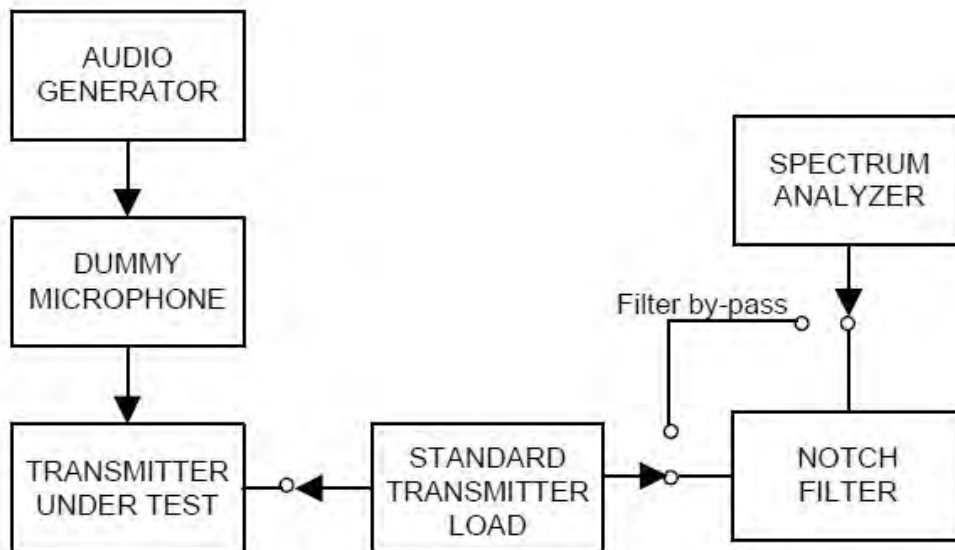


## 7.8 Unwanted Emissions : Conducted Spurious Emission

### Definition

Conducted spurious emissions are emissions at the antenna terminals on a frequency or frequencies that are outside a band sufficient to ensure transmission of information of required quality for the class of communication desired.

### TEST CONFIGURATION



### TEST PROCEDURE

According to 2.2.13 in TIA-603-D Standard.

- e) Connect the equipment as illustrated, with the notch filter by-passed.
- f) Set the center frequency of the spectrum analyzer to the assigned transmitter frequency, key the transmitter, and set the level of the carrier to the full scale reference line.
- g) Modulate the transmitter with a 2500 Hz sine wave at an input level 16 dB greater than that necessary to produce 50% of rated system deviation. The input level shall be established at the frequency of maximum response of the audio modulation circuit.
- h) Adjust the spectrum analyzer for the following settings:
  - 1) Resolution Bandwidth = 10 kHz for spurious emissions below 1 GHz, and 1 MHz for spurious emissions above 1 GHz.
  - 2) Video Bandwidth  $\geq 3$  times the resolution bandwidth.
  - 3) Sweep Speed  $\leq 2000$  Hz per second.
  - 4) Detector Mode = mean or average power.
- e) Adjust the center frequency of the spectrum analyzer for incremental coverage of the range from:
  - 1) The lowest radio frequency generated in the equipment to the carrier frequency minus the test bandwidth (see 1.3.4.4).
  - 2) The carrier frequency plus the test bandwidth to a frequency less than 2 times the carrier frequency.
- f) Record the frequencies and levels of spurious emissions from step e).

- g) Unkey the transmitter. Replace the transmitter under test with the signal generator and adjust the signal level to reproduce the frequencies and levels of every spurious emission recorded in step f). Record the signal generator levels in dBm.
- h) Insert the notch filter.
- i) Adjust the spectrum analyzer for the following settings:
  - 1) Resolution Bandwidth = 10 kHz for spurious emissions below 1 GHz, and 1 MHz for spurious emissions above 1 GHz.
  - 2) Video Bandwidth  $\geq 3$  times the resolution bandwidth.
  - 3) Sweep Speed  $\leq 2000$  Hz per second.
  - 4) Detector Mode = mean or average power.
- j) Key the transmitter. Adjust the center frequency of the spectrum analyzer for incremental coverage of the range from a frequency equal to 2 times the carrier frequency and to the tenth harmonic of the carrier frequency.

**LIMIT**

Frequency Band (MHz)	Channel bandwidth (kHz)	Limit (dB)
138 - 174	12.5	50+10Log(P) or 70 dB
	6.25	55+10Log(P) or 65 dB
	25	43+10Log(p)

**Note**

- 1. Correct Level (dBm) : Substitute SG Level (dBm)
- 2. Emission Level (dBc) : Correct Level – 10Log(P\*1000)
- 3. P = Carrier Output Power(W)  
( P value, please refer to Section 7.1)

**TEST RESULTS For FCC**

11K0F3E

No.	Frequency (MHz)	Band	Setting	Spurious Frequency (MHz)	Correct Level (dBm)	Emission Level (dBc)	Limit (dBc)	Margin (dB)
1	150.05	Low	High Power	870.99	-56.37	-94.02	-57.64	36.37
				824.43	-57.10	-94.75	-57.64	37.10
				1656.00	-48.39	-86.04	-57.64	28.39
2	162.05	Middle		771.08	-56.57	-94.03	-57.45	36.57
				909.79	-56.71	-94.16	-57.45	36.71
				1618.00	-48.14	-85.59	-57.45	28.14
3	173.95	High		132.82	-55.93	-93.39	-57.47	35.93
				896.21	-57.14	-94.60	-57.47	37.14
				1878.00	-48.08	-85.54	-57.47	28.08
4	150.05	Low	Low Power	40.67	-56.07	-86.11	-50.04	36.07
				64.92	-56.84	-86.89	-50.04	36.84
				1957.00	-47.21	-77.25	-50.04	27.21
5	162.05	Middle		39.70	-54.13	-83.87	-49.74	34.13
				182.29	-55.15	-84.88	-49.74	35.15
				1991.00	-48.36	-78.09	-49.74	28.36
6	173.95	High		39.70	-53.85	-83.90	-50.05	33.85
				200.72	-56.13	-86.18	-50.05	36.13
				1555.00	-48.25	-78.30	-50.05	28.25

8K10F1E, 8K10F1D

No.	Frequency (MHz)	Band	Setting	Spurious Frequency (MHz)	Correct Level (dBm)	Emission Level (dBc)	Limit (dBc)	Margin (dB)
1	150.05	Low	High Power	921.43	-56.57	-94.27	-57.70	36.57
				699.30	-57.18	-94.88	-57.70	37.18
				1848.00	-48.18	-85.88	-57.70	28.18
2	162.05	Middle		803.09	-56.34	-93.81	-57.47	36.34
				963.14	-56.90	-94.37	-57.47	36.90
				1816.00	-47.73	-85.20	-57.47	27.73
3	173.95	High		138.64	-56.23	-93.72	-57.49	36.23
				715.79	-57.05	-94.54	-57.49	37.05
				1758.00	-48.29	-85.77	-57.49	28.29
4	150.05	Low	Low Power	69.77	-56.49	-86.51	-50.01	36.49
				133.79	-56.77	-86.79	-50.01	36.77
				1995.00	-48.28	-78.30	-50.01	28.28
5	162.05	Middle		38.73	-54.09	-83.75	-49.66	34.09
				176.47	-56.07	-85.73	-49.66	36.07
				1663.00	-47.58	-77.24	-49.66	27.58
6	173.95	High		38.73	-51.45	-81.45	-50.01	31.45
				152.22	-55.40	-85.41	-50.01	35.40
				1724.00	-48.44	-78.45	-50.01	28.44

8K10F1W

No.	Frequency (MHz)	Band	Setting	Spurious Frequency (MHz)	Correct Level (dBm)	Emission Level (dBc)	Limit (dBc)	Margin (dB)
1	150.05	Low	High Power	884.57	-56.44	-94.06	-57.62	36.44
				997.09	-56.65	-94.27	-57.62	36.65
				1432.00	-48.07	-85.69	-57.62	28.07
2	162.05	Middle		949.56	-56.71	-94.17	-57.46	36.71
				867.11	-57.38	-94.84	-57.46	37.38
				1972.00	-48.42	-85.88	-57.46	28.42
3	173.95	High		135.73	-55.16	-92.58	-57.42	35.16
				974.78	-56.34	-93.76	-57.42	36.34
				1953.00	-48.28	-85.69	-57.42	28.28
4	150.05	Low	Low Power	67.83	-55.82	-86.00	-50.18	35.82
				171.62	-56.01	-86.19	-50.18	36.01
				1833.00	-48.33	-78.51	-50.18	28.33
5	162.05	Middle		39.70	-53.90	-83.78	-49.88	33.90
				181.32	-56.07	-85.95	-49.88	36.07
				1952.00	-48.22	-78.10	-49.88	28.22
6	173.95	High		40.67	-52.04	-82.19	-50.15	32.04
				181.32	-55.24	-85.40	-50.15	35.24
				1910.00	-48.05	-78.20	-50.15	28.05

8K30F1E, 8K30F1D, 8K30F7W

No.	Frequency (MHz)	Band	Setting	Spurious Frequency (MHz)	Correct Level (dBm)	Emission Level (dBc)	Limit (dBc)	Margin (dB)
1	150.05	Low	High Power	878.75	-56.70	-94.36	-57.67	36.70
				548.95	-57.16	-94.83	-57.67	37.16
				1791.00	-48.40	-86.06	-57.67	28.40
2	162.05	Middle		855.47	-56.44	-93.93	-57.49	36.44
				728.40	-56.74	-94.23	-57.49	36.74
				1920.00	-48.18	-85.67	-57.49	28.18
3	173.95	High		768.17	-56.70	-94.20	-57.50	36.70
				140.58	-56.75	-94.25	-57.50	36.75
				1655.00	-48.30	-85.81	-57.50	28.30
4	150.05	Low	Low Power	873.90	-56.04	-86.17	-50.13	36.04
				70.74	-56.07	-86.19	-50.13	36.07
				1936.00	-48.28	-78.40	-50.13	28.28
5	162.05	Middle		39.70	-53.19	-83.02	-49.83	33.19
				186.17	-54.45	-84.28	-49.83	34.45
				1501.00	-48.60	-78.43	-49.83	28.60
6	173.95	High		39.70	-52.26	-82.36	-50.10	32.26
				152.22	-55.75	-85.85	-50.10	35.75
				1754.00	-47.75	-77.85	-50.10	27.75

4K00F1E, 4K00F1D, 4K00F7W

No.	Frequency (MHz)	Band	Setting	Spurious Frequency (MHz)	Correct Level (dBm)	Emission Level (dBc)	Limit (dBc)	Margin (dB)
1	150.05	Low	High Power	807.94	-56.60	-94.28	-62.68	31.60
				639.16	-57.10	-94.78	-62.68	32.10
				1738.00	-48.26	-85.94	-62.68	23.26
2	162.05	Middle		981.57	-56.67	-94.18	-62.51	31.67
				720.64	-57.03	-94.53	-62.51	32.03
				1845.00	-47.80	-85.31	-62.51	22.80
3	173.95	High		132.82	-53.96	-91.42	-62.45	28.96
				916.58	-56.77	-94.22	-62.45	31.77
				1943.00	-47.91	-85.36	-62.45	22.91
4	150.05	Low	Low Power	172.59	-54.97	-85.02	-55.05	29.97
				939.86	-56.33	-86.38	-55.05	31.33
				1974.00	-47.78	-77.83	-55.05	22.78
5	162.05	Middle		40.67	-53.93	-83.68	-54.75	28.93
				927.25	-55.67	-85.42	-54.75	30.67
				1993.00	-48.21	-77.96	-54.75	23.21
6	173.95	High		38.73	-51.02	-81.08	-55.06	26.02
				209.45	-55.10	-85.16	-55.06	30.10
				1760.00	-48.37	-78.43	-55.06	23.37

4K00F2D

No.	Frequency (MHz)	Band	Setting	Spurious Frequency (MHz)	Correct Level (dBm)	Emission Level (dBc)	Limit (dBc)	Margin (dB)
1	150.05	Low	High Power	-	-	-	-	-
				-	-	-	-	-
				-	-	-	-	-
2	162.05	Middle		-	-	-	-	-
				-	-	-	-	-
3	173.95	High		-	-	-	-	-
				-	-	-	-	-
				-	-	-	-	-
4	150.05	Low		Low Power	63.95	-56.65	-86.55	-54.90
			174.53		-56.73	-86.62	-54.90	31.73
			1738.00		-48.07	-77.97	-54.90	23.07
5	162.05	Middle	40.67		-53.23	-82.91	-54.68	28.23
			990.30		-56.23	-85.91	-54.68	31.23
6	173.95	High	1827.00		-48.02	-77.70	-54.68	23.02
			41.64		-52.40	-82.39	-54.99	27.40
			147.37		-55.83	-85.82	-54.99	30.83
			1977.00		-47.84	-77.83	-54.99	22.84



**TEST RESULTS For IC**

16K0F3E

No.	Frequency (MHz)	Band	Setting	Spurious Frequency (MHz)	Correct Level (dBm)	Emission Level (dBc)	Limit (dBc)	Margin (dB)
1	138.05	Low	High Power	939.86	-56.73	-94.27	-50.54	43.73
				864.20	-56.87	-94.41	-50.54	43.87
				1927.00	-48.45	-85.99	-50.54	35.45
2	143.95	Middle		203.63	-55.96	-93.49	-50.53	42.96
				71.71	-56.27	-93.79	-50.53	43.27
				1901.00	-48.67	-86.19	-50.53	35.67
3	148.05	High		944.71	-56.77	-94.33	-50.56	43.77
				629.46	-57.13	-94.70	-50.56	44.13
				1843.00	-48.22	-85.78	-50.56	35.22
4	138.05	Low	Low Power	74.62	-56.31	-86.61	-43.30	43.31
				916.58	-56.82	-87.12	-43.30	43.82
				1653.00	-48.30	-78.60	-43.30	35.30
5	143.95	Middle		71.71	-56.33	-86.35	-43.02	43.33
				883.60	-56.78	-86.80	-43.02	43.78
				1997.00	-48.43	-78.45	-43.02	35.43
6	148.05	High		70.74	-54.92	-84.96	-43.04	41.92
				955.38	-56.28	-86.31	-43.04	43.28
				1936.00	-48.27	-78.31	-43.04	35.27

11K0F3E

No.	Frequency (MHz)	Band	Setting	Spurious Frequency (MHz)	Correct Level (dBm)	Emission Level (dBc)	Limit (dBc)	Margin (dB)
1	138.05	Low	High Power	191.99	-56.40	-93.94	-57.55	36.40
				71.71	-56.58	-94.13	-57.55	36.58
				1663.00	-47.89	-85.44	-57.55	27.89
2	143.95	Middle		68.80	-55.50	-93.02	-57.52	35.50
				868.08	-56.94	-94.46	-57.52	36.94
				1964.00	-48.42	-85.94	-57.52	28.42
3	148.05	High		807.94	-56.91	-94.48	-57.57	36.91
				910.76	-56.93	-94.50	-57.57	36.93
				1997.00	-48.25	-85.83	-57.57	28.25
4	138.05	Low	Low Power	71.71	-55.95	-86.12	-50.18	35.95
				874.87	-56.57	-86.75	-50.18	36.57
				1959.00	-48.27	-78.45	-50.18	28.27
5	143.95	Middle		40.67	-56.40	-86.37	-49.97	36.40
				162.89	-56.59	-86.56	-49.97	36.59
				1639.00	-48.49	-78.46	-49.97	28.49
6	148.05	High		72.68	-56.01	-86.03	-50.02	36.01
				908.82	-56.48	-86.50	-50.02	36.48
				1938.00	-47.37	-77.39	-50.02	27.37

8K10F1E, 8K10F1D

No.	Frequency (MHz)	Band	Setting	Spurious Frequency (MHz)	Correct Level (dBm)	Emission Level (dBc)	Limit (dBc)	Margin (dB)
1	138.05	Low	High Power	194.90	-55.95	-93.56	-57.62	35.95
				75.59	-56.49	-94.10	-57.62	36.49
				1722.00	-48.15	-85.77	-57.62	28.15
2	143.95	Middle		74.62	-56.59	-94.12	-57.53	36.59
				993.21	-57.20	-94.73	-57.53	37.20
				1941.00	-48.19	-85.72	-57.53	28.19
3	148.05	High		887.48	-56.10	-93.68	-57.58	36.10
				979.63	-56.80	-94.38	-57.58	36.80
				1401.00	-48.53	-86.11	-57.58	28.53
4	138.05	Low	Low Power	70.74	-55.82	-86.10	-50.28	35.82
				968.96	-55.88	-86.16	-50.28	35.88
				1953.00	-48.35	-78.63	-50.28	28.35
5	143.95	Middle		71.71	-56.05	-86.06	-50.00	36.05
				895.24	-56.50	-86.50	-50.00	36.50
				1507.00	-48.00	-78.00	-50.00	28.00
6	148.05	High		70.74	-55.72	-85.77	-50.05	35.72
				973.81	-56.30	-86.35	-50.05	36.30
				1920.00	-48.67	-78.72	-50.05	28.67

8K10F1W

No.	Frequency (MHz)	Band	Setting	Spurious Frequency (MHz)	Correct Level (dBm)	Emission Level (dBc)	Limit (dBc)	Margin (dB)
1	138.05	Low	High Power	200.72	-56.48	-94.18	-57.69	36.48
				894.27	-57.33	-95.03	-57.69	37.33
				1805.00	-48.55	-86.24	-57.69	28.55
2	143.95	Middle		76.56	-55.95	-93.55	-57.60	35.95
				960.23	-56.70	-94.30	-57.60	36.70
				1715.00	-48.12	-85.72	-57.60	28.12
3	148.05	High		981.57	-57.05	-94.66	-57.62	37.05
				787.57	-57.05	-94.67	-57.62	37.05
				1934.00	-48.63	-86.25	-57.62	28.63
4	138.05	Low	Low Power	878.75	-56.24	-86.40	-50.16	36.24
				76.56	-56.65	-86.81	-50.16	36.65
				1788.00	-48.19	-78.35	-50.16	28.19
5	143.95	Middle		71.71	-56.61	-86.52	-49.91	36.61
				886.51	-57.02	-86.93	-49.91	37.02
				1509.00	-48.30	-78.21	-49.91	28.30
6	148.05	High		69.77	-55.95	-85.94	-49.99	35.95
				882.63	-56.81	-86.80	-49.99	36.81
				1999.00	-48.78	-78.77	-49.99	28.78

8K30F1E, 8K30F1D, 8K30F7W

No.	Frequency (MHz)	Band	Setting	Spurious Frequency (MHz)	Correct Level (dBm)	Emission Level (dBc)	Limit (dBc)	Margin (dB)
1	138.05	Low	High Power	67.83	-56.45	-94.11	-57.66	36.45
				194.90	-56.64	-94.30	-57.66	36.64
				1941.00	-47.93	-85.60	-57.66	27.93
2	143.95	Middle		68.80	-56.33	-93.91	-57.58	36.33
				833.16	-56.54	-94.12	-57.58	36.54
				1669.00	-48.55	-86.14	-57.58	28.55
3	148.05	High		879.72	-57.25	-94.86	-57.62	37.25
				984.48	-57.35	-94.97	-57.62	37.35
				1714.00	-48.13	-85.75	-57.62	28.13
4	138.05	Low	Low Power	79.47	-55.44	-85.72	-50.28	35.44
				913.67	-56.94	-87.22	-50.28	36.94
				1680.00	-48.66	-78.94	-50.28	28.66
5	143.95	Middle		76.56	-55.33	-85.35	-50.02	35.33
				995.15	-56.72	-86.74	-50.02	36.72
				1624.00	-48.52	-78.53	-50.02	28.52
6	148.05	High		69.77	-53.98	-84.02	-50.04	33.98
				171.62	-56.69	-86.73	-50.04	36.69
				1850.00	-48.38	-78.41	-50.04	28.38

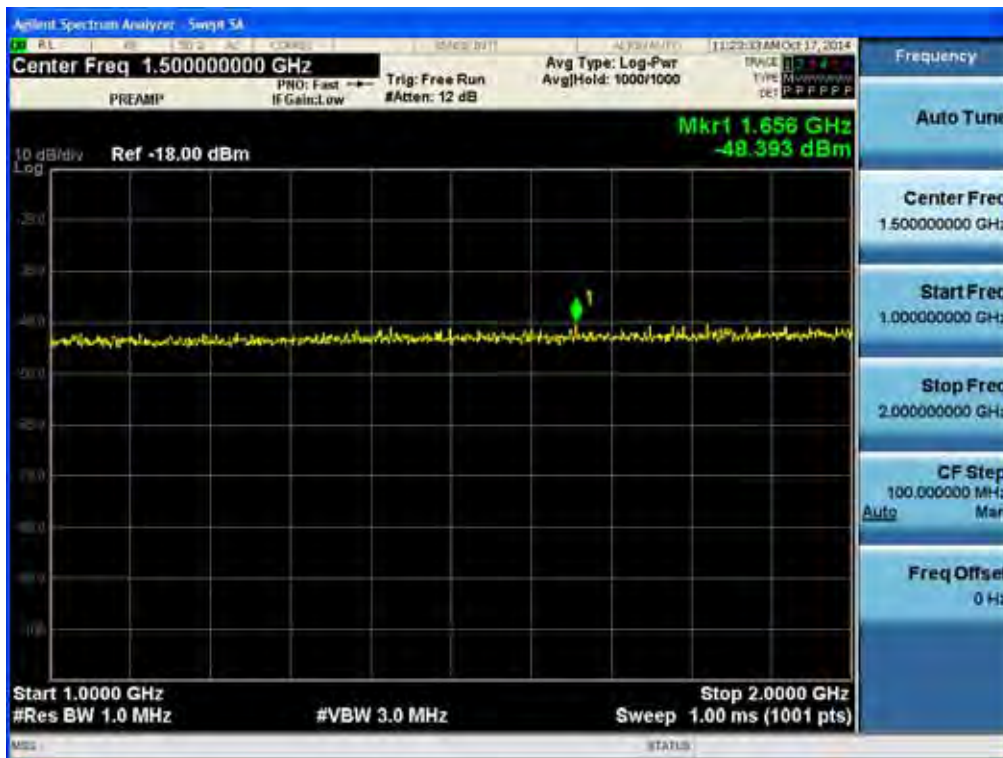
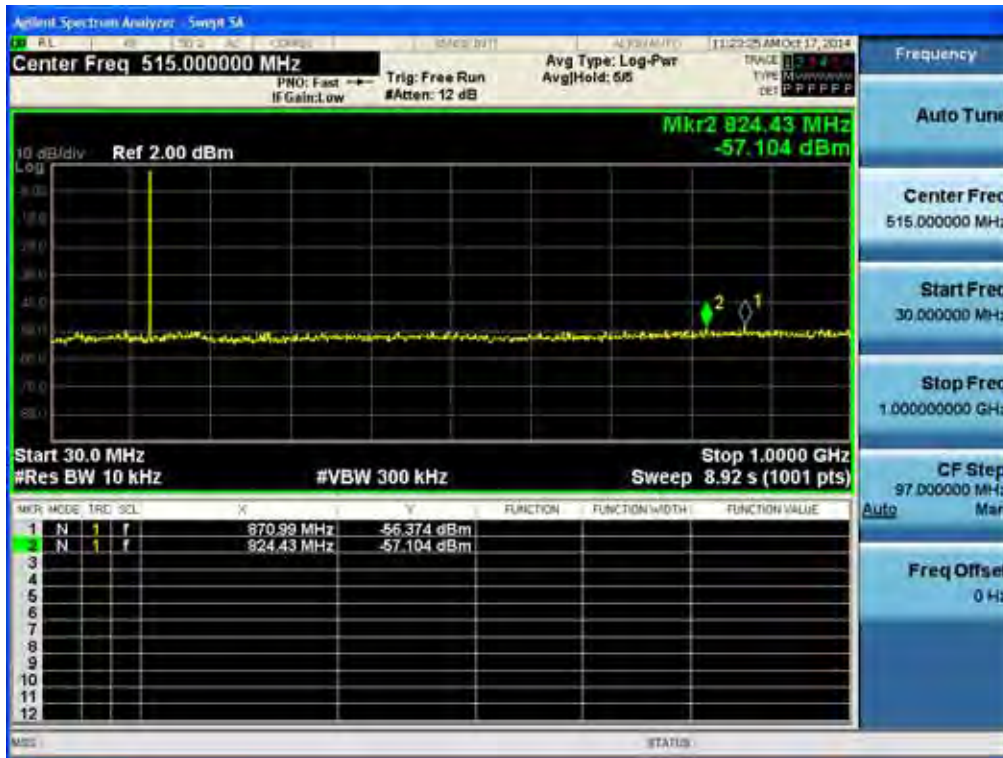
K00F1E, 4K00F1D, 4K00F7W

No.	Frequency (MHz)	Band	Setting	Spurious Frequency (MHz)	Correct Level (dBm)	Emission Level (dBc)	Limit (dBc)	Margin (dB)
1	138.05	Low	High Power	962.17	-56.40	-94.01	-62.61	31.40
				192.96	-56.63	-94.23	-62.61	31.63
				1892.00	-48.23	-85.83	-62.61	23.23
2	143.95	Middle		73.65	-55.89	-93.44	-62.55	30.89
				722.58	-56.70	-94.24	-62.55	31.70
				1367.00	-48.71	-86.26	-62.55	23.71
3	148.05	High		937.92	-56.92	-94.49	-62.57	31.92
				990.30	-57.09	-94.66	-62.57	32.09
				1835.00	-48.32	-85.89	-62.57	23.32
4	138.05	Low	Low Power	80.44	-56.37	-86.57	-55.19	31.37
				153.19	-57.19	-87.38	-55.19	32.19
				1998.00	-47.84	-78.03	-55.19	22.84
5	143.95	Middle		76.56	-55.65	-85.59	-54.94	30.65
				995.15	-55.99	-85.93	-54.94	30.99
				1601.00	-47.46	-77.40	-54.94	22.46
6	148.05	High		169.68	-55.96	-85.95	-54.99	30.96
				70.74	-56.14	-86.12	-54.99	31.14
				1495.00	-47.63	-77.62	-54.99	22.63

4K00F2D

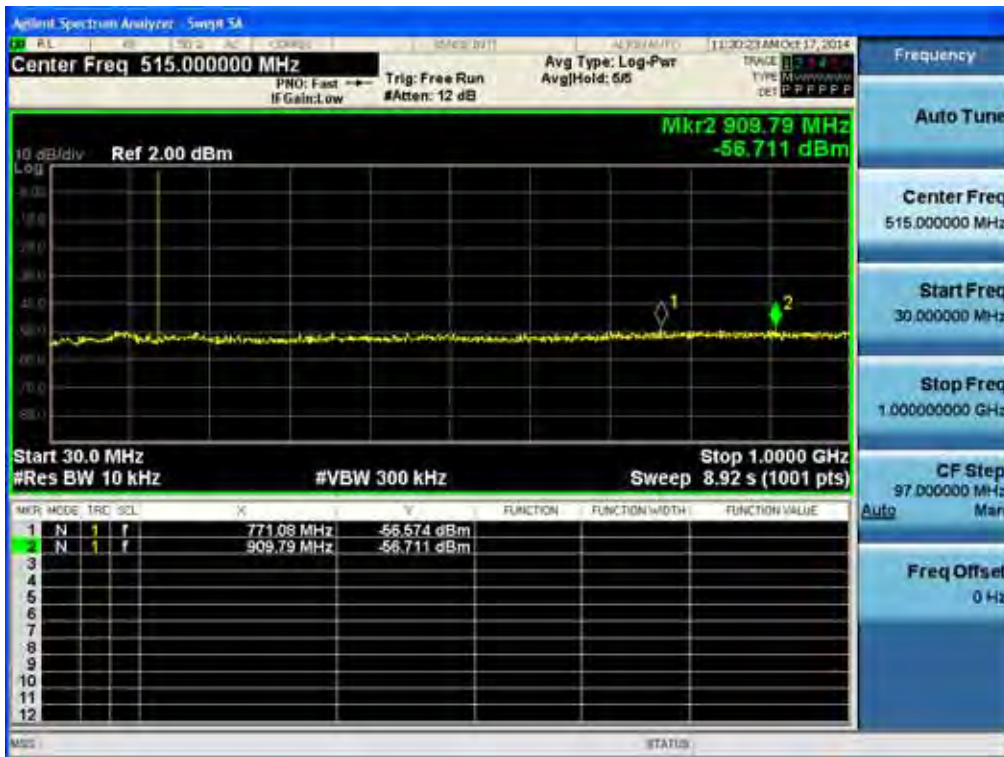
No.	Frequency (MHz)	Band	Setting	Spurious Frequency (MHz)	Correct Level (dBm)	Emission Level (dBc)	Limit (dBc)	Margin (dB)
1	138.05	Low	High Power	-	-	-	-	-
				-	-	-	-	-
				-	-	-	-	-
2	143.95	Middle		-	-	-	-	-
				-	-	-	-	-
3	148.05	High		-	-	-	-	-
				-	-	-	-	-
				-	-	-	-	-
4	138.05	Low		Low Power	71.71	-55.27	-85.28	-55.01
			672.14		-56.67	-86.67	-55.01	31.67
			1807.00		-48.47	-78.48	-55.01	23.47
5	143.95	Middle	159.98		-56.22	-86.07	-54.85	31.22
			803.09		-56.86	-86.70	-54.85	31.86
6	148.05	High	1987.00		-48.63	-78.48	-54.85	23.63
			948.59		-55.89	-85.84	-54.94	30.89
			173.56		-56.13	-86.08	-54.94	31.13
					1926.00	-48.47	-78.41	-54.94

