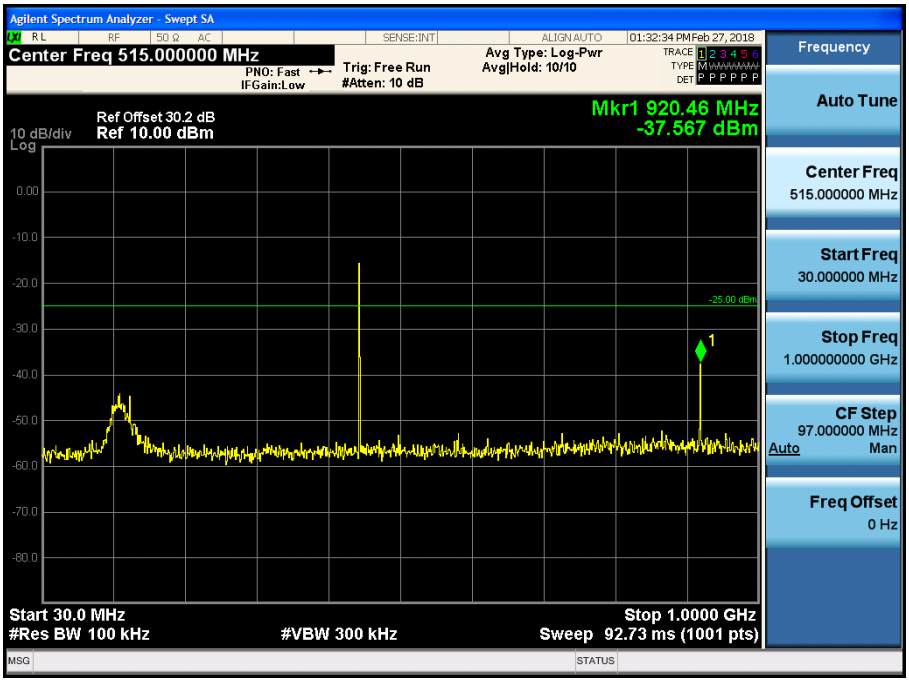
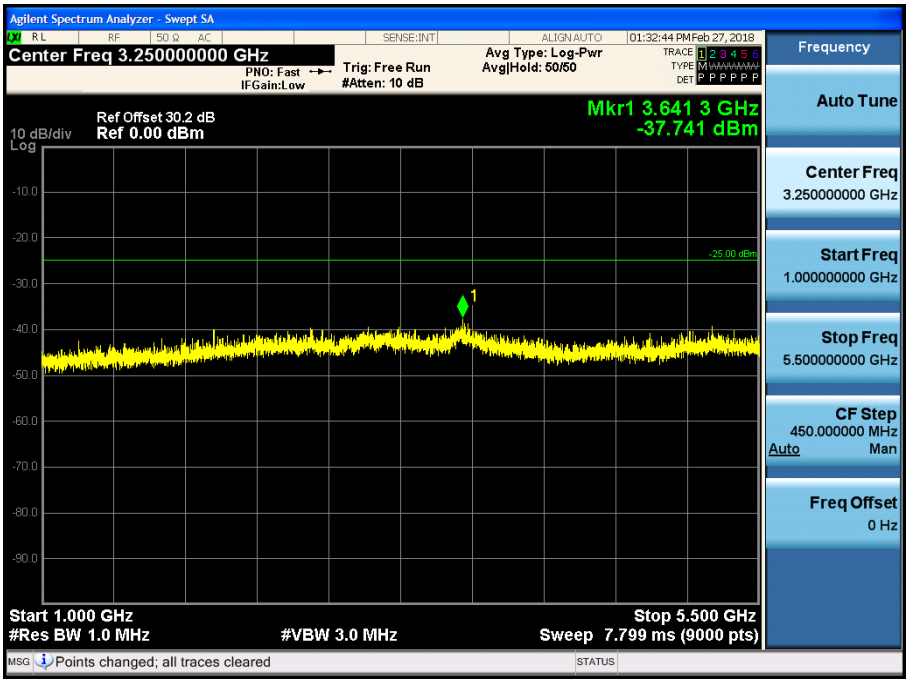
30 MHz~1 GHz

