



Appendix for Bluetooth BLE

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.

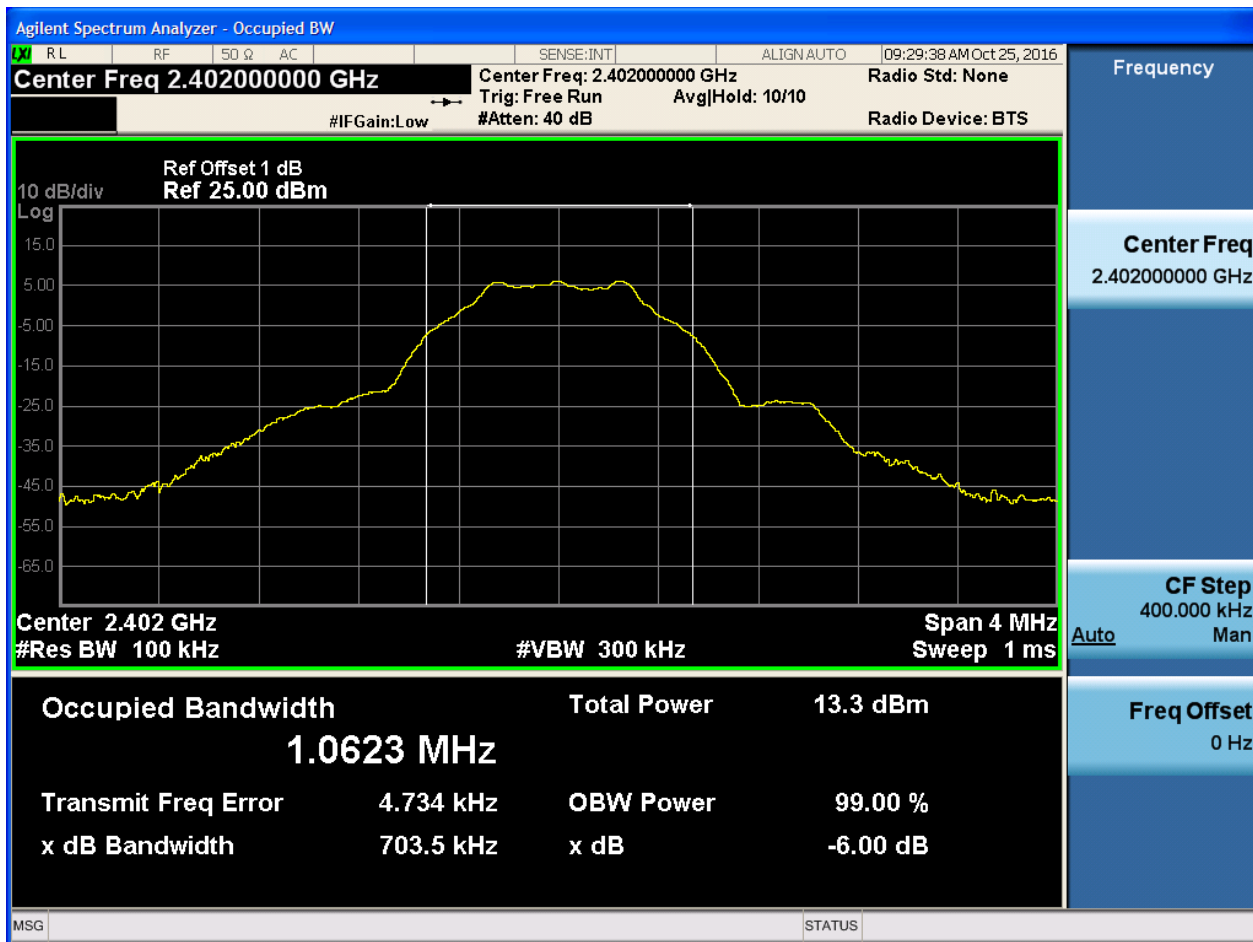
Part I - Test Results

Test Mode	Test Channel	Frequency[MHz]	DTS6dBBW[MHz]	Verdict
TM1 _Ch0	L	2402	0.70	pass
TM1 _Ch19	M	2440	0.71	pass
TM1 _Ch39	H	2480	0.71	pass



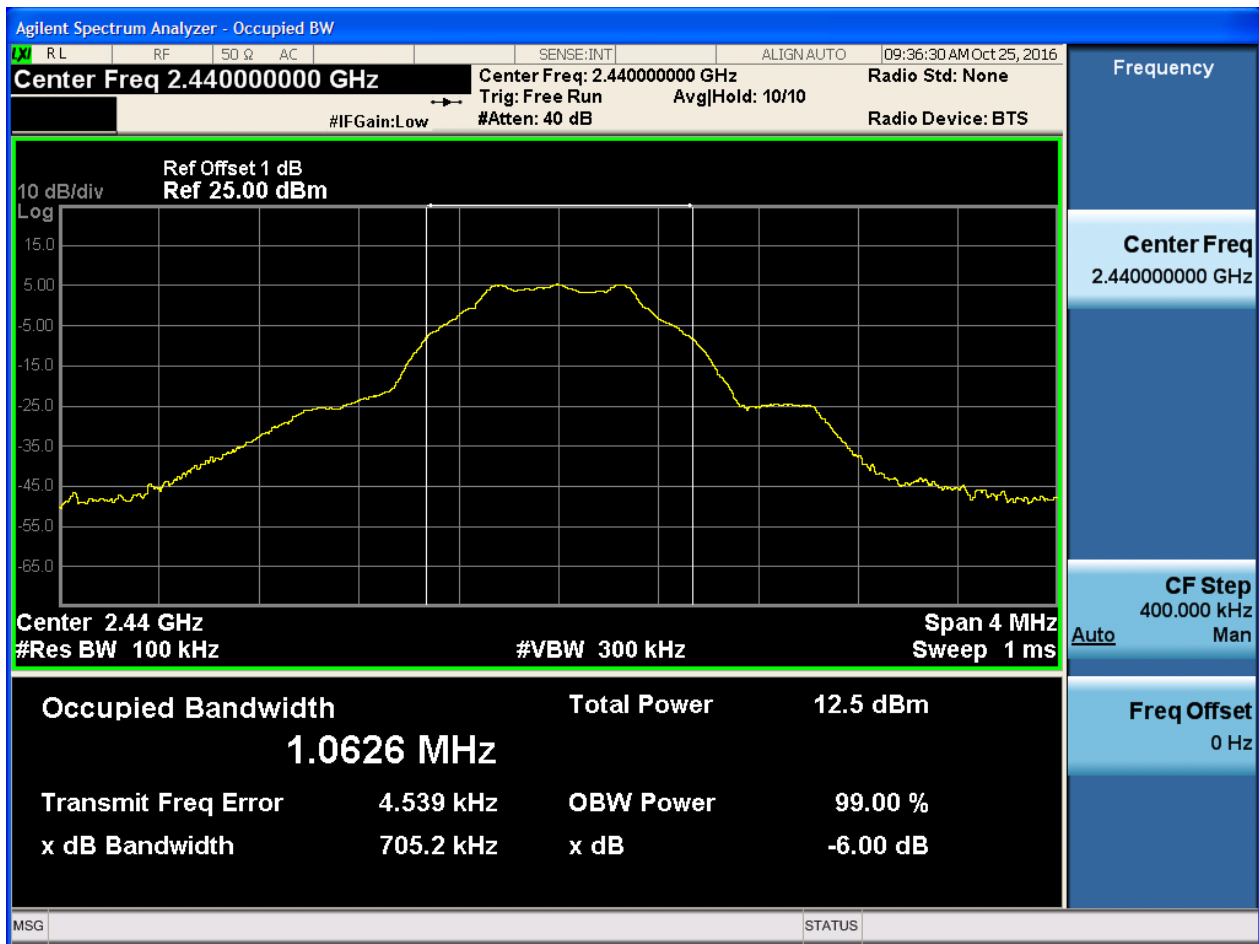
Part II - Test Plots

2.1 TM1_Ch0_L



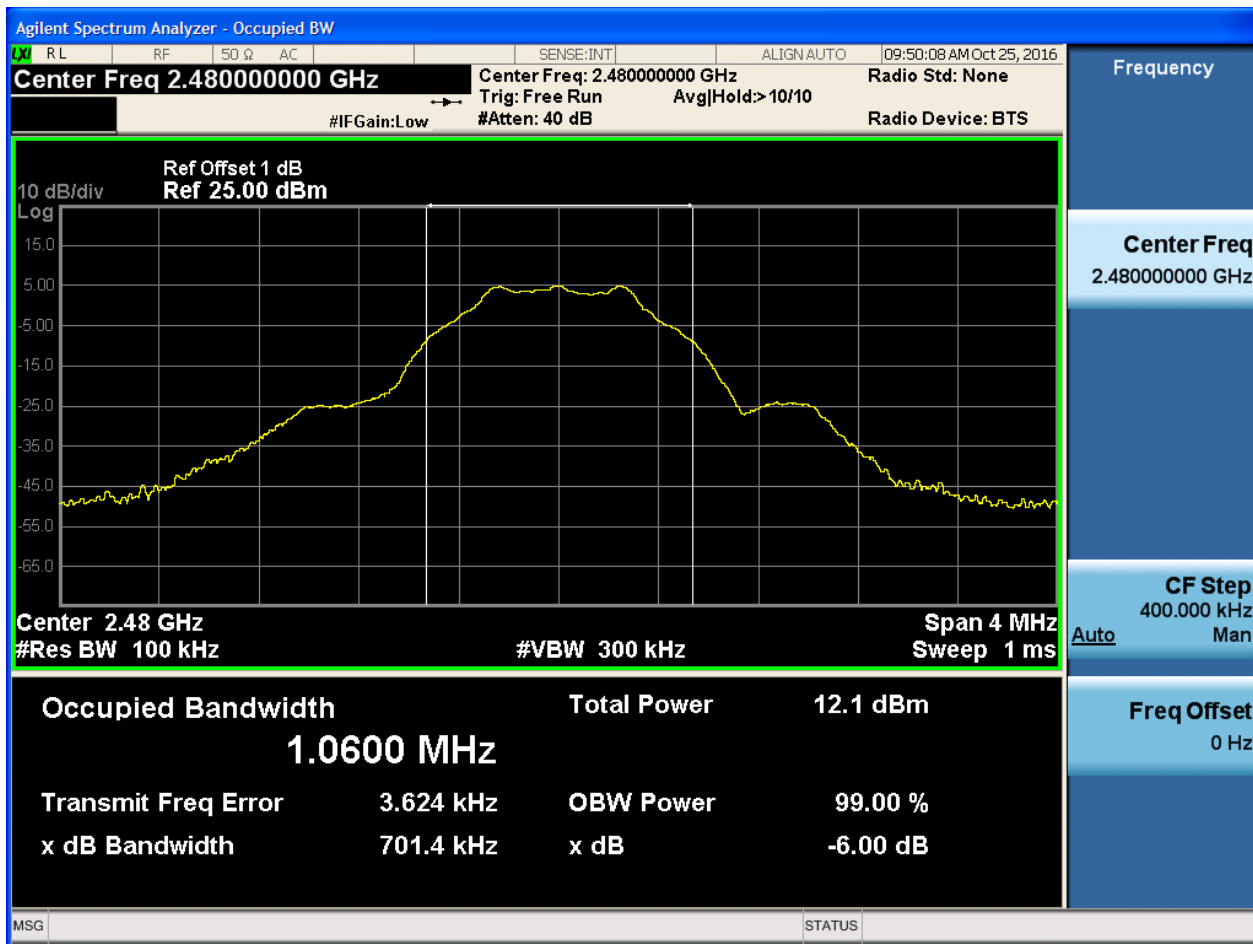


2.2 TM1_Ch19_M





2.3 TM1_Ch39_H



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.

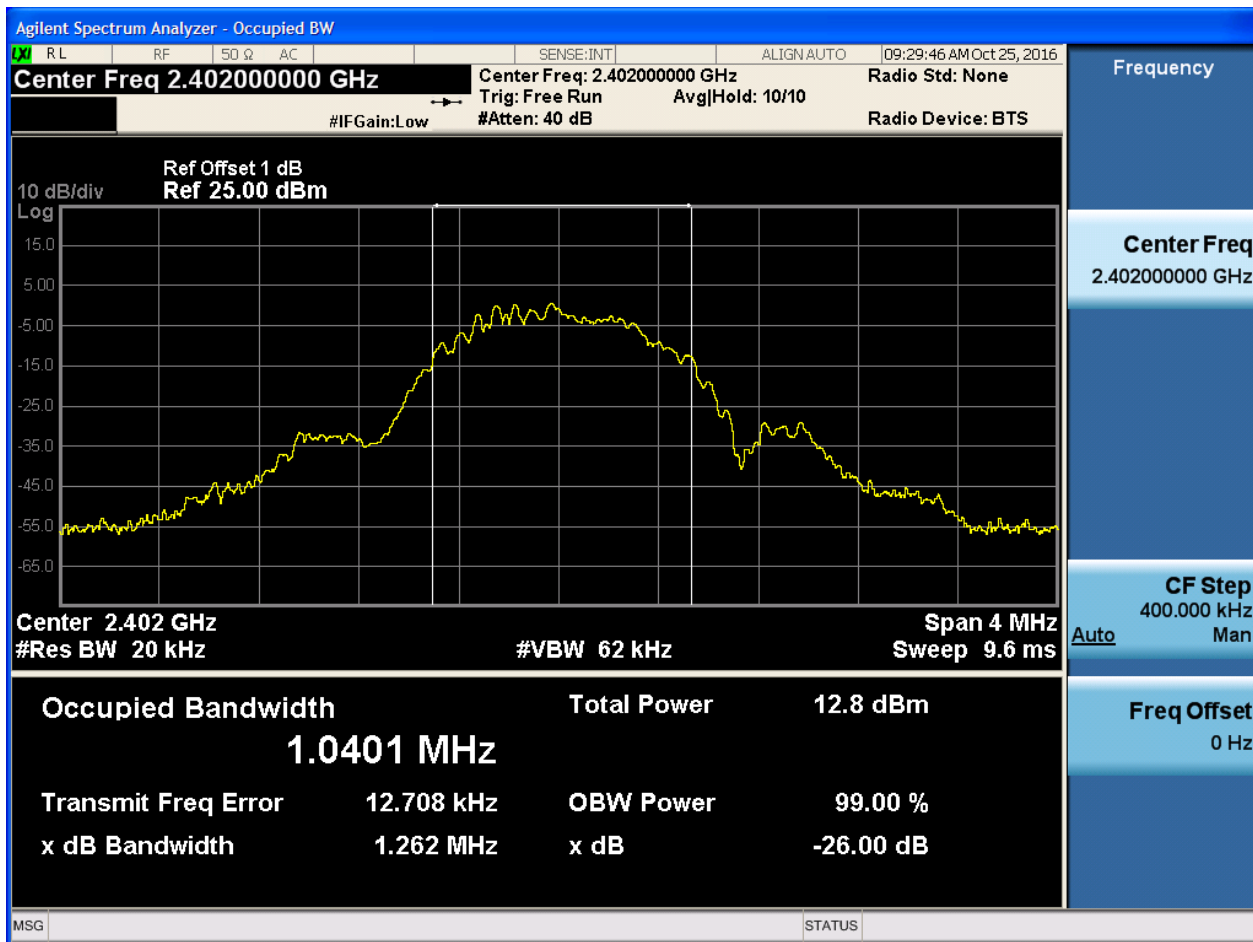
Part I - Test Results

Test Mode	Test Channel	Frequency[MHz]	Occupied Bandwidth [MHz]	Verdict
TM1 _Ch0	L	2402	1.04	pass
TM1 _Ch19	M	2440	1.04	pass
TM1 _Ch39	H	2480	1.04	pass



