



Appendix for Test report

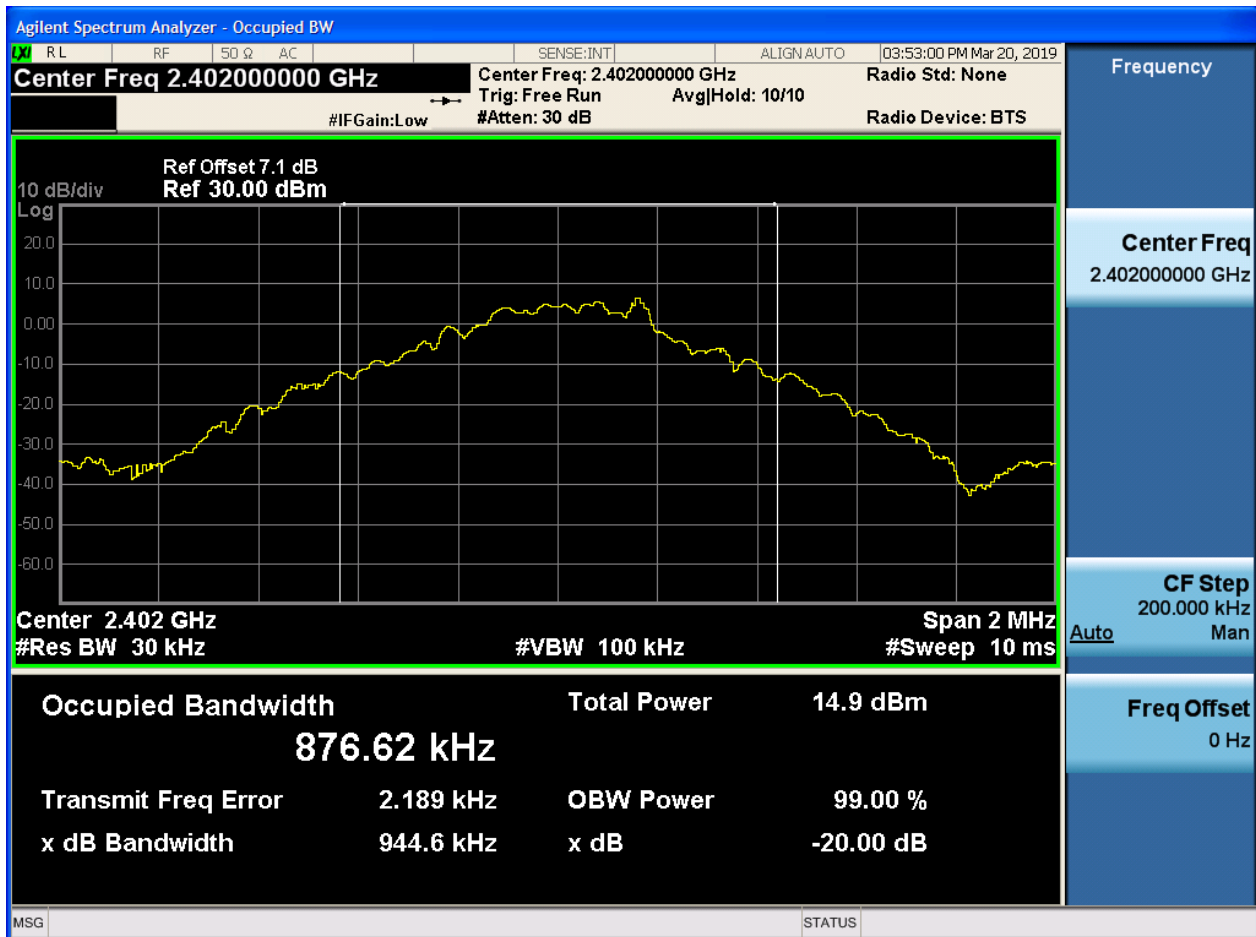
Appendix A: 20dB Emission Bandwidth (EBW)

1 Result Table

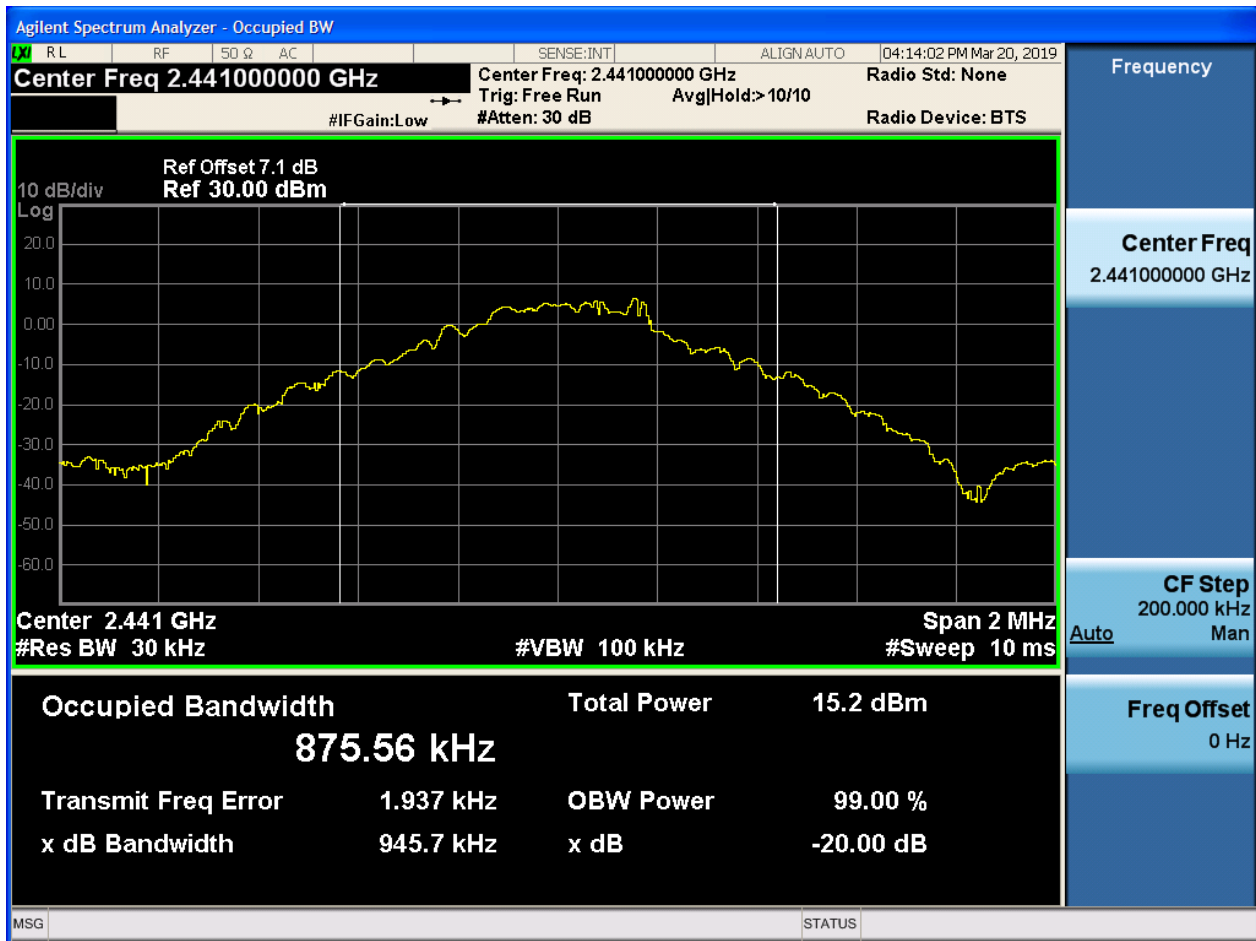
EUT Conf.	EBW [MHz]	Limit[MHz]	Verdict
TM1_DH5_Ch0	0.94	---	Pass
TM1_DH5_Ch39	0.95	---	Pass
TM1_DH5_Ch78	0.94	---	Pass
TM2_2DH5_Ch0	1.27	---	Pass
TM2_2DH5_Ch39	1.27	---	Pass
TM2_2DH5_Ch78	1.28	---	Pass
TM3_3DH5_Ch0	1.27	---	Pass
TM3_3DH5_Ch39	1.27	---	Pass
TM3_3DH5_Ch78	1.28	---	Pass

2 Test Plot

2.1 TM1_DH5_Ch0



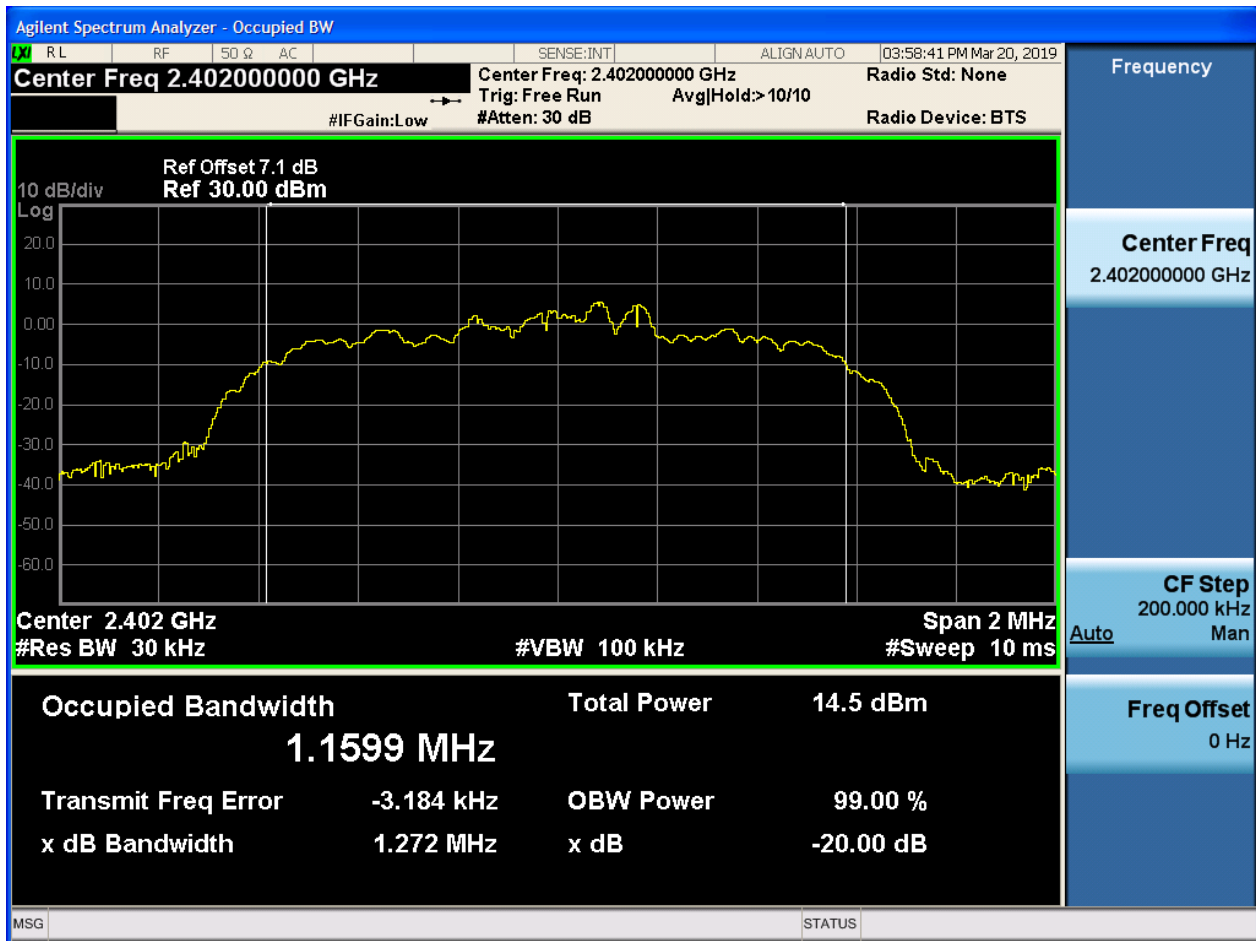
2.2 TM1_DH5_Ch39



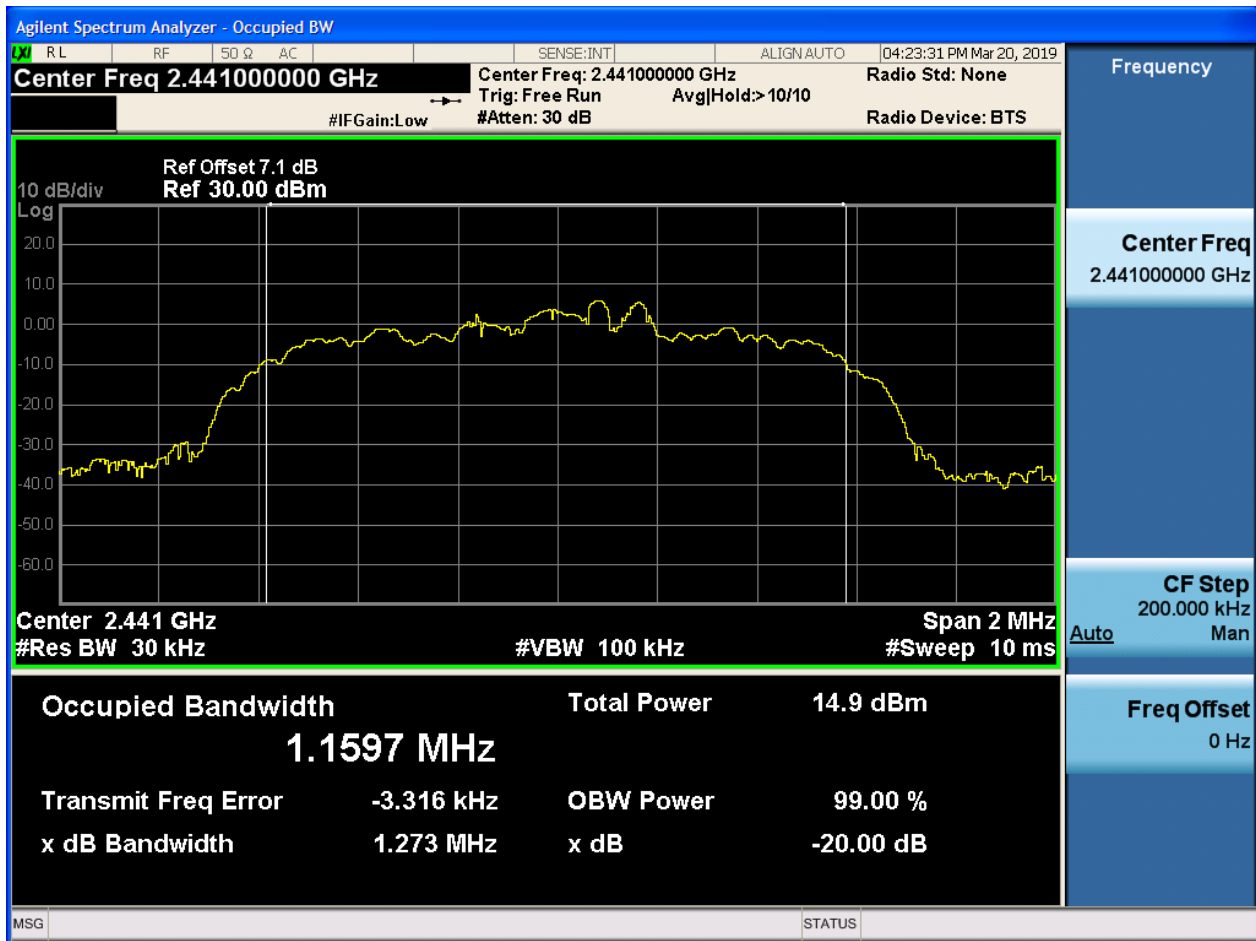
2.3 TM1_DH5_Ch78



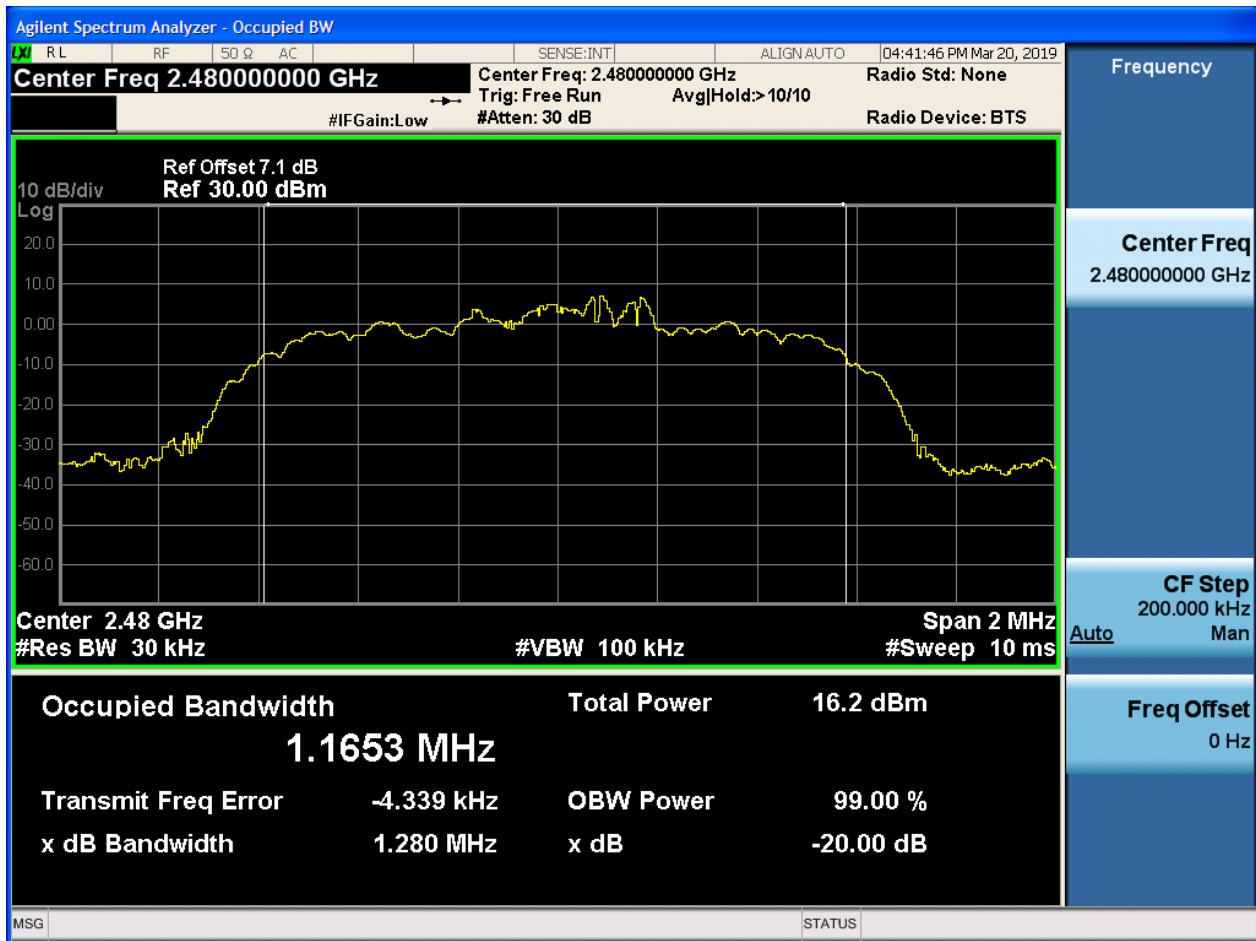
2.4 TM2_2DH5_Ch0

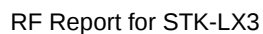


2.5 TM2_2DH5_Ch39



2.6 TM2_2DH5_Ch78





Agilent Spectrum Analyzer - Occupied BW

RL RF 50 Ω AC SENSE:INT ALIGN: AUTO 04:04:19 PM Mar 20, 2019

Center Freq 2.402000000 GHz Center Freq: 2.402000000 GHz Radio Std: None
Trig: Free Run Avg|Hold> 10/10
#IFGain:Low #Atten: 30 dB Radio Device: BTS

Ref Offset 7.1 dB
Ref 30.00 dBm

10 dB/div
Log

Center 2.402 GHz Span 2 MHz
#Res BW 30 kHz #VBW 100 kHz #Sweep 10 ms

Occupied Bandwidth		Total Power	
1.1626 MHz		14.5 dBm	
Transmit Freq Error	-3.153 kHz	OBW Power	99.00 %
x dB Bandwidth	1.271 MHz	x dB	-20.00 dB

MSG STATUS

Frequency

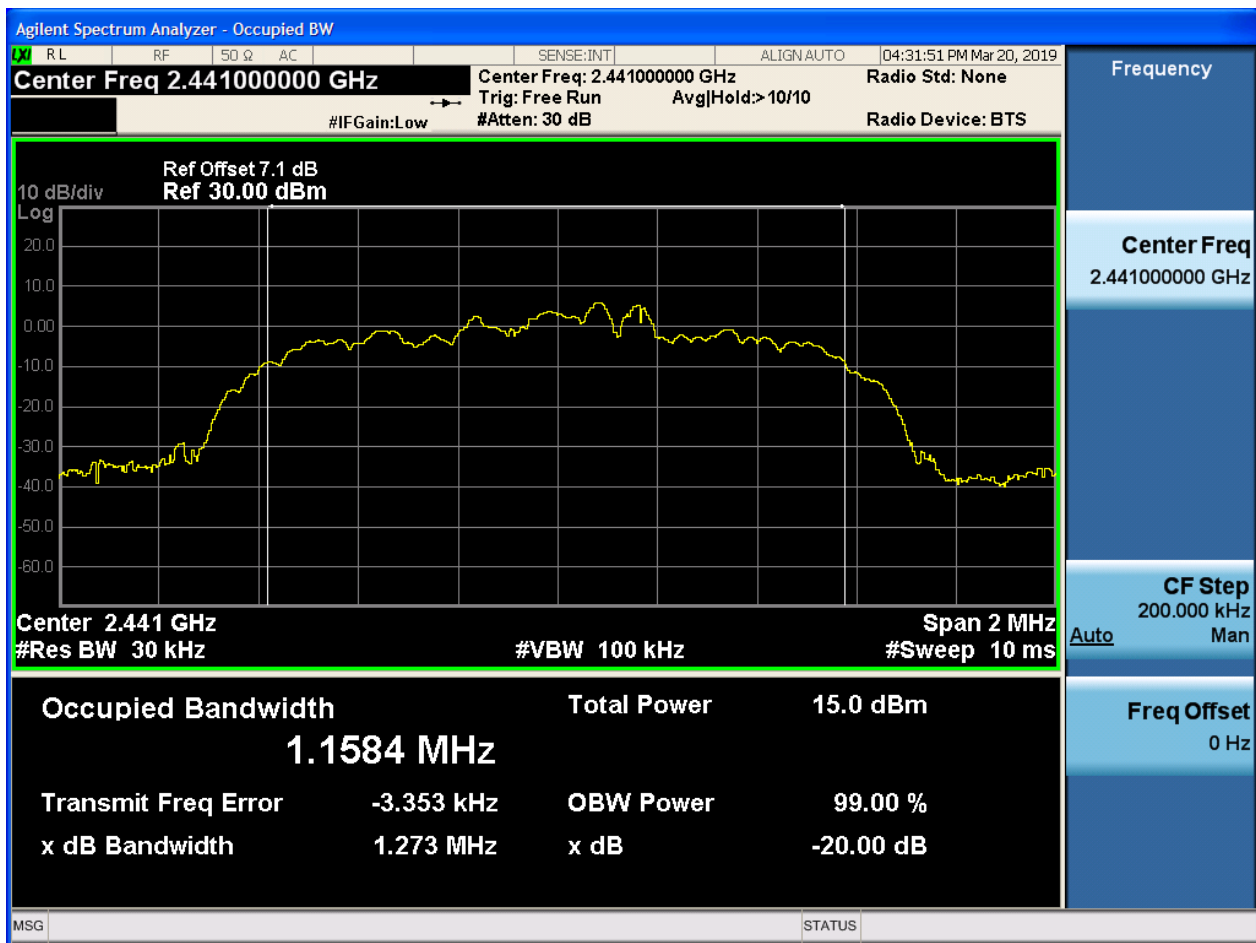
Center Freq
2.402000000 GHz

CF Step
200.000 kHz
Man

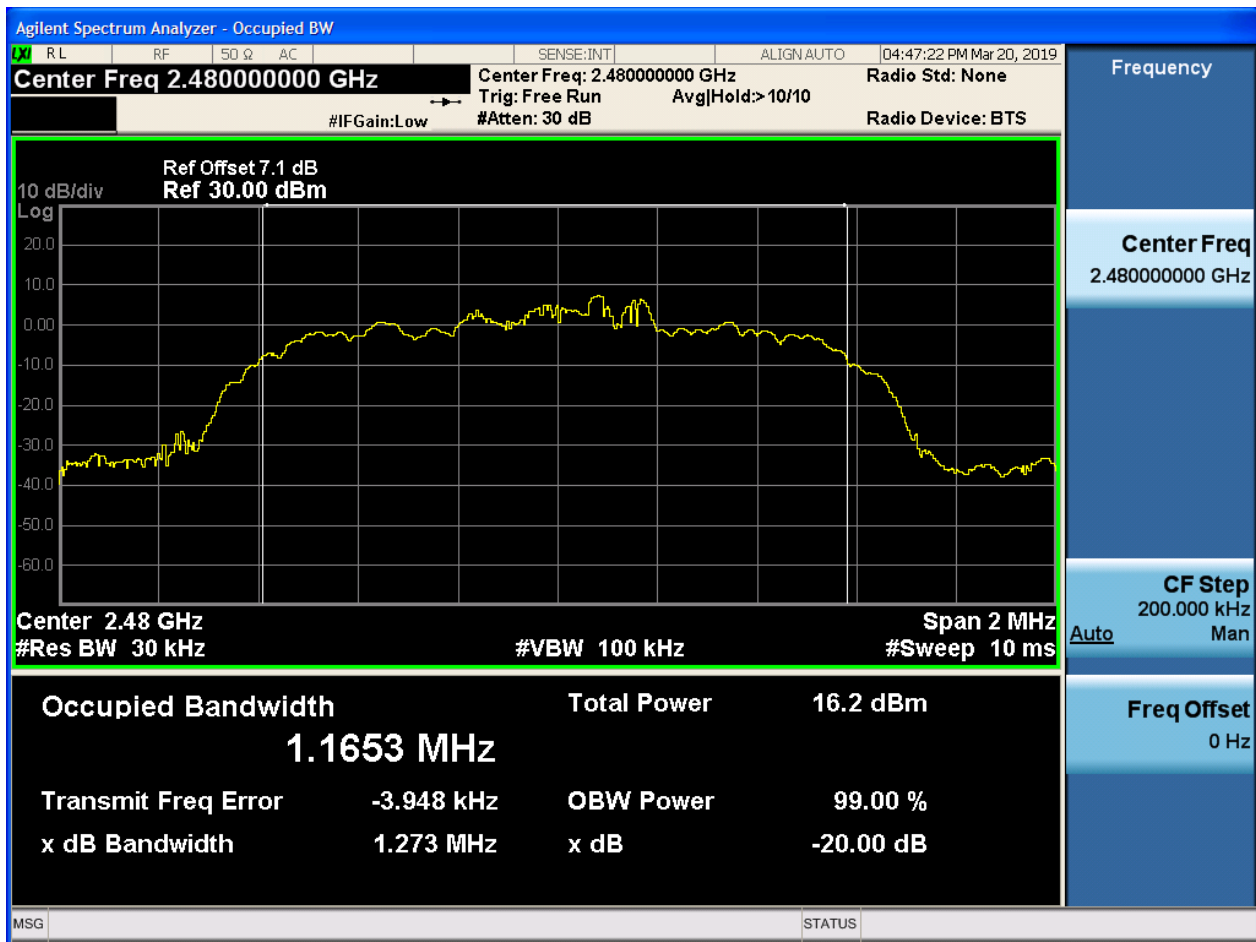
Auto

Freq Offset
0 Hz

2.8 TM3_3DH5_Ch39



2.9 TM3_3DH5_Ch78



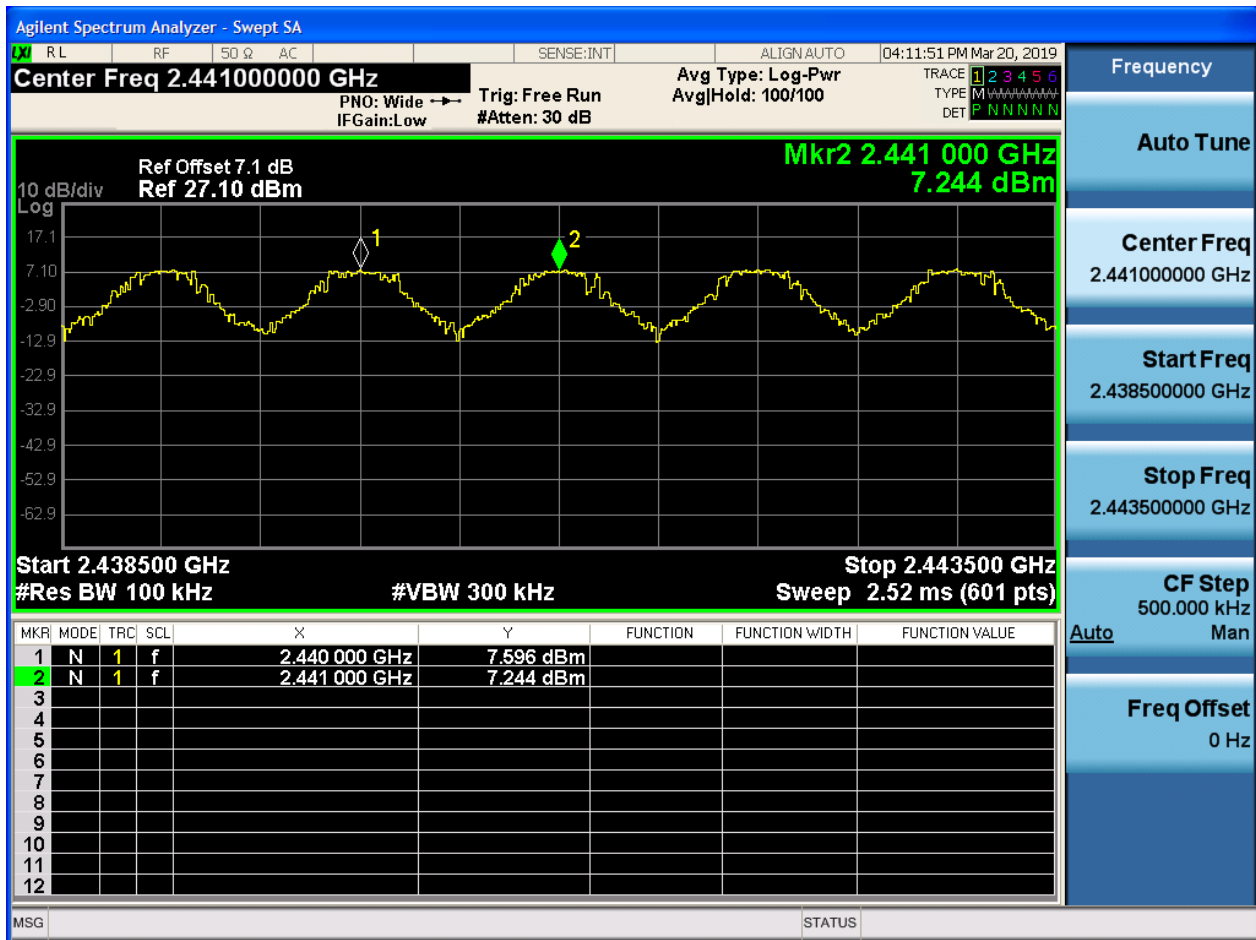
Appendix B: Carrier Frequency Separation

1 Result Table

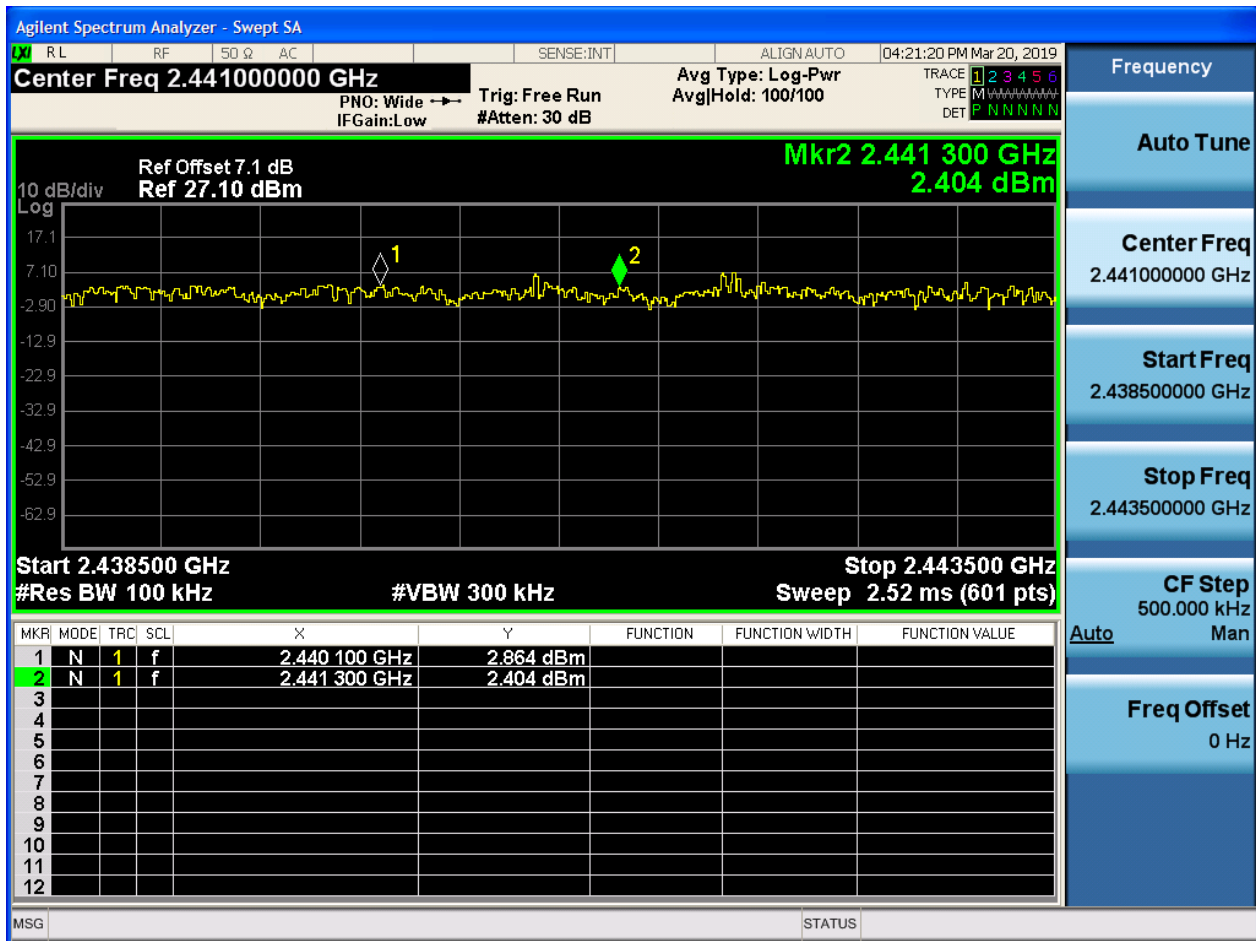
EUT Conf.	Carrier Frequency Separation [MHz]	Limit[MHz]	Verdict
TM1_DH5_Hop	1	≥ 0.633	Pass
TM2_2DH5_Hop	1.2	≥ 0.853	Pass
TM3_3DH5_Hop	1	≥ 0.853	Pass

2 Test Plot

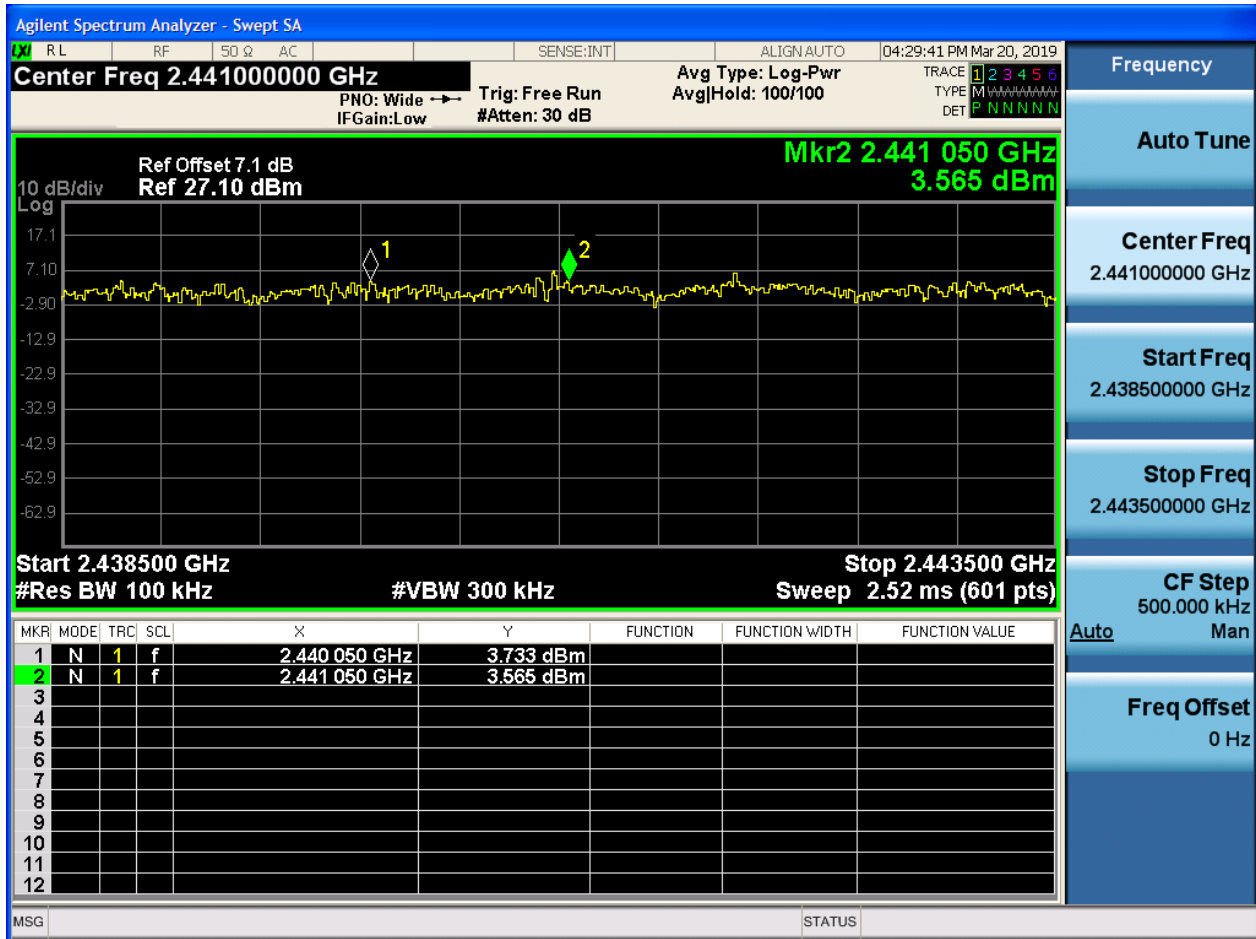
2.1 TM1_DH5_Hop



2.2 TM2_2DH5_Hop



2.3 TM3_3DH5_Hop



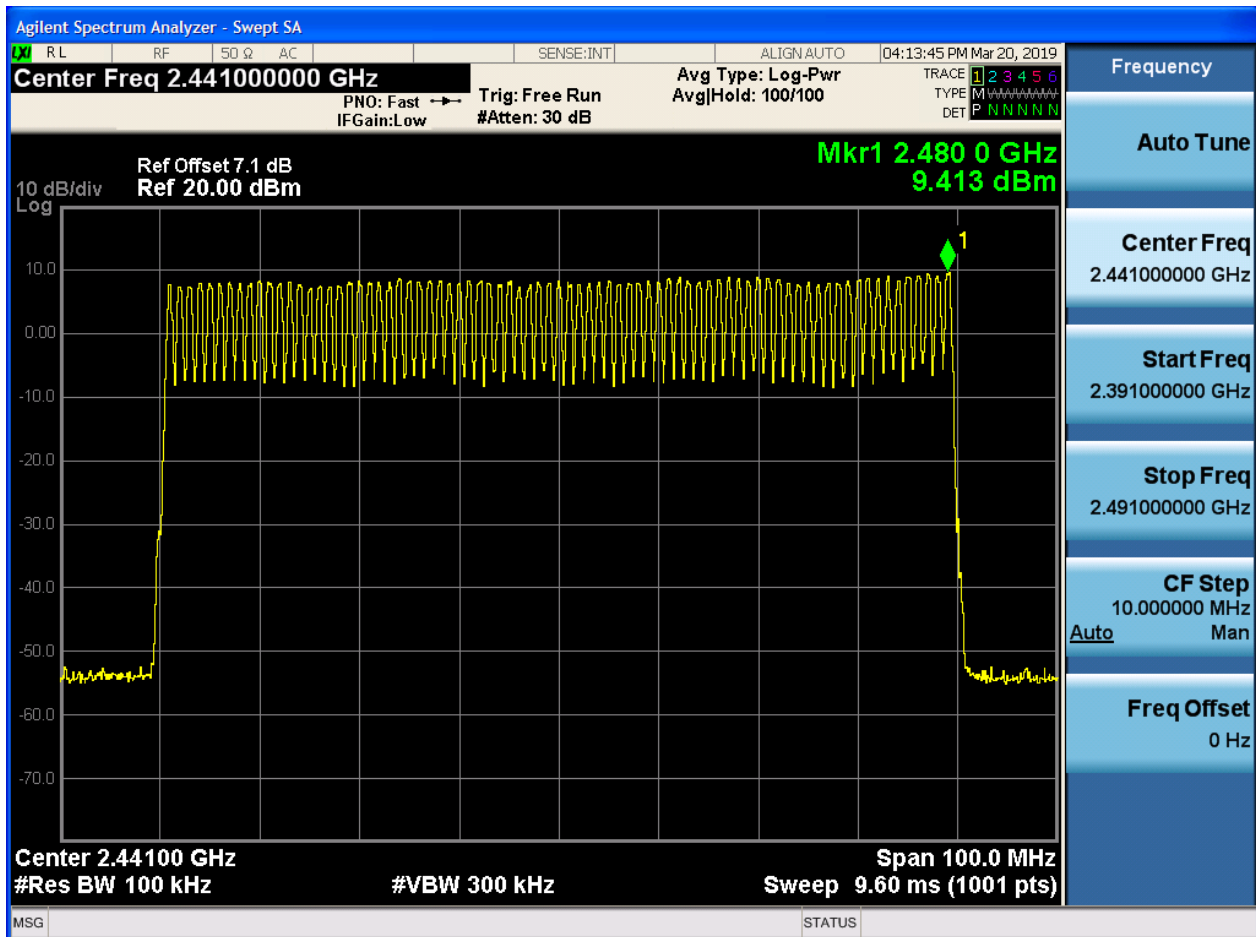
Appendix C: Number of Hopping Channel

1 Result Table

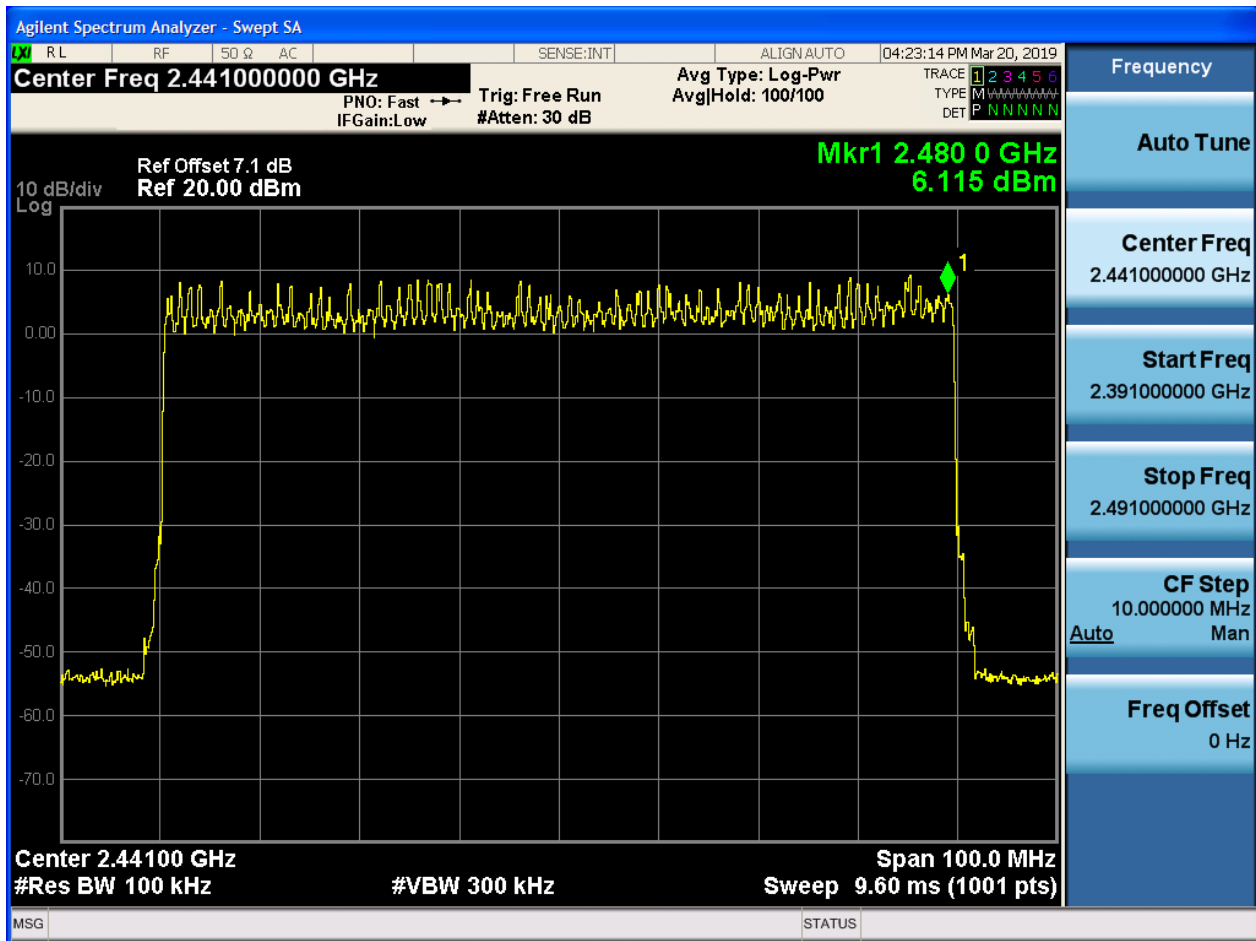
EUT Conf.	Number of Hopping Channel	Limit	Verdict
TM1_DH5_Hop	79	≥ 15	Pass
TM2_2DH5_Hop	79	≥ 15	Pass
TM3_3DH5_Hop	79	≥ 15	Pass