**Plots of Unwanted Emissions : Conducted Spurious Emission FCC**  
(11K0F3E \_ 150.05 MHz)\_High

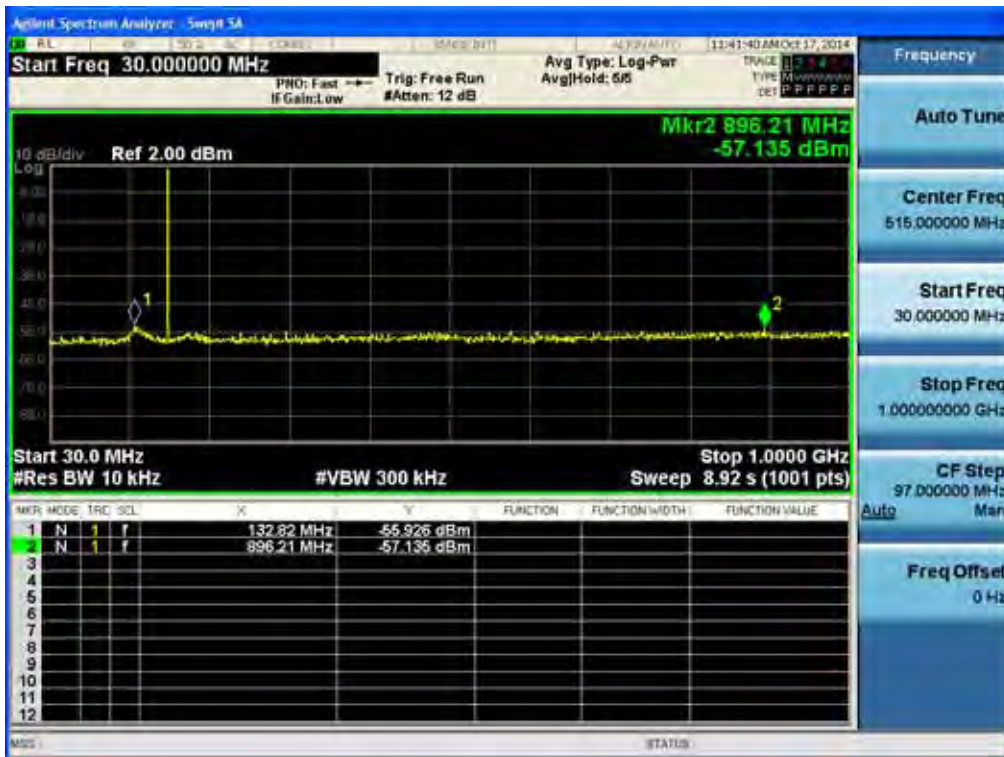




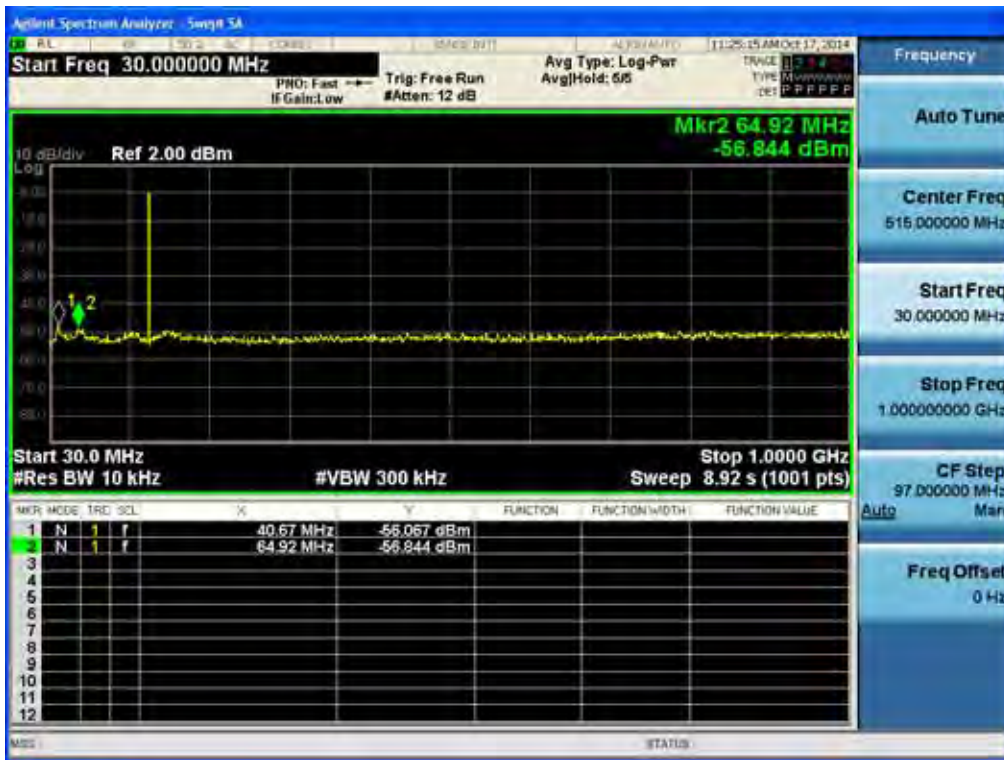
(11K0F3E \_ 162.05 MHz)\_High



(11K0F3E \_ 173.95 MHz)\_High



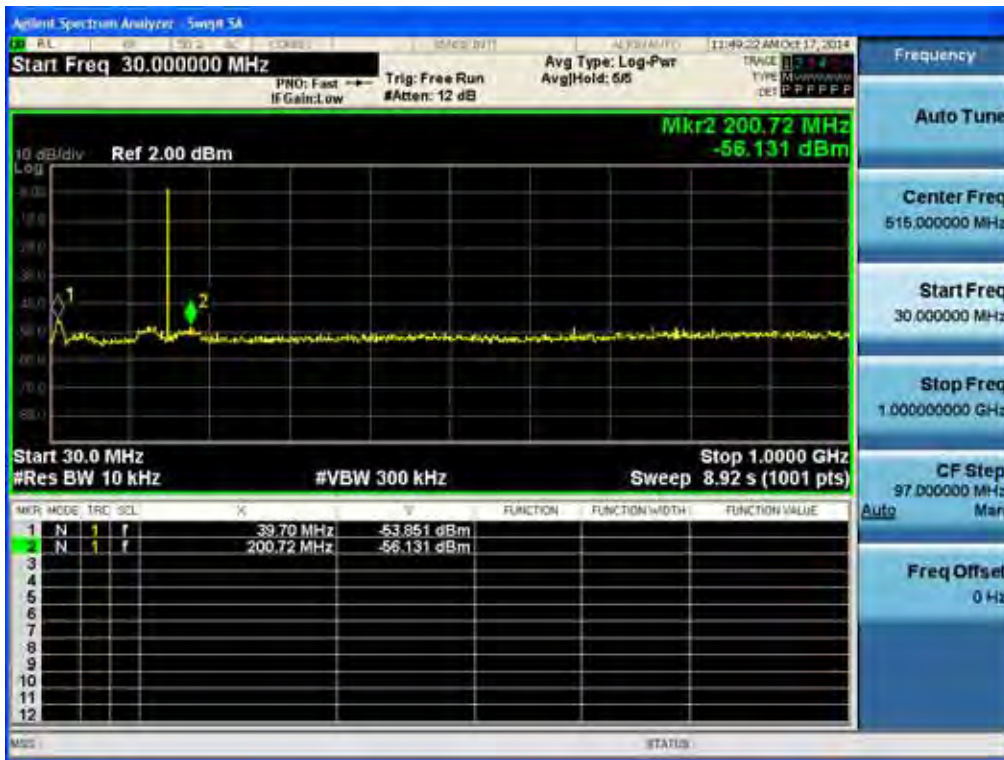
(11K0F3E \_ 150.05 MHz)\_Low



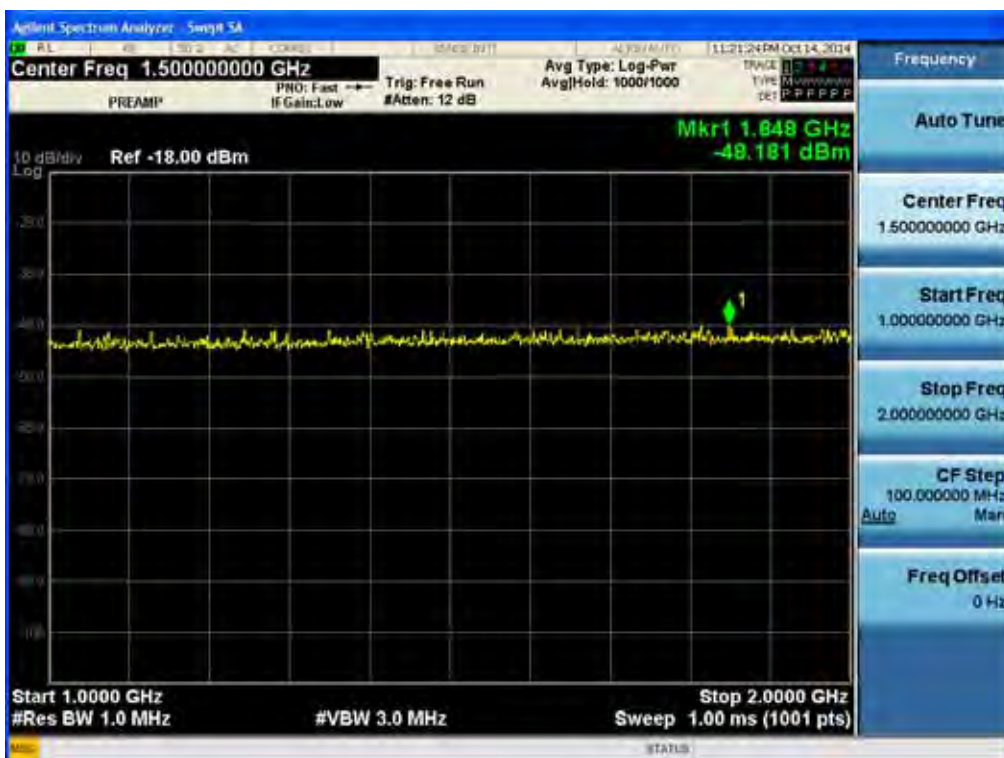
(11K0F3E \_ 162.05 MHz)\_Low



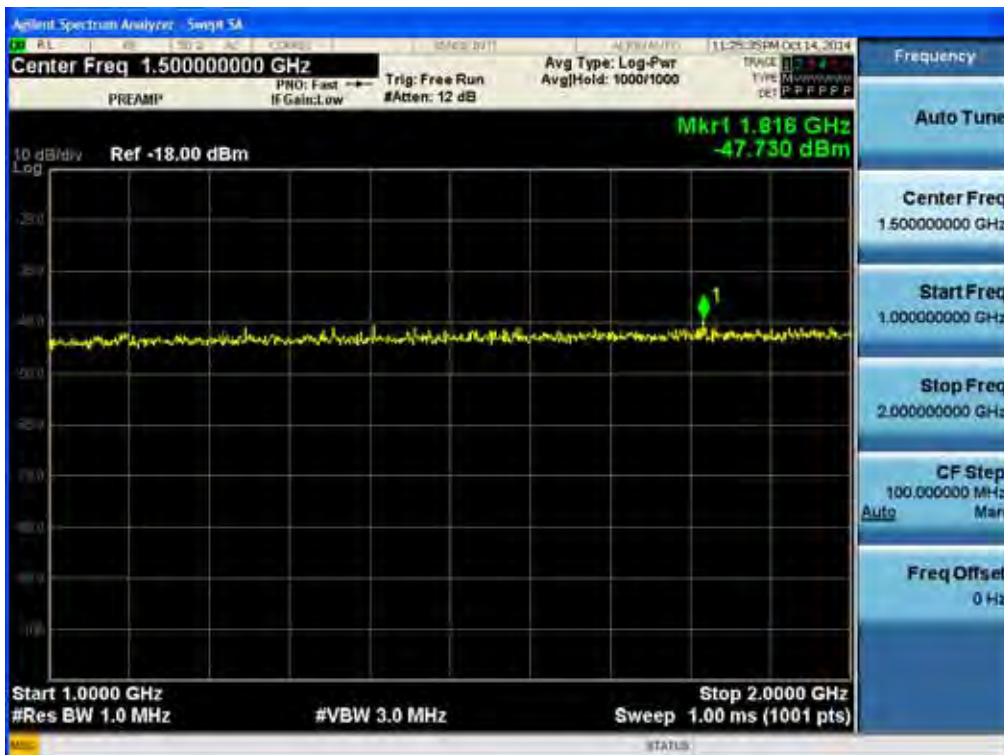
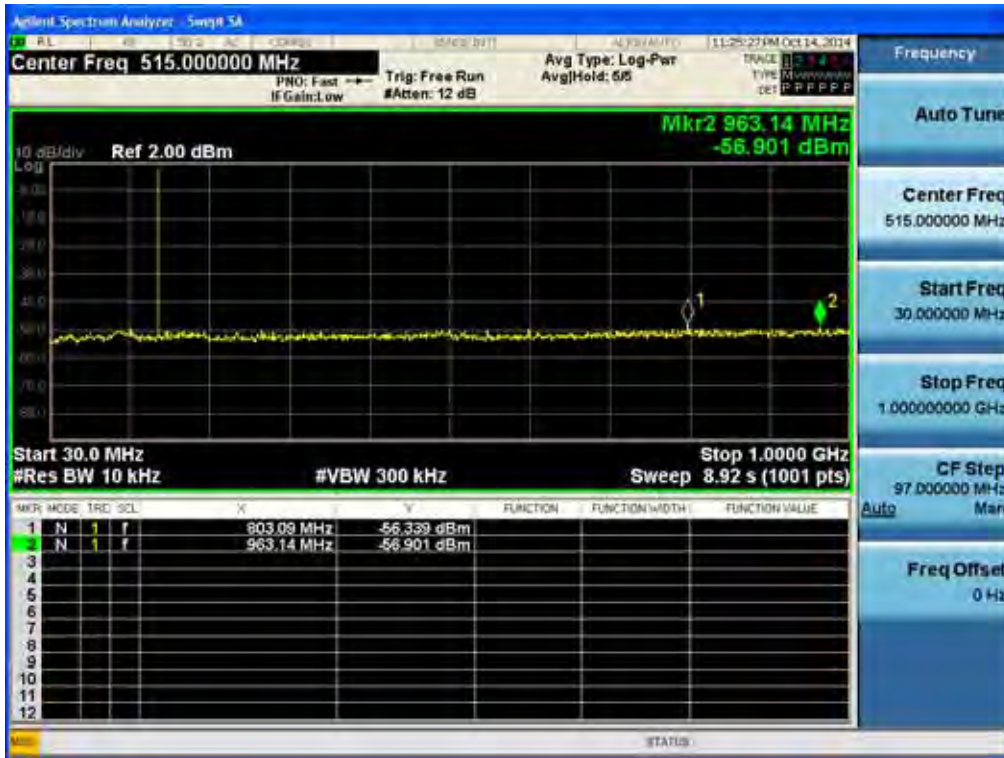
(11K0F3E \_ 173.95 MHz)\_Low



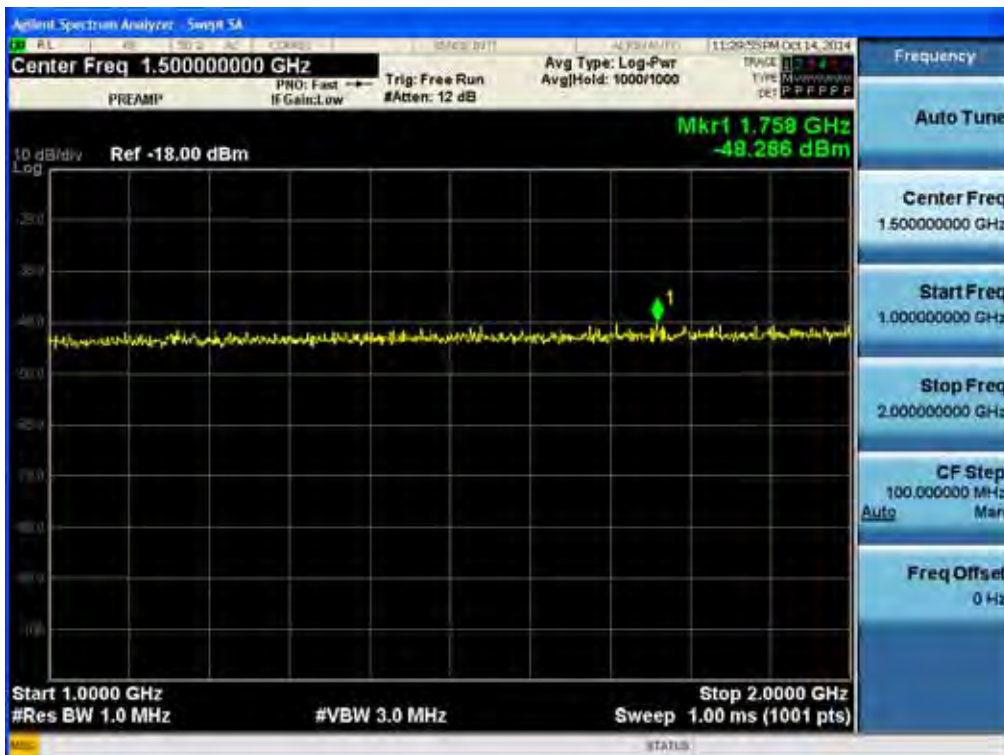
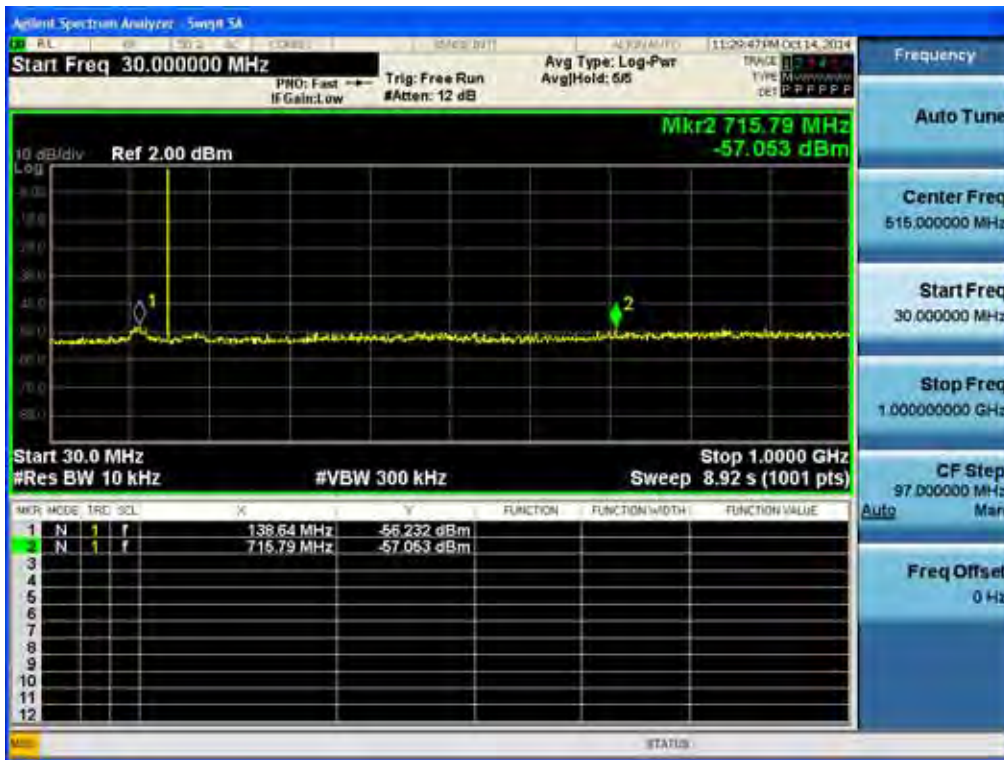
(8K10F1E, 8K10F1D \_ 150.05 MHz)\_High



(8K10F1E, 8K10F1D \_ 162.05 MHz)\_High

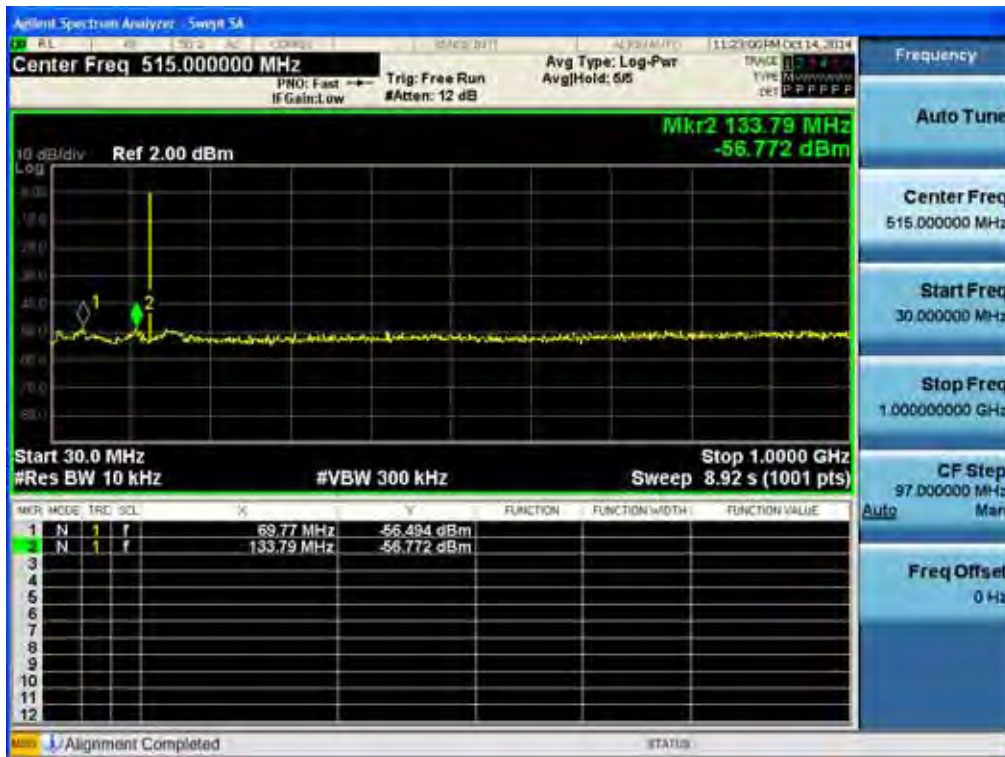


(8K10F1E, 8K10F1D \_ 173.95 MHz)\_High

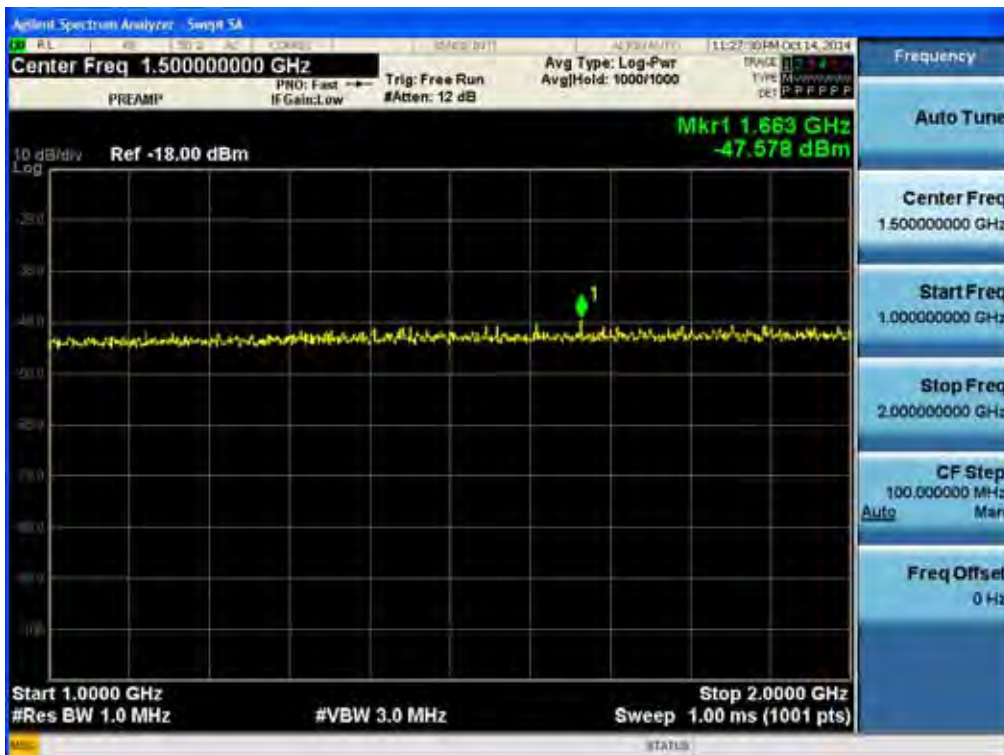




(8K10F1E, 8K10F1D \_ 150.05 MHz)\_Low



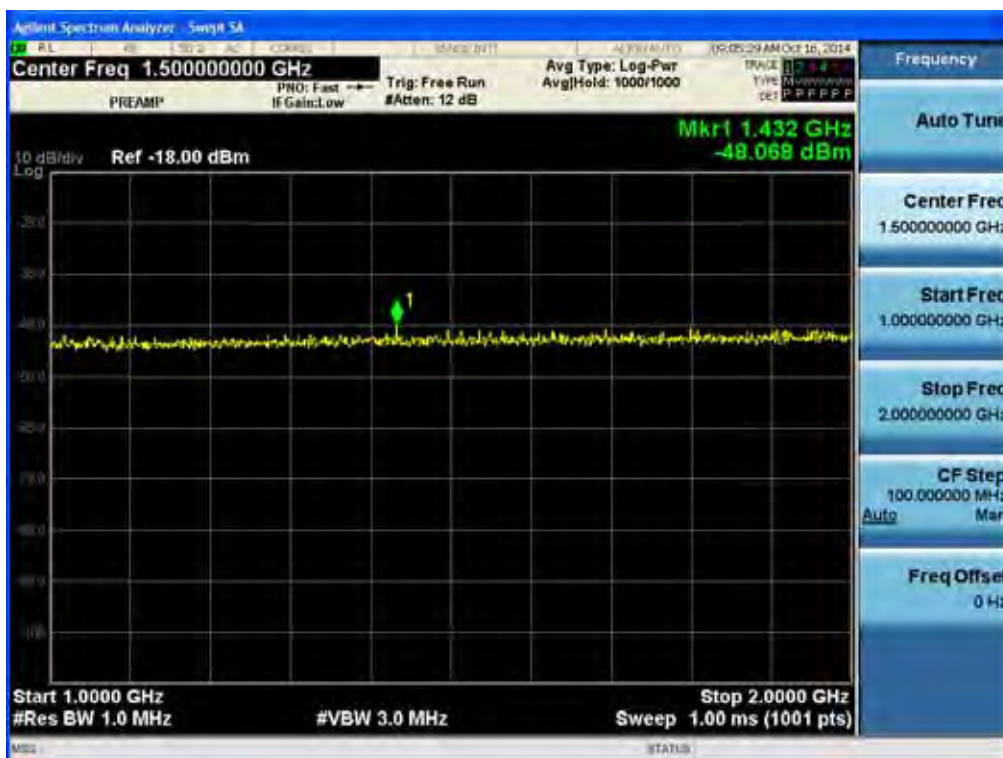
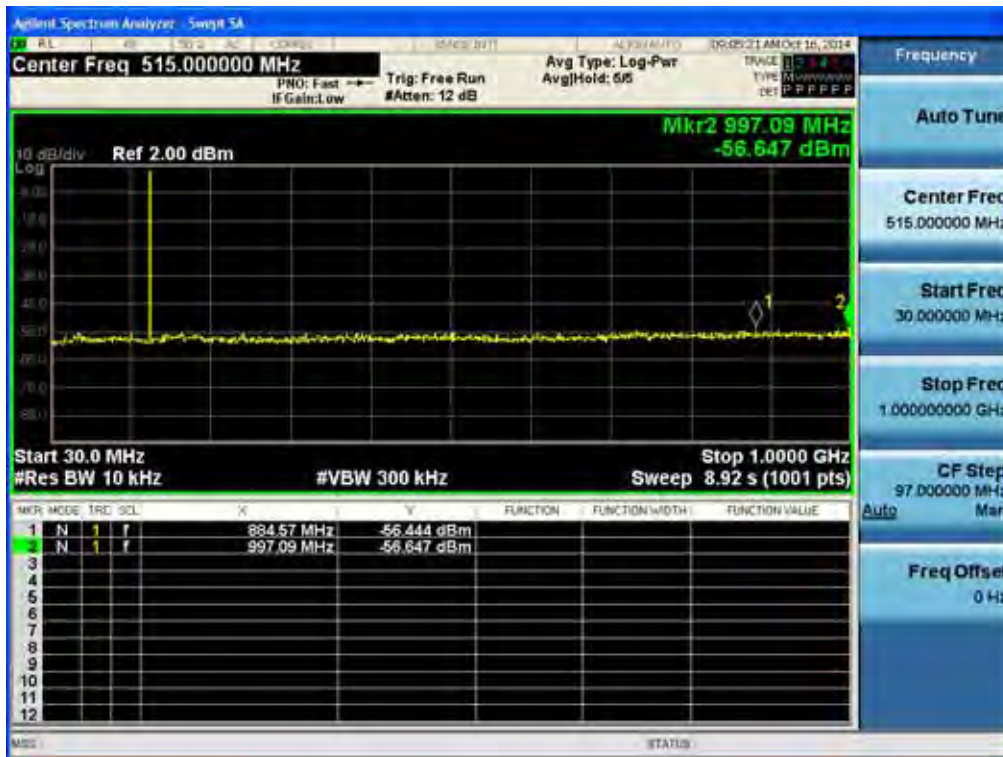
(8K10F1E, 8K10F1D \_ 162.05 MHz)\_Low



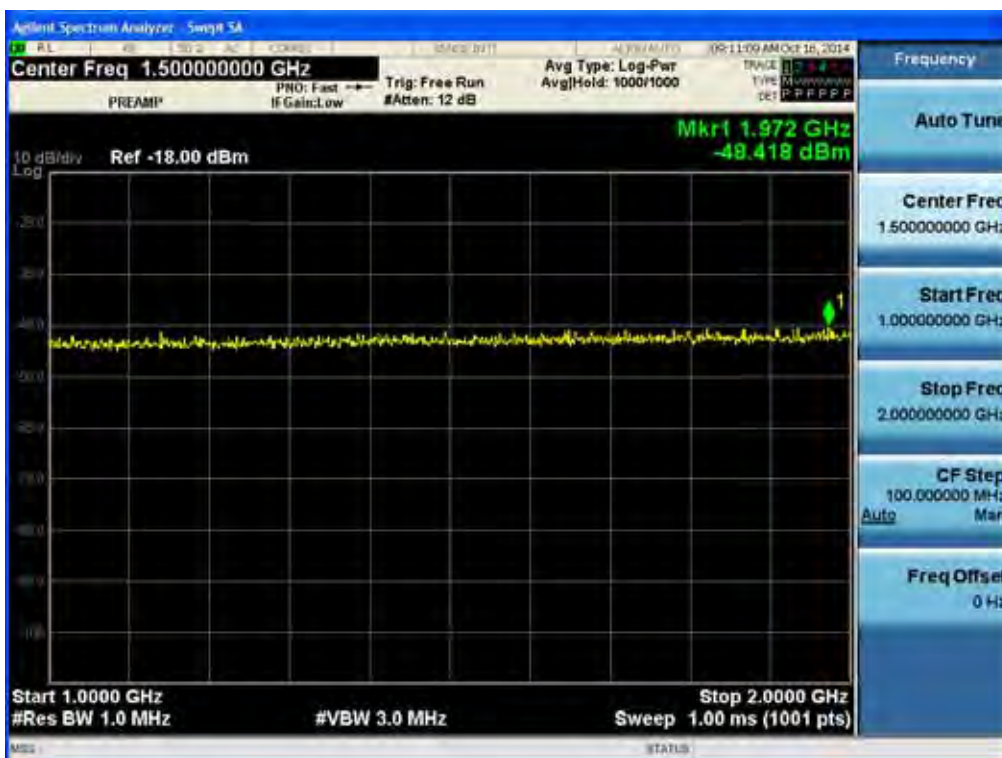
(8K10F1E, 8K10F1D \_ 173.95 MHz)\_Low



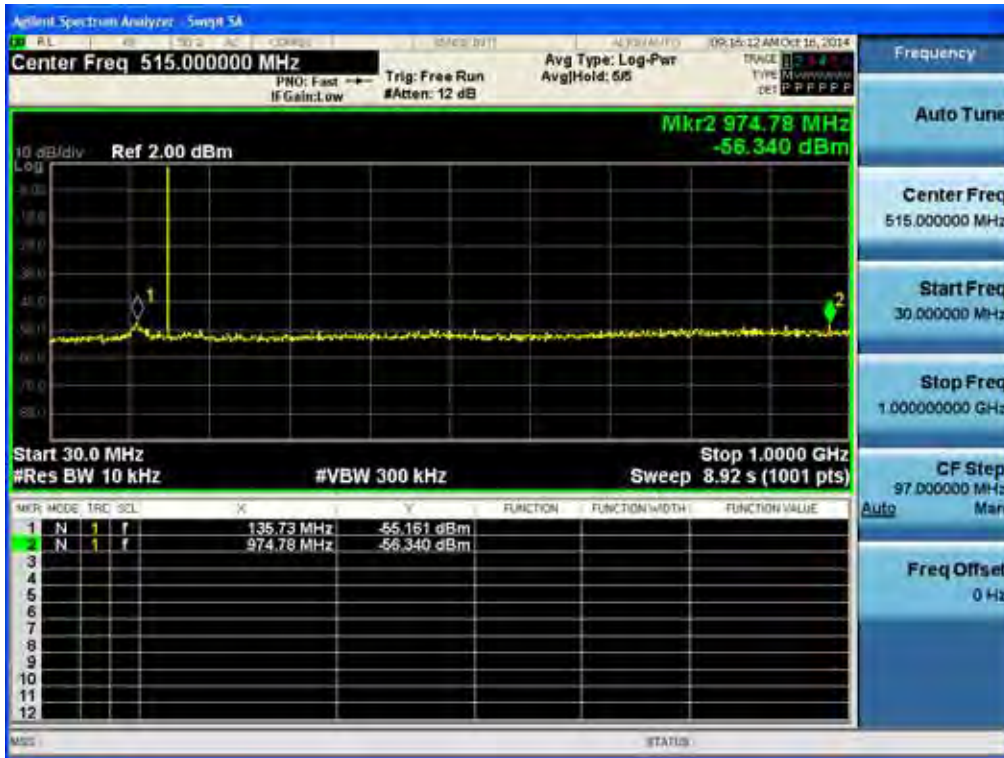
(8K10F1W \_ 150.05 MHz)\_High



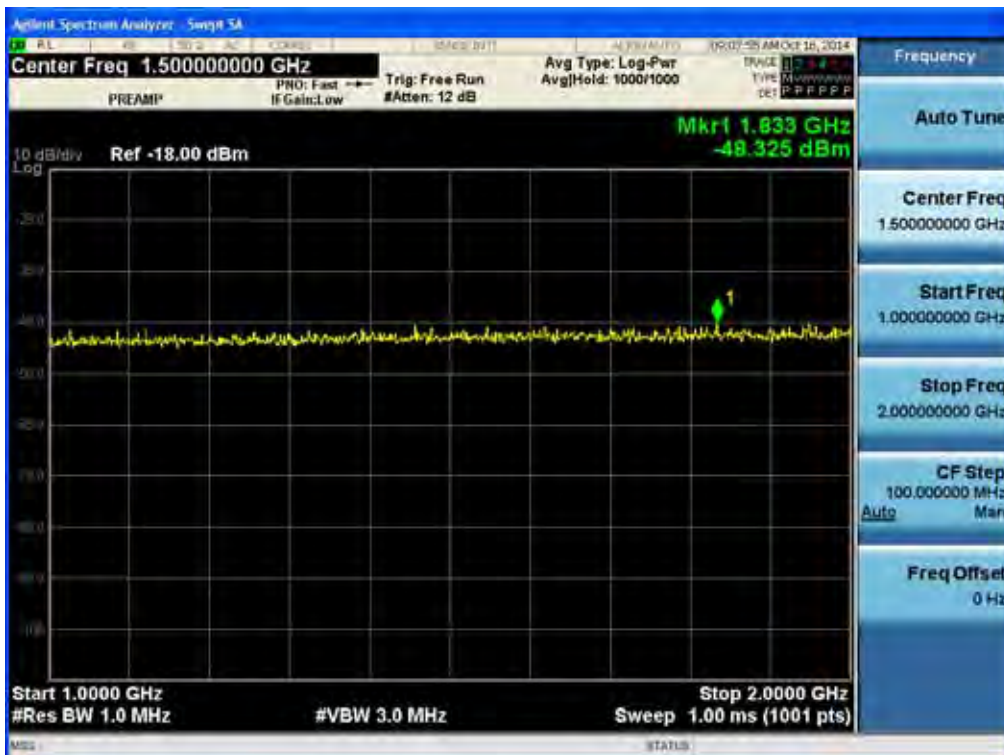
(8K10F1W \_ 162.05 MHz)\_High



(8K10F1W \_ 173.95 MHz)\_High



(8K10F1W \_ 150.05 MHz)\_Low



(8K10F1W \_ 162.05 MHz)\_Low

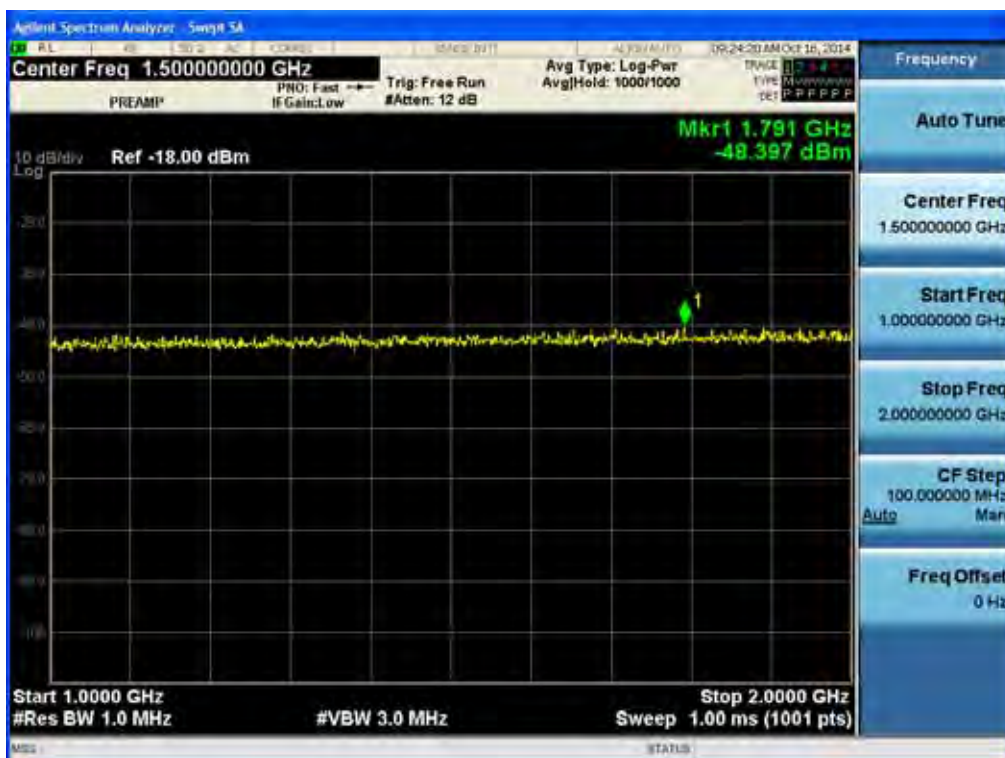




(8K10F1W \_ 173.95 MHz)\_Low



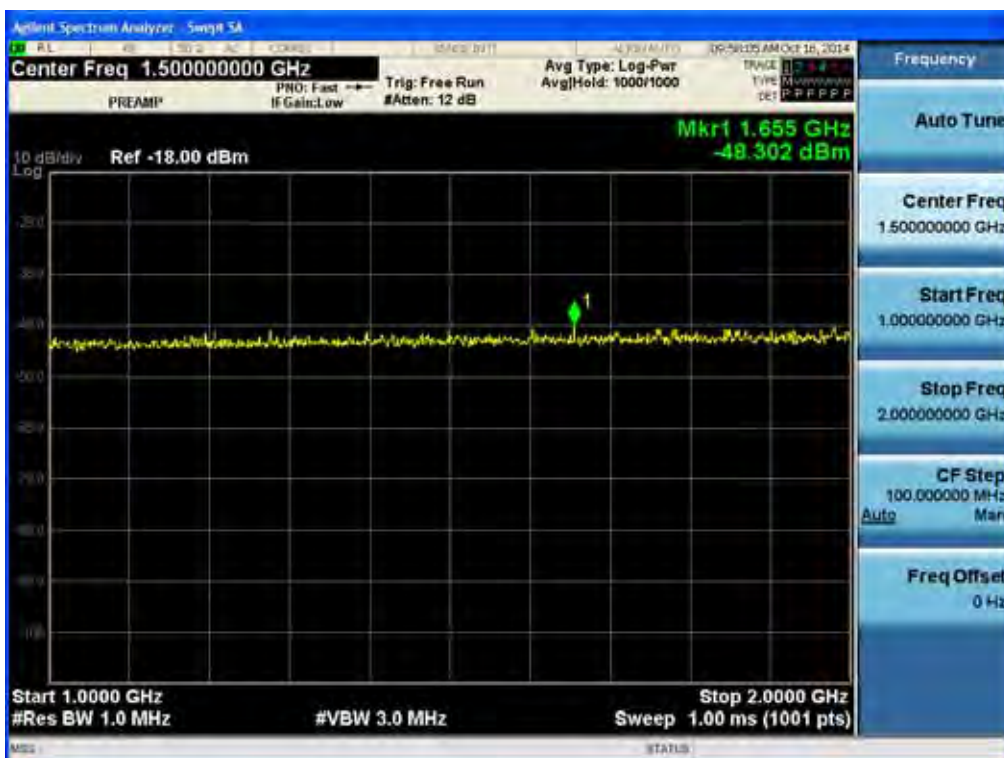
(8K30F1E, 8K30F1D, 8K30F7W \_ 150.05 MHz)\_High



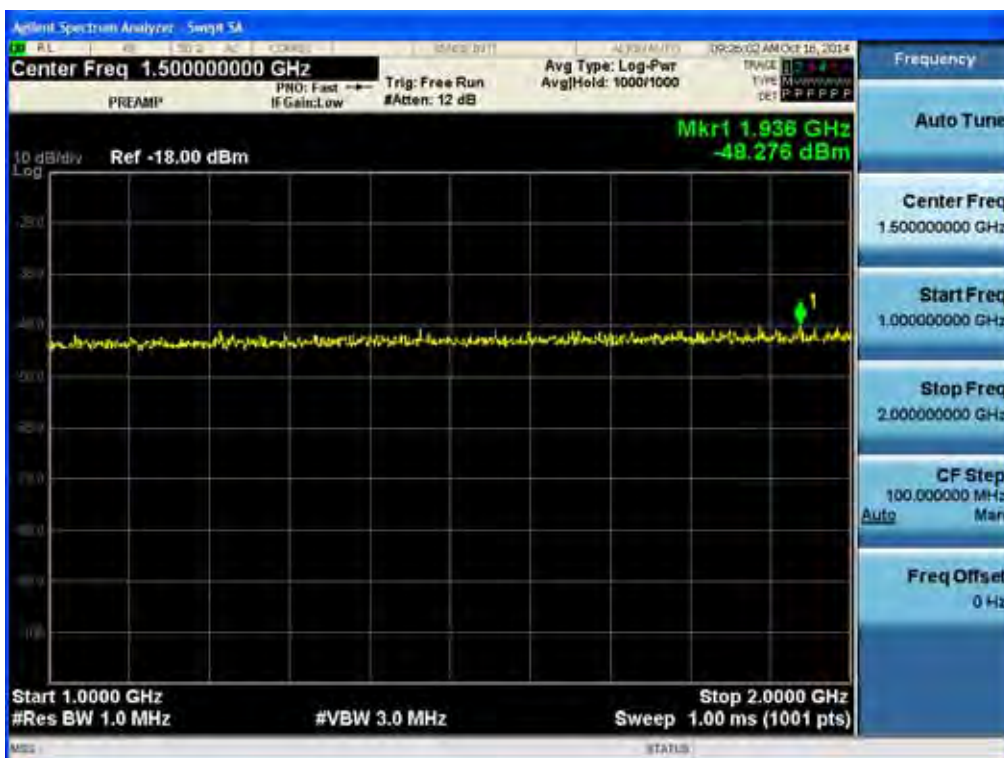
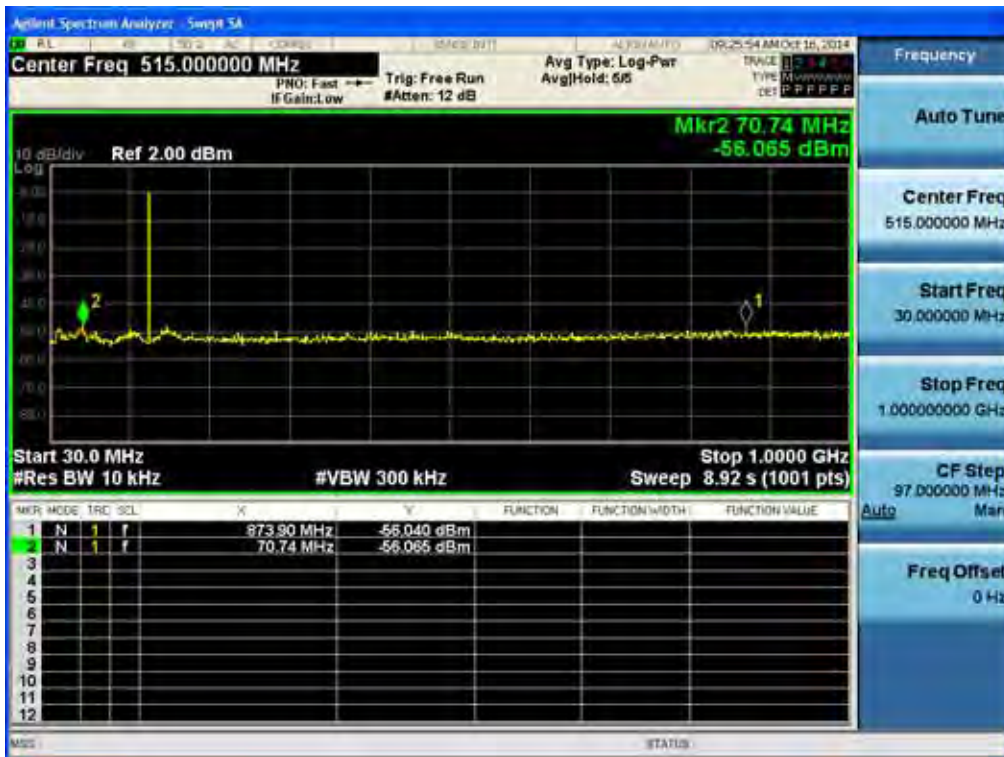
(8K30F1E, 8K30F1D, 8K30F7W \_ 162.05 MHz)\_High