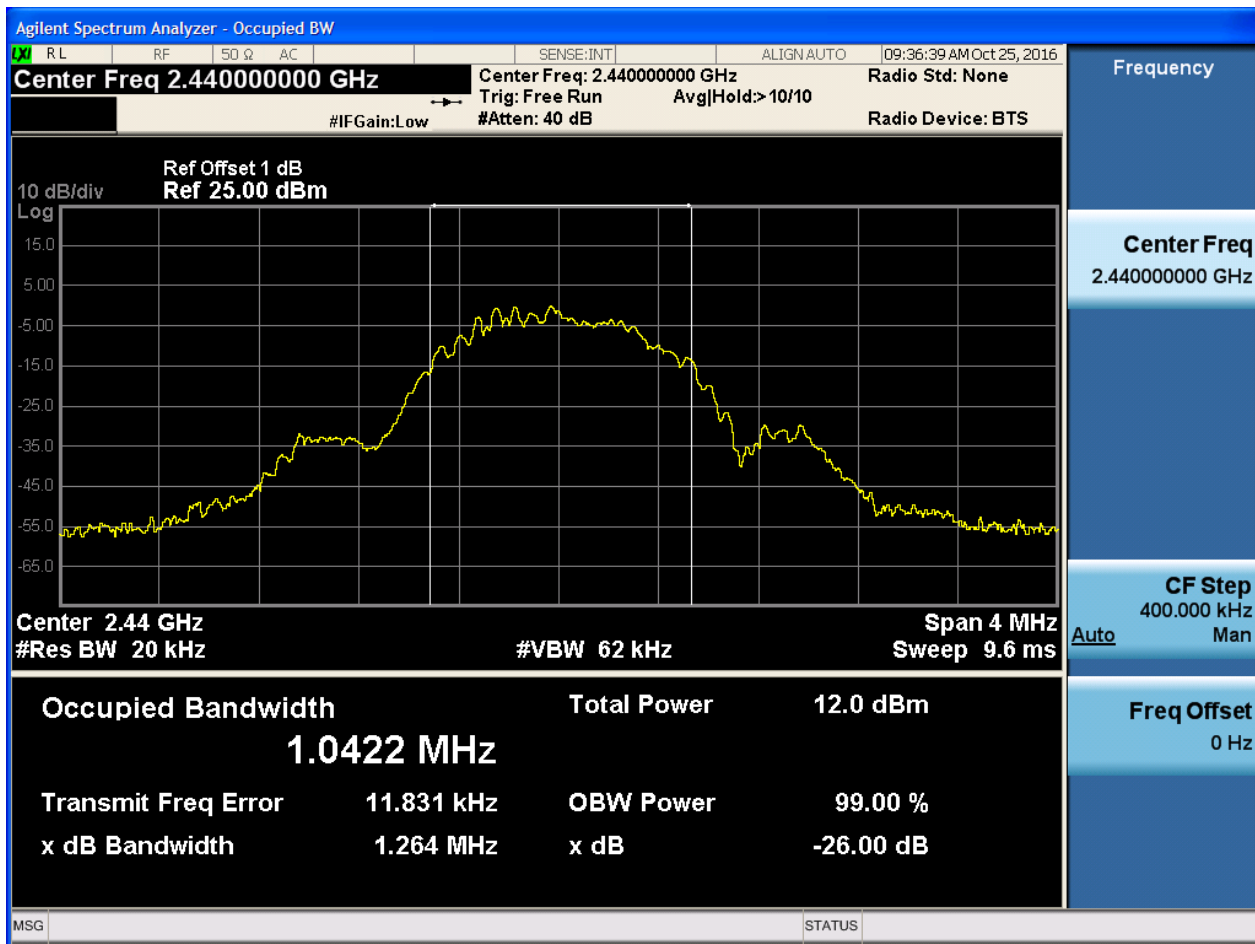
Part II - Test Plots

2.1 TM1 _Ch0_L



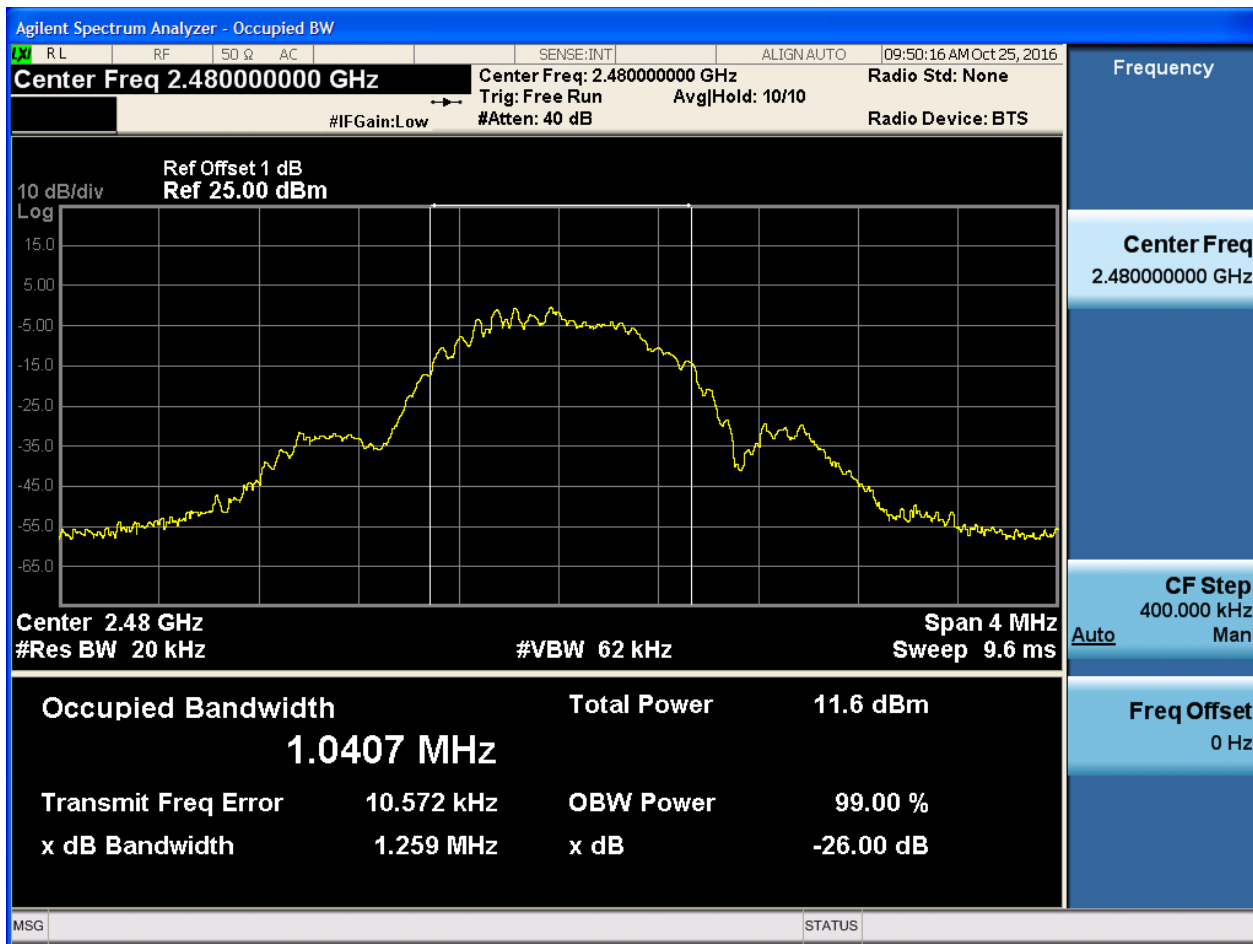


2.2 TM1 _Ch19_M





2.3 TM1 _Ch39_H



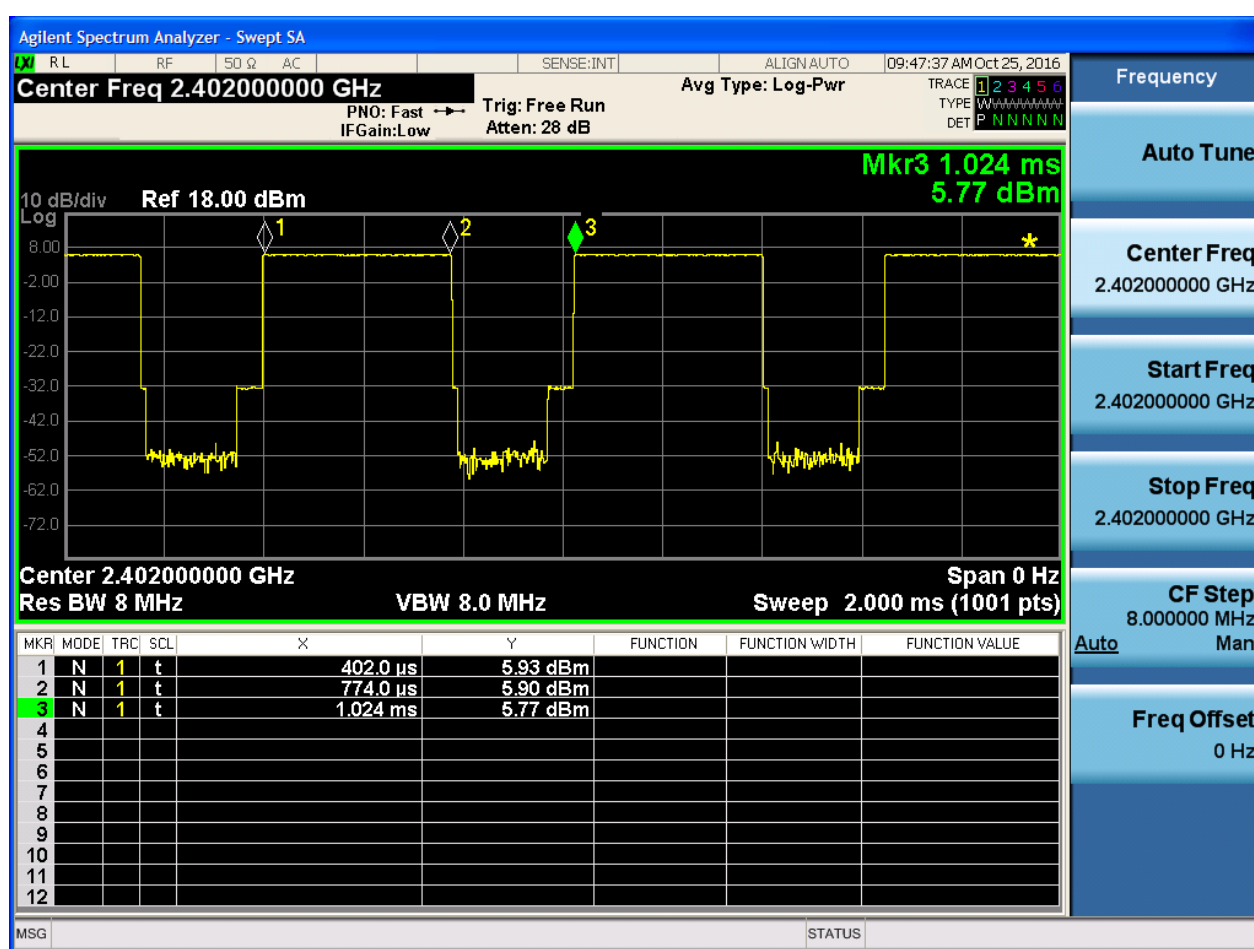
Appendix C : Duty Cycle

Part I - Test Results

Test Mode	TX Freq. [MHz]	Duty cycle [%]
TM1	CH0,CH19,CH39	60

Part II - Test Plots

2.1 TM1



Appendix D: Maximum Conducted Average Output Power

Part I - Test Results

Test Mode	Test Channel	Frequency[MHz]	Power[dBm]	Verdict
TM1 _Ch0	L	2402	6.71	pass
TM1 _Ch19	M	2440	5.92	pass
TM1 _Ch39	H	2480	5.54	pass