2 Test Plot

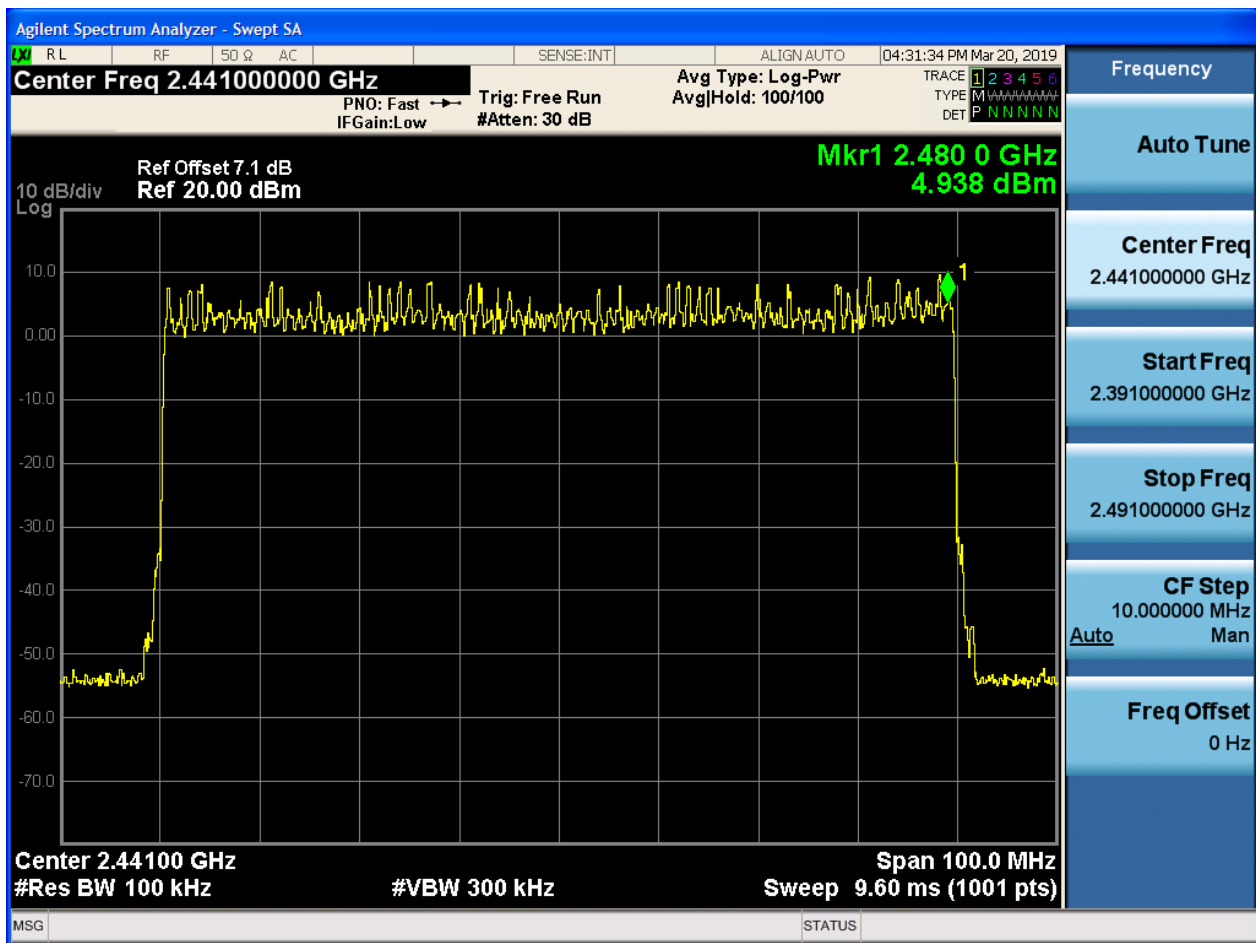
2.1 TM1_DH5_Hop



2.2 TM2_2DH5_Hop



2.3 TM3_3DH5_Hop



Appendix D: Time of Occupancy (Dwell Time)

1 Result Table

The Dwell Time = Burst Width * Total Hops. The detailed calculations are showed as follows:

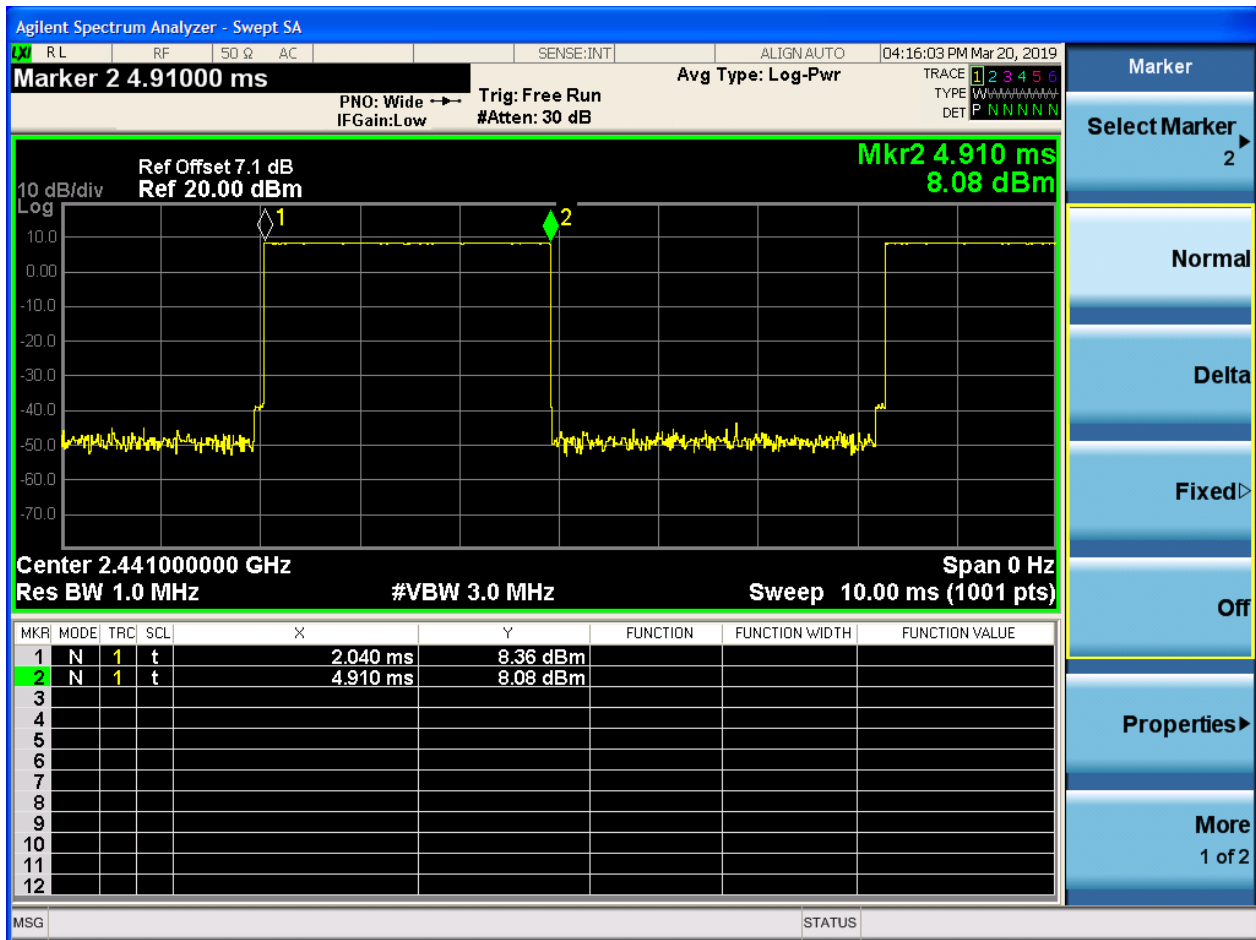
- The duration for dwell time calculation: $0.4 \text{ [s]} * \text{hopping number} = 0.4 \text{ [s]} * 79 \text{ [ch]} = 31.6 \text{ [s*ch]}$;
- The burst width [ms/hop/ch], which is directly measured, refers to the duration on one channel hop.
- The hops per second for all channels: The selected EUT Conf uses a slot type of 5-Tx&1-Rx and a hopping rate of 1600 [ch*hop/s] for all channels. So the final hopping rate for all channels is $1600 / 6 = 266.67 \text{ [ch*hop/s]}$;
- The hops per second on one channel: $266.67 \text{ [ch*hop/s]} / 79 \text{ [ch]} = 3.38 \text{ [hop/s]}$;
- The total hops for all channels within the dwell time calculation duration: $3.38 \text{ [hop/s]} * 31.6 \text{ [s*ch]} = 106.67 \text{ [hop*ch]}$;
- The dwell time for all channels hopping: $106.67 \text{ [hop*ch]} * \text{Burst Width [ms/hop/ch]}$.

EUT Conf.	Burst Width [s/hop/ch]	Total Hops [hop*ch]	Dwell Time [ms]	Verdict
TM1_DH5_Ch39	0.00287	106.67	0.309	Pass
TM2_2DH5_Ch39	0.00288	106.67	0.309	Pass
TM3_3DH5_Ch39	0.00288	106.67	0.309	Pass

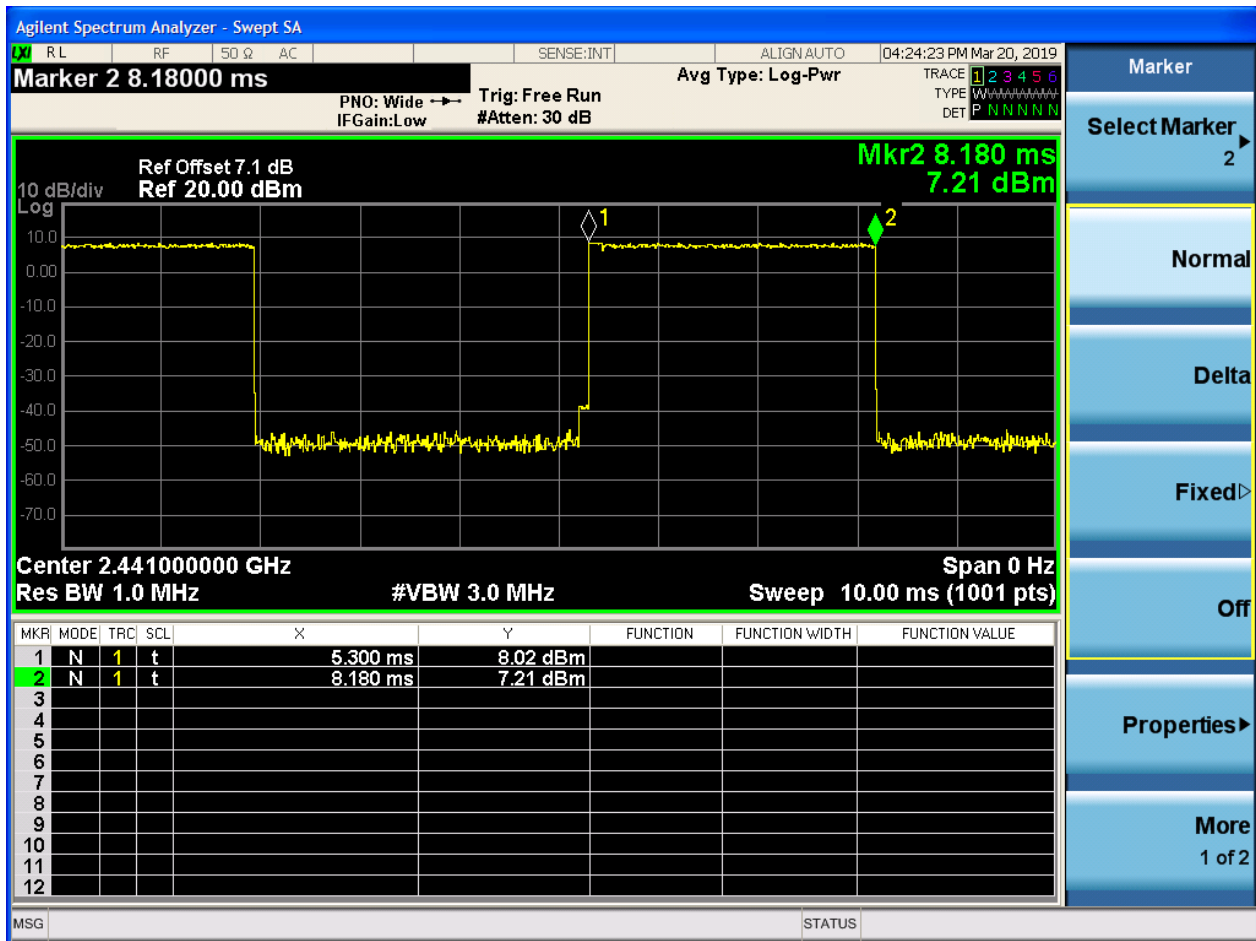
2 Test Plot

NOTE: The test plots are only for Burst Width measurements.

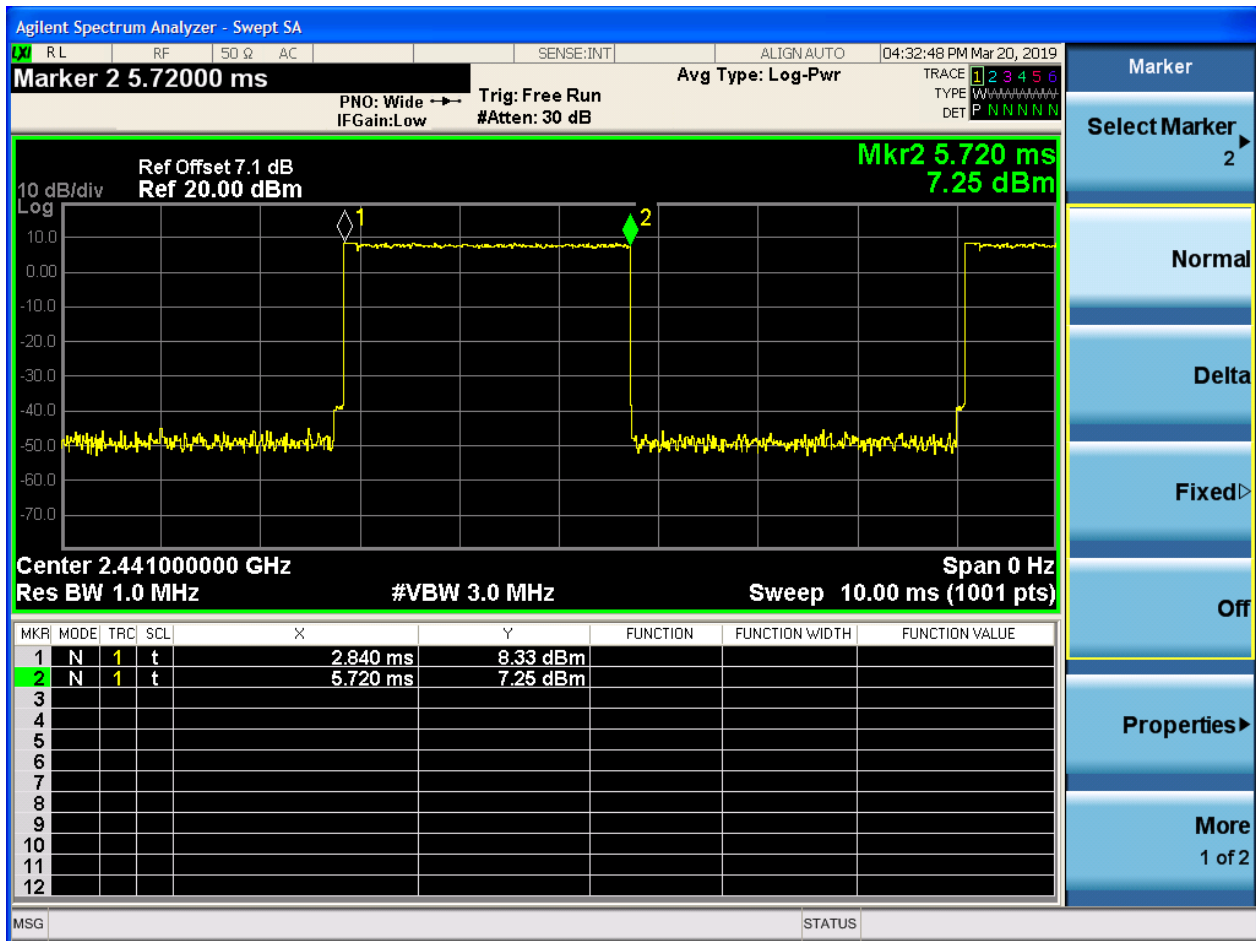
2.1 TM1_DH5_Ch39



2.2 TM2_2DH5_Ch39



2.3 TM3_3DH5_Ch39



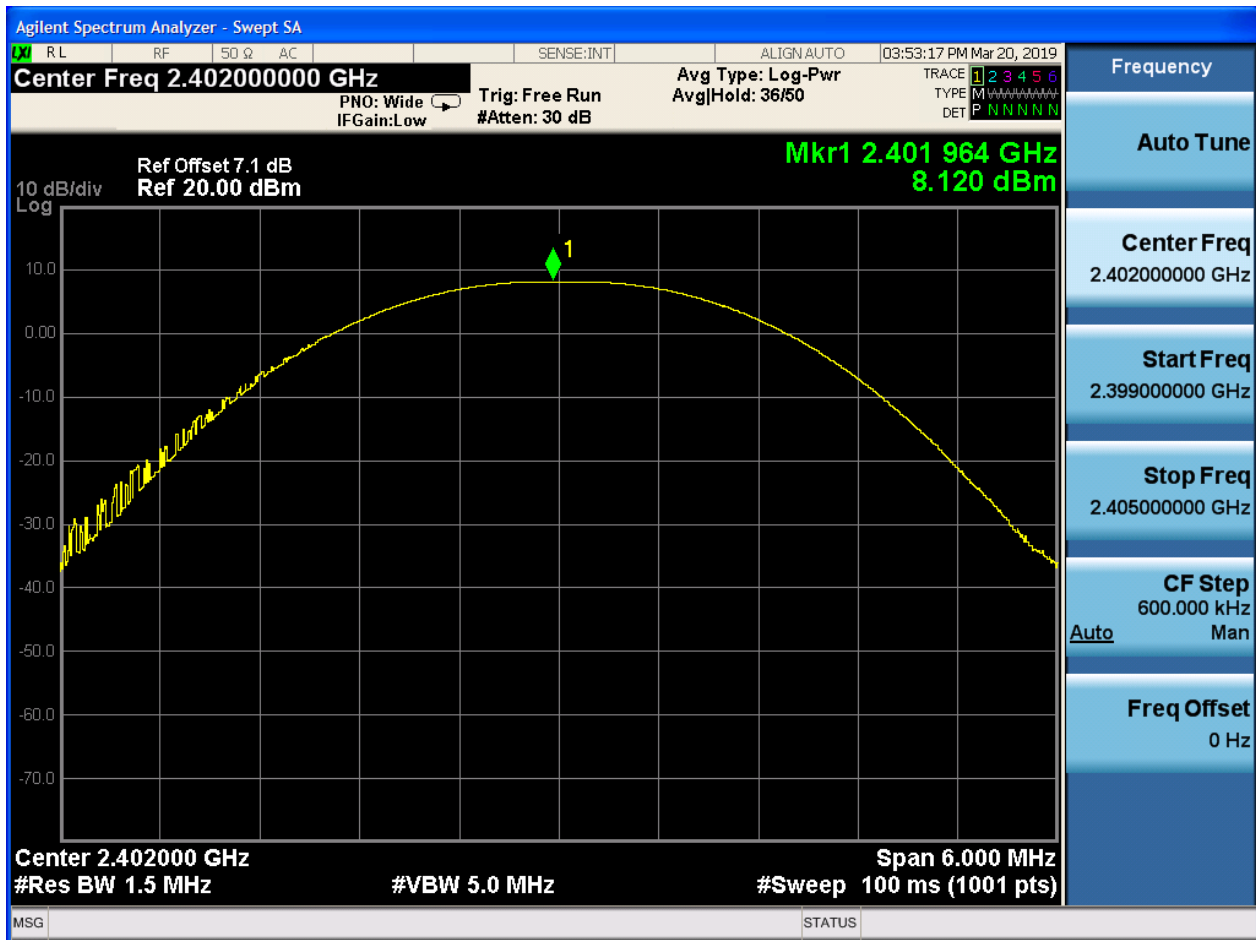
Appendix E: Maximum Peak Conducted Output Power

1 Result Table

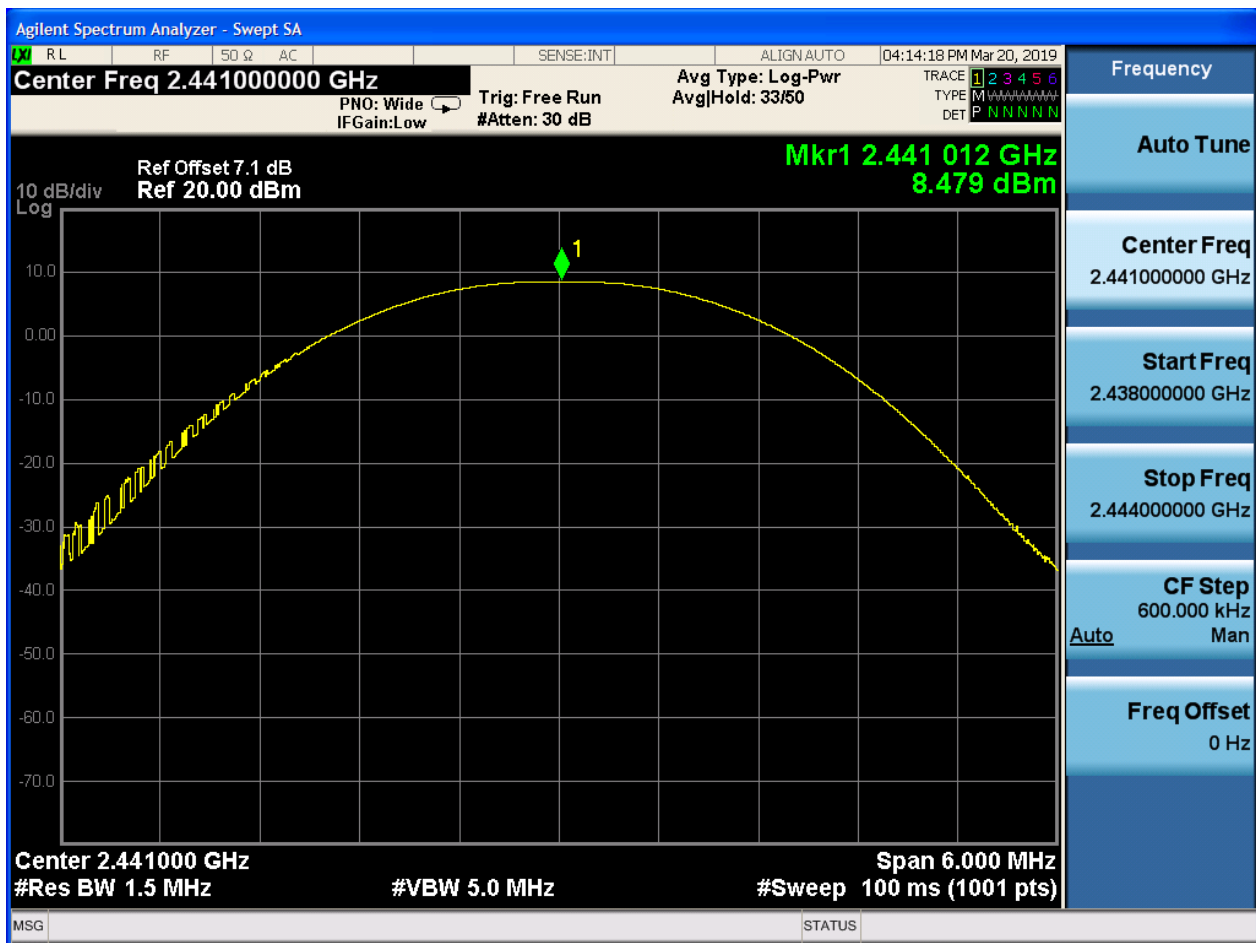
EUT Conf.	Max. Peak Power [dBm]	Limit[dBm]	Verdict
TM1_DH5_Ch0	8.12	30	Pass
TM1_DH5_Ch39	8.479	30	Pass
TM1_DH5_Ch78	9.961	30	Pass
TM2_2DH5_Ch0	8.51	30	Pass
TM2_2DH5_Ch39	8.814	30	Pass
TM2_2DH5_Ch78	10.178	30	Pass
TM3_3DH5_Ch0	8.547	30	Pass
TM3_3DH5_Ch39	8.831	30	Pass
TM3_3DH5_Ch78	10.213	30	Pass