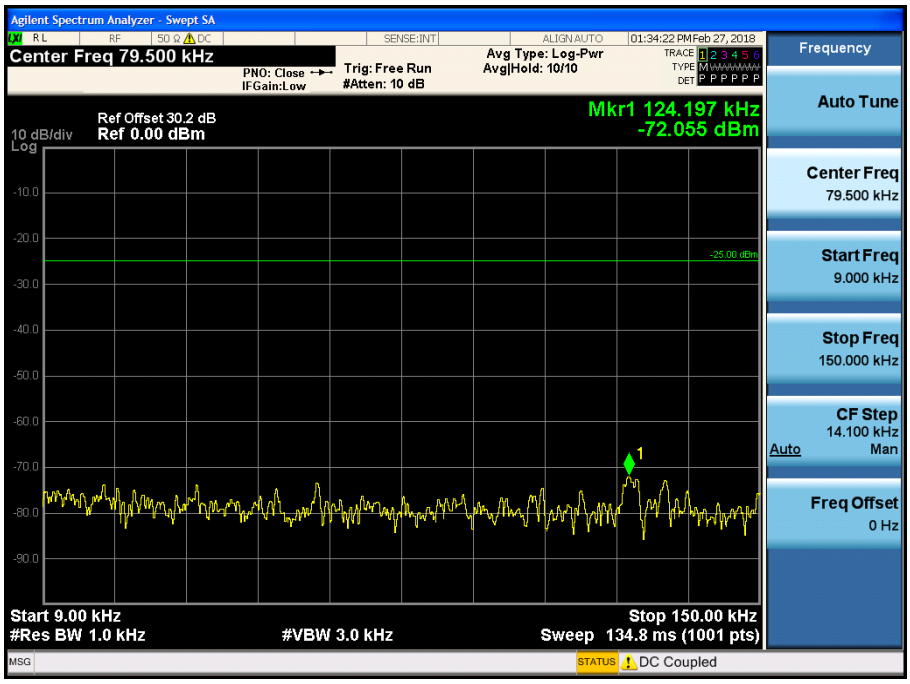


1 GHz~5.5 GHz

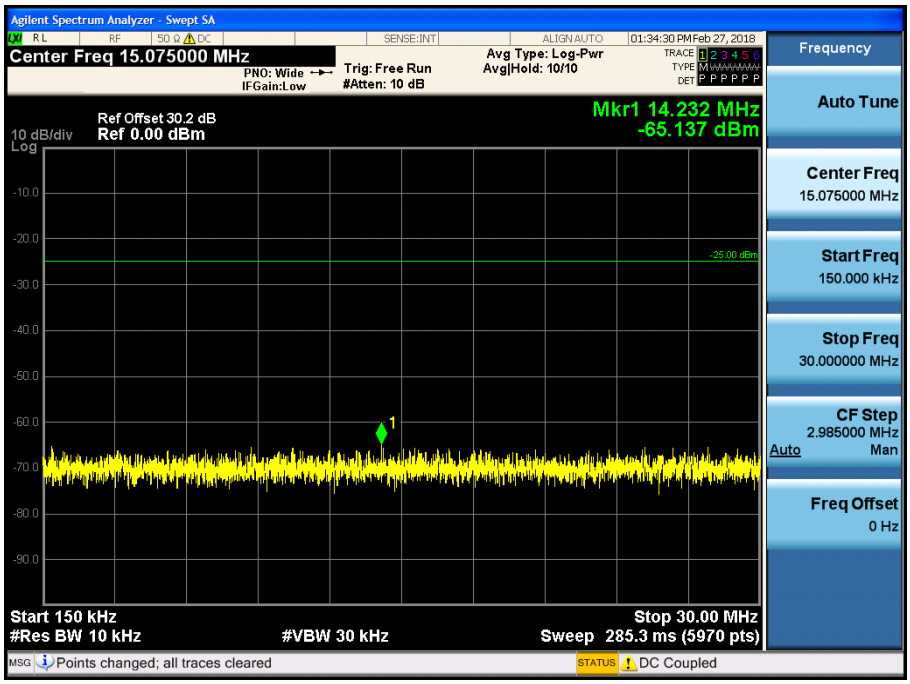


4K00F1E, 4K00F1D, 4K00F7W _ 469.95 MHz_High

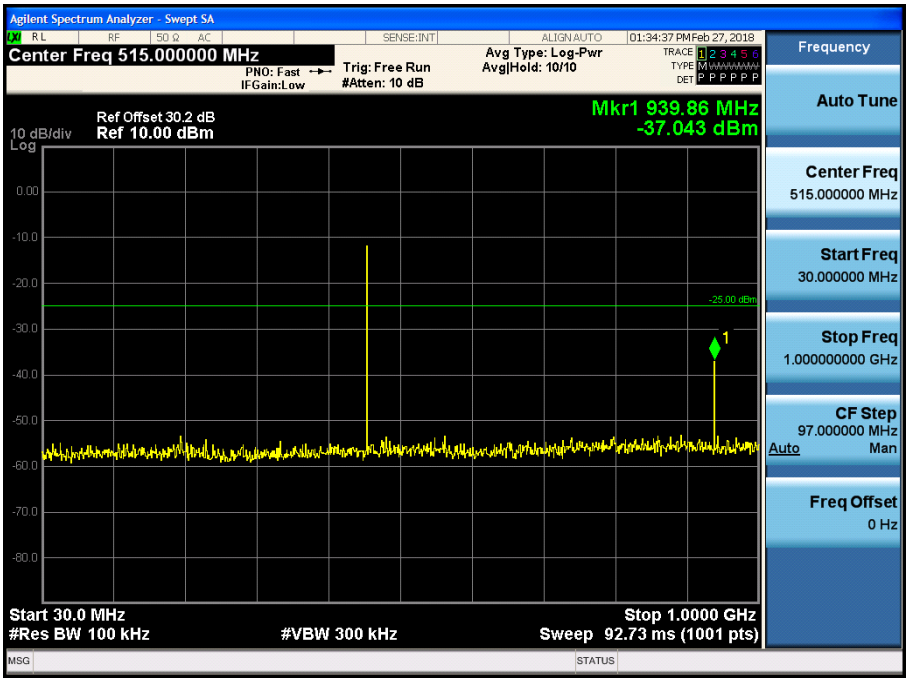
9 kHz~150 kHz



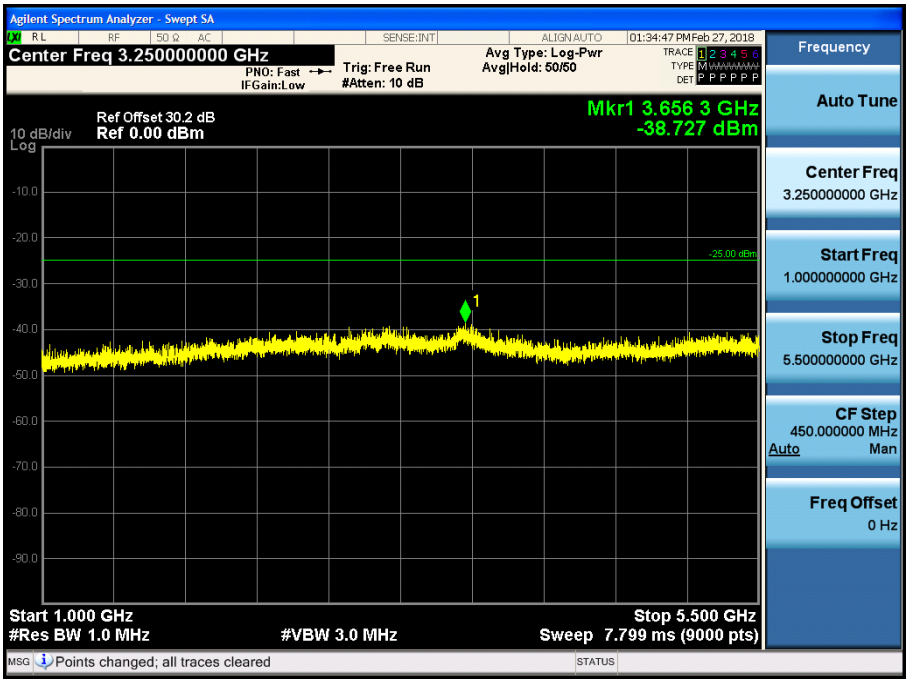
150 kHz~30 MHz



30 MHz~1 GHz

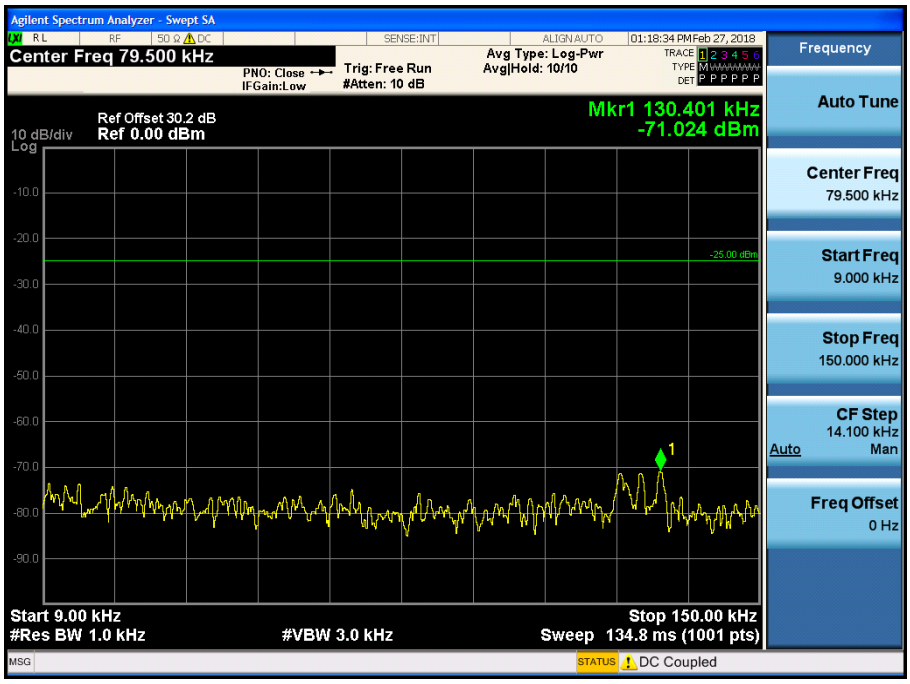


1 GHz~5.5 GHz