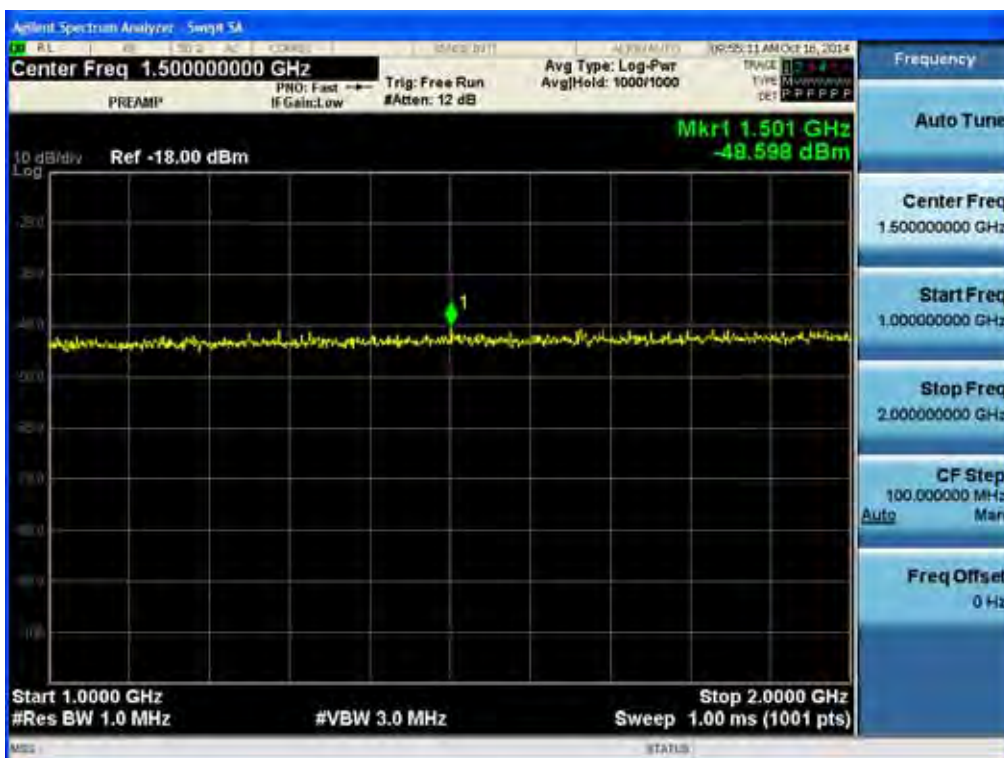
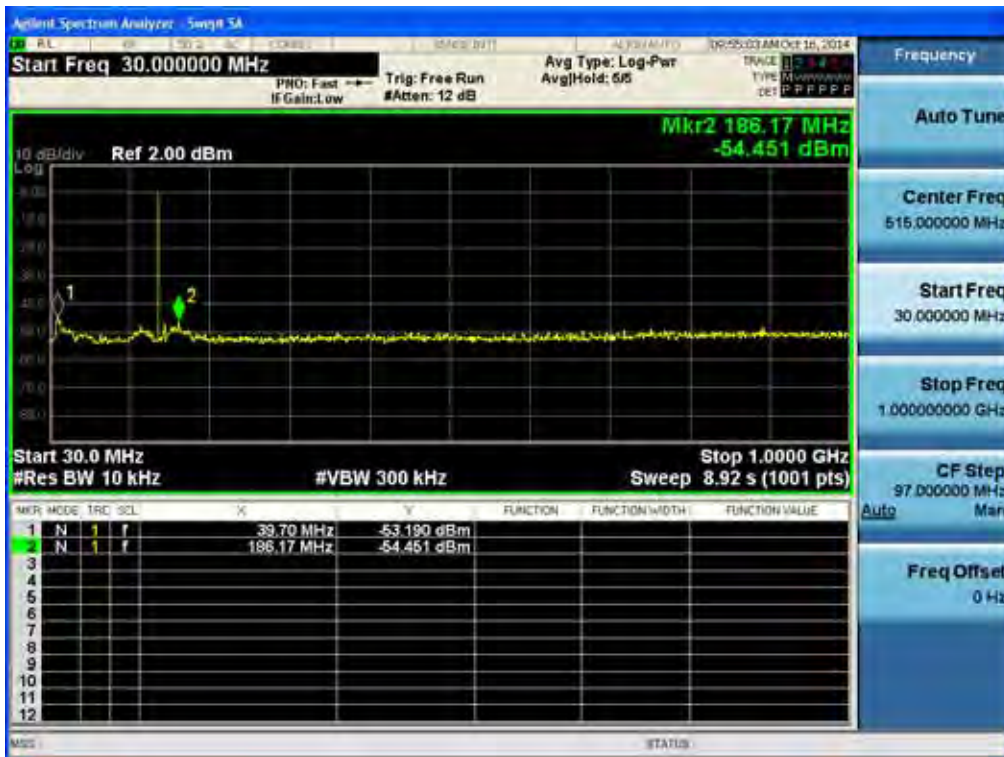
(8K30F1E, 8K30F1D, 8K30F7W \_ 173.95 MHz)\_High



(8K30F1E, 8K30F1D, 8K30F7W \_ 150.05 MHz)\_Low



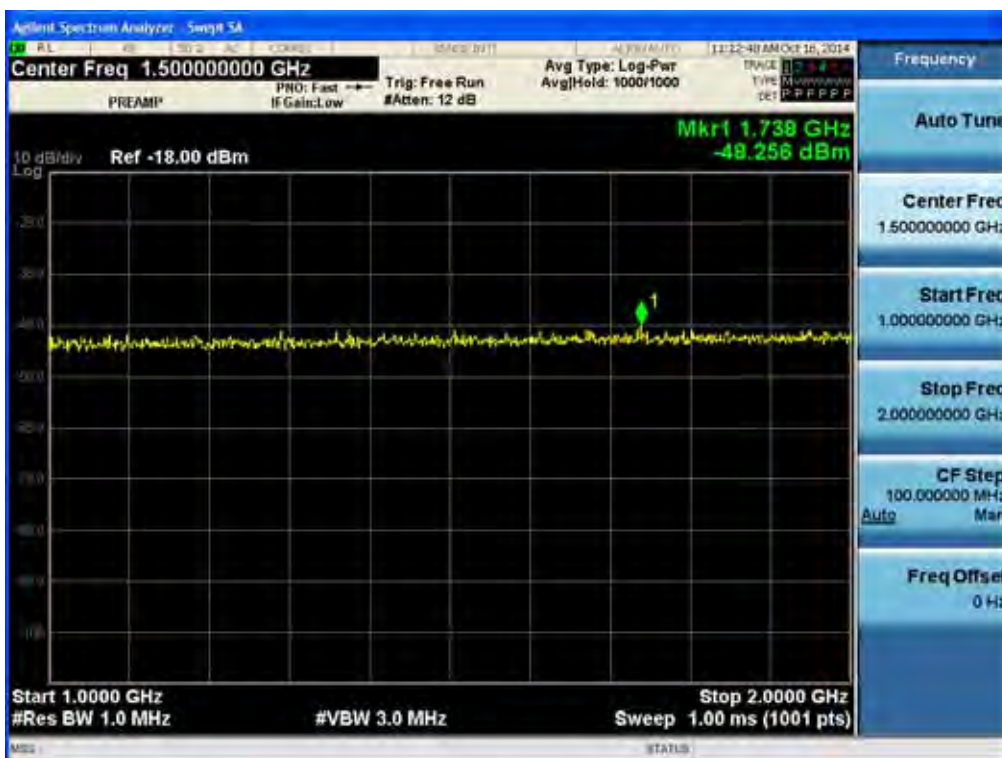
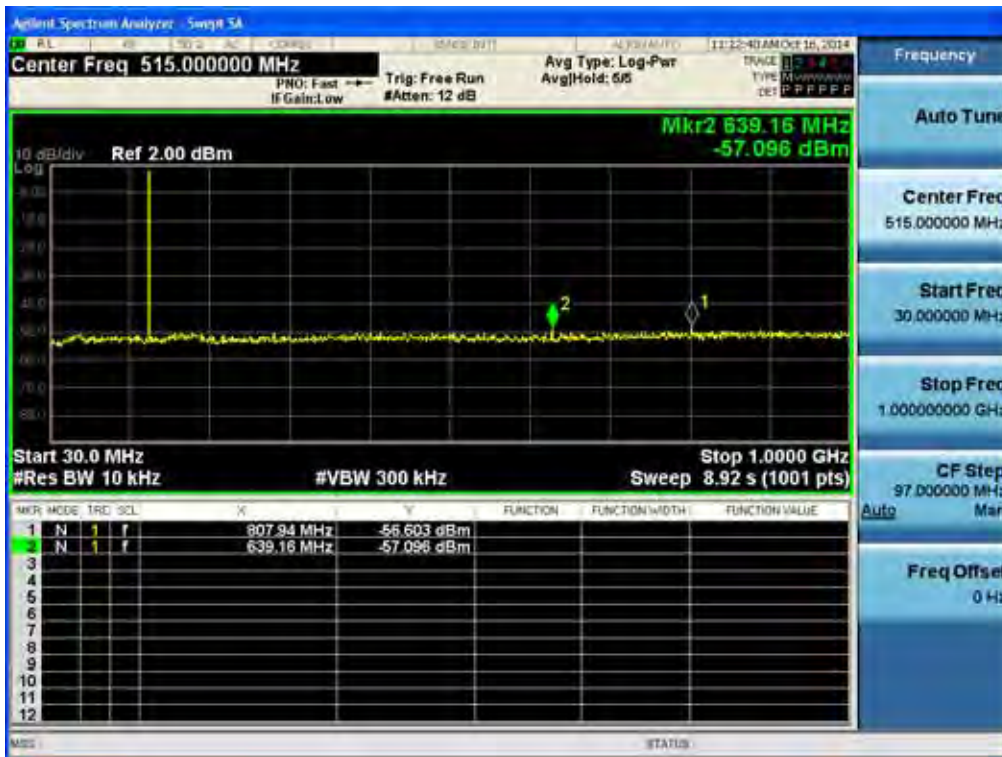
(8K30F1E, 8K30F1D, 8K30F7W \_ 162.05 MHz)\_Low



(8K30F1E, 8K30F1D, 8K30F7W \_ 173.95 MHz)\_Low

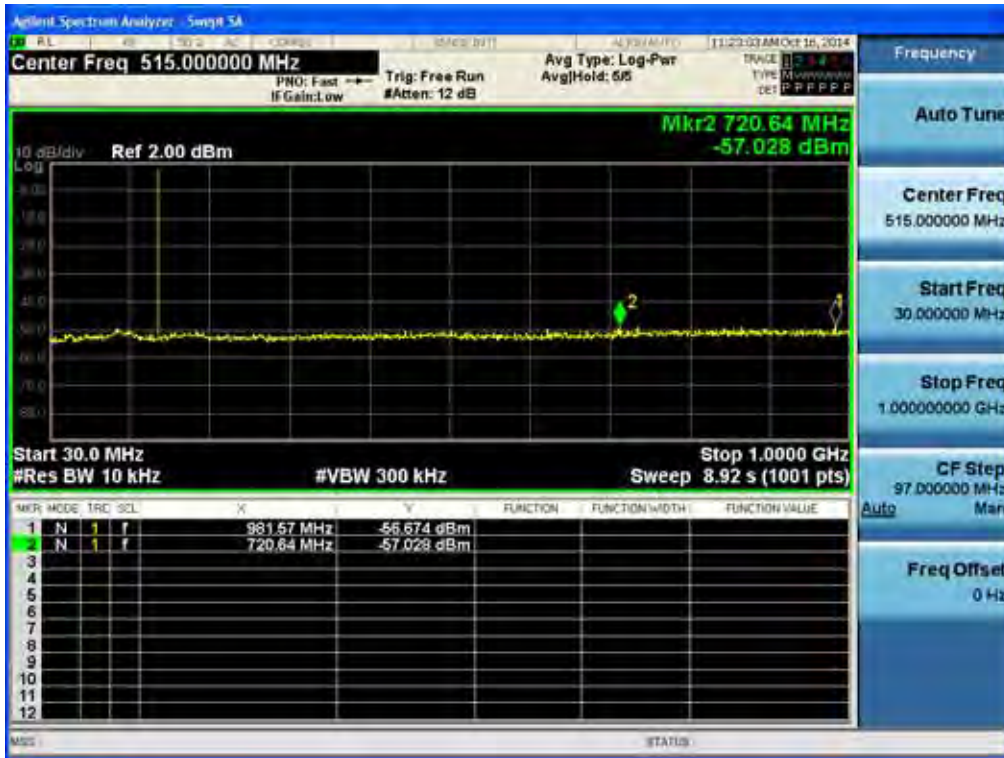


(4K00F1E, 4K00F1D, 4K00F7W \_ 150.05 MHz)\_High

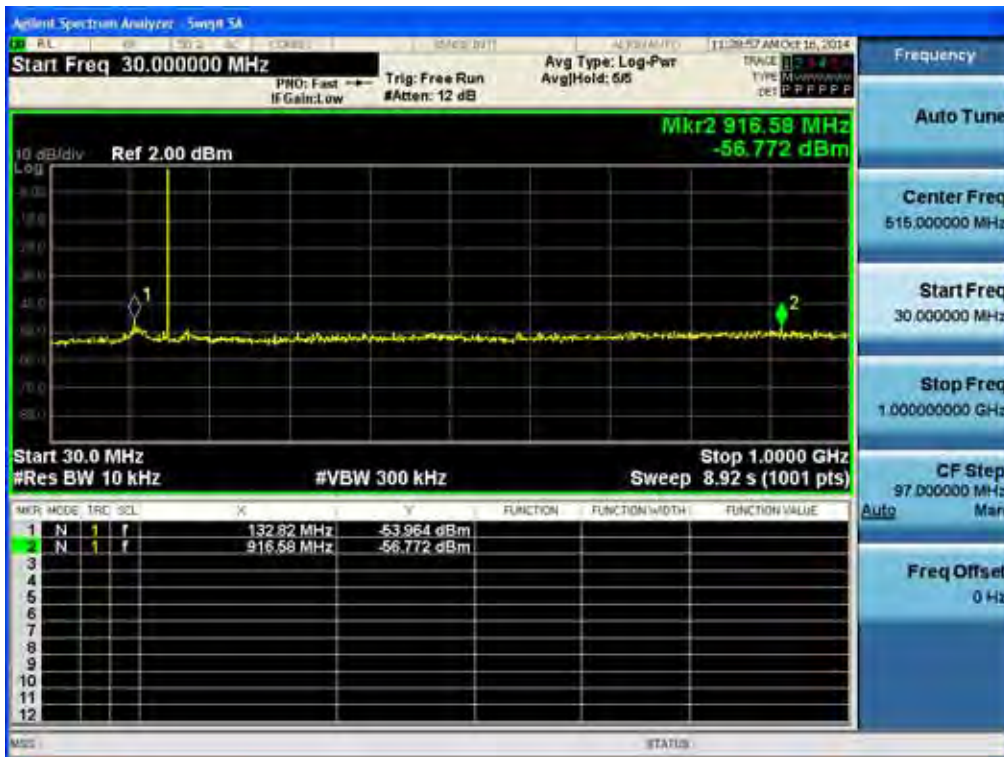




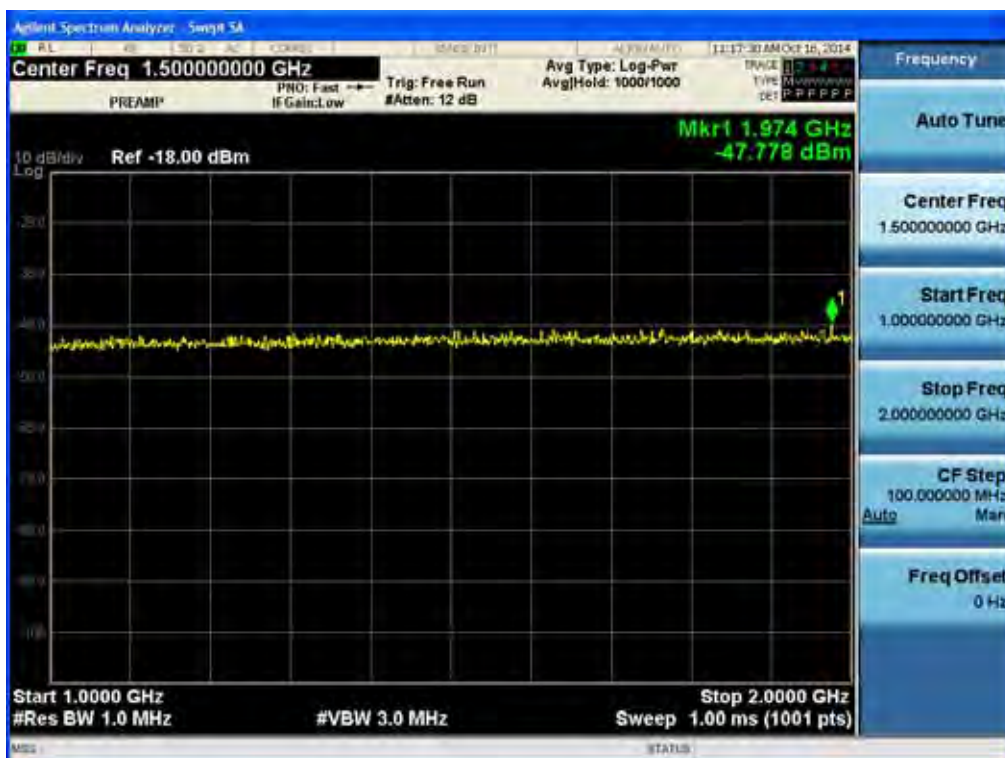
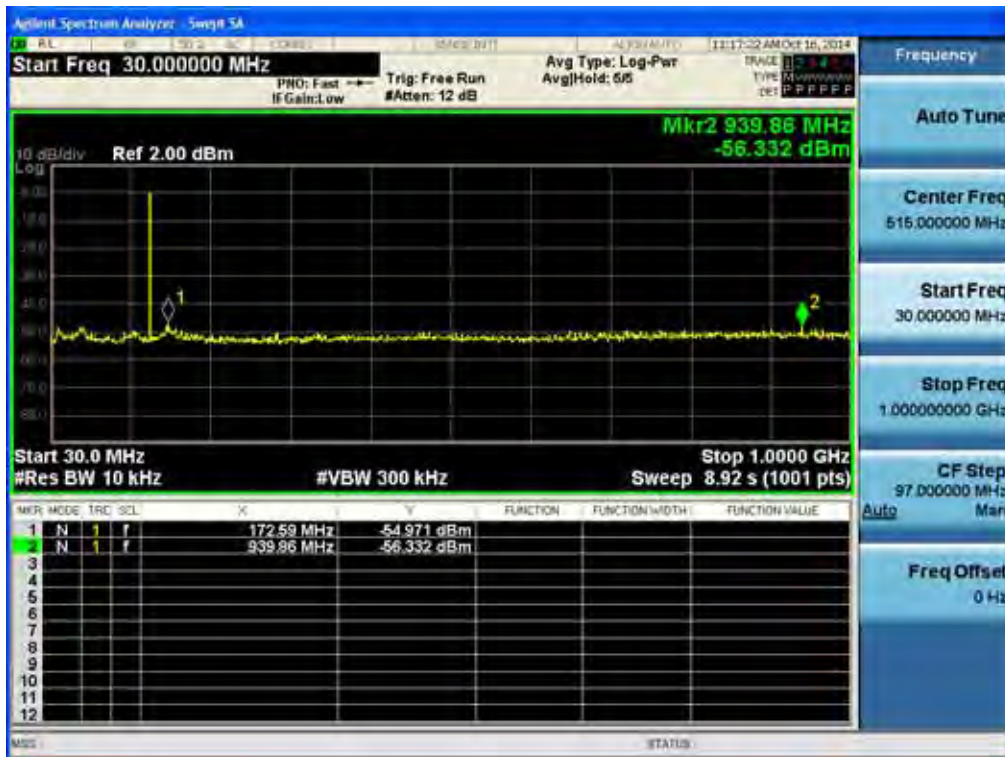
(4K00F1E, 4K00F1D, 4K00F7W \_ 162.05 MHz)\_High



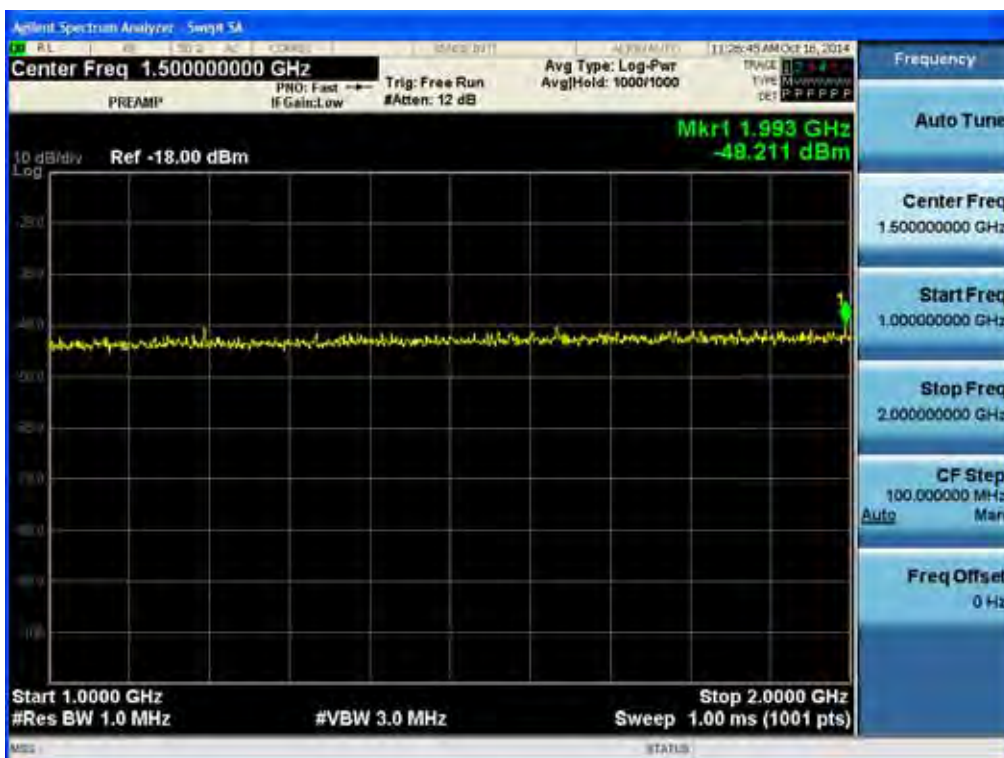
(4K00F1E, 4K00F1D, 4K00F7W \_ 173.95 MHz)\_High



(4K00F1E, 4K00F1D, 4K00F7W \_ 150.05 MHz)\_Low



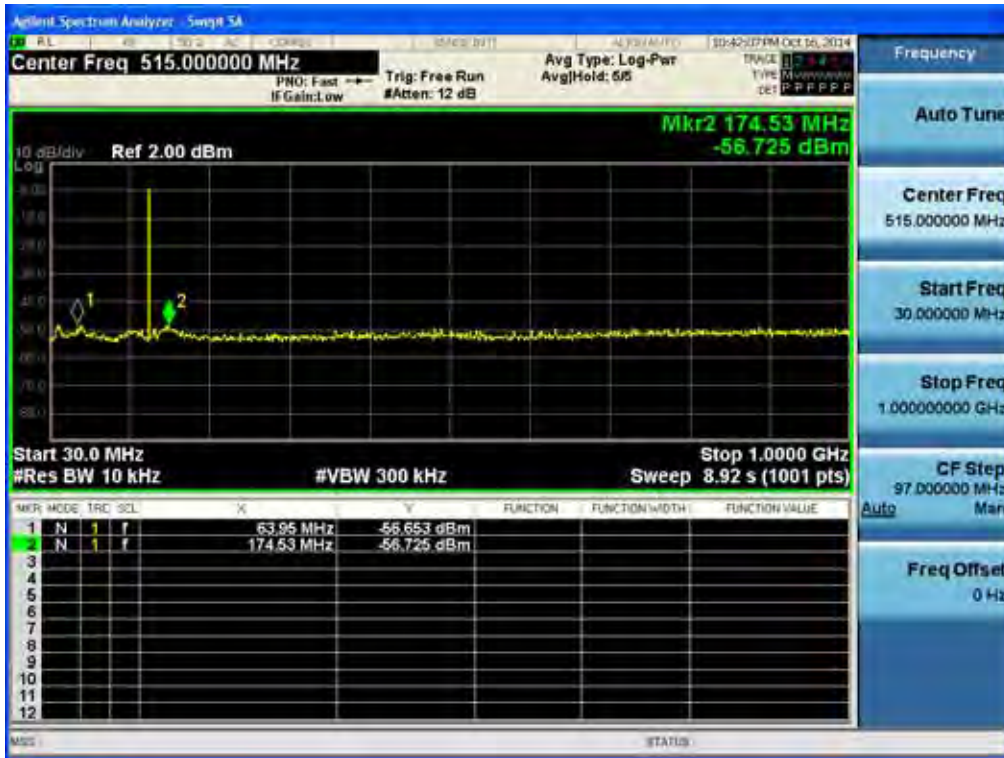
(4K00F1E, 4K00F1D, 4K00F7W \_ 162.05 MHz)\_Low



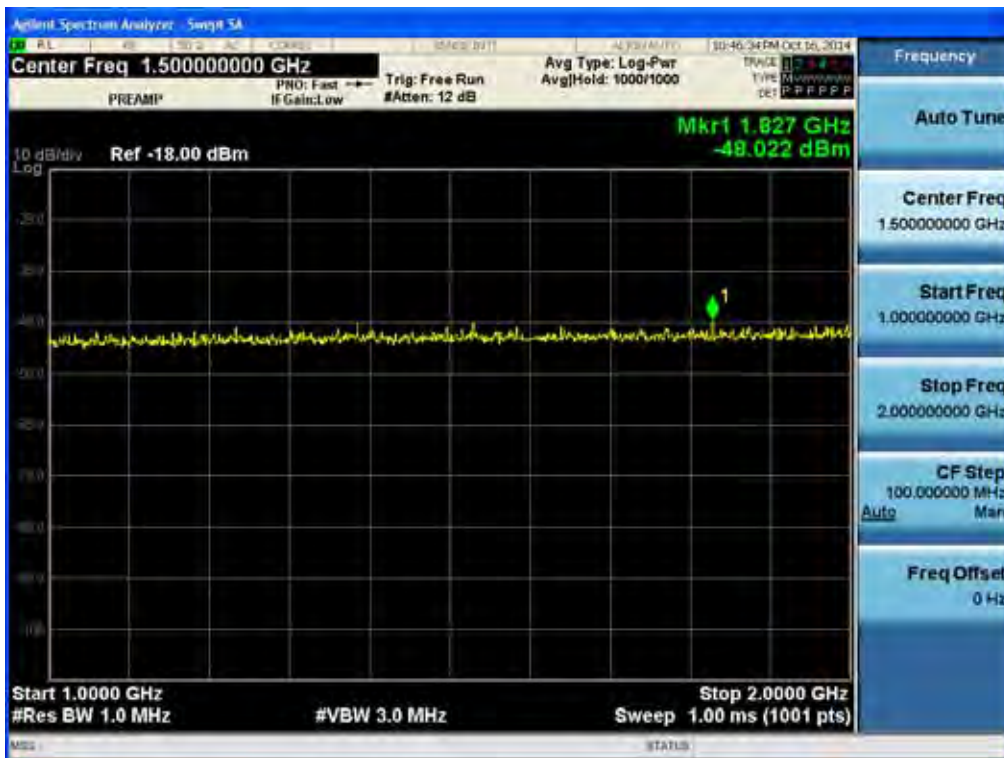
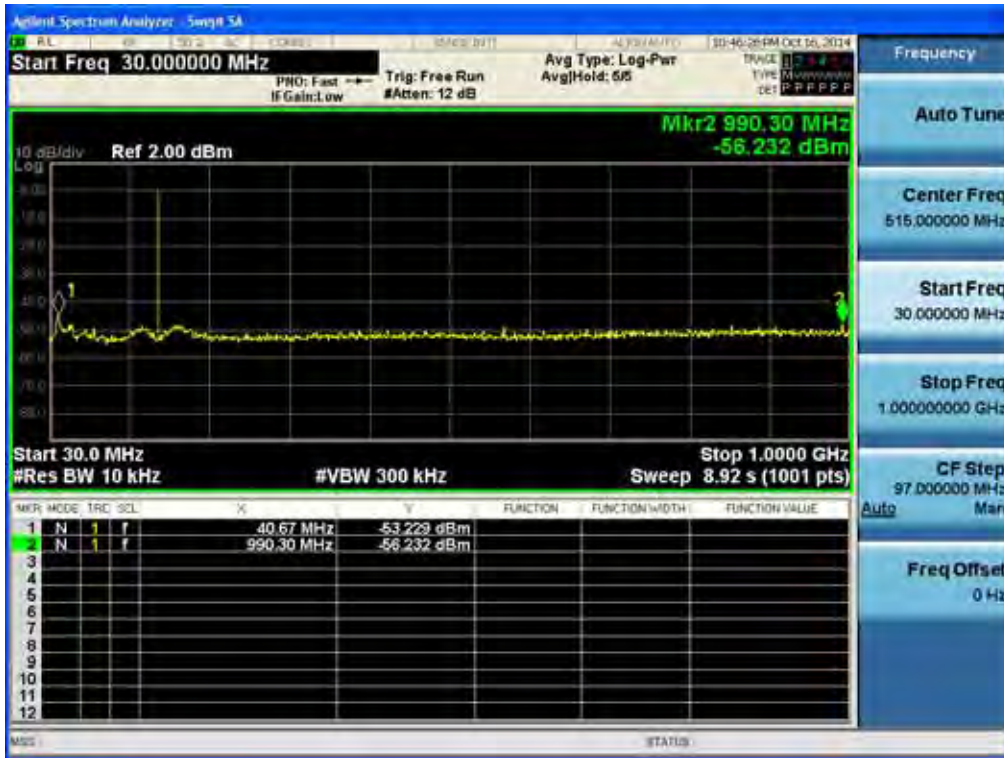
(4K00F1E, 4K00F1D, 4K00F7W \_ 173.95 MHz)\_Low



(4K00F2D \_ 150.05 MHz)\_Low



(4K00F2D \_ 162.05 MHz)\_Low

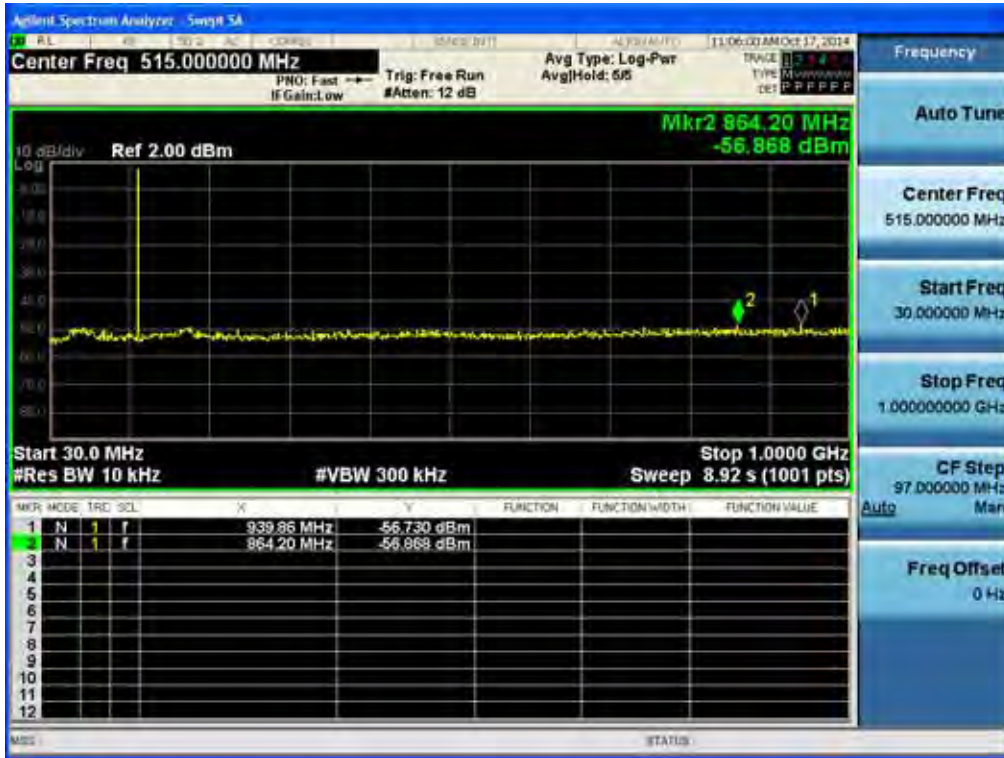


(4K00F2D \_ 173.95 MHz)\_Low

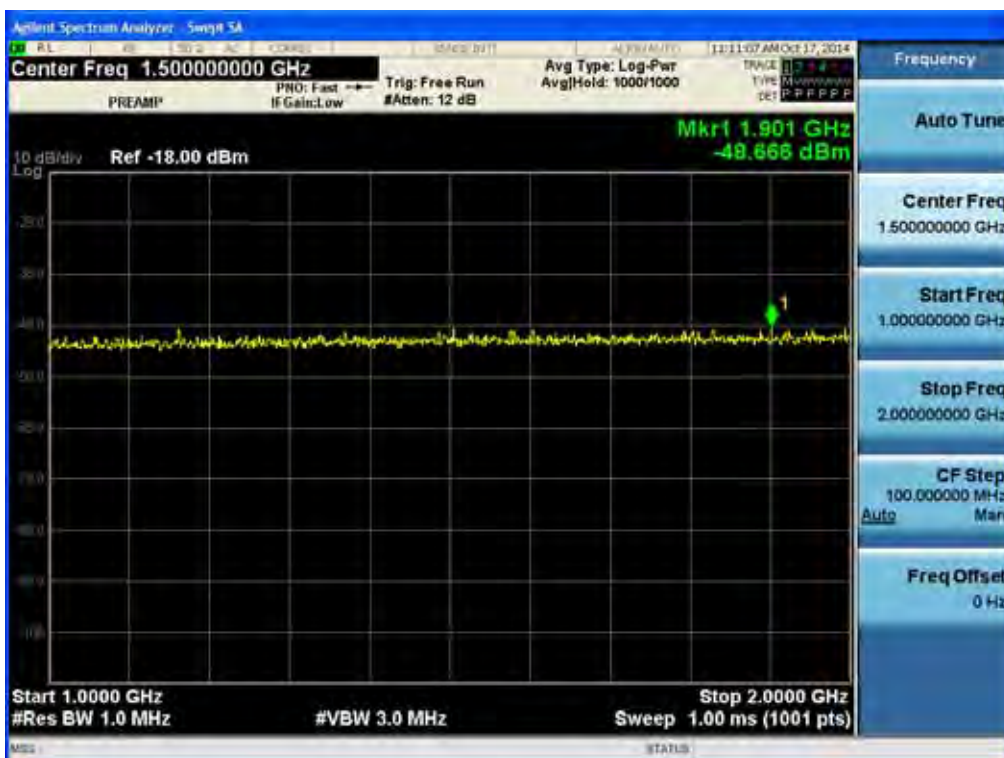




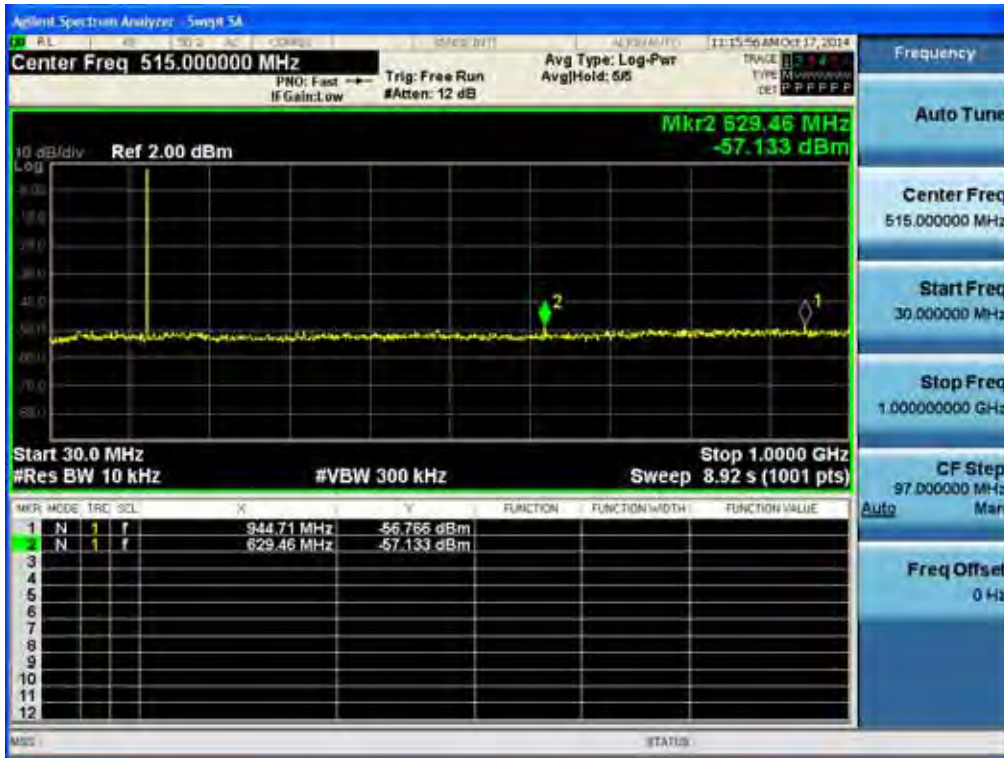
**Plots of Unwanted Emissions : Conducted Spurious Emission IC**  
(16K0F3E \_ 138.05 MHz)\_High