Part II - Test Plots

2.1 TM1 _Ch0_L





2.2 TM1 _Ch19_M





2.3 TM1 _Ch39_H



Appendix E: Maximum Power Spectral Density Level

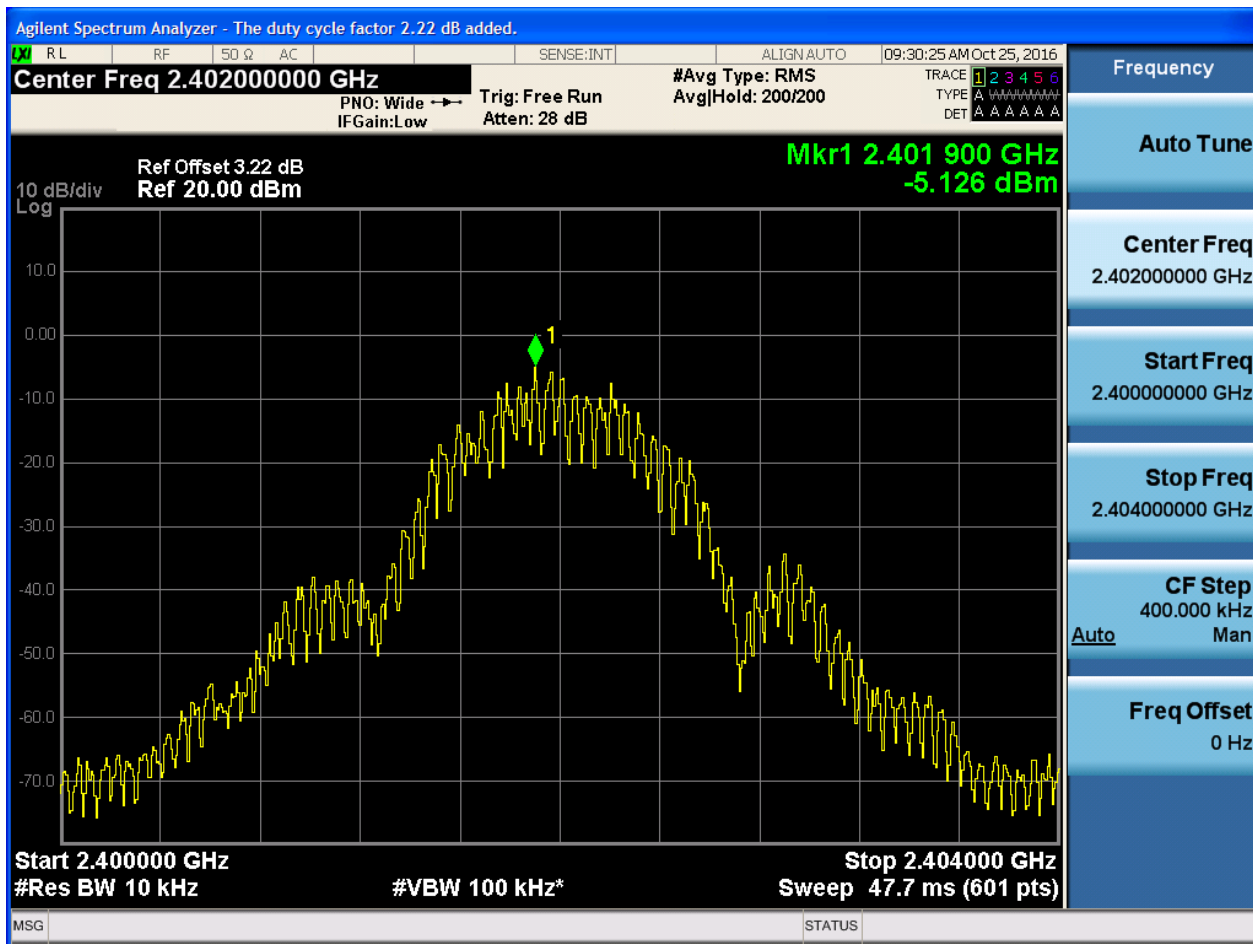
Part I - Test Results

Test Mode	Test Channel	Frequency[MHz]	PD[MHz]	Verdict
TM1 _Ch0	L	2402	-5.13	pass
TM1 _Ch19	M	2440	-6.92	pass
TM1 _Ch39	H	2480	-6.92	pass



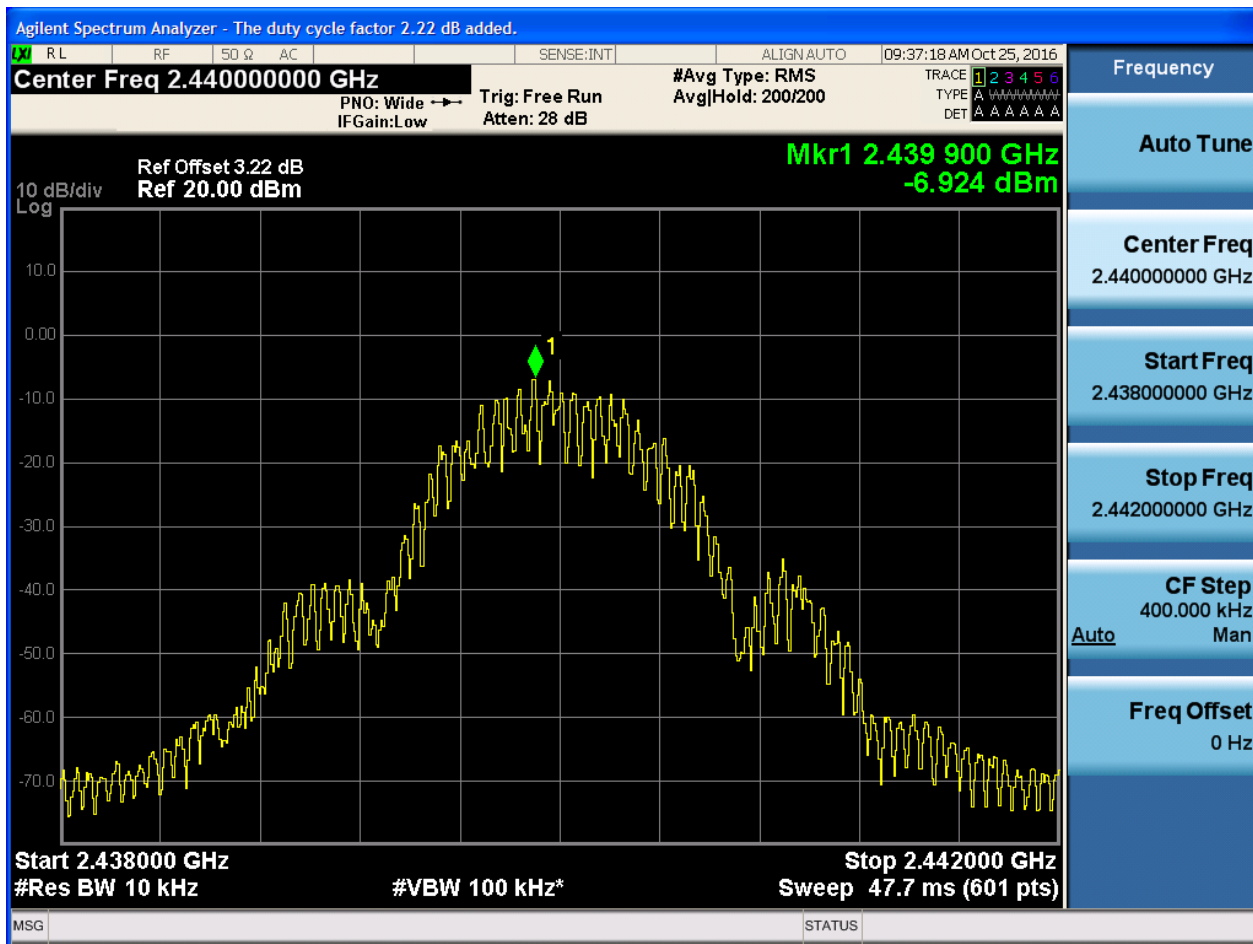
Part II - Test Plots

2.1 TM1 _Ch0_L



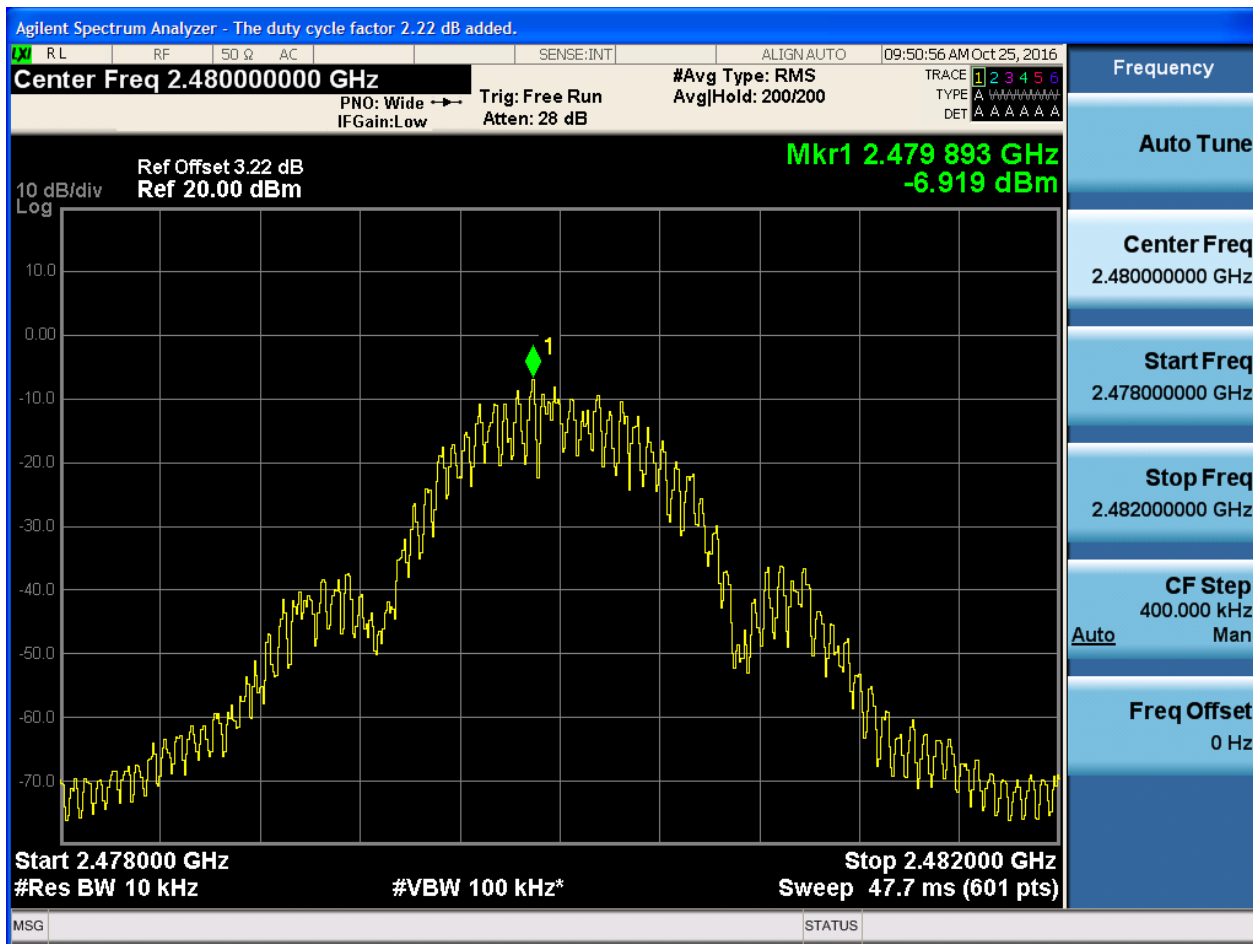


2.2 TM1 _Ch19_M





2.3 TM1 _Ch39_H



Appendix F: Band Edges Compliance

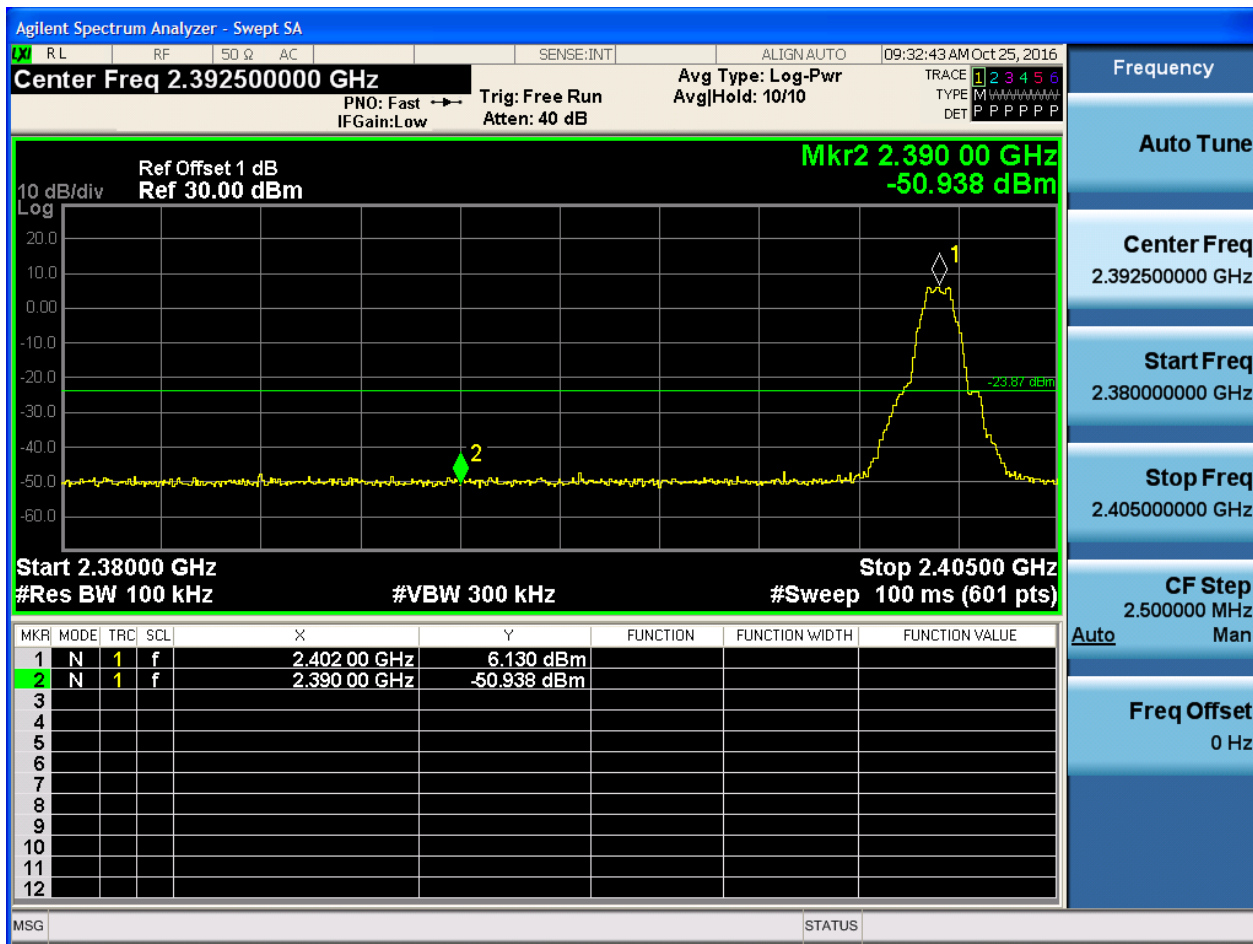
Part I - Test Results

Test Mode	Test Channel	Frequency[MHz]	Carrier Power[dBm]	Max.Spurious Level[dBm]	Verdict
TM1 _Ch0	L	2402	6.13	-50.94	pass
TM1 _Ch39	H	2480	4.91	-49.70	pass