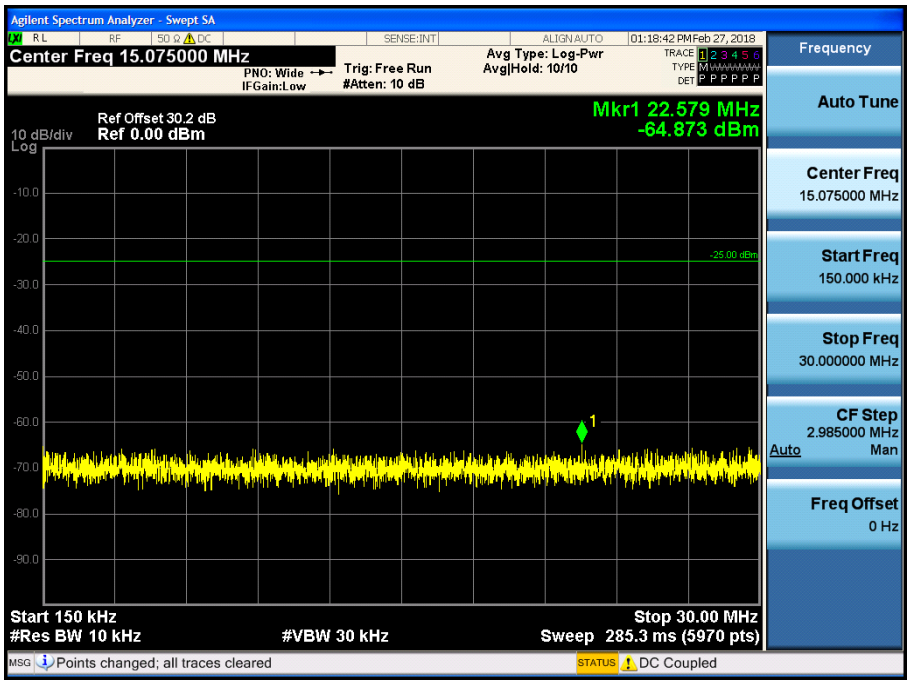


4K00F1E, 4K00F1D, 4K00F7W _ 450.05 MHz_Low

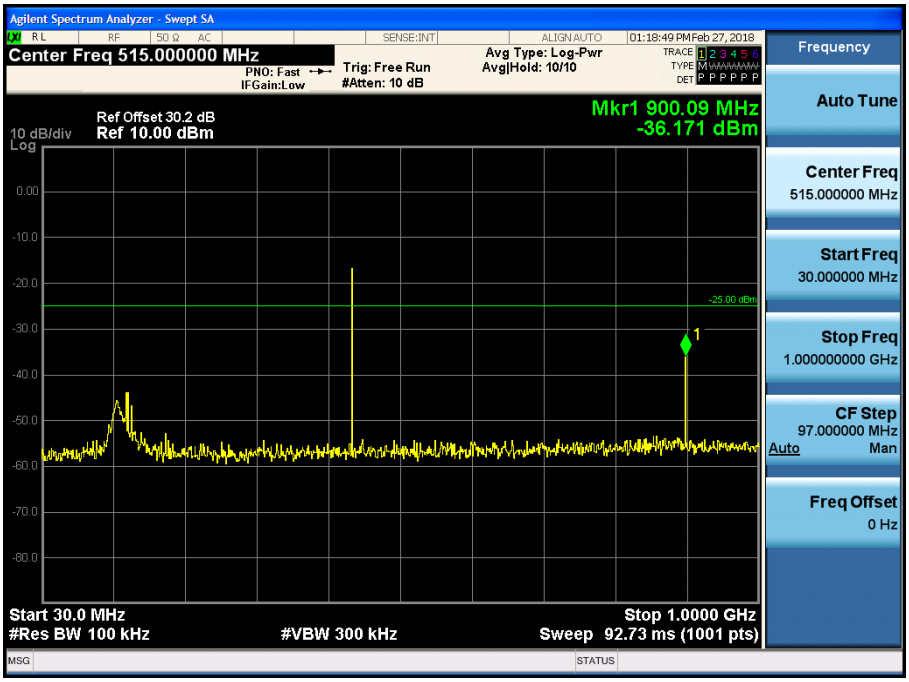
9 kHz~150 kHz



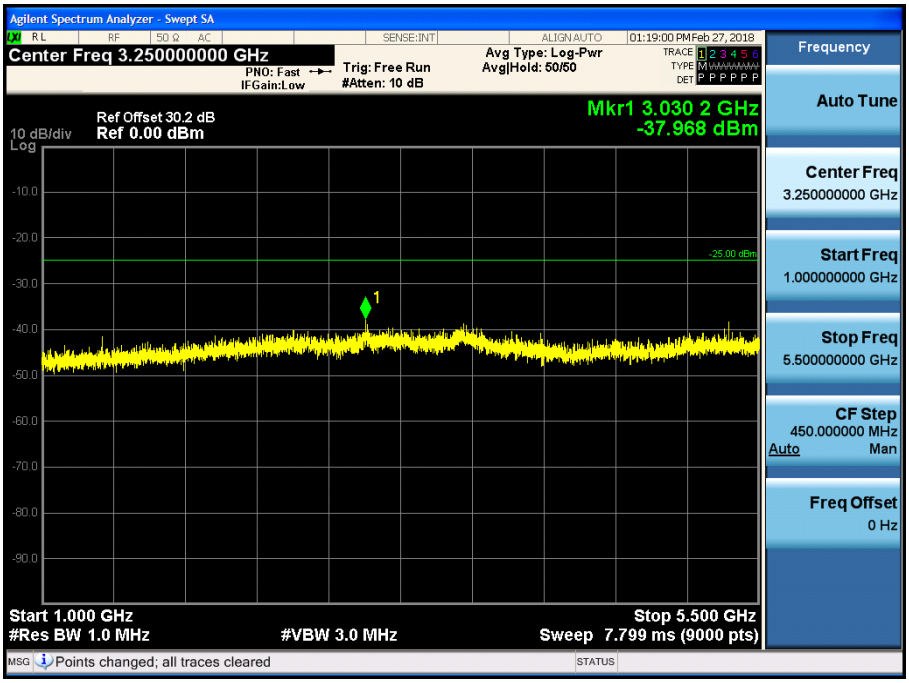
150 kHz~30 MHz



30 MHz~1 GHz

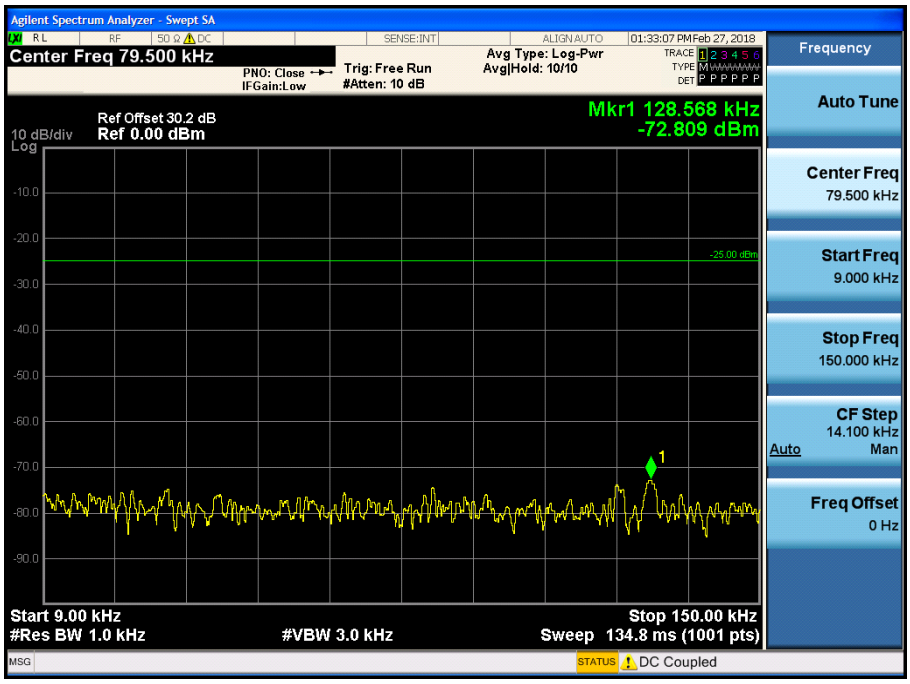


1 GHz~5.5 GHz

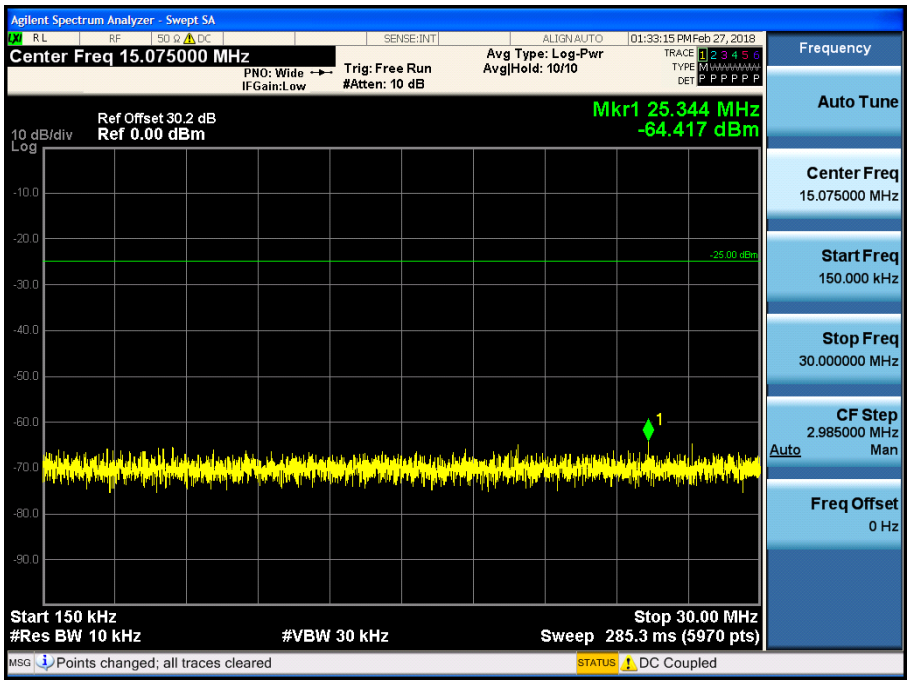