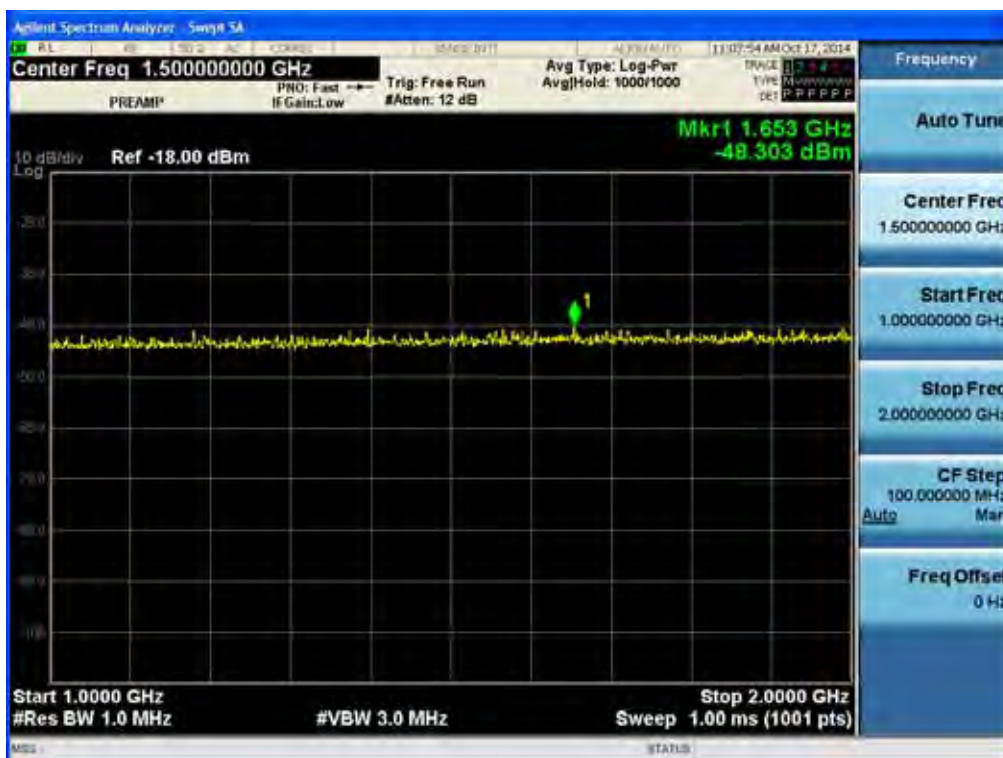
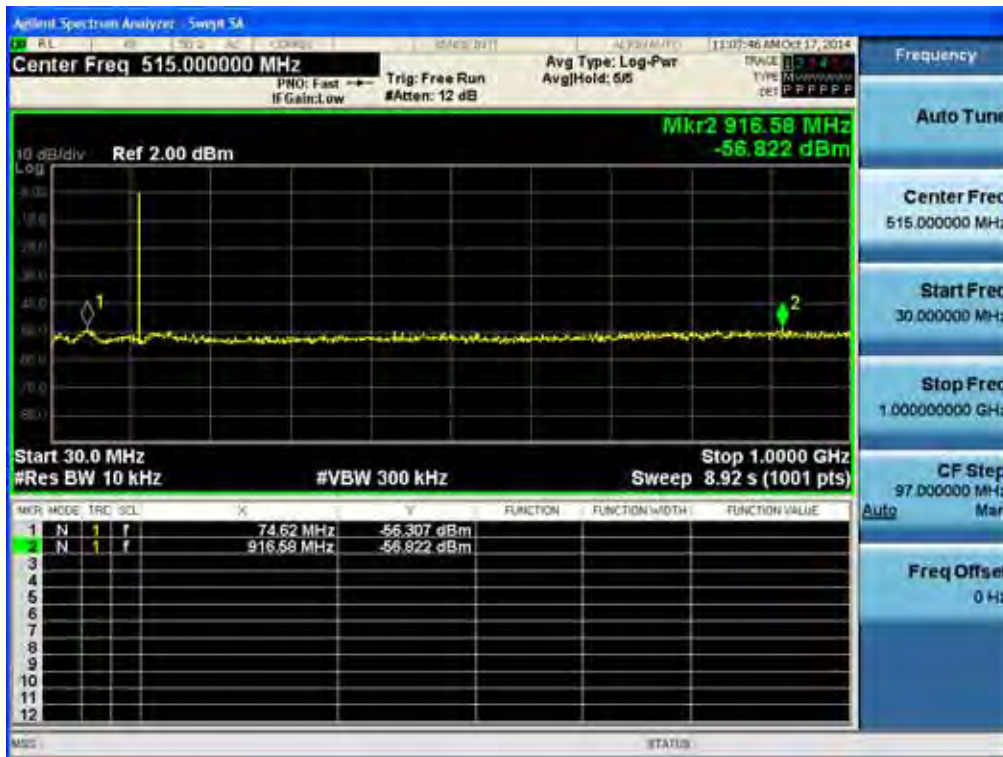
(16K0F3E \_ 143.95 MHz)\_High



(16K0F3E \_ 148.05 MHz)\_High



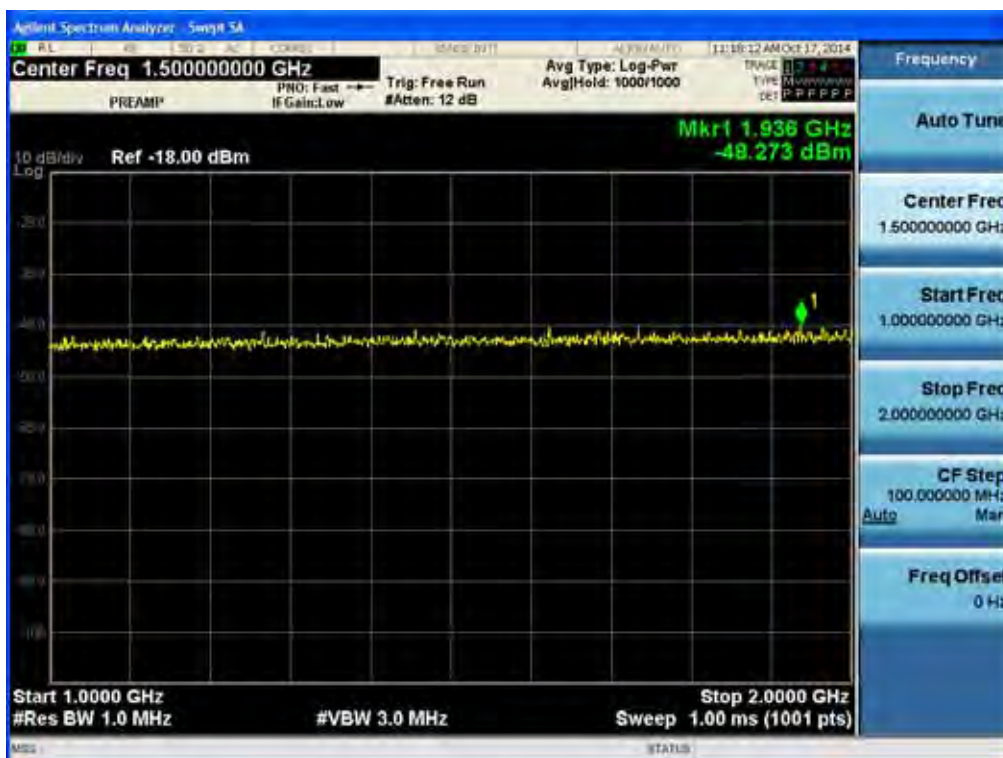
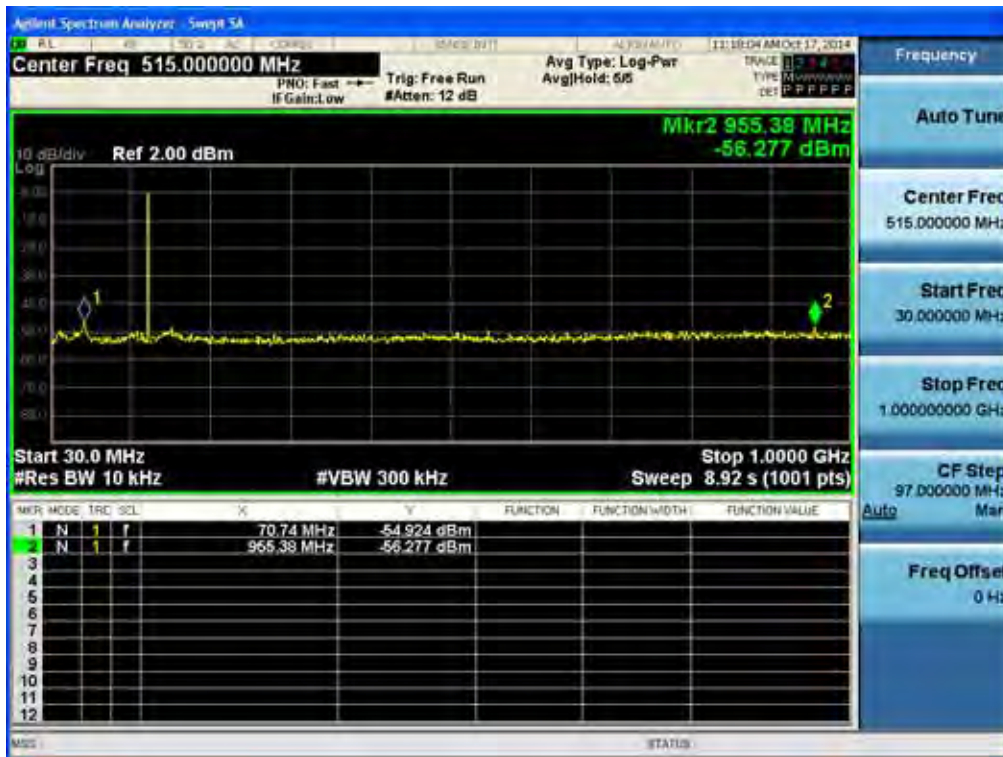
(16K0F3E \_ 138.05 MHz)\_Low



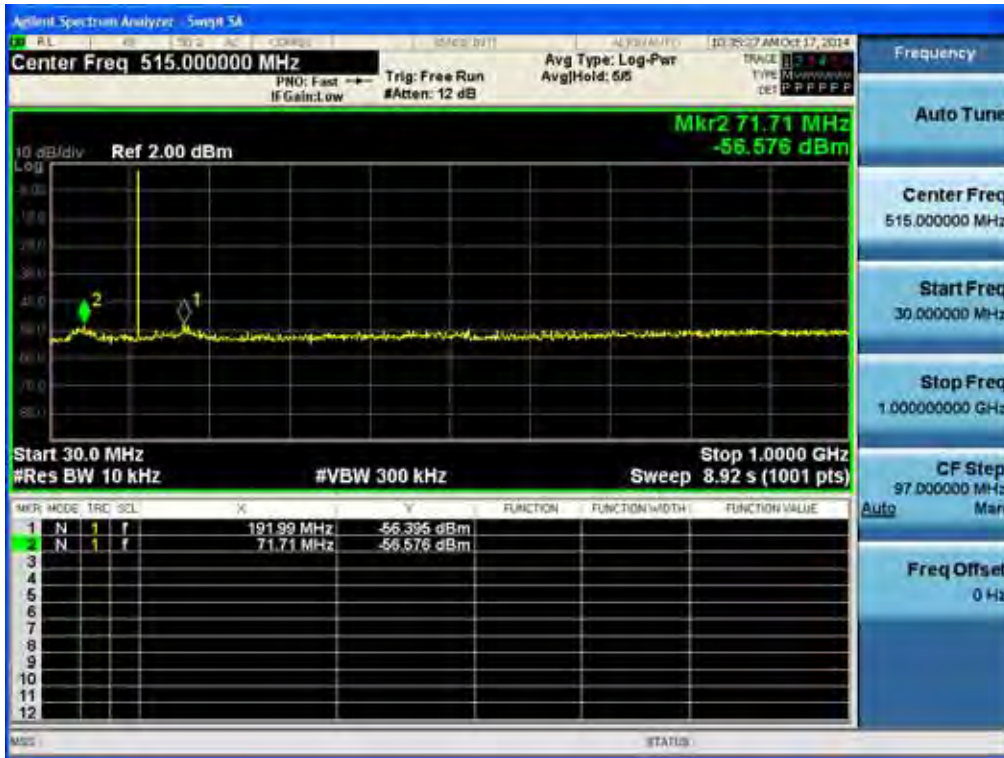
(16K0F3E \_ 143.95 MHz)\_Low



(16K0F3E \_ 148.05 MHz)\_Low



(11K0F3E \_ 138.05 MHz)\_High

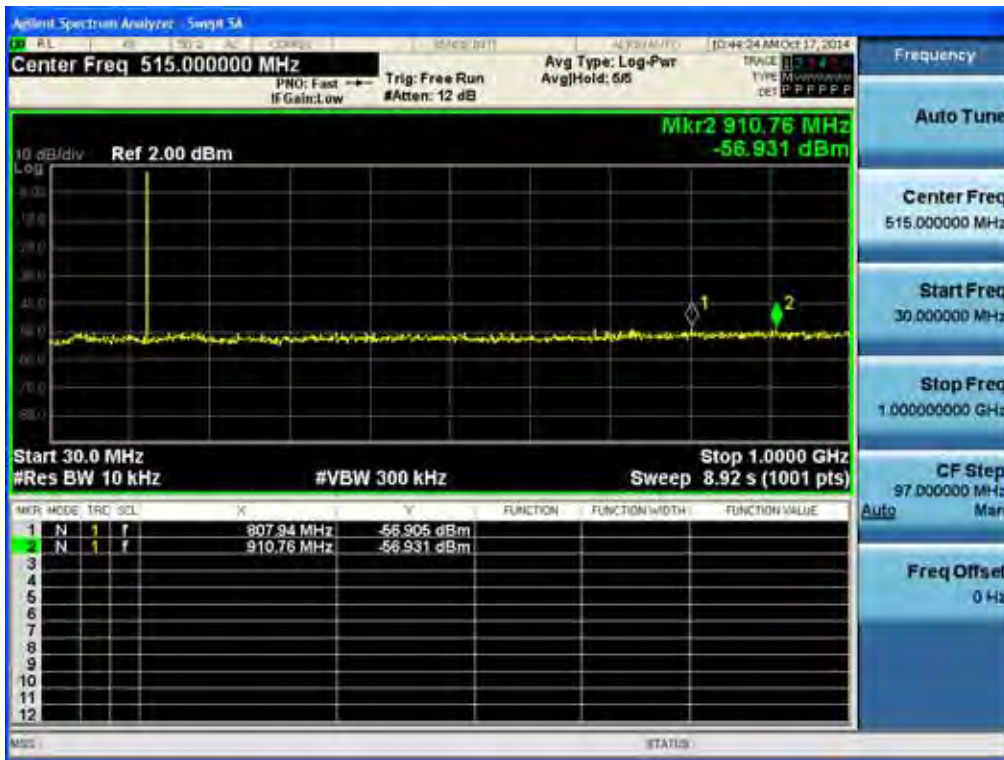


(11K0F3E \_ 143.95 MHz)\_High

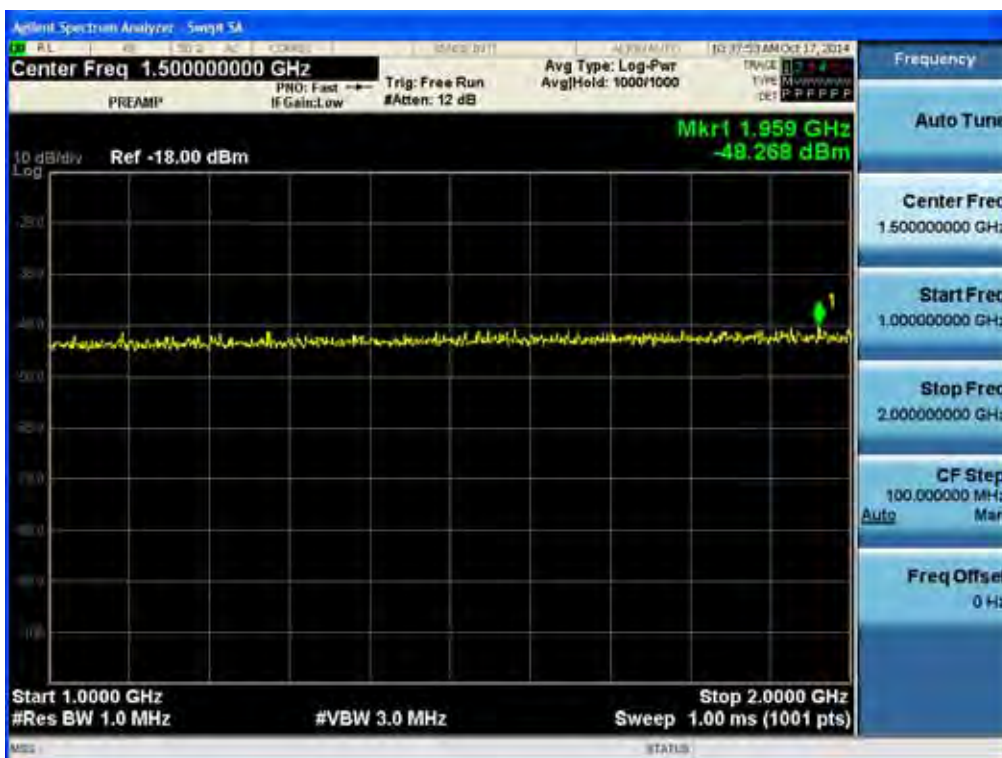
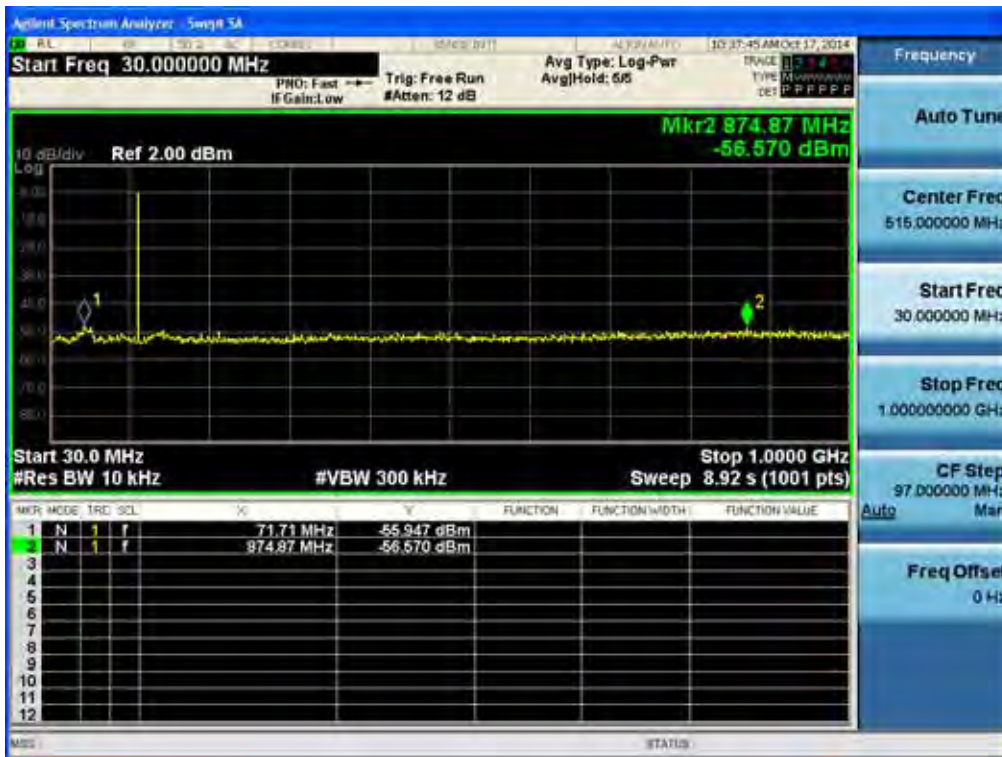




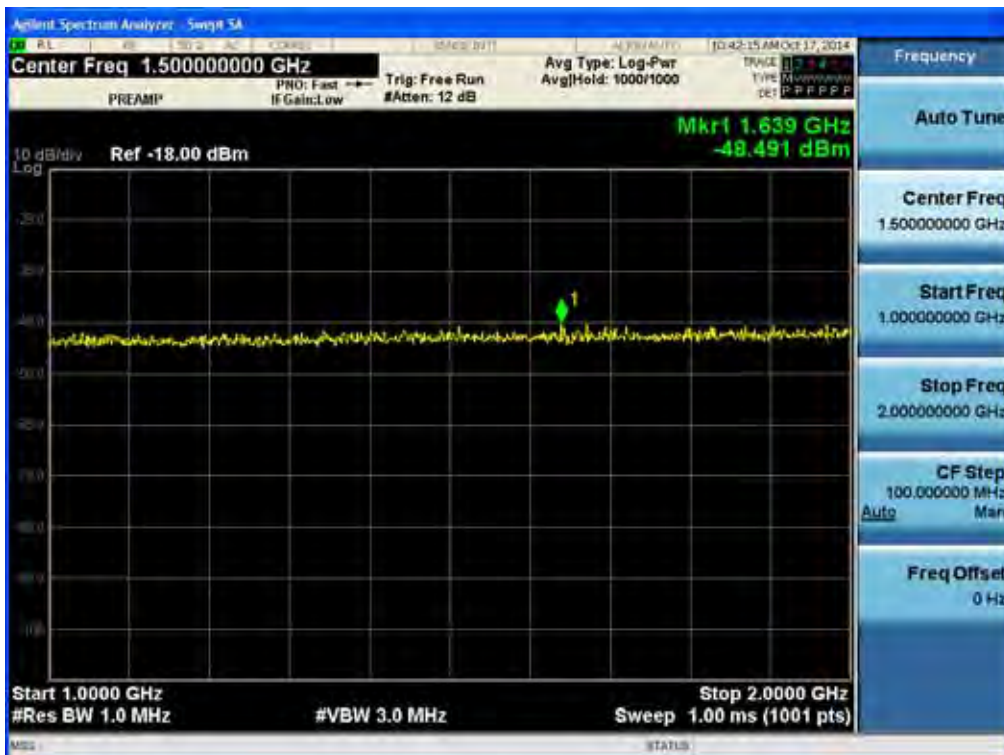
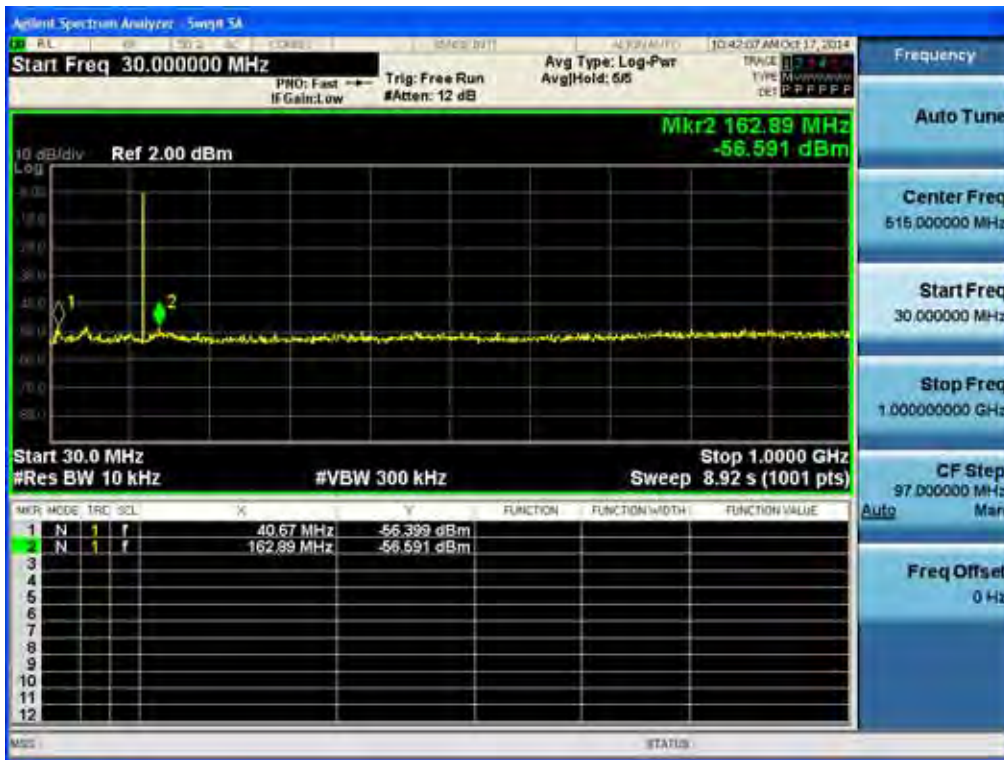
(11K0F3E \_ 148.05 MHz)\_High



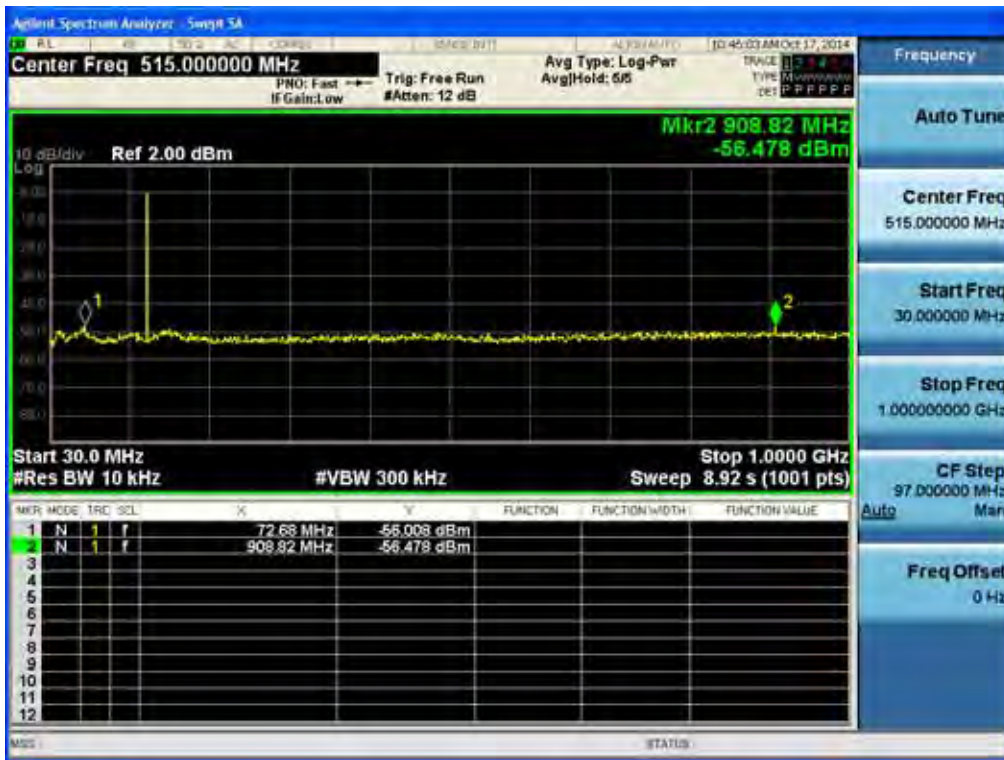
(11K0F3E \_ 138.05 MHz)\_Low



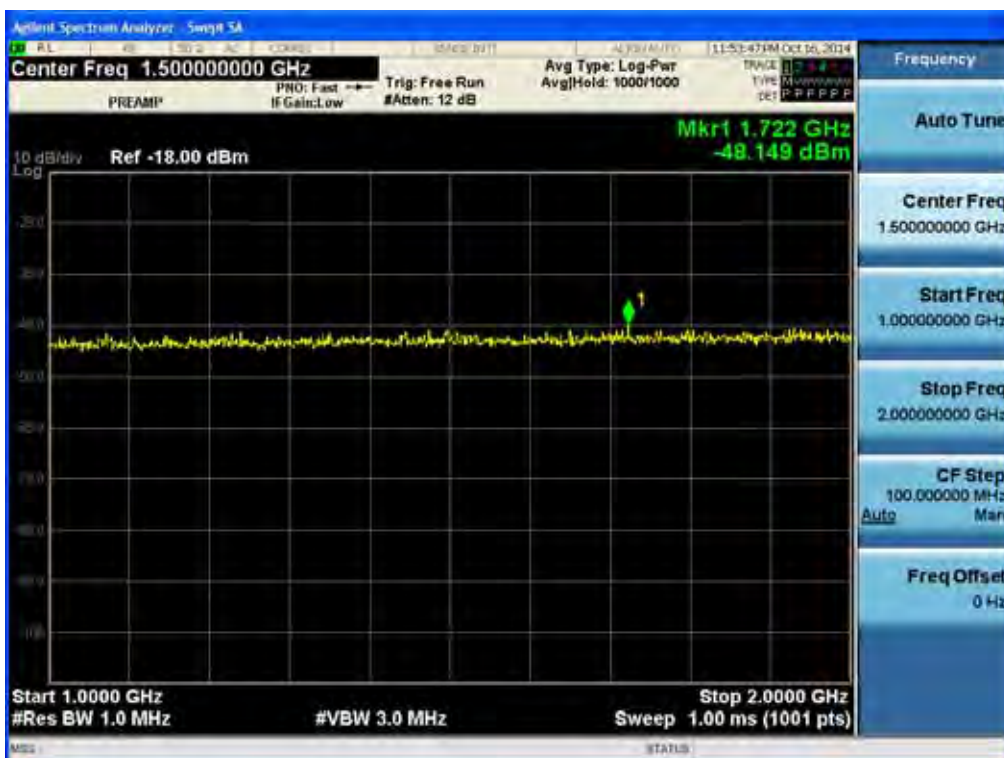
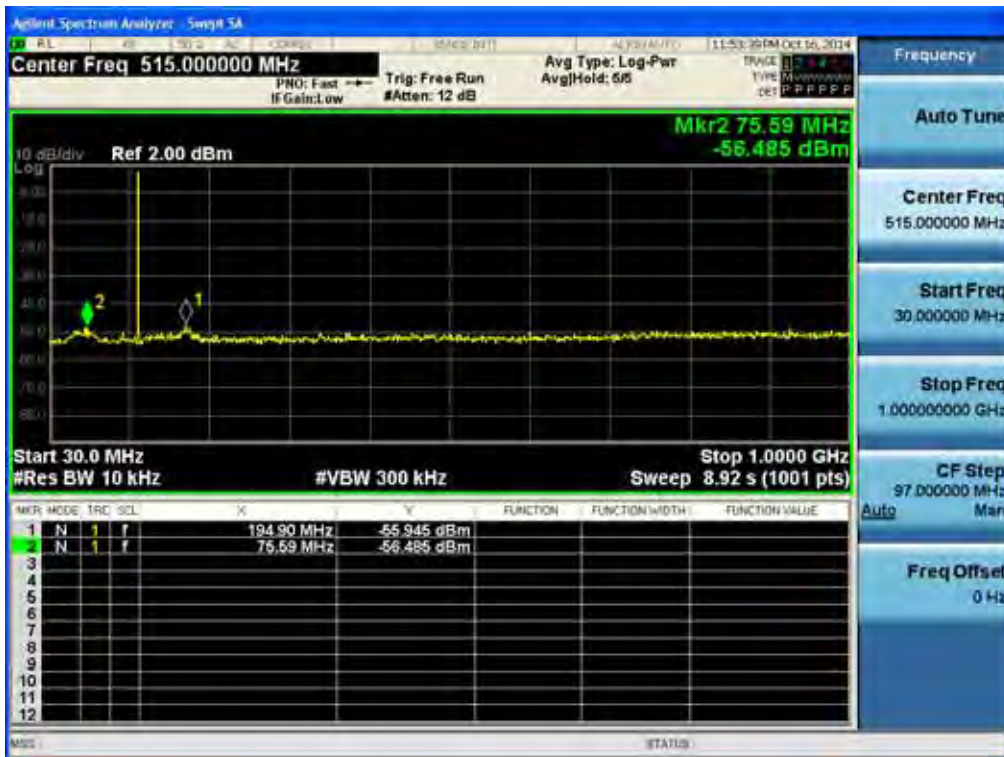
(11K0F3E \_ 143.95 MHz)\_Low