2 Test Plot

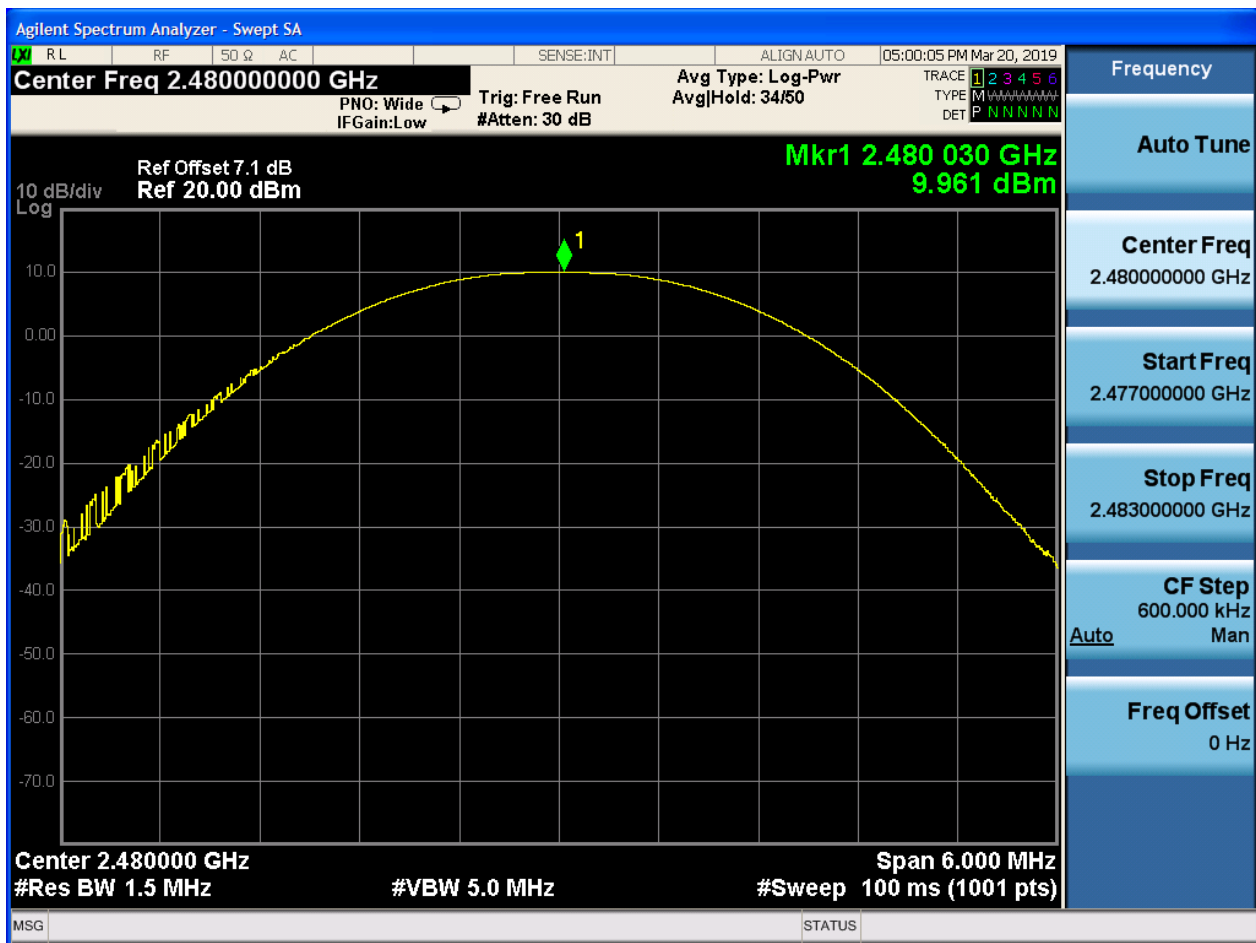
2.1 TM1_DH5_Ch0



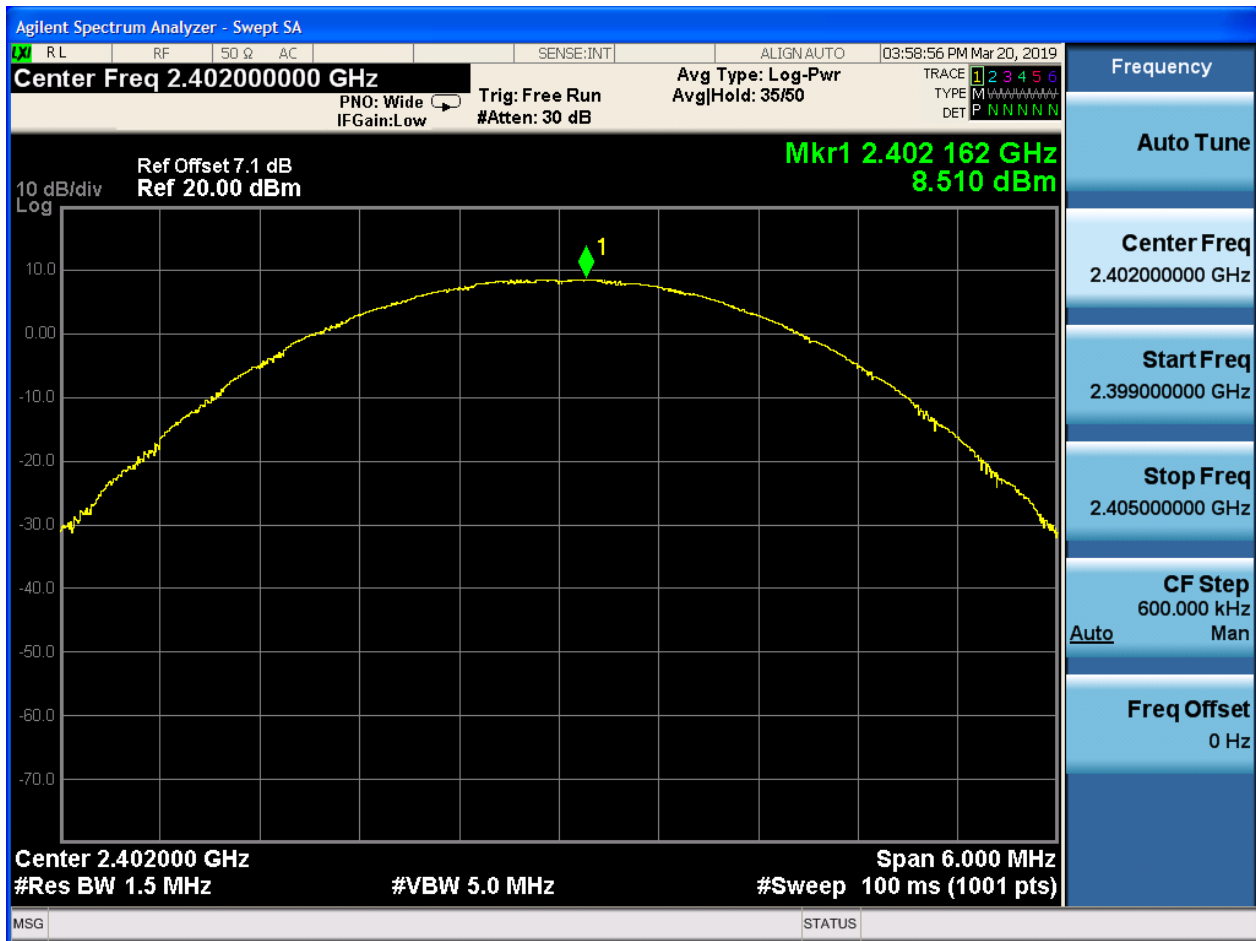
2.2 TM1_DH5_Ch39



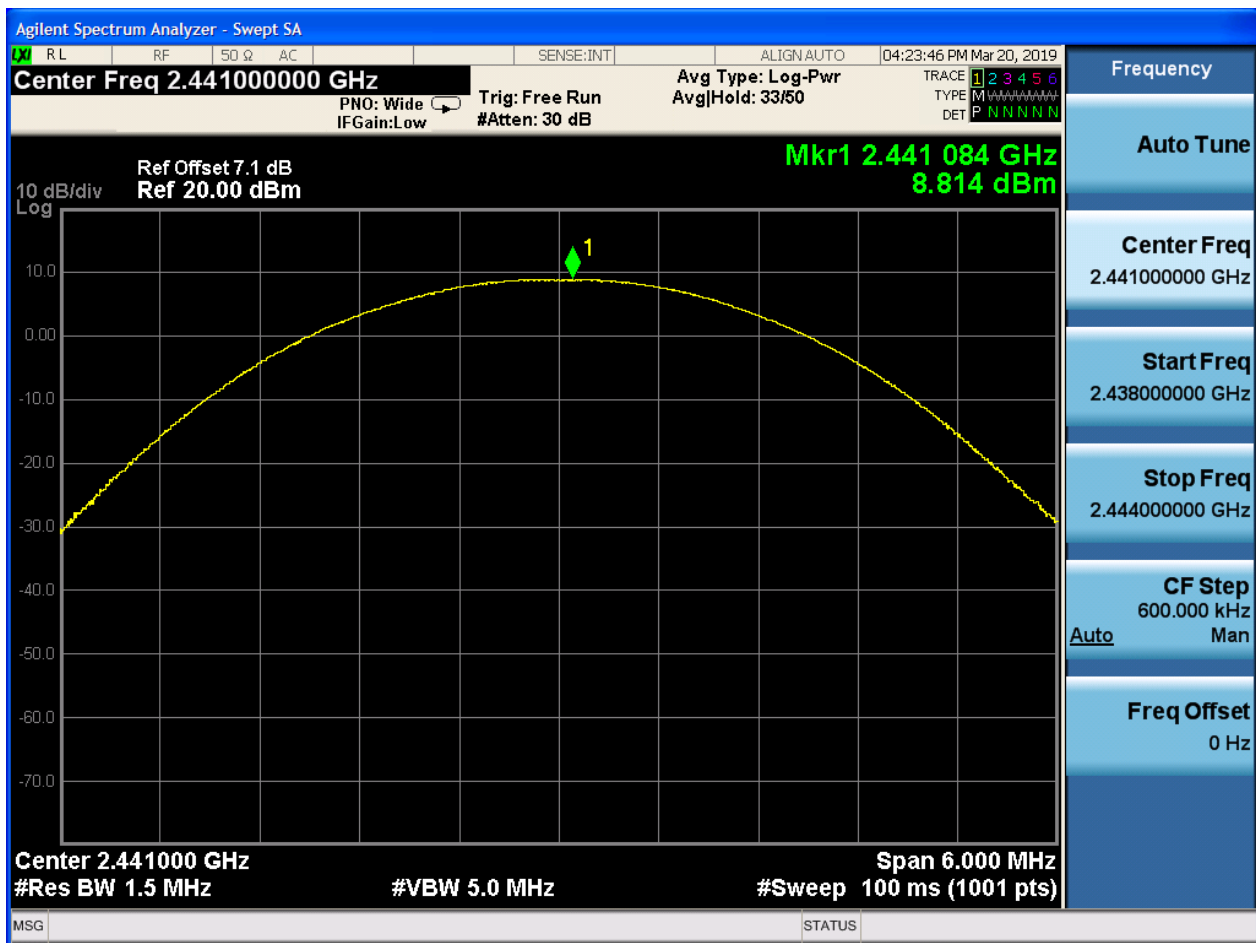
2.3 TM1_DH5_Ch78



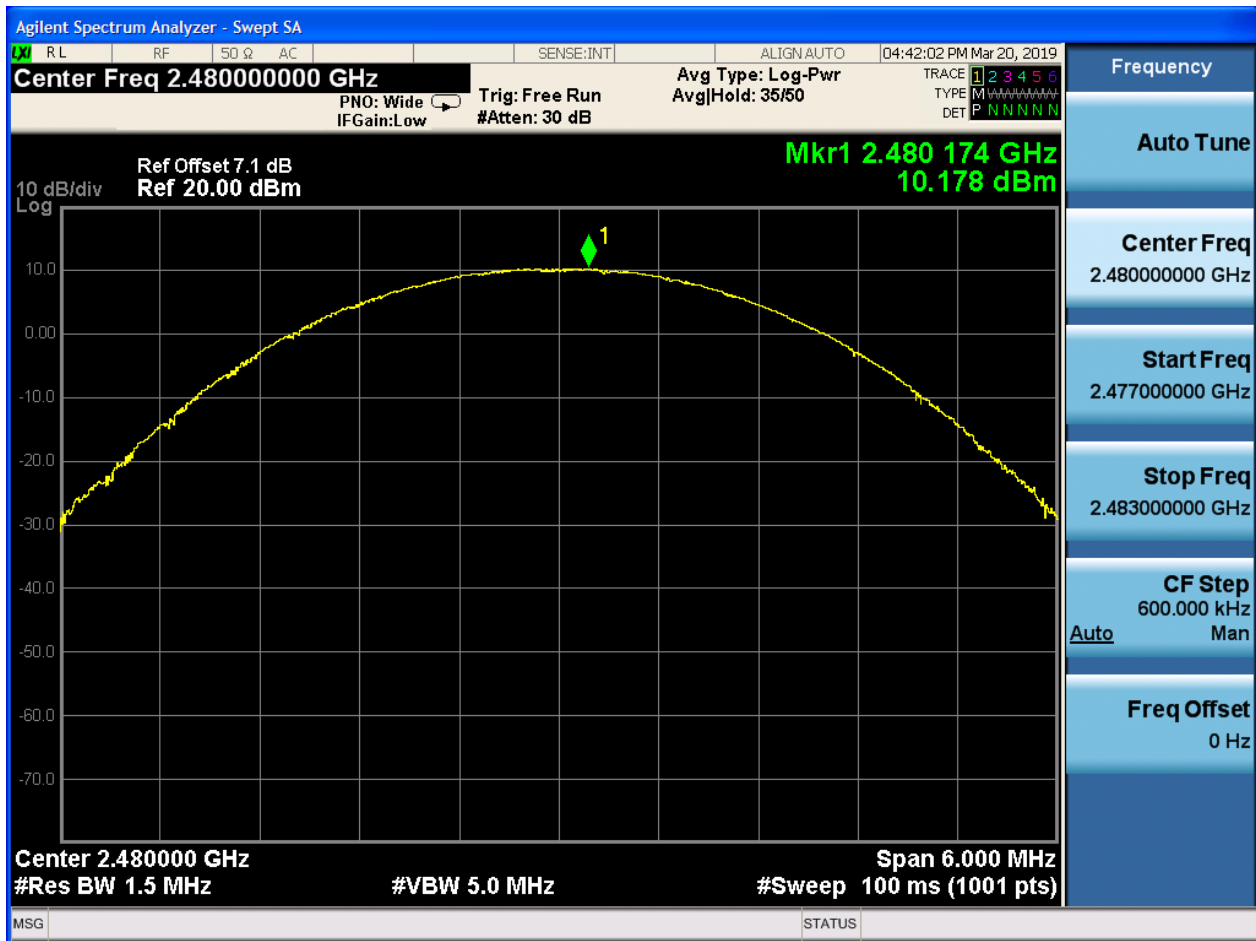
2.4 TM2_2DH5_Ch0



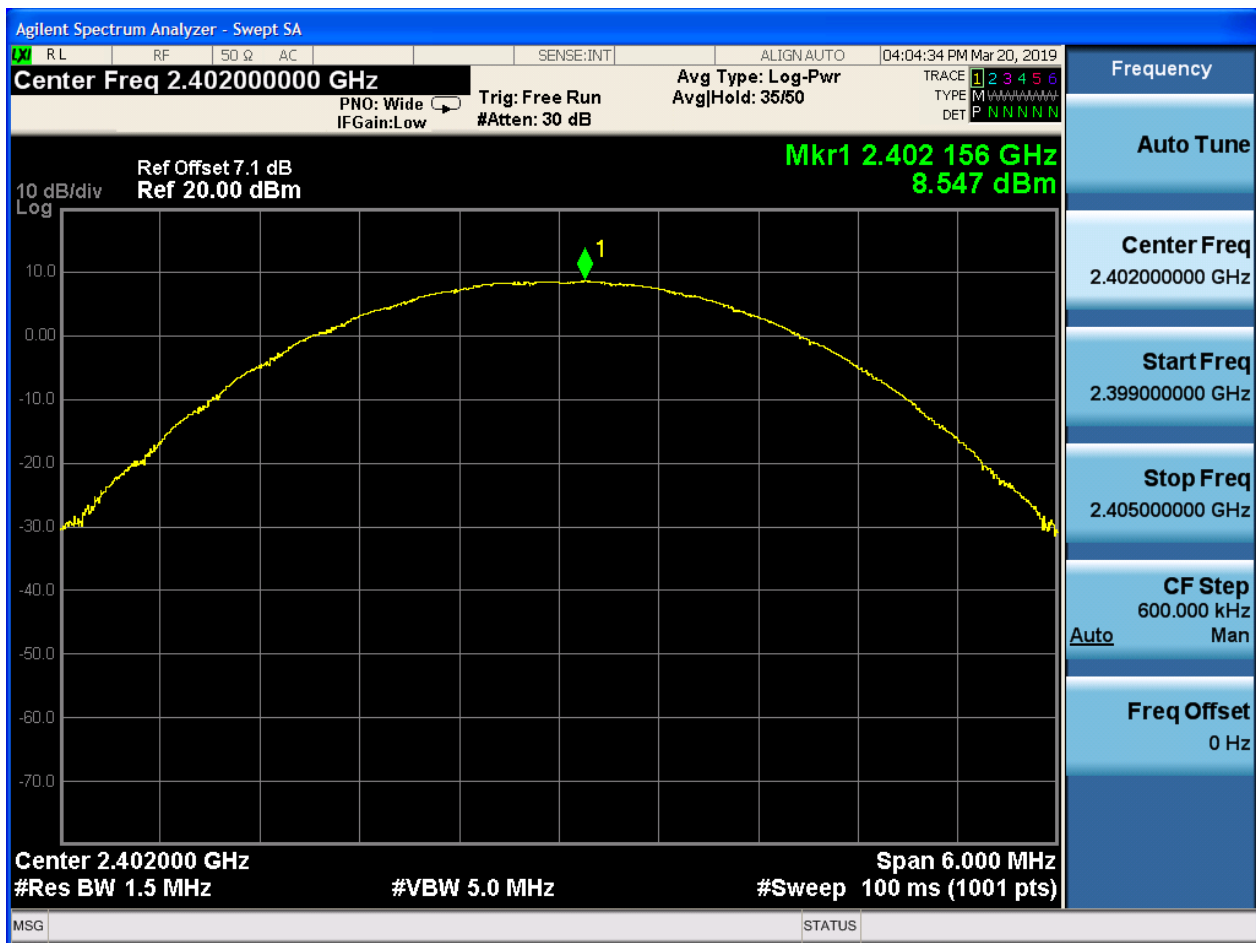
2.5 TM2_2DH5_Ch39



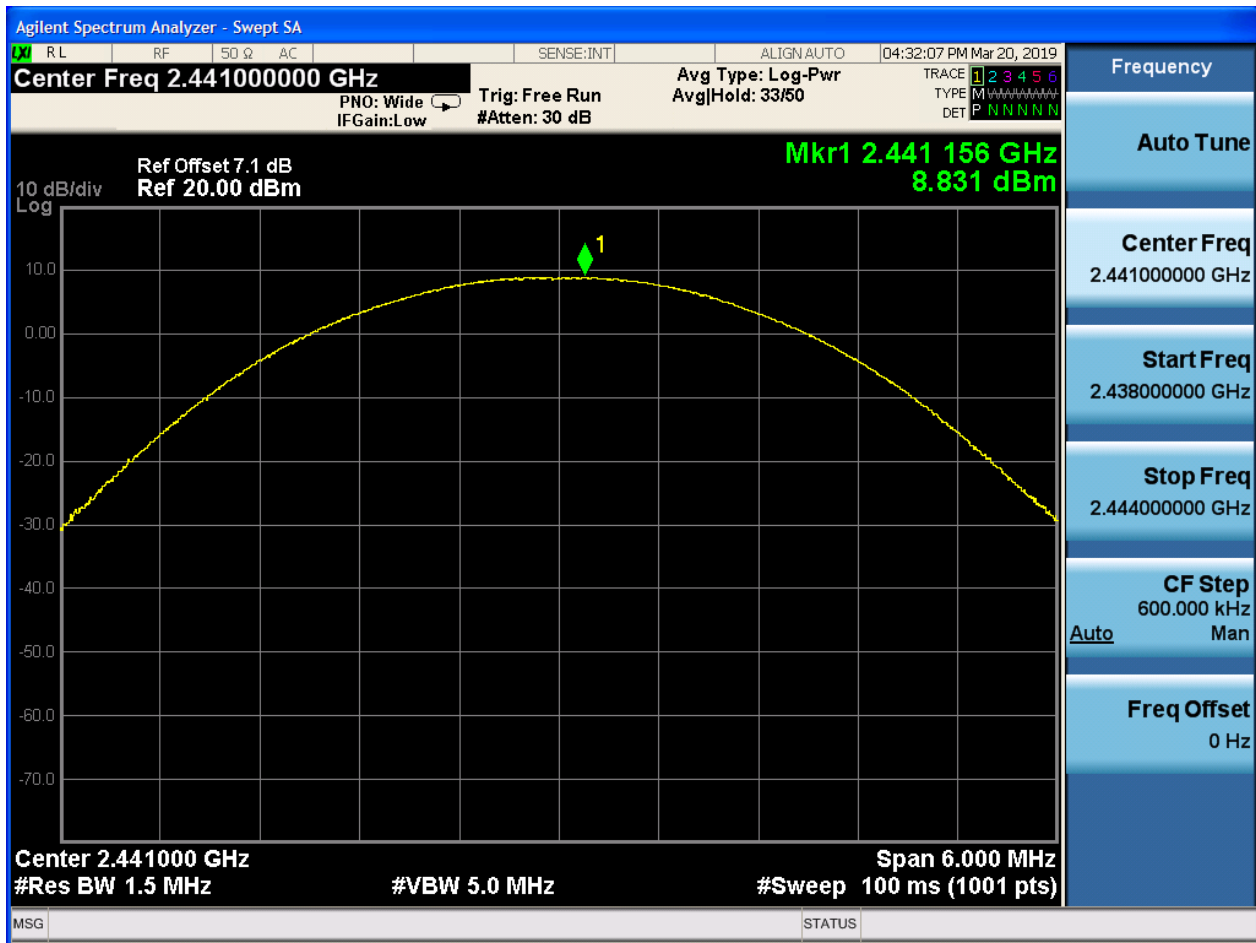
2.6 TM2_2DH5_Ch78



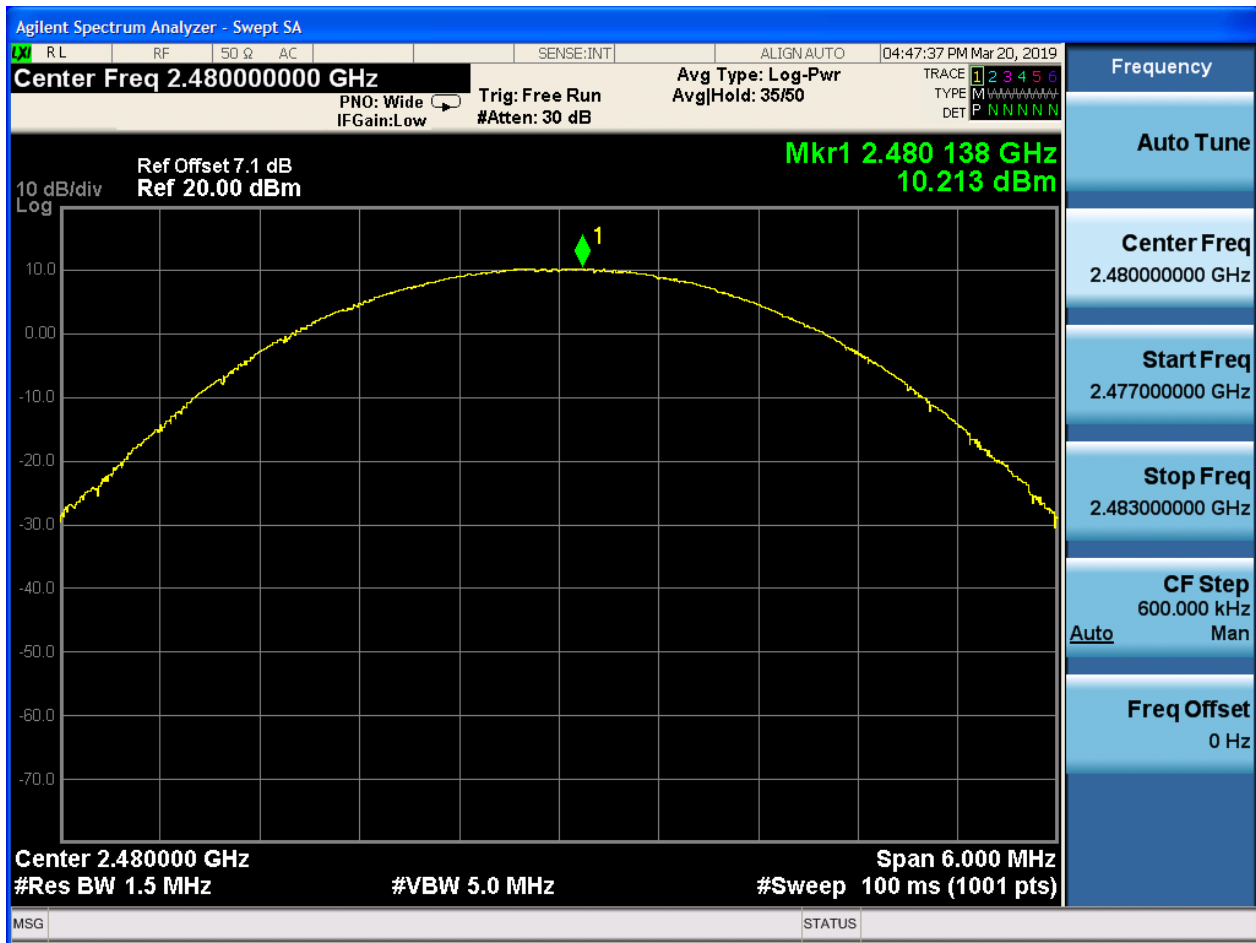
2.7 TM3_3DH5_Ch0



2.8 TM3_3DH5_Ch39



2.9 TM3_3DH5_Ch78



Appendix F: Band edge spurious emission

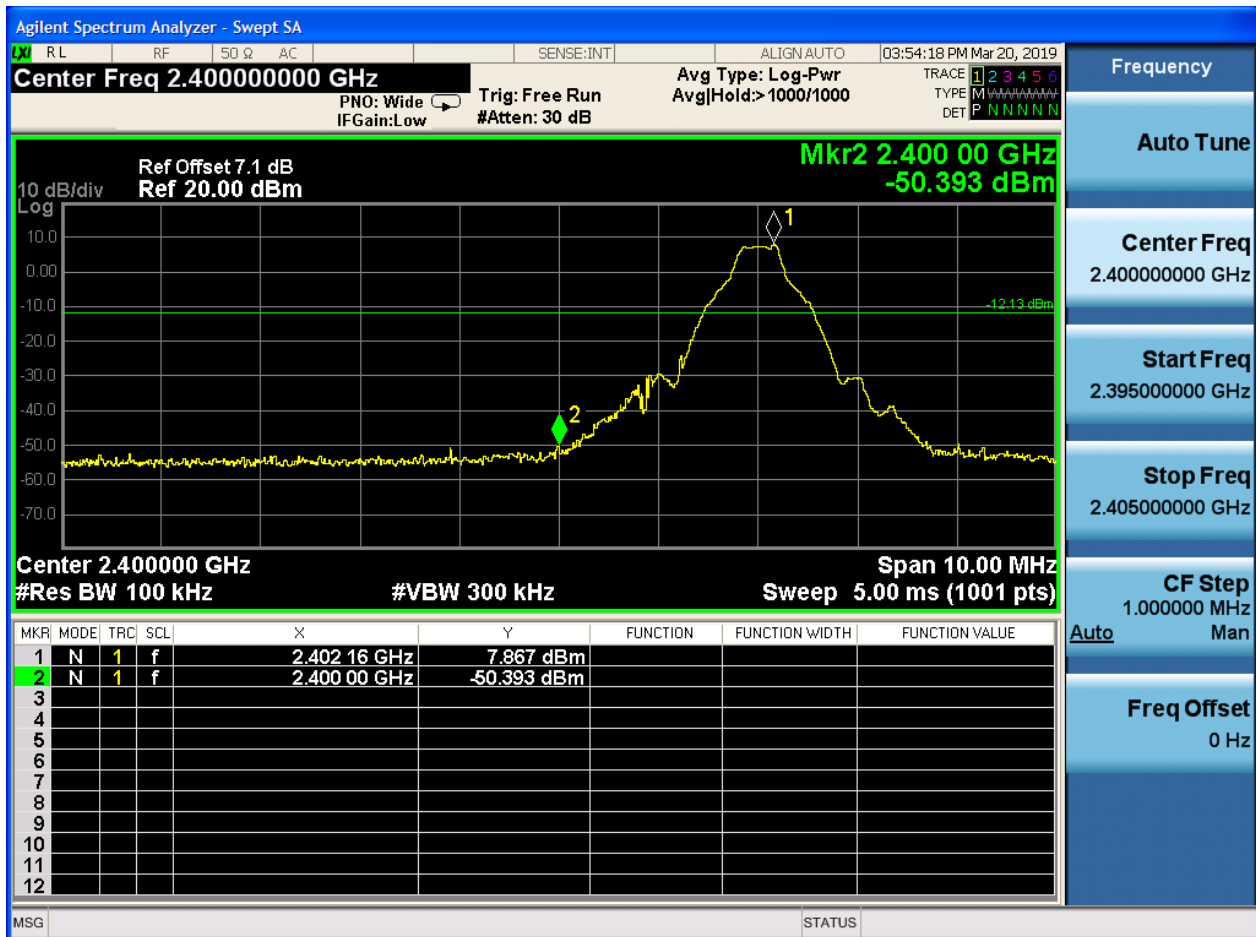
1 Result Table

EUT Conf.	Channel No.	Carrier Frequency [MHz]	Max. Spurious Level [dBm]	Frequency Hopping	Carrier Power [dBm]	Limit [dBm/100 kHz]	Result
TM1_DH5_Ch0	0	2402	-50.393	Off	7.867	-12.133	Pass
	-	-	-53.832	On	7.462	-12.538	Pass
TM1_DH5_Ch78	78	2480	-54.424	Off	9.604	-10.396	Pass
	-	-	-54.232	On	9.383	-10.617	Pass
TM2_2DH_5_Ch0	0	2402	-46.496	Off	7.596	-12.404	Pass
	-	-	-55.524	On	3.379	-16.621	Pass
TM2_2DH_5_Ch78	78	2480	-53.739	Off	9.433	-10.567	Pass
	-	-	-55.459	On	4.642	-15.358	Pass
TM3_3DH_5_Ch0	0	2402	-47.667	Off	7.69	-12.31	Pass
	-	-	-47.256	On	6.996	-13.004	Pass
TM3_3DH_5_Ch78	78	2480	-54.65	Off	9.495	-10.505	Pass
	-	-	-54.486	On	4.48	-15.52	Pass

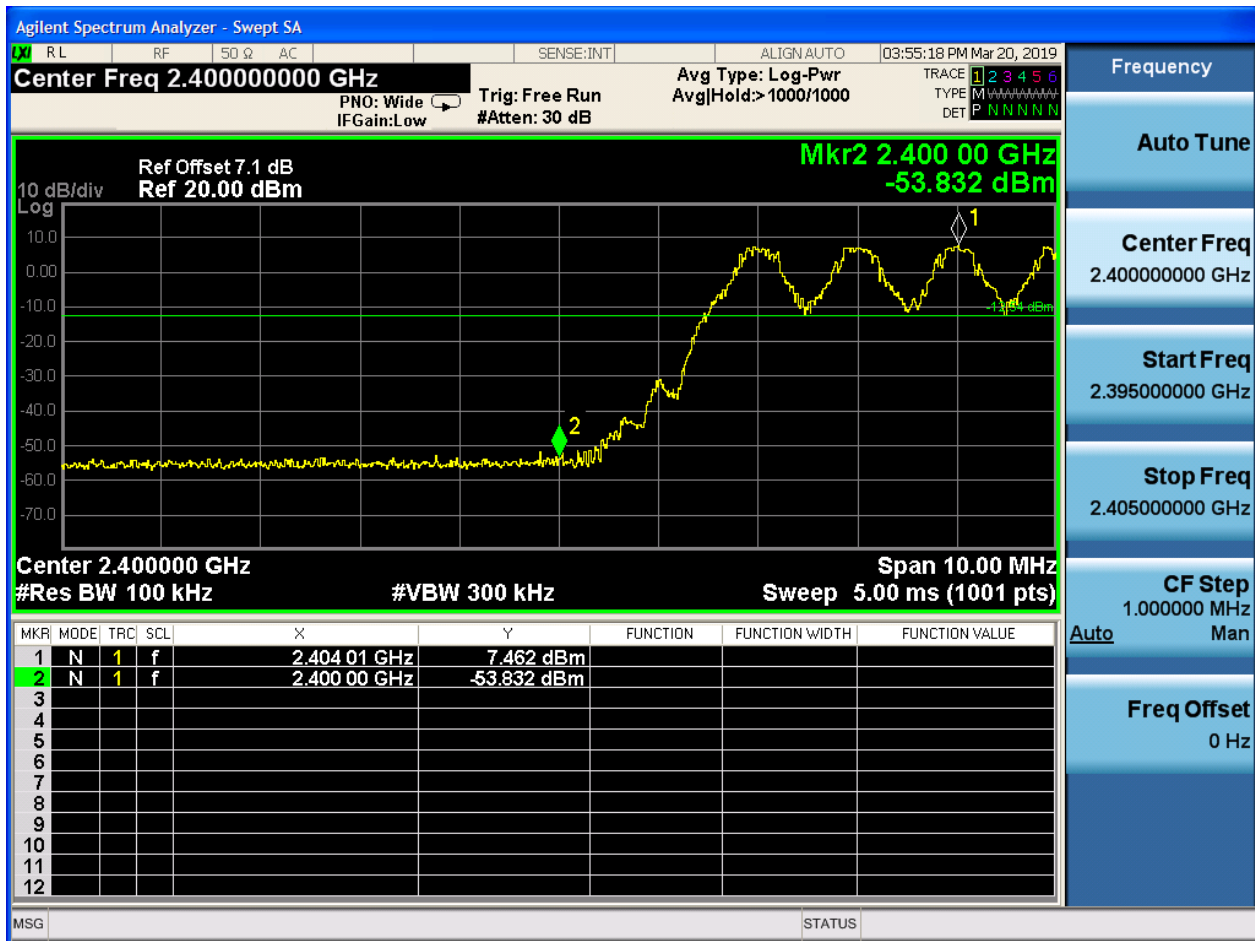
2 Test Plot

2.1 TM1_DH5_Ch0

No hopping

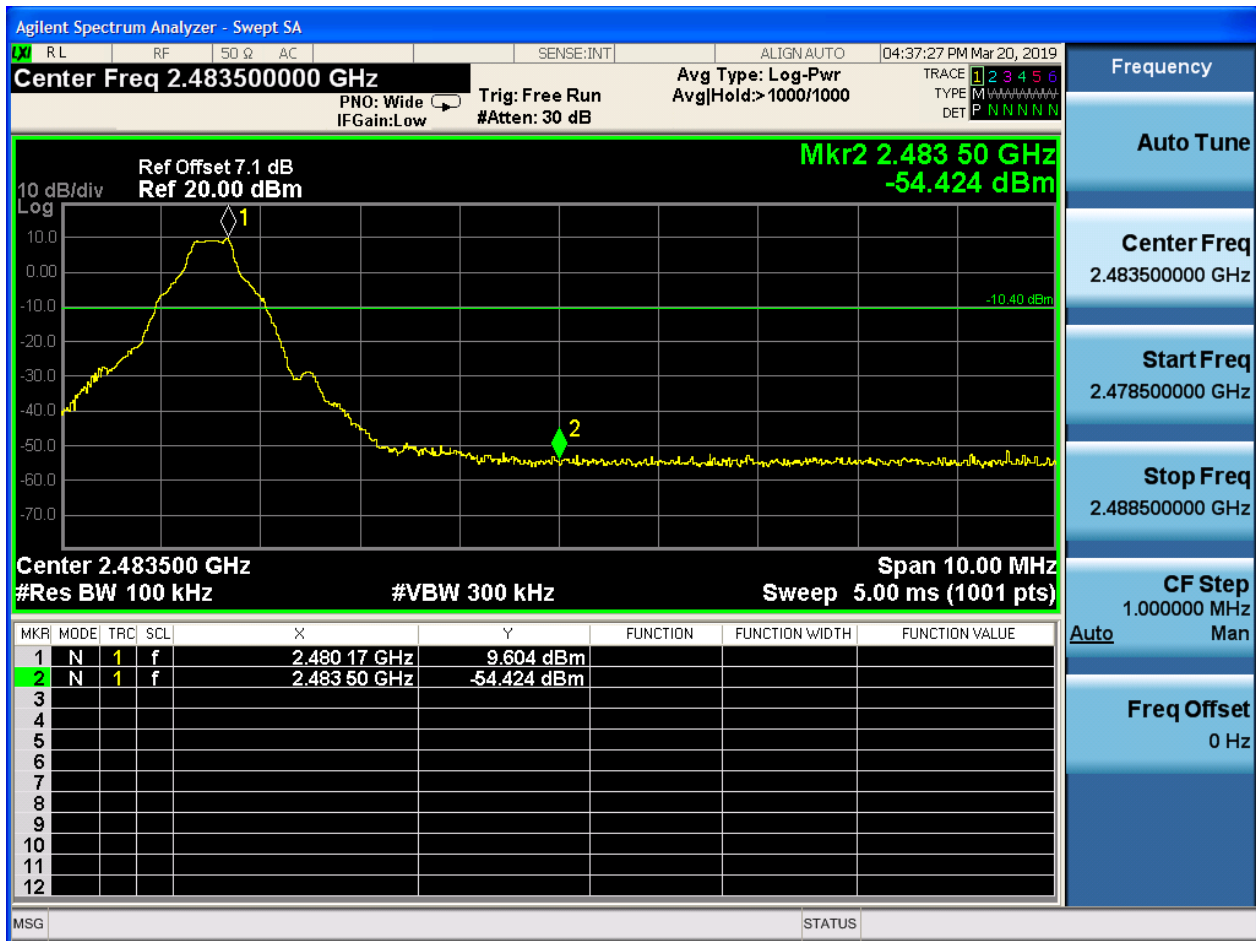


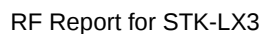
With hopping



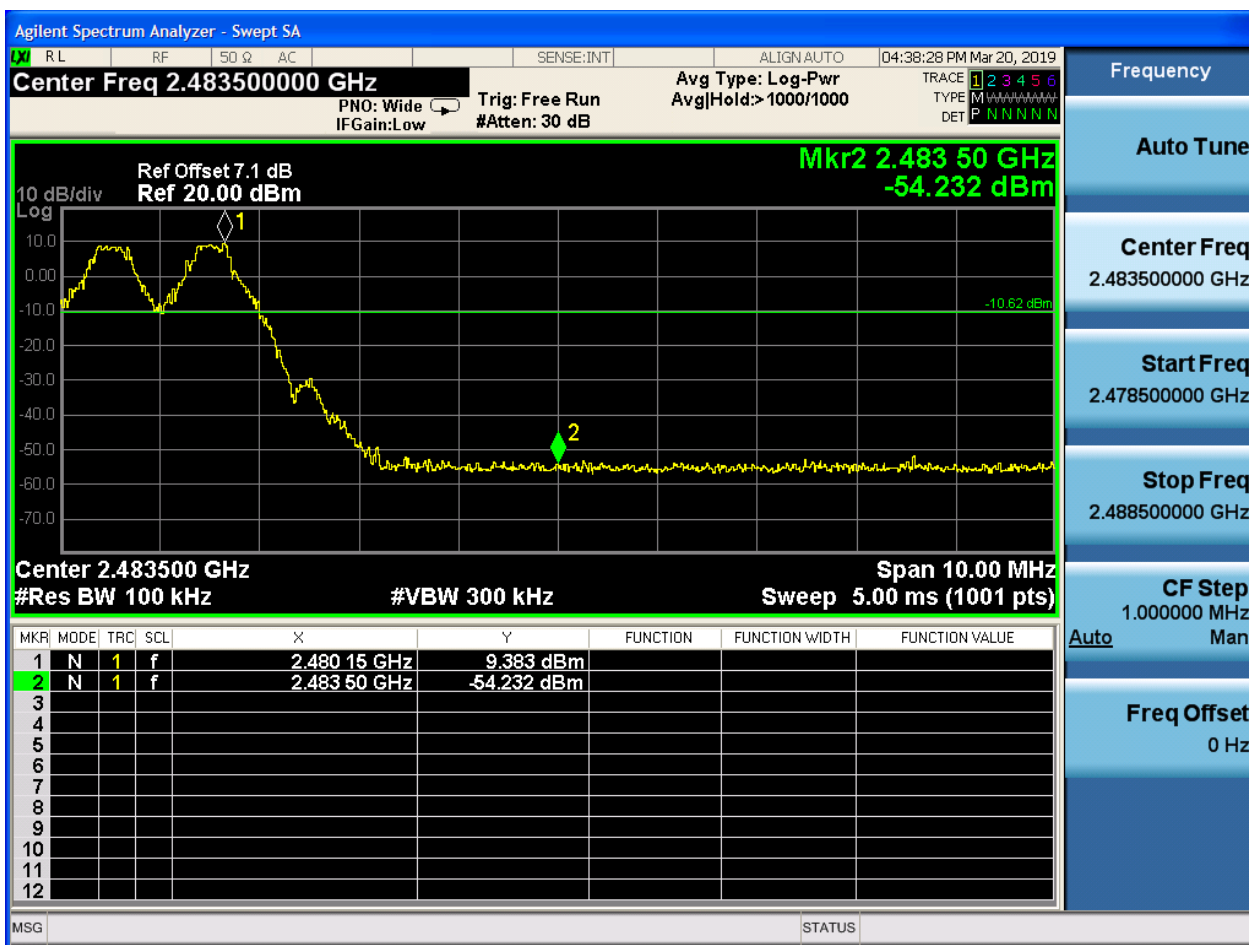
2.2 TM1_DH5_Ch78

No hopping



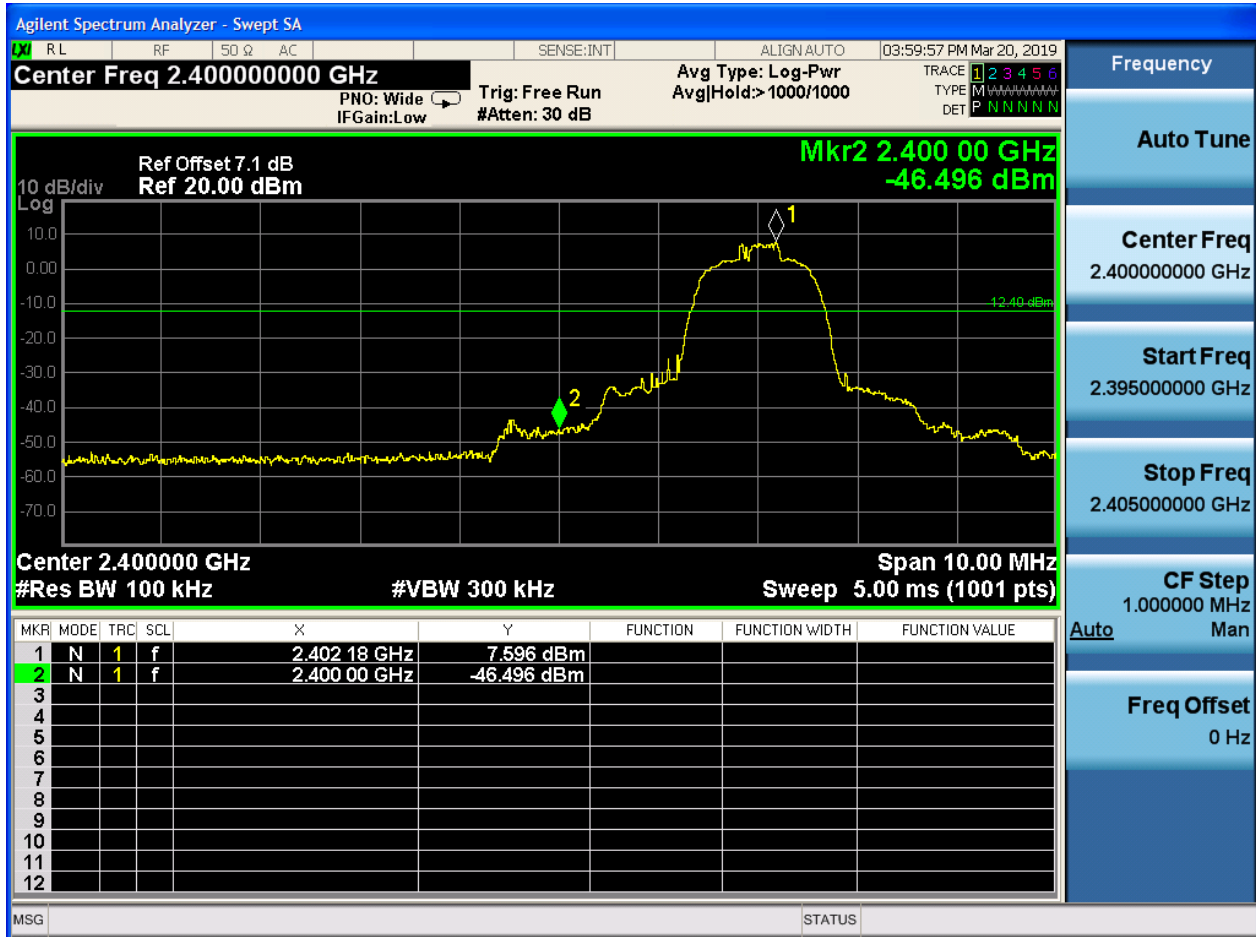


With hopping

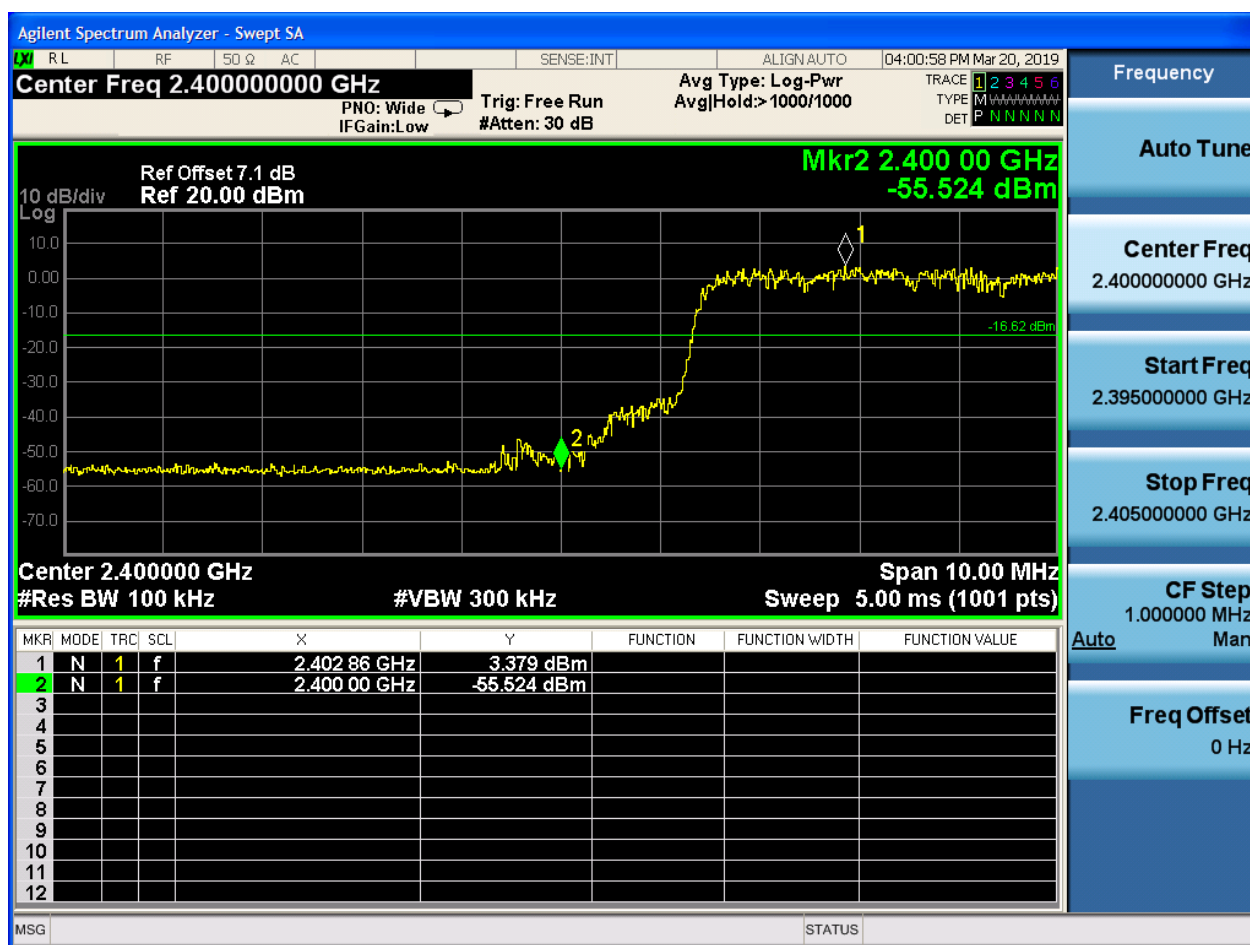


2.3 TM2_2DH5_Ch0

No hopping

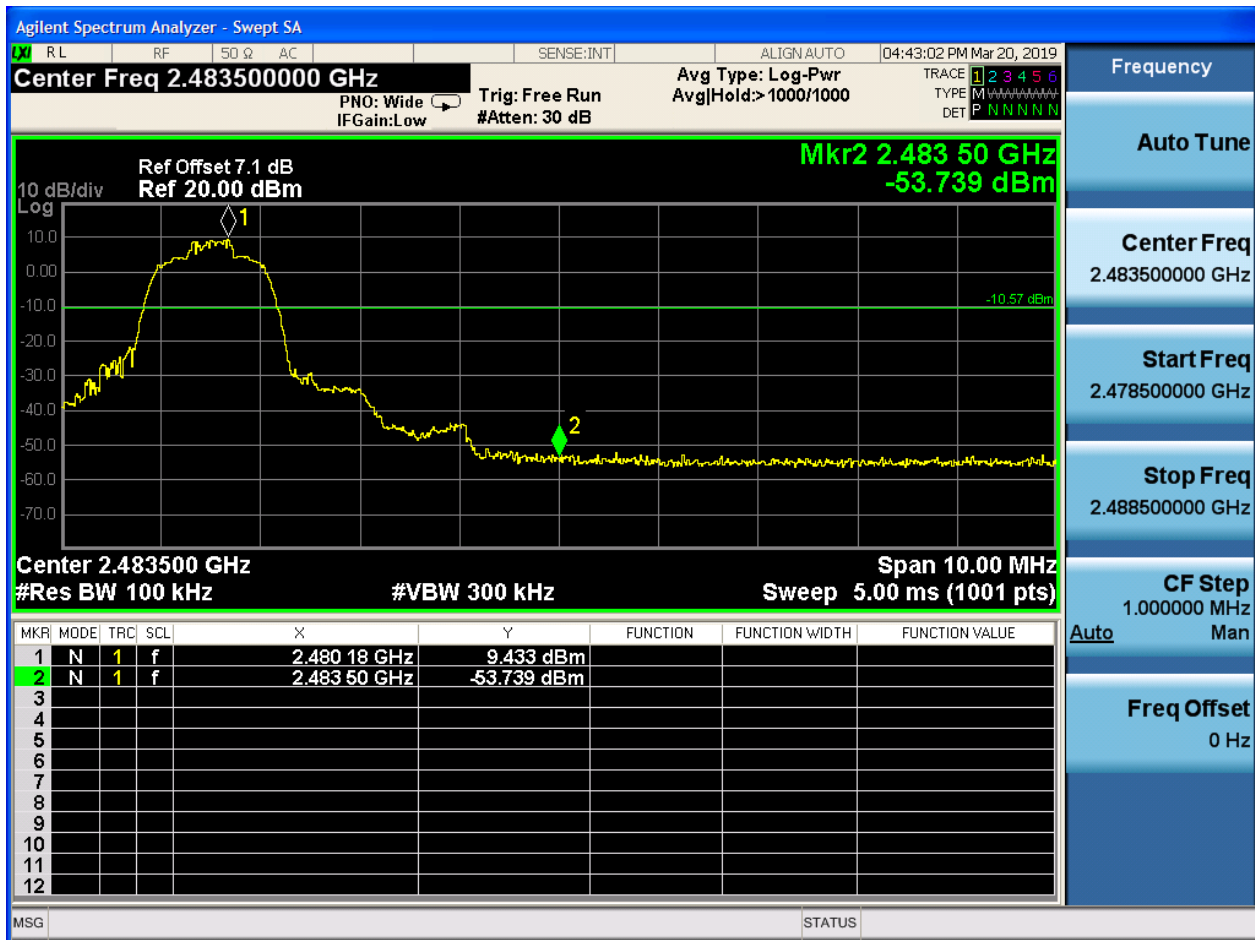


With hopping

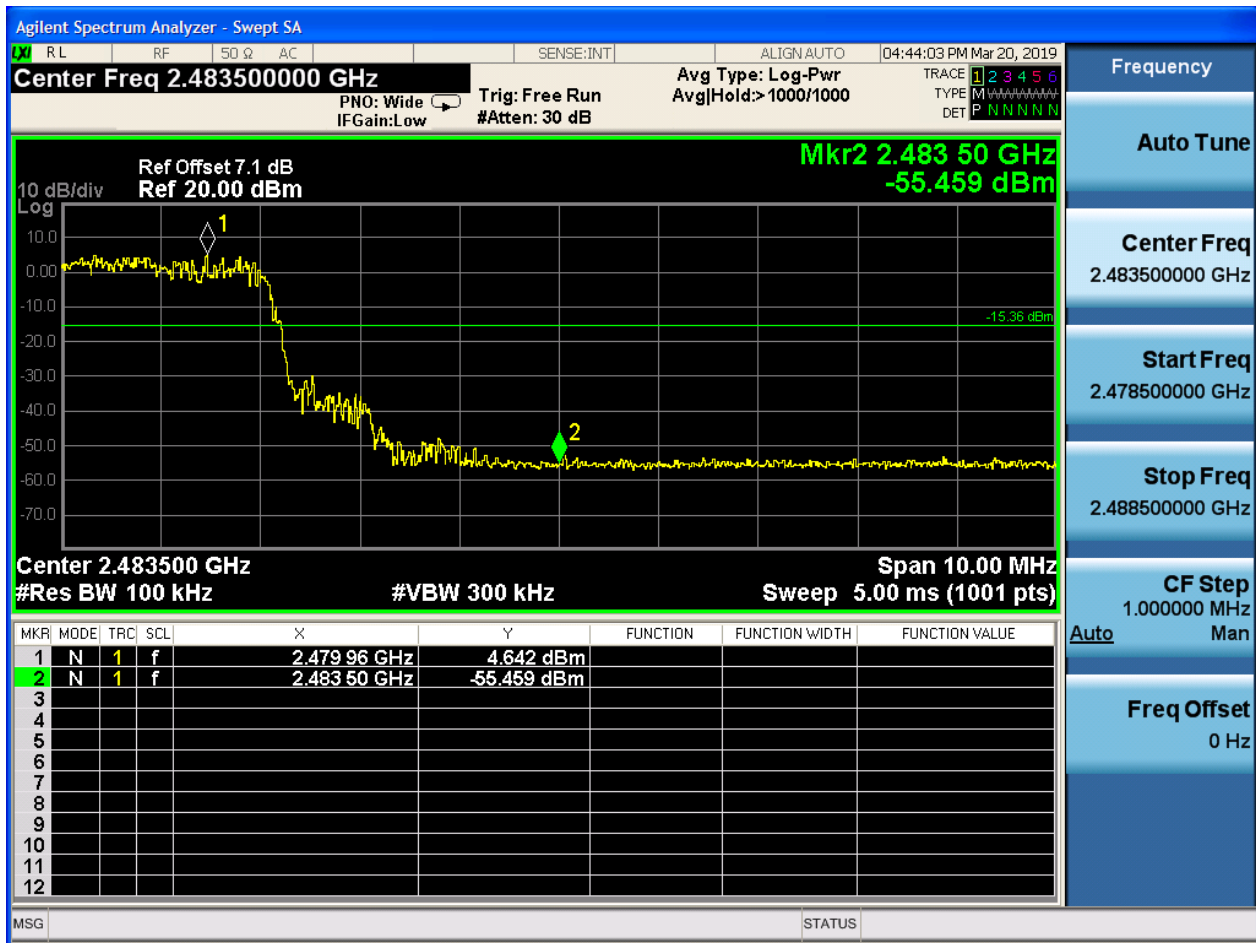


2.4 TM2_2DH5_Ch78

No hopping

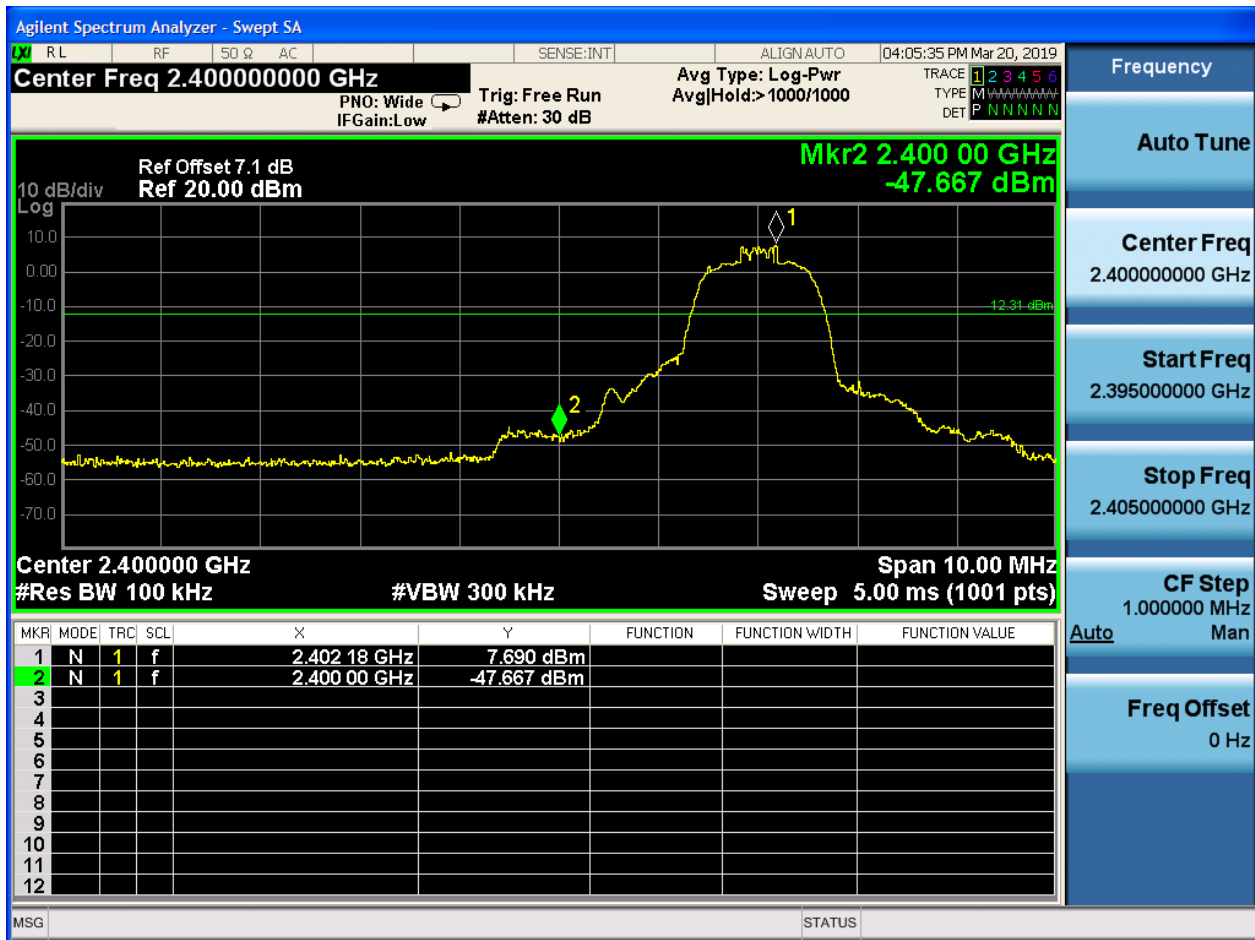


With hopping

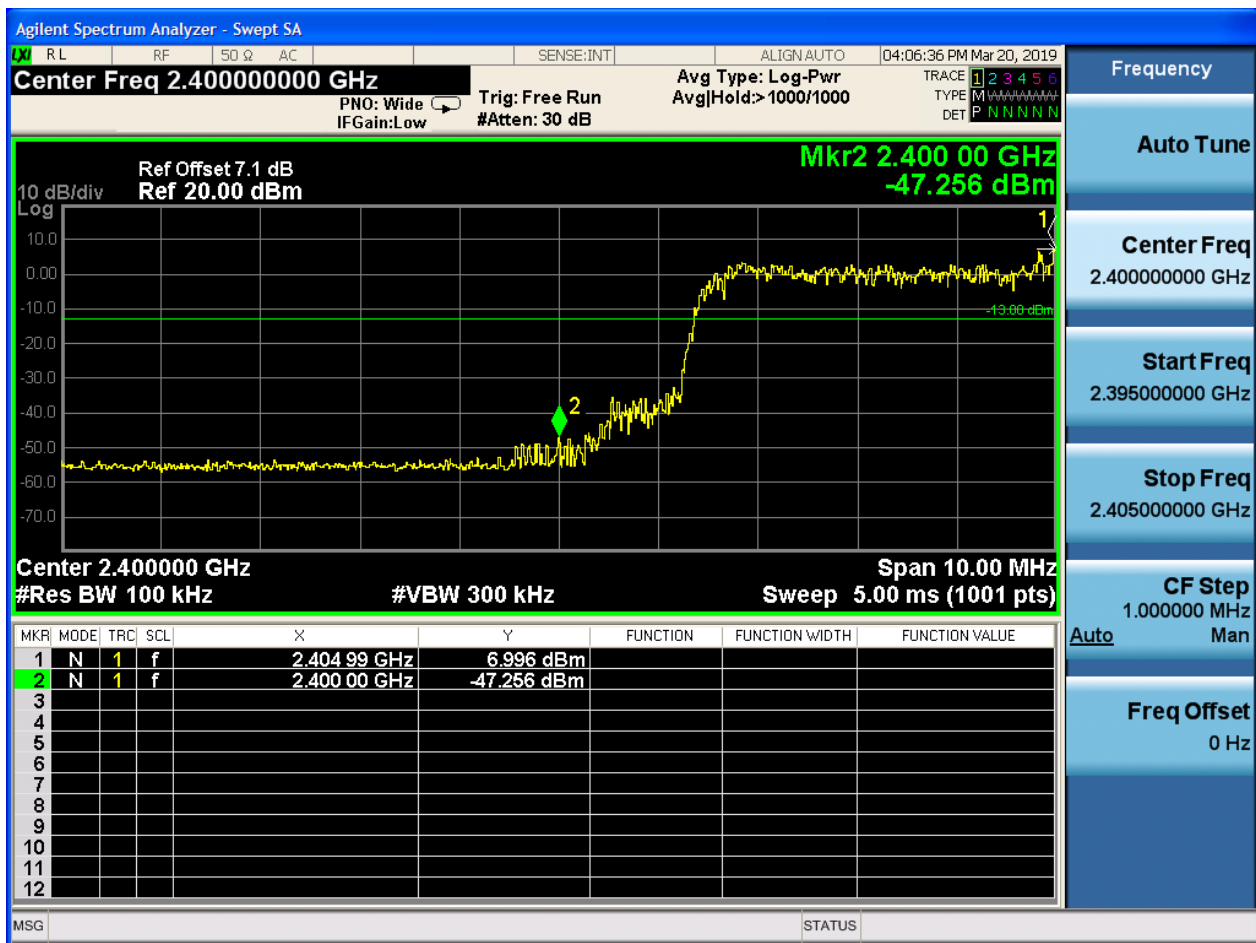


2.5 TM3_3DH5_Ch0

No hopping

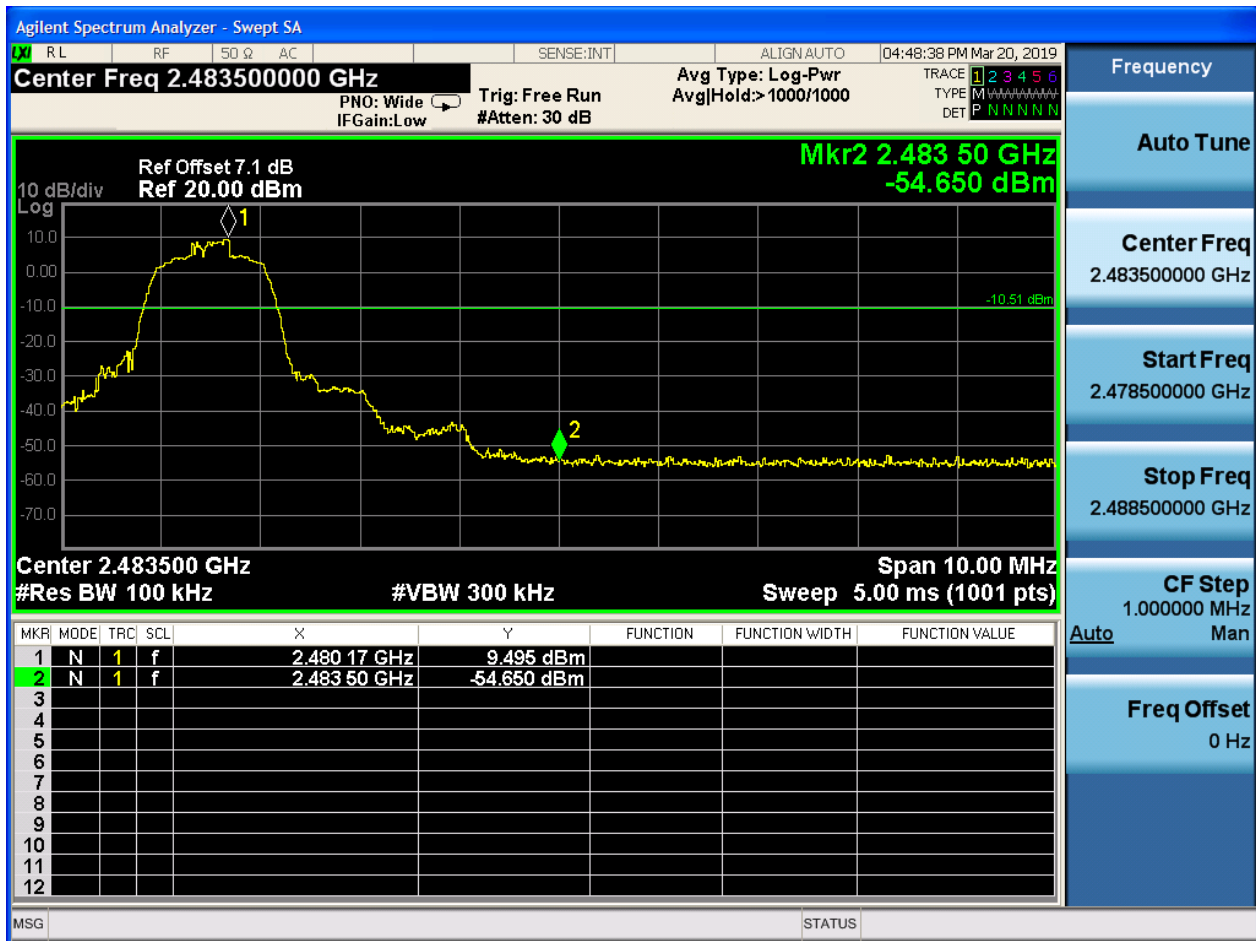


With hopping



2.6 TM3_3DH5_Ch78

No hopping



With hopping



Appendix G: Conducted RF Spurious Emission

1 Result Table

In this Appendix, the “Pref” refers to the peak power level in any 100 kHz bandwidth within the fundamental emission which is used as the reference level, 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.

