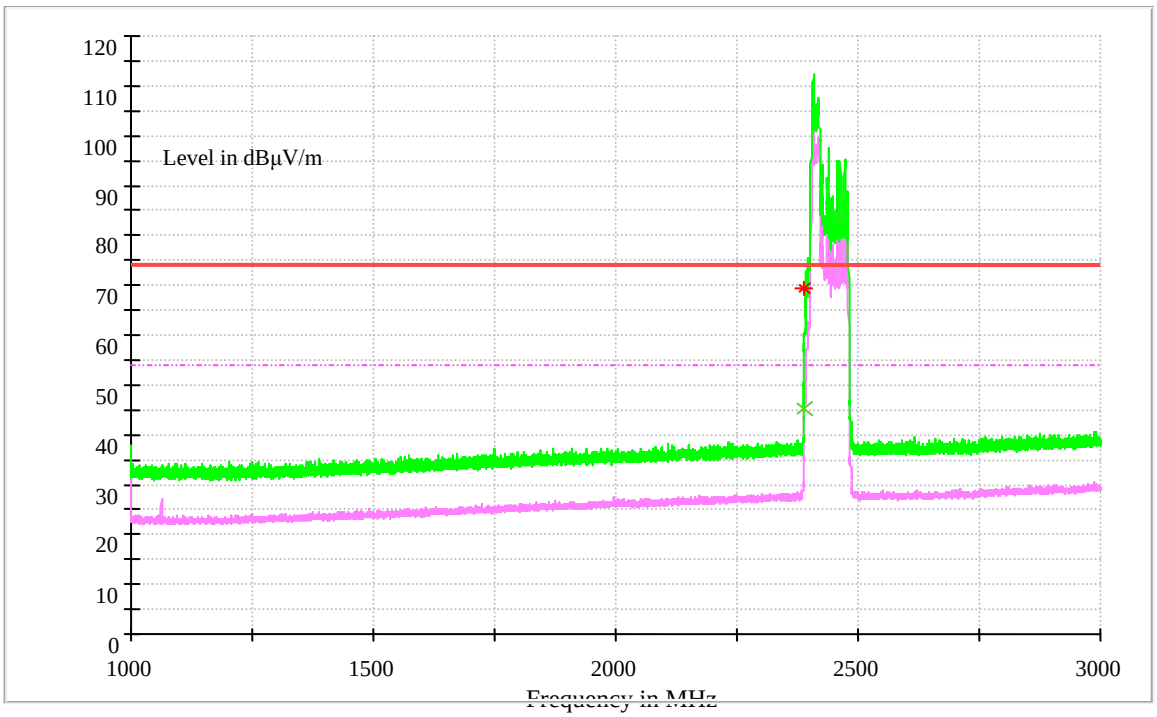
1, Level =Reading level by receiver + Transd (Antenna factor + cable loss – preamplifier gain)

The reading level is calculated by software which is not shown in the sheet.

2, Margin=Limit - Level

1.4.2Test Mode: 11G

1.4.2.1 Channel 1 @Ant 1



MEASUREMENT RESULT: AV Detector

Frequency (MHz)	Level (dBµ V/m)	Limit (dBµ V/m)	Margin (dB)	Height (cm)	Pol	Azimuth	Transd. (dB)
2390	45.4	54	8.6	136	H	194	-2.1

MEASUREMENT RESULT: PK Detector

Frequency (MHz)	Level (dBµ V/m)	Limit (dBµ V/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Transd. (dB)
2390	69.28	74	4.72	200	H	184	-2.1