4K00F1E, 4K00F1D, 4K00F7W _ 460.05 MHz_Low

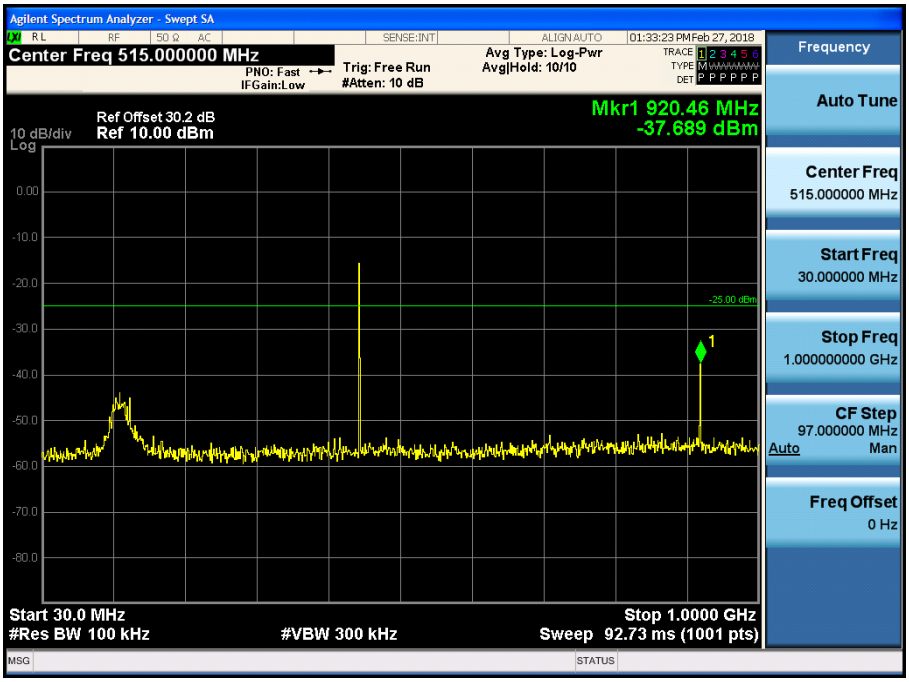
9 kHz~150 kHz



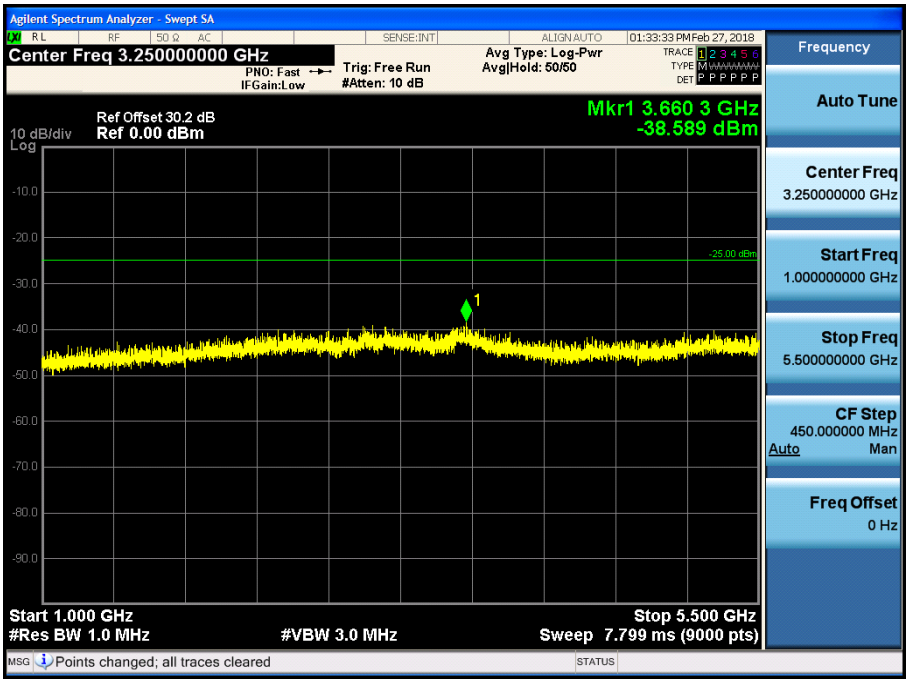
150 kHz~30 MHz



30 MHz~1 GHz

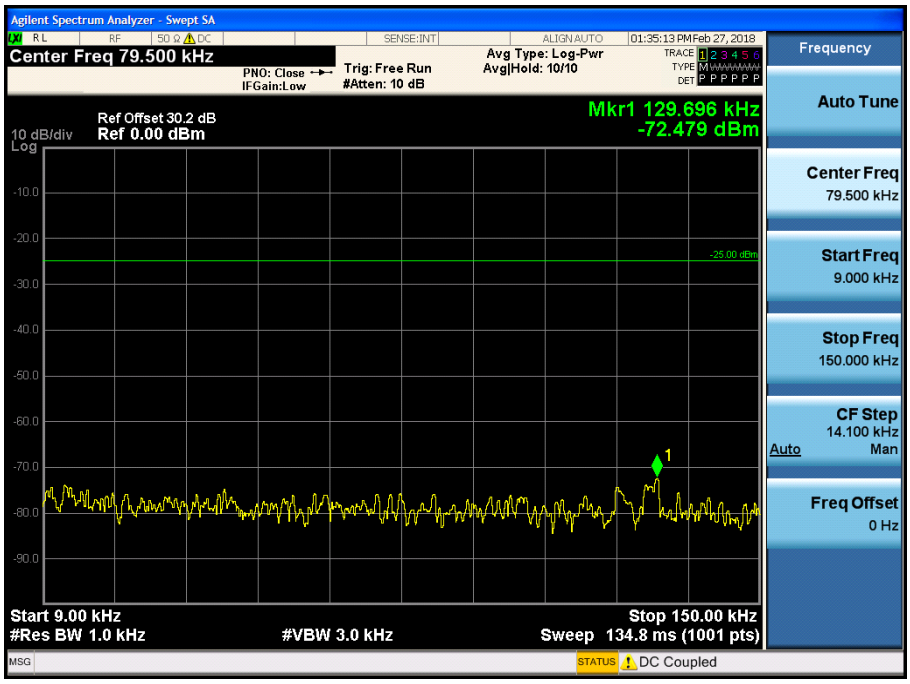


1 GHz~5.5 GHz

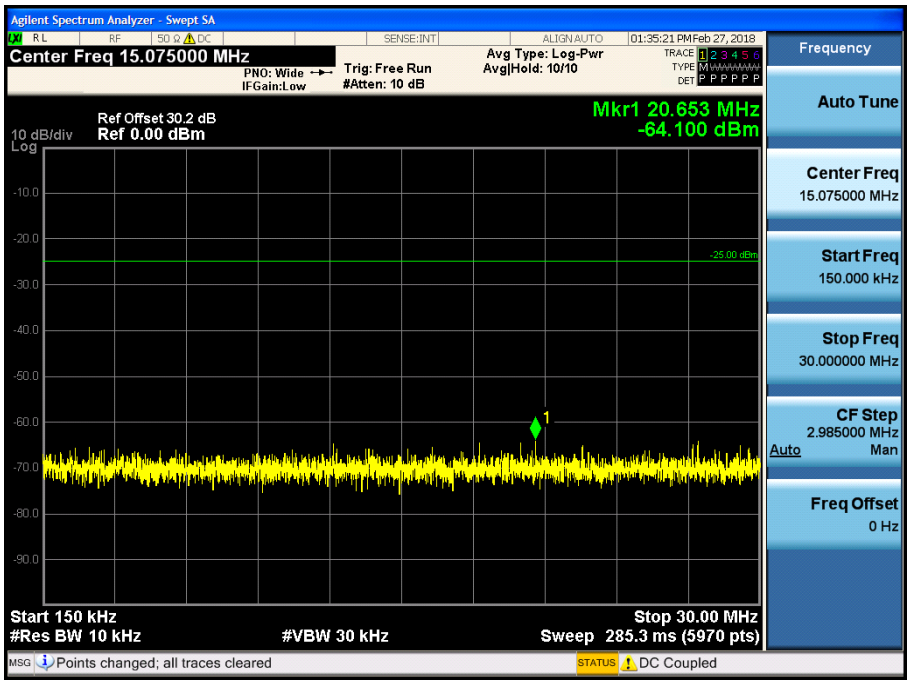


4K00F1E, 4K00F1D, 4K00F7W _ 469.95 MHz_Low

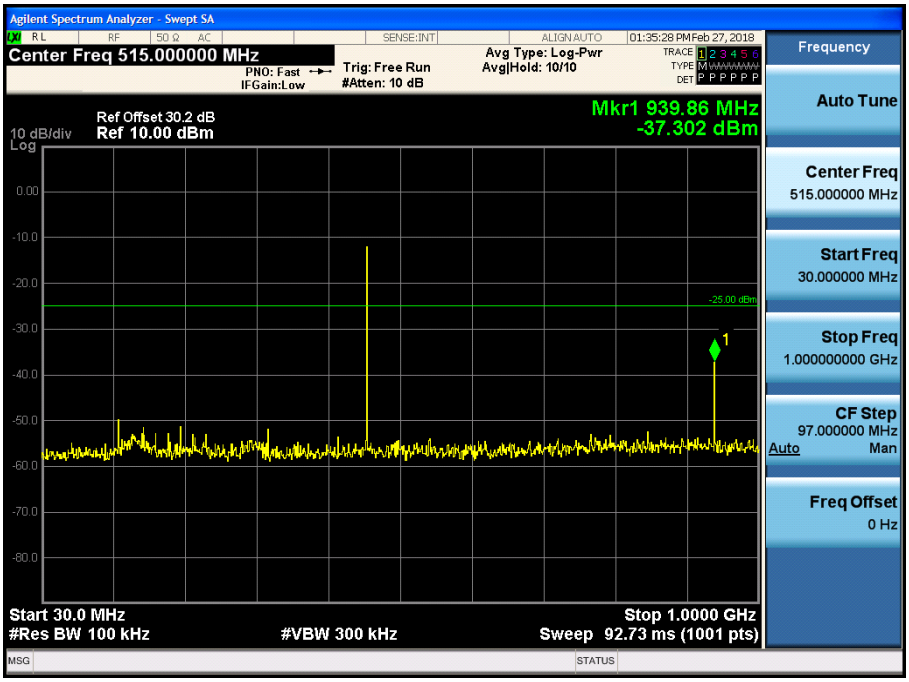