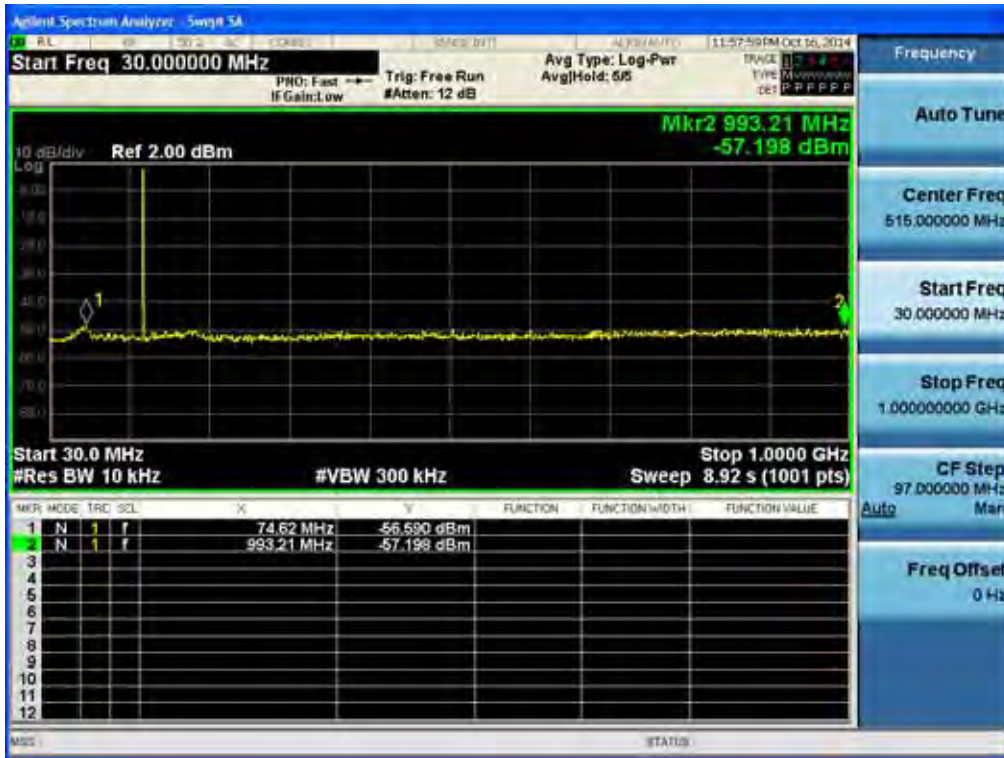
(11K0F3E \_ 148.05 MHz)\_Low



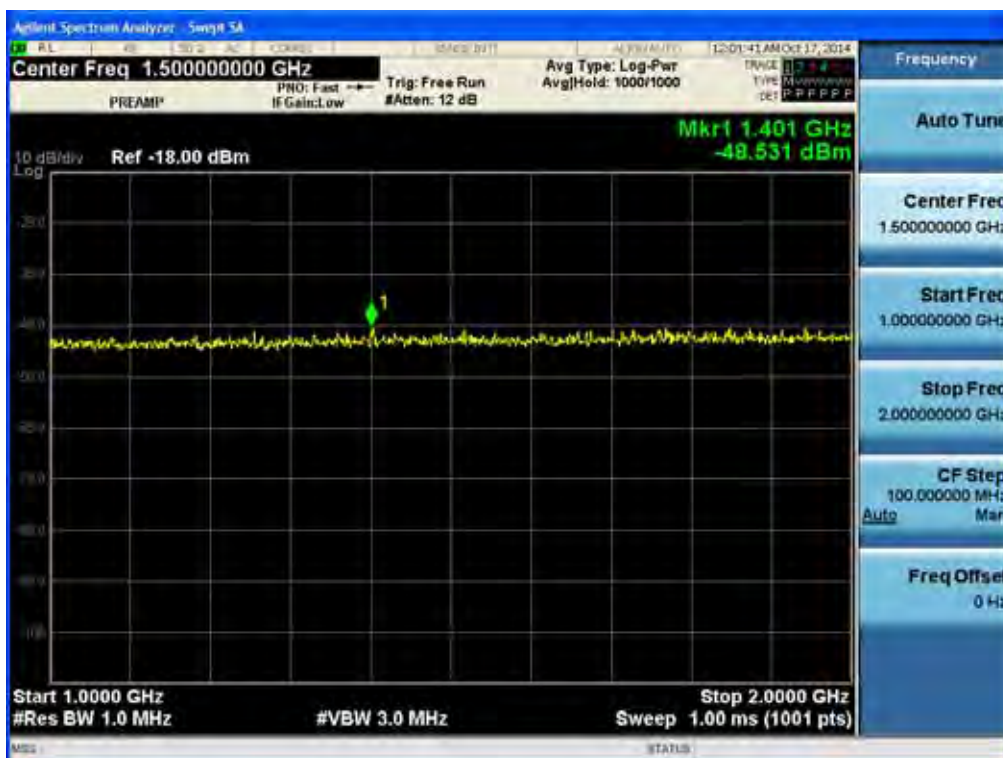
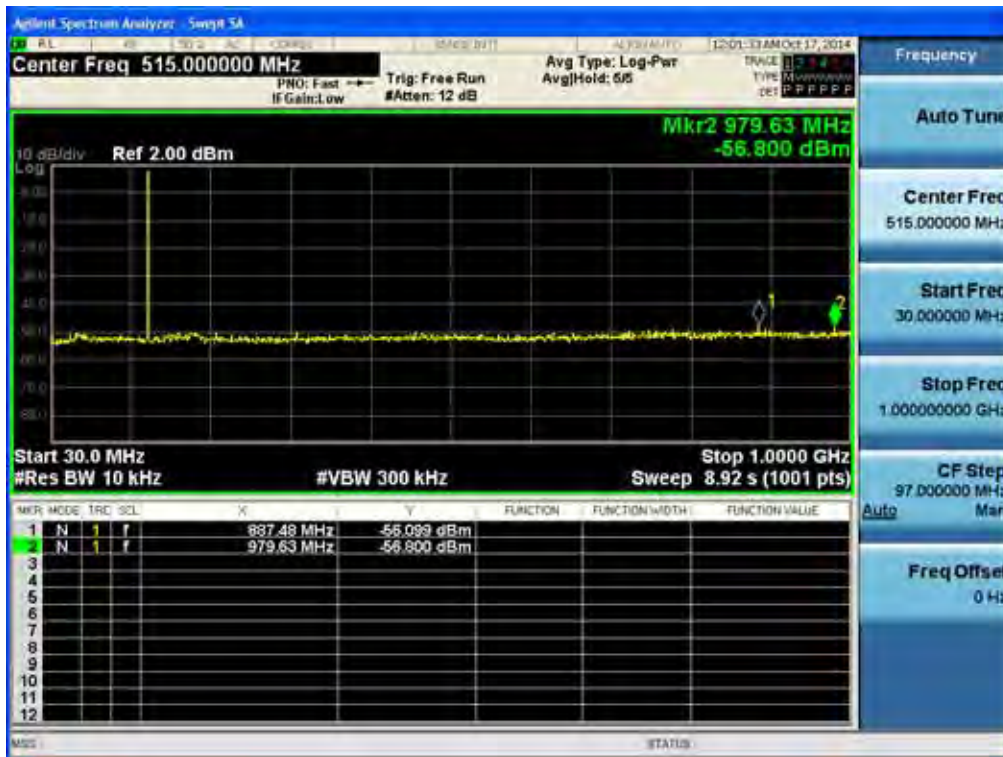
(8K10F1E, 8K10F1D \_ 138.05 MHz)\_High



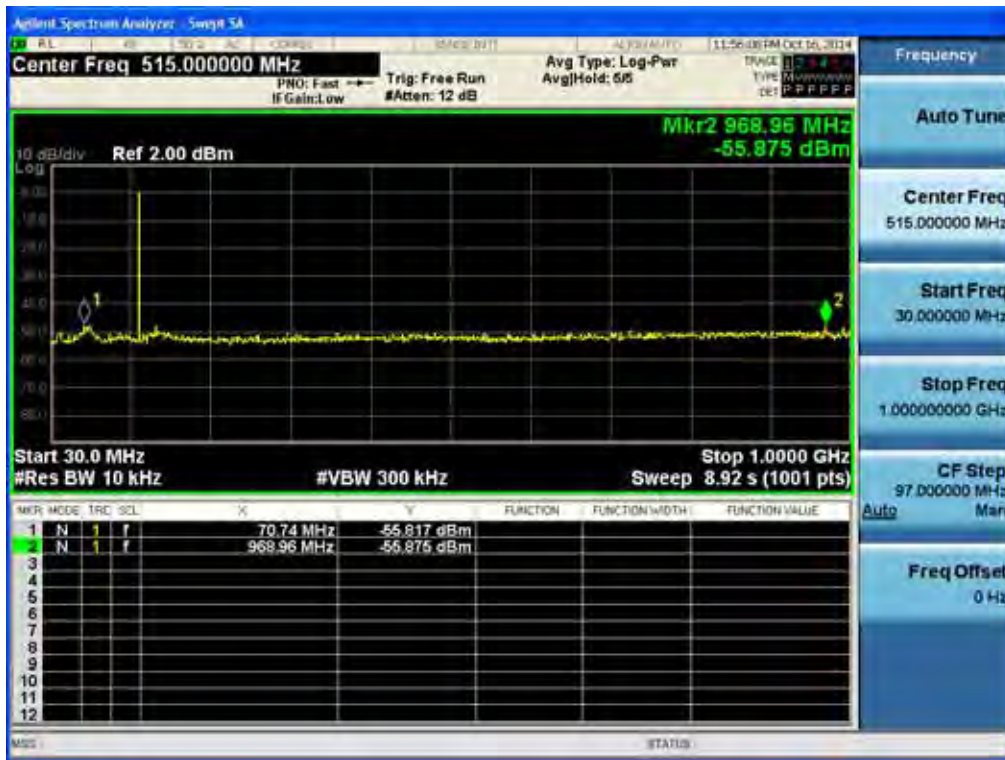
(8K10F1E, 8K10F1D \_ 143.95 MHz)\_High



(8K10F1E, 8K10F1D \_ 148.05 MHz)\_High

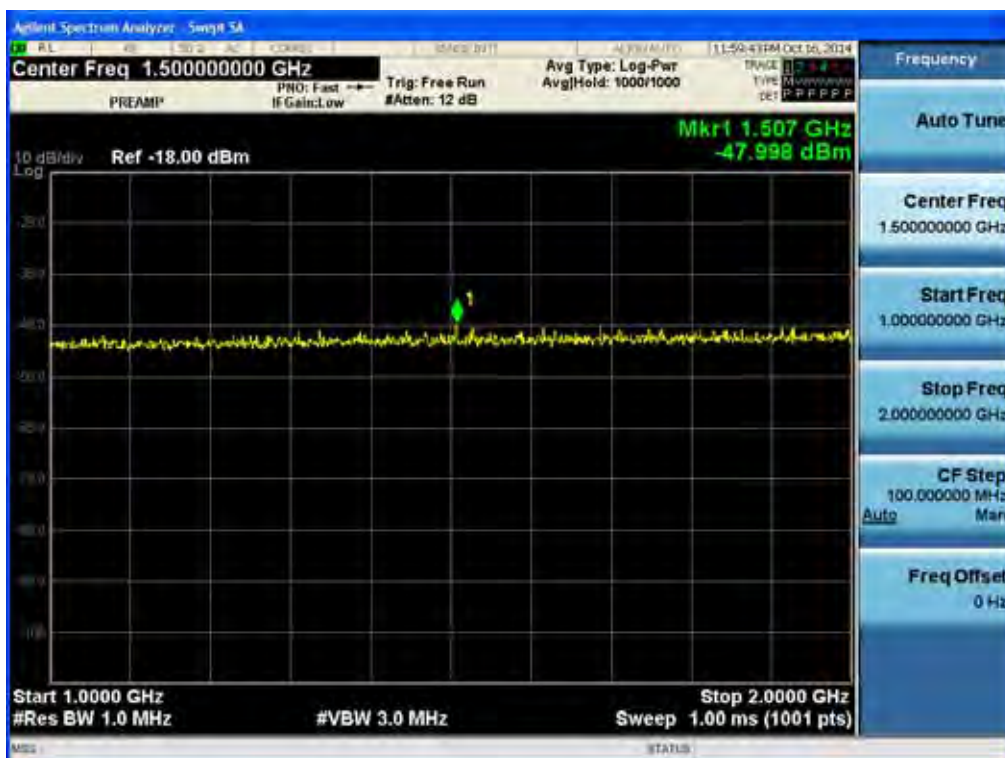
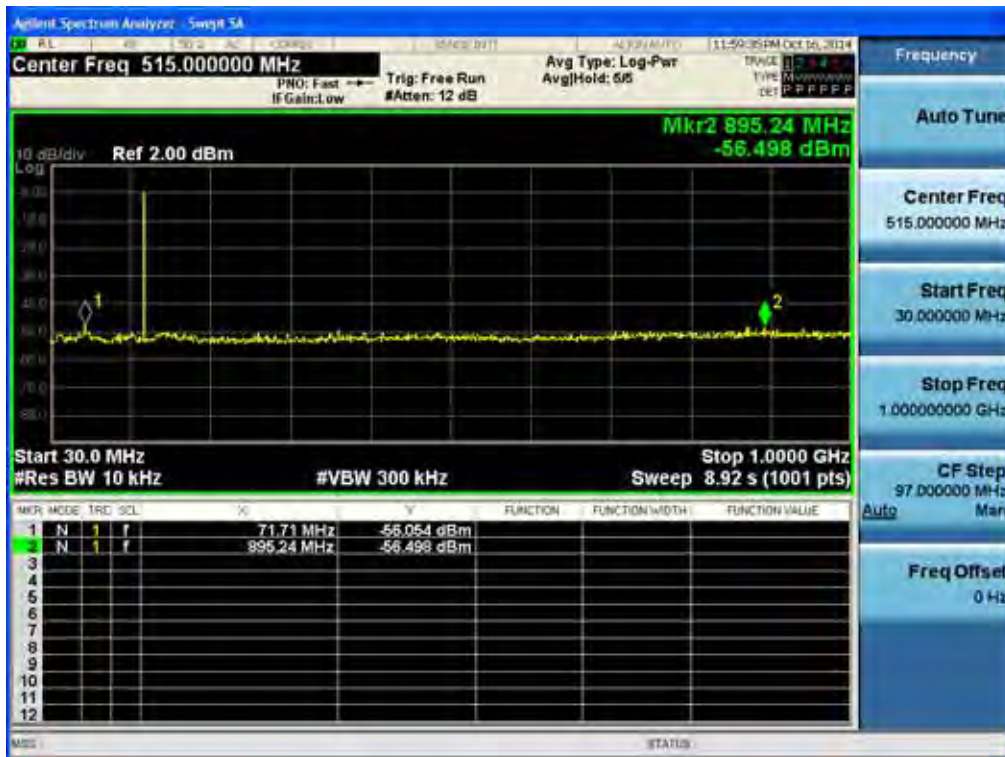


(8K10F1E, 8K10F1D \_ 138.05 MHz)\_Low

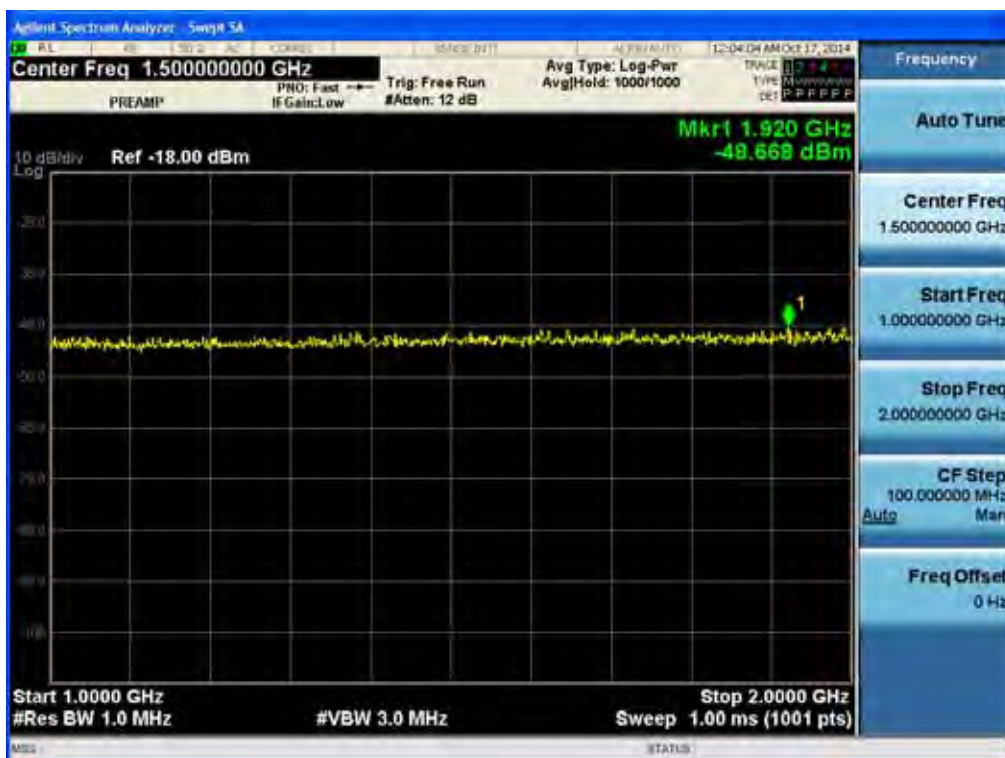
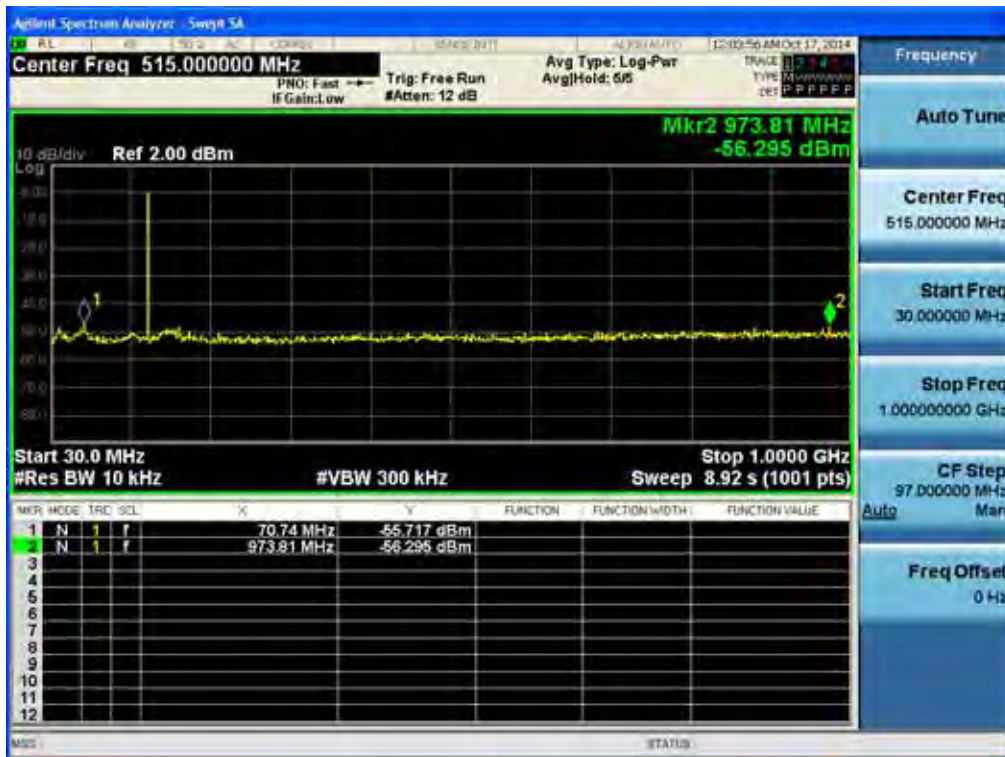




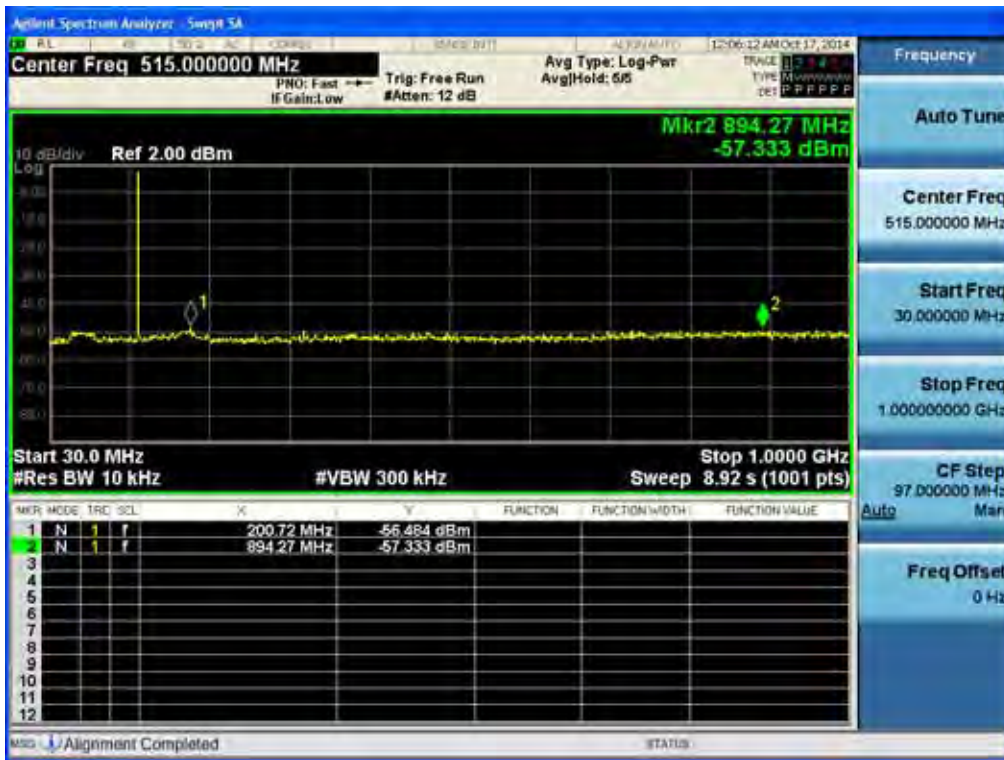
(8K10F1E, 8K10F1D \_ 143.95 MHz)\_Low



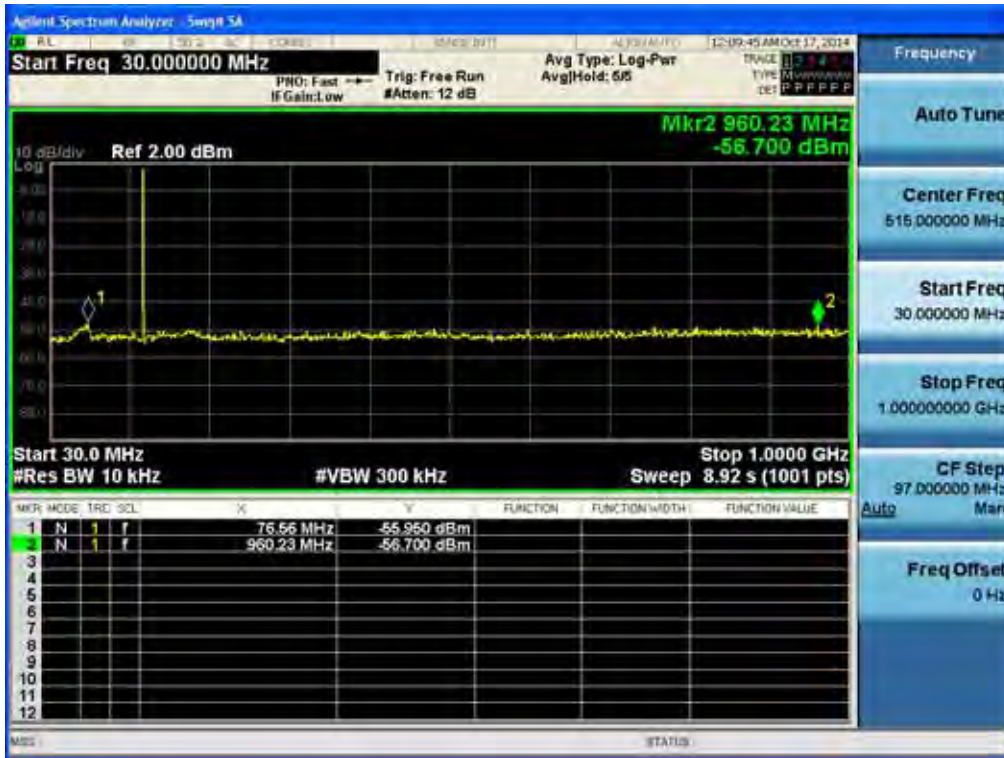
(8K10F1E, 8K10F1D \_ 148.05 MHz)\_Low



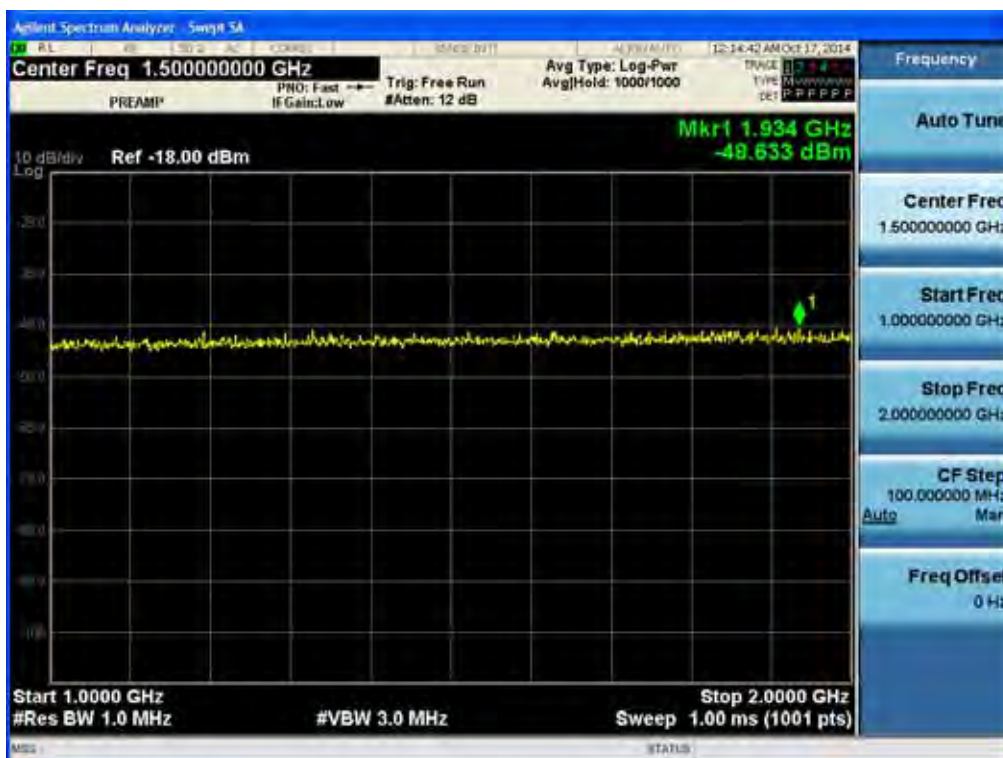
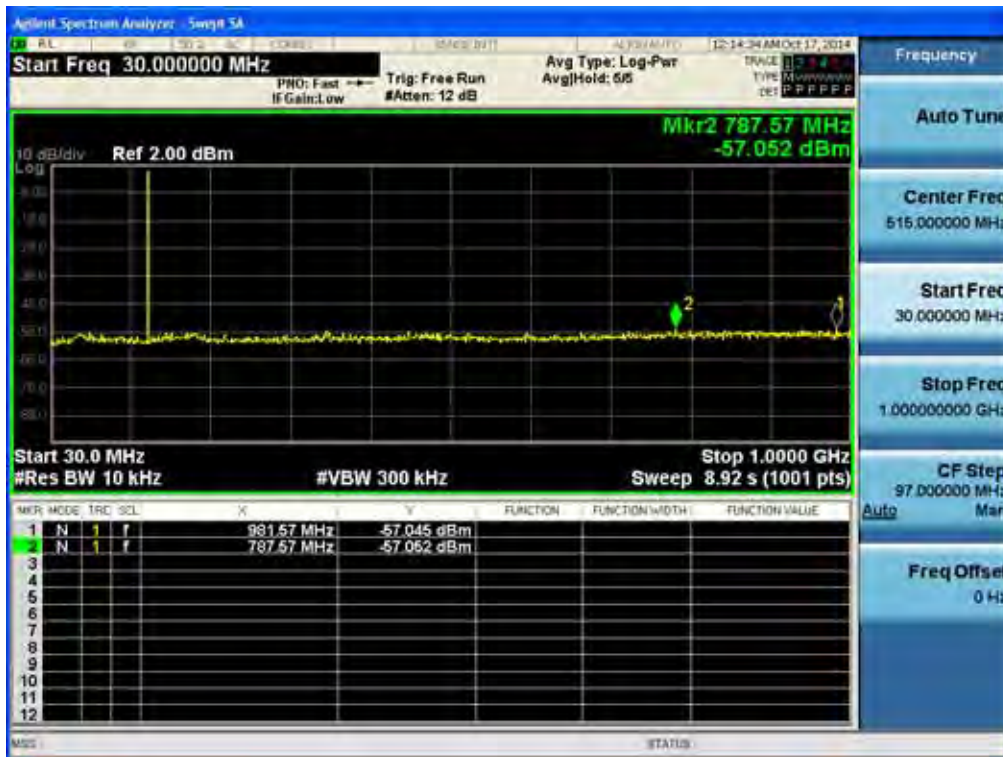
(8K10F1W \_ 138.05 MHz)\_High



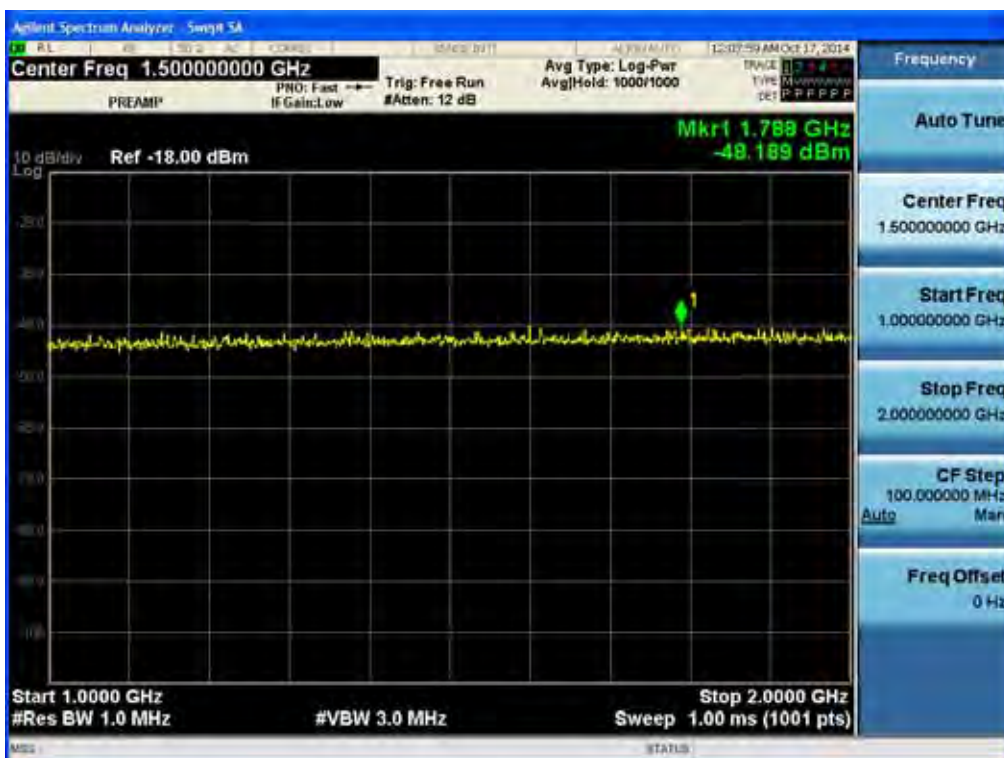
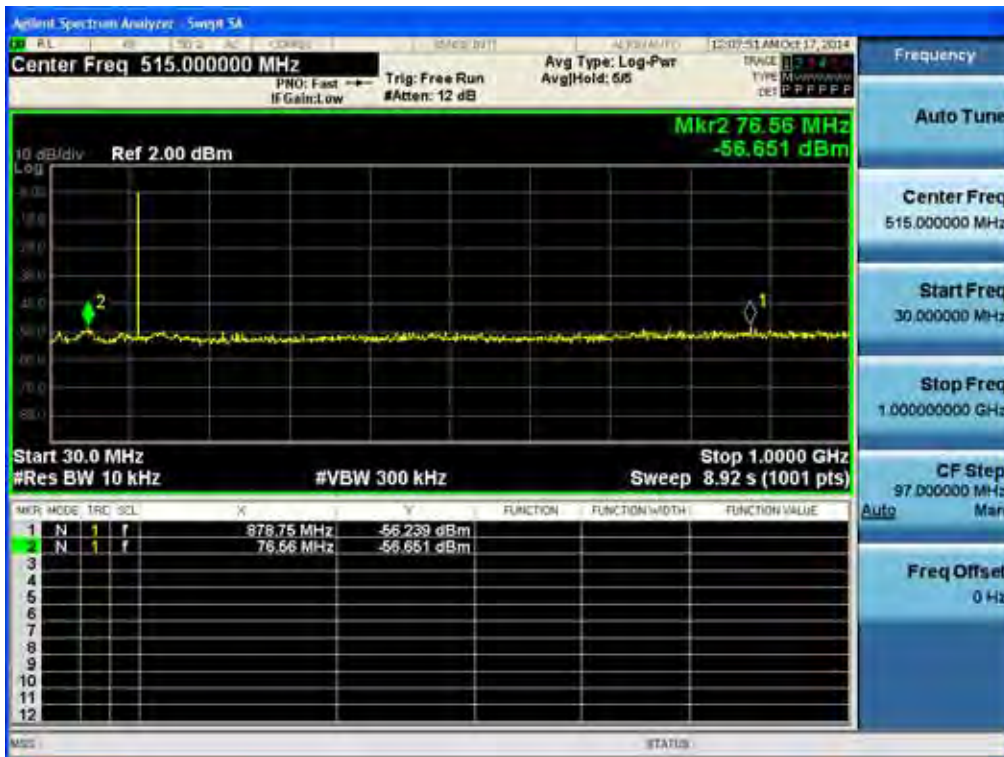
(8K10F1W \_ 143.95 MHz)\_High



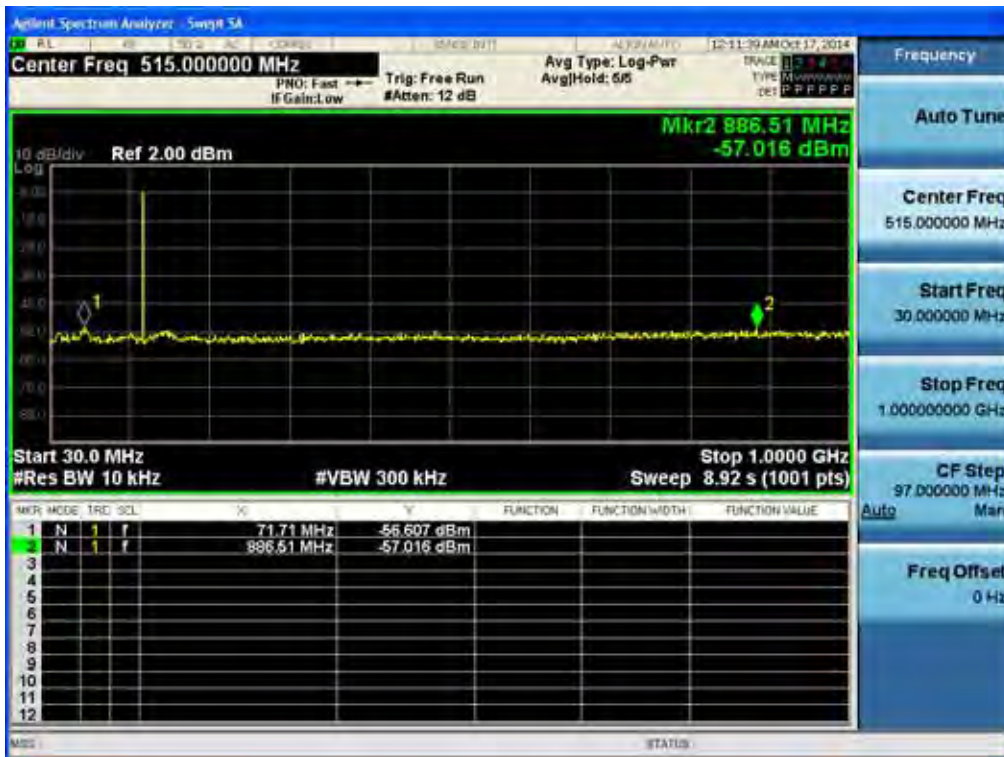
(8K10F1W \_ 148.05 MHz)\_High



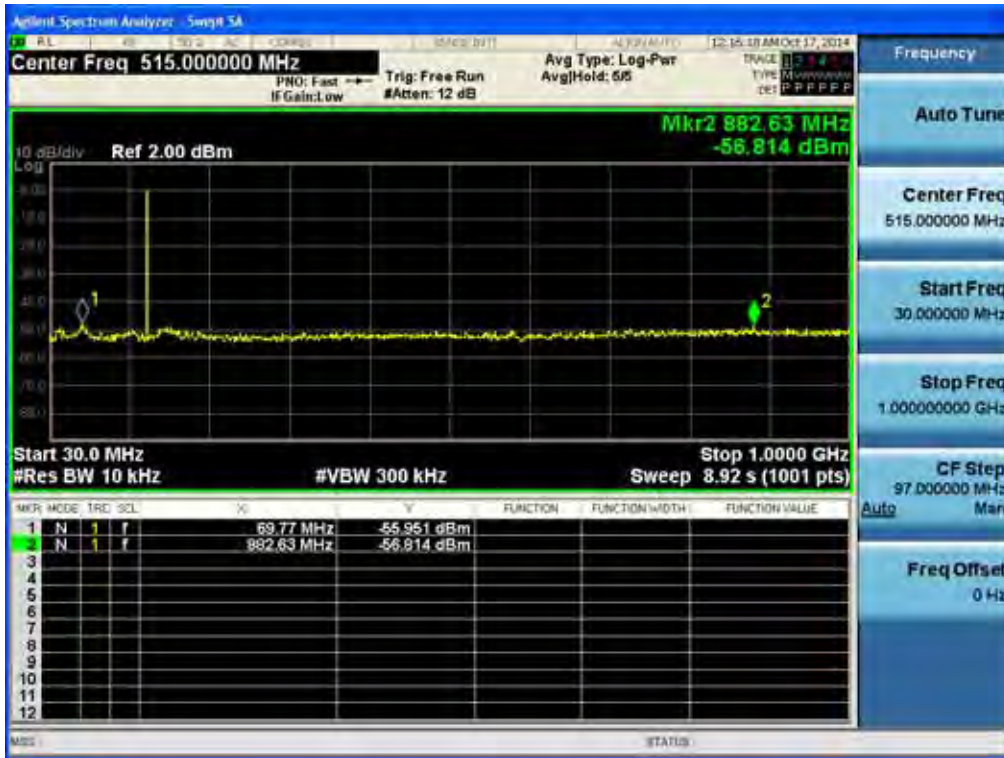
(8K10F1W \_ 138.05 MHz)\_Low



(8K10F1W \_ 143.95 MHz)\_Low



(8K10F1W \_ 148.05 MHz)\_Low

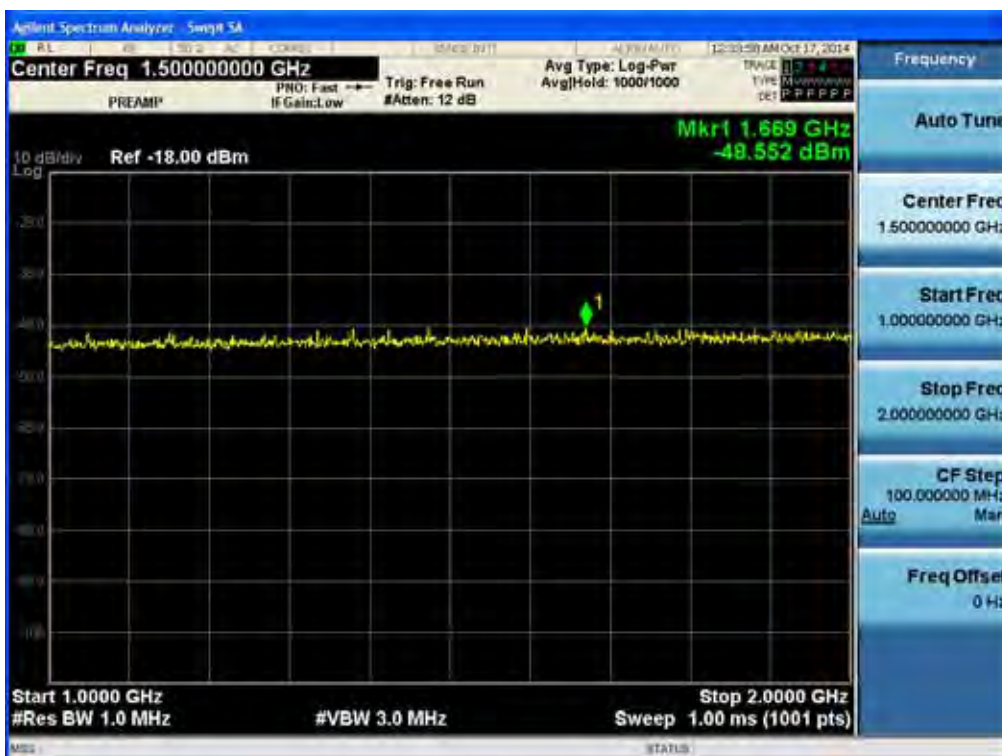
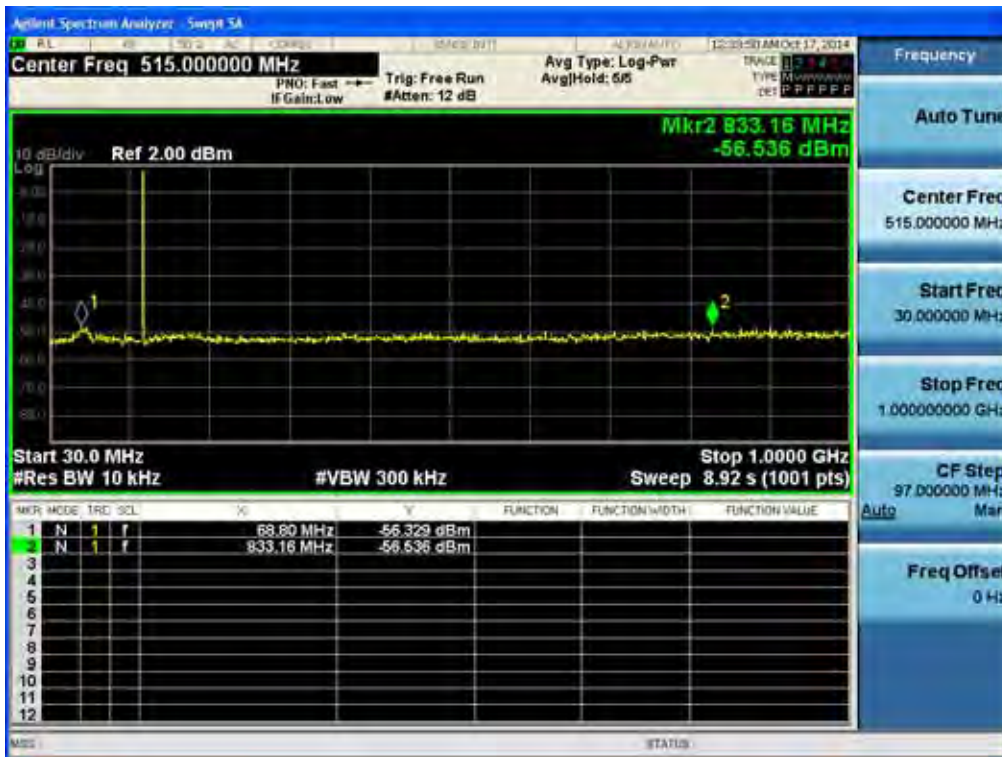