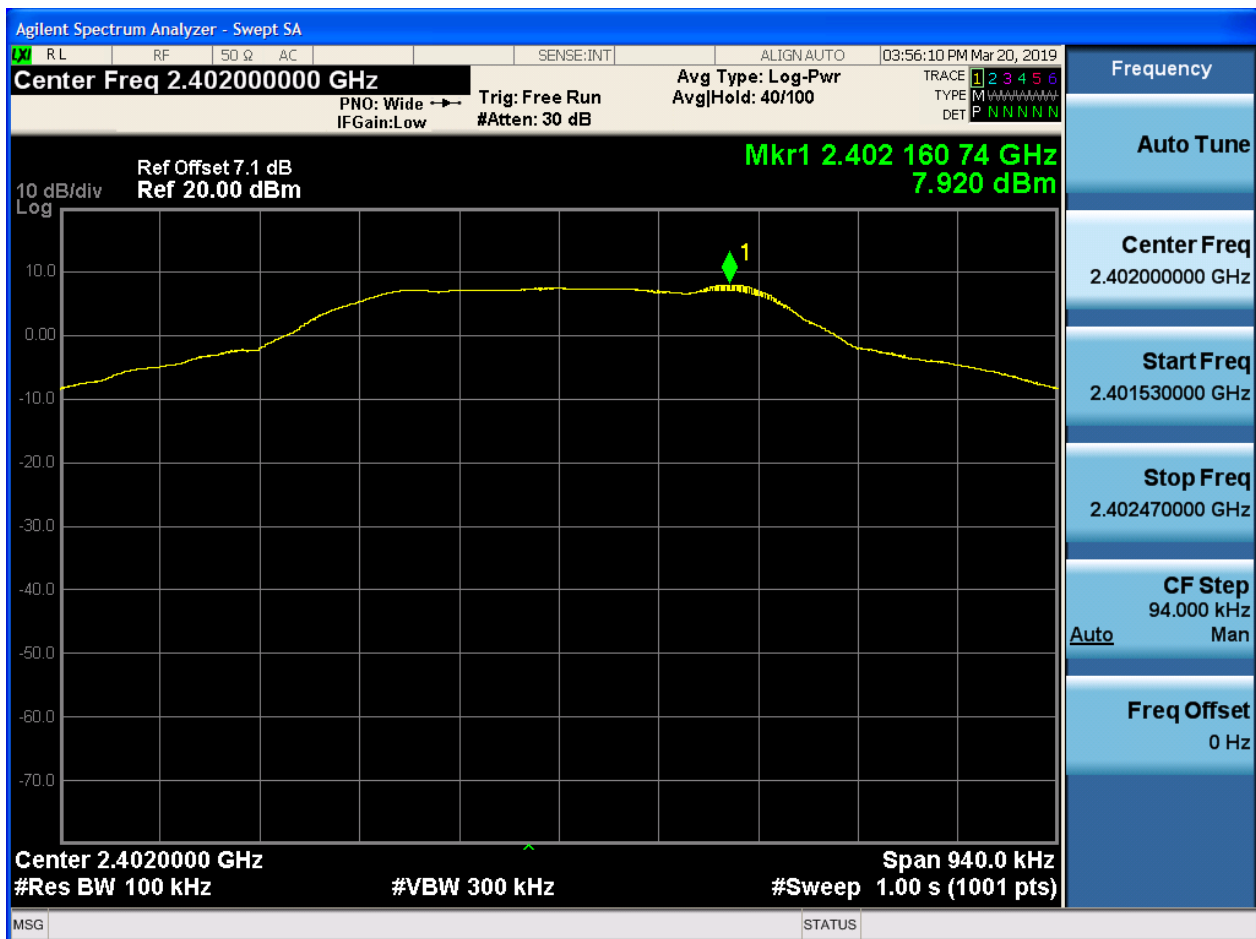
In the result table, the “< Limit” denotes that “The Puw [dBm] is less than Pref [dBm] - 20 [dB], see test plots for detailed”.

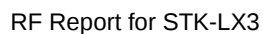
EUT Conf.	Pref [dBm/100 kHz]	Puw [dBm/100 kHz]	Verdict
TM1_DH5_Ch0	7.92	< Limit	Pass
TM1_DH5_Ch39	8.246	< Limit	Pass
TM1_DH5_Ch78	9.622	< Limit	Pass
TM2_2DH5_Ch0	7.978	< Limit	Pass
TM2_2DH5_Ch39	8.259	< Limit	Pass
TM2_2DH5_Ch78	9.639	< Limit	Pass
TM3_3DH5_Ch0	7.99	< Limit	Pass
TM3_3DH5_Ch39	8.278	< Limit	Pass
TM3_3DH5_Ch78	9.665	< Limit	Pass

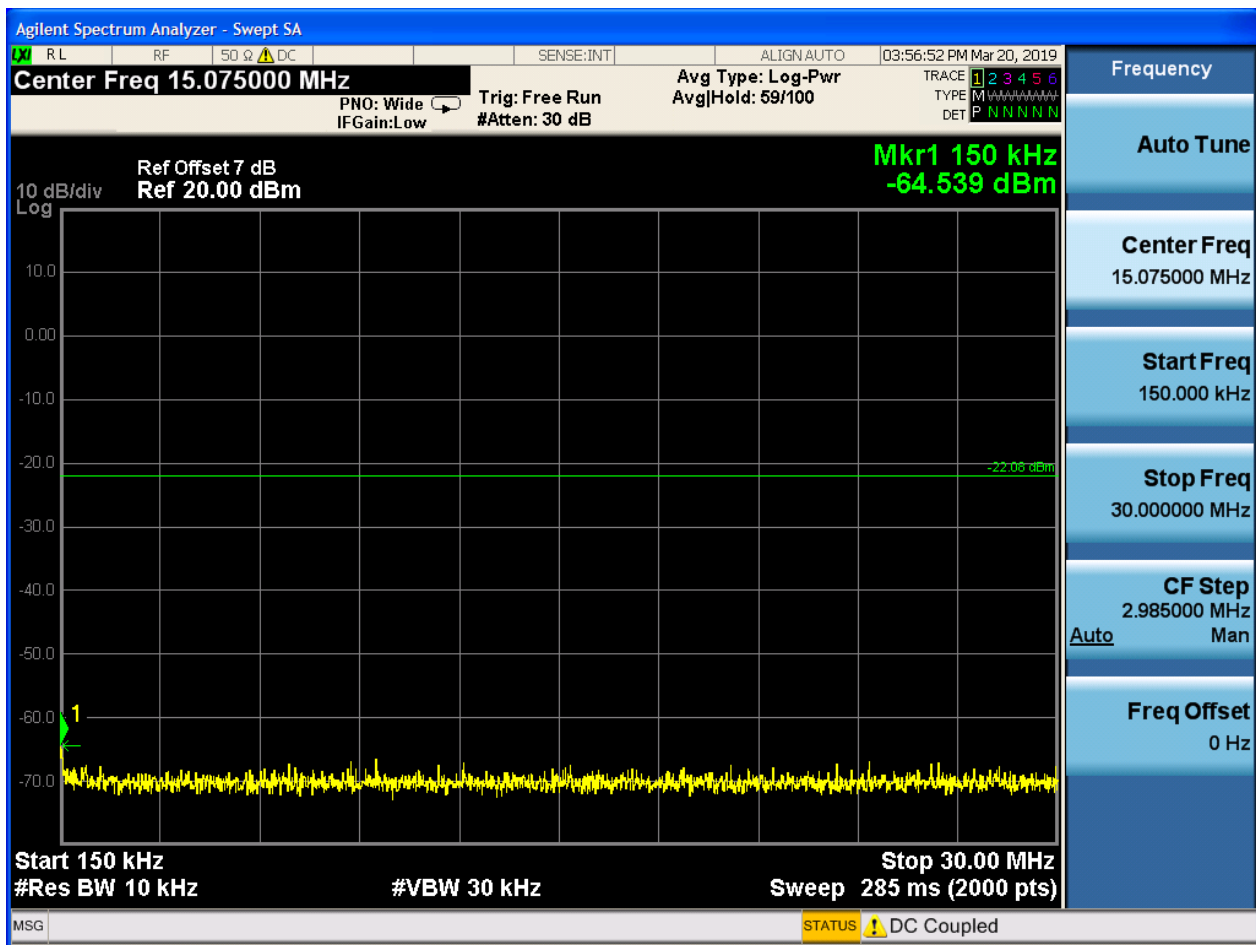
2 Test Plot

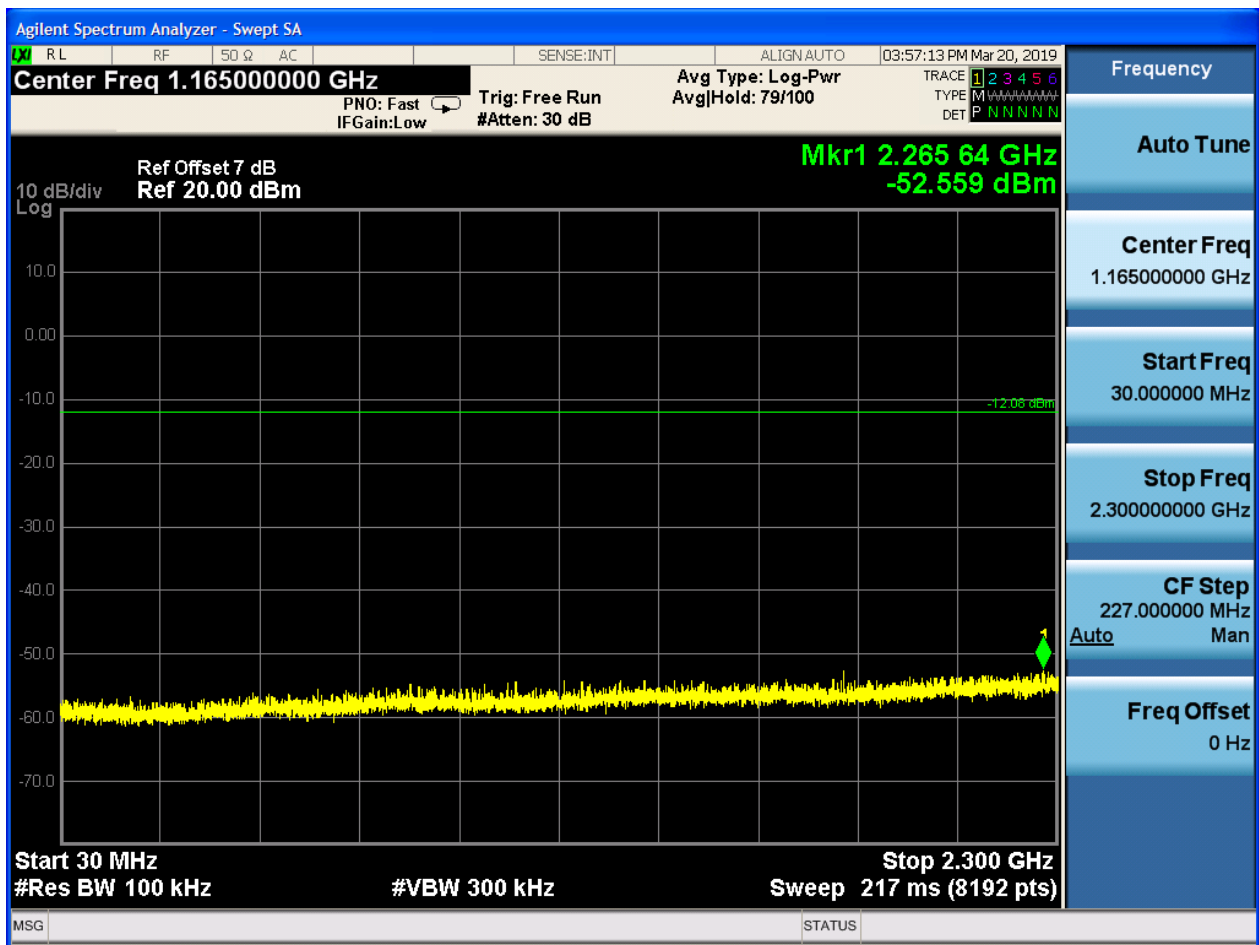
2.1 TM1_DH5_Ch0

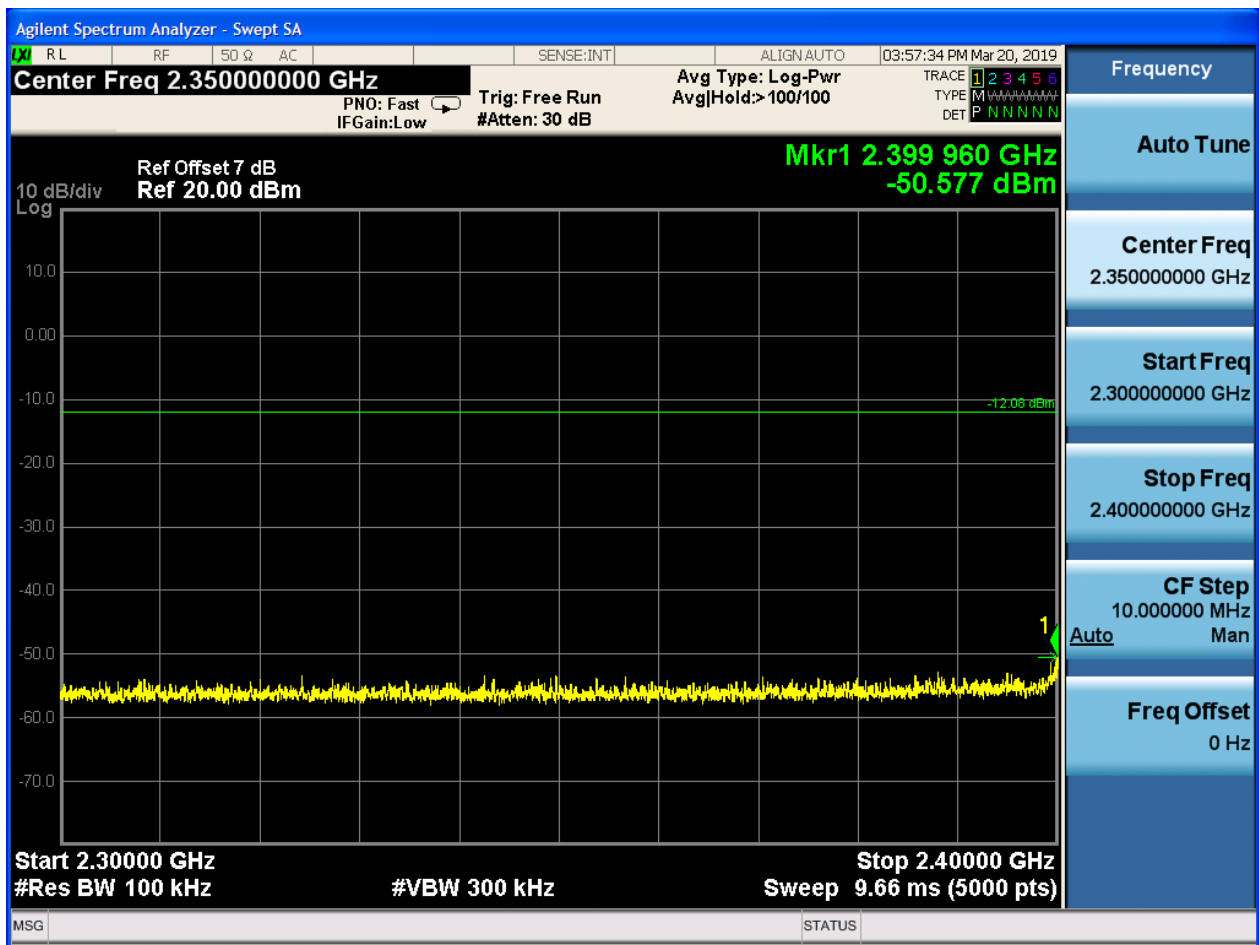
2.1.1 Pref

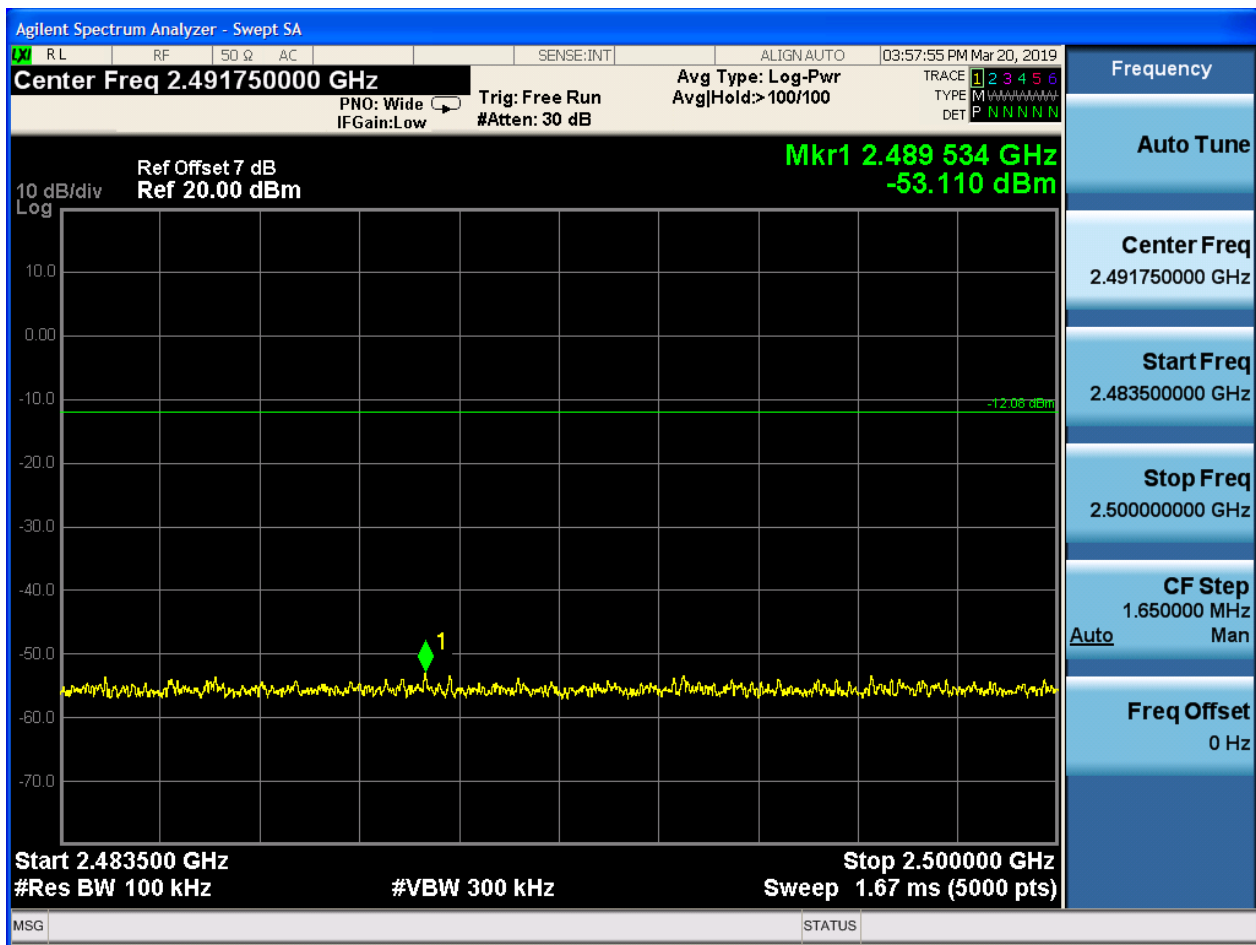


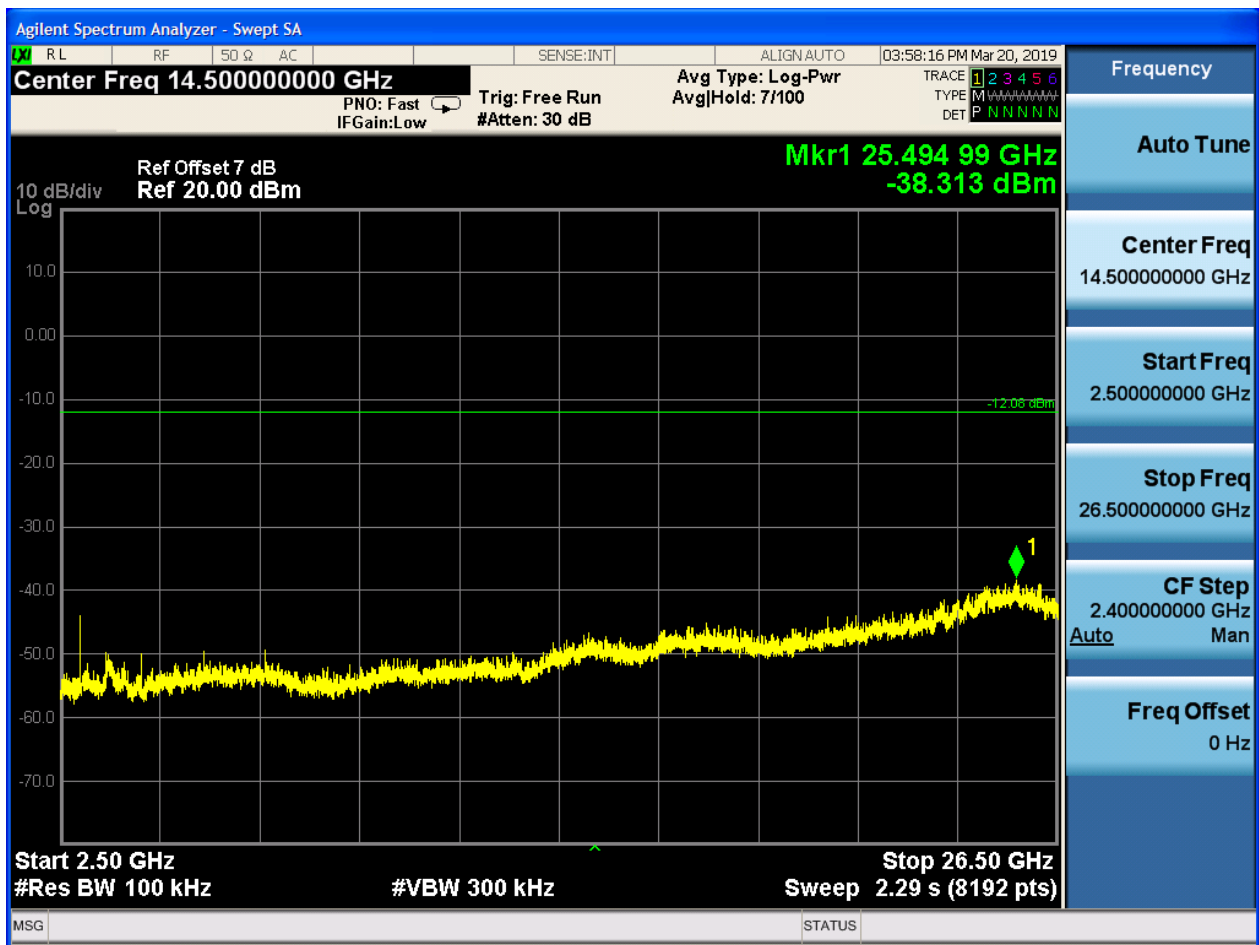






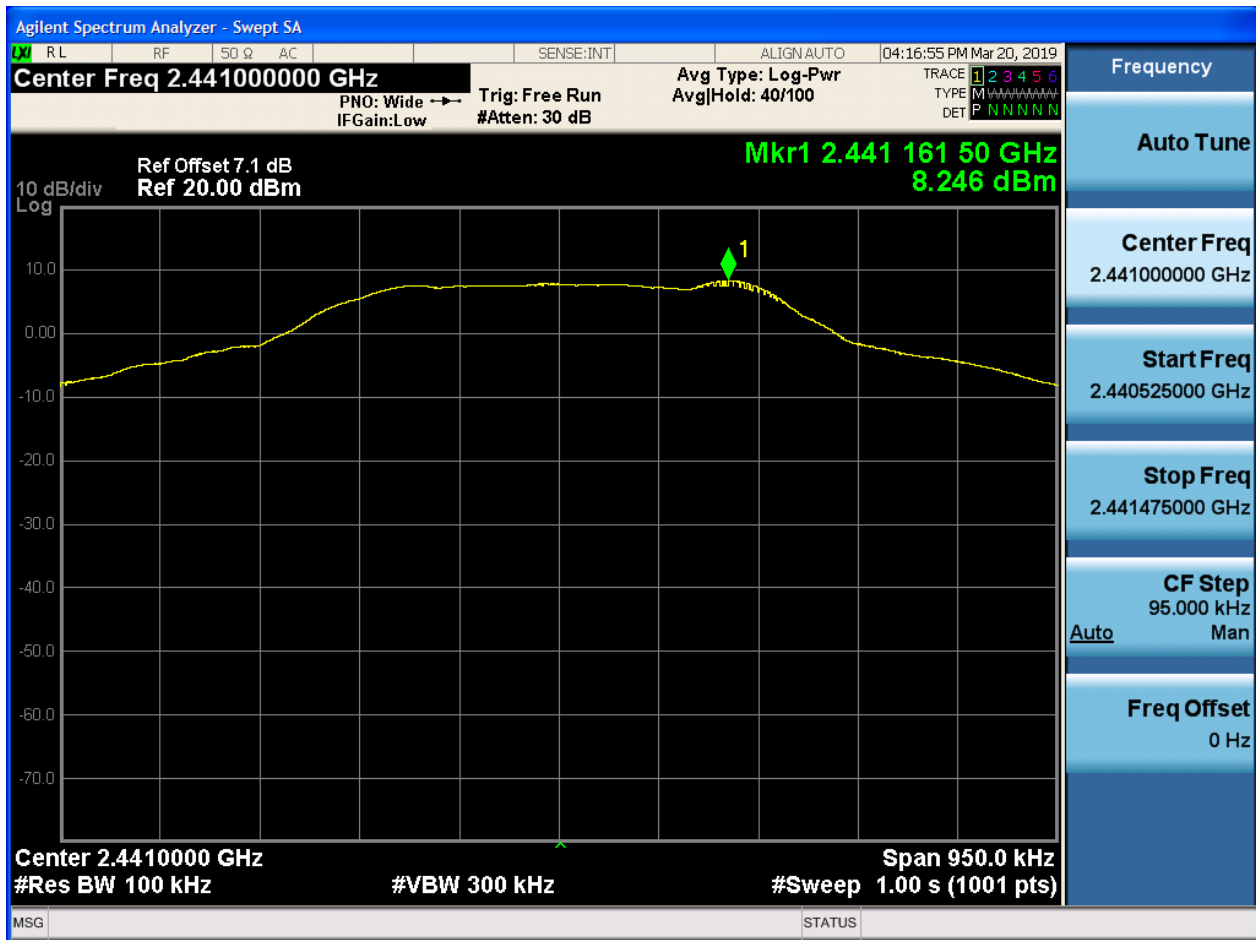




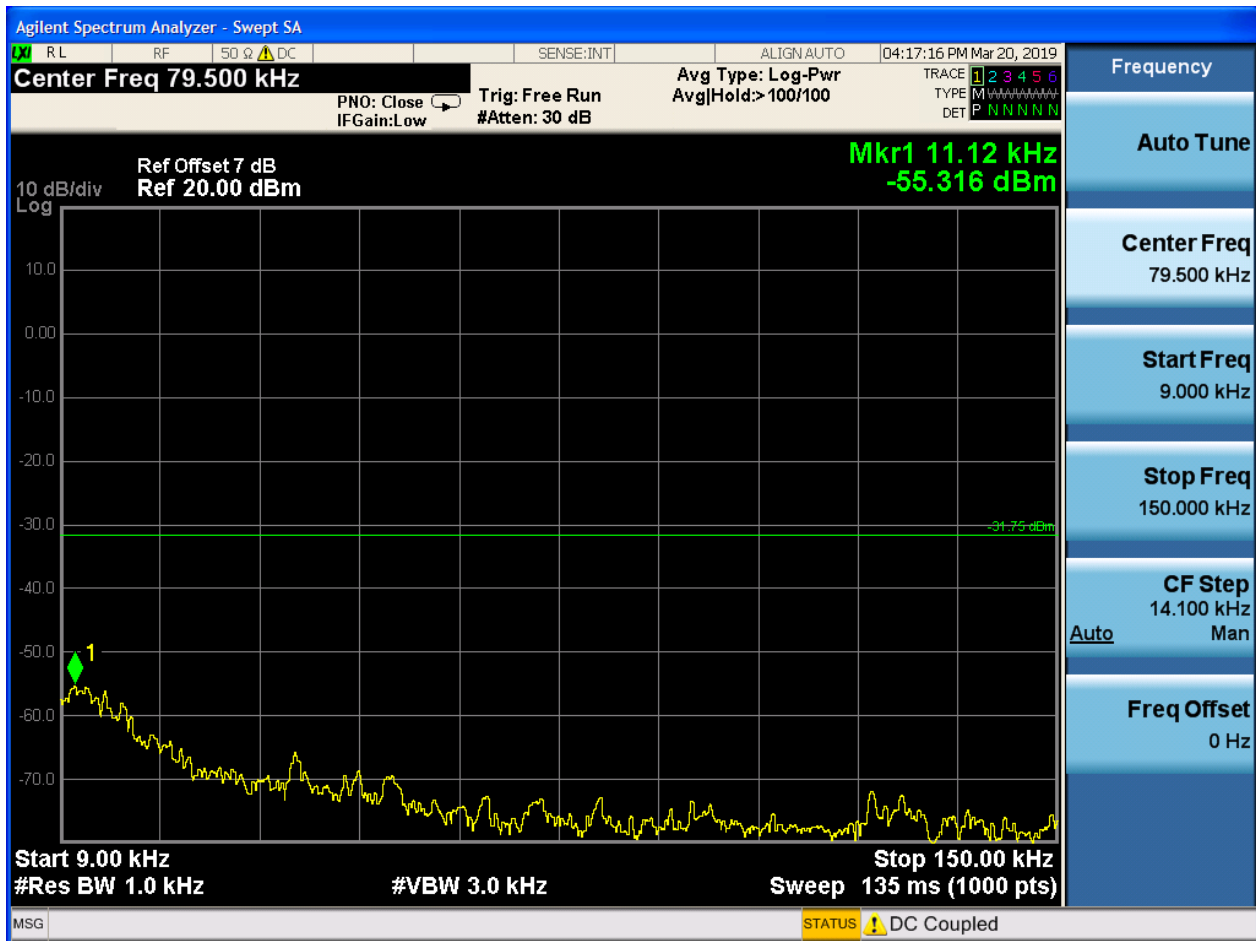


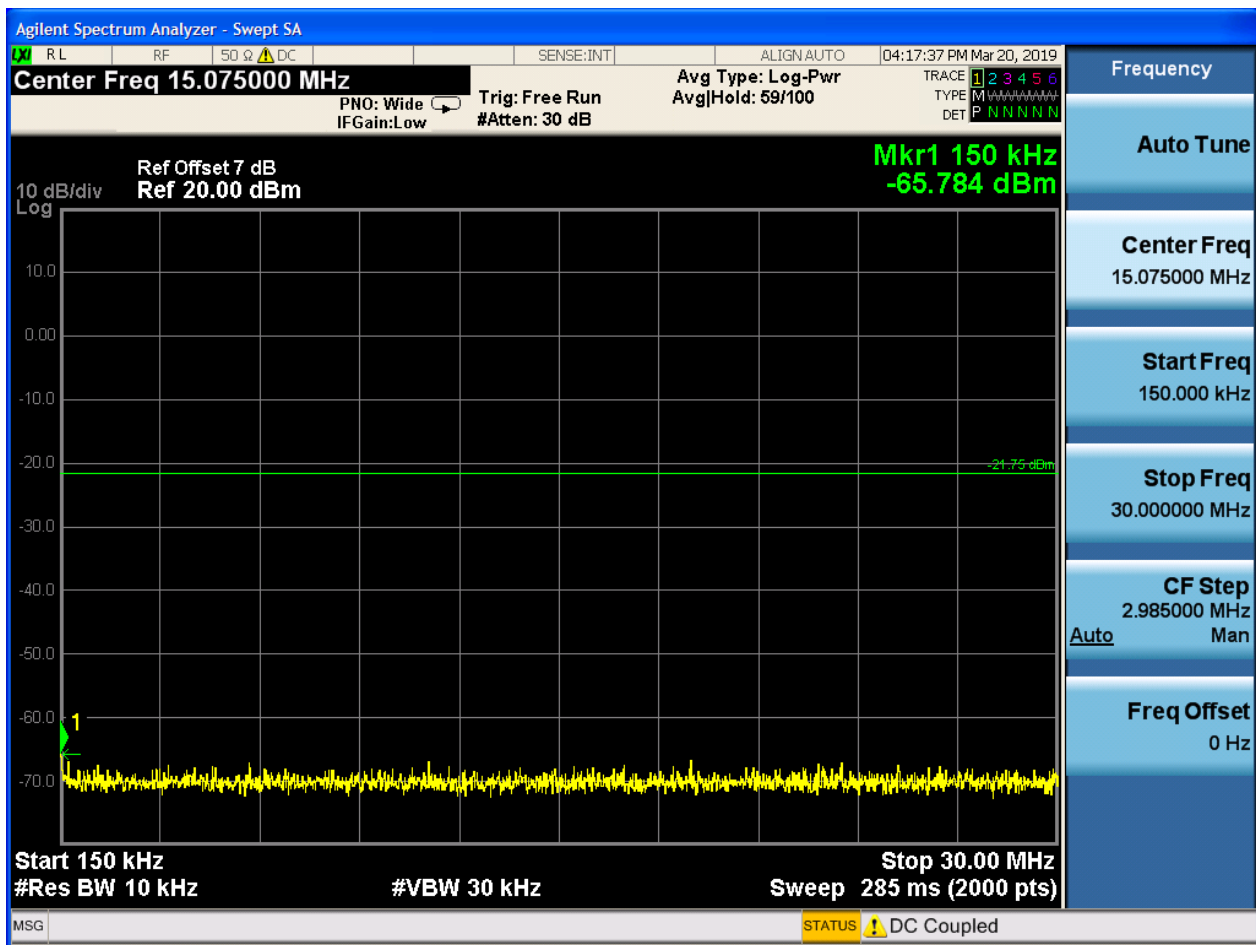
2.2 TM1_DH5_Ch39

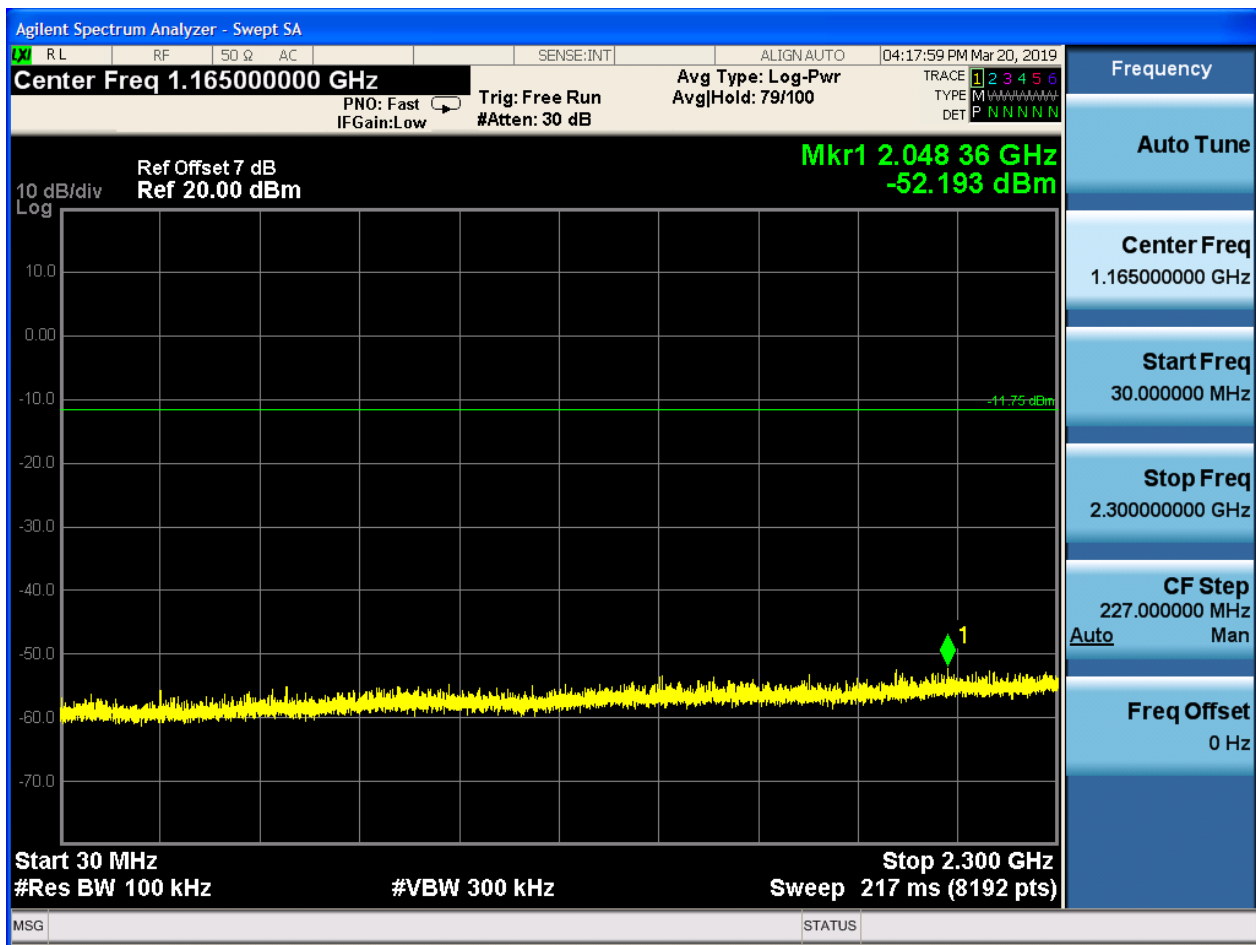
2.2.1 Pref

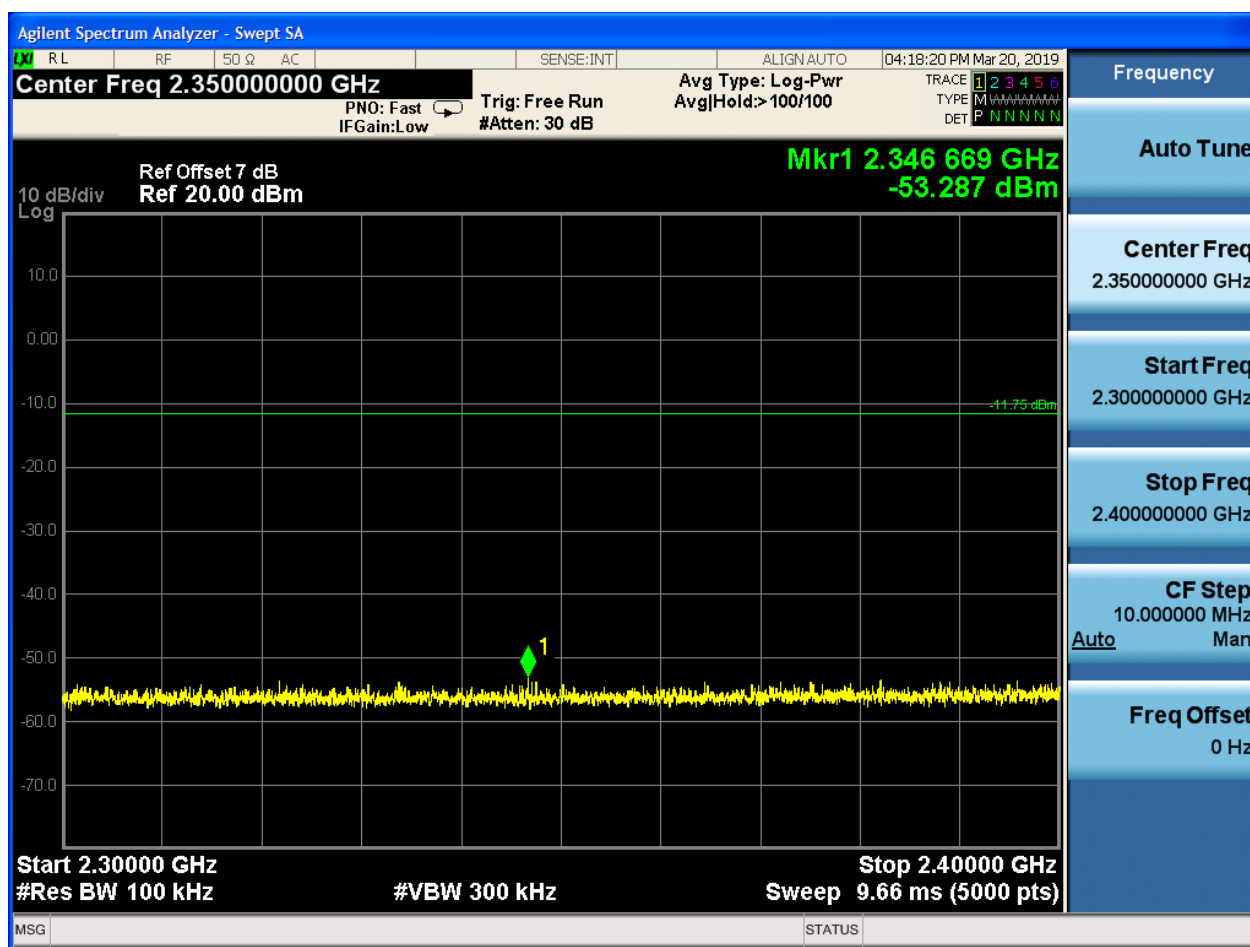
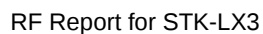