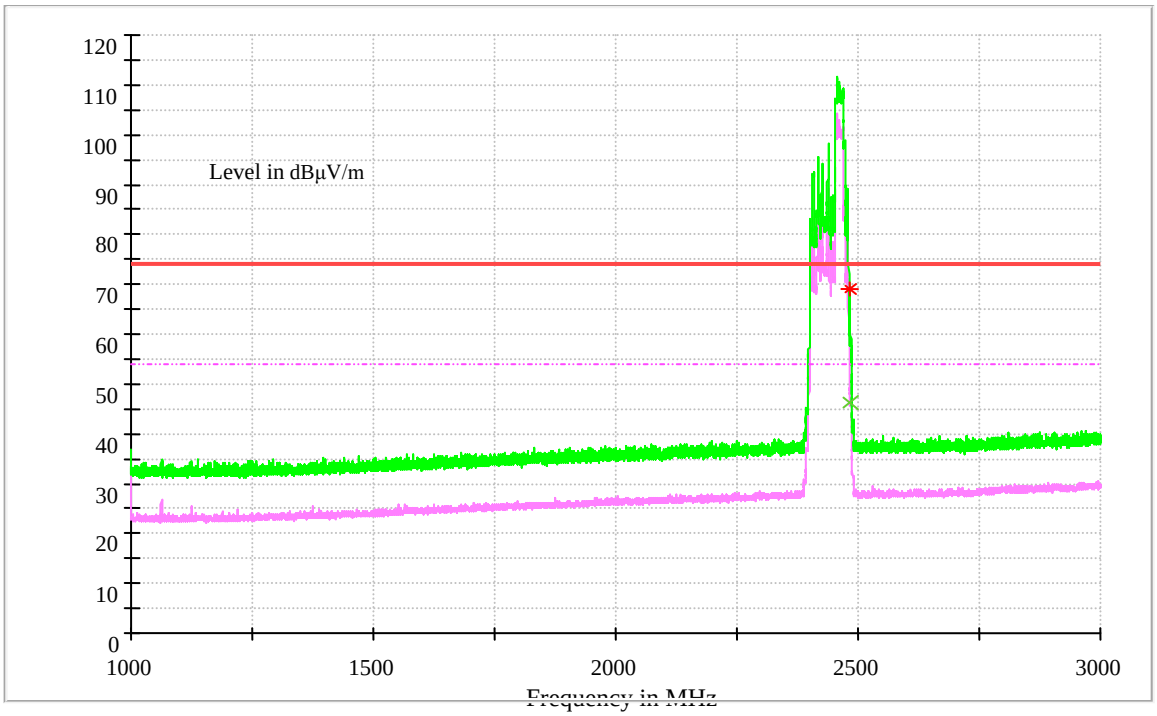
Note2:

1, Level =Reading level by receiver + Transd (Antenna factor + cable loss – preamplifier gain)

The reading level is calculated by software which is not shown in the sheet.

2, Margin=Limit - Level

1.4.2.2 Channel 11@Ant 1



MEASUREMENT RESULT: AV Detector

Frequency (MHz)	Level (dBµ V/m)	Limit (dBµ V/m)	Margin (dB)	Height (cm)	Pol	Azimuth	Transd. (dB)
2483.5	46.36	54	7.64	100	H	196	7.2

MEASUREMENT RESULT: PK Detector

Frequency (MHz)	Level (dBµ V/m)	Limit (dBµ V/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Transd. (dB)
2483.5	69.16	74	4.84	100	H	210	7.2

Note2:

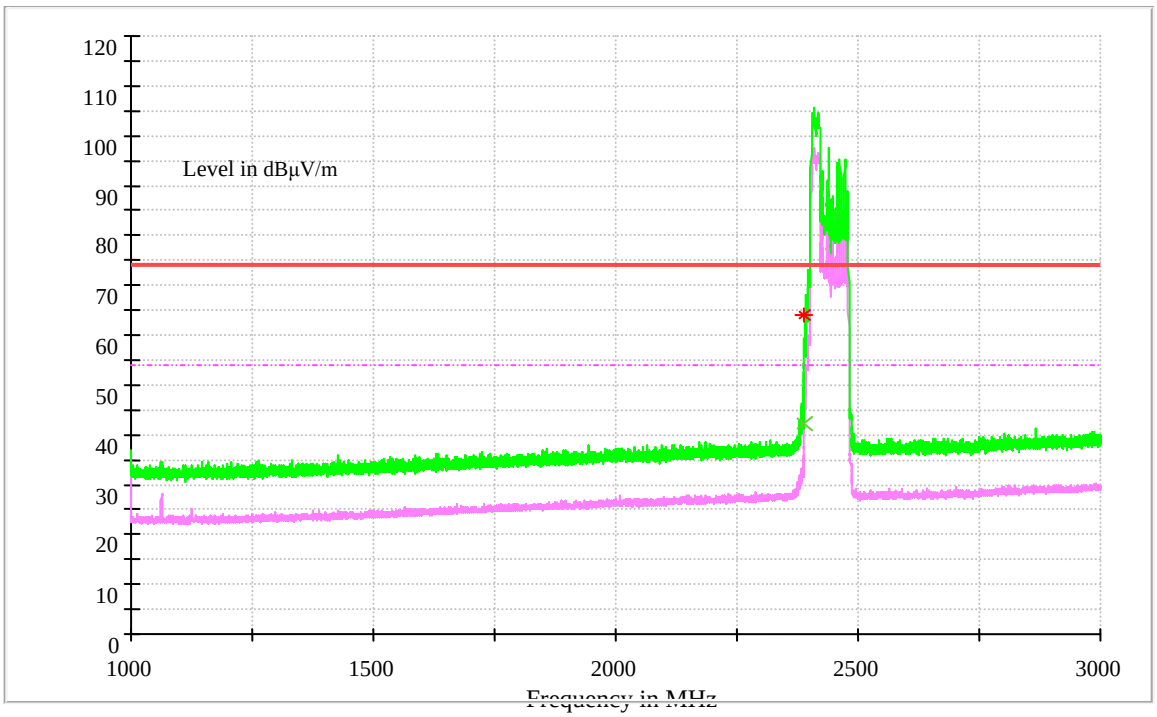
1, Level =Reading level by receiver + Transd (Antenna factor + cable loss – preamplifier gain)