9 kHz~150 kHz



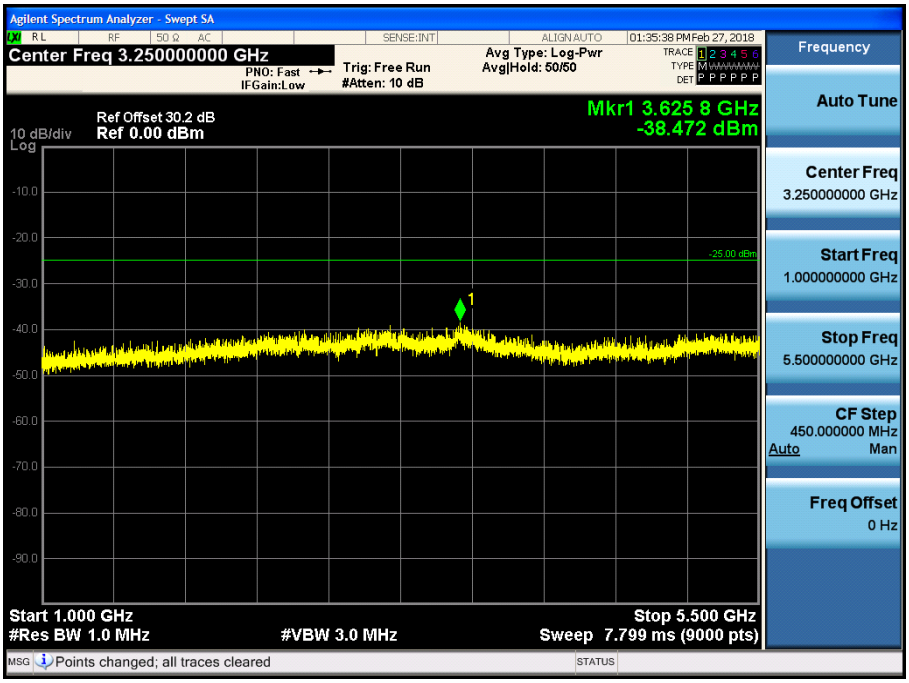
150 kHz~30 MHz



30 MHz~1 GHz

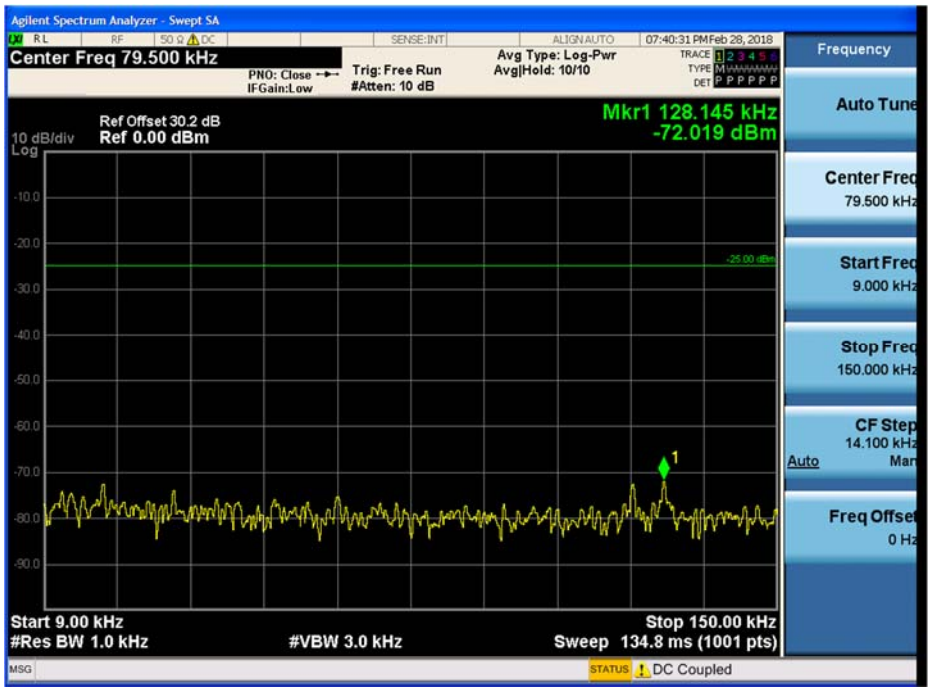


1 GHz~5.5 GHz

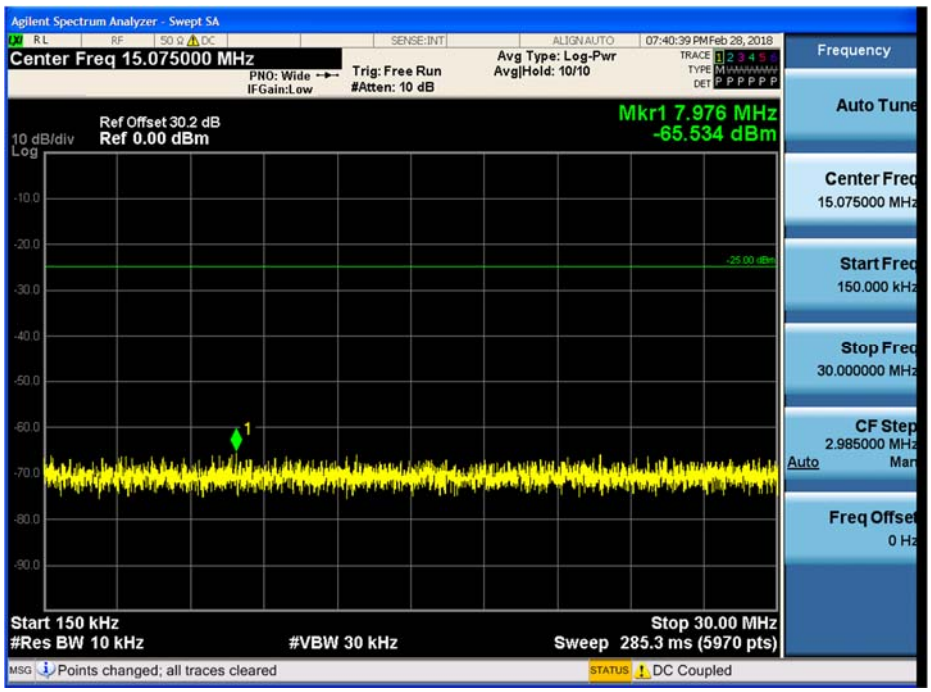


4K00F2D _ 450.05 MHz_High

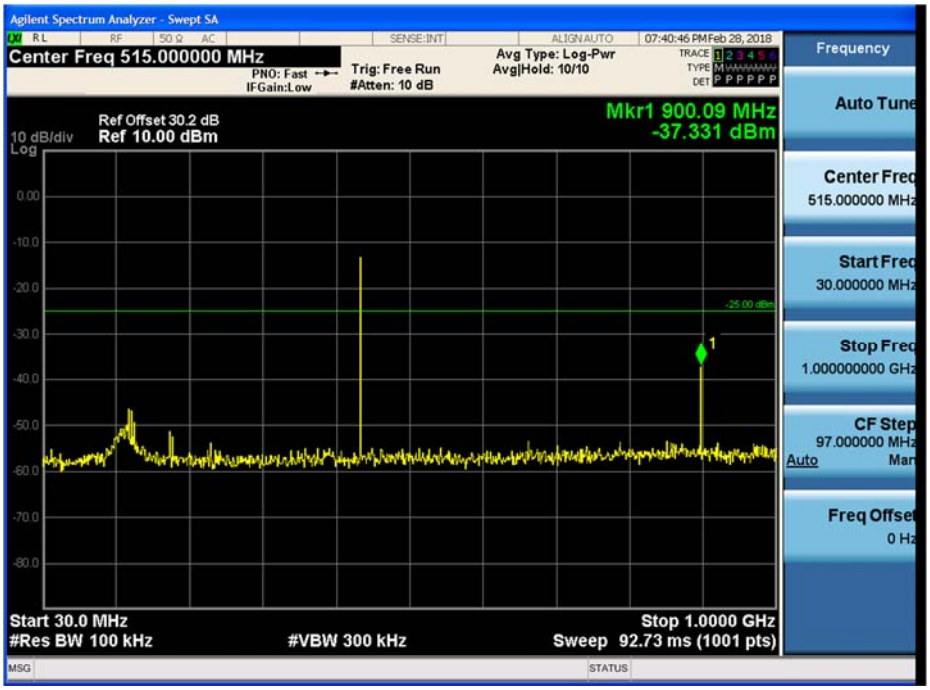
9 kHz~150 kHz



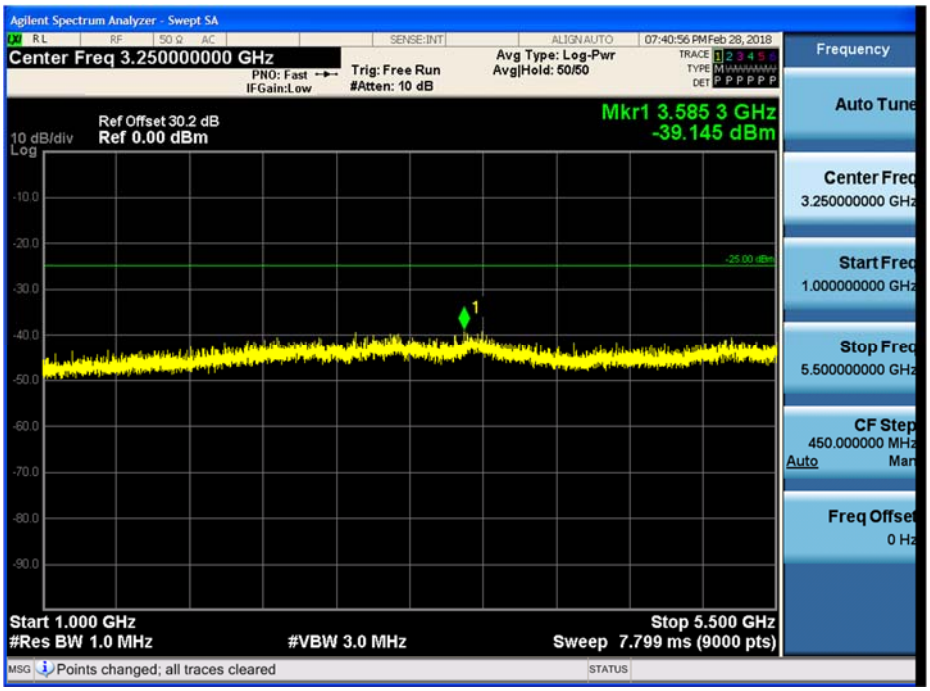