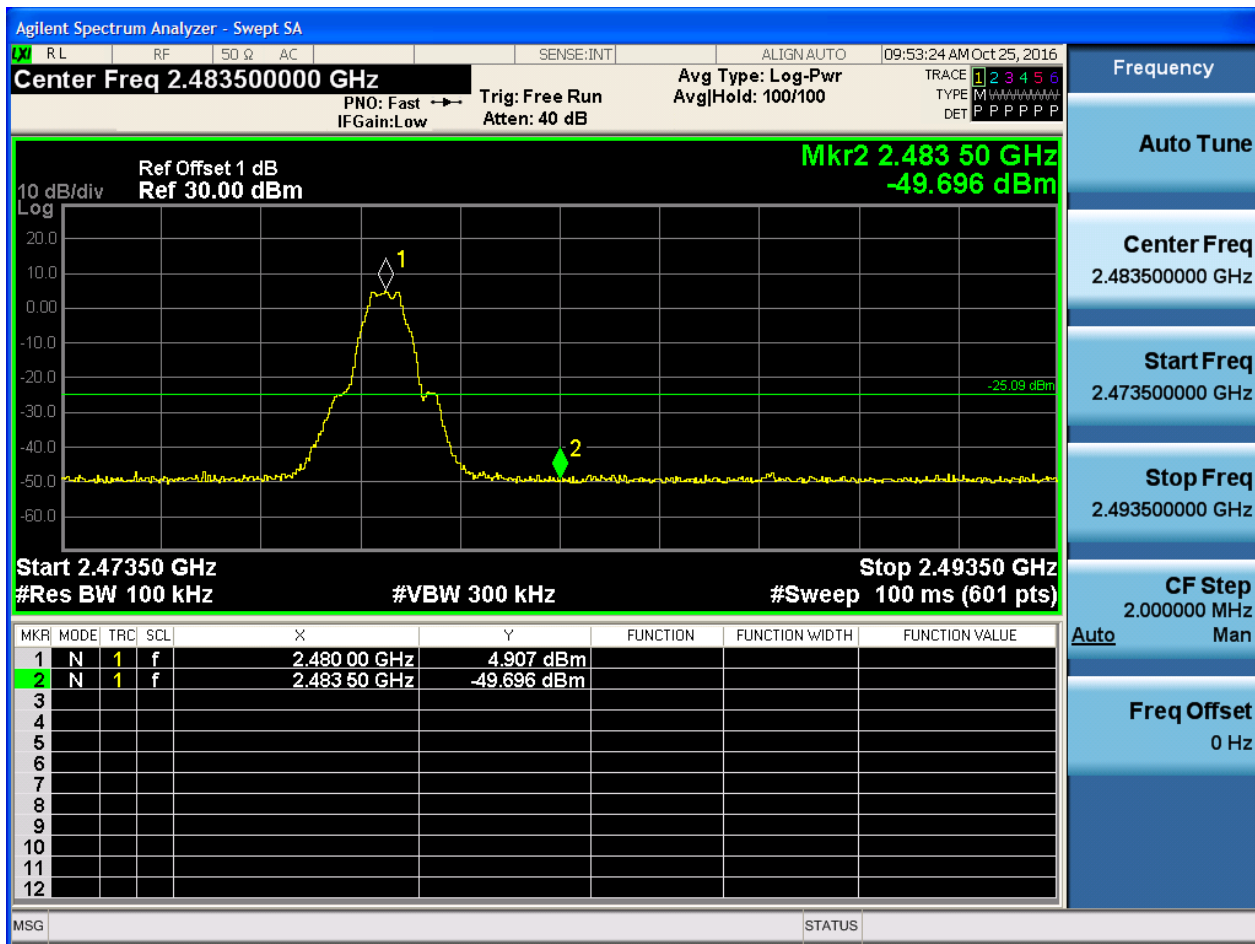
Part II - Test Plots

2.1 TM1 _Ch0_L





2.2 TM1 _Ch39_H



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]	Pref[dBm]	Puw[dBm]	Verdict
TM1_Ch0	L	2402	6.13	<limit	pass
TM1_Ch19	M	2440	5.34	<limit	pass
TM1_Ch39	H	2480	4.97	<limit	pass



Part II - Test Plots

2.1 TM1_Ch0_L

Pref:





Agilent Spectrum Analyzer - Swept SA

Start Freq 9.000 kHz

Ref Offset 1 dB
Ref 6.00 dBm

10 dB/div
Log

Mkr1 9.141 kHz
-63.932 dBm

Start 9.00 kHz
#Res BW 1.0 kHz

Stop 150.00 kHz
Sweep 135 ms (1001 pts)