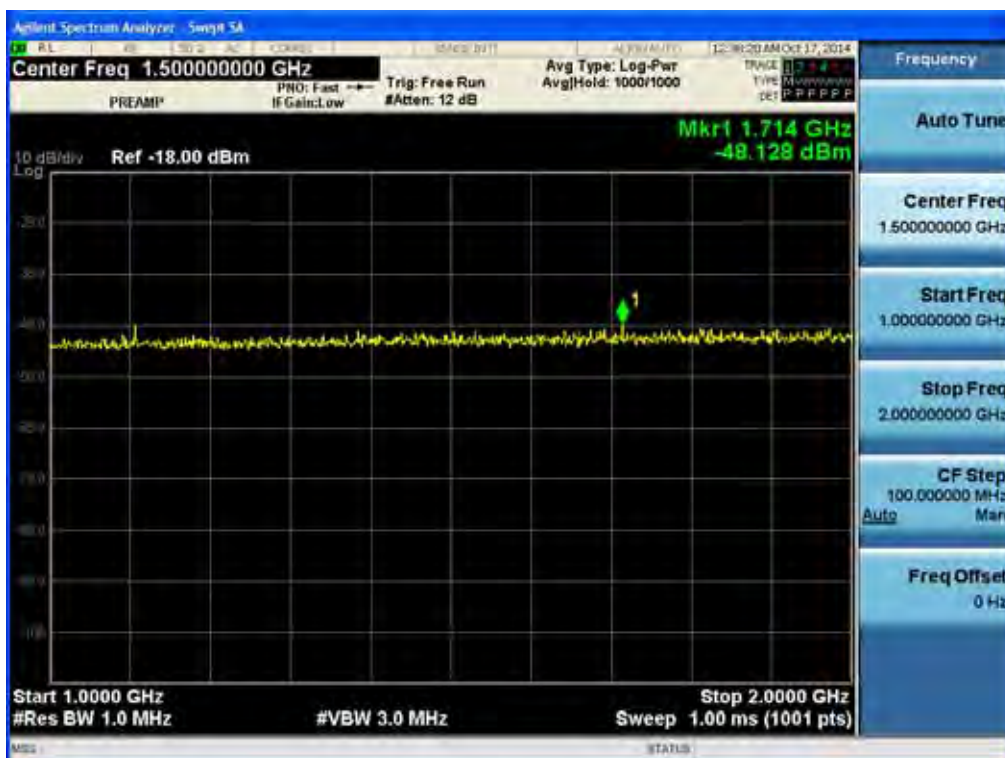
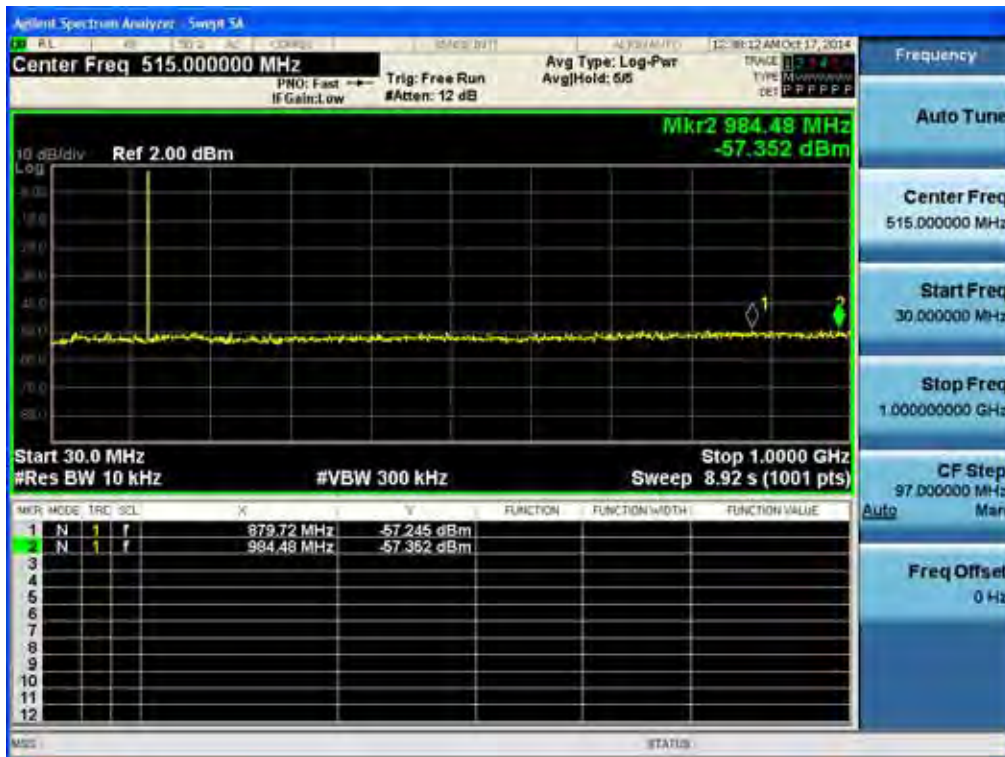
(8K30F1E, 8K30F1D, 8K30F7W \_ 138.05 MHz)\_High



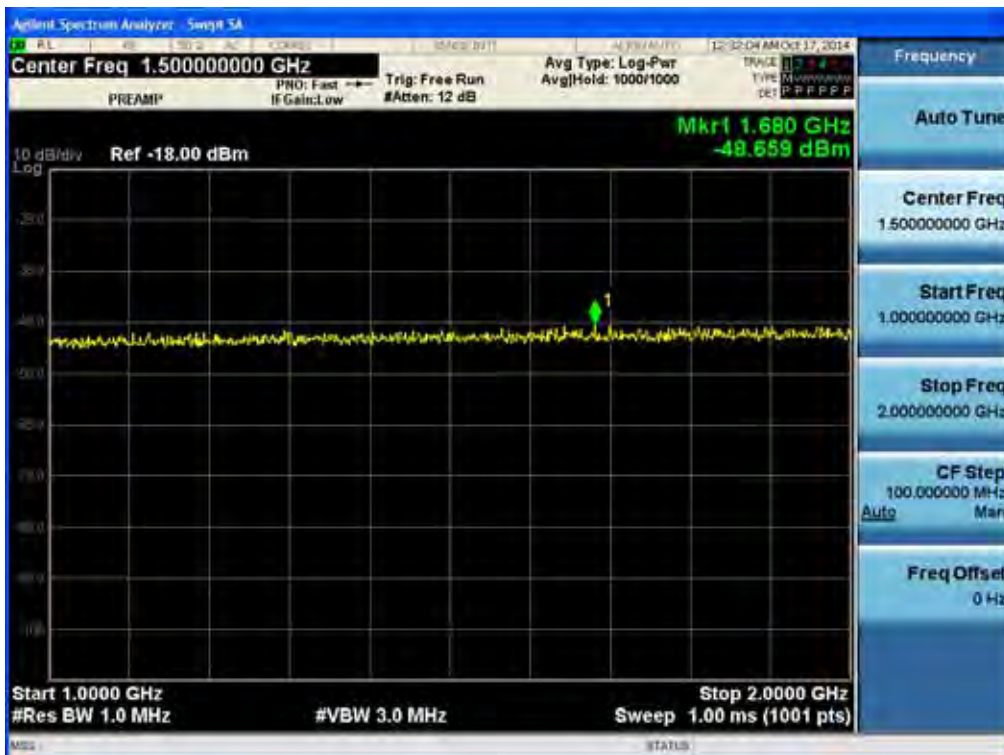
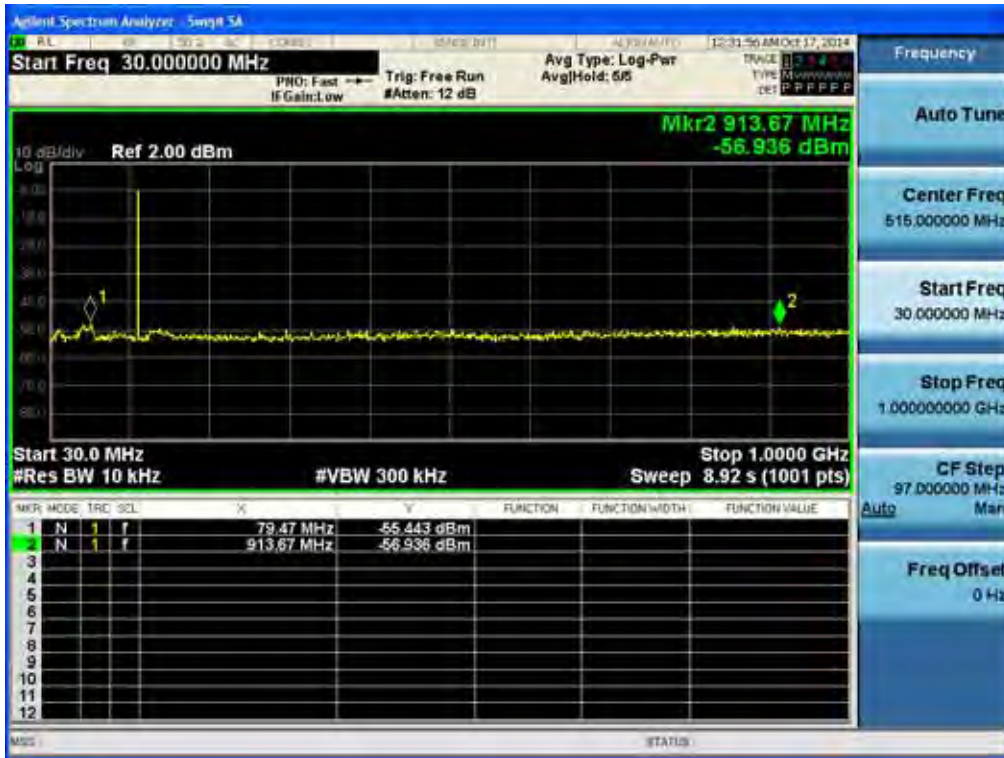
(8K30F1E, 8K30F1D, 8K30F7W \_ 143.95 MHz)\_High



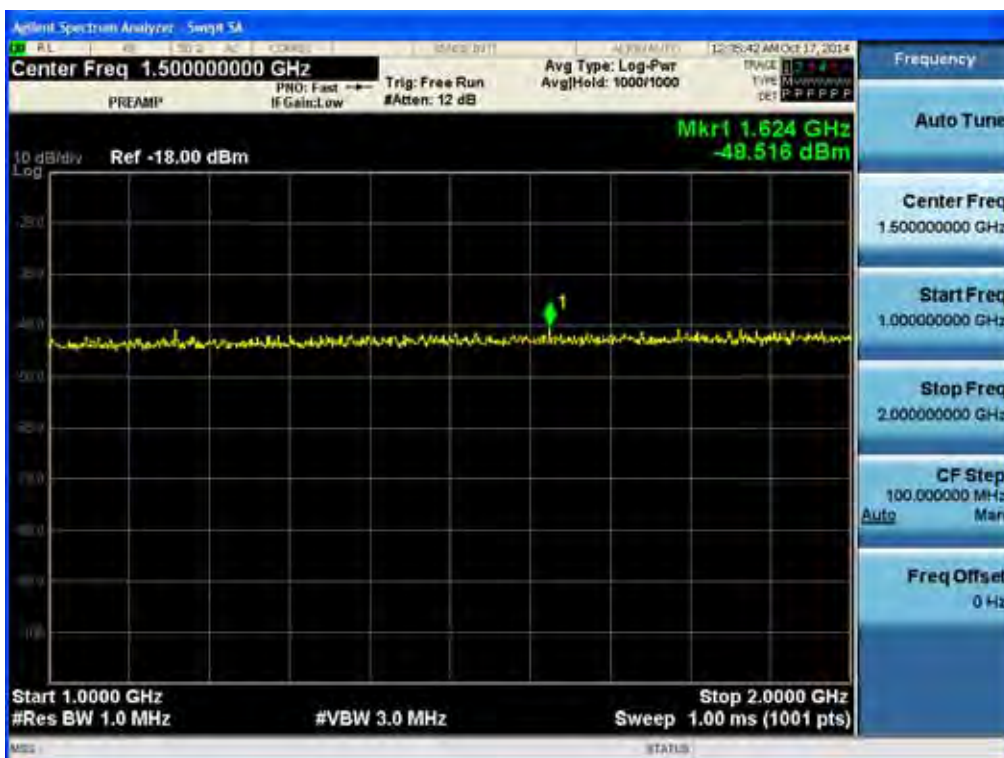
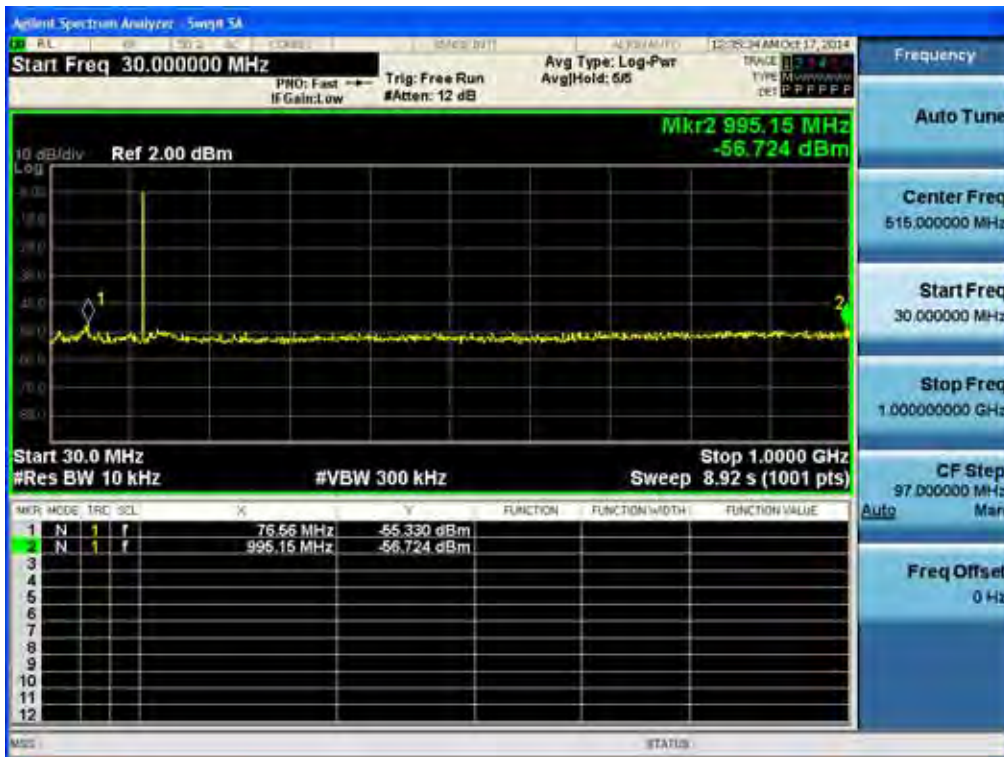
(8K30F1E, 8K30F1D, 8K30F7W \_ 148.05 MHz)\_High



(8K30F1E, 8K30F1D, 8K30F7W \_ 138.05 MHz)\_Low



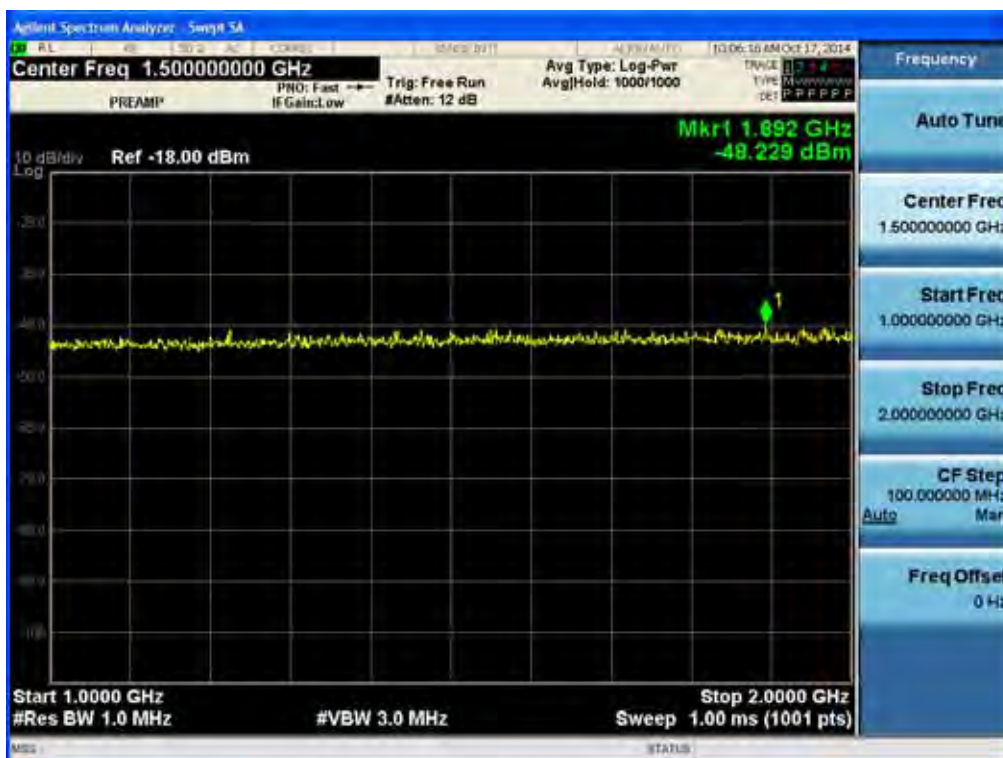
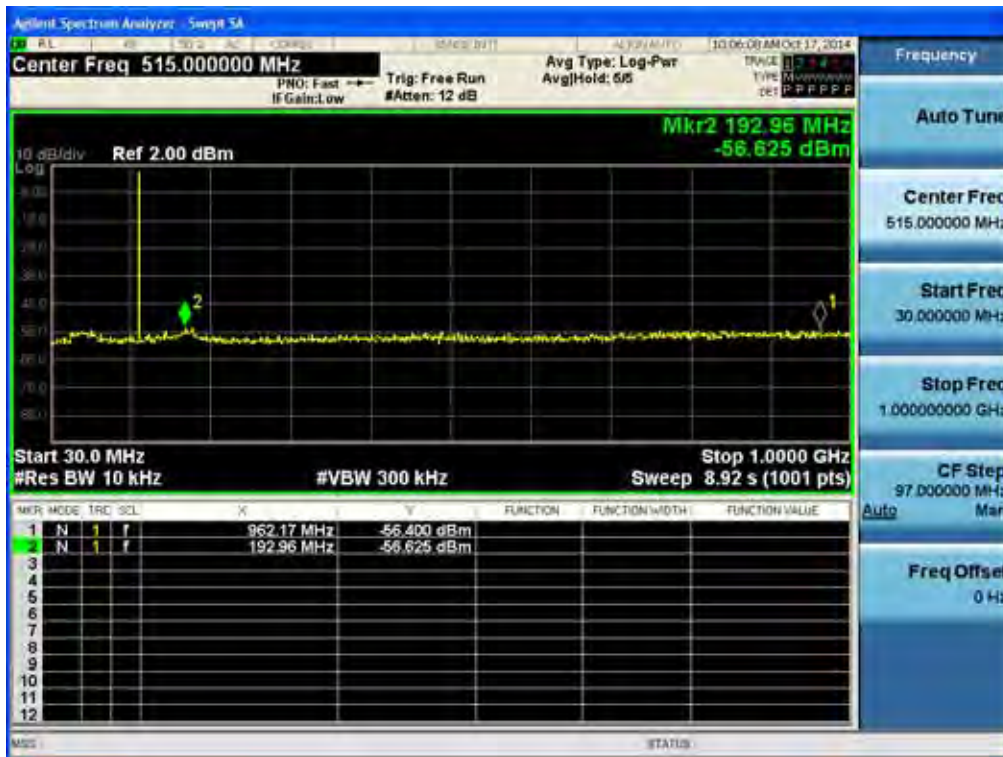
(8K30F1E, 8K30F1D, 8K30F7W \_ 143.95 MHz)\_Low



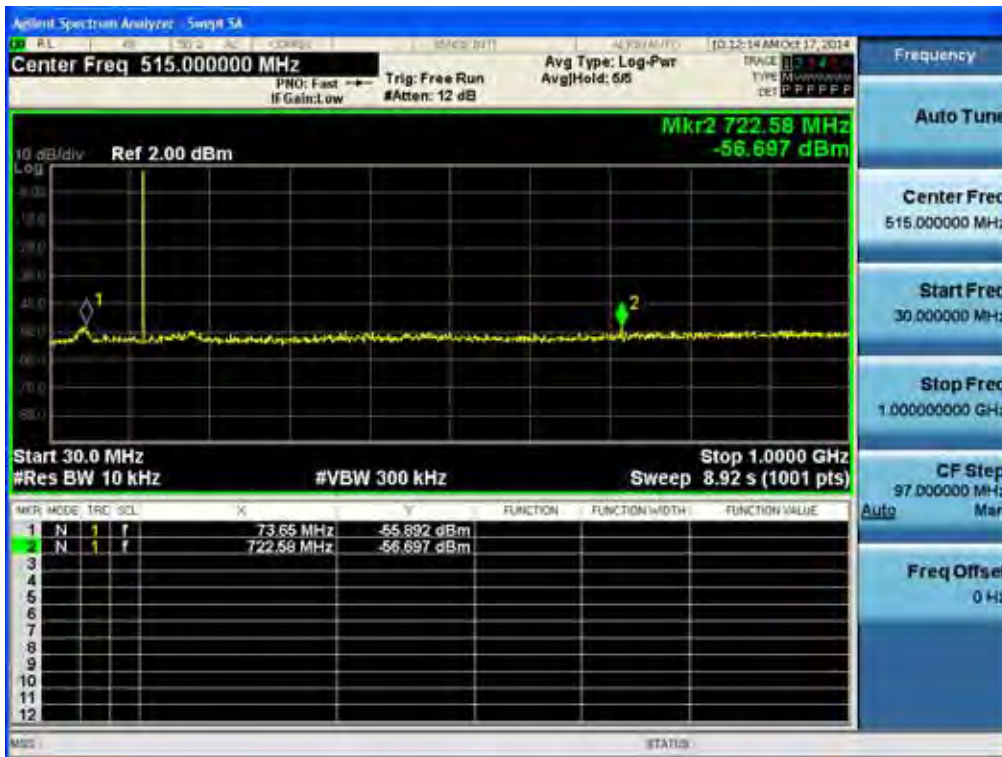
(8K30F1E, 8K30F1D, 8K30F7W \_ 148.05 MHz)\_Low



(4K00F1E, 4K00F1D, 4K00F7W \_ 138.05 MHz)\_High

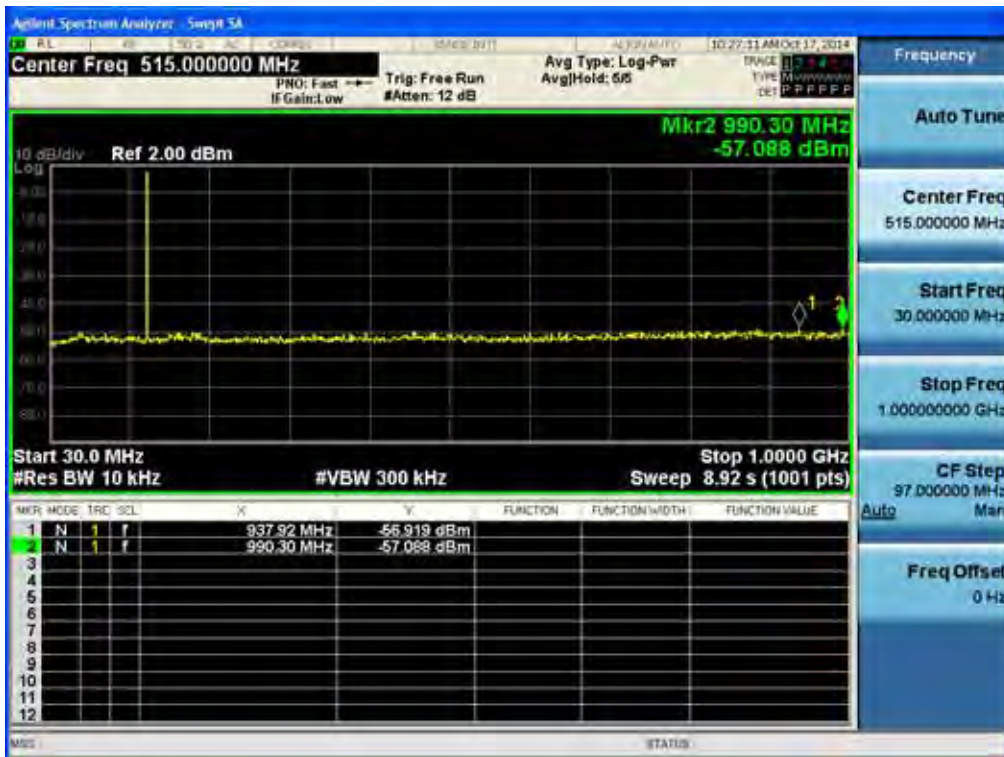


(4K00F1E, 4K00F1D, 4K00F7W \_ 143.95 MHz)\_High





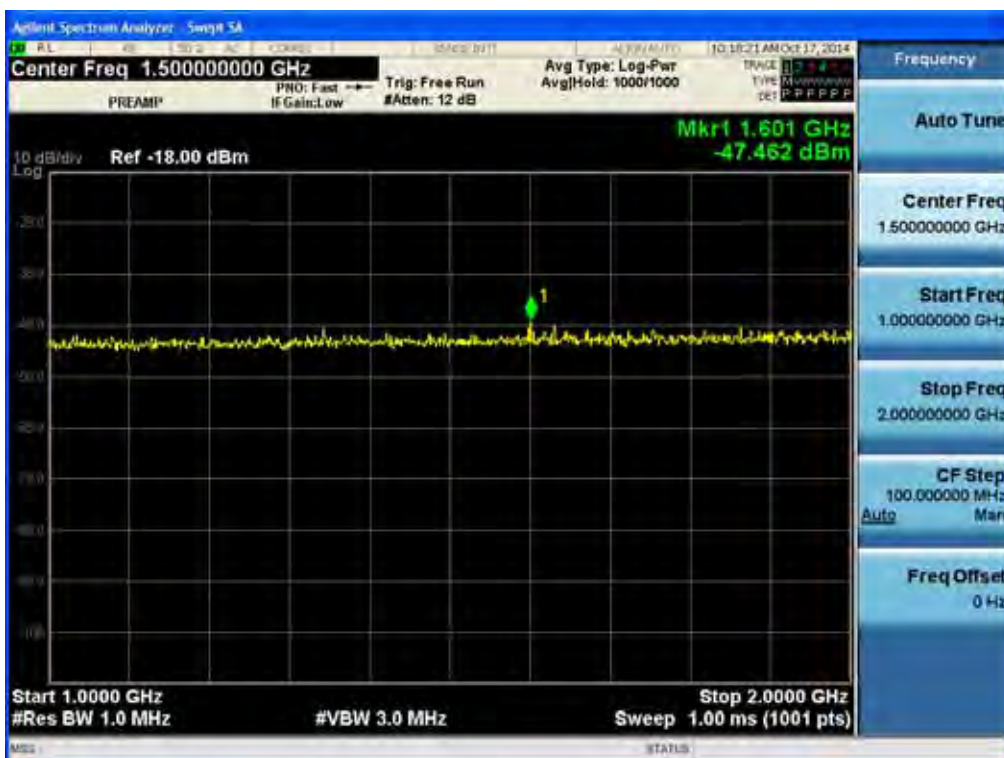
(4K00F1E, 4K00F1D, 4K00F7W \_ 148.05 MHz)\_High



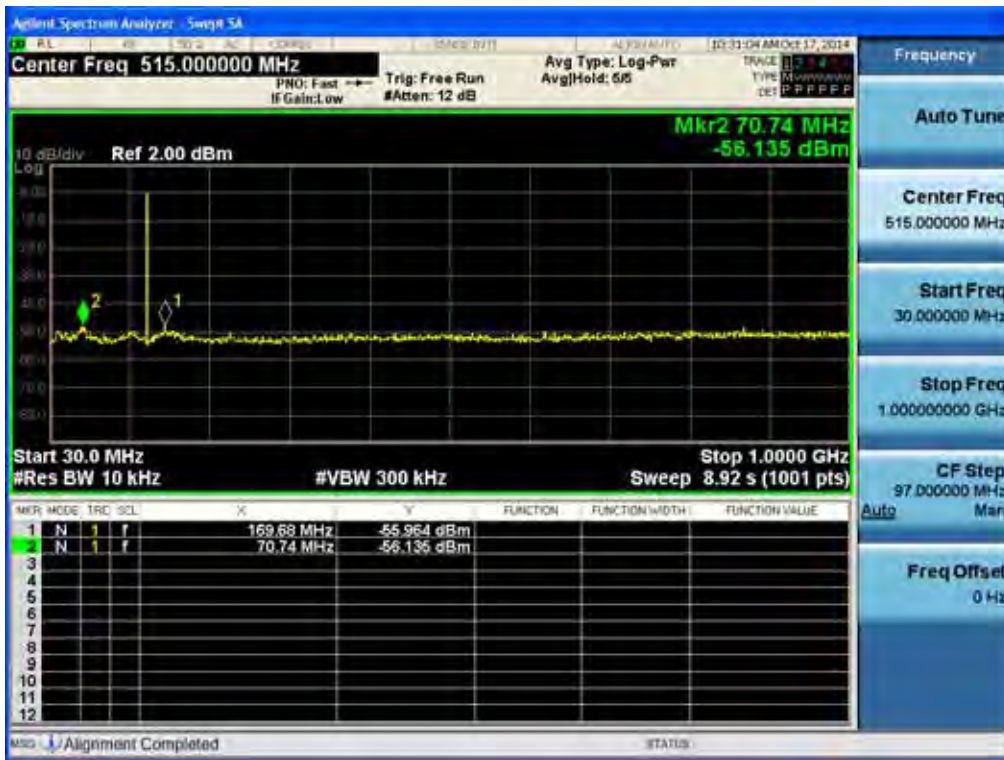
(4K00F1E, 4K00F1D, 4K00F7W \_ 138.05 MHz)\_Low



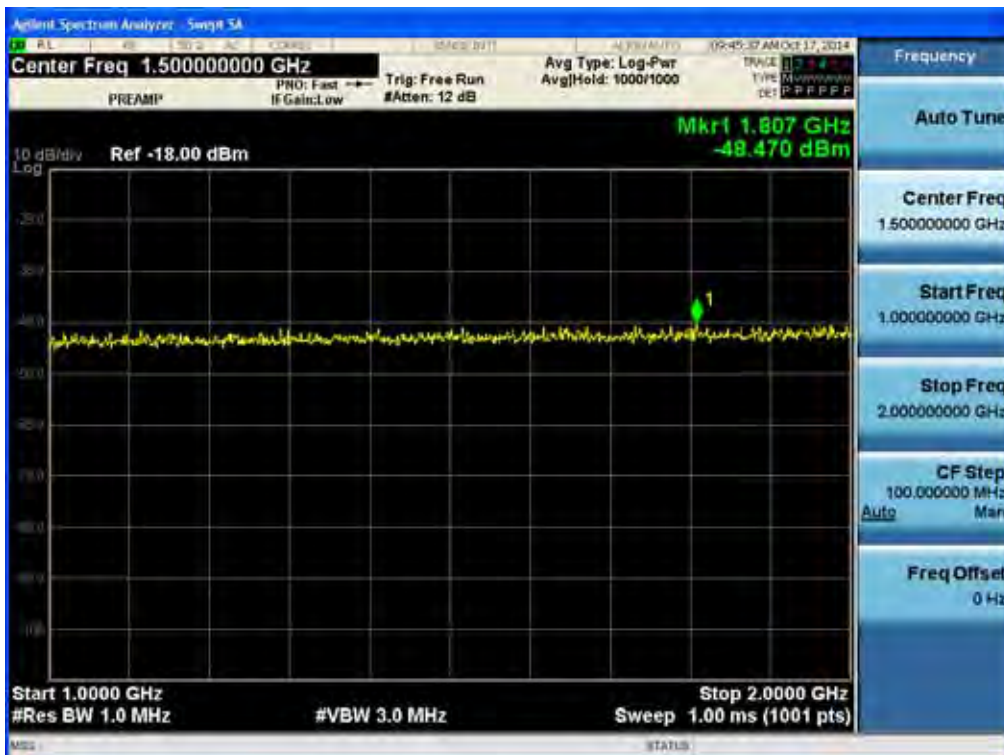
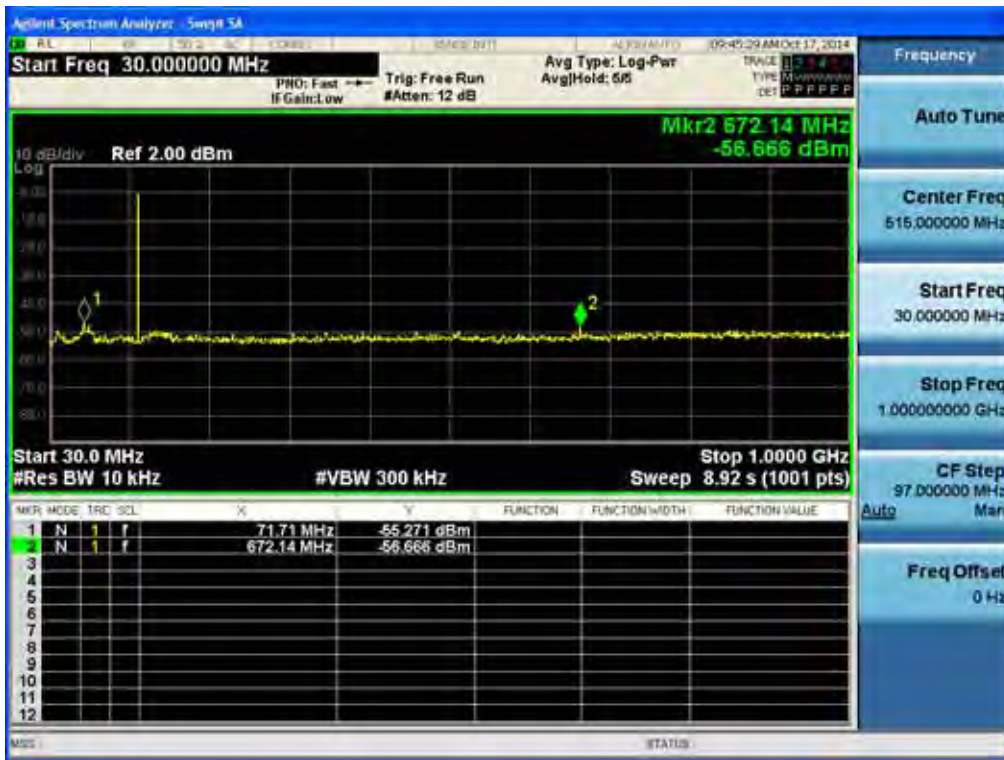
(4K00F1E, 4K00F1D, 4K00F7W \_ 143.95 MHz)\_Low