The reading level is calculated by software which is not shown in the sheet.

2, Margin=Limit - Level

1.4.3Test Mode: 11N20

1.4.3.1 Channel 1 @Ant 1



MEASUREMENT RESULT: AV Detector

Frequency (MHz)	Level (dBµ V/m)	Limit (dBµ V/m)	Margin (dB)	Height (cm)	Pol	Azimuth	Transd. (dB)
2390	42.13	54	11.87	136	H	199	-2.1

MEASUREMENT RESULT: PK Detector

Frequency (MHz)	Level (dBµ V/m)	Limit (dBµ V/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Transd. (dB)
2390	64.18	74	9.82	117	H	199	-2.1

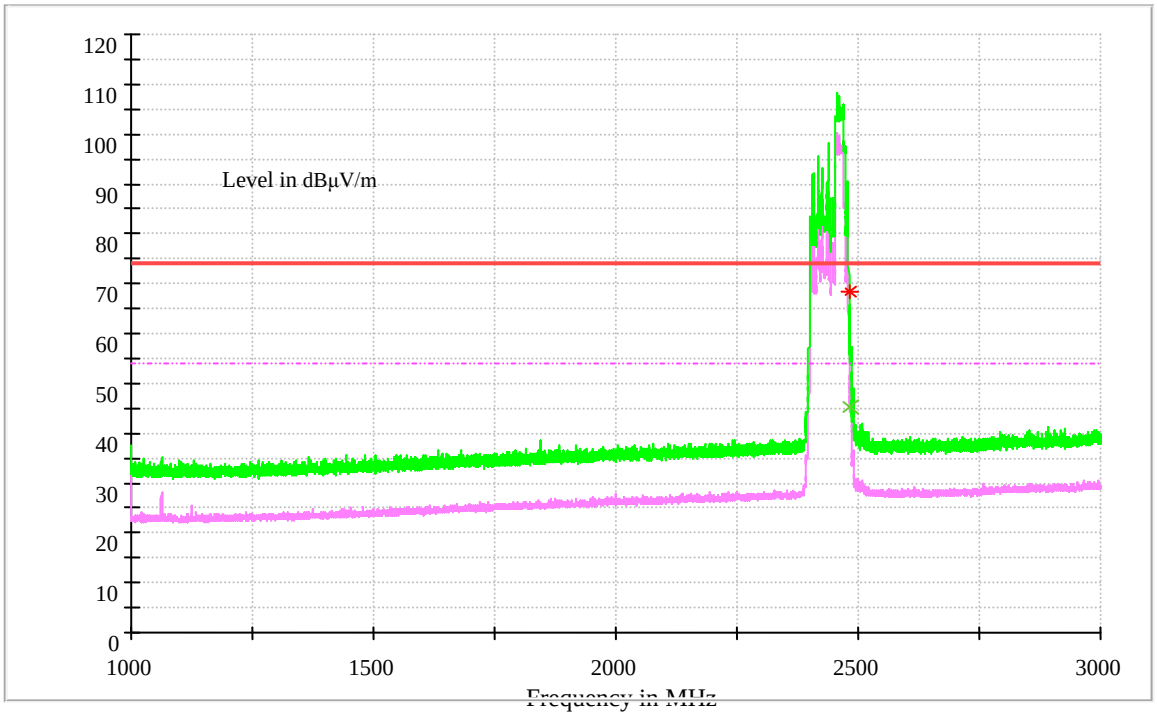
Note2:

1, Level =Reading level by receiver + Transd (Antenna factor + cable loss – preamplifier gain)

The reading level is calculated by software which is not shown in the sheet.