150 kHz~30 MHz



30 MHz~1 GHz

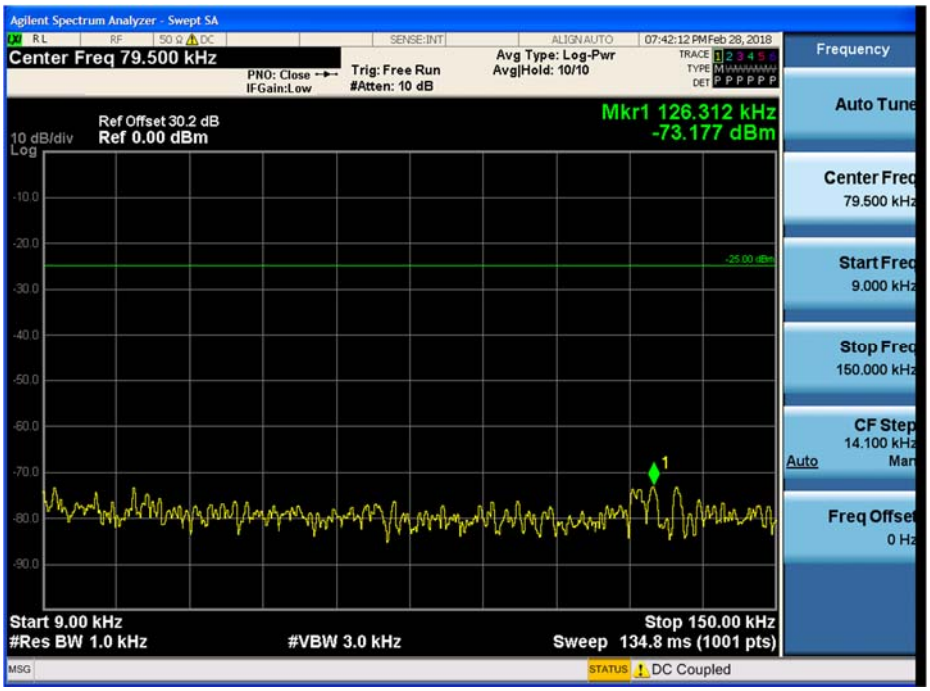


1 GHz~5.5 GHz

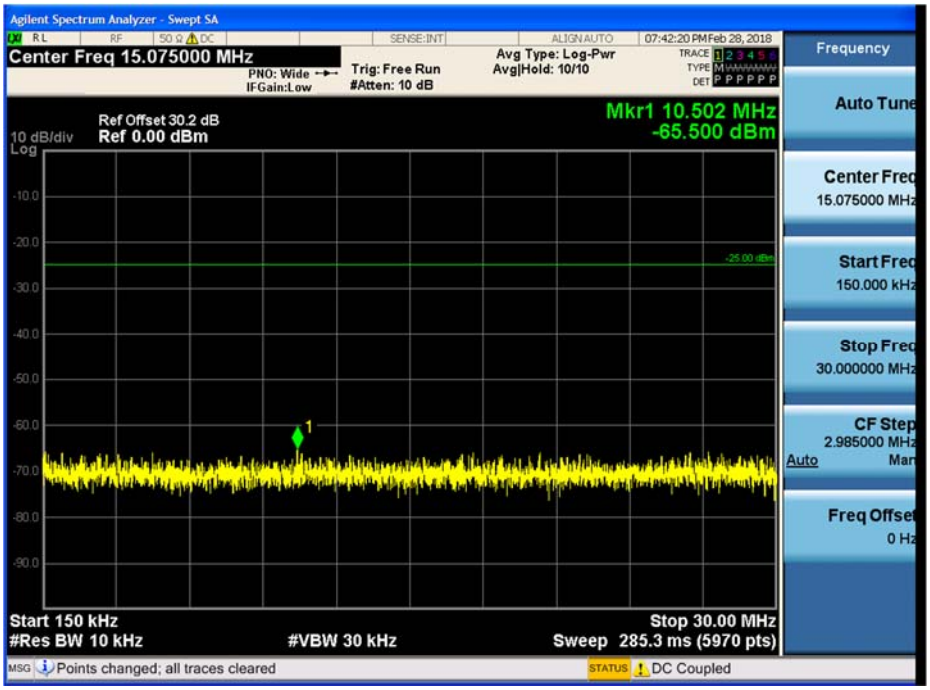


4K00F2D _ 460.05 MHz_High

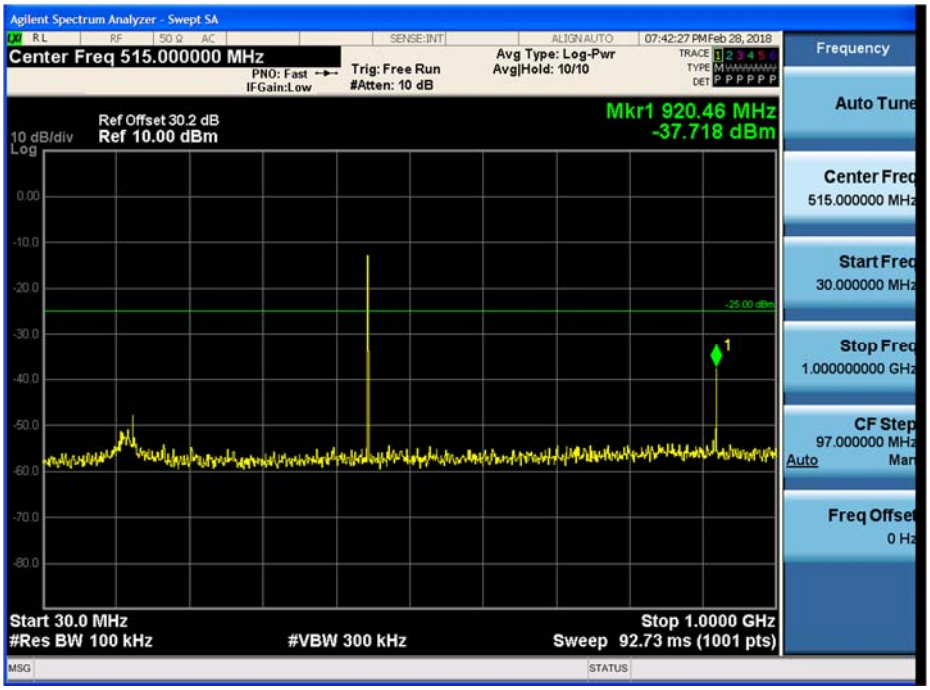
9 kHz~150 kHz



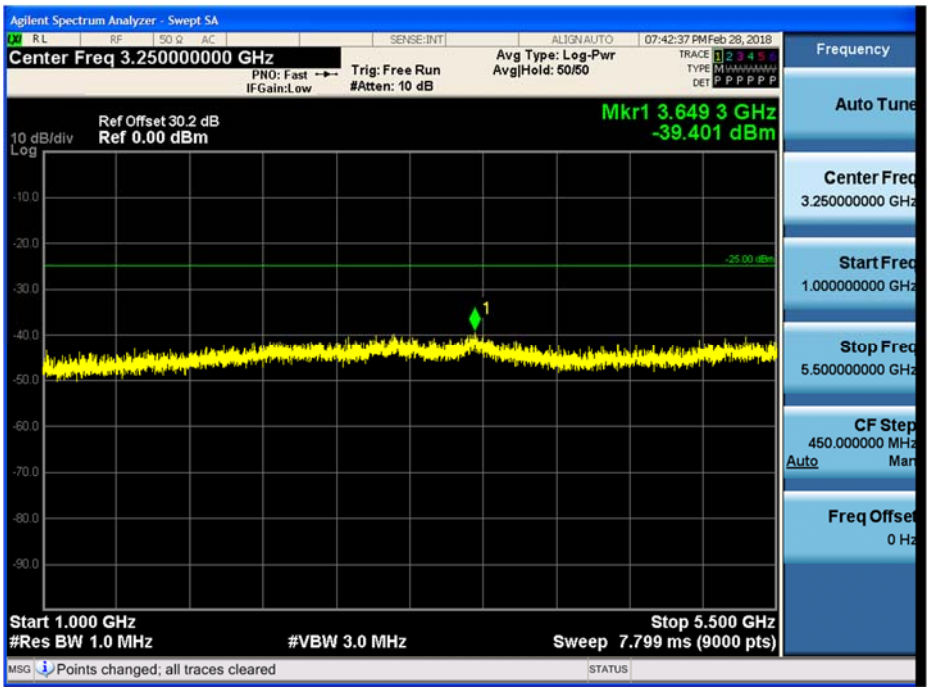
150 kHz~30 MHz



30 MHz~1 GHz

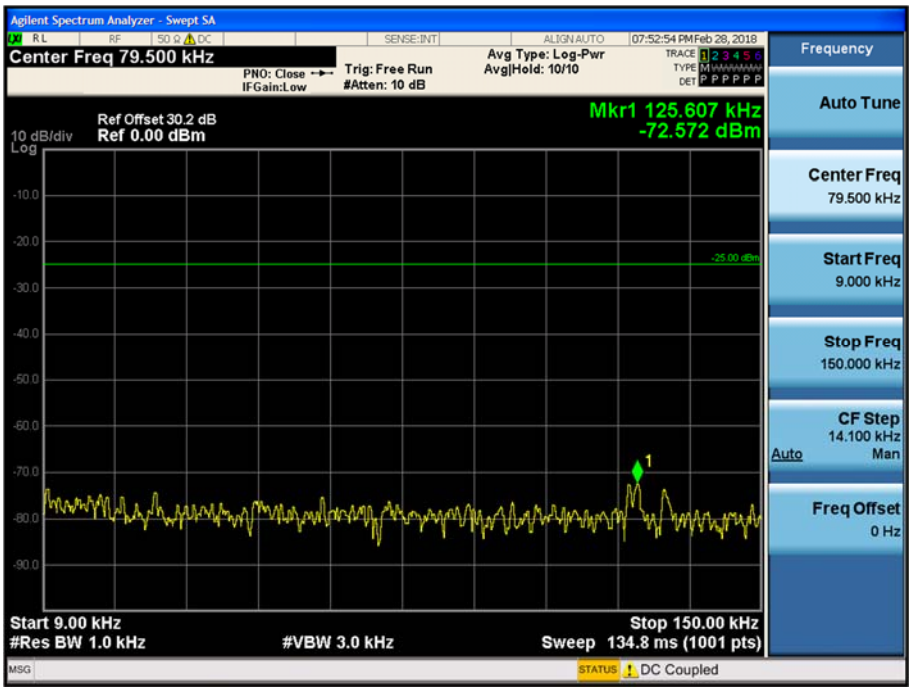