(4K00F1E, 4K00F1D, 4K00F7W \_ 148.05 MHz)\_Low



(4K00F2D \_ 138.05 MHz)\_Low



(4K00F2D \_ 143.95 MHz)\_Low



(4K00F2D \_ 148.05 MHz)\_Low



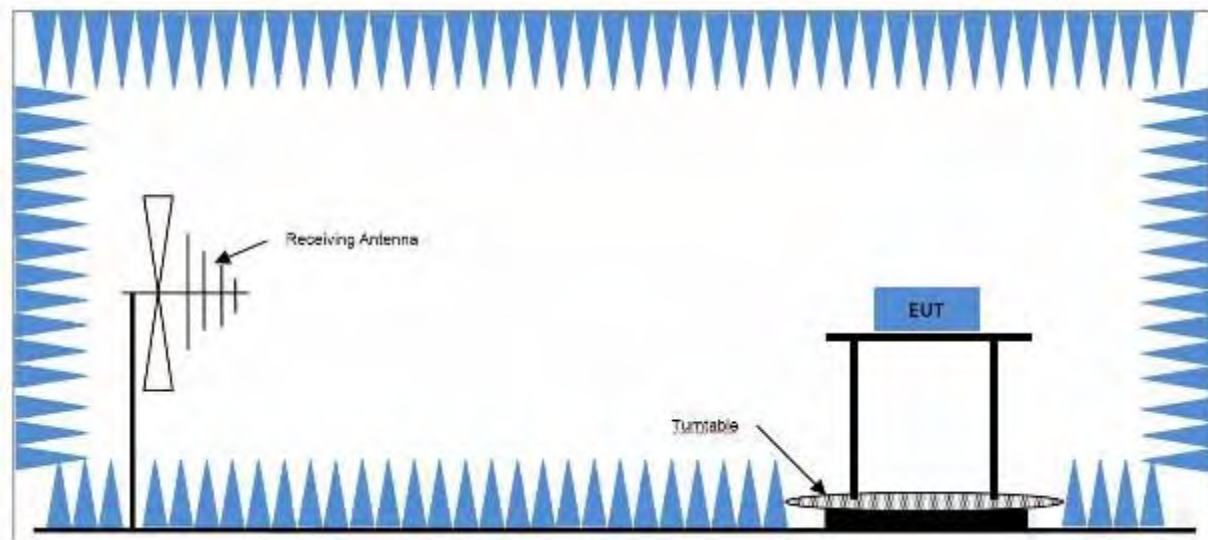
## 7.9 Unwanted Emissions : Radiated Spurious Emission

### Definition

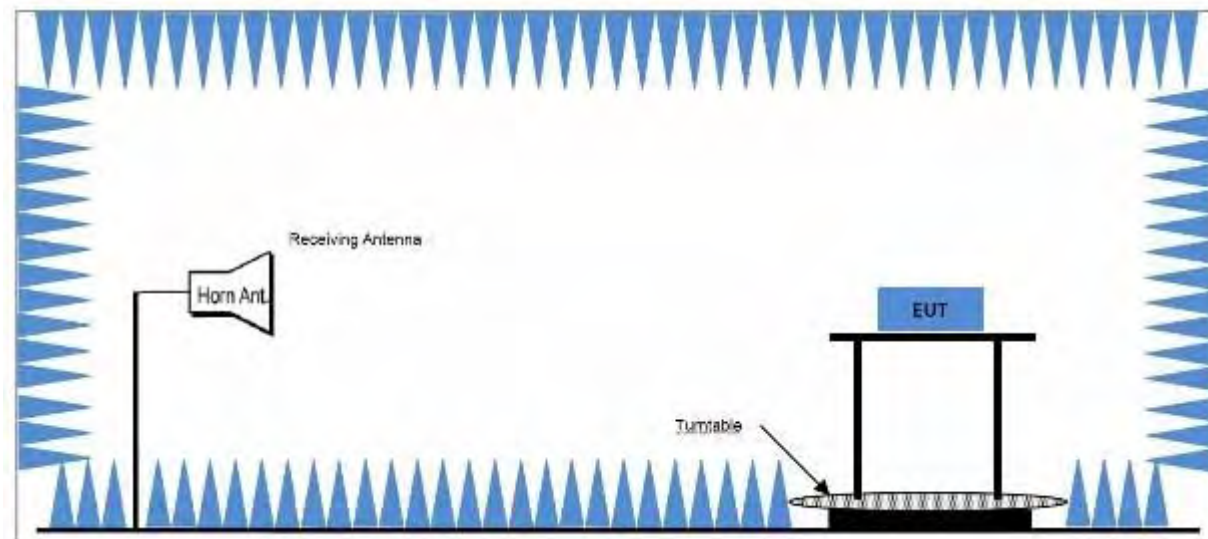
Radiated spurious emissions are emissions from the equipment when transmitting into a non-radiating load on a frequency or frequencies that are outside an occupied band sufficient to ensure transmission of information of required quality for the class of communications desired.

### TEST CONFIGURATION

#### Below 30 MHz



#### Above 1 GHz



### TEST PROCEDURE USED

According to 2.2.12 in TIA-603-D Standard.

- a) Connect the equipment as illustrated.
- b) Adjust the spectrum analyzer for the following settings:
  - 1) Resolution Bandwidth = 10 kHz for spurious emissions below 1 GHz, and 1 MHz for spurious



- emissions above 1GHz.
- 2) Video Bandwidth = 300 kHz for spurious emissions below 1 GHz, and 3 MHz for spurious emissions above 1 GHz.
  - 3) Sweep Speed slow enough to maintain measurement calibration.
  - 4) Detector Mode = Positive Peak.
- c) Place the transmitter to be tested on the turntable in the standard test site, or an FCC listed site compliant with ANSI C63.4-2001 clause 5.4. The transmitter is transmitting into a nonradiating load that is placed on the turntable. The RF cable to this load should be of minimum length. For transmitters with integral antennas, the tests are to be run with the unit operating into the integral antenna.
  - d) For each spurious measurement the test antenna should be adjusted to the correct length for the frequency involved. This length may be determined from a calibration ruler supplied with the equipment. Measurements shall be made from the lowest radio frequency generated in the equipment to the tenth harmonic of the carrier, except for the region close to the carrier equal to  $\pm$  the test bandwidth (see 1.3.4.4).
  - e) Key the transmitter.
  - f) For each spurious frequency, raise and lower the test antenna from 1 m to 4 m to obtain a maximum reading on the spectrum analyzer with the test antenna at horizontal polarity. Then the turntable should be rotated 360° to determine the maximum reading.  
Repeat this procedure to obtain the highest possible reading. Record this maximum reading.
  - g) Repeat step f) for each spurious frequency with the test antenna polarized vertically.
  - h) Reconnect the equipment as illustrated.
  - i) Keep the spectrum analyzer adjusted as in step b).
  - j) Remove the transmitter and replace it with a substitution antenna (the antenna should be half-wavelength for each frequency involved). The center of the substitution antenna should be approximately at the same location as the center of the transmitter. At the lower frequencies, where the substitution antenna is very long, this will be impossible to achieve when the antenna is polarized vertically. In such case the lower end of the antenna should be 0.3 m above the ground.
  - k) Feed the substitution antenna at the transmitter end with a signal generator connected to the antenna by means of a nonradiating cable. With the antennas at both ends horizontally polarized, and with the signal generator tuned to a particular spurious frequency, raise and lower the test antenna to obtain a maximum reading at the spectrum analyzer. Adjust the level of the signal generator output until the previously recorded maximum reading for this set of conditions is obtained. This should be done carefully repeating the adjustment of the test antenna and generator output.  
l) Repeat step k) with both antennas vertically polarized for each spurious frequency.
  - m) Calculate power in dBm into a reference ideal half-wave dipole antenna by reducing the readings obtained in steps k) and l) by the power loss in the cable between the generator and the antenna, and further corrected for the gain of the substitution antenna used relative to an ideal half-wave dipole antenna by the following formula:

$$Pd(\text{dBm}) = Pg(\text{dBm}) - \text{cable loss (dB)} + \text{antenna gain (dB)}$$

where:

$Pd$  is the dipole equivalent power and

$Pg$  is the generator output power into the substitution antenna.

n) The  $Pd$  levels record in step m) are the absolute levels of radiated spurious emissions in dBm. The radiated spurious emissions in dB can be calculated by the following:

Radiated spurious emissions (dB) =

$$10 \cdot \log_{10}(\text{TX power in watts}/0.001) - \text{the levels in step m)}$$

**LIMIT**

Frequency Band (MHz)	Channel bandwidth (kHz)	Limit (dB)
138 - 174	12.5	50+10Log(P) or 70 dB
	6.25	55+10Log(P) or 65 dB
	25	43+10Log(p)

**Operating Mode**

EUT Type (Worst case)	Modulation (Worst case)	Battery (Worst case)	Test frequency (MHz)	Antenna
Stand alone	8K10F1E, 8K10F1D	KNB-L3	138.05 (IC)	KRA-26(M3)
				KRA-22(M3)
				KRA-41(M3)
			143.95 (IC)	KRA-26(M3)
				KRA-22(M3)
				KRA-41(M3)
				KRA-28
			148.05 (IC)	KRA-26(M)
				KRA-26(M3)
				KRA-22(M)
				KRA-22(M3)
				KRA-41(M)
				KRA-41(M3)
				KRA-25
			150.05 (FCC)	KRA-28
				KRA-26(M)
				KRA-22(M)
				KRA-41(M)
			162.05 (FCC / IC)	KRA-25
				KRA-28
				KRA-26(M2)
KRA-22(M2)				
173.95 (FCC / IC)	KRA-41(M2)			
	KRA-28			
	KRA-26(M2)			
	KRA-22(M2)			
	KRA-41(M2)			

**Note**

1. It is permissible to use other antennas provided they can be referenced to a dipole.
2. We performed stand alone and EUT with KMC49. And worst case is stand alone.  
This report is attached only stand alone result.

**TEST RESULTS For FCC**

8K10F1E, 8K10F1D

Frequency [MHz] : 150.05

Battery : KNB-L3      Antenna : KRA-26(M)

Freq (MHz)	Reading [dBm]	Factor (dBm)	Reading + Factor [dBm]	Pol	Result (dB)	Limit (dB)	Margin (dB)
150.05	-17.40	27.23	9.83 (A)	X-V	0.00	-	-
300.10	-77.18	25.14	-52.04	X-V	61.87	29.83	32.04
450.15	-76.64	28.84	-47.80	X-V	57.63	29.83	27.80
600.20	-79.79	31.28	-48.51	X-V	58.34	29.83	28.51
150.05	-1.86	27.23	25.37 (A)	Y-V	0.00	-	-
300.10	-81.48	25.14	-56.34	Y-V	81.71	45.37	36.34
450.15	-79.83	28.84	-50.99	Y-V	76.36	45.37	30.99
600.20	-81.44	31.28	-50.16	Y-V	75.53	45.37	30.16
150.05	-1.97	27.23	25.26 (A)	X-H	0.00	-	-
300.10	-83.93	25.14	-58.79	X-H	84.05	45.26	38.79
450.15	-85.68	28.84	-56.84	X-H	82.10	45.26	36.84
600.20	-87.04	31.28	-55.76	X-H	81.02	45.26	35.76
150.05	-21.81	27.23	5.42 (A)	Y-H	0.00	-	-
300.10	-77.85	25.14	-52.71	Y-H	58.13	25.42	32.71
450.15	-77.83	28.84	-48.99	Y-H	54.41	25.42	28.99
600.20	-81.55	31.28	-50.27	Y-H	55.69	25.42	30.27
150.05	-1.67	27.23	25.56 (A)	Z-H	0.00	-	-
300.10	-76.60	25.14	-51.46	Z-H	77.02	45.56	31.46
450.15	-76.96	28.84	-48.12	Z-H	73.68	45.56	28.12
600.20	-79.11	31.28	-47.83	Z-H	73.39	45.56	27.83

**Note**

1. A (dBm) = Output Power
2. Result (dB) = A - Reading + Factor
3. Limit (dB) = 50+10Log(P)
4. P (W) = (10<sup>(A/10)</sup>)/1000

## 8K10F1E, 8K10F1D

Frequency [MHz] : 150.05

Battery : KNB-L3      Antenna : KRA-22(M)

Freq (MHz)	Reading [dBm]	Factor (dBm)	Reading + Factor [dBm]	Pol	Result (dB)	Limit (dB)	Margin (dB)
150.05	-18.72	27.23	8.51 (A)	X-V	0.00	-	-
300.10	-77.73	25.14	-52.59	X-V	61.10	28.51	32.59
450.15	-76.40	28.84	-47.56	X-V	56.07	28.51	27.56
600.20	-79.77	31.28	-48.49	X-V	57.00	28.51	28.49
150.05	-3.88	27.23	23.35 (A)	Y-V	0.00	-	-
300.10	-80.68	25.14	-55.54	Y-V	78.89	43.35	35.54
450.15	-76.83	28.84	-47.99	Y-V	71.34	43.35	27.99
600.20	-80.95	31.28	-49.67	Y-V	73.02	43.35	29.67
150.05	-19.18	27.23	8.05 (A)	Z-V	0.00	-	-
300.10	-84.00	25.14	-58.86	Z-V	66.91	28.05	38.86
450.15	-84.40	28.84	-55.56	Z-V	63.61	28.05	35.56
600.20	-85.97	31.28	-54.69	Z-V	62.74	28.05	34.69
150.05	-4.07	27.23	23.16 (A)	X-H	0.00	-	-
300.10	-82.00	25.14	-56.86	X-H	80.02	43.16	36.86
450.15	-76.73	28.84	-47.89	X-H	71.05	43.16	27.89
600.20	-84.10	31.28	-52.82	X-H	75.98	43.16	32.82
150.05	-21.94	27.23	5.29 (A)	Y-H	0.00	-	-
300.10	-77.70	25.14	-52.56	Y-H	57.85	25.29	32.56
450.15	-76.84	28.84	-48.00	Y-H	53.29	25.29	28.00
600.20	-80.70	31.28	-49.42	Y-H	54.71	25.29	29.42
150.05	-3.65	27.23	23.58 (A)	Z-H	0.00	-	-
300.10	-77.06	25.14	-51.92	Z-H	75.50	43.58	31.92
450.15	-74.88	28.84	-46.04	Z-H	69.62	43.58	26.04
600.20	-79.01	31.28	-47.73	Z-H	71.31	43.58	27.73

**Note**

1. A (dBm) = Output Power
2. Result (dB) = A - Reading + Factor
3. Limit (dB) = 50+10Log(P)
4. P (W) = (10<sup>(A/10)</sup>)/1000

## 8K10F1E, 8K10F1D

Frequency [MHz] : 150.05

Battery : KNB-L3      Antenna : KRA-41(M)

Freq (MHz)	Reading [dBm]	Factor (dBm)	Reading + Factor [dBm]	Pol	Result (dB)	Limit (dB)	Margin (dB)
150.05	-21.43	27.23	5.80 (A)	X-V	0.00	-	-
300.10	-81.78	25.14	-56.64	X-V	62.44	25.80	36.64
450.15	-86.44	28.84	-57.60	X-V	63.40	25.80	37.60
150.05	-6.31	27.23	20.92 (A)	Y-V	0.00	-	-
300.10	-80.56	25.14	-55.42	Y-V	76.34	40.92	35.42
450.15	-82.84	28.84	-54.00	Y-V	74.92	40.92	34.00
600.20	-81.60	31.28	-50.32	Y-V	71.24	40.92	30.32
150.05	-19.00	27.23	8.23 (A)	Z-V	0.00	-	-
300.10	-83.60	25.14	-58.46	Z-V	66.69	28.23	38.46
450.15	-85.37	28.84	-56.53	Z-V	64.76	28.23	36.53
600.20	-86.11	31.28	-54.83	Z-V	63.06	28.23	34.83
150.05	-6.48	27.23	20.75 (A)	X-H	0.00	-	-
300.10	-78.05	25.14	-52.91	X-H	73.66	40.75	32.91
450.15	-79.13	28.84	-50.29	X-H	71.04	40.75	30.29
600.20	-80.33	31.28	-49.05	X-H	69.80	40.75	29.05
150.05	-21.09	27.23	6.14 (A)	Y-H	0.00	-	-
300.10	-77.97	25.14	-52.83	Y-H	58.97	26.14	32.83
450.15	-81.08	28.84	-52.24	Y-H	58.38	26.14	32.24
600.20	-83.03	31.28	-51.75	Y-H	57.89	26.14	31.75
150.05	-6.22	27.23	21.01 (A)	Z-H	0.00	-	-
300.10	-77.52	25.14	-52.38	Z-H	73.39	41.01	32.38
450.15	-79.39	28.84	-50.55	Z-H	71.56	41.01	30.55
600.20	-80.57	31.28	-49.29	Z-H	70.30	41.01	29.29

**Note**

1. A (dBm) = Output Power
2. Result (dB) = A - Reading + Factor
3. Limit (dB) = 50+10Log(P)
4. P (W) = (10<sup>(A/10)</sup>)/1000

## 8K10F1E, 8K10F1D

Frequency [MHz] : 150.05

Battery : KNB-L3      Antenna : KRA-25

Freq (MHz)	Reading [dBm]	Factor (dBm)	Reading + Factor [dBm]	Pol	Result (dB)	Limit (dB)	Margin (dB)
150.05	-17.63	27.23	9.60 (A)	X-V	0.00	-	-
300.10	-77.86	25.14	-52.72	X-V	62.32	29.60	32.72
450.15	-77.04	28.84	-48.20	X-V	57.80	29.60	28.20
600.20	-80.18	31.28	-48.90	X-V	58.50	29.60	28.90
150.05	-0.93	27.23	26.30 (A)	Y-V	0.00	-	-
300.10	-84.34	25.14	-59.20	Y-V	85.50	46.30	39.20
450.15	-80.00	28.84	-51.16	Y-V	77.46	46.30	31.16
600.20	-80.47	31.28	-49.19	Y-V	75.49	46.30	29.19
150.05	-18.43	27.23	8.80 (A)	Z-V	0.00	-	-
300.10	-84.48	25.14	-59.34	Z-V	68.14	28.80	39.34
450.15	-84.91	28.84	-56.07	Z-V	64.87	28.80	36.07
600.20	-85.95	31.28	-54.67	Z-V	63.47	28.80	34.67
150.05	-0.97	27.23	26.26 (A)	X-H	0.00		
300.10	-85.56	25.14	-60.42	X-H	86.68	46.26	40.42
450.15	-84.39	28.84	-55.55	X-H	81.81	46.26	35.55
600.20	-84.44	31.28	-53.16	X-H	79.42	46.26	33.16
150.05	-19.98	27.23	7.25 (A)	Y-H	0.00	-	-
300.10	-78.78	25.14	-53.64	Y-H	60.89	27.25	33.64
450.15	-78.65	28.84	-49.81	Y-H	57.06	27.25	29.81
600.20	-82.63	31.28	-51.35	Y-H	58.60	27.25	31.35
150.05	-0.85	27.23	26.38 (A)	Z-H	0.00	-	-
300.10	-77.55	25.14	-52.41	Z-H	78.79	46.38	32.41
450.15	-76.67	28.84	-47.83	Z-H	74.21	46.38	27.83
600.20	-79.54	31.28	-48.26	Z-H	74.64	46.38	28.26

**Note**

1. A (dBm) = Output Power
2. Result (dB) = A - Reading + Factor
3. Limit (dB) = 50+10Log(P)
4. P (W) = (10<sup>(A/10)</sup>)/1000

## 8K10F1E, 8K10F1D

Frequency [MHz] : 150.05

Battery : KNB-L3      Antenna : KRA-28

Freq (MHz)	Reading [dBm]	Factor (dBm)	Reading + Factor [dBm]	Pol	Result (dB)	Limit (dB)	Margin (dB)
150.05	-11.65	27.23	15.58 (A)	X-V	0.00	-	-
300.10	-77.47	25.14	-52.33	X-V	67.91	35.58	32.33
450.15	-75.97	28.84	-47.13	X-V	62.71	35.58	27.13
600.20	-84.41	31.28	-53.13	X-V	68.71	35.58	33.13
150.05	3.56	27.23	30.79 (A)	Y-V	0.00	-	-
300.10	-79.14	25.14	-54.00	Y-V	84.79	50.79	34.00
450.15	-79.20	28.84	-50.36	Y-V	81.15	50.79	30.36
600.20	-84.47	31.28	-53.19	Y-V	83.98	50.79	33.19
150.05	-14.38	27.23	12.85 (A)	Z-V	0.00	-	-
300.10	-84.63	25.14	-59.49	Z-V	72.34	32.85	39.49
450.15	-84.79	28.84	-55.95	Z-V	68.80	32.85	35.95
600.20	-86.58	31.28	-55.30	Z-V	68.15	32.85	35.30
150.05	3.50	27.23	30.73 (A)	X-H	0.00	-	-
300.10	-80.87	25.14	-55.73	X-H	86.46	50.73	35.73
450.15	-83.31	28.84	-54.47	X-H	85.20	50.73	34.47
150.05	-17.54	27.23	9.69 (A)	Y-H	0.00	-	-
300.10	-78.98	25.14	-53.84	Y-H	63.53	29.69	33.84
450.15	-79.00	28.84	-50.16	Y-H	59.85	29.69	30.16
600.20	-84.73	31.28	-53.45	Y-H	63.14	29.69	33.45
150.05	3.81	27.23	31.04 (A)	Z-H	0.00	-	-
300.10	-75.90	25.14	-50.76	Z-H	81.80	51.04	30.76
450.15	-77.31	28.84	-48.47	Z-H	79.51	51.04	28.47
600.20	-83.05	31.28	-51.77	Z-H	82.81	51.04	31.77

**Note**

1. A (dBm) = Output Power
2. Result (dB) = A - Reading + Factor
3. Limit (dB) = 50+10Log(P)
4. P (W) = (10<sup>(A/10)</sup>)/1000



## 8K10F1E, 8K10F1D

Frequency [MHz] : 162.05

Battery : KNB-L3      Antenna : KRA-26(M2)

Freq (MHz)	Reading [dBm]	Factor (dBm)	Reading + Factor [dBm]	Pol	Result (dB)	Limit (dB)	Margin (dB)
162.05	-15.16	26.53	11.37 (A)	X-V	0.00	-	-
324.10	-79.18	25.86	-53.32	X-V	64.69	31.37	33.32
486.15	-85.61	28.71	-56.90	X-V	68.27	31.37	36.90
648.20	-86.05	31.85	-54.20	X-V	65.57	31.37	34.20
162.05	-1.64	26.53	24.89 (A)	Y-V	0.00	-	-
188.70	-68.28	26.04	-42.24	Y-V	67.13	44.89	22.24
324.10	-83.91	25.86	-58.05	Y-V	82.94	44.89	38.05
486.15	-88.28	28.71	-59.57	Y-V	84.46	44.89	39.57
648.20	-87.42	31.85	-55.57	Y-V	80.46	44.89	35.57
162.05	-18.22	26.53	8.31 (A)	Y-H	0.00	-	-
324.10	-80.18	25.86	-54.32	Y-H	62.63	28.31	34.32
486.15	-87.17	28.71	-58.46	Y-H	66.77	28.31	38.46
648.20	-86.43	31.85	-54.58	Y-H	62.89	28.31	34.58
162.05	-2.11	26.53	24.42 (A)	Z-H	0.00	-	-
189.00	-70.21	26.04	-44.17	Z-H	68.59	44.42	24.17
324.10	-80.59	25.86	-54.73	Z-H	79.15	44.42	34.73
486.15	-81.49	28.71	-52.78	Z-H	77.20	44.42	32.78
648.20	-85.92	31.85	-54.07	Z-H	78.49	44.42	34.07

**Note**

1. A (dBm) = Output Power
2. Result (dB) = A - Reading + Factor
3. Limit (dB) = 50+10Log(P)
4. P (W) = (10<sup>(A/10)</sup>)/1000

8K10F1E, 8K10F1D

Frequency [MHz] : 162.05

Battery : KNB-L3      Antenna : KRA-22(M2)

Freq (MHz)	Reading [dBm]	Factor (dBm)	Reading + Factor [dBm]	Pol	Result (dB)	Limit (dB)	Margin (dB)
162.05	-18.12	26.53	8.41 (A)	X-V	0.00	-	-
324.10	-79.88	25.86	-54.02	X-V	62.43	28.41	34.02
486.15	-86.52	28.71	-57.81	X-V	66.22	28.41	37.81
162.05	-4.05	26.53	22.48 (A)	Y-V	0.00	-	-
324.10	-83.72	25.86	-57.86	Y-V	80.34	42.48	37.86
486.15	-83.31	28.71	-54.60	Y-V	77.08	42.48	34.60
648.20	-86.46	31.85	-54.61	Y-V	77.09	42.48	34.61
162.05	-5.02	26.53	21.51 (A)	X-H	0.00	-	-
324.10	-84.73	25.86	-58.87	X-H	80.38	41.51	38.87
486.15	-84.80	28.71	-56.09	X-H	77.60	41.51	36.09
162.05	-21.98	26.53	4.55 (A)	Y-H	0.00	-	-
324.10	-81.06	25.86	-55.20	Y-H	59.75	24.55	35.20
162.05	-5.04	26.53	21.49 (A)	Z-H	0.00	-	-
324.10	-80.95	25.86	-55.09	Z-H	76.58	41.49	35.09

**Note**

1. A (dBm) = Output Power
2. Result (dB) = A - Reading + Factor
3. Limit (dB) = 50+10Log(P)
4. P (W) = (10^(A/10))/1000

## 8K10F1E, 8K10F1D

Frequency [MHz] : 162.05

Battery : KNB-L3      Antenna : KRA-22(M2)

Freq (MHz)	Reading [dBm]	Factor (dBm)	Reading + Factor [dBm]	Pol	Result (dB)	Limit (dB)	Margin (dB)
162.05	-28.33	26.53	-1.80 (A)	X-V	0.00	-	-
324.10	-80.26	25.86	-54.40	X-V	52.60	18.20	34.40
486.15	-83.82	28.71	-55.11	X-V	53.31	18.20	35.11
162.05	-7.65	26.53	18.88 (A)	Y-V	0.00	-	-
324.10	-83.36	25.86	-57.50	Y-V	76.38	38.88	37.50
648.20	-84.70	31.85	-52.85	Y-V	71.73	38.88	32.85
162.05	-25.24	26.53	1.29 (A)	Z-V	0.00	-	-
324.10	-85.41	25.86	-59.55	Z-V	60.84	21.29	39.55
162.05	-10.78	26.53	15.75 (A)	X-H	0.00	-	-
324.10	-84.80	25.86	-58.94	X-H	74.69	35.75	38.94
162.05	-21.96	26.53	4.57 (A)	Y-H	0.00	-	-
324.10	-80.91	25.86	-55.05	Y-H	59.62	24.57	35.05
486.15	-85.96	28.71	-57.25	Y-H	61.82	24.57	37.25
648.20	-83.22	31.85	-51.37	Y-H	55.94	24.57	31.37
162.05	-8.82	26.53	17.71 (A)	Z-H	0.00	-	-
324.10	-81.60	25.86	-55.74	Z-H	73.45	37.71	35.74
486.15	-84.53	28.71	-55.82	Z-H	73.53	37.71	35.82

**Note**

1. A (dBm) = Output Power
2. Result (dB) = A - Reading + Factor
3. Limit (dB) = 50+10Log(P)
4. P (W) = (10<sup>(A/10)</sup>)/1000

## 8K10F1E, 8K10F1D

Frequency [MHz] : 162.05

Battery : KNB-L3      Antenna : KRA-28

Freq (MHz)	Reading [dBm]	Factor (dBm)	Reading + Factor [dBm]	Pol	Result (dB)	Limit (dB)	Margin (dB)
162.05	-12.09	26.53	14.44 (A)	X-V	0.00	-	-
324.10	-79.06	25.86	-53.20	X-V	67.64	34.44	33.20
486.15	-84.32	28.71	-55.61	X-V	70.05	34.44	35.61
162.05	1.52	26.53	28.05 (A)	Y-V	0.00	-	-
147.00	-72.37	27.23	-45.14	Y-V	73.19	48.05	25.14
324.10	-80.65	25.86	-54.79	Y-V	82.84	48.05	34.79
486.15	-84.82	28.71	-56.11	Y-V	84.16	48.05	36.11
162.05	0.52	26.53	27.05 (A)	X-H	0.00	-	-
147.00	-71.55	27.23	-44.32	X-H	71.37	48.05	23.32
324.10	-80.16	25.86	-54.30	X-H	81.35	47.05	34.30
162.05	-15.16	26.53	11.37 (A)	Y-H	0.00	-	-
324.10	-80.29	25.86	-54.43	Y-H	65.80	31.37	34.43
486.15	-85.53	28.71	-56.82	Y-H	68.19	31.37	36.82
162.05	0.72	26.53	27.25 (A)	Z-H	0.00	-	-
147.00	-72.99	27.23	-45.76	Z-H	73.01	47.25	25.76
324.10	-78.43	25.86	-52.57	Z-H	79.82	47.25	32.57
486.15	-84.79	28.71	-56.08	Z-H	83.33	47.25	36.08

**Note**

1. A (dBm) = Output Power
2. Result (dB) = A - Reading + Factor
3. Limit (dB) = 50+10Log(P)
4. P (W) = (10<sup>(A/10)</sup>)/1000

8K10F1E, 8K10F1D

Frequency [MHz] : 173.95

Battery : KNB-L3      Antenna : KRA-26(M2)

Freq (MHz)	Reading [dBm]	Factor (dBm)	Reading + Factor [dBm]	Pol	Result (dB)	Limit (dB)	Margin (dB)
173.95	-6.14	26.04	19.90 (A)	X-V	0.00	-	-
347.90	-72.08	26.26	-45.82	X-V	65.72	39.90	25.82
521.85	-72.84	29.40	-43.44	X-V	63.34	39.90	23.44
173.95	7.73	26.04	33.77 (A)	Y-V	0.00	-	-
347.90	-73.81	26.26	-47.55	Y-V	81.32	53.77	27.55
173.95	-7.37	26.04	18.67 (A)	Z-V	0.00	-	-
347.90	-79.38	26.26	-53.12	Z-V	71.79	38.67	33.12
173.95	6.61	26.04	32.65 (A)	X-H	0.00	-	-
347.90	-77.07	26.26	-50.81	X-H	83.46	52.65	30.81
173.95	-6.63	26.04	19.41 (A)	Y-H	0.00	-	-
347.90	-72.71	26.26	-46.45	Y-H	65.86	39.41	26.45
173.95	6.60	26.04	32.64 (A)	Z-H	0.00	-	-
347.90	-72.89	26.26	-46.63	Z-H	79.27	52.64	26.63

**Note**

1. A (dBm) = Output Power
2. Result (dB) = A - Reading + Factor
3. Limit (dB) = 50+10Log(P)
4. P (W) = (10<sup>(A/10)</sup>)/1000

## 8K10F1E, 8K10F1D

Frequency [MHz] : 173.95

Battery : KNB-L3      Antenna : KRA-22(M2)

Freq (MHz)	Reading [dBm]	Factor (dBm)	Reading + Factor [dBm]	Pol	Result (dB)	Limit (dB)	Margin (dB)
173.95	-9.41	26.04	16.63 (A)	X-V	0.00	-	-
347.90	-71.63	26.26	-45.37	X-V	62.00	36.63	25.37
521.85	-75.79	29.40	-46.39	X-V	63.02	36.63	26.39
173.95	4.84	26.04	30.88 (A)	Y-V	0.00	-	-
347.90	-74.69	26.26	-48.43	Y-V	79.31	50.88	28.43
521.85	-60.91	29.40	-31.51	Y-V	62.39	50.88	11.51
695.80	-74.56	32.23	-42.33	Y-V	73.21	50.88	22.33
173.95	-9.21	26.04	16.83 (A)	Z-V	0.00	-	-
521.85	-72.66	29.40	-43.26	Z-V	60.09	36.83	23.26
173.95	3.60	26.04	29.64 (A)	X-H	0.00	-	-
347.90	-75.26	26.26	-49.00	X-H	78.64	49.64	29.00
521.85	-61.52	29.40	-32.12	X-H	61.76	49.64	12.12
173.95	-9.62	26.04	16.42 (A)	Y-H	0.00	-	-
347.90	-73.35	26.26	-47.09	Y-H	63.51	36.42	27.09
521.85	-72.42	29.40	-43.02	Y-H	59.44	36.42	23.02
173.95	3.73	26.04	29.77 (A)	Z-H	0.00	-	-
347.90	-73.88	26.26	-47.62	Z-H	77.39	49.77	27.62
521.85	-60.19	29.40	-30.79	Z-H	60.56	49.77	10.79
695.80	-74.60	32.23	-42.37	Z-H	72.14	49.77	22.37

**Note**

1. A (dBm) = Output Power
2. Result (dB) = A - Reading + Factor
3. Limit (dB) = 50+10Log(P)
4. P (W) = (10<sup>(A/10)</sup>)/1000

8K10F1E, 8K10F1D

Frequency [MHz] : 173.95

Battery : KNB-L3      Antenna : KRA-41(M2)

Freq (MHz)	Reading [dBm]	Factor (dBm)	Reading + Factor [dBm]	Pol	Result (dB)	Limit (dB)	Margin (dB)
173.95	-12.46	26.04	13.58 (A)	X-V	0.00	-	-
347.90	-71.18	26.26	-44.92	X-V	58.50	33.58	24.92
173.95	0.69	26.04	26.73 (A)	Y-V	0.00	-	-
347.90	-74.54	26.26	-48.28	Y-V	75.01	46.73	28.28
173.95	-0.43	26.04	25.61 (A)	X-H	0.00	-	-
347.90	-79.33	26.26	-53.07	X-H	78.68	45.61	33.07
173.95	-16.82	26.04	9.22 (A)	Y-H	0.00	-	-
347.90	-72.14	26.26	-45.88	Y-H	55.10	29.22	25.88
173.95	-0.38	26.04	25.66 (A)	Z-H	0.00	-	-
347.90	-72.17	26.26	-45.91	Z-H	71.57	45.66	25.91

**Note**

1. A (dBm) = Output Power
2. Result (dB) = A - Reading + Factor
3. Limit (dB) = 50+10Log(P)
4. P (W) = (10<sup>(A/10)</sup>)/1000

**TEST RESULTS For IC**

8K10F1E, 8K10F1D

Frequency [MHz] : 138.05

Battery : KNB-L3      Antenna : KRA-26(M3)

Freq (MHz)	Reading [dBm]	Factor (dBm)	Reading + Factor [dBm]	Pol	Result (dB)	Limit (dB)	Margin (dB)
138.05	-21.49	24.87	3.38 (A)	X-V	0.00	-	-
276.10	-81.81	24.74	-57.07	X-V	60.45	23.38	37.07
414.15	-84.60	27.57	-57.03	X-V	60.41	23.38	37.03
552.20	-85.47	29.90	-55.57	X-V	58.95	23.38	35.57
138.05	-3.43	24.87	21.44 (A)	Y-V	0.00	-	-
276.10	-85.06	24.74	-60.32	Y-V	81.76	41.44	40.32
414.15	-85.34	27.57	-57.77	Y-V	79.21	41.44	37.77
552.20	-87.25	29.90	-57.35	Y-V	78.79	41.44	37.35
138.05	-23.01	24.87	1.86 (A)	Z-V	0.00	-	-
276.10	-85.90	24.74	-61.16	Z-V	63.02	21.86	41.16
414.15	-87.61	27.57	-60.04	Z-V	61.90	21.86	40.04
138.05	-18.50	24.87	6.37 (A)	Y-H	0.00	-	-
276.10	-80.30	24.74	-55.56	Y-H	61.93	26.37	35.56
414.15	-83.48	27.57	-55.91	Y-H	62.28	26.37	35.91
138.05	-1.50	24.87	23.37 (A)	Z-H	0.00	-	-
276.10	-81.36	24.74	-56.62	Z-H	79.99	43.37	36.62
414.15	-84.51	27.57	-56.94	Z-H	80.31	43.37	36.94
552.20	-85.51	29.90	-55.61	Z-H	78.98	43.37	35.61

**Note**

1. A (dBm) = Output Power
2. Result (dB) = A - Reading + Factor
3. Limit (dB) = 50+10Log(P)
4. P (W) = (10<sup>(A/10)</sup>)/1000



## 8K10F1E, 8K10F1D

Frequency [MHz] : 138.05

Battery : KNB-L3      Antenna : KRA-22(M3)