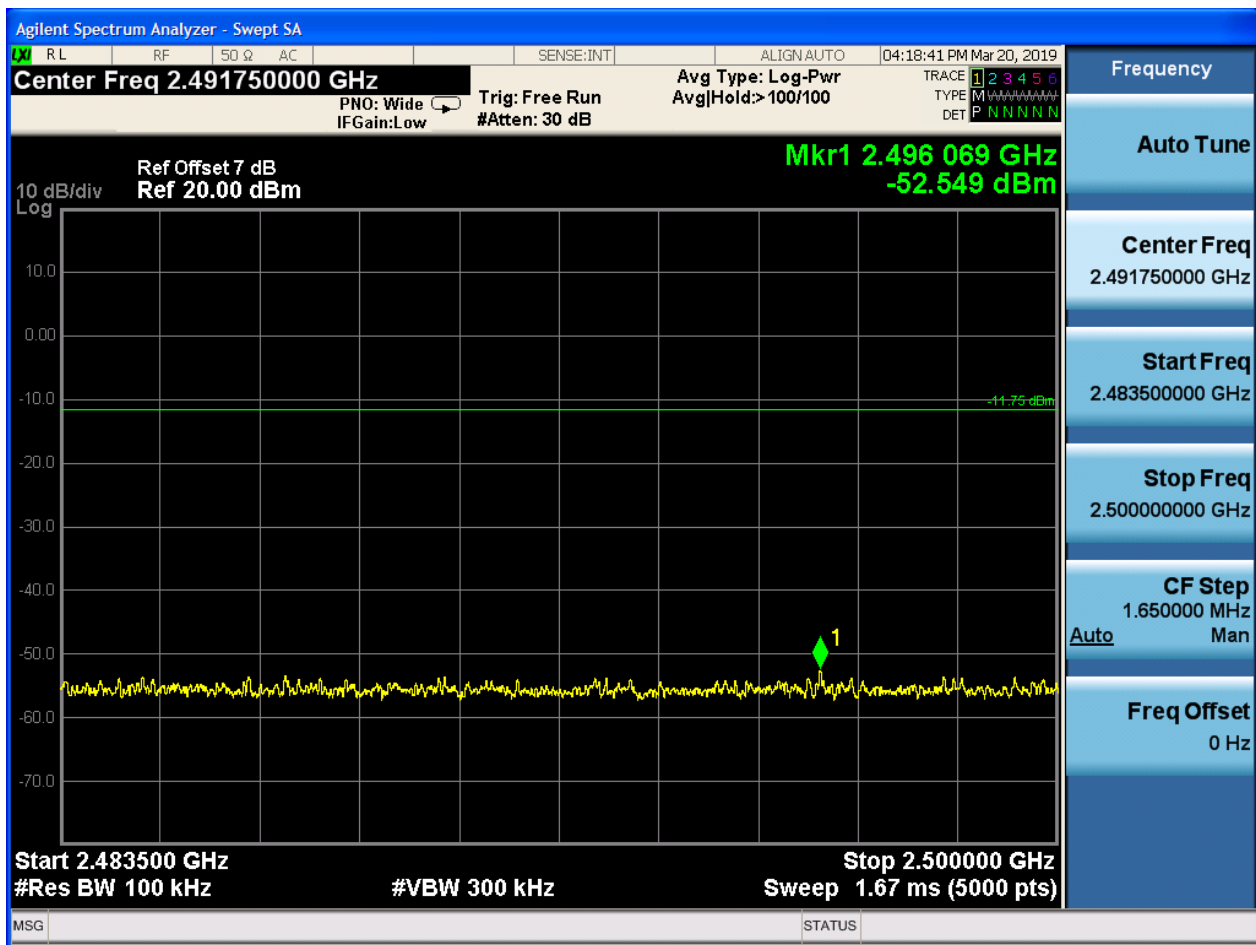
2.2.2 Puw

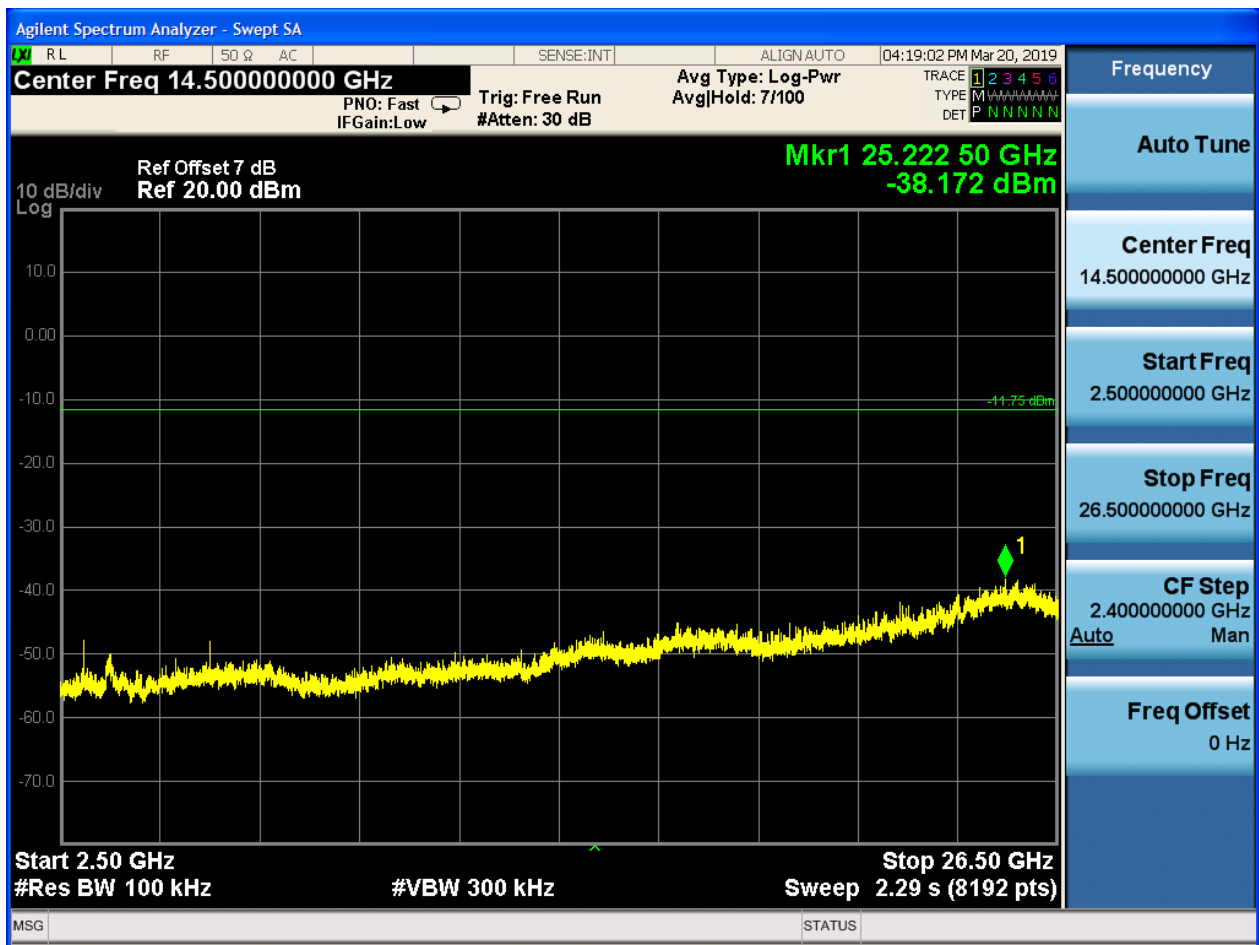






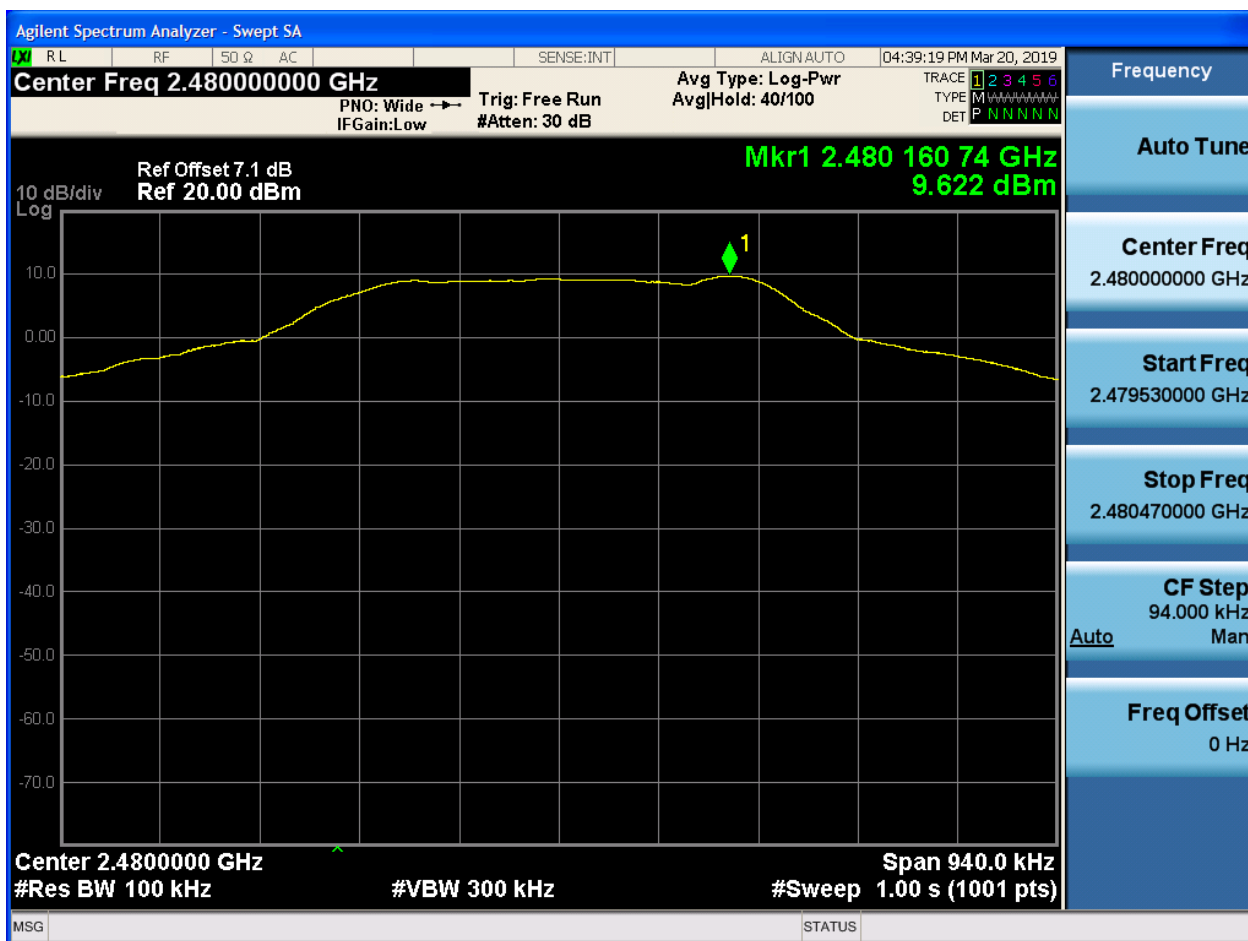


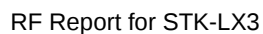




2.3 TM1_DH5_Ch78

2.3.1 Pref





Agilent Spectrum Analyzer - Swept SA

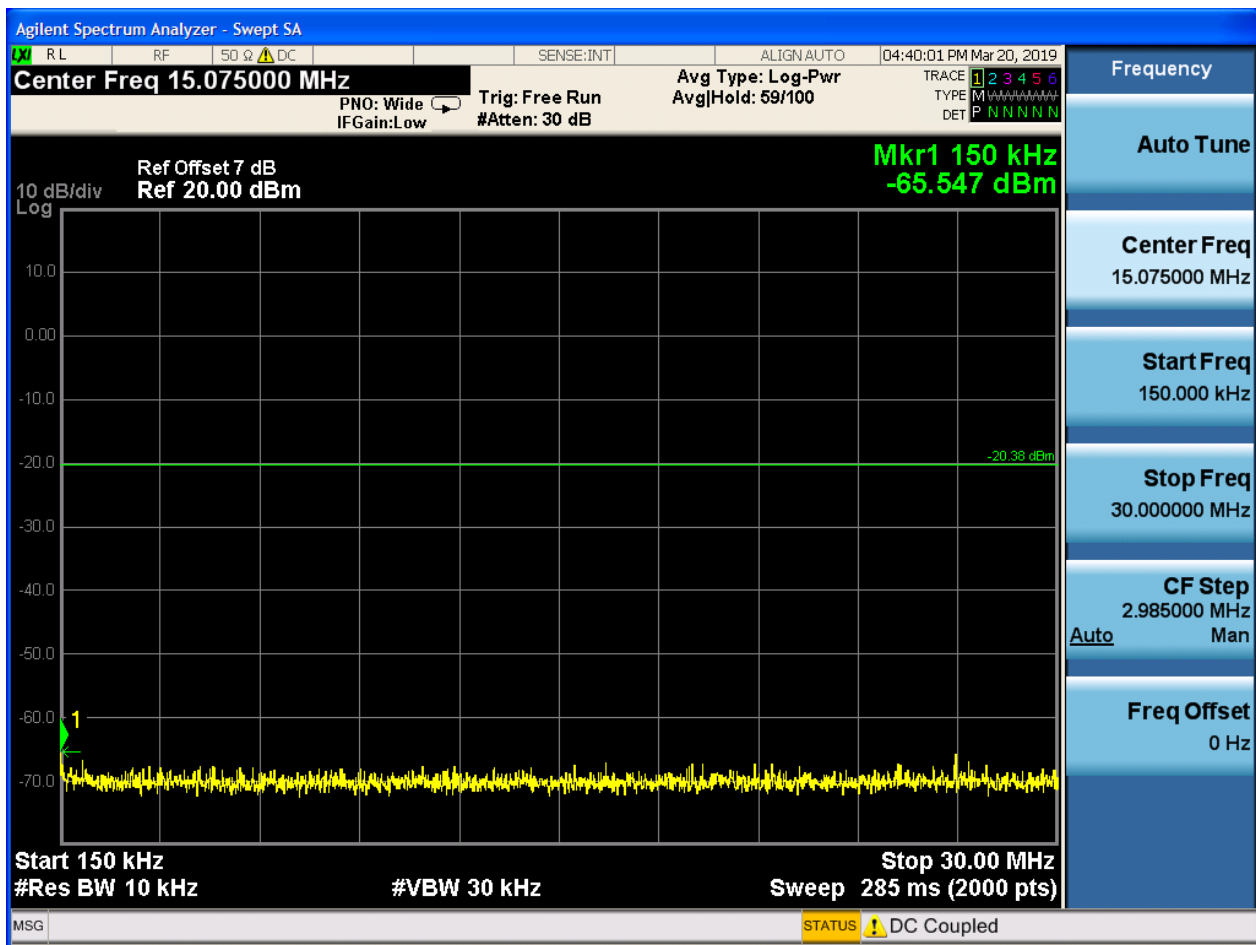
RL RF 50 Ω DC SENSE:INT ALIGN: AUTO 04:39:40 PM Mar 20, 2019

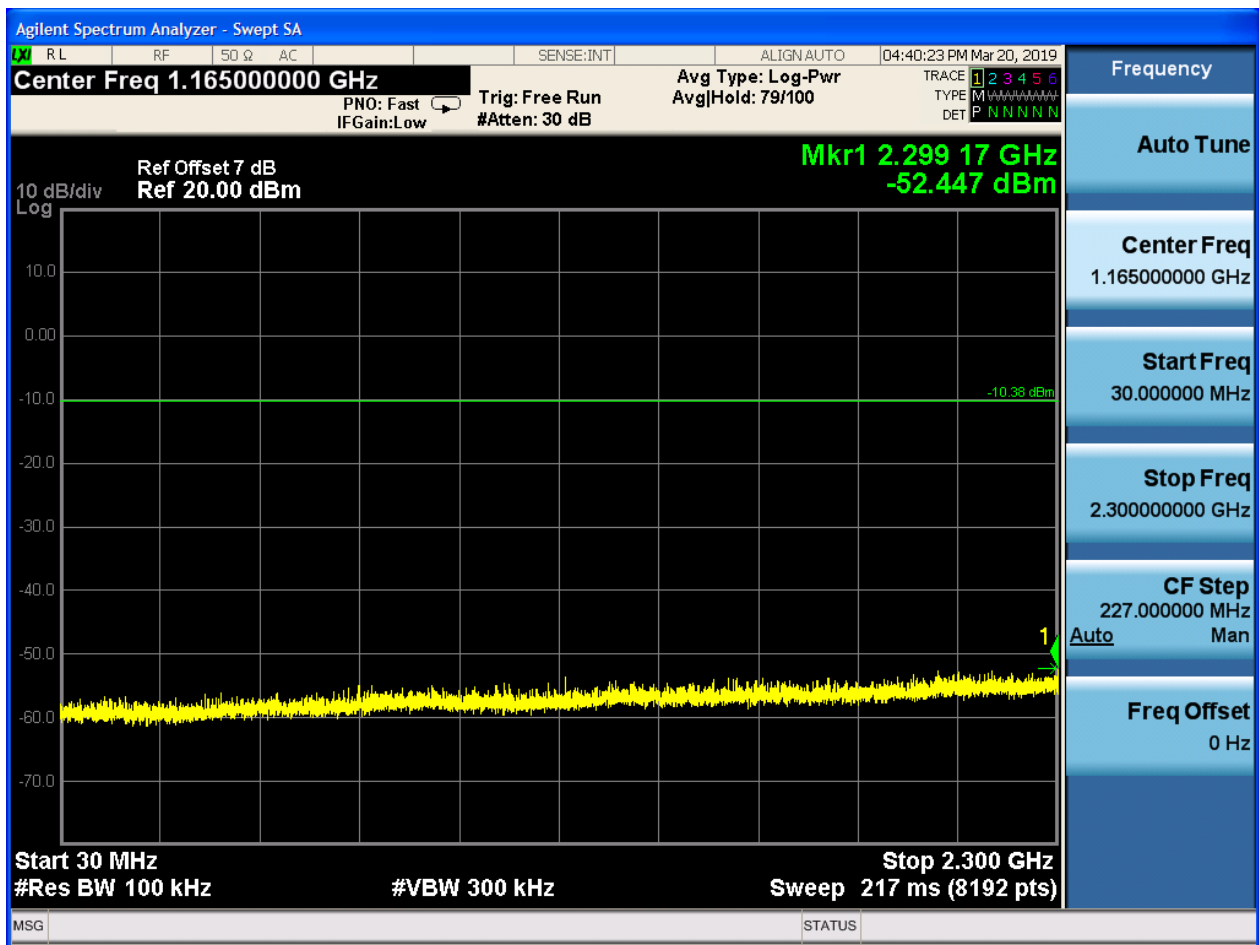
Center Freq 79.500 kHz PNO: Close Trig: Free Run Avg Type: Log-Pwr TRACE 1 2 3 4 5 6
IFGain: Low #Atten: 30 dB Avg|Hold:>100/100 TYPE [M] NNNNN
DET P

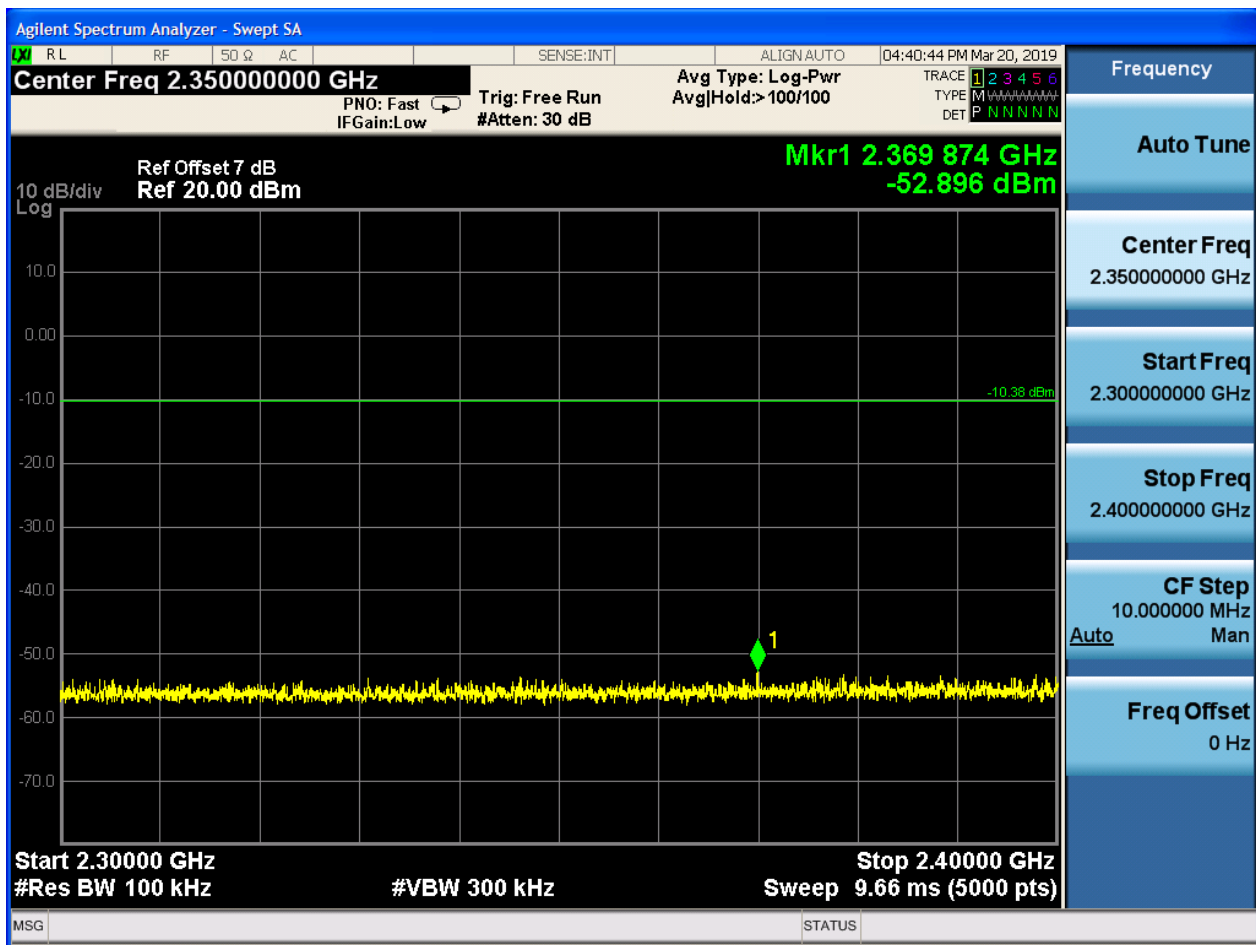
10 dB/div Ref Offset 7 dB Mkr1 9.56 kHz
Log Ref 20.0 dBm -56.933 dBm

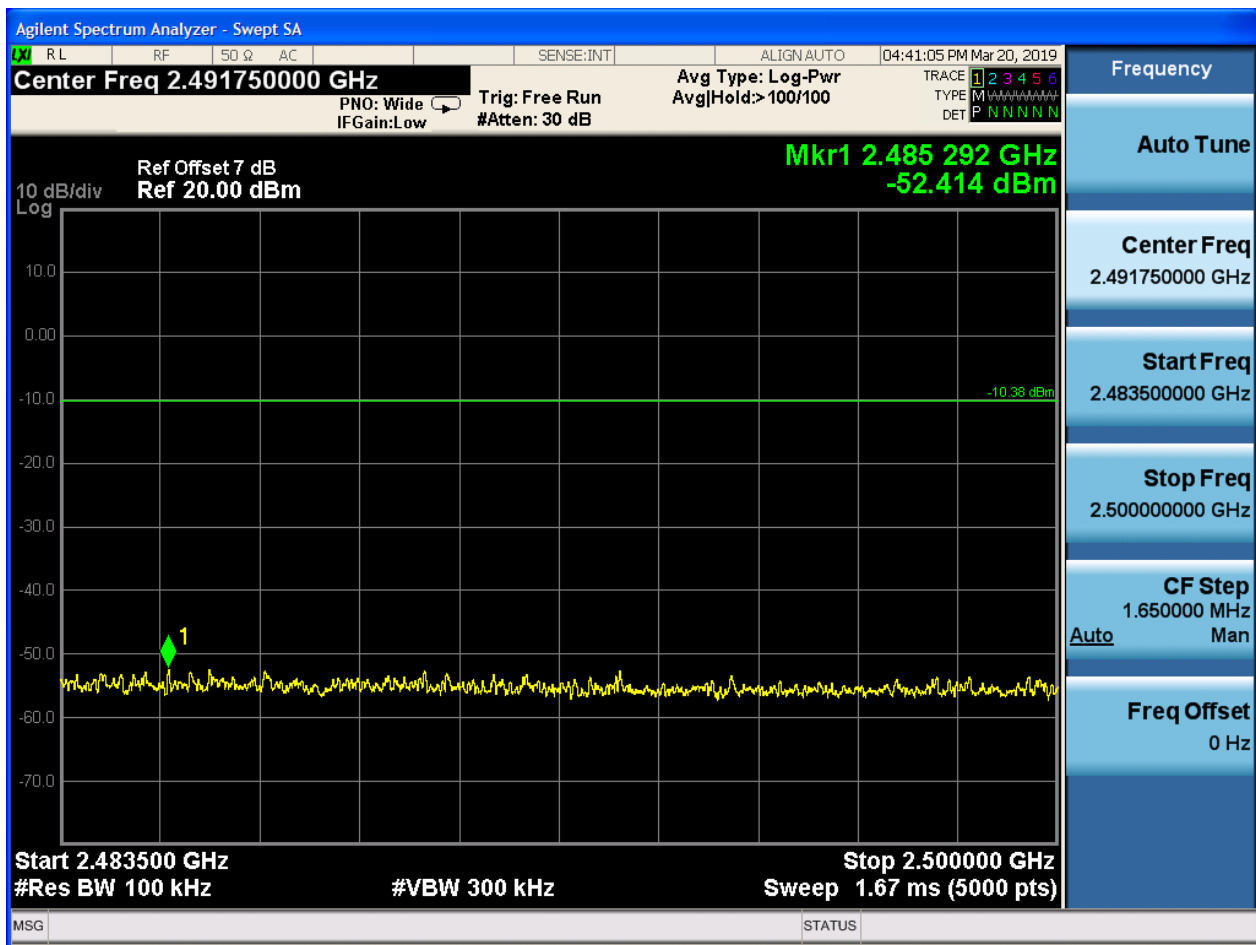
Start 9.00 kHz #Res BW 1.0 kHz Stop 150.00 kHz
#VBW 3.0 kHz Sweep 135 ms (1000 pts)