2, Margin=Limit - Level

1.4.3.2 Channel 11@Ant 1



MEASUREMENT RESULT: AV Detector

Frequency (MHz)	Level (dBµ V/m)	Limit (dBµ V/m)	Margin (dB)	Height (cm)	Pol	Azimuth	Transd. (dB)
2483.5	45.4	54	8.6	100	H	196	7.2

MEASUREMENT RESULT: PK Detector

Frequency (MHz)	Level (dBµ V/m)	Limit (dBµ V/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Transd. (dB)
2483.5	68.47	74	5.53	148	H	210	7.2

Note2:

1, Level =Reading level by receiver + Transd (Antenna factor + cable loss – preamplifier gain)

The reading level is calculated by software which is not shown in the sheet.

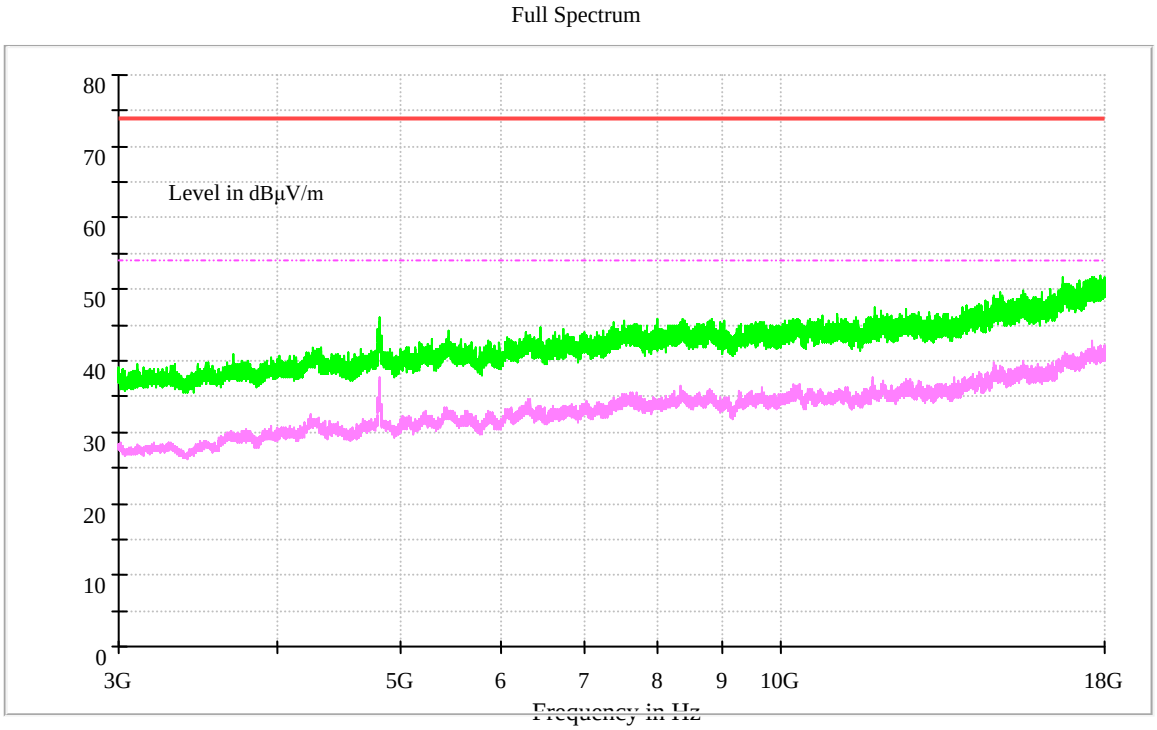
2, Margin=Limit – Level

1.4 Part 4: Testing Range of “3 GHz to 18 GHz”

Note 1: The test results and plot for testing range of “3 GHz to 18 GHz” showed as below is the WORST case for all Test Modes and Channels. This range will not be presented for each Test Mode and each Channel.

Note 2: The testing range of “3 GHz to 18 GHz” is for checking radiated emissions located in restricted bands faraway from the EUT operating bands.

Note 3: Two limits are required in the testing range above 1 GHz, that is Peak limit (74 dBμV/m) and Average Limit (54 dBμV/m).