1 GHz~5.5 GHz

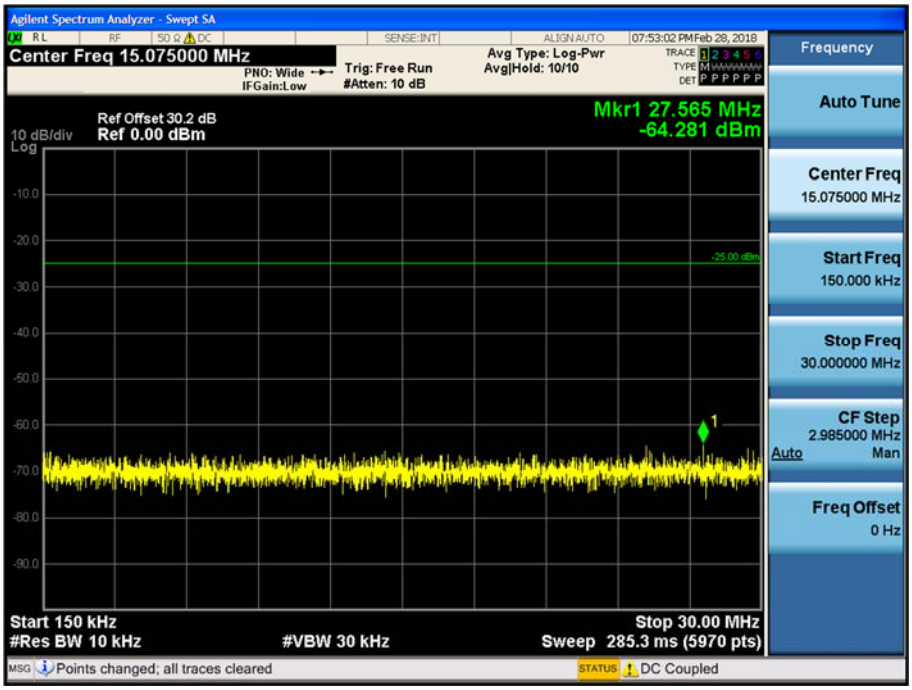


4K00F2D _ 469.95 MHz_High

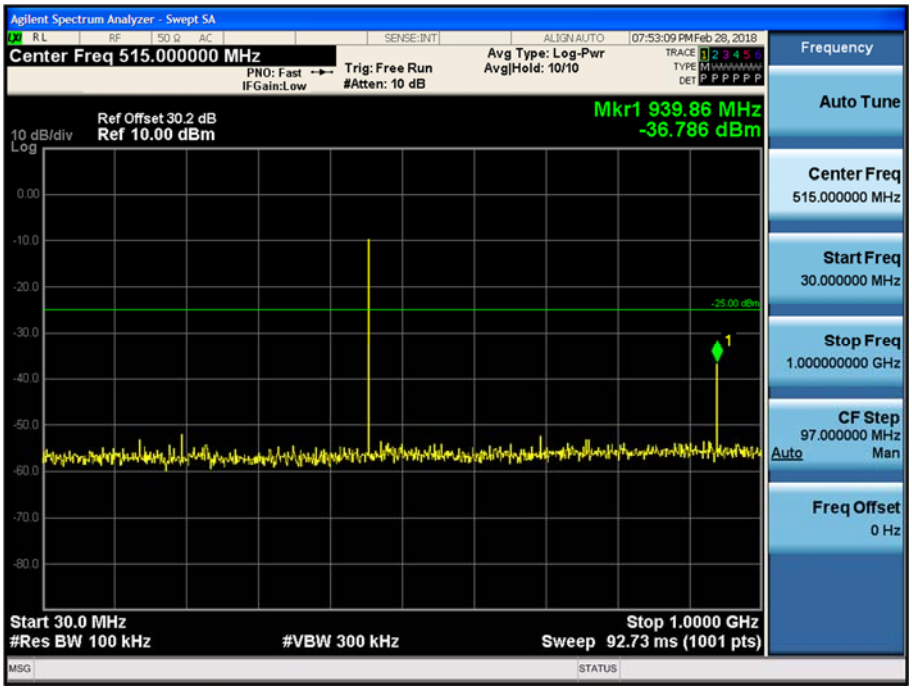
9 kHz~150 kHz



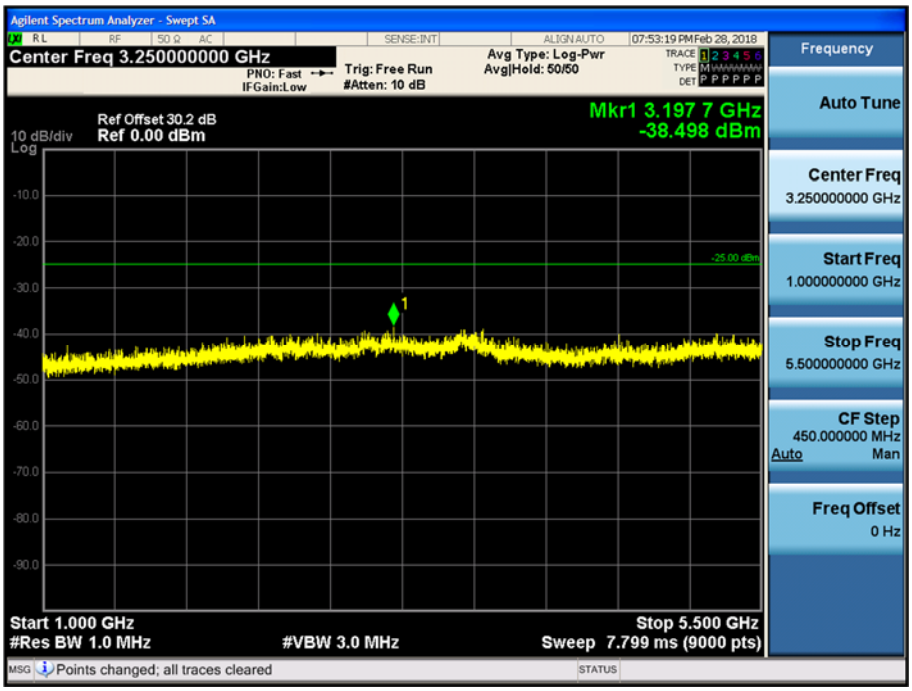
150 kHz~30 MHz



30 MHz~1 GHz

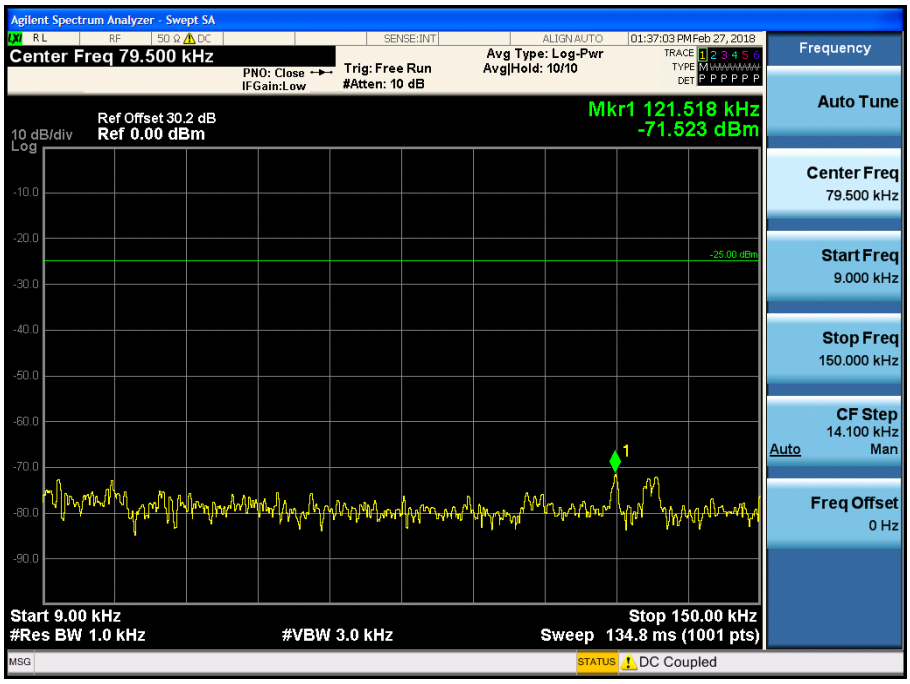


1 GHz~5.5 GHz

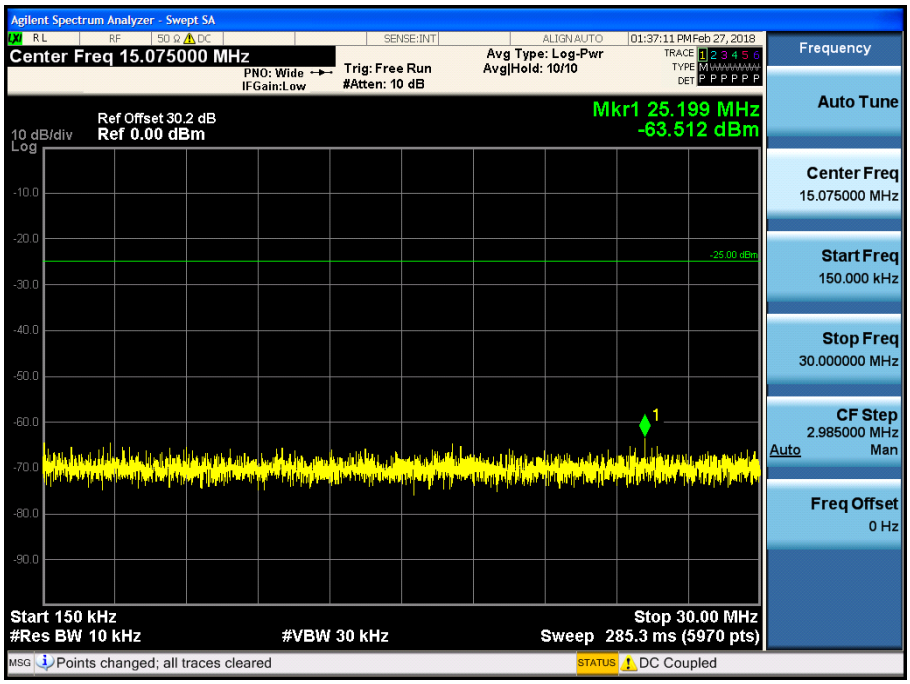