MSG STATUS DC Coupled





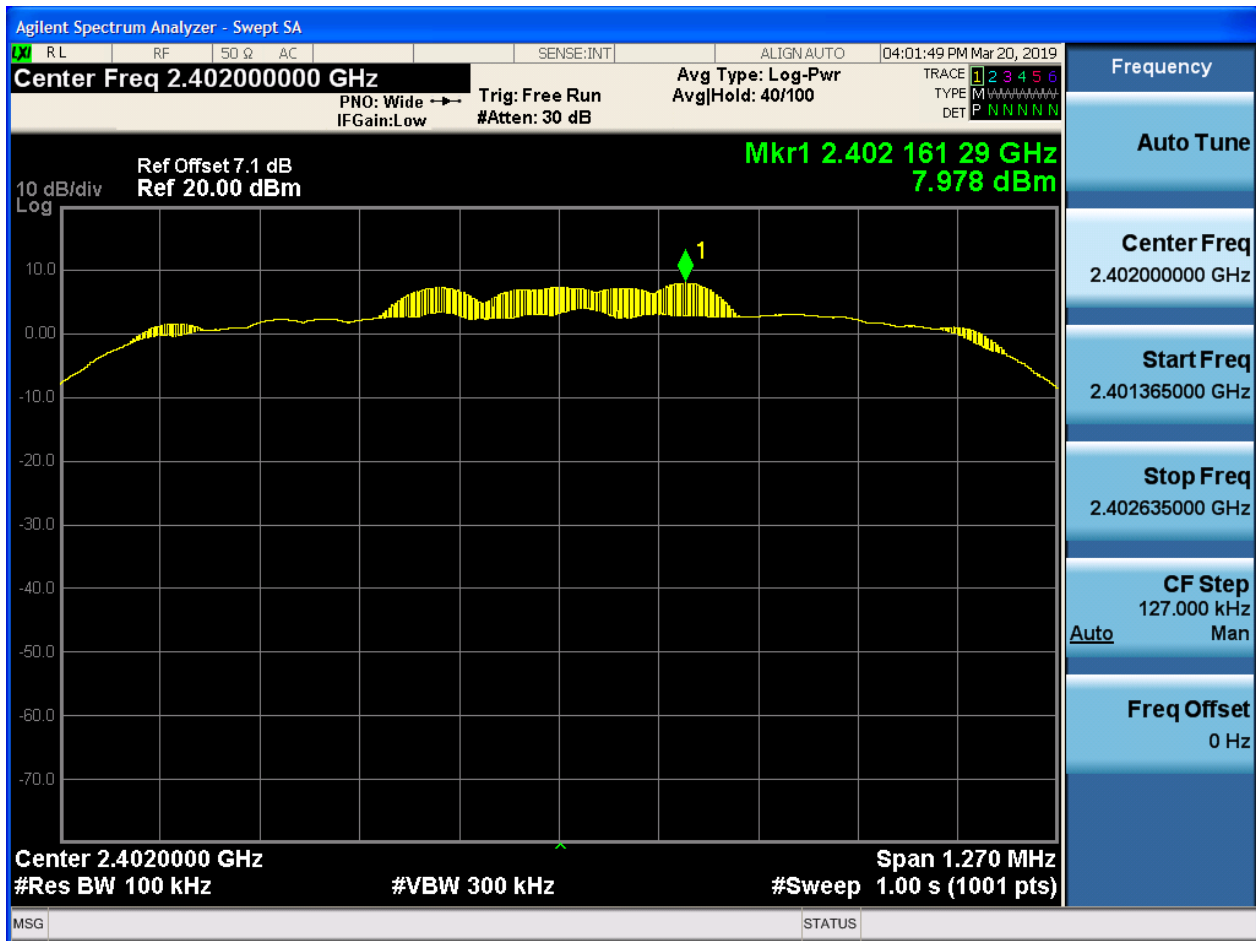






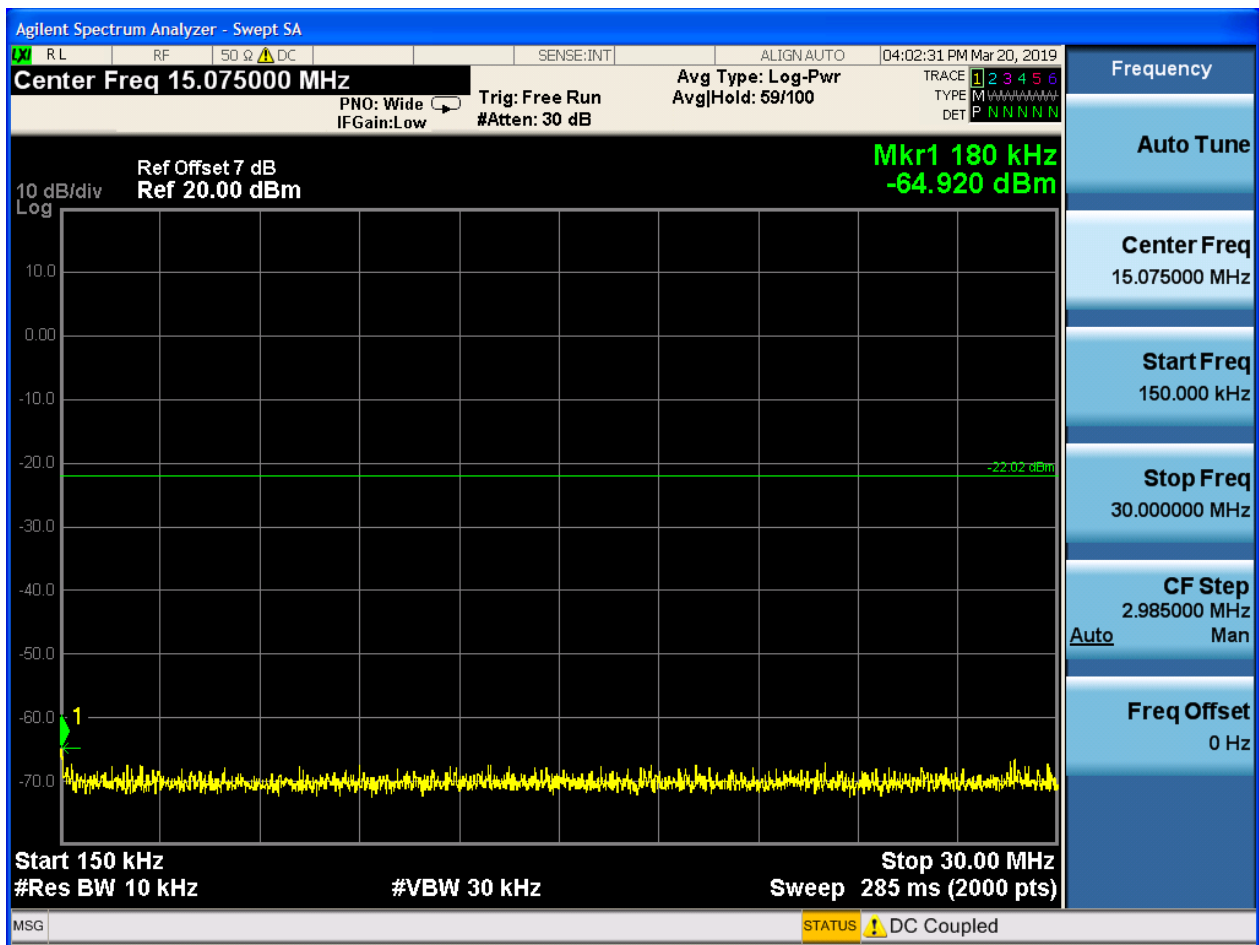
2.4 TM2_2DH5_Ch0

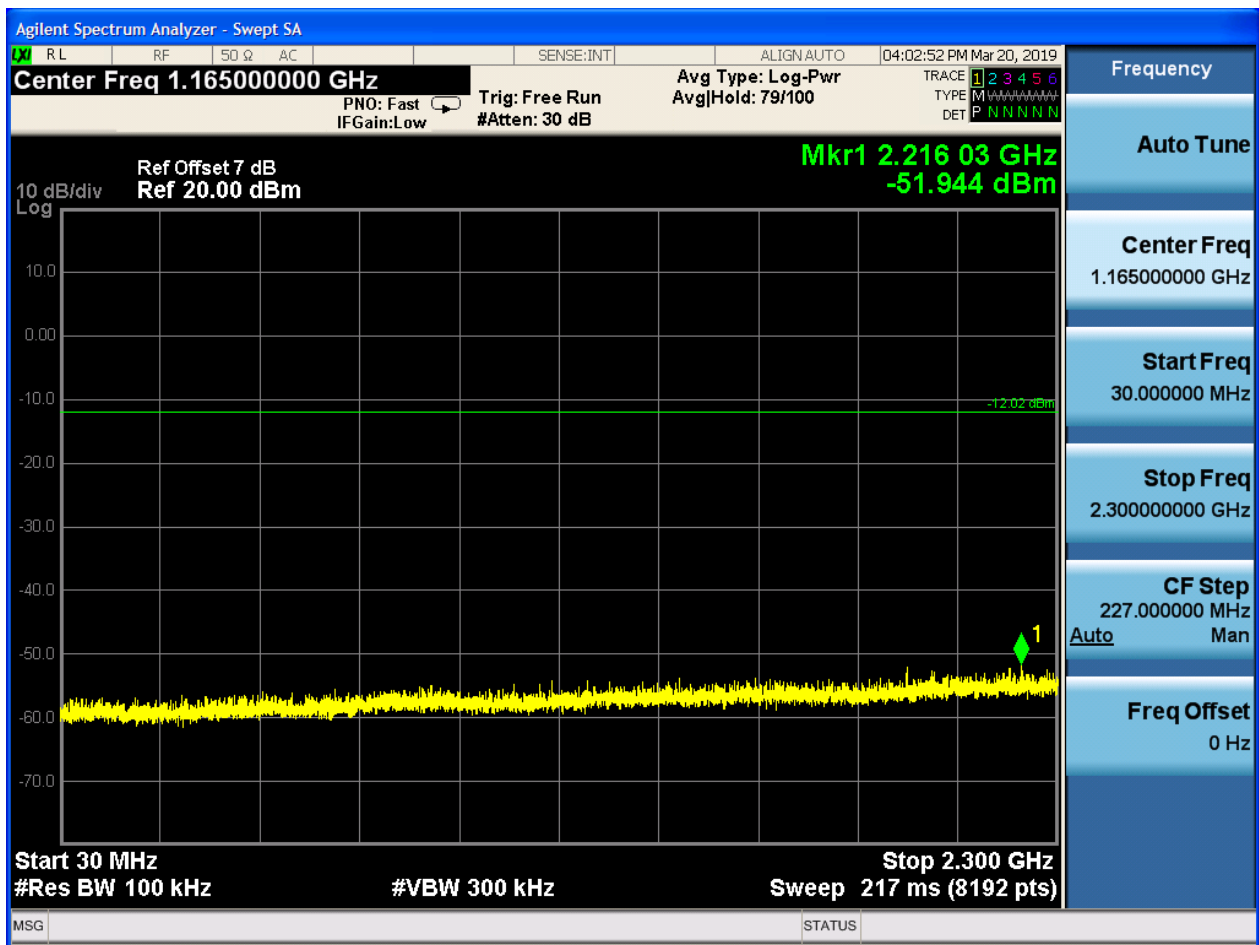
2.4.1 Pref

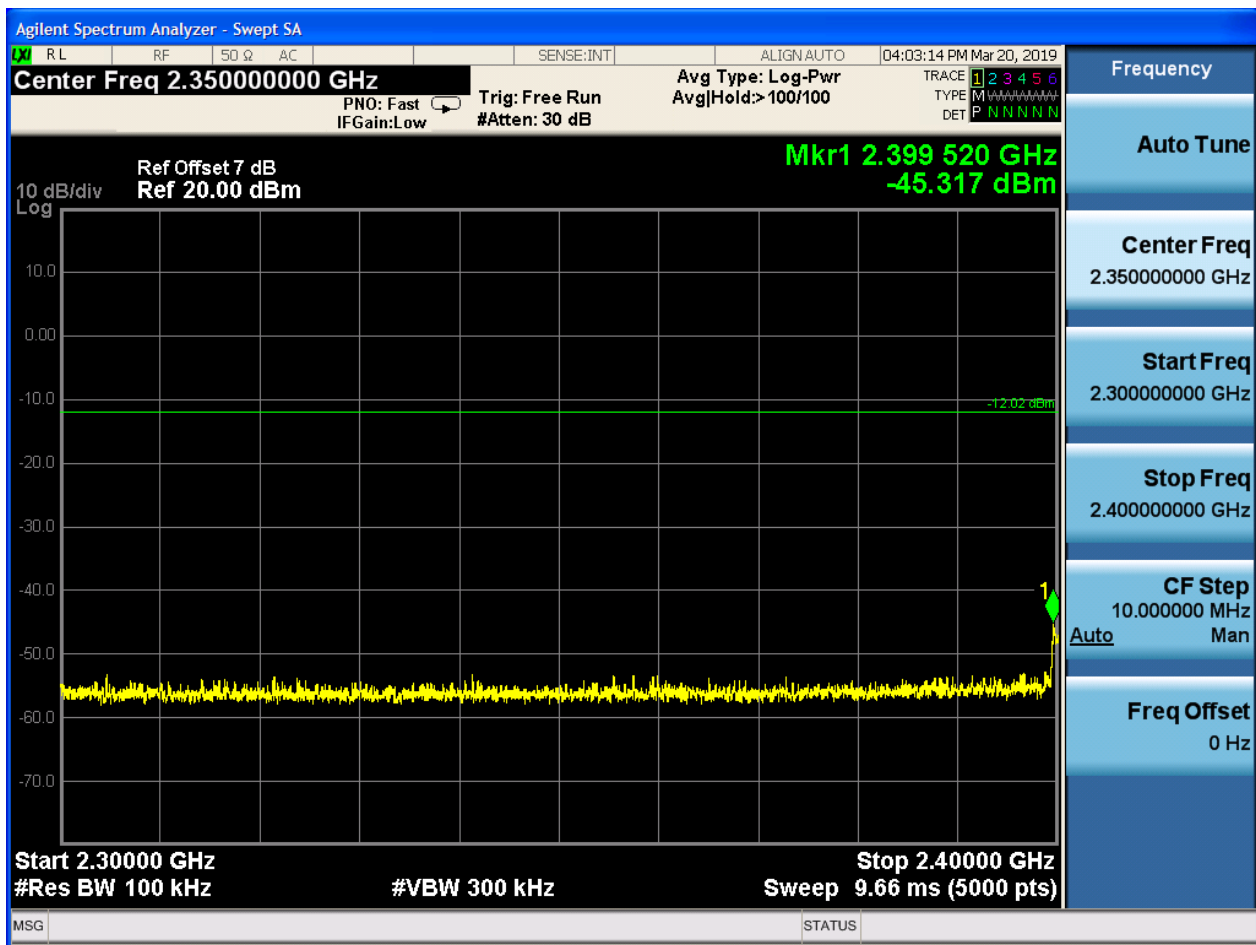


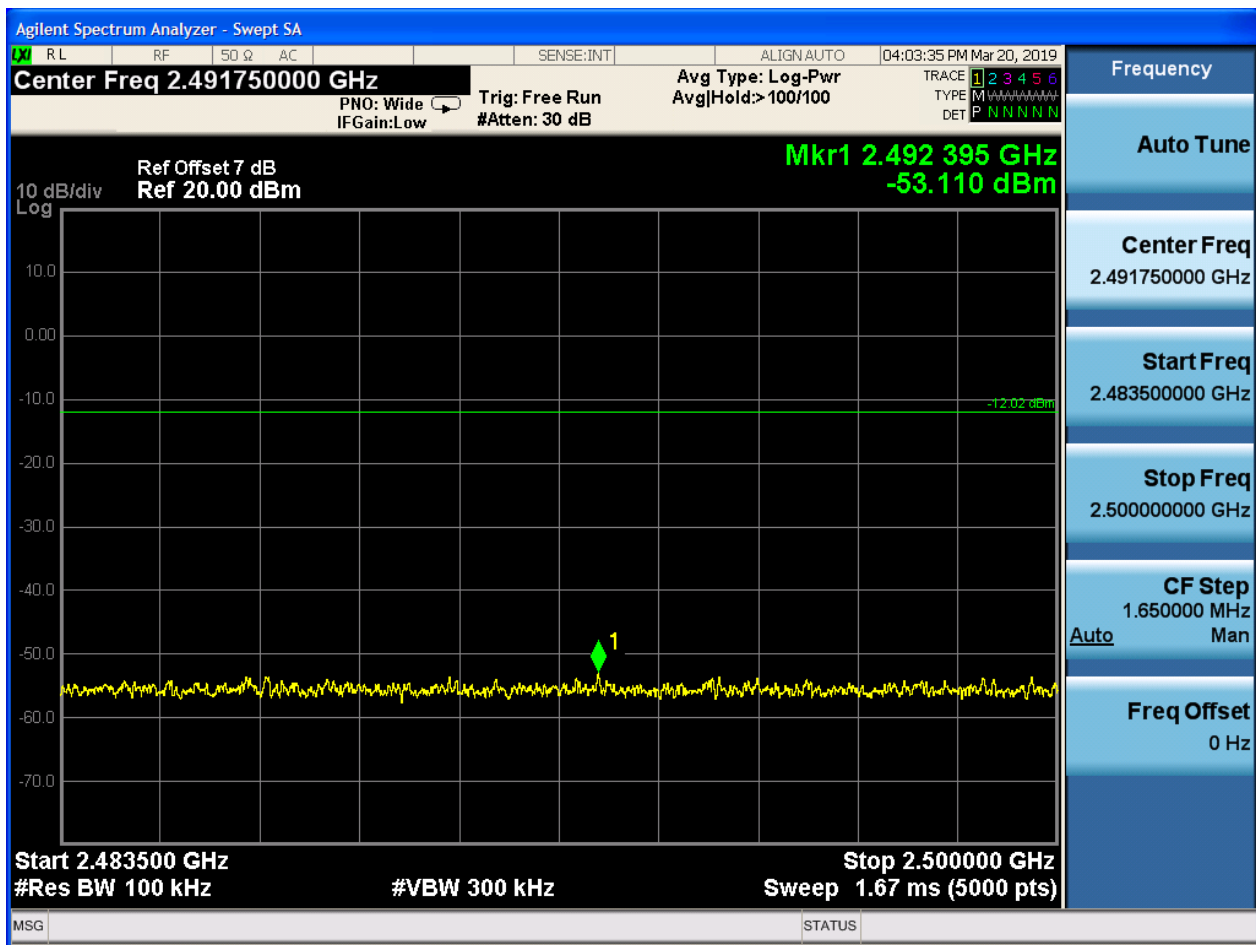
2.4.2 Puw

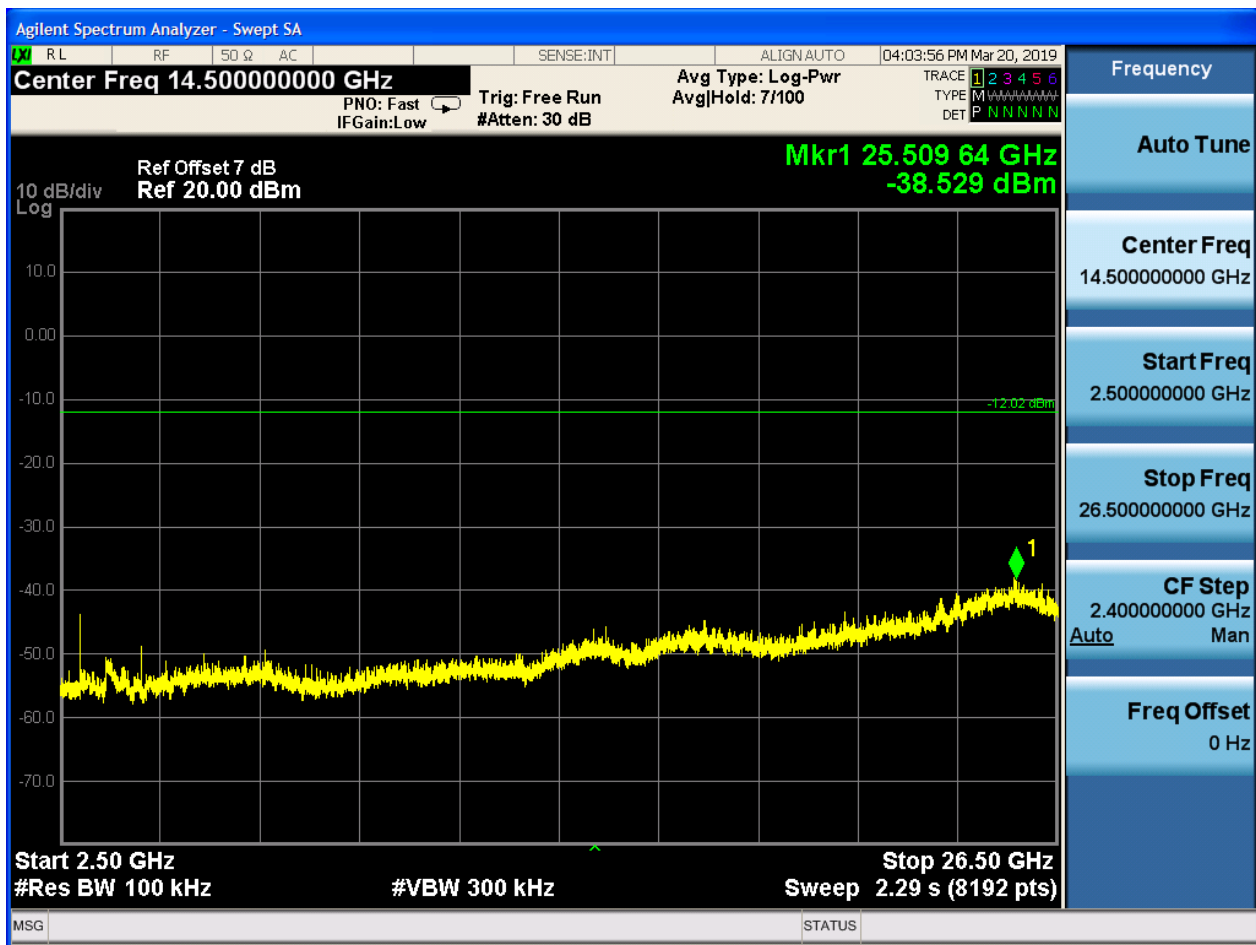






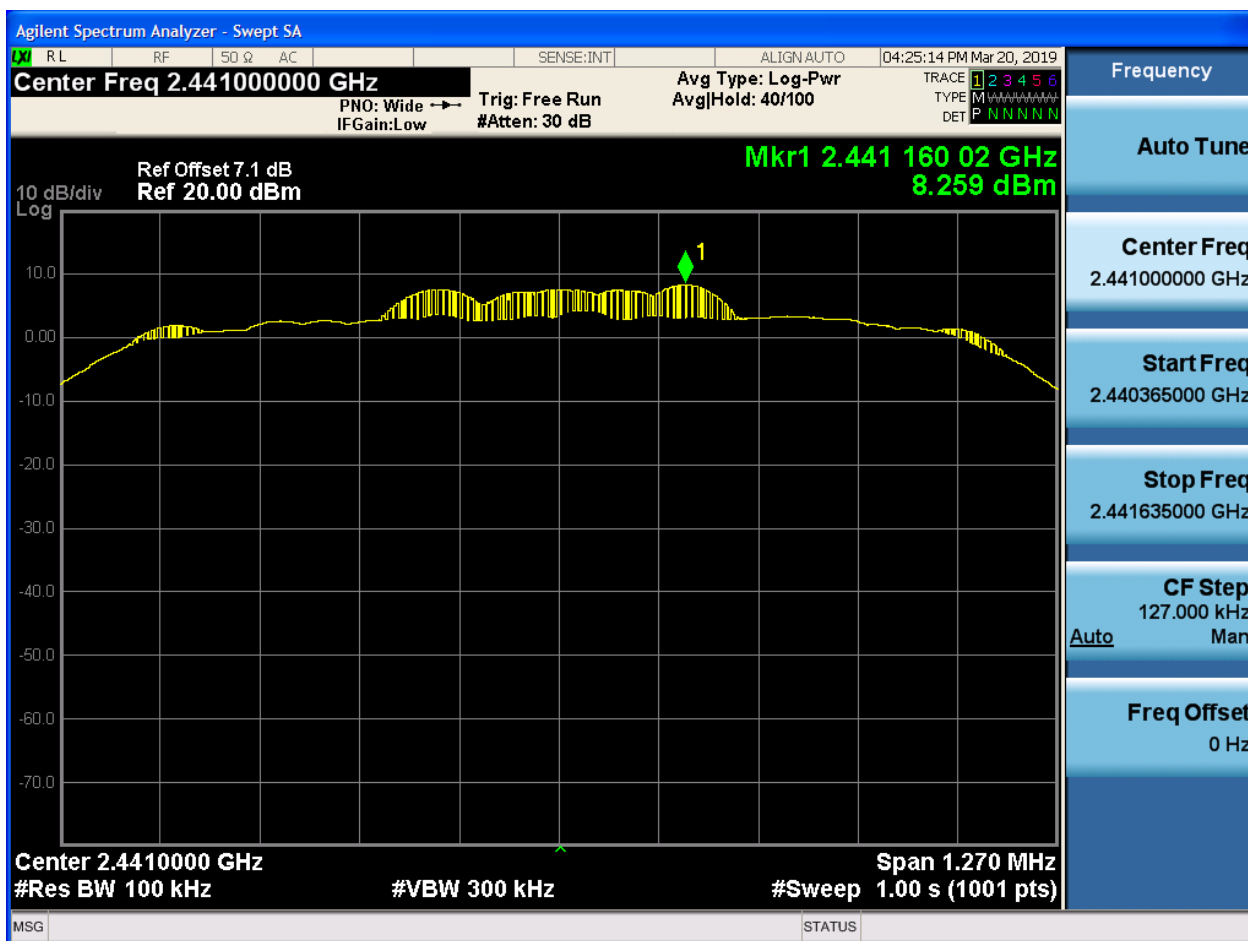






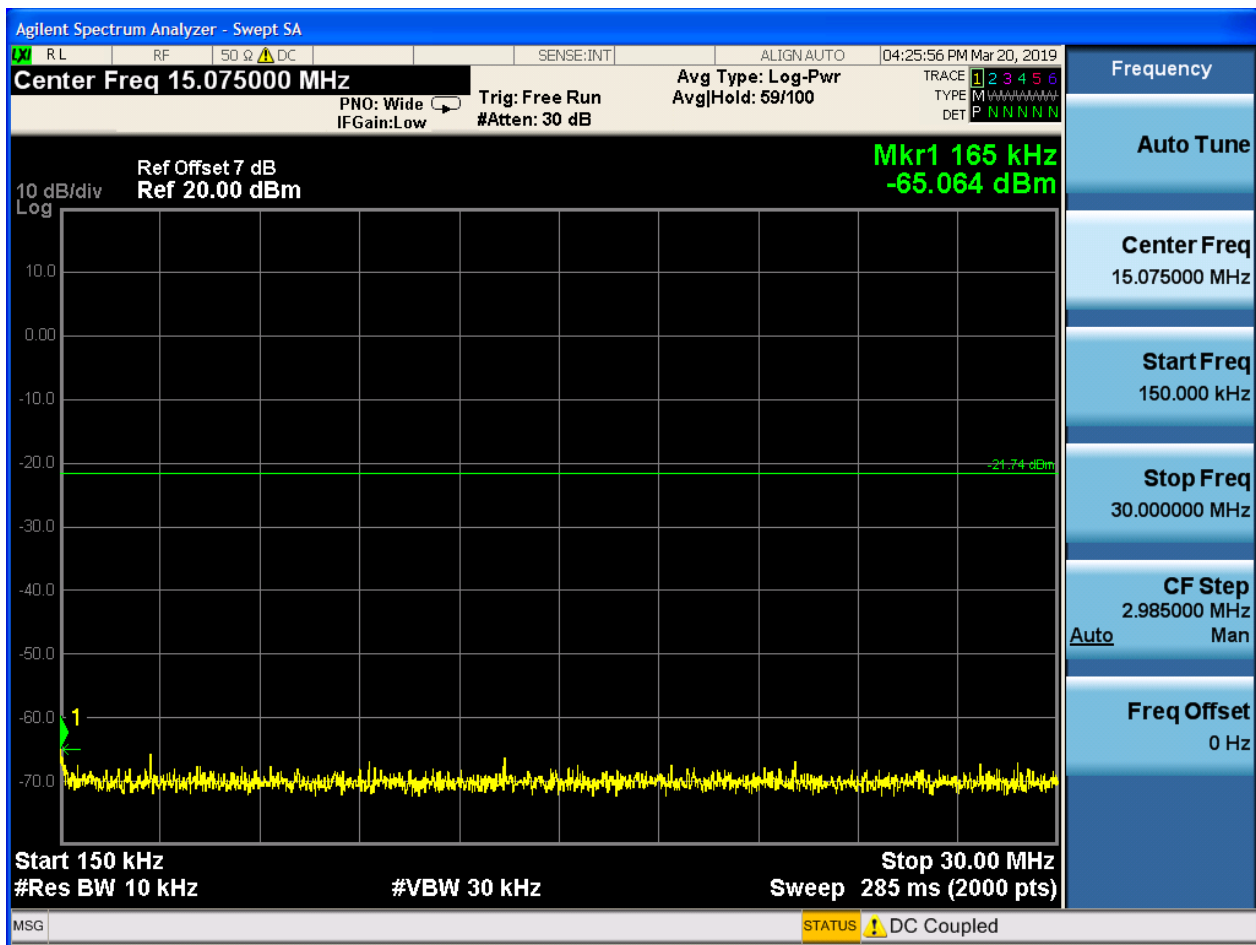
2.5 TM2_2DH5_Ch39

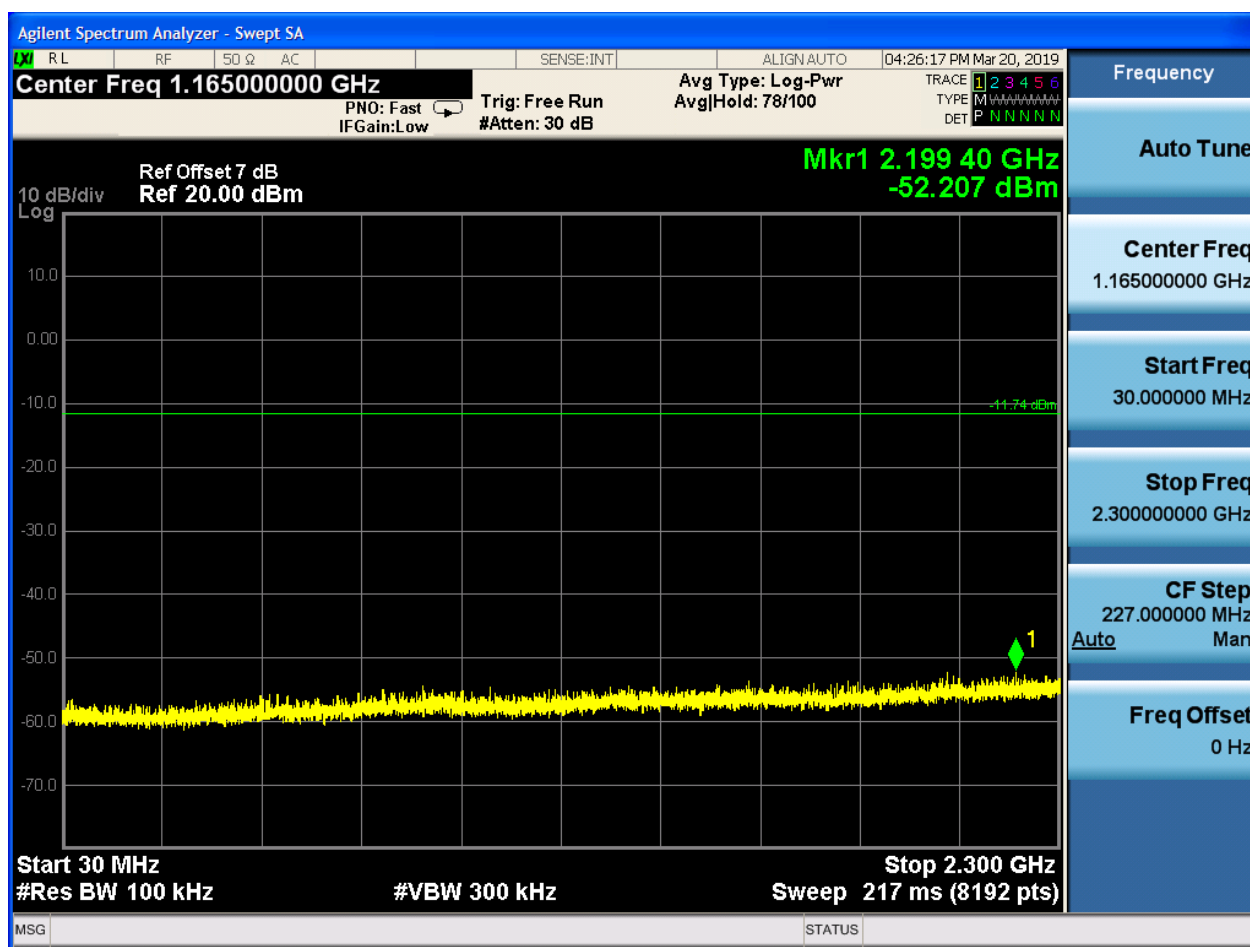
2.5.1 Pref

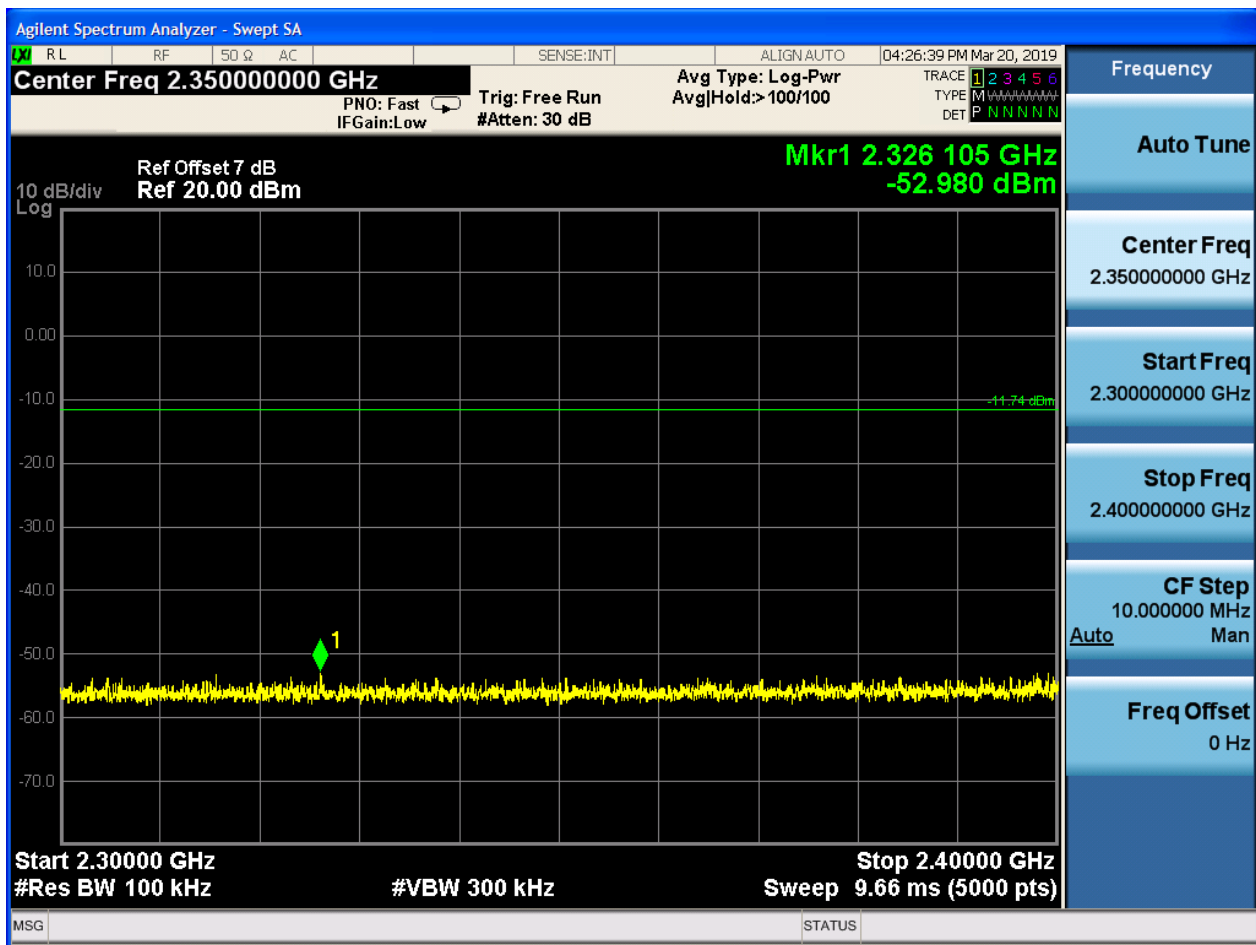


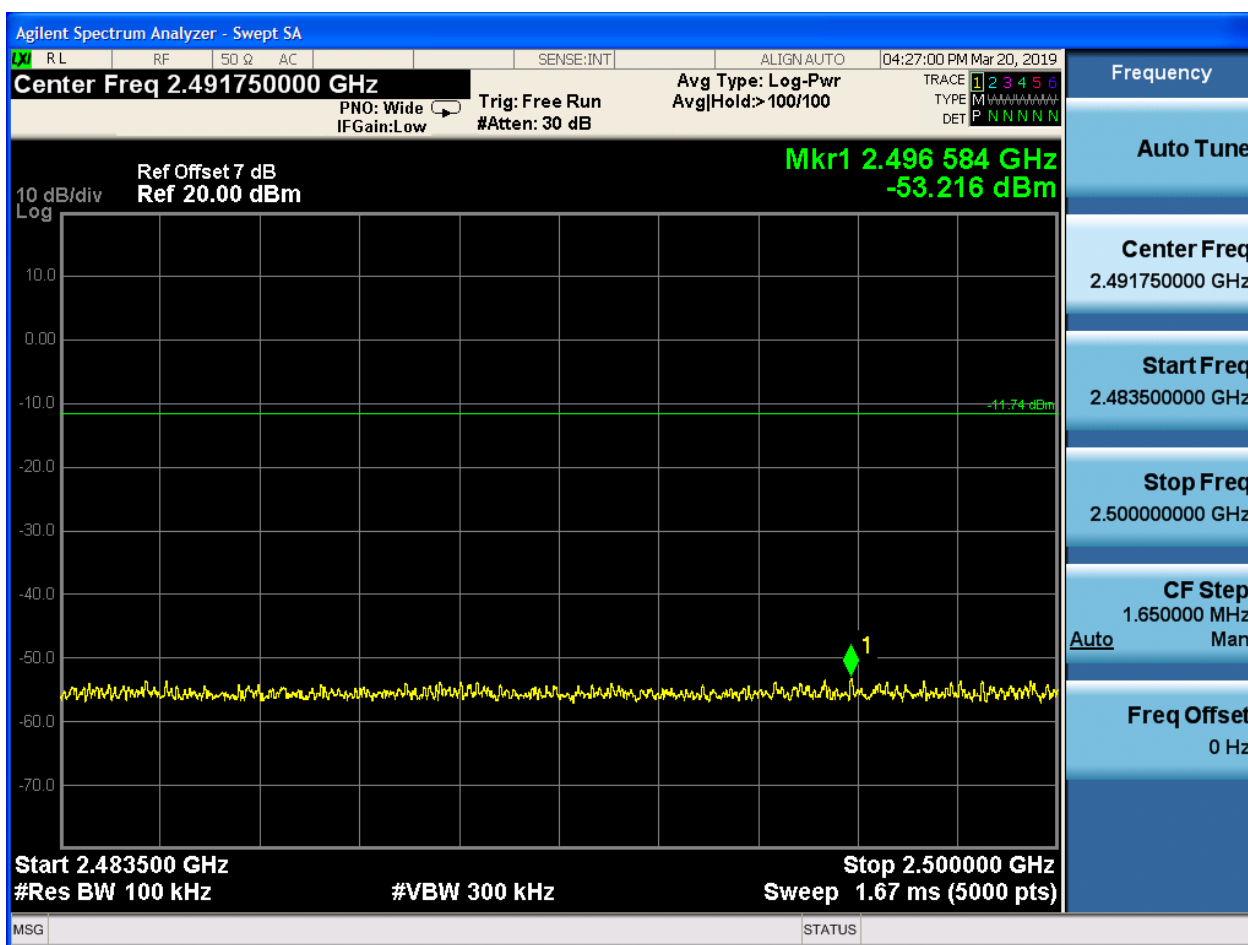
2.5.2 Puw

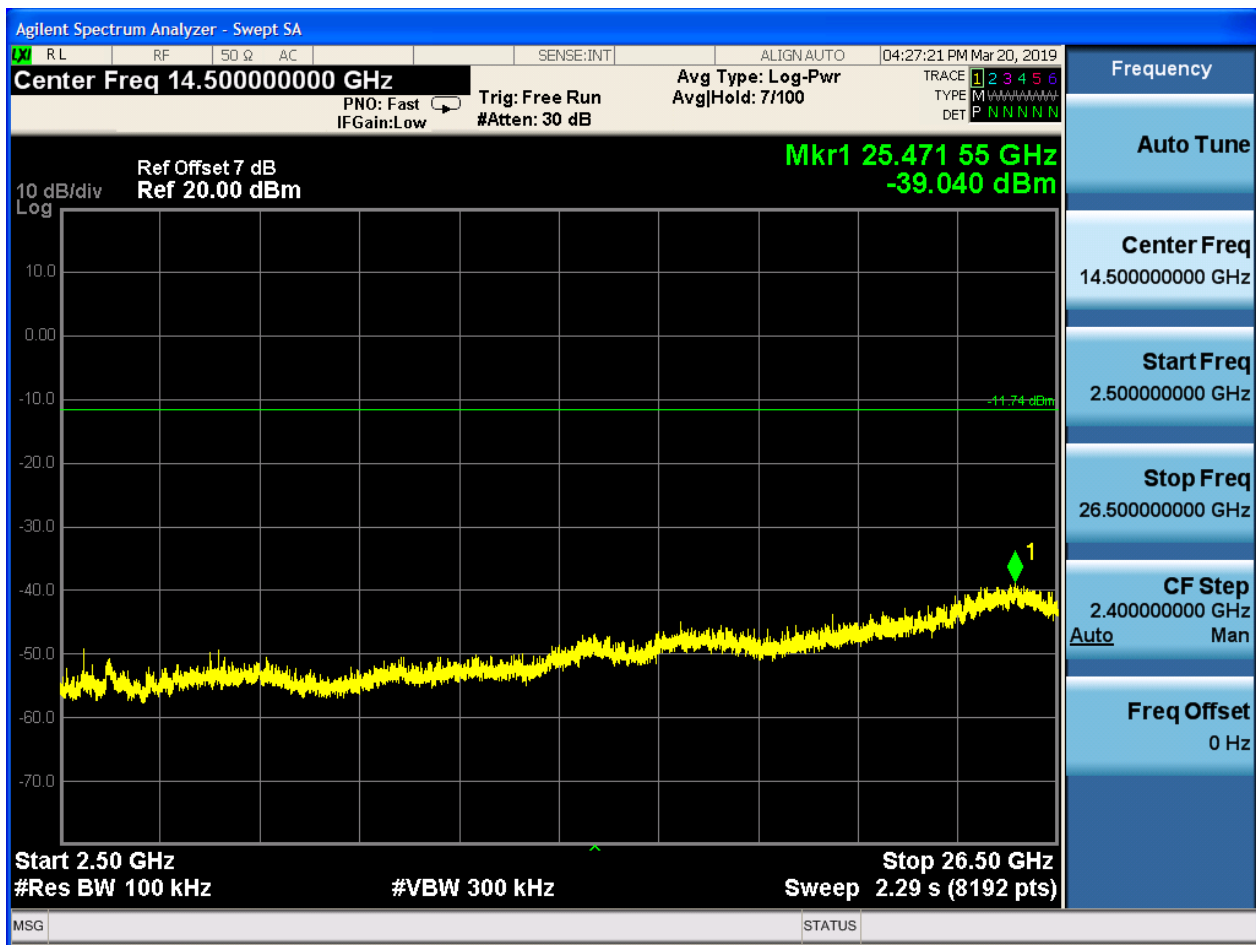






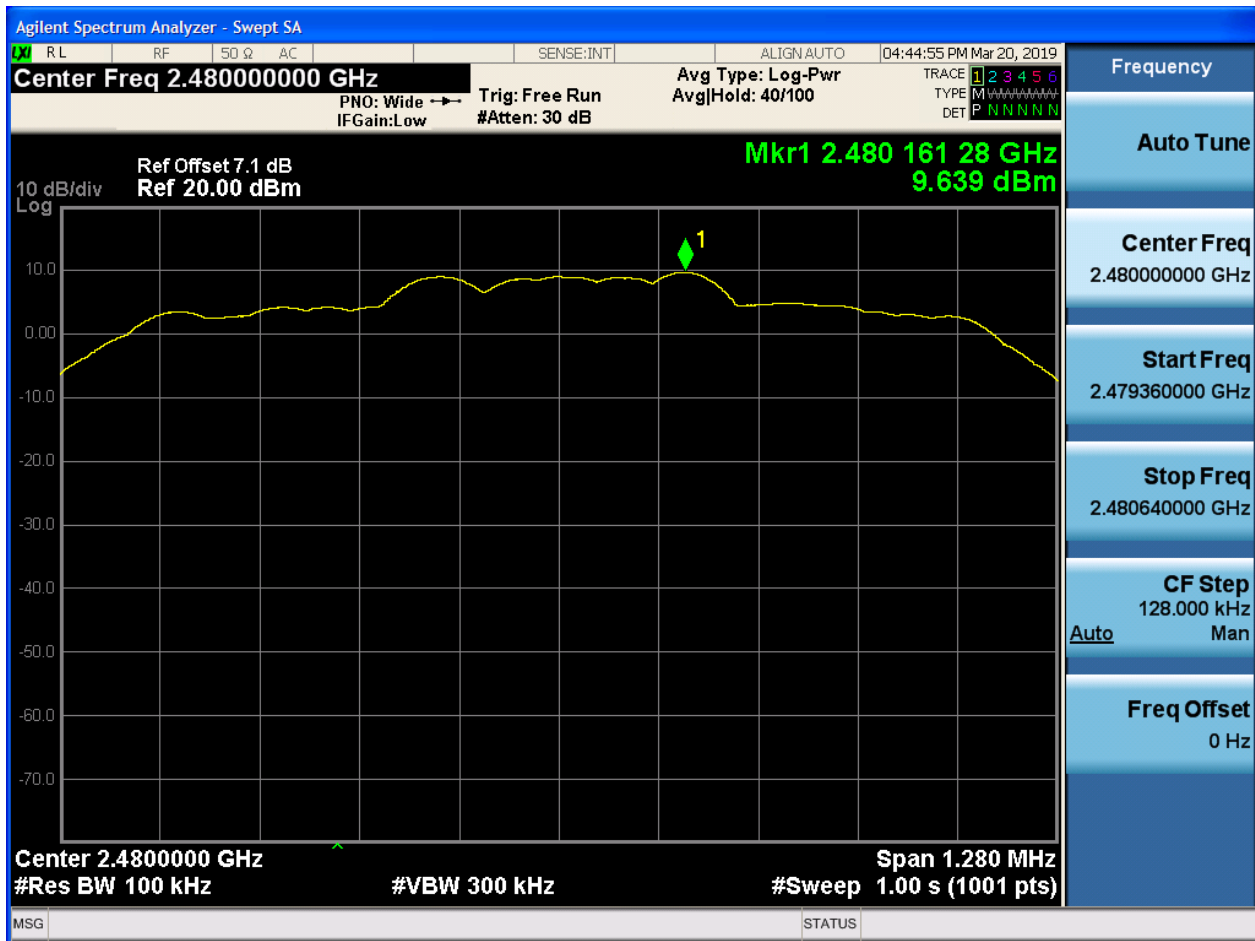






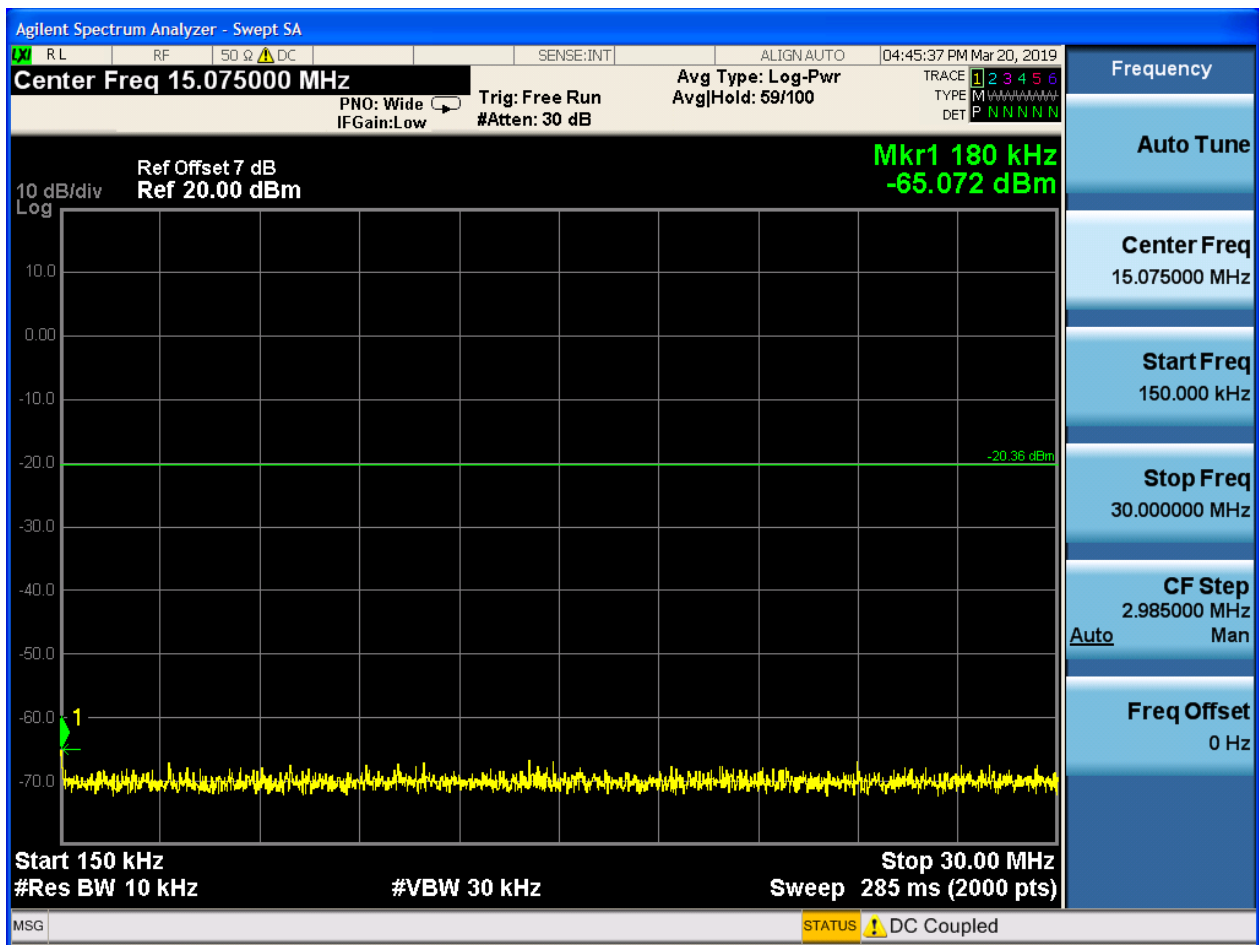
2.6 TM2_2DH5_Ch78

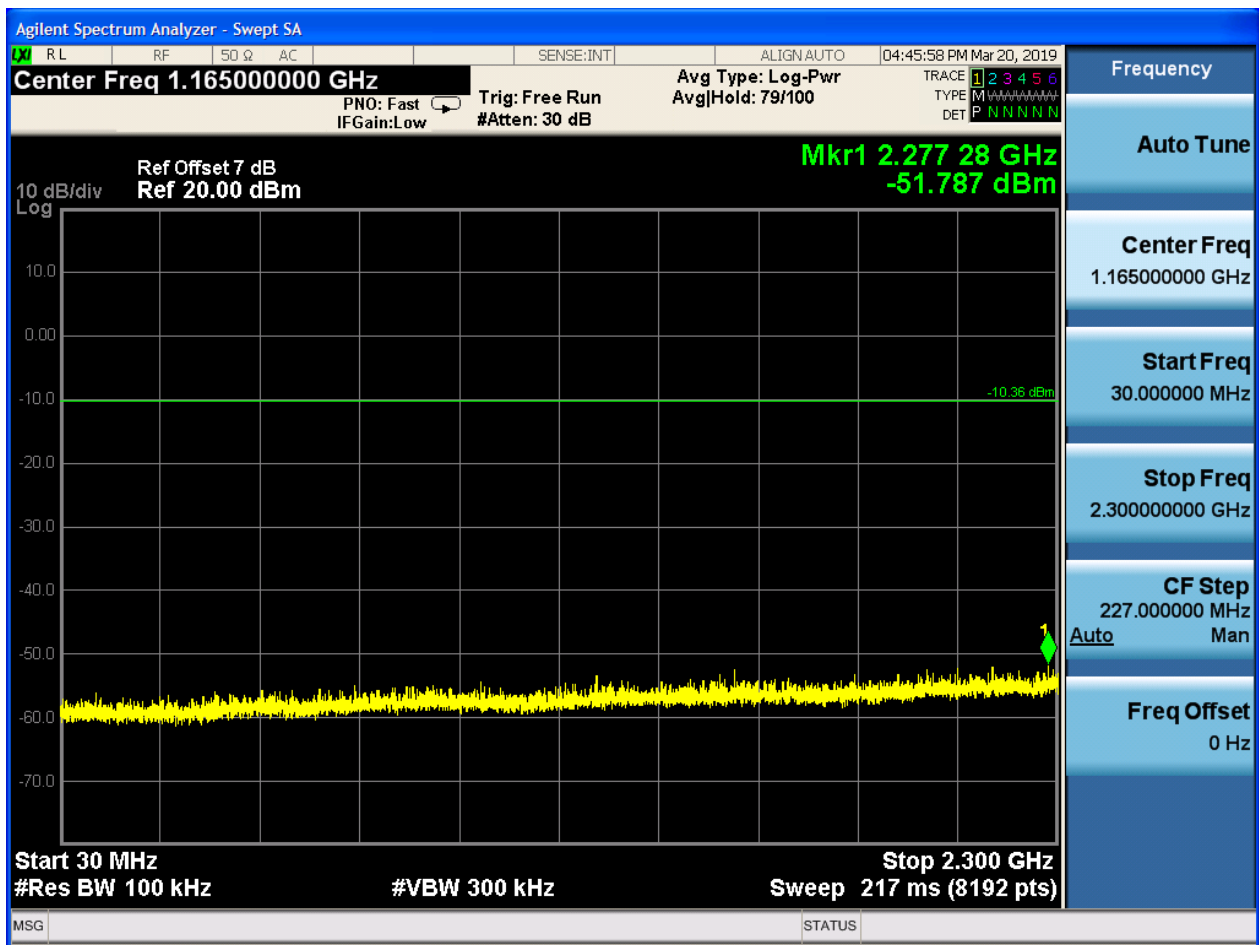
2.6.1 Pref

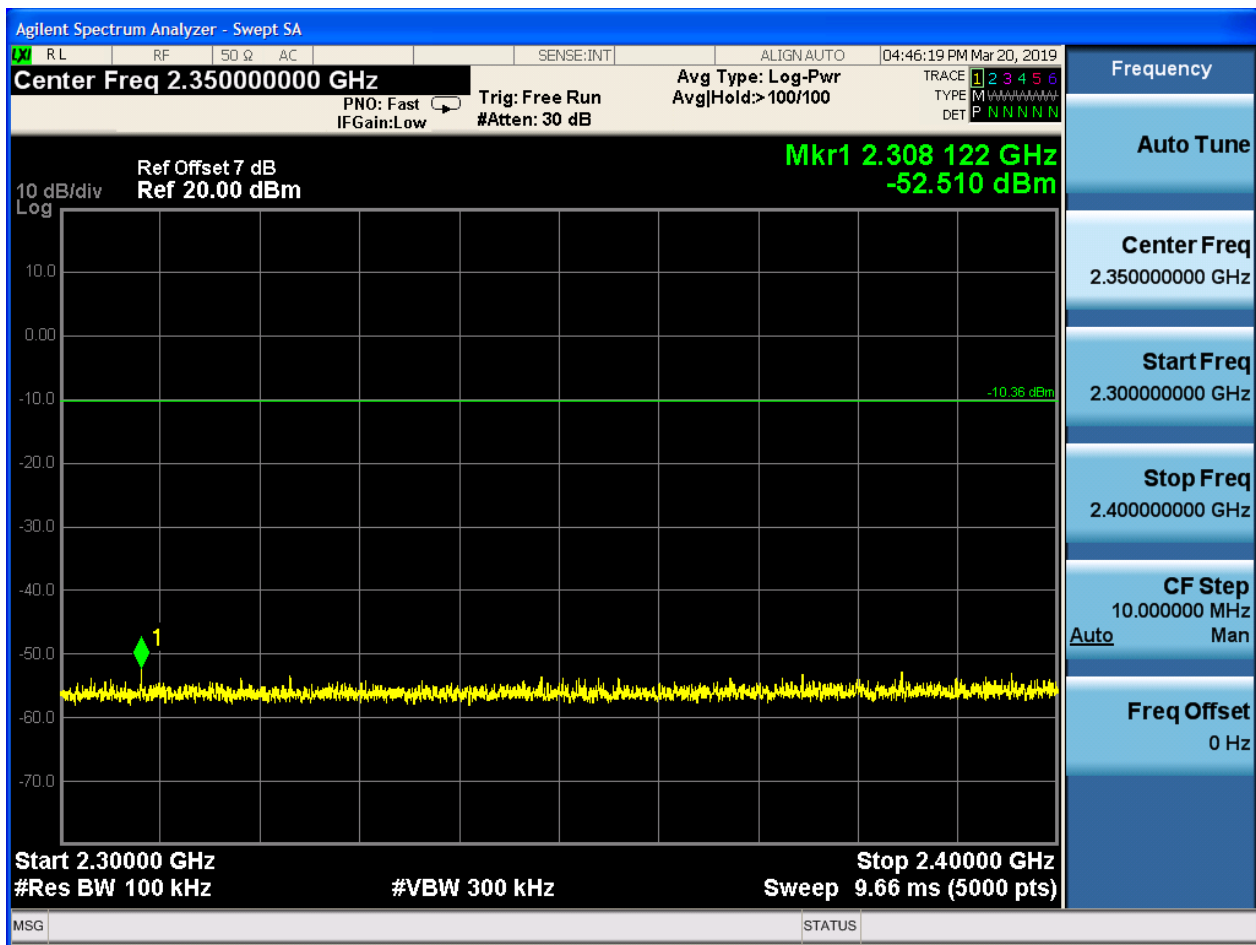


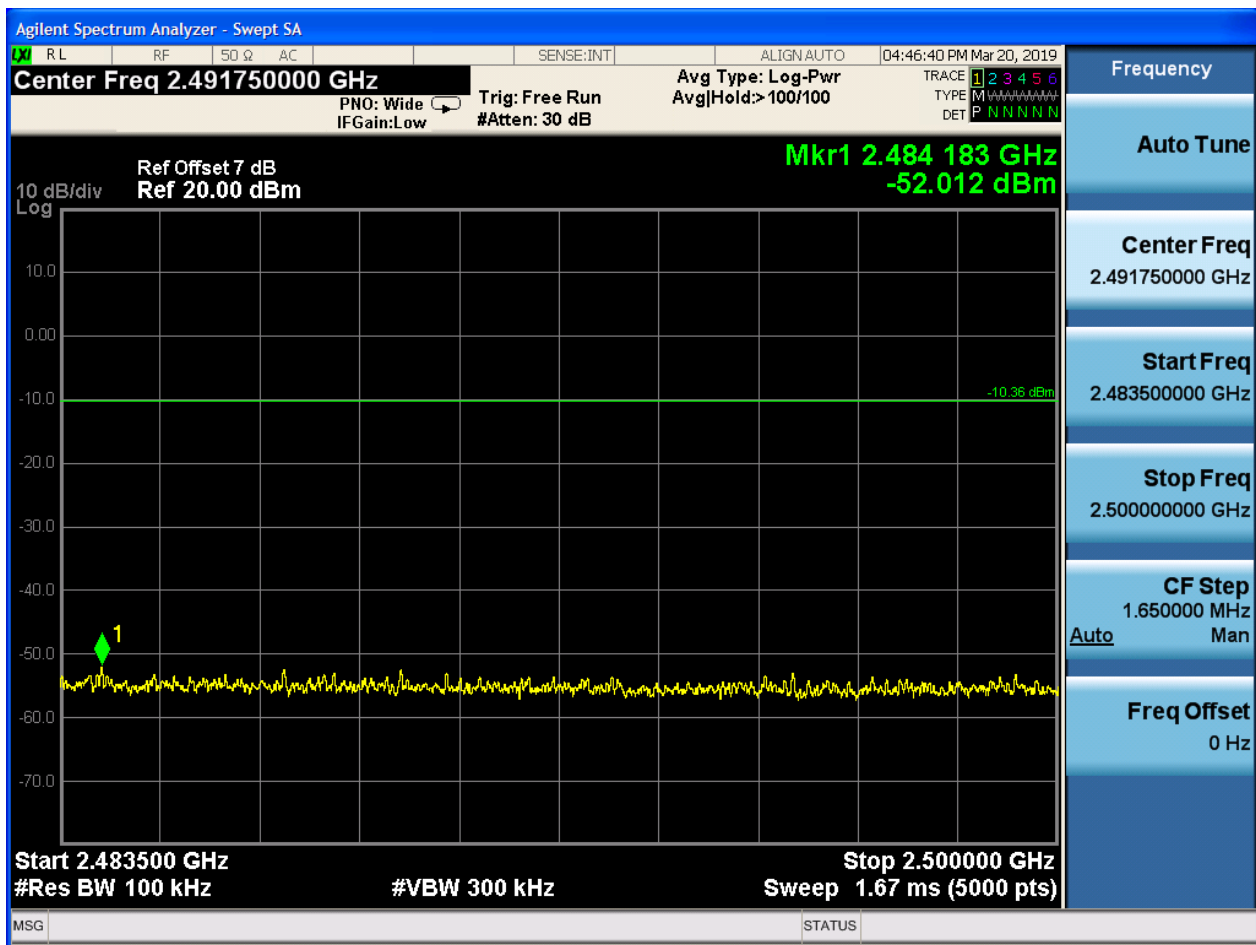
2.6.2 Puw







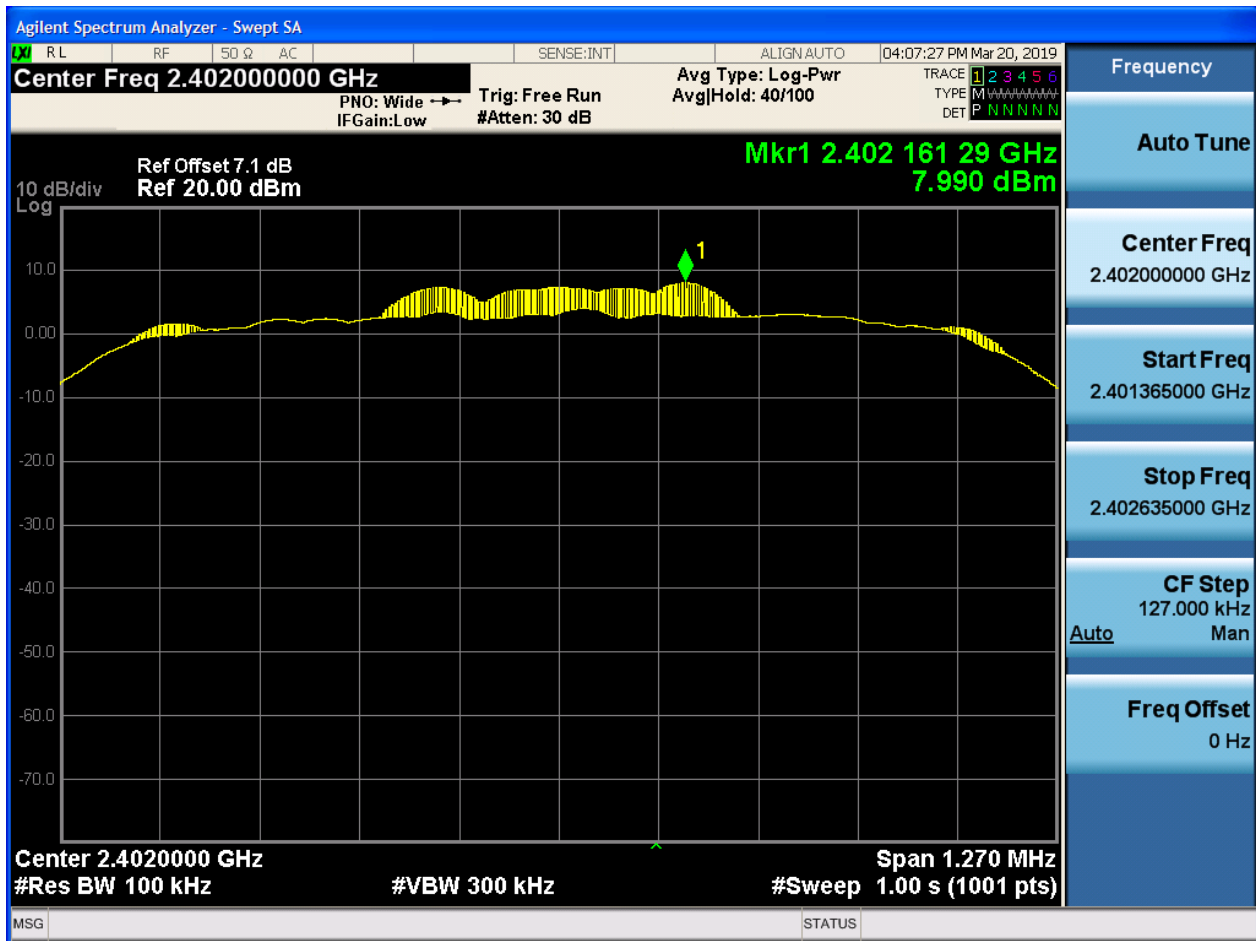






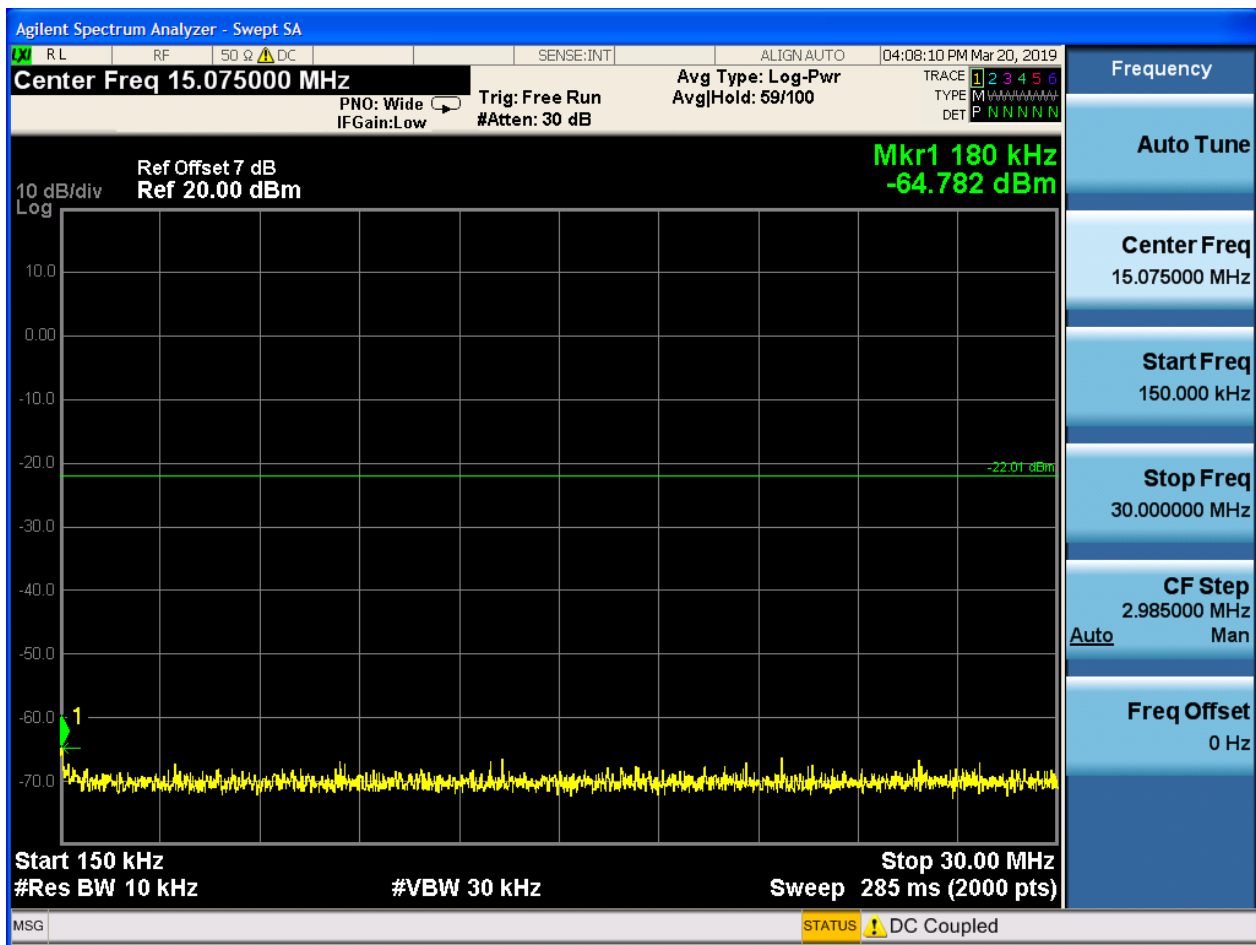
2.7 TM3_3DH5_Ch0

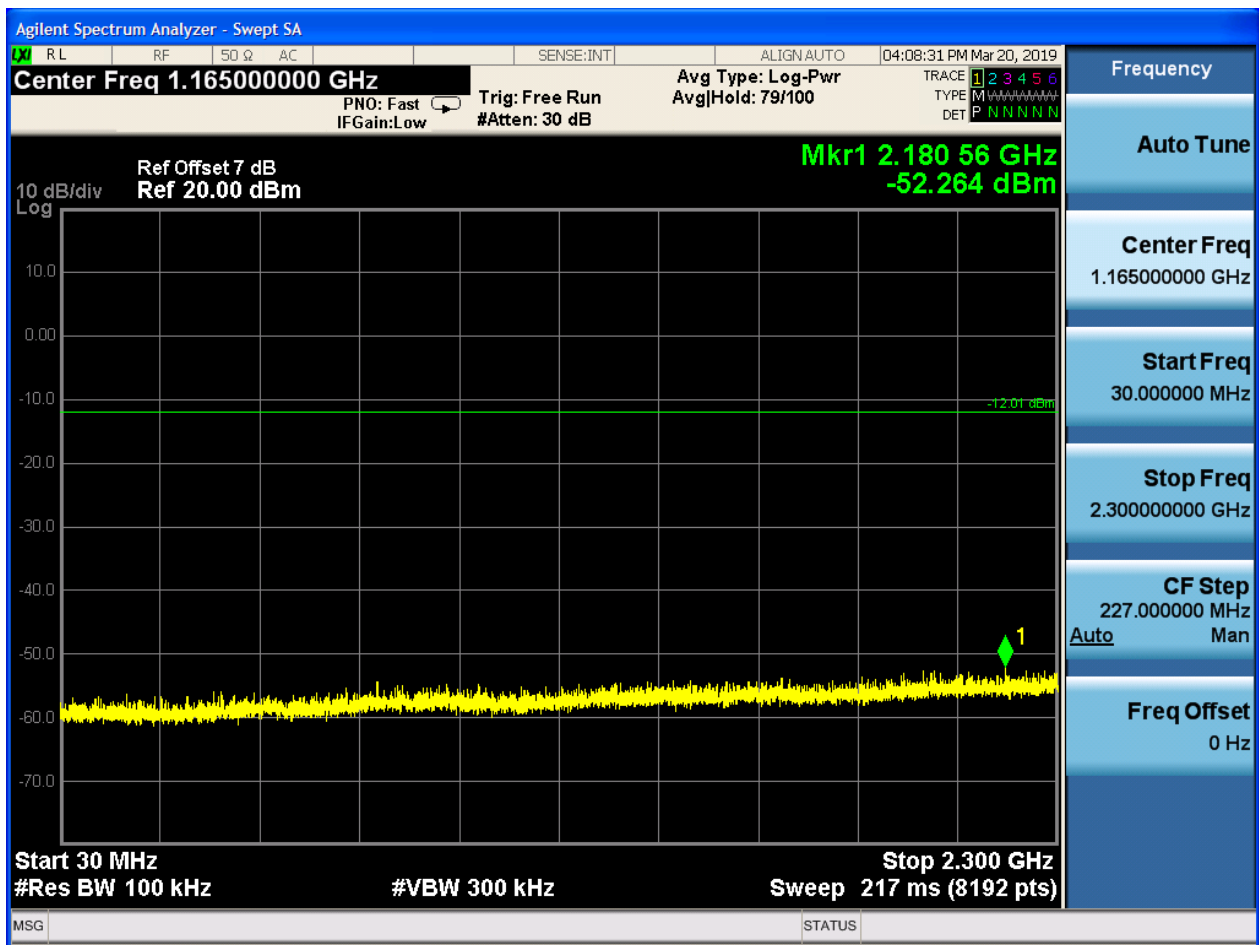
2.7.1 Pref

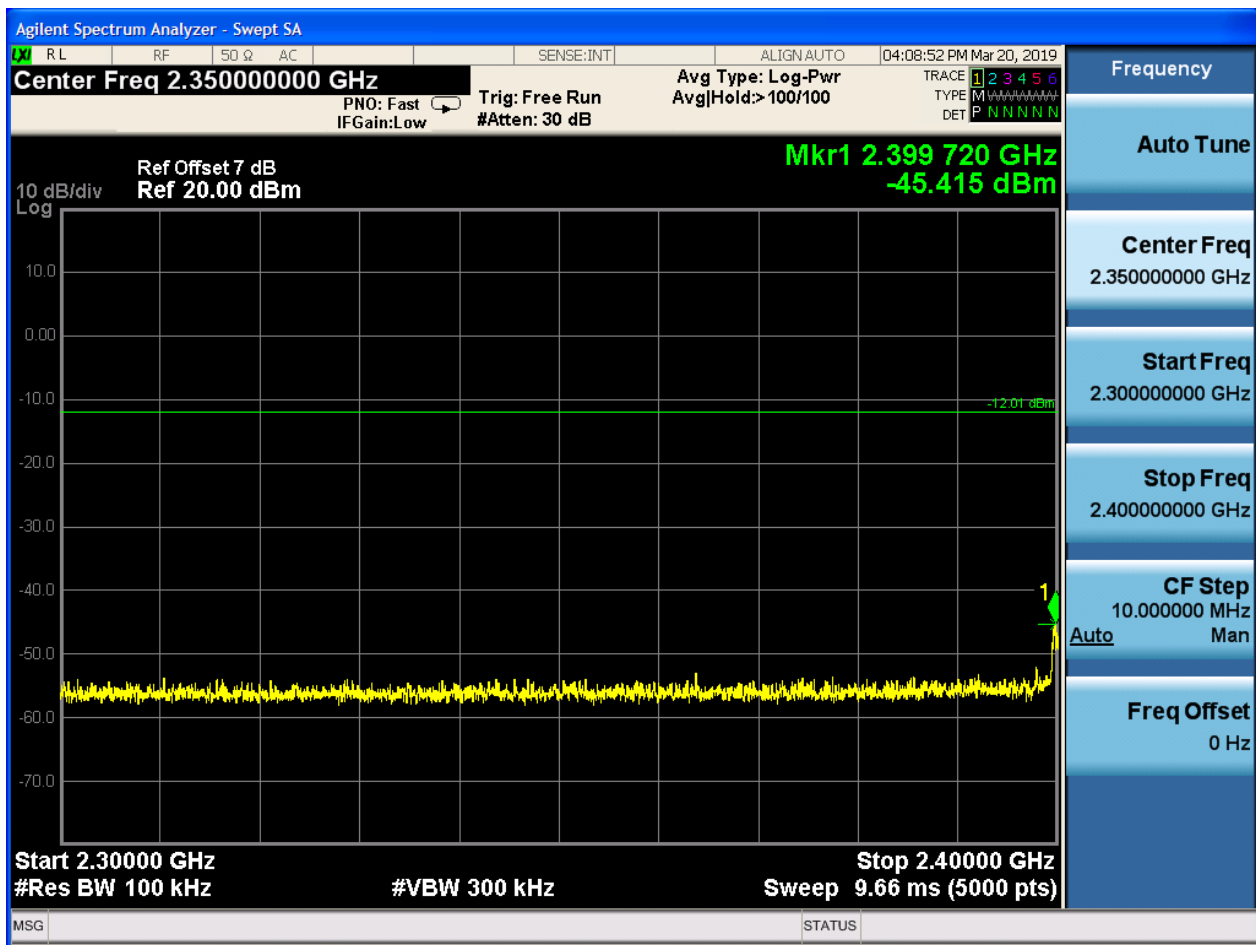


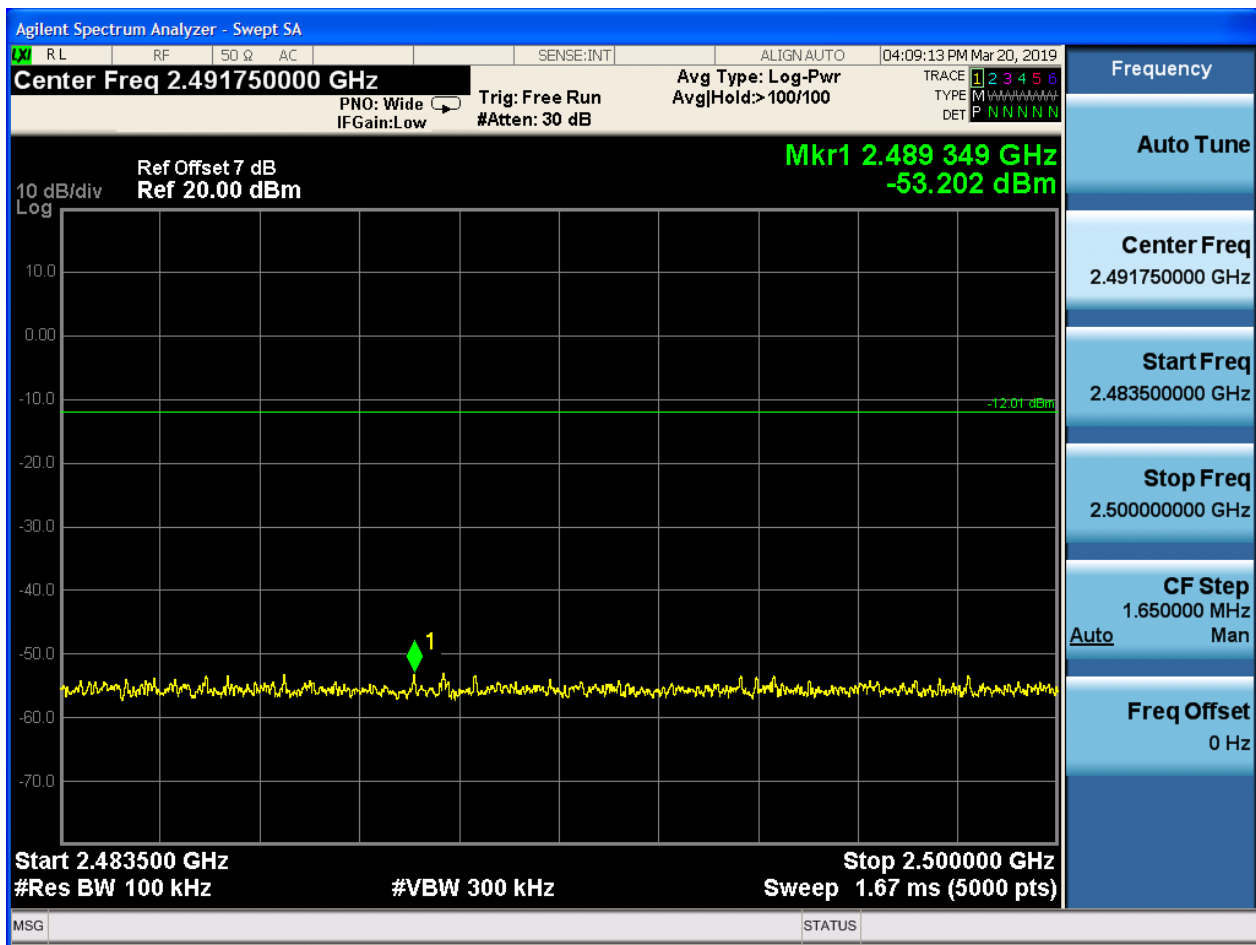
2.7.2 Puw

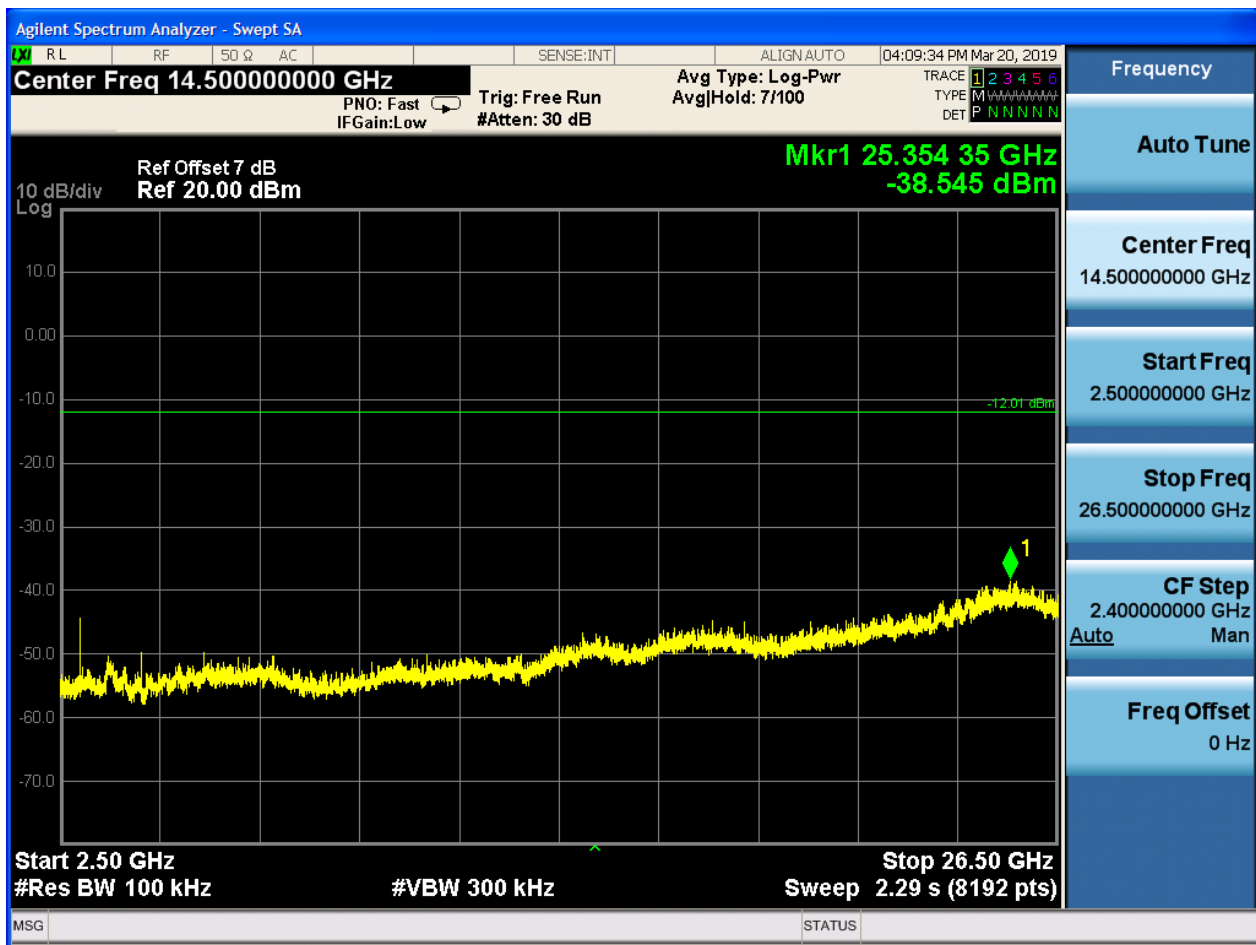






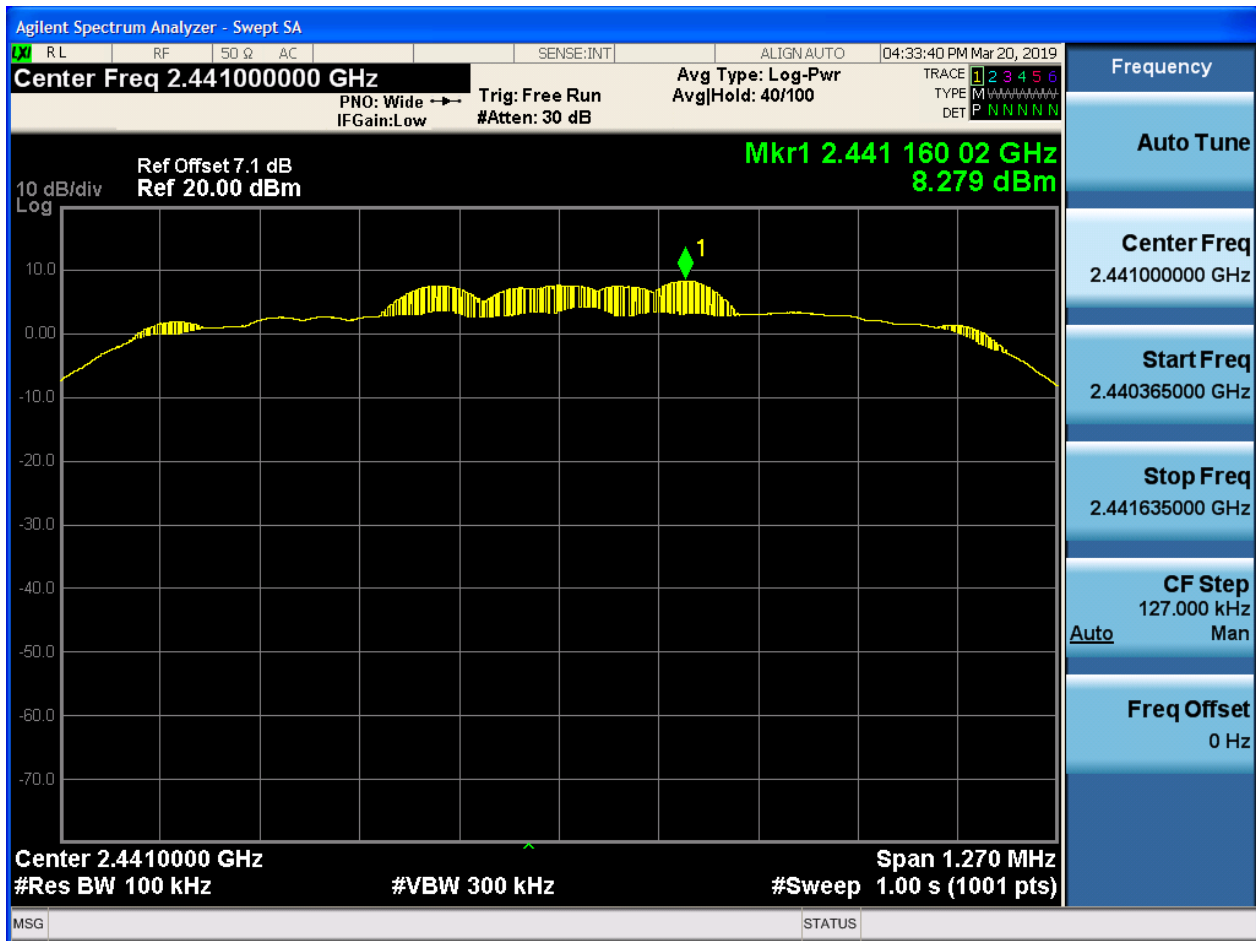




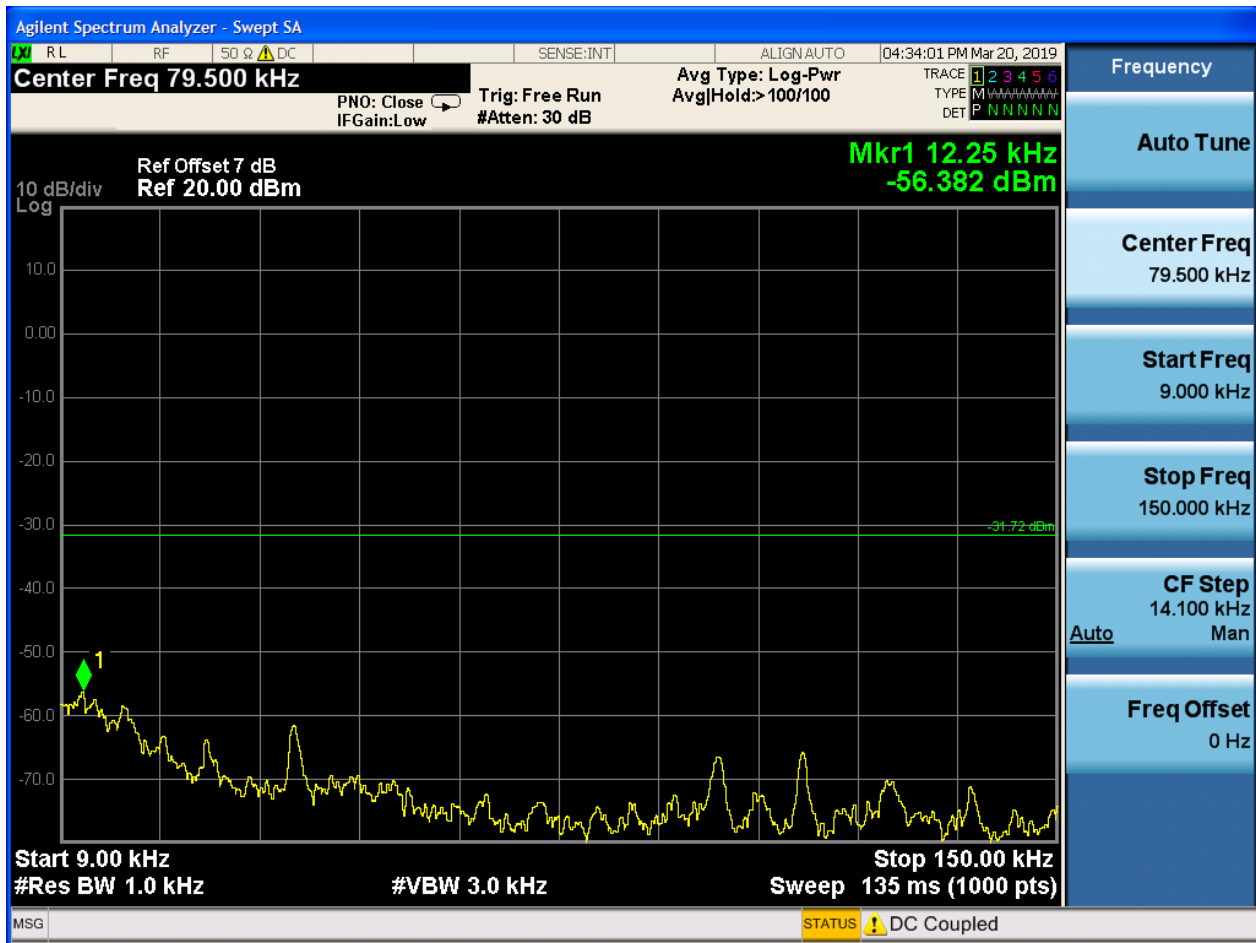


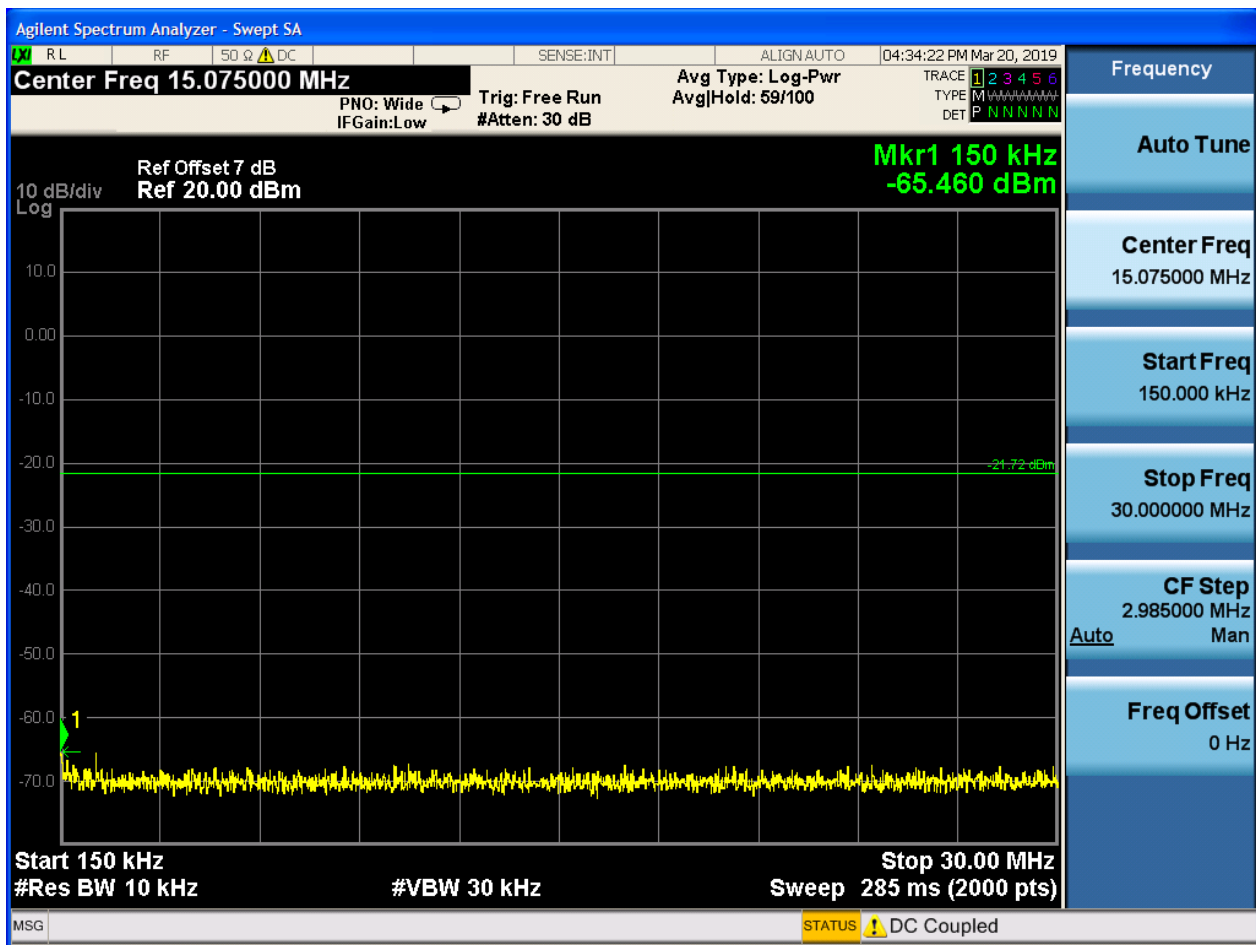
2.8 TM3_3DH5_Ch39

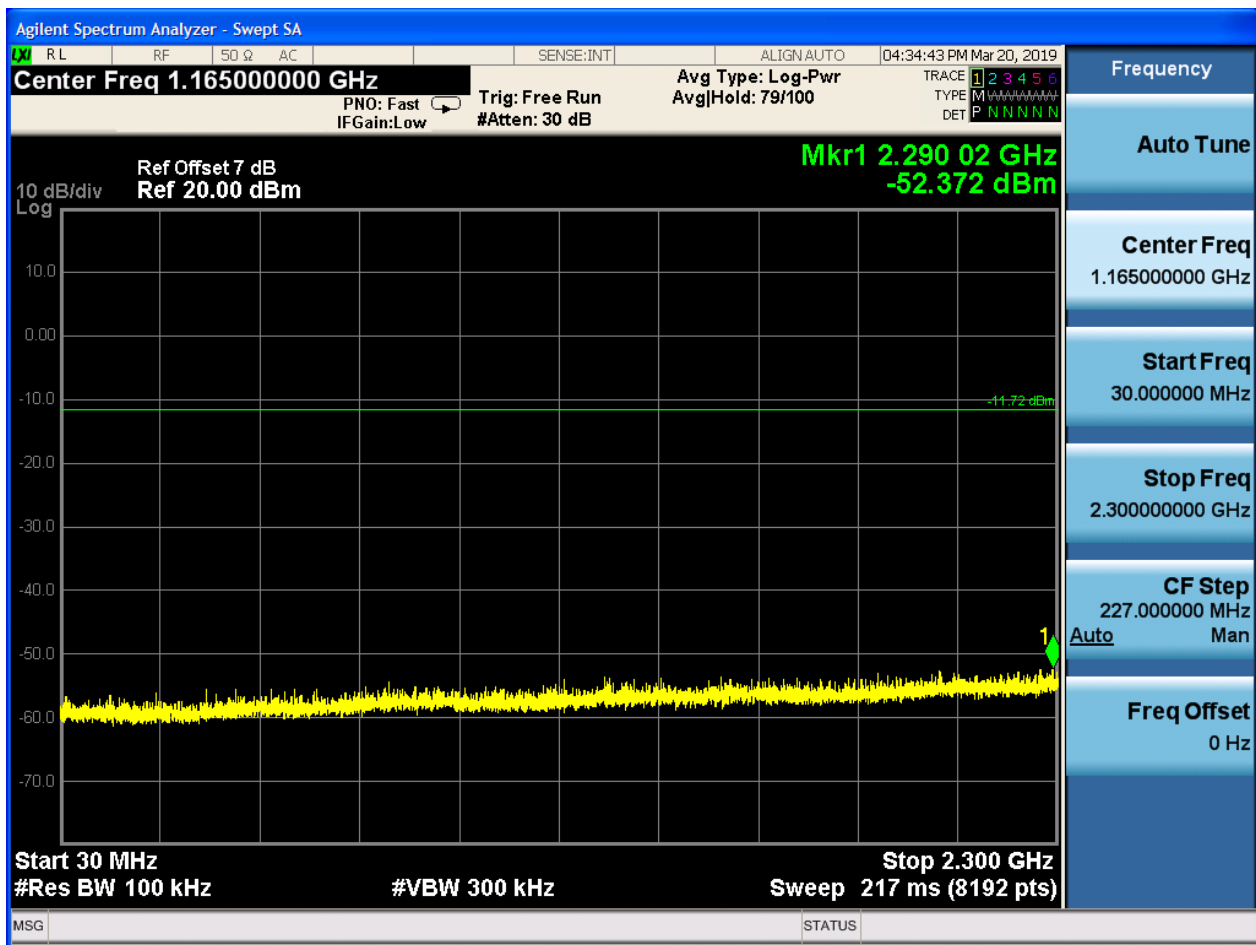
2.8.1 Pref

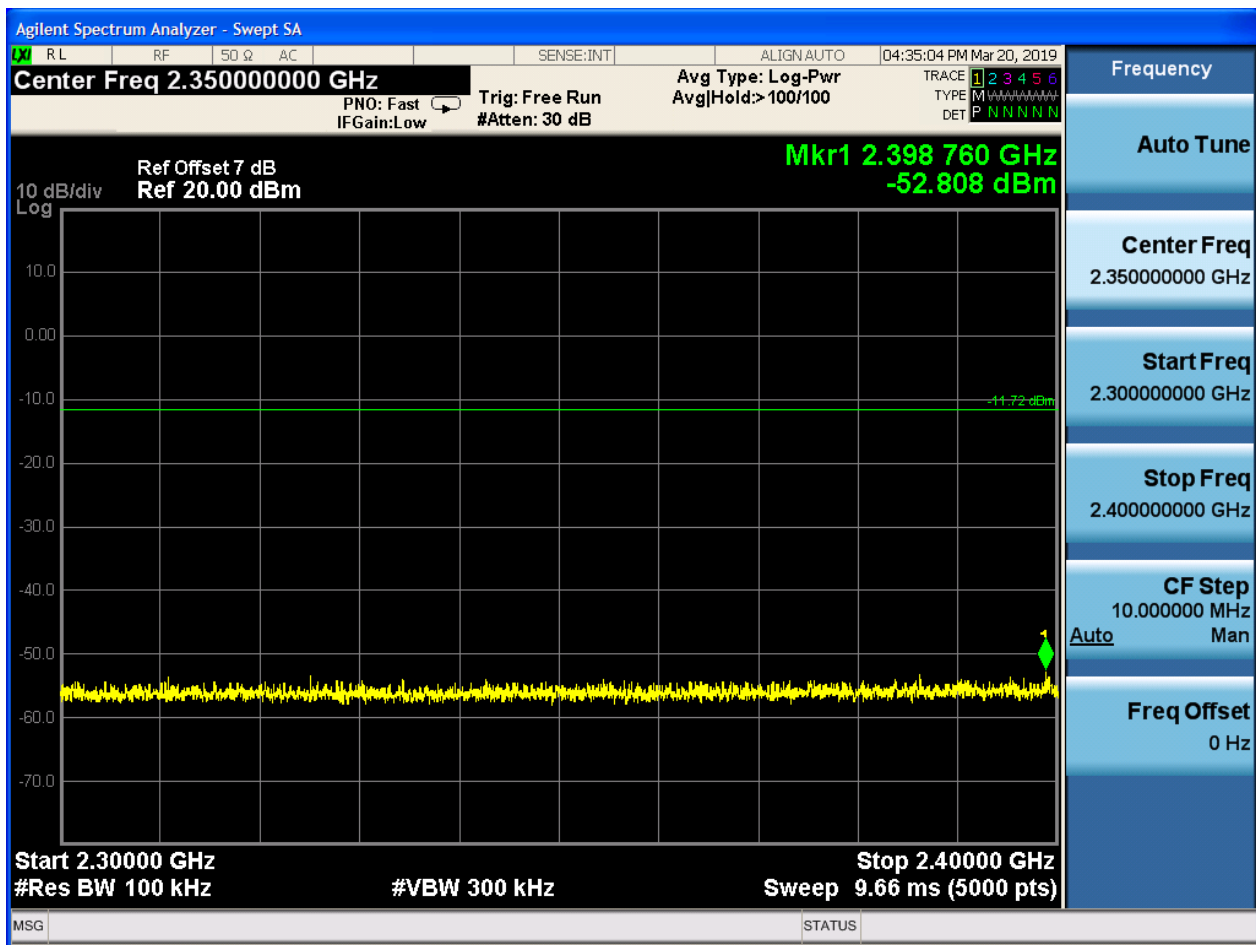


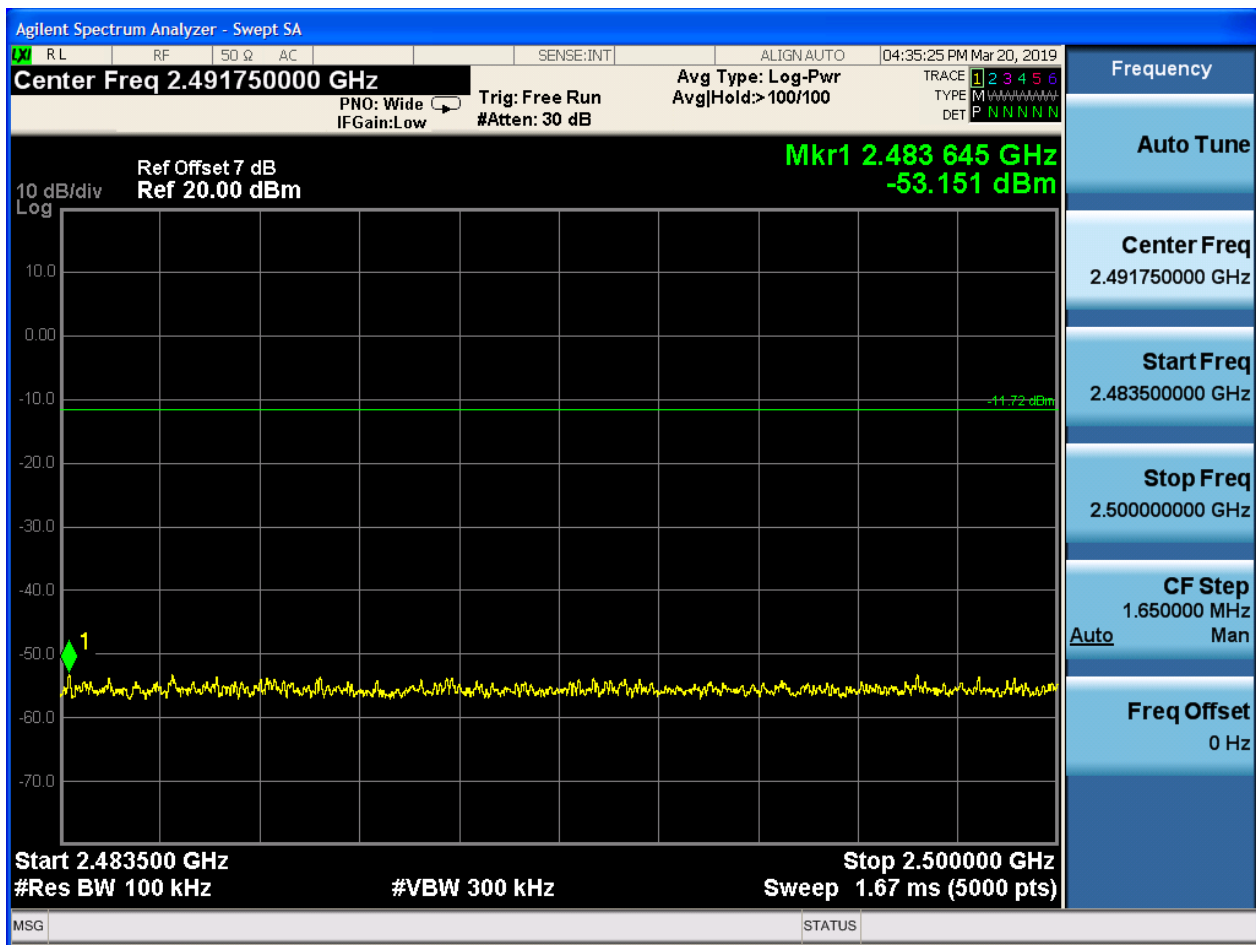
2.8.2 Puw

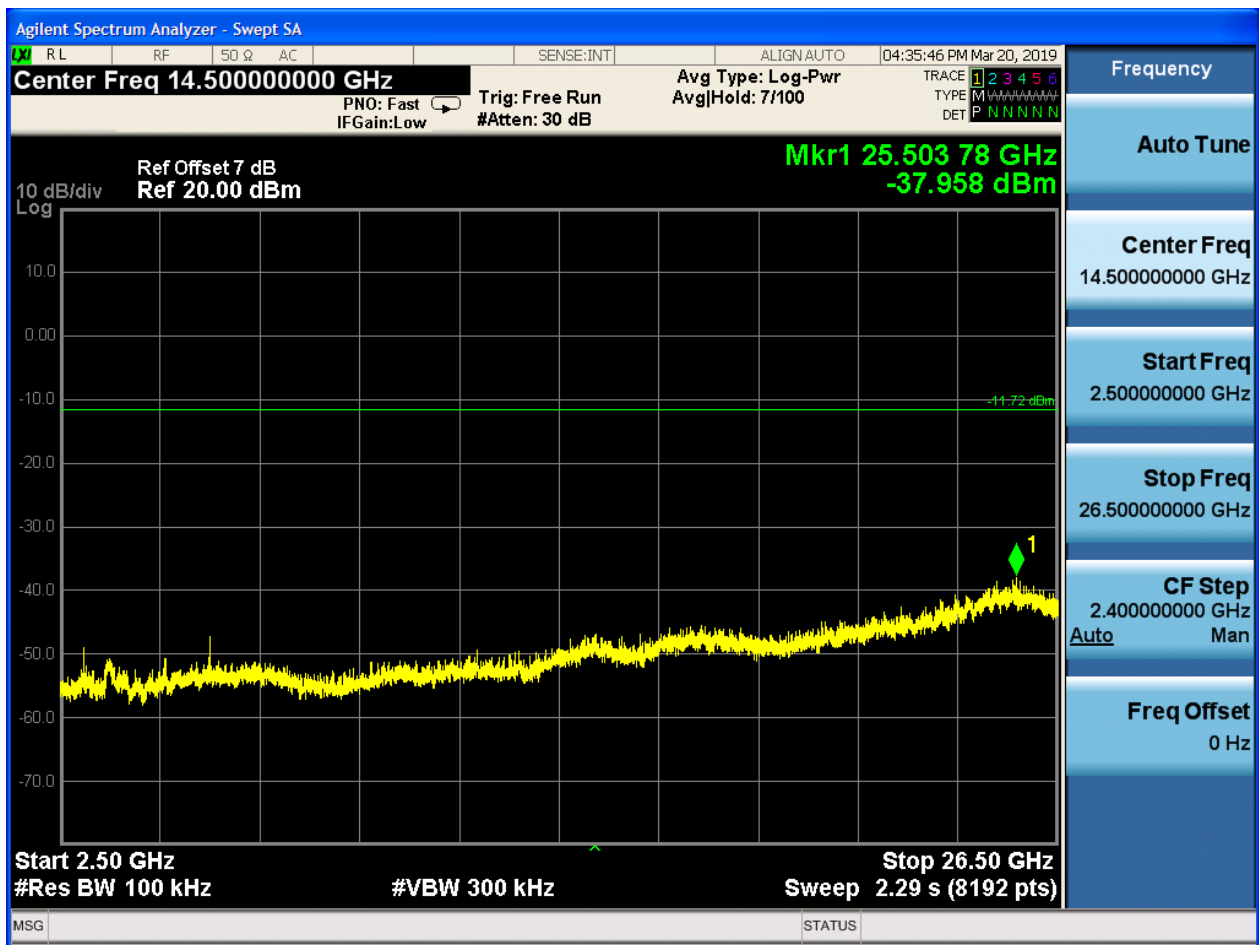






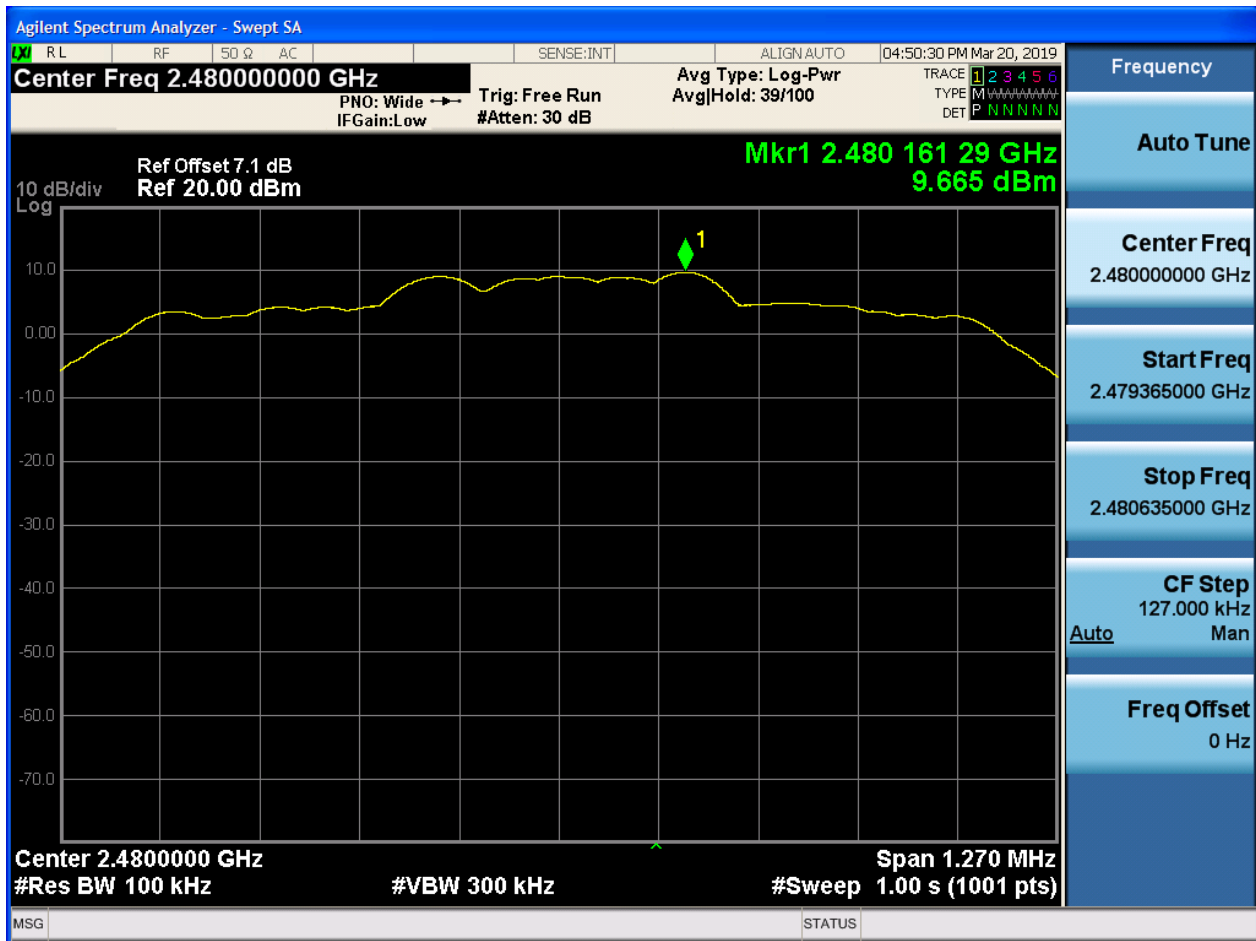




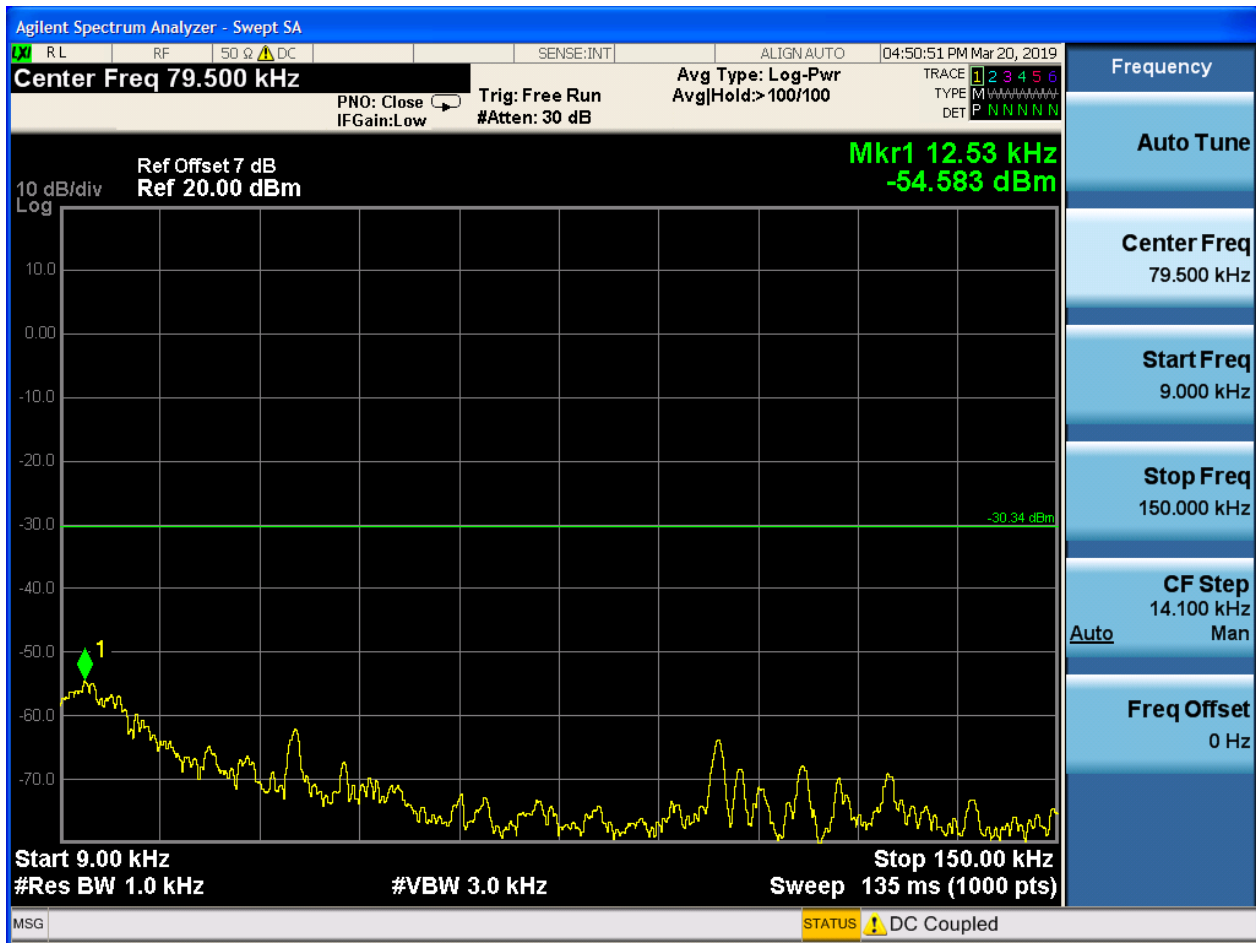


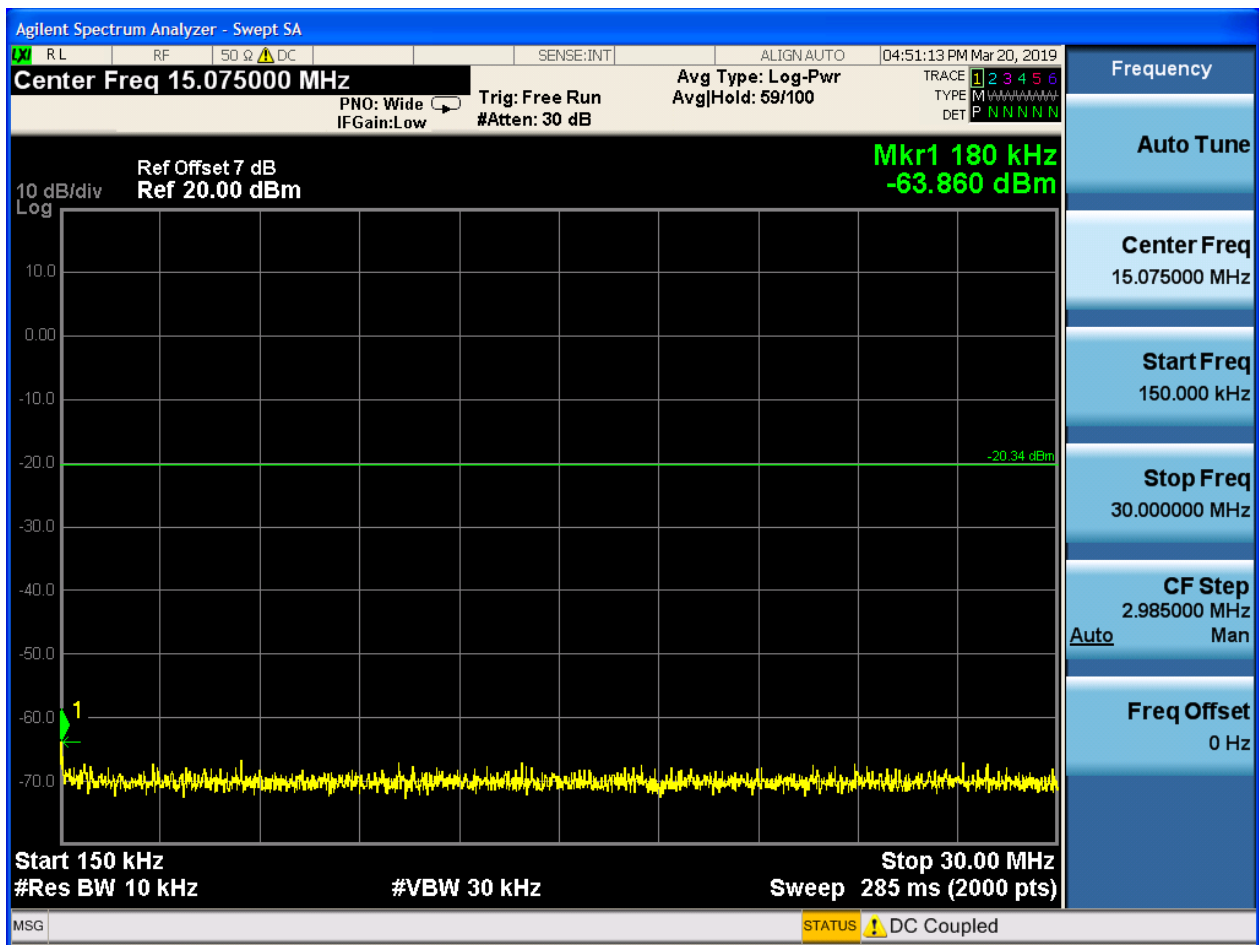
2.9 TM3_3DH5_Ch78

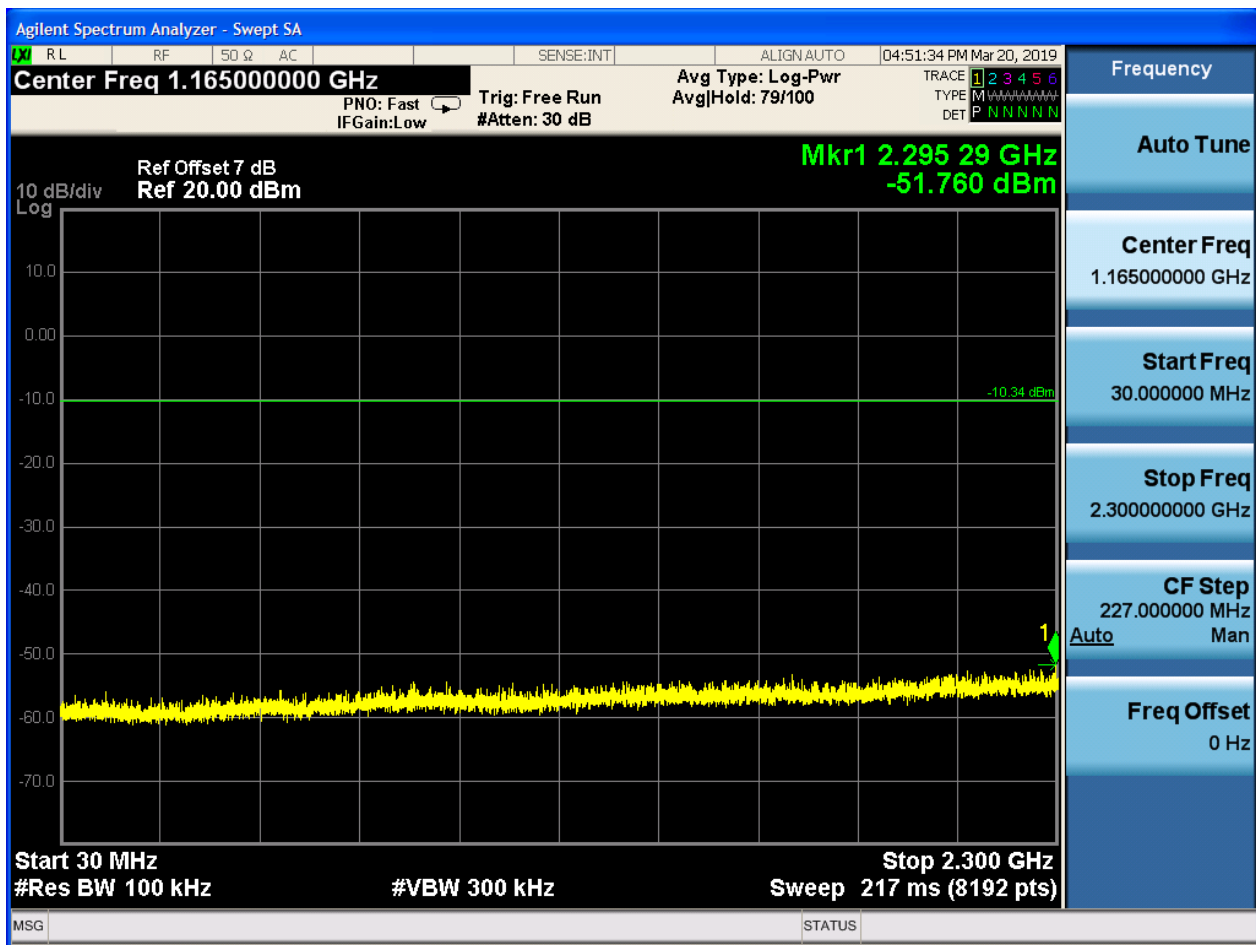
2.9.1 Pref

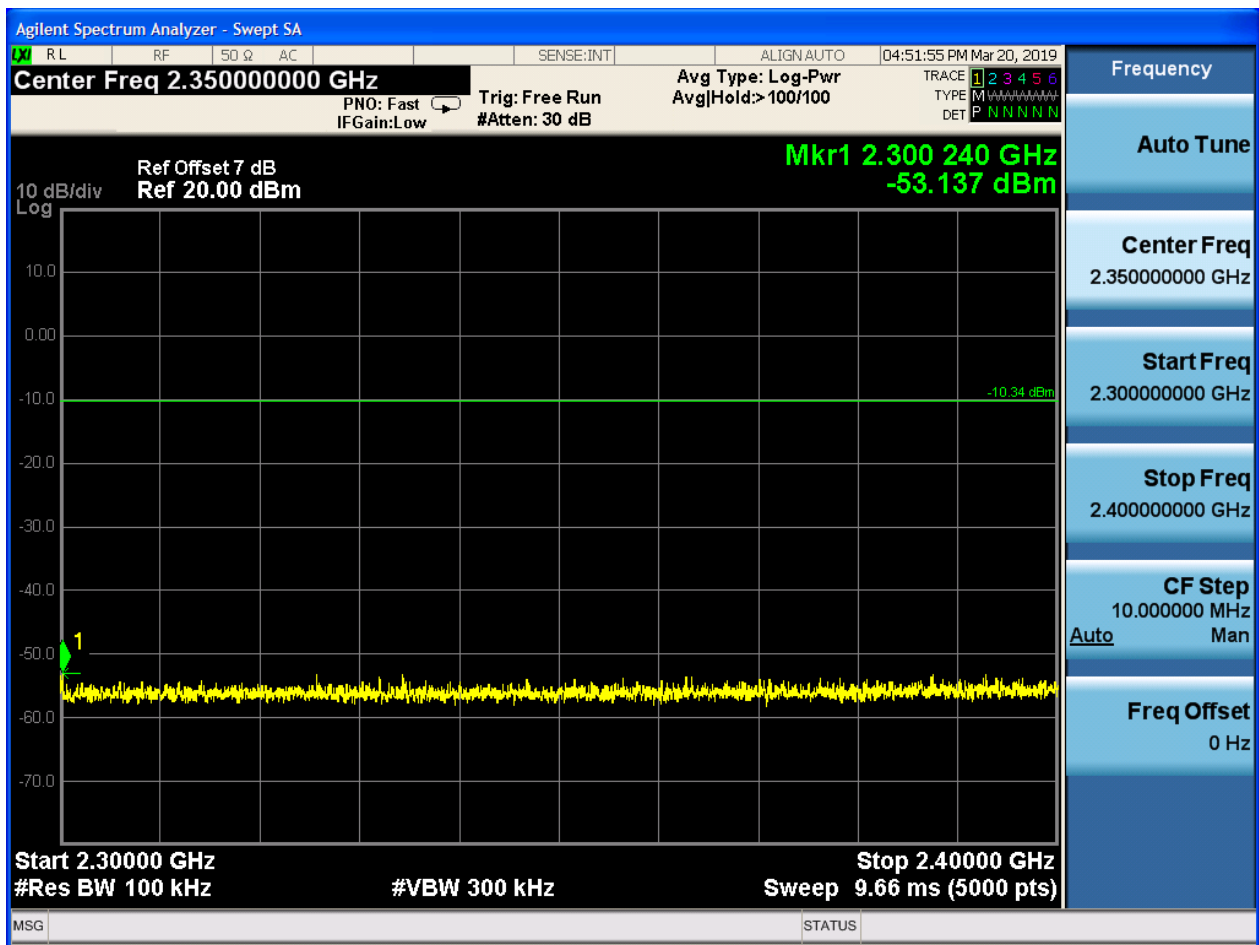


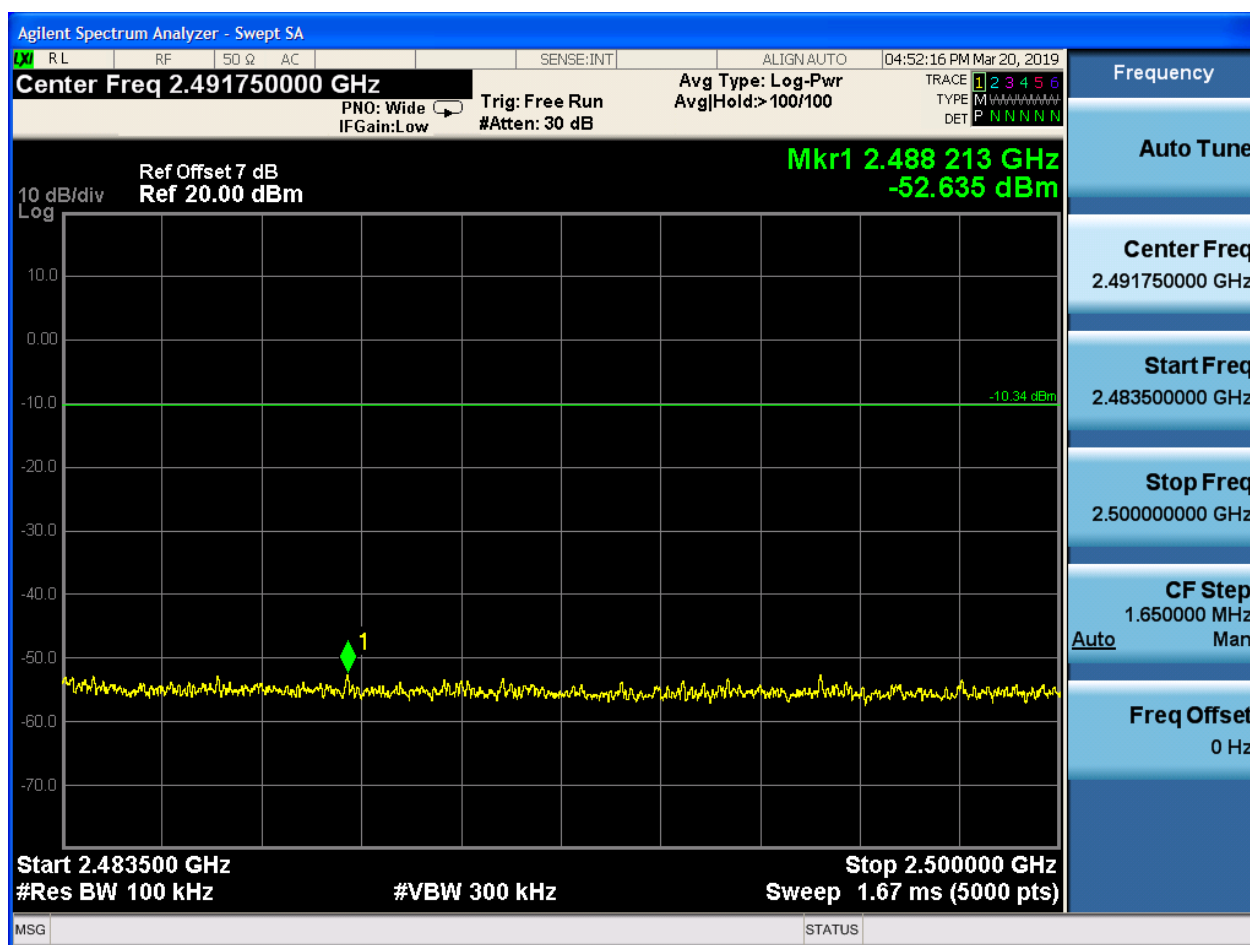
2.9.2 Puw













Appendix H: Radiated Emissions in the Restricted Bands

3 Result Table

The whole testing range is from “30 MHz to 26.5 GHz (10th harmonics)” is divided into 4 parts according to the test site settings, which are:

- (Part 1): Test range of “30 MHz to 1 GHz”,
- (Part 2): Test range of “18 GHz to 26.5 GHz”.
- (Part 3): Test range of “3 GHz to 18 GHz”, and
- (Part 4): Test range of “1 GHz to 3 GHz”.