#VBW 3.0 kHz

Auto Tune

Center Freq
79.500 kHz

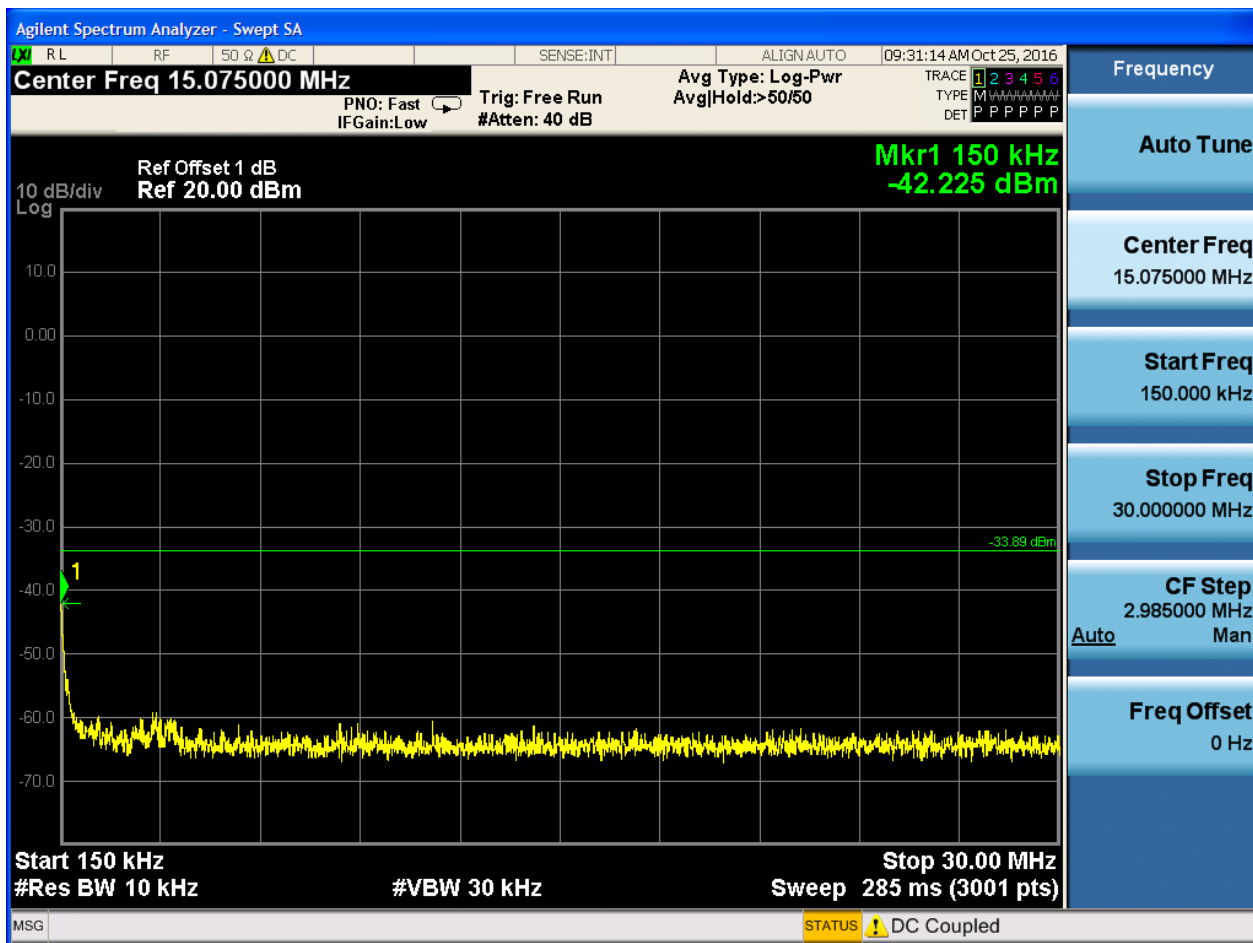
Start Freq
9.000 kHz

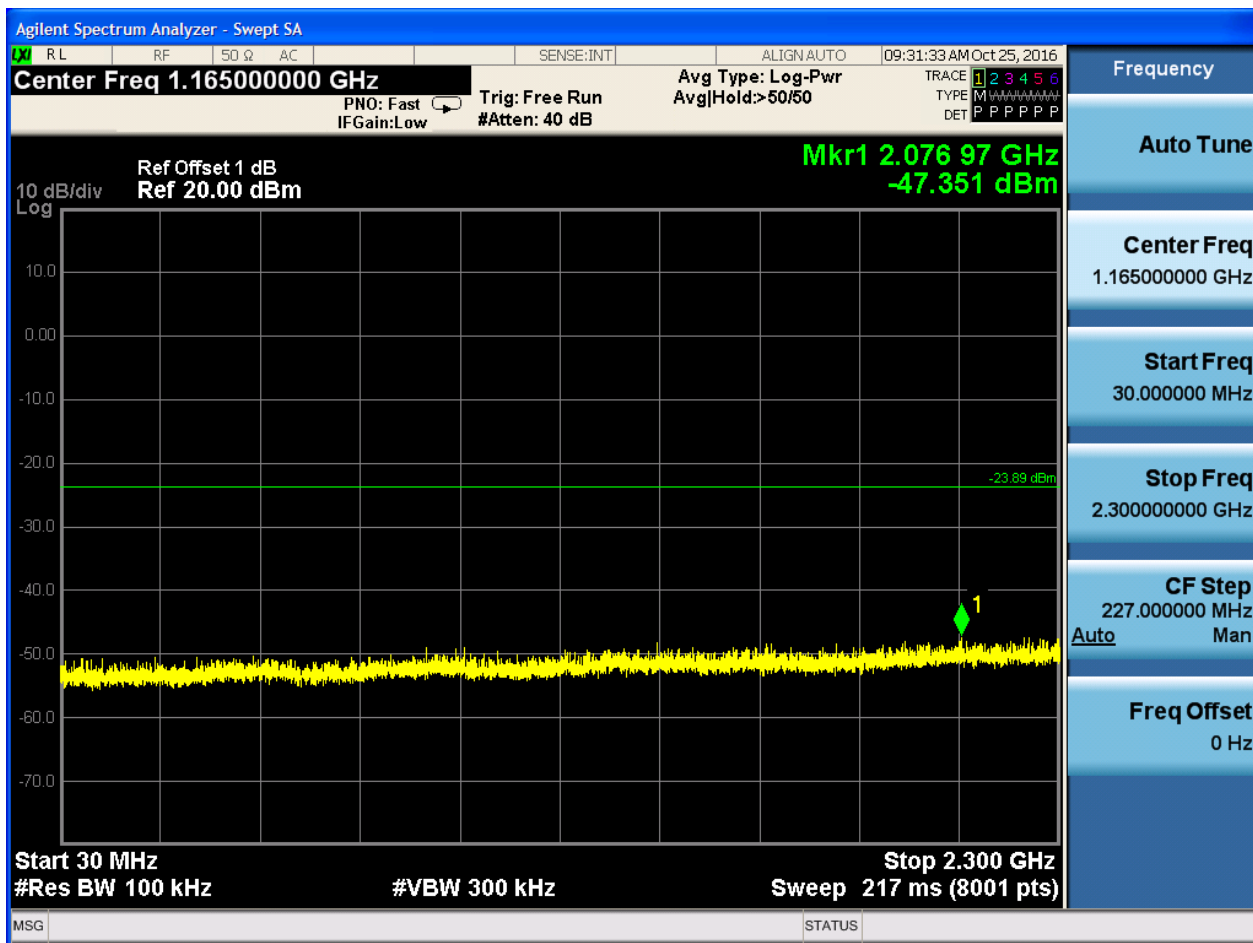
Stop Freq
150.000 kHz

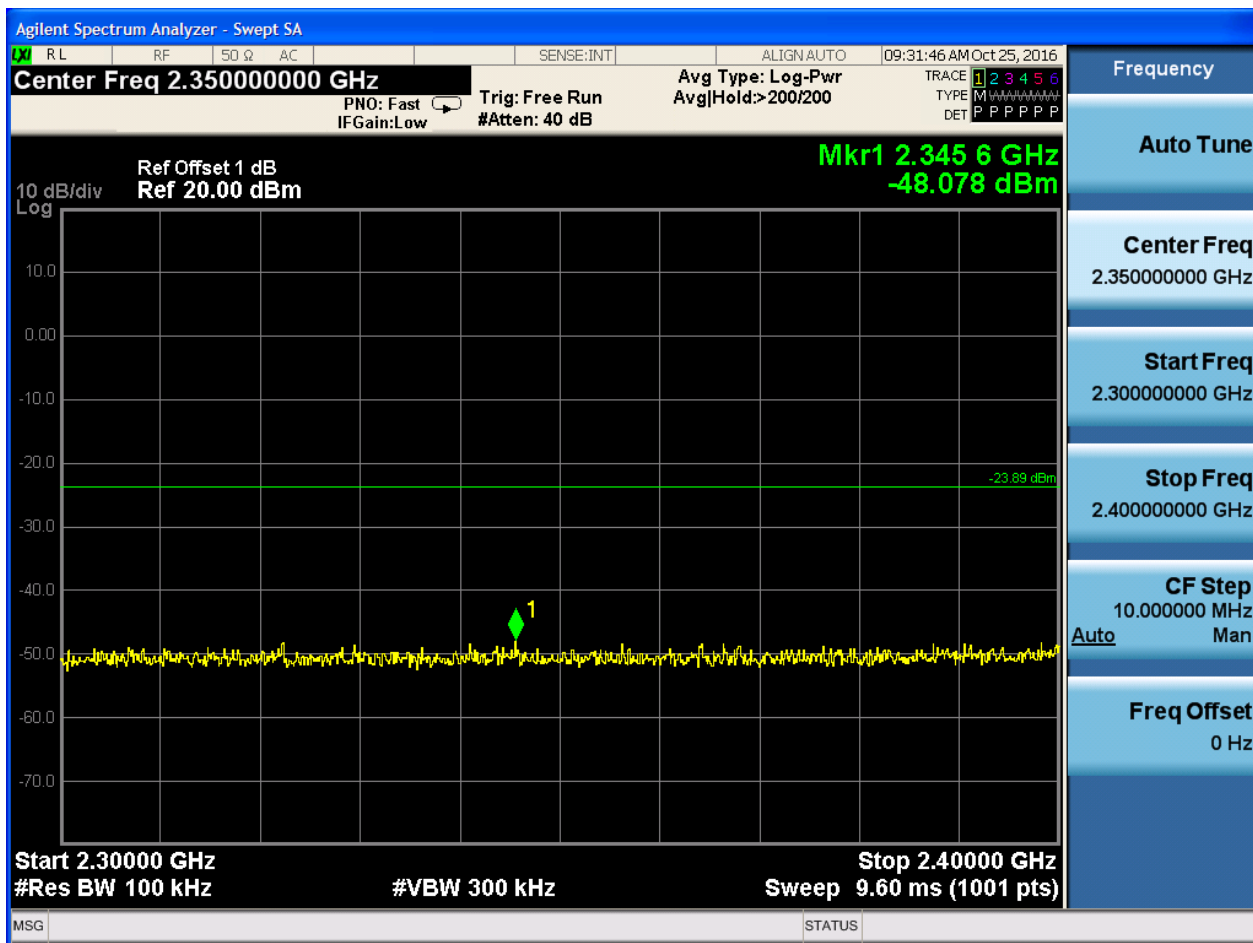
CF Step
14.100 kHz
Man

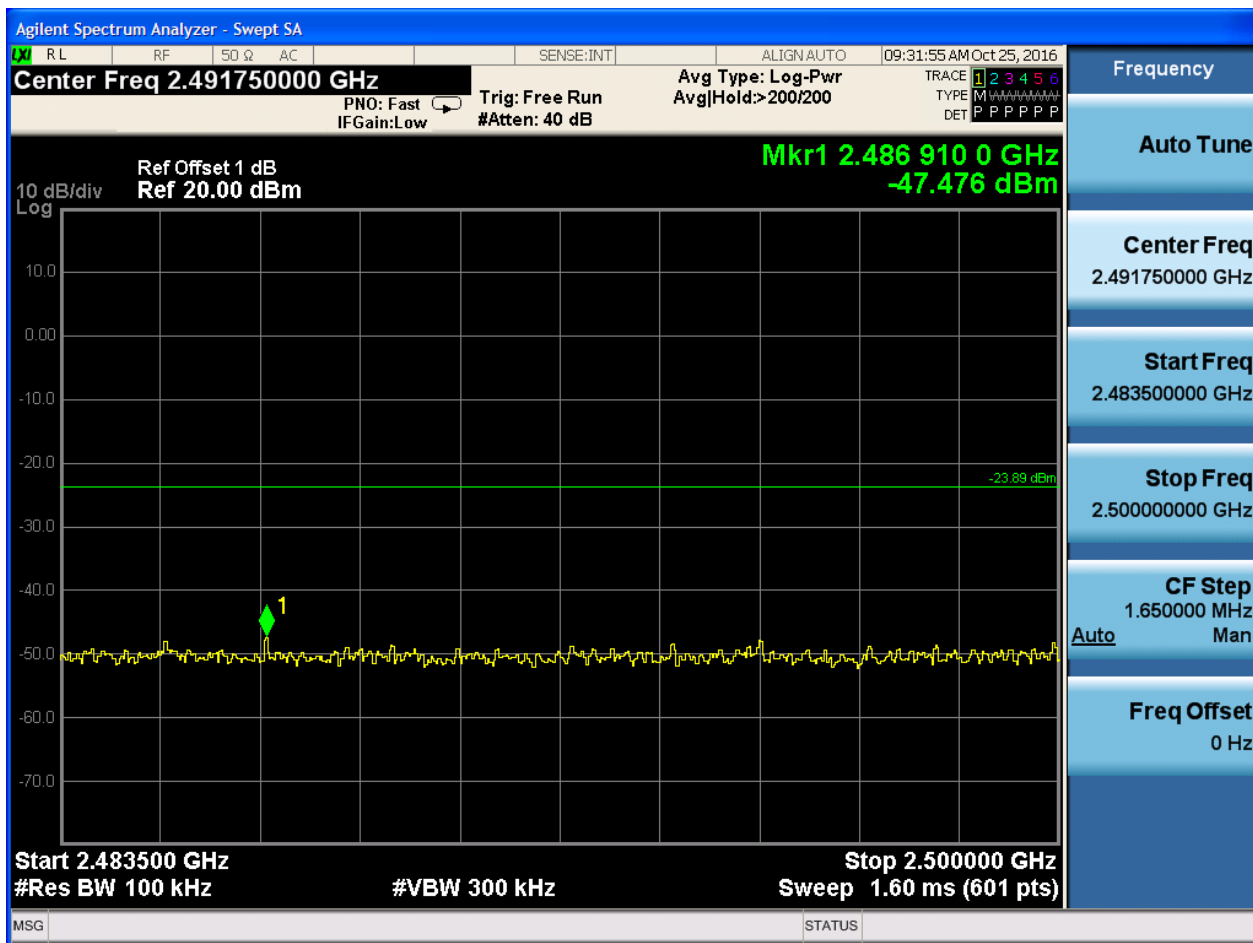
Freq Offset
0 Hz

STATUS DC Coupled













2.2 TM1_Ch19_M

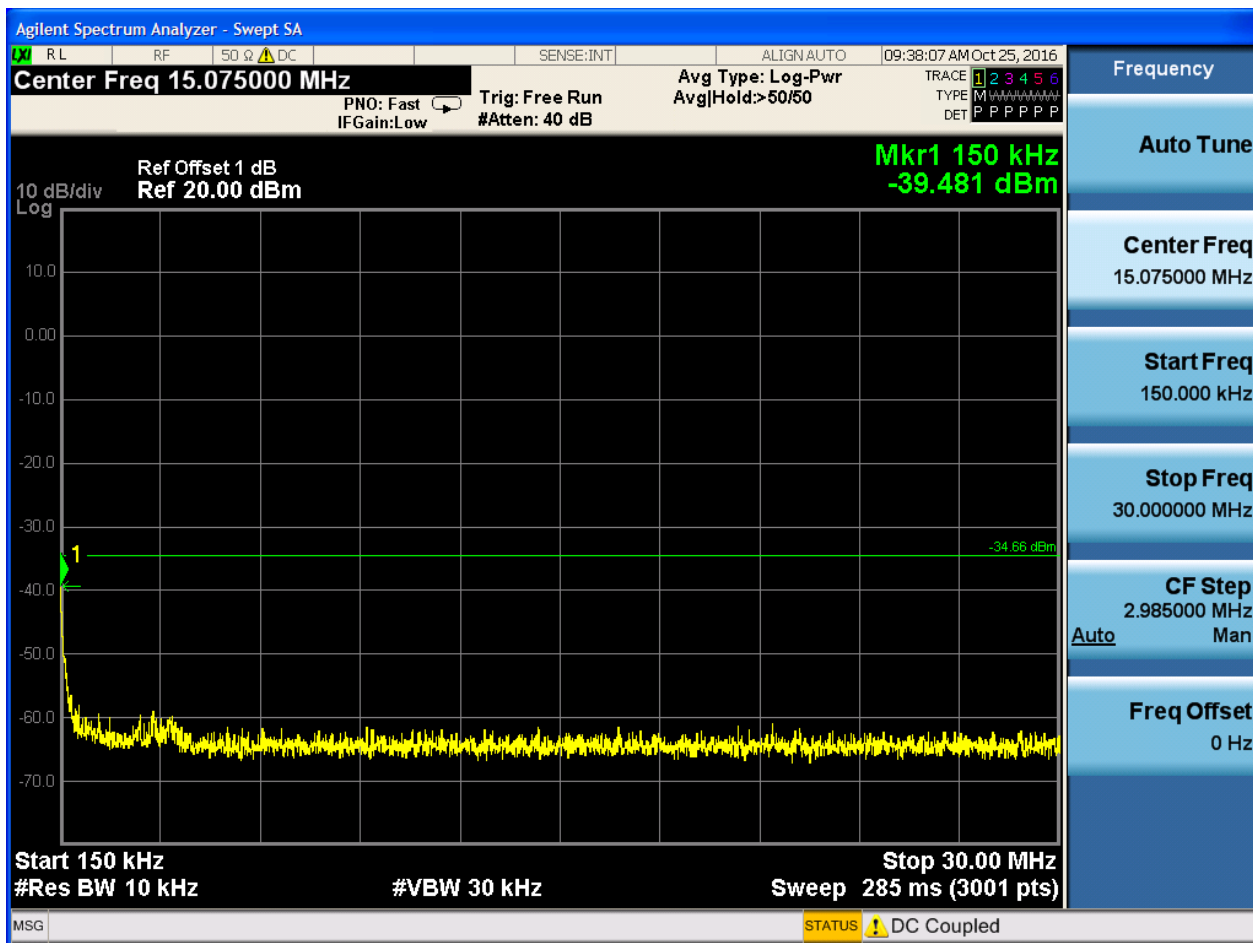
Pref:

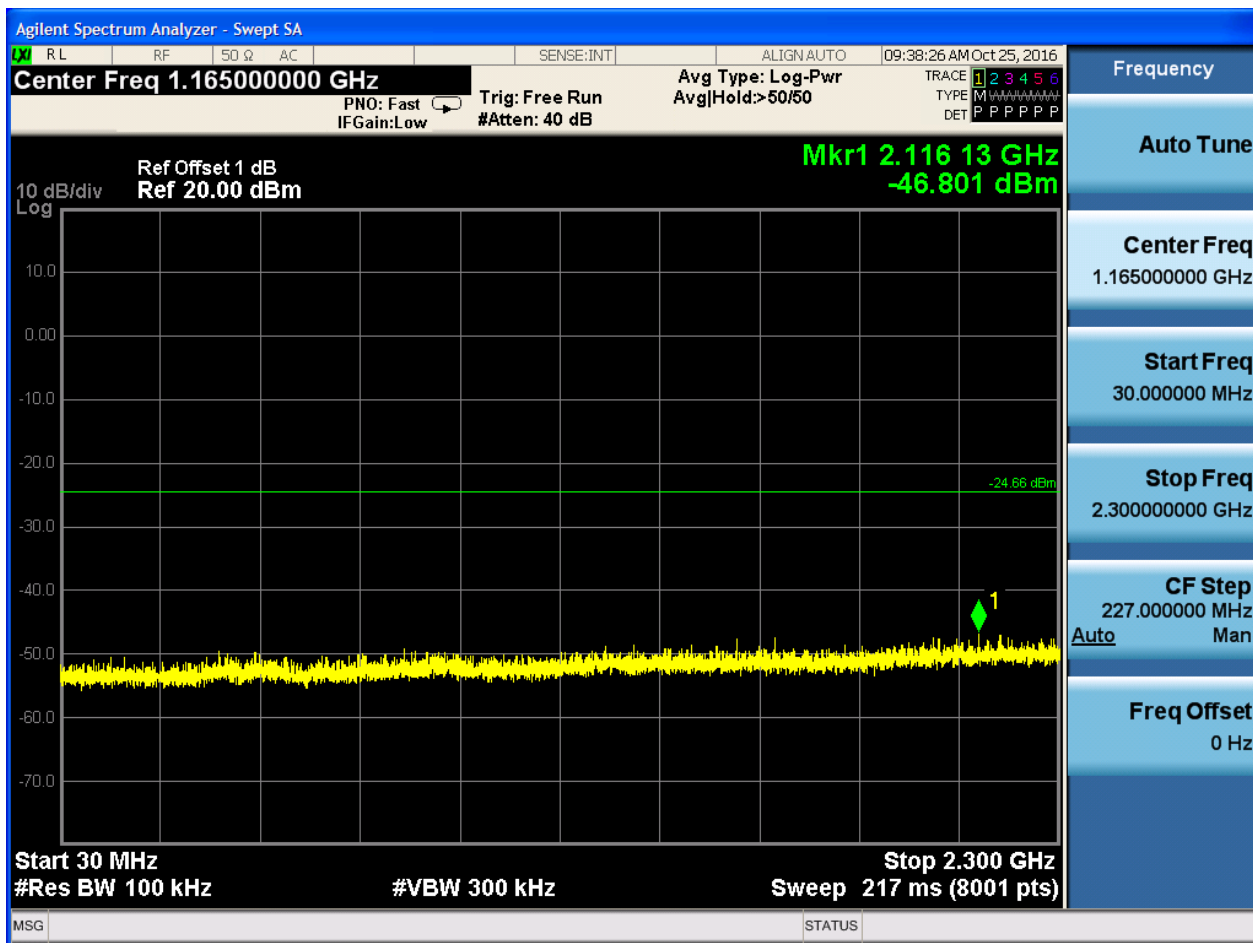


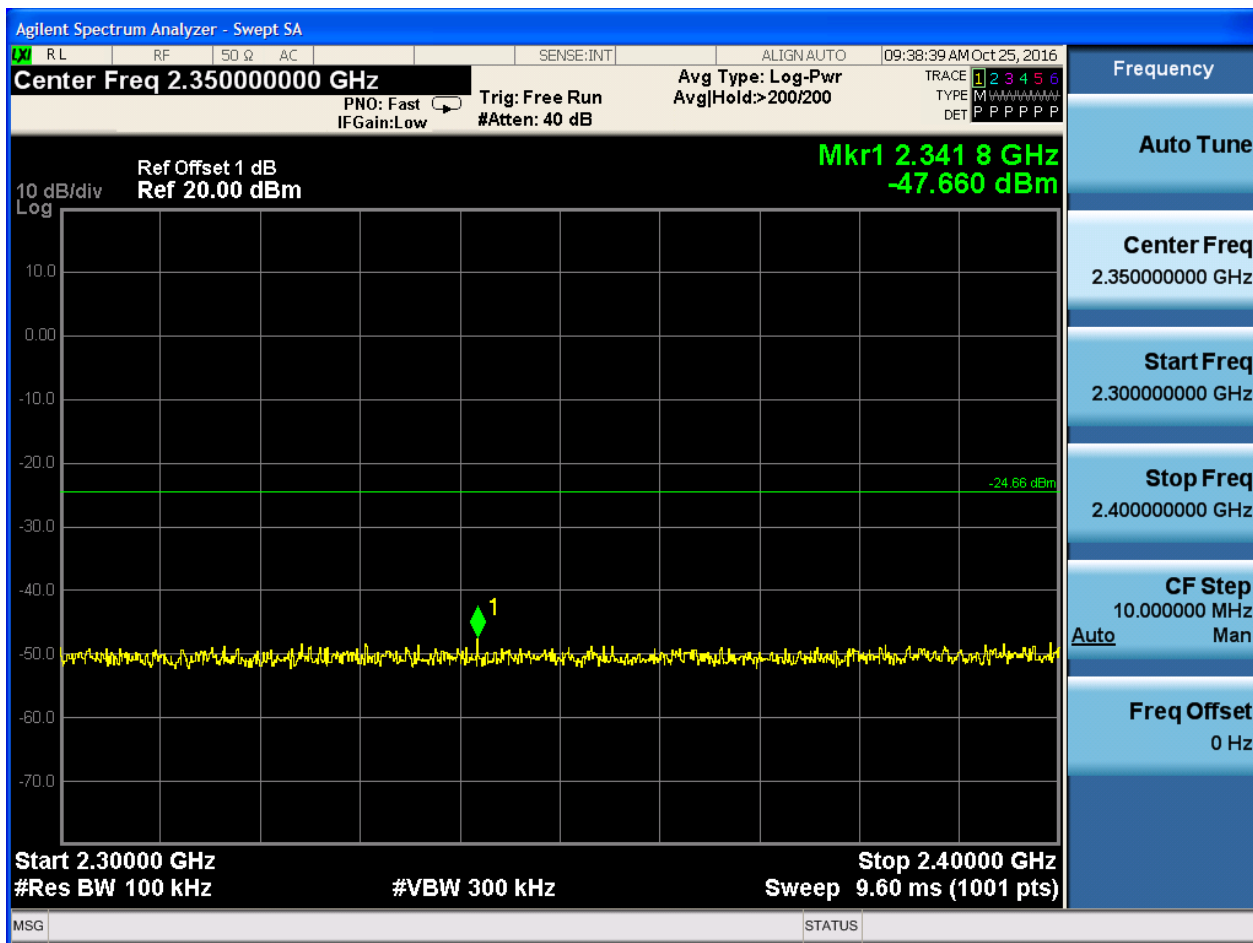


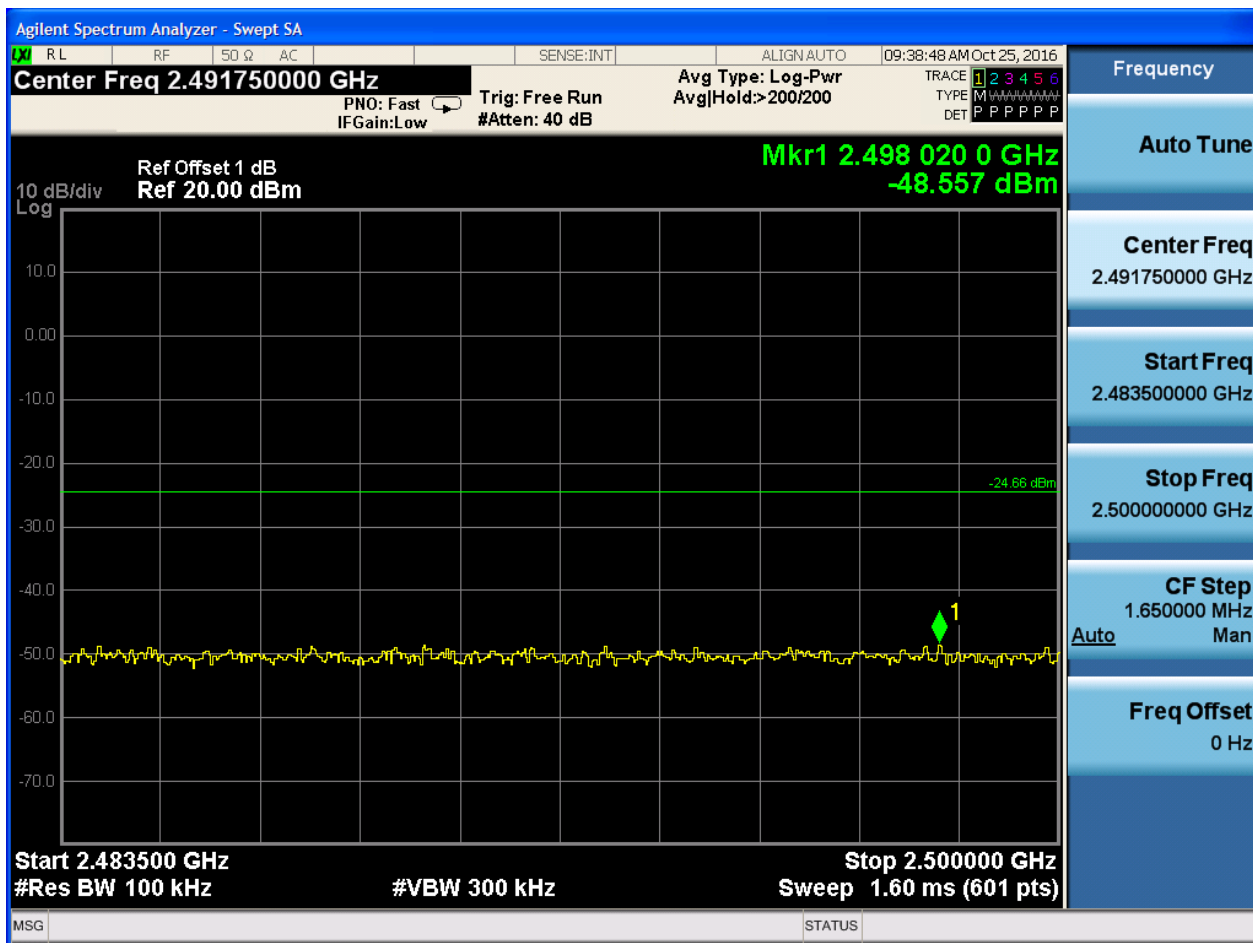
Puw:















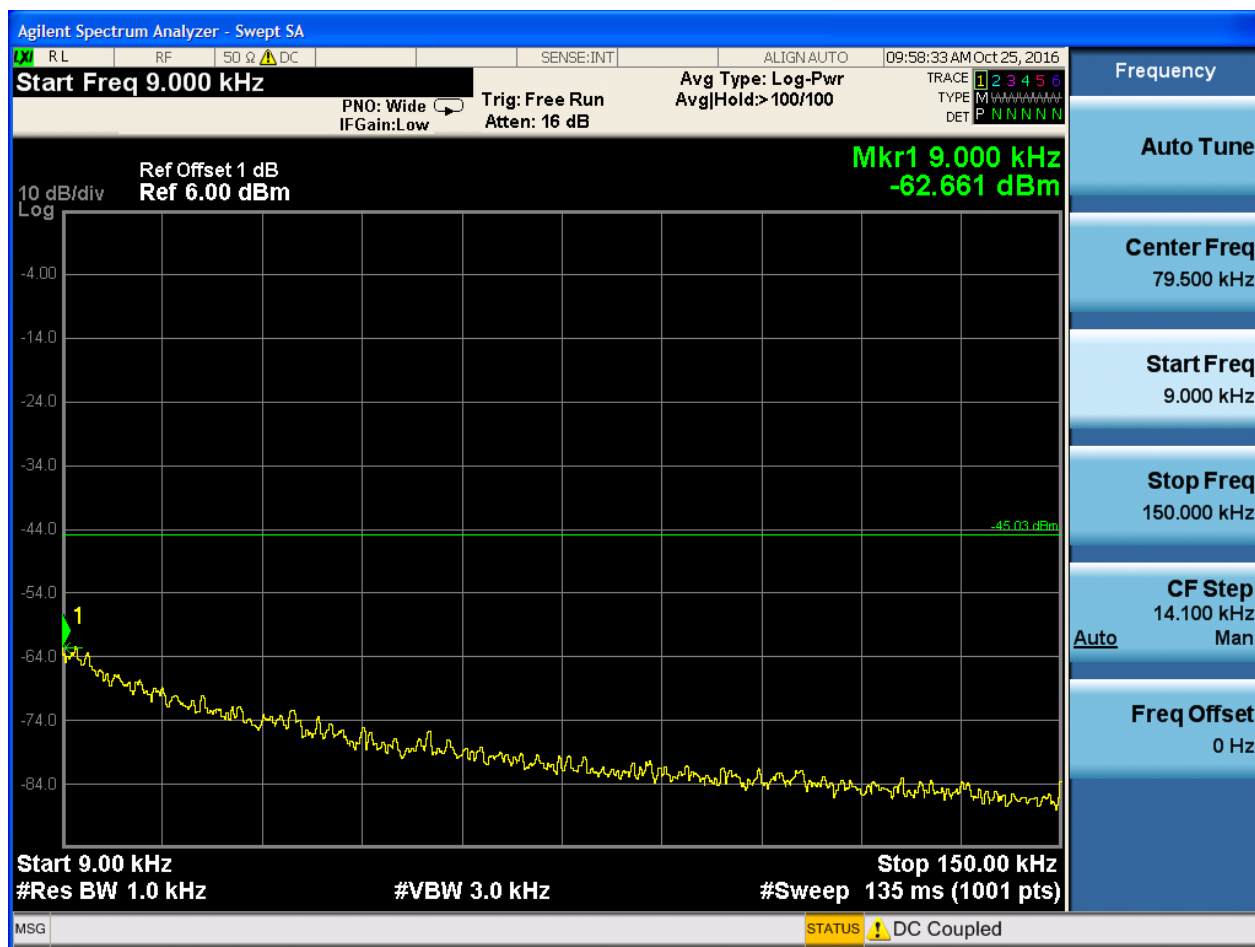
2.3 TM1_Ch39_H

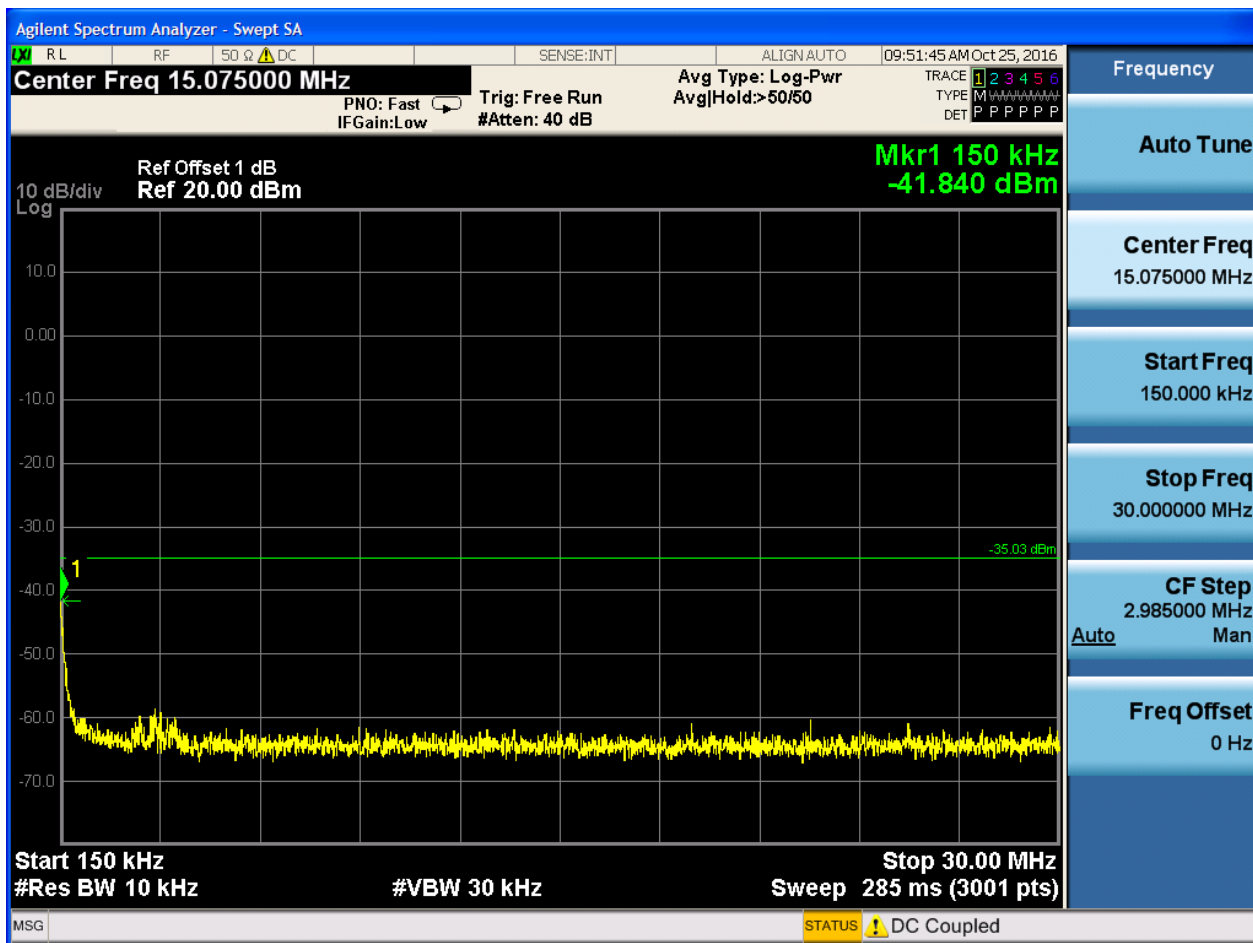
Pref:

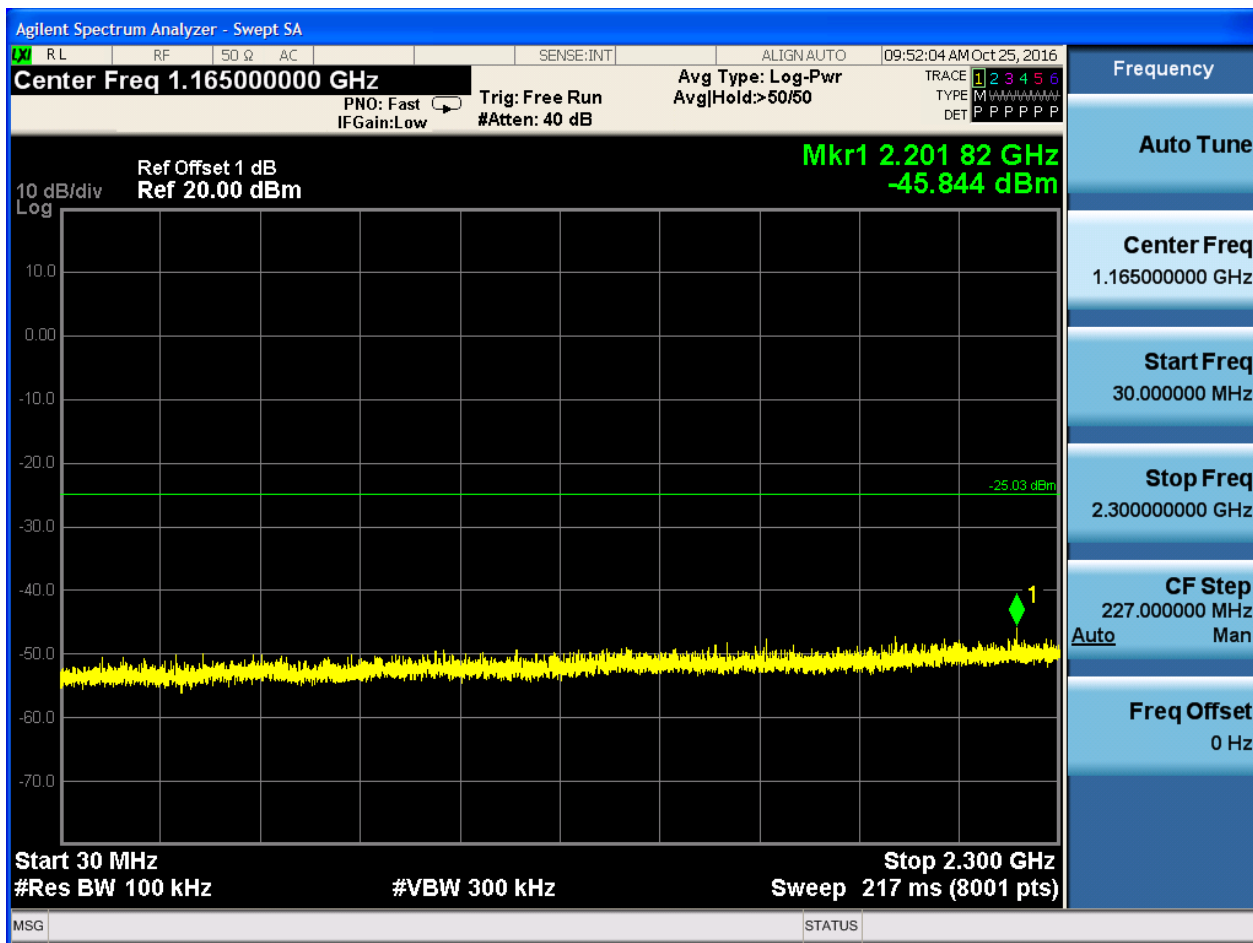


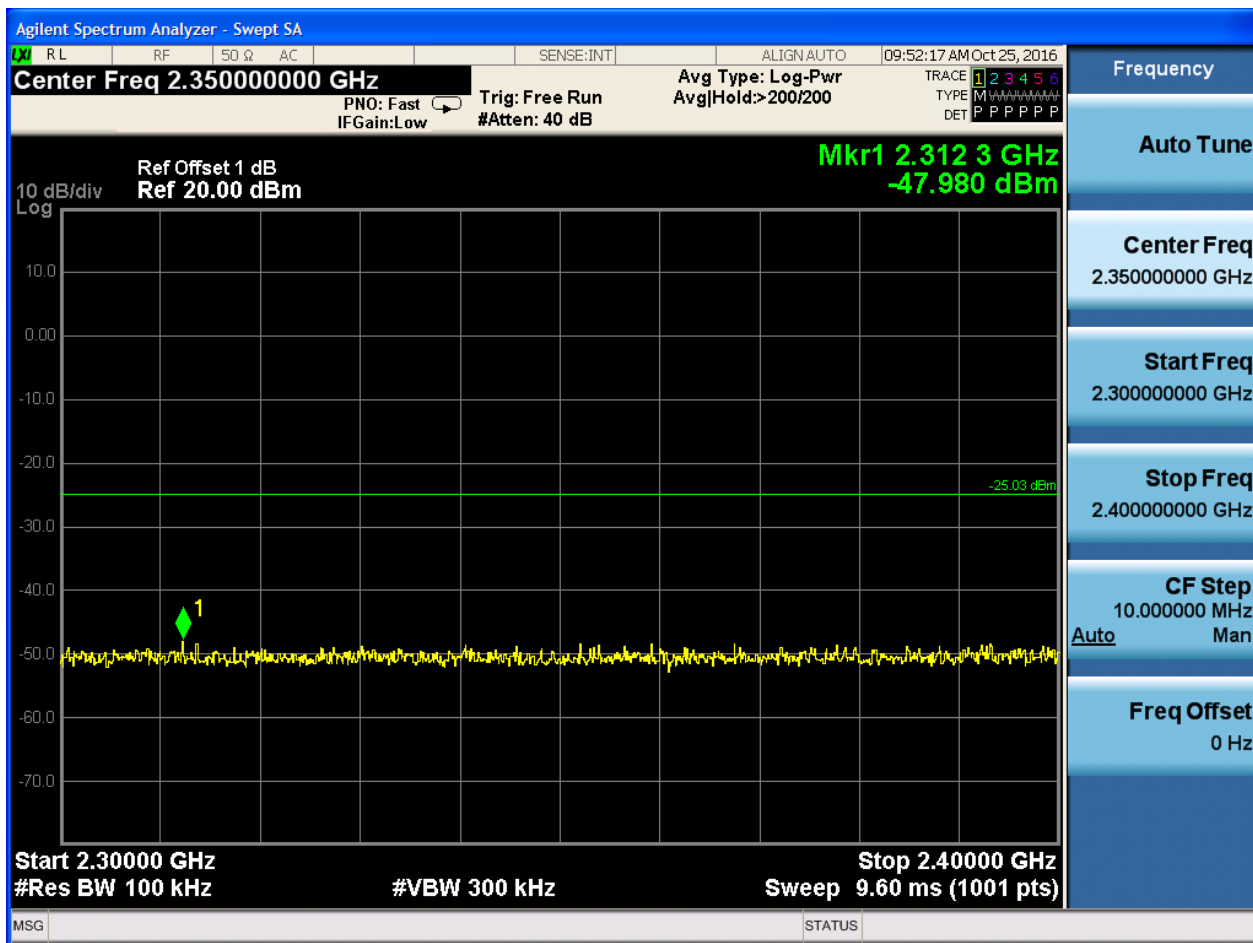


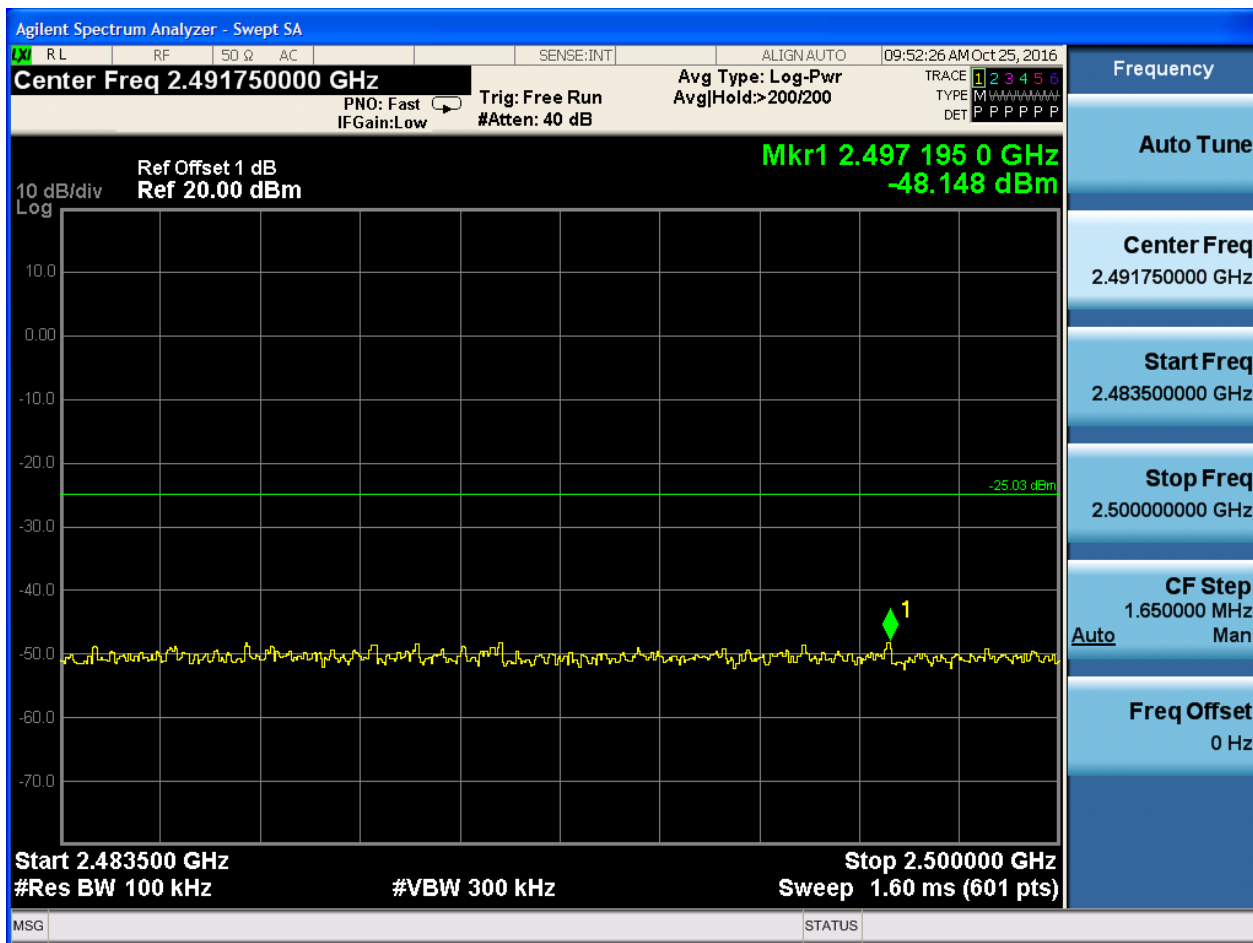
Puw:

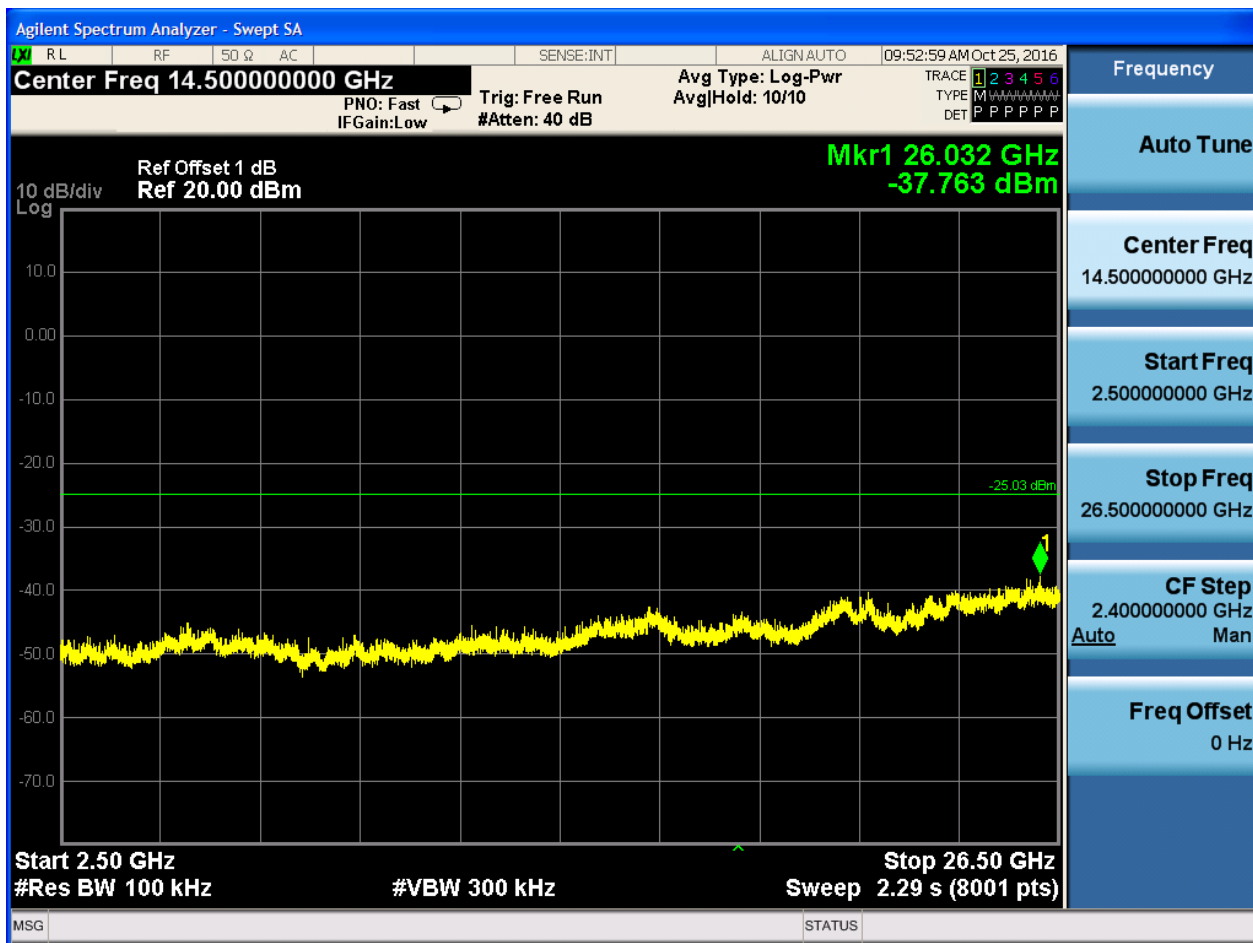












Appendix H: Radiated Spurious Emission & Spurious in Restricted Band

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

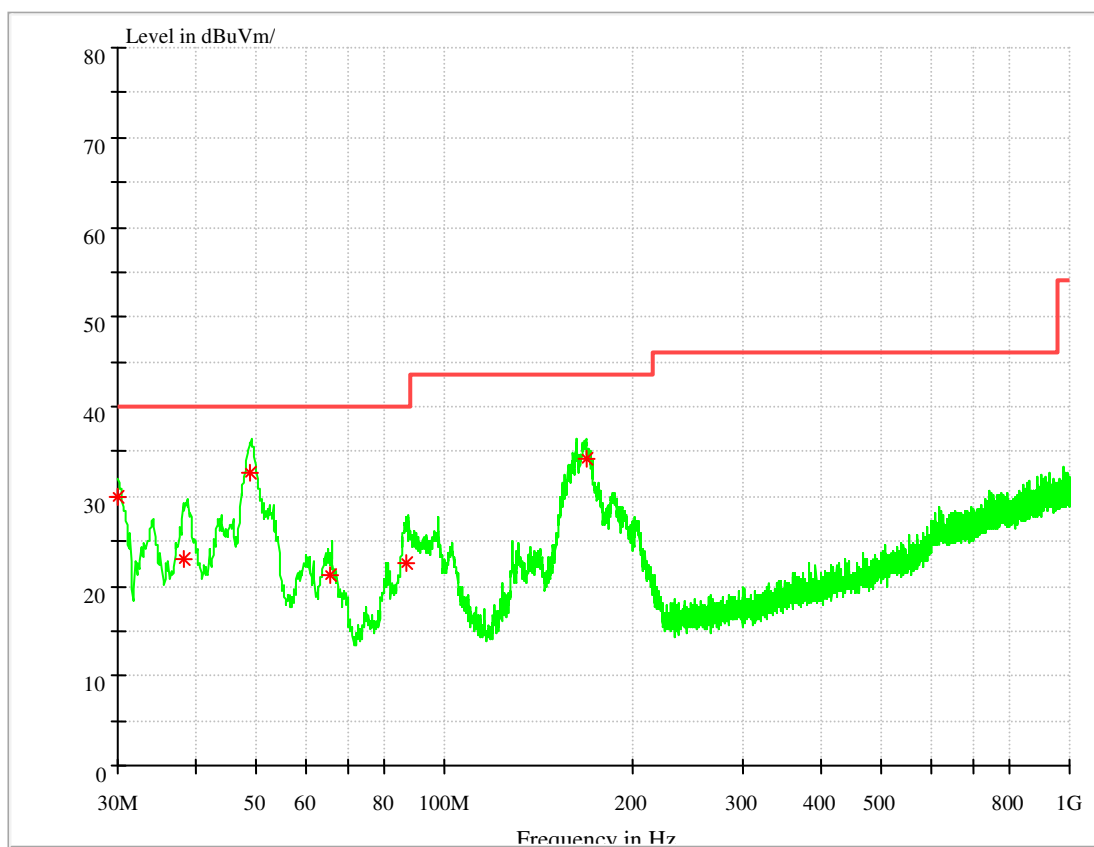
1.1 Part 1: Testing Range of “9 kHz to 30MHz”