Freq (MHz)	Reading [dBm]	Factor (dBm)	Reading + Factor [dBm]	Pol	Result (dB)	Limit (dB)	Margin (dB)
138.05	-22.21	24.87	2.66 (A)	X-V	0.00	-	-
276.10	-81.72	24.74	-56.98	X-V	59.64	22.66	36.98
414.15	-83.57	27.57	-56.00	X-V	58.66	22.66	36.00
552.20	-84.67	29.90	-54.77	X-V	57.43	22.66	34.77
138.05	-4.09	24.87	20.78 (A)	Y-V	0.00	-	-
276.10	-84.92	24.74	-60.18	Y-V	80.96	40.78	40.18
414.15	-84.85	27.57	-57.28	Y-V	78.06	40.78	37.28
552.20	-86.03	29.90	-56.13	Y-V	76.91	40.78	36.13
138.05	-20.86	24.87	4.01 (A)	Z-V	0.00	-	-
276.10	-84.76	24.74	-60.02	Z-V	64.03	24.01	40.02
414.15	-85.94	27.57	-58.37	Z-V	62.38	24.01	38.37
138.05	-2.30	24.87	22.57 (A)	X-H	0.00	-	-
276.10	-84.45	24.74	-59.71	X-H	82.28	42.57	39.71
138.05	-22.64	24.87	2.23 (A)	Y-H	0.00	-	-
276.10	-81.11	24.74	-56.37	Y-H	58.60	22.23	36.37
414.15	-83.77	27.57	-56.20	Y-H	58.43	22.23	36.20
552.20	-85.33	29.90	-55.43	Y-H	57.66	22.23	35.43
138.05	-2.60	24.87	22.27 (A)	Z-H	0.00	-	-
276.10	-80.83	24.74	-56.09	Z-H	78.36	42.27	36.09
414.15	-86.10	27.57	-58.53	Z-H	80.80	42.27	38.53
552.20	-86.25	29.90	-56.35	Z-H	78.62	42.27	36.35

**Note**

1. A (dBm) = Output Power
2. Result (dB) = A - Reading + Factor
3. Limit (dB) = 50+10Log(P)
4. P (W) = (10<sup>(A/10)</sup>)/1000

8K10F1E, 8K10F1D

Frequency [MHz] : 138.05

Battery : KNB-L3      Antenna : KRA-41(M3)

Freq (MHz)	Reading [dBm]	Factor (dBm)	Reading + Factor [dBm]	Pol	Result (dB)	Limit (dB)	Margin (dB)
138.05	-25.84	24.87	-0.97 (A)	X-V	0.00	-	-
276.10	-81.74	24.74	-57.00	X-V	56.03	19.03	37.00
414.15	-83.35	27.57	-55.78	X-V	54.81	19.03	35.78
552.20	-85.41	29.90	-55.51	X-V	54.54	19.03	35.51
138.05	-6.04	24.87	18.83 (A)	Y-V	0.00	-	-
276.10	-83.68	24.74	-58.94	Y-V	77.77	38.83	38.94
138.05	-4.28	24.87	20.59 (A)	X-H	0.00	-	-
276.10	-84.03	24.74	-59.29	X-H	79.88	40.59	39.29
138.05	-20.14	24.87	4.73 (A)	Y-H	0.00	-	-
276.10	-81.17	24.74	-56.43	Y-H	61.16	24.73	36.43
414.15	-84.27	27.57	-56.70	Y-H	61.43	24.73	36.70
138.05	-4.14	24.87	20.73 (A)	Z-H	0.00	-	-
276.10	-81.33	24.74	-56.59	Z-H	77.32	40.73	36.59
414.15	-83.40	27.57	-55.83	Z-H	76.56	40.73	35.83
552.20	-85.82	29.90	-55.92	Z-H	76.65	40.73	35.92

**Note**

1. A (dBm) = Output Power
2. Result (dB) = A - Reading + Factor
3. Limit (dB) = 50+10Log(P)
4. P (W) = (10^(A/10))/1000

## 8K10F1E, 8K10F1D

Frequency [MHz] : 143.95

Battery : KNB-L3      Antenna : KRA-26(M3)

Freq (MHz)	Reading [dBm]	Factor (dBm)	Reading + Factor [dBm]	Pol	Result (dB)	Limit (dB)	Margin (dB)
143.95	-20.18	26.05	5.87 (A)	X-V	0.00	-	-
287.90	-79.62	24.90	-54.72	X-V	60.59	25.87	34.72
431.85	-75.17	28.47	-46.70	X-V	52.57	25.87	26.70
575.80	-83.44	30.58	-52.86	X-V	58.73	25.87	32.86
143.95	-1.57	26.05	24.48 (A)	Y-V	0.00	-	-
287.90	-82.33	24.90	-57.43	Y-V	81.91	44.48	37.43
431.85	-79.37	28.47	-50.90	Y-V	75.38	44.48	30.90
575.80	-85.68	30.58	-55.10	Y-V	79.58	44.48	35.10
143.95	-23.15	26.05	2.90 (A)	Z-V	0.00	-	-
287.90	-85.90	24.90	-61.00	Z-V	63.90	22.90	41.00
431.85	-82.55	28.47	-54.08	Z-V	56.98	22.90	34.08
575.80	-84.72	30.58	-54.14	Z-V	57.04	22.90	34.14
143.95	-0.35	26.05	25.70 (A)	X-H	0.00	-	-
287.90	-85.75	24.90	-60.85	X-H	86.55	45.70	40.85
431.85	-84.13	28.47	-55.66	X-H	81.36	45.70	35.66
143.95	-19.26	26.05	6.79 (A)	Y-H	0.00	-	-
287.90	-79.79	24.90	-54.89	Y-H	61.68	26.79	34.89
431.85	-76.86	28.47	-48.39	Y-H	55.18	26.79	28.39
575.80	-84.51	30.58	-53.93	Y-H	60.72	26.79	33.93
143.95	-0.48	26.05	25.57 (A)	Z-H	0.00	-	-
287.90	-80.02	24.90	-55.12	Z-H	80.69	45.57	35.12
431.85	-76.29	28.47	-47.82	Z-H	73.39	45.57	27.82
575.80	-85.46	30.58	-54.88	Z-H	80.45	45.57	34.88

**Note**

1. A (dBm) = Output Power
2. Result (dB) = A - Reading + Factor
3. Limit (dB) = 50+10Log(P)
4. P (W) = (10<sup>(A/10)</sup>)/1000

## 8K10F1E, 8K10F1D

Frequency [MHz] : 143.95

Battery : KNB-L3      Antenna : KRA-22(M3)

Freq (MHz)	Reading [dBm]	Factor (dBm)	Reading + Factor [dBm]	Pol	Result (dB)	Limit (dB)	Margin (dB)
143.95	-18.93	26.05	7.12 (A)	X-V	0.00	-	-
287.90	-78.16	24.90	-53.26	X-V	60.38	27.12	33.26
431.85	-77.08	28.47	-48.61	X-V	55.73	27.12	28.61
575.80	-83.13	30.58	-52.55	X-V	59.67	27.12	32.55
143.95	-0.93	26.05	25.12 (A)	Y-V	0.00	-	-
287.90	-80.23	24.90	-55.33	Y-V	80.45	45.12	35.33
431.85	-69.32	28.47	-40.85	Y-V	65.97	45.12	20.85
575.80	-76.56	30.58	-45.98	Y-V	71.10	45.12	25.98
143.95	-18.56	26.05	7.49 (A)	Z-V	0.00	-	-
287.90	-84.86	24.90	-59.96	Z-V	67.45	27.49	39.96
431.85	-82.11	28.47	-53.64	Z-V	61.13	27.49	33.64
143.95	0.14	26.05	26.19 (A)	X-H	0.00	-	-
287.90	-80.96	24.90	-56.06	X-H	82.25	46.19	36.06
431.85	-79.03	28.47	-50.56	X-H	76.75	46.19	30.56
575.80	-83.13	30.58	-52.55	X-H	78.74	46.19	32.55
143.95	-16.80	26.05	9.25 (A)	Y-H	0.00	-	-
287.90	-77.53	24.90	-52.63	Y-H	61.88	29.25	32.63
431.85	-76.57	28.47	-48.10	Y-H	57.35	29.25	28.10
575.80	-84.48	30.58	-53.90	Y-H	63.15	29.25	33.90
143.95	0.73	26.05	26.78 (A)	Z-H	0.00	-	-
287.90	-76.84	24.90	-51.94	Z-H	78.72	46.78	31.94
431.85	-67.84	28.47	-39.37	Z-H	66.15	46.78	19.37
575.80	-80.08	30.58	-49.50	Z-H	76.28	46.78	29.50

**Note**

1. A (dBm) = Output Power
2. Result (dB) = A - Reading + Factor
3. Limit (dB) = 50+10Log(P)
4. P (W) = (10<sup>(A/10)</sup>)/1000

## 8K10F1E, 8K10F1D

Frequency [MHz] : 143.95

Battery : KNB-L3      Antenna : KRA-41(M3)

Freq (MHz)	Reading [dBm]	Factor (dBm)	Reading + Factor [dBm]	Pol	Result (dB)	Limit (dB)	Margin (dB)
143.95	-18.33	26.05	7.72 (A)	X-V	0.00	-	-
287.90	-74.87	24.90	-49.97	X-V	57.69	27.72	29.97
431.85	-78.79	28.47	-50.32	X-V	58.04	27.72	30.32
575.80	-83.73	30.58	-53.15	X-V	60.87	27.72	33.15
143.95	-1.07	26.05	24.98 (A)	Y-V	0.00	-	-
287.90	-77.43	24.90	-52.53	Y-V	77.51	44.98	32.53
431.85	-82.68	28.47	-54.21	Y-V	79.19	44.98	34.21
575.80	-83.96	30.58	-53.38	Y-V	78.36	44.98	33.38
143.95	-15.80	26.05	10.25 (A)	Z-V	0.00	-	-
287.90	-82.97	24.90	-58.07	Z-V	68.32	30.25	38.07
143.95	0.01	26.05	26.06 (A)	X-H	0.00	-	-
287.90	-79.08	24.90	-54.18	X-H	80.24	46.06	34.18
143.95	-16.42	26.05	9.63 (A)	Y-H	0.00	-	-
287.90	-75.72	24.90	-50.82	Y-H	60.45	29.63	30.82
431.85	-81.16	28.47	-52.69	Y-H	62.32	29.63	32.69
575.80	-85.92	30.58	-55.34	Y-H	64.97	29.63	35.34
143.95	-0.09	26.05	25.96 (A)	Z-H	0.00	-	-
287.90	-74.19	24.90	-49.29	Z-H	75.25	45.96	29.29
431.85	-83.08	28.47	-54.61	Z-H	80.57	45.96	34.61
575.80	-84.92	30.58	-54.34	Z-H	80.30	45.96	34.34

**Note**

1. A (dBm) = Output Power
2. Result (dB) = A - Reading + Factor
3. Limit (dB) = 50+10Log(P)
4. P (W) = (10<sup>(A/10)</sup>)/1000

## 8K10F1E, 8K10F1D

Frequency [MHz] : 143.95

Battery : KNB-L3      Antenna : KRA-28

Freq (MHz)	Reading [dBm]	Factor (dBm)	Reading + Factor [dBm]	Pol	Result (dB)	Limit (dB)	Margin (dB)
143.95	-15.23	26.05	10.82 (A)	X-V	0.00	-	-
287.90	-78.03	24.90	-53.13	X-V	63.95	30.82	33.13
431.85	-73.86	28.47	-45.39	X-V	56.21	30.82	25.39
143.95	3.15	26.05	29.20 (A)	Y-V	0.00	-	-
287.90	-80.07	24.90	-55.17	Y-V	84.37	49.20	35.17
431.85	-83.96	28.47	-55.49	Y-V	84.69	49.20	35.49
143.95	-14.95	26.05	11.10 (A)	Z-V	0.00	-	-
287.90	-85.27	24.90	-60.37	Z-V	71.47	31.10	40.37
431.85	-77.25	28.47	-48.78	Z-V	59.88	31.10	28.78
143.95	4.45	26.05	30.50 (A)	X-H	0.00	-	-
287.90	-79.03	24.90	-54.13	X-H	84.63	50.50	34.13
431.85	-83.49	28.47	-55.02	X-H	85.52	50.50	35.02
143.95	-16.52	26.05	9.53 (A)	Y-H	0.00	-	-
287.90	-77.20	24.90	-52.30	Y-H	61.83	29.53	32.30
431.85	-83.73	28.47	-55.26	Y-H	64.79	29.53	35.26
143.95	4.66	26.05	30.71 (A)	Z-H	0.00	-	-
287.90	-77.15	24.90	-52.25	Z-H	82.96	50.71	32.25
431.85	-80.78	28.47	-52.31	Z-H	83.02	50.71	32.31

**Note**

1. A (dBm) = Output Power
2. Result (dB) = A - Reading + Factor
3. Limit (dB) = 50+10Log(P)
4. P (W) = (10<sup>(A/10)</sup>)/1000

## 8K10F1E, 8K10F1D

Frequency [MHz] : 148.05

Battery : KNB-L3      Antenna : KRA-26(M)

Freq (MHz)	Reading [dBm]	Factor (dBm)	Reading + Factor [dBm]	Pol	Result (dB)	Limit (dB)	Margin (dB)
148.05	-21.06	26.05	4.99 (A)	X-V	0.00	-	-
296.10	-78.91	24.96	-53.95	X-V	58.94	24.99	33.95
444.15	-82.33	28.84	-53.49	X-V	58.48	24.99	33.49
592.20	-84.39	31.26	-53.13	X-V	58.12	24.99	33.13
148.05	-3.63	26.05	22.42 (A)	Y-V	0.00	-	-
296.10	-82.12	24.96	-57.16	Y-V	79.58	42.42	37.16
444.15	-84.89	28.84	-56.05	Y-V	78.47	42.42	36.05
148.05	-2.84	26.05	23.21 (A)	X-H	0.00	-	-
296.10	-84.80	24.96	-59.84	X-H	83.05	43.21	39.84
444.15	-82.19	28.84	-53.35	X-H	76.56	43.21	33.35
592.20	-86.38	31.26	-55.12	X-H	78.33	43.21	35.12
148.05	-22.21	26.05	3.84 (A)	Y-H	0.00	-	-
296.10	-79.24	24.96	-54.28	Y-H	58.12	23.84	34.28
444.15	-82.15	28.84	-53.31	Y-H	57.15	23.84	33.31
148.05	-3.17	26.05	22.88 (A)	Z-H	0.00	-	-
296.10	-78.84	24.96	-53.88	Z-H	76.76	42.88	33.88
444.15	-76.94	28.84	-48.10	Z-H	70.98	42.88	28.10
592.20	-85.36	31.26	-54.10	Z-H	76.98	42.88	34.10

**Note**

1. A (dBm) = Output Power
2. Result (dB) = A - Reading + Factor
3. Limit (dB) = 50+10Log(P)
4. P (W) = (10<sup>(A/10)</sup>)/1000

## 8K10F1E, 8K10F1D

Frequency [MHz] : 148.05

Battery : KNB-L3      Antenna : KRA-26(M3)

Freq (MHz)	Reading [dBm]	Factor (dBm)	Reading + Factor [dBm]	Pol	Result (dB)	Limit (dB)	Margin (dB)
148.05	-16.97	26.05	9.08 (A)	X-V	0.00	-	-
296.10	-76.43	24.96	-51.47	X-V	60.55	29.08	31.47
444.15	-79.00	28.84	-50.16	X-V	59.24	29.08	30.16
592.20	-83.14	31.26	-51.88	X-V	60.96	29.08	31.88
148.05	0.86	26.05	26.91 (A)	Y-V	0.00	-	-
296.10	-78.87	24.96	-53.91	Y-V	80.82	46.91	33.91
444.15	-84.23	28.84	-55.39	Y-V	82.30	46.91	35.39
592.20	-84.61	31.26	-53.35	Y-V	80.26	46.91	33.35
148.05	-21.11	26.05	4.94 (A)	Z-V	0.00	-	-
296.10	-82.92	24.96	-57.96	Z-V	62.90	24.94	37.96
444.15	-85.94	28.84	-57.10	Z-V	62.04	24.94	37.10
592.20	-86.81	31.26	-55.55	Z-V	60.49	24.94	35.55
148.05	2.55	26.05	28.60 (A)	X-H	0.00	-	-
296.10	-80.75	24.96	-55.79	X-H	84.39	48.60	35.79
444.15	-86.44	28.84	-57.60	X-H	86.20	48.60	37.60
592.20	-86.50	31.26	-55.24	X-H	83.84	48.60	35.24
148.05	-14.02	26.05	12.03 (A)	Y-H	0.00	-	-
296.10	-76.72	24.96	-51.76	Y-H	63.79	32.03	31.76
444.15	-81.12	28.84	-52.28	Y-H	64.31	32.03	32.28
592.20	-84.98	31.26	-53.72	Y-H	65.75	32.03	33.72
148.05	1.51	26.05	27.56 (A)	Z-H	0.00	-	-
296.10	-75.47	24.96	-50.51	Z-H	78.07	47.56	30.51
444.15	-79.82	28.84	-50.98	Z-H	78.54	47.56	30.98
592.20	-83.05	31.26	-51.79	Z-H	79.35	47.56	31.79

**Note**

1. A (dBm) = Output Power
2. Result (dB) = A - Reading + Factor
3. Limit (dB) = 50+10Log(P)
4. P (W) = (10<sup>(A/10)</sup>)/1000



## 8K10F1E, 8K10F1D

Frequency [MHz] : 148.05

Battery : KNB-L3      Antenna : KRA-22(M)

Freq (MHz)	Reading [dBm]	Factor (dBm)	Reading + Factor [dBm]	Pol	Result (dB)	Limit (dB)	Margin (dB)
148.05	-24.20	26.05	1.85 (A)	X-V	0.00	-	-
296.10	-79.79	24.96	-54.83	X-V	56.68	21.85	34.83
444.15	-84.94	28.84	-56.10	X-V	57.95	21.85	36.10
592.20	-83.42	31.26	-52.16	X-V	54.01	21.85	32.16
148.05	-5.42	26.05	20.63 (A)	Y-V	0.00	-	-
296.10	-82.35	24.96	-57.39	Y-V	78.02	40.63	37.39
444.15	-87.92	28.84	-59.08	Y-V	79.71	40.63	39.08
592.20	-84.27	31.26	-53.01	Y-V	73.64	40.63	33.01
148.05	-25.03	26.05	1.02 (A)	Z-V	0.00	-	-
296.10	-85.38	24.96	-60.42	Z-V	61.44	21.02	40.42
444.15	-85.91	28.84	-57.07	Z-V	58.09	21.02	37.07
592.20	-86.18	31.26	-54.92	Z-V	55.94	21.02	34.92
148.05	-5.45	26.05	20.60 (A)	X-H	0.00	-	-
296.10	-74.10	24.96	-49.14	X-H	69.74	40.60	29.14
444.15	-88.02	28.84	-59.18	X-H	79.78	40.60	39.18
592.20	-86.43	31.26	-55.17	X-H	75.77	40.60	35.17
148.05	-23.41	26.05	2.64 (A)	Y-H	0.00	-	-
296.10	-79.70	24.96	-54.74	Y-H	57.38	22.64	34.74
444.15	-83.09	28.84	-54.25	Y-H	56.89	22.64	34.25
592.20	-86.73	31.26	-55.47	Y-H	58.11	22.64	35.47
148.05	-5.20	26.05	20.85 (A)	Z-H	0.00	-	-
296.10	-78.99	24.96	-54.03	Z-H	74.88	40.85	34.03
592.20	-83.00	31.26	-51.74	Z-H	72.59	40.85	31.74

**Note**

1. A (dBm) = Output Power
2. Result (dB) = A - Reading + Factor
3. Limit (dB) = 50+10Log(P)
4. P (W) = (10<sup>(A/10)</sup>)/1000

## 8K10F1E, 8K10F1D

Frequency [MHz] : 148.05

Battery : KNB-L3      Antenna : KRA-22(M3)

Freq (MHz)	Reading [dBm]	Factor (dBm)	Reading + Factor [dBm]	Pol	Result (dB)	Limit (dB)	Margin (dB)
148.05	-16.62	26.05	9.43 (A)	X-V	0.00	-	-
296.10	-75.29	24.96	-50.33	X-V	59.76	29.43	30.33
444.15	-77.87	28.84	-49.03	X-V	58.46	29.43	29.03
592.20	-85.55	31.26	-54.29	X-V	63.72	29.43	34.29
148.05	2.34	26.05	28.39 (A)	Y-V	0.00	-	-
296.10	-78.37	24.96	-53.41	Y-V	81.80	48.39	33.41
444.15	-71.76	28.84	-42.92	Y-V	71.31	48.39	22.92
592.20	-87.22	31.26	-55.96	Y-V	84.35	48.39	35.96
148.05	-15.36	26.05	10.69 (A)	Z-V	0.00	-	-
296.10	-84.81	24.96	-59.85	Z-V	70.54	30.69	39.85
444.15	-81.67	28.84	-52.83	Z-V	63.52	30.69	32.83
592.20	-89.08	31.26	-57.82	Z-V	68.51	30.69	37.82
148.05	2.41	26.05	28.46 (A)	X-H	0.00	-	-
296.10	-79.10	24.96	-54.14	X-H	82.60	48.46	34.14
444.15	-67.26	28.84	-38.42	X-H	66.88	48.46	18.42
592.20	-87.77	31.26	-56.51	X-H	84.97	48.46	36.51
148.05	-14.77	26.05	11.28 (A)	Y-H	0.00	-	-
296.10	-75.14	24.96	-50.18	Y-H	61.46	31.28	30.18
444.15	-80.46	28.84	-51.62	Y-H	62.90	31.28	31.62
592.20	-86.70	31.26	-55.44	Y-H	66.72	31.28	35.44
148.05	2.53	26.05	28.58 (A)	Z-H	0.00	-	-
296.10	-75.13	24.96	-50.17	Z-H	78.75	48.58	30.17
444.15	-68.20	28.84	-39.36	Z-H	67.94	48.58	19.36
592.20	-85.69	31.26	-54.43	Z-H	83.01	48.58	34.43

**Note**

1. A (dBm) = Output Power
2. Result (dB) = A - Reading + Factor
3. Limit (dB) = 50+10Log(P)
4. P (W) = (10<sup>(A/10)</sup>)/1000

## 8K10F1E, 8K10F1D

Frequency [MHz] : 148.05

Battery : KNB-L3      Antenna : KRA-41(M)

Freq (MHz)	Reading [dBm]	Factor (dBm)	Reading + Factor [dBm]	Pol	Result (dB)	Limit (dB)	Margin (dB)
148.05	-25.99	26.05	0.06 (A)	X-V	0.00	-	-
296.10	-79.86	24.96	-54.90	X-V	54.96	20.06	34.90
444.15	-81.50	28.84	-52.66	X-V	52.72	20.06	32.66
592.20	-84.68	31.26	-53.42	X-V	53.48	20.06	33.42
148.05	-8.33	26.05	17.72 (A)	Y-V	0.00	-	-
296.10	-81.85	24.96	-56.89	Y-V	74.61	37.72	36.89
444.15	-84.76	28.84	-55.92	Y-V	73.64	37.72	35.92
592.20	-84.27	31.26	-53.01	Y-V	70.73	37.72	33.01
148.05	-24.90	26.05	1.15 (A)	Z-V	0.00	-	-
296.10	-84.62	24.96	-59.66	Z-V	60.81	21.15	39.66
444.15	-85.02	28.84	-56.18	Z-V	57.33	21.15	36.18
592.20	-86.22	31.26	-54.96	Z-V	56.11	21.15	34.96
148.05	-8.21	26.05	17.84 (A)	X-H	0.00	-	-
296.10	-82.83	24.96	-57.87	X-H	75.71	37.84	37.87
444.15	-87.36	28.84	-58.52	X-H	76.36	37.84	38.52
592.20	-85.09	31.26	-53.83	X-H	71.67	37.84	33.83
148.05	-22.25	26.05	3.80 (A)	Y-H	0.00	-	-
296.10	-79.89	24.96	-54.93	Y-H	58.73	23.80	34.93
444.15	-81.48	28.84	-52.64	Y-H	56.44	23.80	32.64
592.20	-85.40	31.26	-54.14	Y-H	57.94	23.80	34.14
148.05	-7.93	26.05	18.12 (A)	Z-H	0.00	-	-
296.10	-79.29	24.96	-54.33	Z-H	72.45	38.12	34.33
444.15	-82.74	28.84	-53.90	Z-H	72.02	38.12	33.90
592.20	-84.46	31.26	-53.20	Z-H	71.32	38.12	33.20

**Note**

1. A (dBm) = Output Power
2. Result (dB) = A - Reading + Factor
3. Limit (dB) = 50+10Log(P)
4. P (W) = (10<sup>(A/10)</sup>)/1000

## 8K10F1E, 8K10F1D

Frequency [MHz] : 148.05

Battery : KNB-L3      Antenna : KRA-41(M3)

Freq (MHz)	Reading [dBm]	Factor (dBm)	Reading + Factor [dBm]	Pol	Result (dB)	Limit (dB)	Margin (dB)
148.05	-19.31	26.05	6.74 (A)	X-V	0.00	-	-
296.10	-81.11	24.96	-56.15	X-V	62.89	26.74	36.15
444.15	-85.79	28.84	-56.95	X-V	63.69	26.74	36.95
592.20	-88.21	31.26	-56.95	X-V	63.69	26.74	36.95
148.05	-0.75	26.05	25.30 (A)	Y-V	0.00	-	-
296.10	-80.96	24.96	-56.00	Y-V	81.30	45.30	36.00
444.15	-80.88	28.84	-52.04	Y-V	77.34	45.30	32.04
592.20	-86.35	31.26	-55.09	Y-V	80.39	45.30	35.09
148.05	-20.53	26.05	5.52 (A)	Z-V	0.00	-	-
296.10	-84.09	24.96	-59.13	Z-V	64.65	25.52	39.13
444.15	-87.17	28.84	-58.33	Z-V	63.85	25.52	38.33
592.20	-87.88	31.26	-56.62	Z-V	62.14	25.52	36.62
148.05	-0.55	26.05	25.50 (A)	X-H	0.00	-	-
296.10	-77.23	24.96	-52.27	X-H	77.77	45.50	32.27
444.15	-78.64	28.84	-49.80	X-H	75.30	45.50	29.80
592.20	-84.98	31.26	-53.72	X-H	79.22	45.50	33.72
148.05	-18.26	26.05	7.79 (A)	Y-H	0.00	-	-
296.10	-76.36	24.96	-51.40	Y-H	59.19	27.79	31.40
444.15	-79.08	28.84	-50.24	Y-H	58.03	27.79	30.24
592.20	-86.16	31.26	-54.90	Y-H	62.69	27.79	34.90
148.05	-0.24	26.05	25.81 (A)	Z-H	0.00	-	-
296.10	-76.72	24.96	-51.76	Z-H	77.57	45.81	31.76
444.15	-78.35	28.84	-49.51	Z-H	75.32	45.81	29.51
592.20	-85.88	31.26	-54.62	Z-H	80.43	45.81	34.62

**Note**

1. A (dBm) = Output Power
2. Result (dB) = A - Reading + Factor
3. Limit (dB) = 50+10Log(P)
4. P (W) = (10<sup>(A/10)</sup>)/1000

## 8K10F1E, 8K10F1D

Frequency [MHz] : 148.05

Battery : KNB-L3      Antenna : KRA-25

Freq (MHz)	Reading [dBm]	Factor (dBm)	Reading + Factor [dBm]	Pol	Result (dB)	Limit (dB)	Margin (dB)
148.05	-24.09	26.05	1.96 (A)	X-V	0.00	-	-
296.10	-77.86	24.96	-52.90	X-V	54.86	21.96	32.90
444.15	-83.06	28.84	-54.22	X-V	56.18	21.96	34.22
592.20	-84.49	31.26	-53.23	X-V	55.19	21.96	33.23
148.05	-2.25	26.05	23.80 (A)	Y-V	0.00	-	-
296.10	-82.98	24.96	-58.02	Y-V	81.82	43.80	38.02
444.15	-86.53	28.84	-57.69	Y-V	81.49	43.80	37.69
592.20	-83.36	31.26	-52.10	Y-V	75.90	43.80	32.10
148.05	-23.95	26.05	2.10 (A)	Z-V	0.00		
296.10	-84.27	24.96	-59.31	Z-V	61.41	22.10	39.31
444.15	-85.35	28.84	-56.51	Z-V	58.61	22.10	36.51
592.20	-86.44	31.26	-55.18	Z-V	57.28	22.10	35.18
148.05	-1.74	26.05	24.31 (A)	X-H	0.00	-	-
296.10	-85.65	24.96	-60.69	X-H	85.00	44.31	40.69
444.15	-87.84	28.84	-59.00	X-H	83.31	44.31	39.00
592.20	-83.70	31.26	-52.44	X-H	76.75	44.31	32.44
148.05	-20.30	26.05	5.75 (A)	Y-H	0.00	-	-
296.10	-78.23	24.96	-53.27	Y-H	59.02	25.75	33.27
444.15	-83.33	28.84	-54.49	Y-H	60.24	25.75	34.49
592.20	-85.56	31.26	-54.30	Y-H	60.05	25.75	34.30
148.05	-1.88	26.05	24.17 (A)	Z-H	0.00	-	-
296.10	-77.60	24.96	-52.64	Z-H	76.81	44.17	32.64
444.15	-86.46	28.84	-57.62	Z-H	81.79	44.17	37.62
592.20	-84.85	31.26	-53.59	Z-H	77.76	44.17	33.59

**Note**

1. A (dBm) = Output Power
2. Result (dB) = A - Reading + Factor
3. Limit (dB) = 50+10Log(P)
4. P (W) = (10<sup>(A/10)</sup>)/1000

## 8K10F1E, 8K10F1D

Frequency [MHz] : 148.05

Battery : KNB-L3      Antenna : KRA-28

Freq (MHz)	Reading [dBm]	Factor (dBm)	Reading + Factor [dBm]	Pol	Result (dB)	Limit (dB)	Margin (dB)
148.05	-15.11	26.05	10.94 (A)	X-V	0.00	-	-
296.10	-77.87	24.96	-52.91	X-V	63.85	30.94	32.91
444.15	-73.30	28.84	-44.46	X-V	55.40	30.94	24.46
592.20	-84.21	31.26	-52.95	X-V	63.89	30.94	32.95
148.05	3.43	26.05	29.48 (A)	Y-V	0.00	-	-
296.10	-81.43	24.96	-56.47	Y-V	85.95	49.48	36.47
444.15	-79.72	28.84	-50.88	Y-V	80.36	49.48	30.88
592.20	-82.44	31.26	-51.18	Y-V	80.66	49.48	31.18
148.05	-16.84	26.05	9.21 (A)	Z-V	0.00	-	-
296.10	-86.16	24.96	-61.20	Z-V	70.41	29.21	41.20
444.15	-84.55	28.84	-55.71	Z-V	64.92	29.21	35.71
592.20	-85.74	31.26	-54.48	Z-V	63.69	29.21	34.48
148.05	3.71	26.05	29.76 (A)	X-H	0.00	-	-
296.10	-81.66	24.96	-56.70	X-H	86.46	49.76	36.70
444.15	-73.45	28.84	-44.61	X-H	74.37	49.76	24.61
592.20	-84.59	31.26	-53.33	X-H	83.09	49.76	33.33
148.05	-14.14	26.05	11.91 (A)	Y-H	0.00	-	-
296.10	-79.11	24.96	-54.15	Y-H	66.06	31.91	34.15
444.15	-78.31	28.84	-49.47	Y-H	61.38	31.91	29.47
592.20	-85.67	31.26	-54.41	Y-H	66.32	31.91	34.41
148.05	4.08	26.05	30.13 (A)	Z-H	0.00	-	-
296.10	-77.08	24.96	-52.12	Z-H	82.25	50.13	32.12
444.15	-77.04	28.84	-48.20	Z-H	78.33	50.13	28.20
592.20	-81.75	31.26	-50.49	Z-H	80.62	50.13	30.49

**Note**

1. A (dBm) = Output Power
2. Result (dB) = A - Reading + Factor
3. Limit (dB) = 50+10Log(P)
4. P (W) = (10<sup>(A/10)</sup>)/1000

### 7.10 Unwanted Emissions : Receiver Radiated Spurious Emission

**IC Rule(s)** RSS-GEN  
**Test Requirements:** Blow the table  
**Operating conditions:** Under normal test conditions  
**Method of testing:** Radiated

**S/A. Settings:** F < 1 GHz: RBW: 120 kHz, VBW: 300 kHz (Quasi Peak)  
 F > 1 GHz: RBW: 1 MHz, VBW: 1 MHz (Peak)  
**Mode of operation:** Receive

Frequency (MHz)	Field Strength (microvolts/m at 3 meters)
30 – 88	100
88 - 216	150
216 – 960	200
Above 960	500

**Operation Mode: Receive:**

30 MHz ~ 1 GHz

Frequency	Reading	Ant. factor	Cable loss	Ant. POL	Total	Limit	Margin
MHz	dB $\mu$ V	dB /m	dB	(H/V)	dB $\mu$ V/m	dB $\mu$ V/m	dB
No Critical peaks found							

Above 1 GHz

Frequency	Reading	Ant. factor	Cable loss	Ant. POL	Total	Limit	Margin
MHz	dB $\mu$ V	dB /m	dB	(H/V)	dB $\mu$ V/m	dB $\mu$ V/m	dB
No Critical peaks found							

## 7.11 Necessary Bandwidth Calculations

Modulation : 16K0F3E (Authorized Bandwidth 20 kHz)	
Maximum Modulation (M), kHz	3
Maximum Deviation (D), kHz	5
Constant Factor (K)	1
Necessary Bandwidth (BN), kHz	$(2 \times M) + (2 \times D \times K) = 16.0$

Modulation : 11K0F3E (Authorized Bandwidth 11.25 kHz)	
Maximum Modulation (M), kHz	3
Maximum Deviation (D), kHz	2.5
Constant Factor (K)	1
Necessary Bandwidth (BN), kHz	$(2 \times M) + (2 \times D \times K) = 11.0$

Modulation : 8K30F1E, 8K30F1D, 8K30F7W (4Level FSK / 9600bps, Authorized Bandwidth 11.25 kHz)	
Digital information rate (R), bps	9600
Maximum Deviation (D), kHz	3.391
Signaling States (S)	4
Numerical factor (K)	0.516
Necessary Bandwidth (BN), kHz	$(R / \log_2 S) + 2DK = 8.3$

Modulation : 4K00F1E, 4K00F1D, 4K00F7W (4Level FSK / 4800bps, Authorized Bandwidth 6 kHz)	
Digital information rate (R), bps	4800
Maximum Deviation (D), kHz	1.55
Signaling States (S)	4
Numerical factor (K)	0.516
Necessary Bandwidth (BN), kHz	$(R / \log_2 S) + 2DK = 4.0$

Modulation : 4K00F2D (CWID, Authorized Bandwidth 6 kHz)	
Maximum Modulation (M), kHz	0.8
Maximum Deviation (D), kHz	1.2
Numerical factor (K)	1
Necessary Bandwidth (BN), kHz	$(2 \times M) + (2 \times D \times K) = 4.0$



## 8. LIST OF TEST EQUIPMENT

Manufacturer	Model / Equipment	Calibration Date	Calibration Interval	Calibration Due	Serial No.
Agilent	N9020A/ SIGNAL ANALYZER	07/01/2014	Annual	07/01/2015	MY51110085
Agilent	N1911A/Power Meter	01/24/2014	Annual	01/24/2015	MY45100523
Agilent	N1921A /POWER SENSOR	07/09/2014	Annual	07/09/2015	MY45241059
Hewlett Packard	8903B/Audio Analyzer	12/21/2013	Annual	12/21/2014	3413A13913
Hewlett Packard	8901B/Modulation Analyzer	04/10/2014	Annual	04/10/2015	2406A00169
Tektronix	RSA3303B/Real Time Spectrum Analyzer	05/20/2014	Annual	05/20/2015	B010208
Agilent	8498A/30 dB Attenuator	11/05/2013	Annual	11/05/2014	51162
HP	8493C/10 dB Attenuator	06/10/2014	Annual	06/10/2015	08285
EAGLE	220NFNM/Tuneable Notch Filter	10/29/2014	Annual	10/29/2015	H00564-8
Korea Engineering	KR-1005L / Temperature Chamber	10/30/2013	Annual	10/30/2014	KRAB05063-3CH
MITEQ	AMF-6D-001180-35-20P/AMP	09/04/2014	Annual	09/04/2015	1081666
Wainwright	WHK1.2/15G-10EF/H.P.F	06/17/2014	Annual	06/17/2015	4
Schwarzbeck	UHAP/ Dipole Antenna	03/05/2013	Biennial	03/05/2015	557
Schwarzbeck	UHAP/ Dipole Antenna	05/03/2013	Biennial	05/03/2015	558
Schwarzbeck	VULB9160/ BI-LOG Antenna	12/07/2012	Biennial	12/07/2014	3150
Schwarzbeck	BBHA 9120D/ Horn Antenna	12/03/2013	Biennial	12/03/2015	1191
REOHDE&SCHWARZ	FSV40/Spectrum Analyzer	06/09/2014	Annual	06/09/2015	1307.9002K40-100931-NK
Inn-co GmbH	CT 0800/Turn table	N/A	N/A	N/A	AS2000P/034/9740305
Inn-co GmbH	DE 3260/Ant. Mast	N/A	N/A	N/A	DE3260/005/7860504/L
Schwarzbeck	VULB 9160/ TRILOG Antenna	12/17/2012	Biennial	12/17/2014	3150