- (Part 5): Test range of “18 GHz to 26.5 GHz”.

In this Appendix, only the test results and plots under the worst case can be reported. In the result table, the “< Limit” denotes that “Not found obvious spikes or see marked spikes on plots and listed emissions records”.

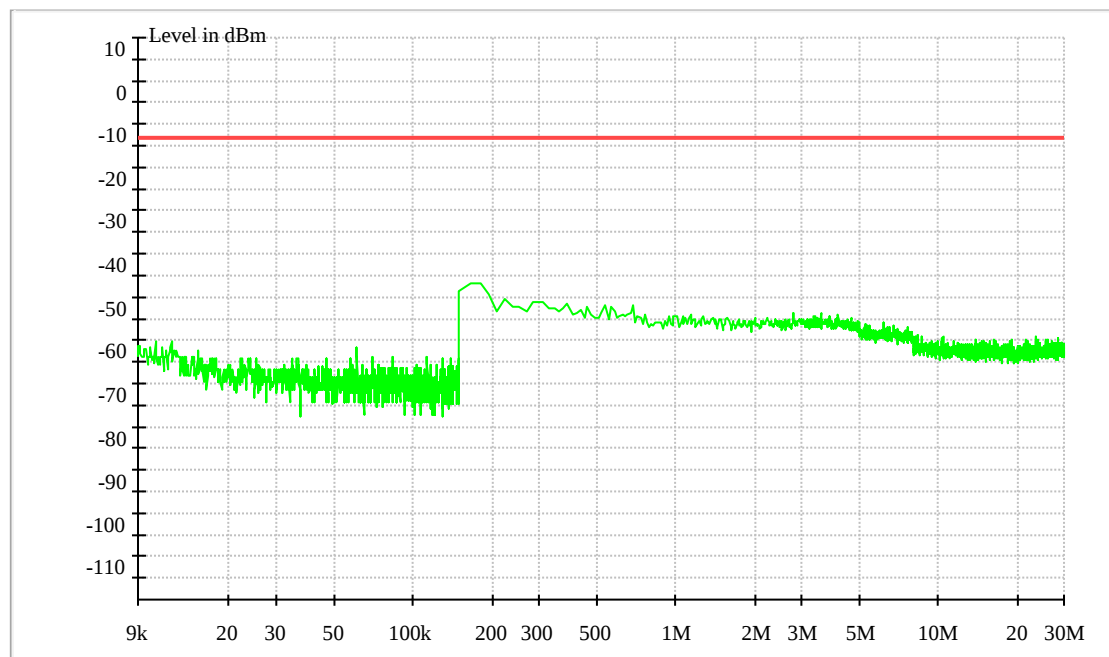
Test Range	EUT Conf.	Emissions	Verdict
30 MHz to 1 GHz	TM1_DH5_Ch0 (Worst Conf.)	< Limit	Pass
1 GHz to 3 GHz	TM1_DH5_Ch0 (Worst Conf.)	< Limit	Pass
	TM1_DH5_Ch78 (Worst Conf.)	< Limit	Pass
3 GHz to 18 GHz	TM1_DH5_Ch0 (Worse Conf.)	< Limit	Pass
18 GHz to 26.5 GHz	TM1_DH5_Ch0 (Worst Conf.)	< Limit	Pass

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

4 Result Plot

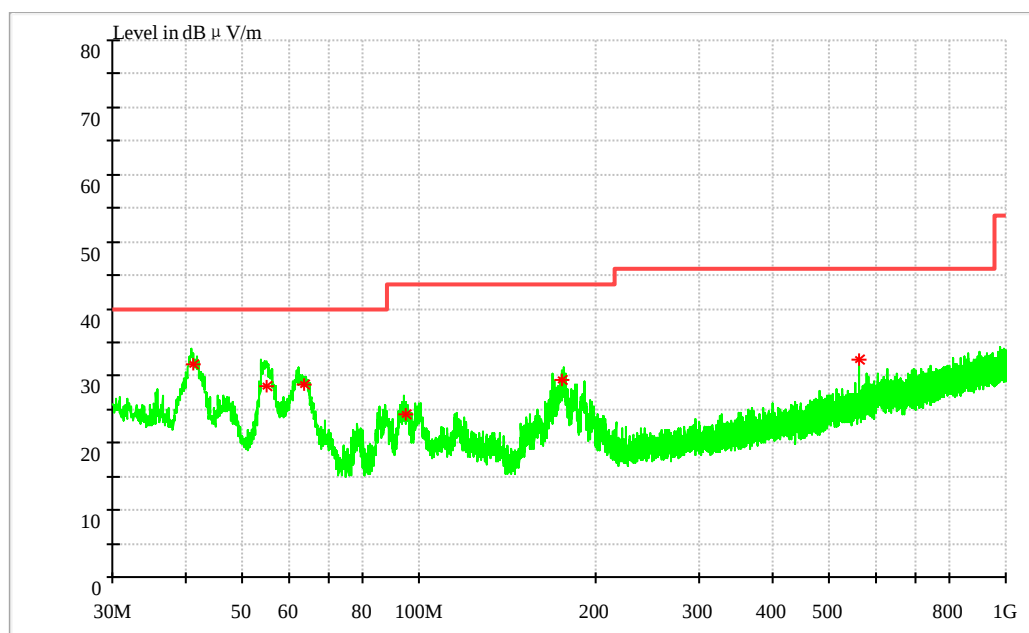
Part 1: Testing Range of “9 kHz to 30MHz”

Note 1: The test results and plot for testing range of “9 kHz to 30 MHz” 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.



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).



MEASUREMENT RESULT: QP Detector

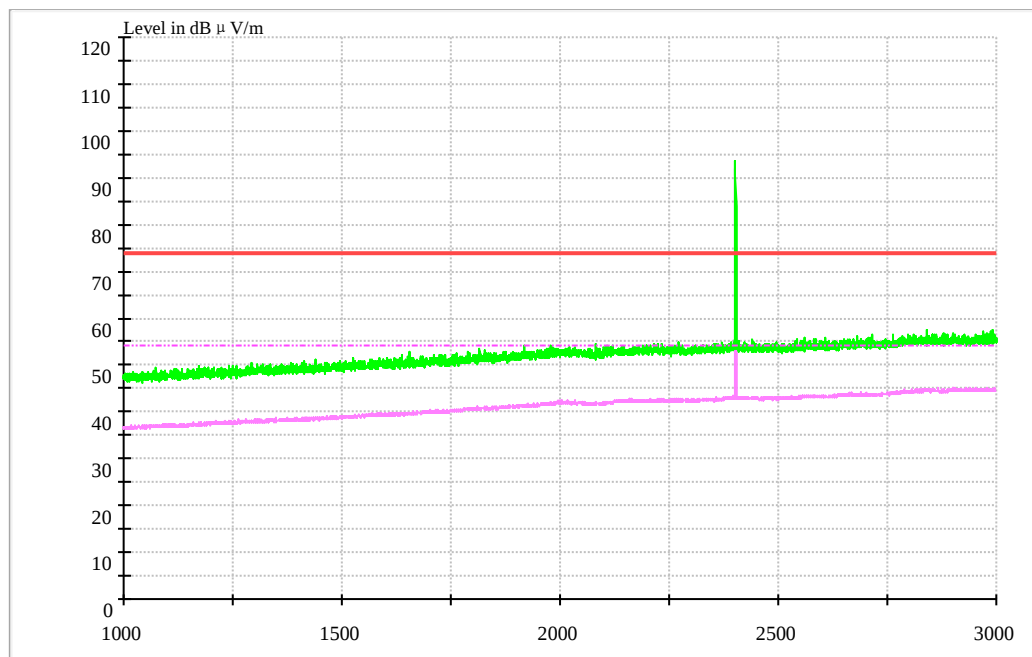
Frequency (MHz)	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Trans d. (dB)
41.314940	31.83	40.00	8.17	100.0	V	345.0	14.5
55.006660	28.37	40.00	11.63	102.0	V	178.0	13.5
63.486040	28.80	40.00	11.20	100.0	V	33.0	12.0
95.047140	24.32	43.50	19.18	101.0	V	45.0	13.6
175.627480	29.36	43.50	14.14	101.0	V	54.0	10.5
561.617520	32.43	46.00	13.57	100.0	V	125.0	19.7

Note:

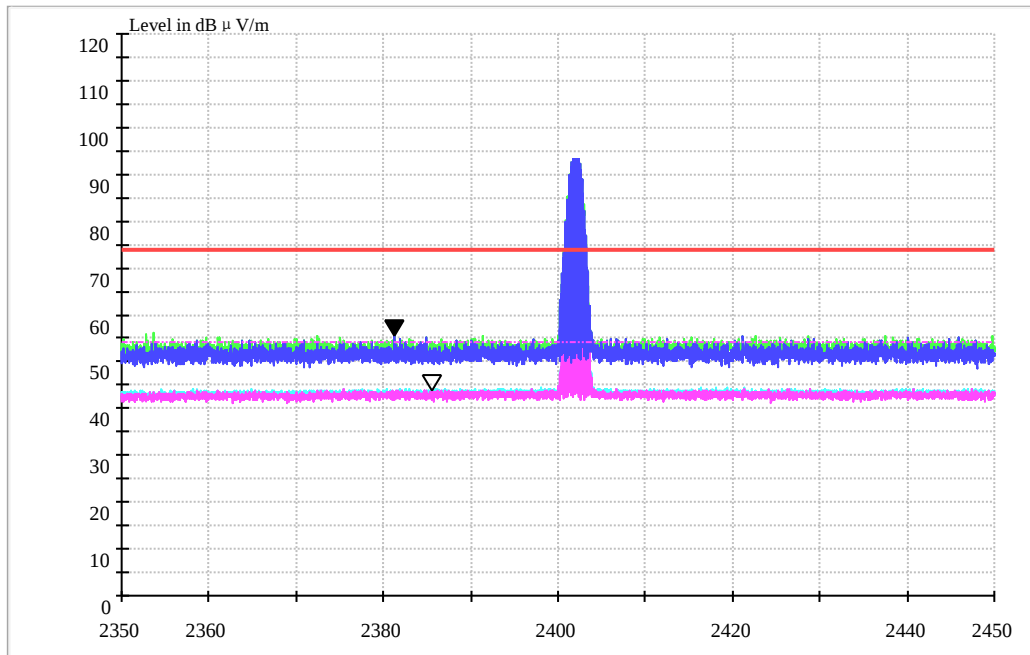
- 1, Level =Reading level by receiver + Transd (Antenna factor + cable loss – preamplifier gain)
The reading level is calculated by software which is not shown in the sheet.
- 2, Margin=Limit - Level

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

- 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 dB μ V/m) and Average Limit (54 dB μ V/m).
- Note 3: The peak spike exceeds the limit line is EUT’s operating frequency.



Channel 0



MEASUREMENT RESULT: PK Detector

Frequency (MHz)	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Transd. (dB)
2381.2	55.71	74.00	18.29	150.0	V	211.0	-9.3

MEASUREMENT RESULT: AV Detector

Frequency (MHz)	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Height (cm)	Pol	Azimuth h	Transd. (dB)
2385.5	44.26	54.00	9.74	150.0	V	135.0	-9.3