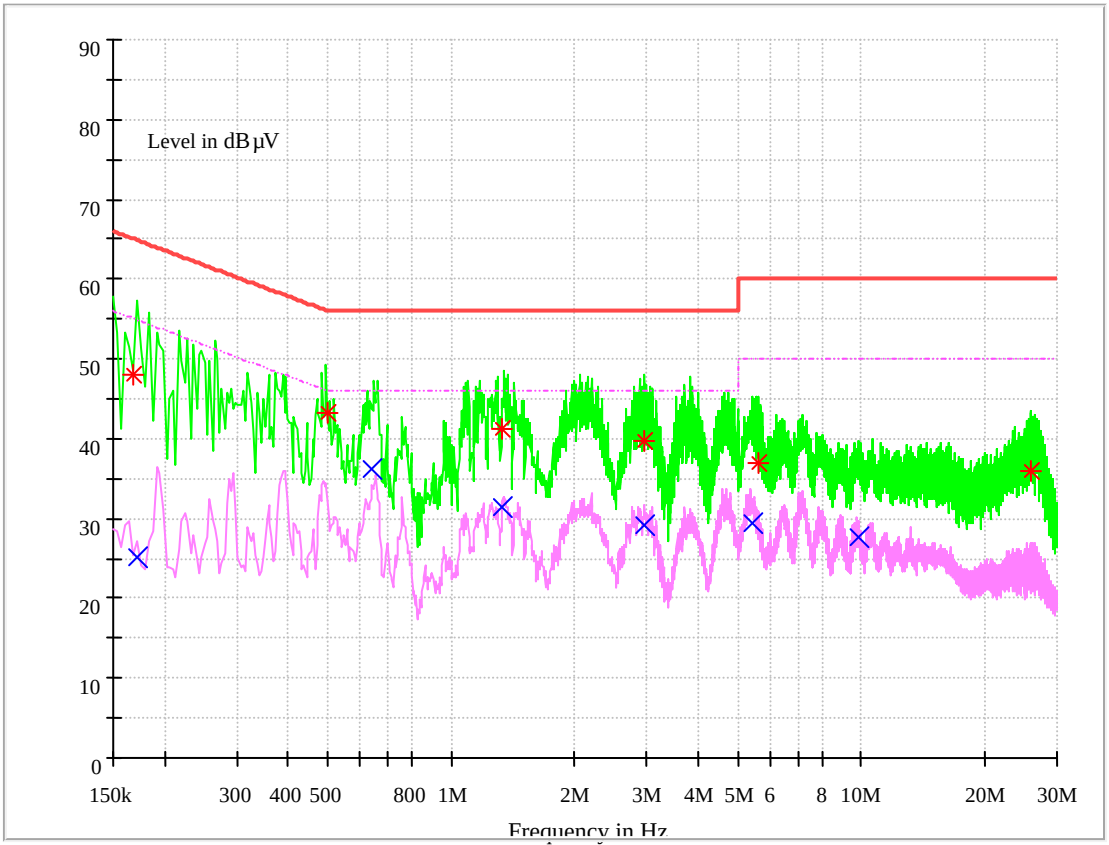


1.5 Part 5: Testing Range of “18 GHz to 26.5 GHz”

NOTE: No peak found in the Test Range of “18 GHz to 26.5GHz”

Appendix I: Conducted Emission at Power Port

Note: RBW =9 kHz, VBW = 30 kHz



MEASUREMENT RESULT: AV Detector

Frequency (MHz)	Level (dBμ V)	Limit (dBμ V)	Transd. (dB)	Margin (dB)	Line	PE
0.17264	25.11	54.83	9.7	29.72	L1	FLO
0.64361	36.26	46	9.7	9.74	L1	FLO
1.33141	31.42	46	9.7	14.58	N	FLO
2.94691	29.14	46	9.8	16.86	L1	FLO
5.401	29.54	50	9.8	20.46	L1	FLO
9.80076	27.65	50	10	22.35	L1	FLO

MEASUREMENT RESULT: PK Detector

Frequency (MHz)	Level (dBμ V)	Limit (dBμ V)	Transd. (dB)	Margin (dB)	Line	PE
0.16852	47.89	65.03	9.7	17.14	L1	FLO
0.49944	43.26	56.01	9.7	12.75	N	FLO
1.33387	41.35	56	9.7	14.65	N	FLO
2.94119	39.63	56	9.8	16.37	N	FLO
5.6152	37.04	60	9.8	22.96	N	FLO
26.0528	35.93	60	10.3	24.07	L1	FLO

Note2:

1, Level =Reading level by receiver + Transd (Antenna factor + cable loss – preamplifier gain)

The reading level is calculated by software which is not shown in the sheet.

2, Margin=Limit - Level

END