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 (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Trans d. (dB)
30.049200	30.02	40.00	9.98	100.0	V	162.0	14.6
38.414800	23.05	40.00	16.95	173.0	V	202.0	15.4
48.978800	32.73	40.00	7.27	100.0	V	272.0	15.2
65.651850	21.24	40.00	18.76	100.0	V	283.0	11.9
87.132400	22.66	40.00	17.34	145.0	V	113.0	11.7
168.478800	34.19	43.50	9.31	100.0	V	232.0	11.0

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

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

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

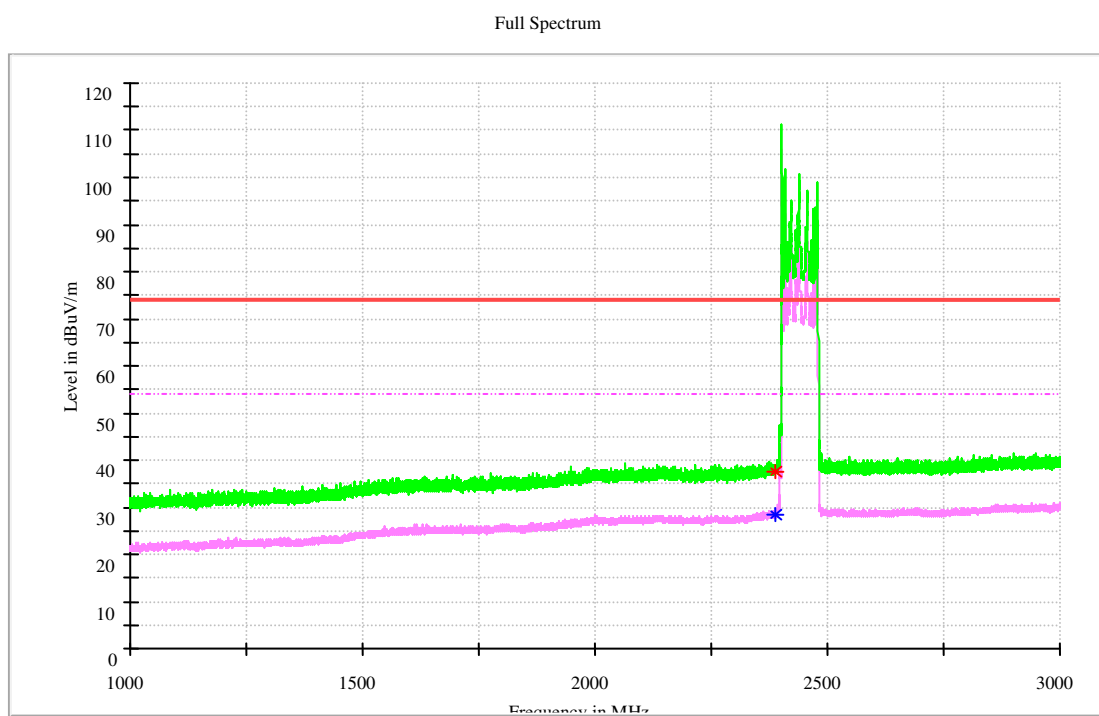
Note 2: Two limits are required in the testing range above 1 GHz, that is Peak limit (74 dBμV/m) and Average Limit (54 dBμV/m).

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

Test Mode:

1.4.1 Test Mode: TM1

1.4.1.1 Channel 0



MEASUREMENT RESULT: AV Detector

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Transd. (dB)
2390	28.31	54.00	25.69	100.0	H	280.0	-7.6

MEASUREMENT RESULT: PK Detector

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Transd. (dB)
2390	37.59	74.00	36.41	100.0	V	73.0	-7.6

Note2:

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

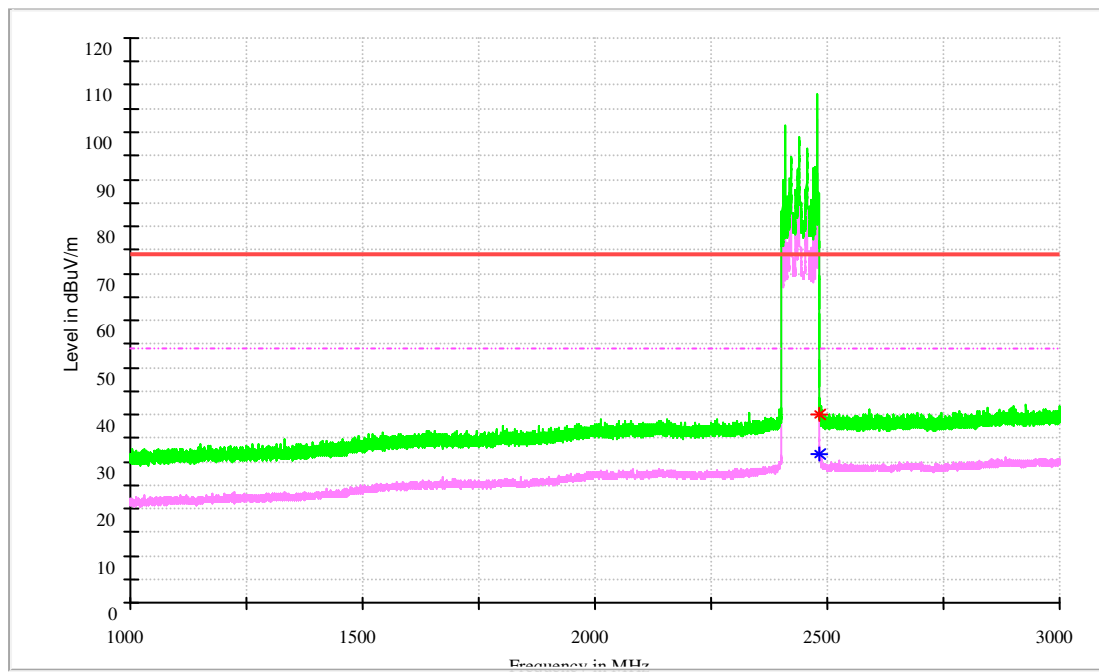
The reading level is calculated by software which is not shown in the sheet.



2, Margin=Limit - Level

1.4.1.2 Channel 39

Full Spectrum



MEASUREMENT RESULT: AV Detector

Frequency (MHz)	Level (dBμ V/m)	Limit (dBμ V/m)	Margin (dB)	Height (cm)	Pol	Azimuth h	Transd. (dB)
2483.5	31.67	54.00	22.33	100.0	H	232.0	-5.4

MEASUREMENT RESULT: PK Detector

Frequency (MHz)	Level (dBμ V/m)	Limit (dBμ V/m)	Margin (dB)	Height (cm)	Pol	Azimuth h (deg)	Transd. (dB)
2483.5	40.09	74.00	33.91	100.0	H	232.0	-5.4

Note2:

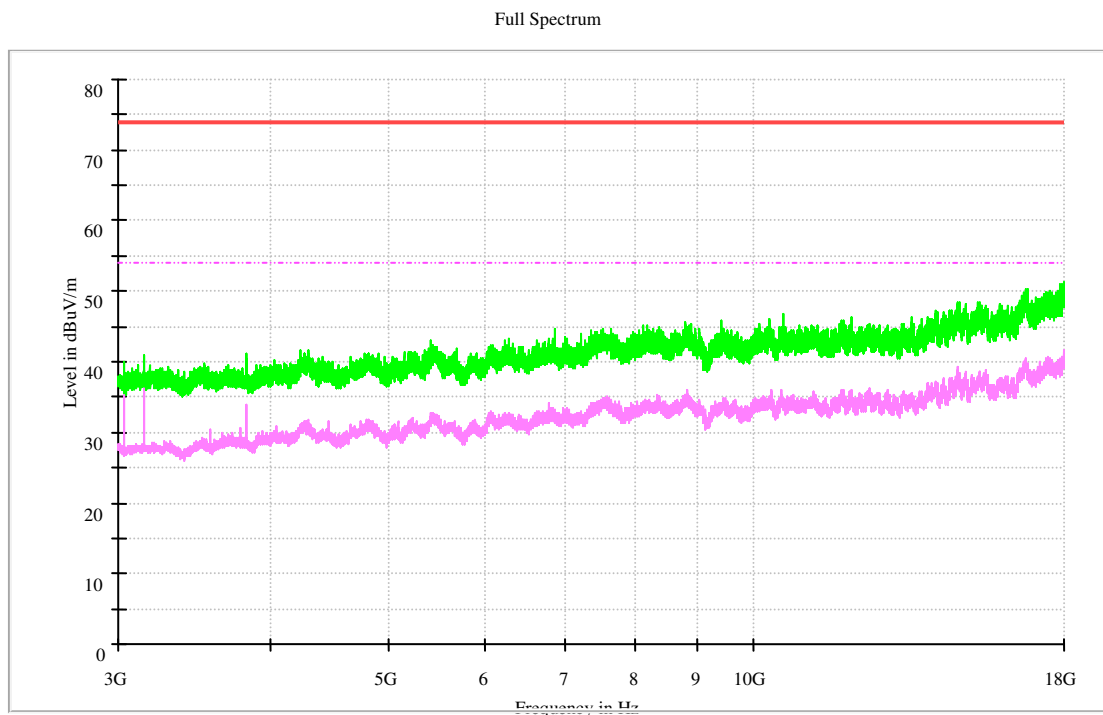
1, Level =Reading level by receiver + Transd (Antenna factor + cable loss – preamplifier gain)

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





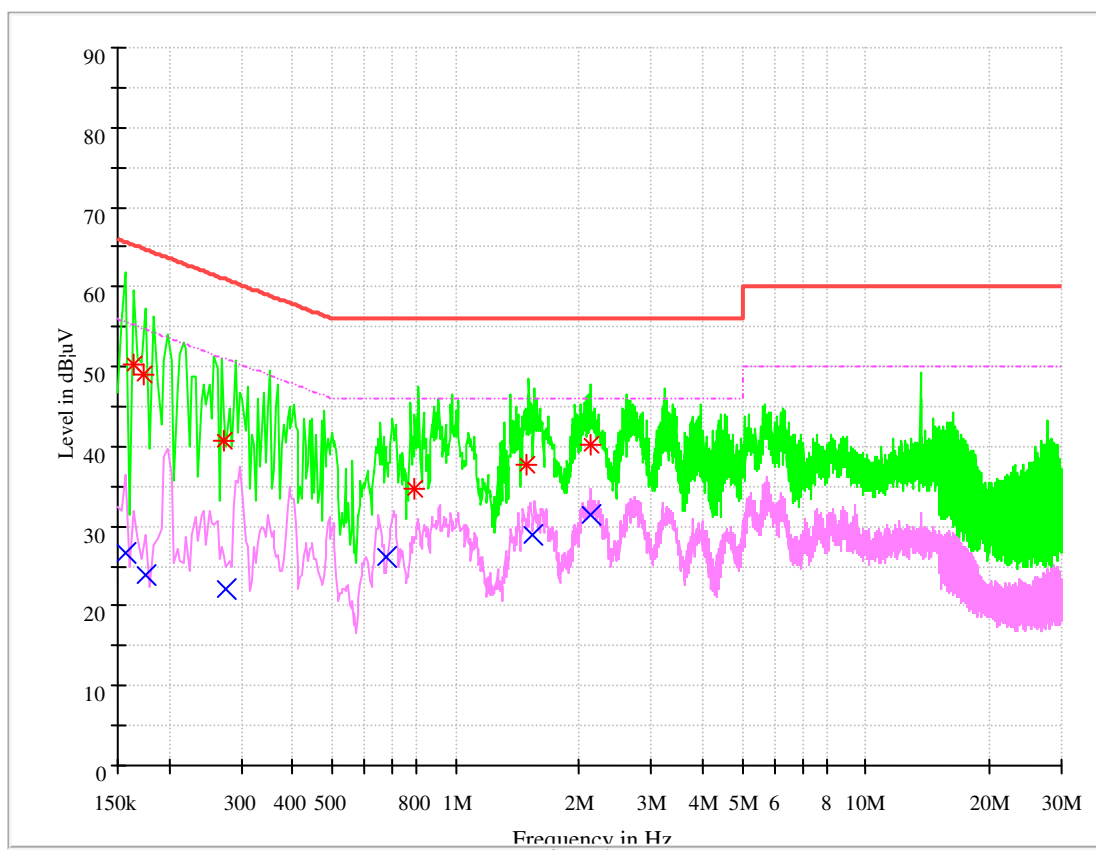
1.5 Part 5: Testing Range of "18 GHz to 26.5 GHz"

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

Appendix I: AC Power Line Conducted Emission

Note: RBW = 9 kHz, VBW = 30 kHz

Channel 39



MEASUREMENT RESULT: AV Detector

Frequency (MHz)	Level (dBμ V)	Limit (dBμ V)	Transd. (dB)	Margin (dB)	Line	PE
0.157672	26.54	55.59	9.7	29.05	N	FLO
0.174631	23.82	54.74	9.7	30.92	N	FLO
0.276199	22.22	50.93	9.7	28.71	N	FLO
0.679604	26.26	46.00	9.7	19.74	L1	FLO
1.531916	28.82	46.00	9.7	17.18	L1	FLO
2.136414	31.48	46.00	9.8	14.52	L1	FLO

MEASUREMENT RESULT: PK Detector

Frequency (MHz)	Level (dBμ V)	Limit (dBμ V)	Transd. (dB)	Margin (dB)	Line	PE
0.163867	50.26	65.27	9.7	15.00	N	FLO
0.172775	48.94	64.83	9.7	15.89	N	FLO
0.272274	40.79	61.05	9.7	20.26	N	FLO
0.789079	34.65	56.00	9.7	21.35	N	FLO
1.492878	37.83	56.00	9.7	18.17	N	FLO
2.136524	40.12	56.00	9.7	15.88	N	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