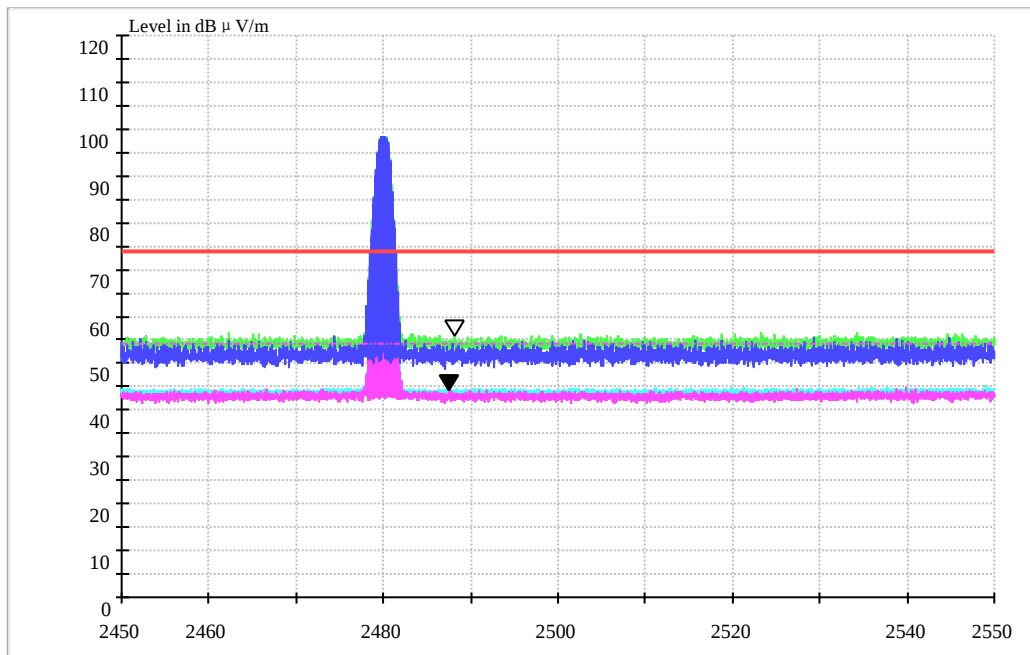
Note:

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

Channel 78



MEASUREMENT RESULT: PK Detector

Frequency (MHz)	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Height (cm)	Pol	Azimuth h (deg)	Transd. (dB)
2488.2	56.21	74.00	17.79	150.0	V	73.0	-9.6

MEASUREMENT RESULT: AV Detector

Frequency (MHz)	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Height (cm)	Pol	Azimuth h	Transd. (dB)
2487.4	44.58	54.00	9.42	150.0	V	133.0	-9.6

Note:

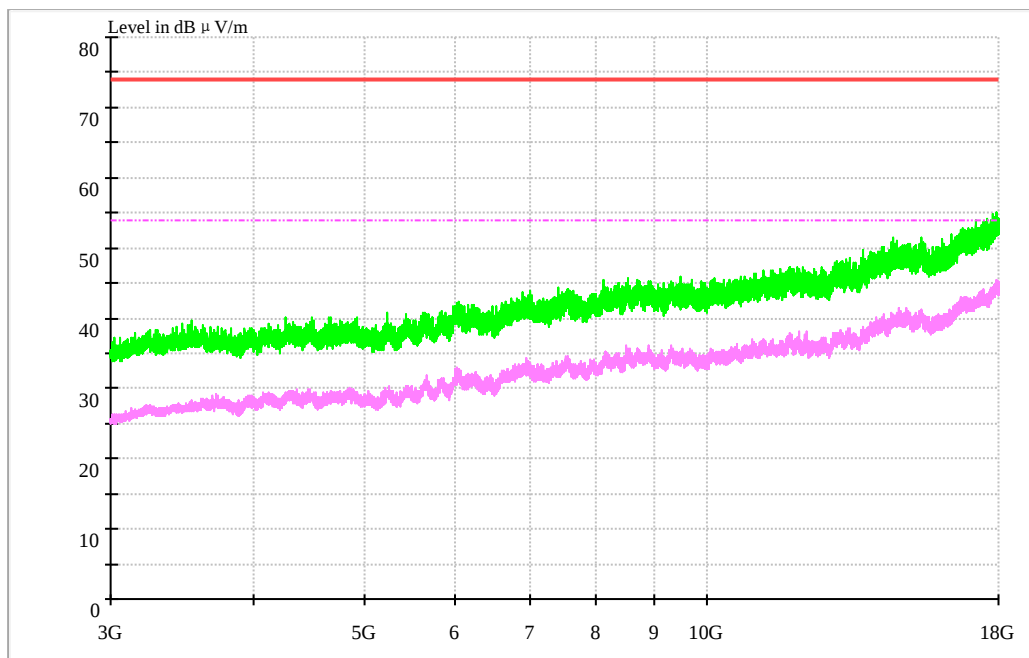
1, Level =Reading level by receiver + Transd (Antenna factor + cable loss – preamplifier gain)

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

2, Margin=Limit - Level

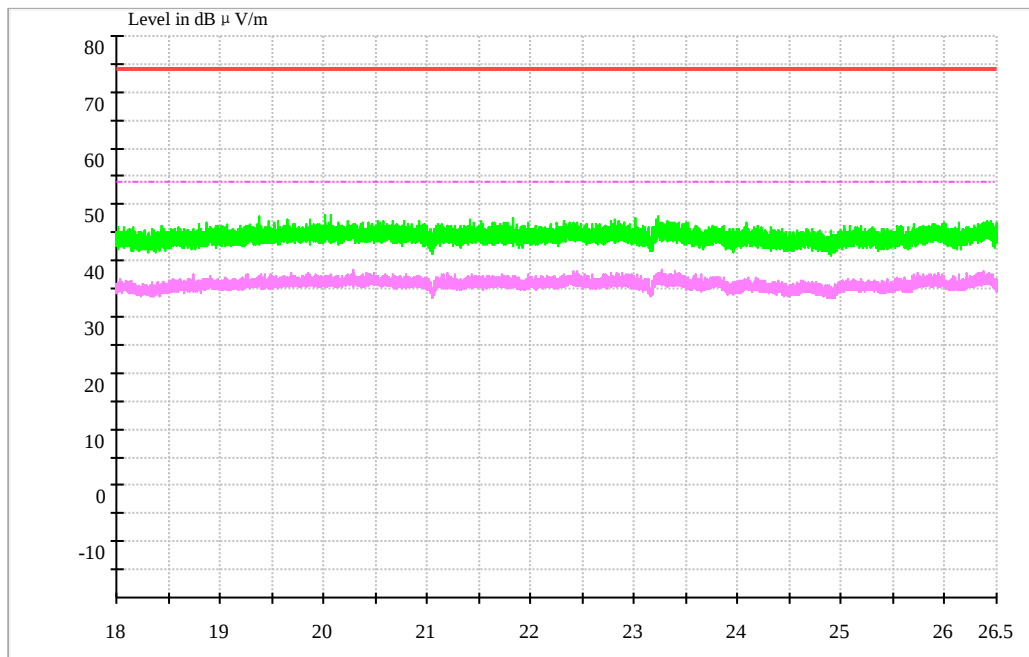
Part 4: Testing Range of “3 GHz to 18 GHz”

- 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 dB μ V/m) and Average Limit (54 dB μ V/m).



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

- Note 1: The test results and plot for testing range of “18 GHz to 26.5 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 “18 GHz to 26.5 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 dB μ V/m) and Average Limit (54 dB μ V/m).



Appendix I: Conducted Emission at Power Port

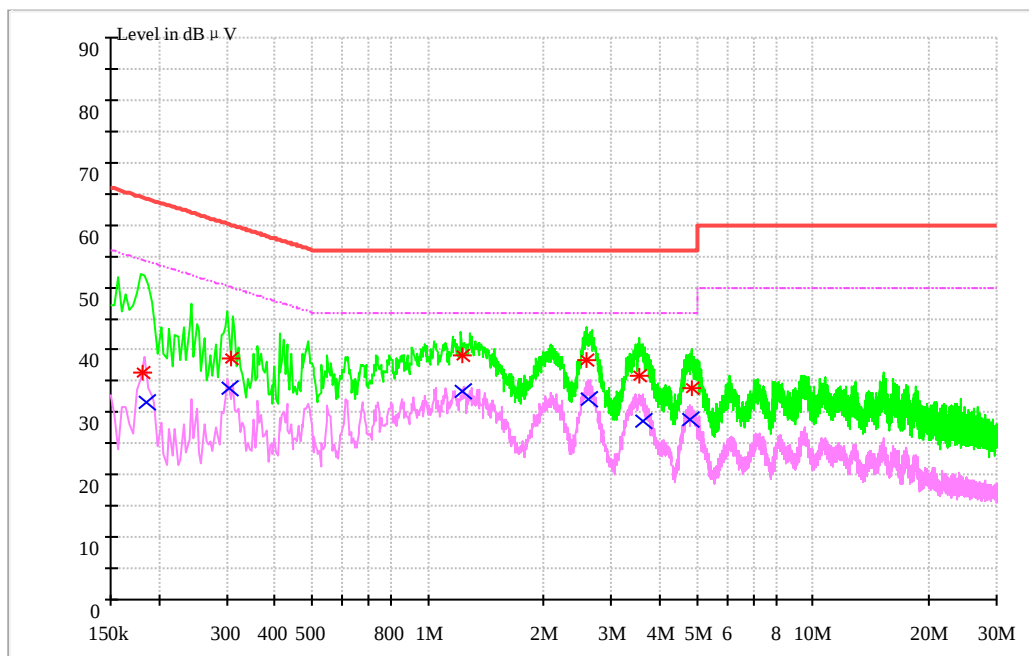
1 Result Table

In this Appendix, only the test results and plots under the worst case can be reported.

EUT Conf.	Maximum Emissions	Verdict
TM1_DH5_Ch78	Not found obvious spikes or see marked spikes on plots and listed emissions records.	Pass

2 Result Plot

Channel 78



MEASUREMENT RESULT: QP Detector

Frequency (MHz)	Level (dB μ V)	Limit (dB μ V)	Transd. (dB)	Margin (dB)	Line	PE
0.182048	36.27	64.39	9.7	28.12	N	FLO
0.307327	38.49	60.04	9.7	21.55	L1	FLO
1.224179	39.19	56	9.7	16.81	L1	FLO
2.588385	38.43	56	9.8	17.57	L1	FLO
3.53092	35.83	56	9.8	20.17	L1	FLO
4.842071	33.75	56	9.8	22.25	L1	FLO

MEASUREMENT RESULT: AV Detector

Frequency (MHz)	Level (dB μ V)	Limit (dB μ V)	Transd. (dB)	Margin (dB)	Line	PE
0.185804	31.46	54.22	9.7	22.76	L1	FLO
0.30507	33.91	50.11	9.7	16.2	L1	FLO
1.235833	33.27	46	9.7	12.73	L1	FLO
2.60307	32.14	46	9.8	13.86	L1	FLO
3.61326	28.64	46	9.8	17.36	L1	FLO
4.785769	28.72	46	9.8	17.28	L1	FLO

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

END