4K00F2D _ 450.05 MHz_Low

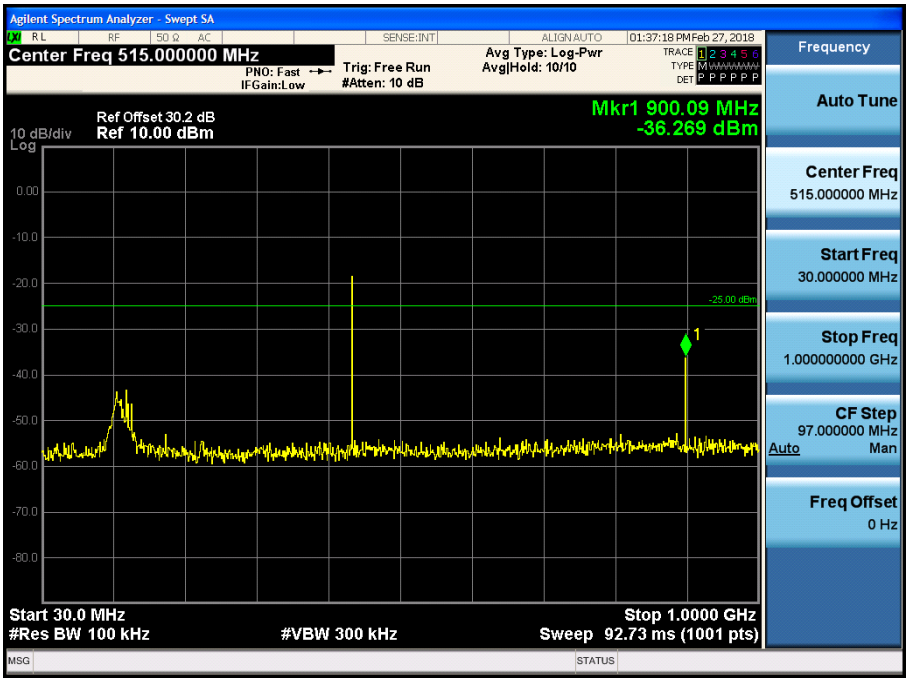
9 kHz~150 kHz



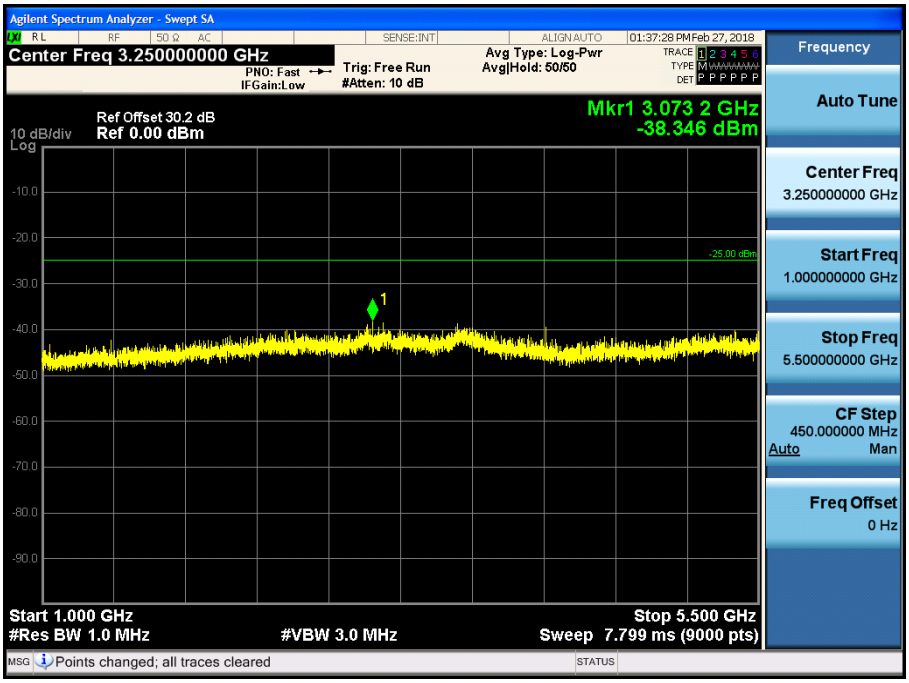
150 kHz~30 MHz



30 MHz~1 GHz

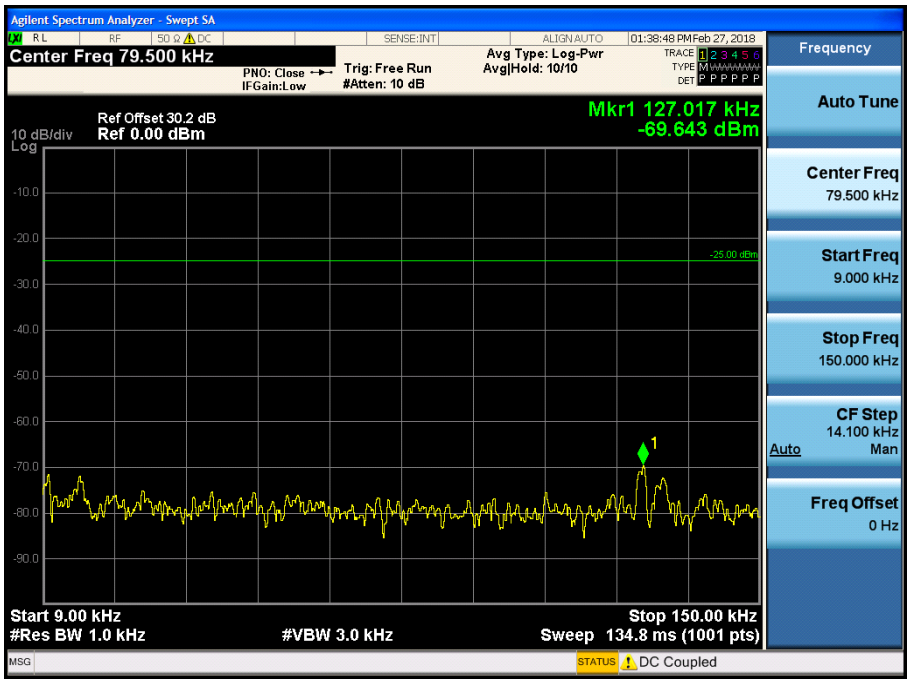


1 GHz~5.5 GHz

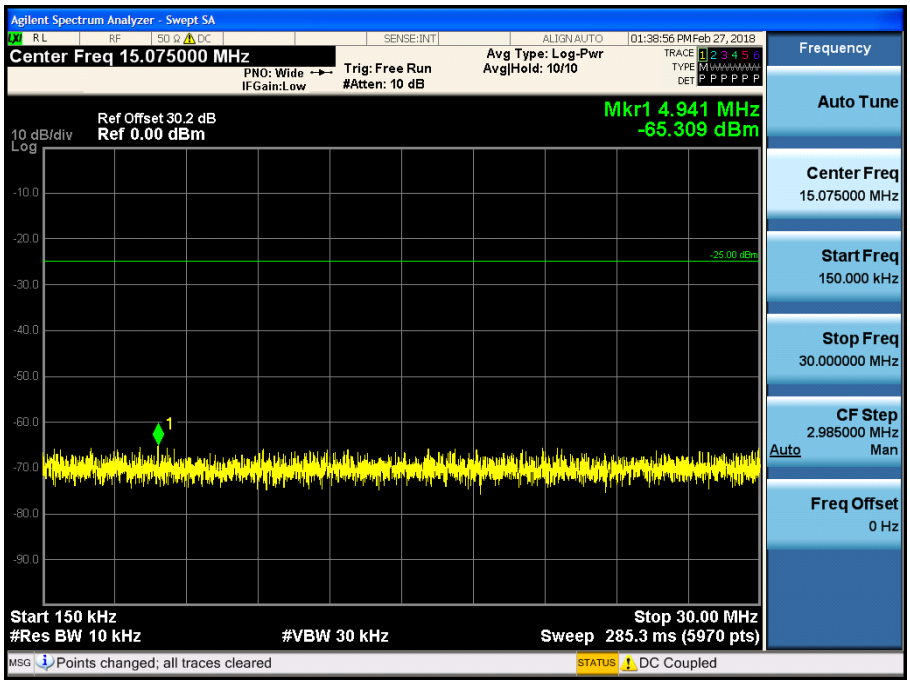


4K00F2D _ 460.05 MHz_Low

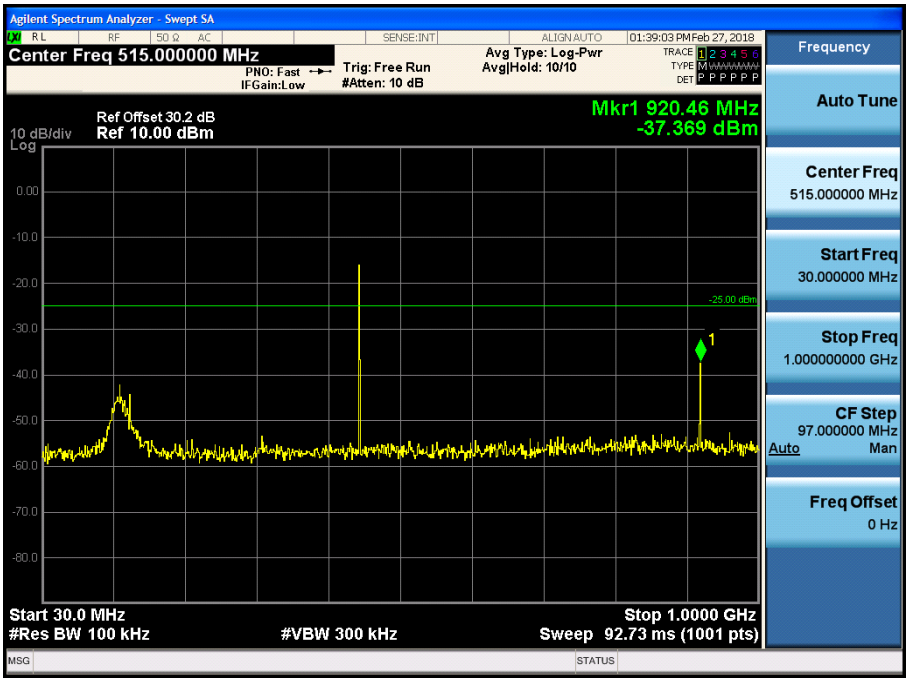
9 kHz~150 kHz



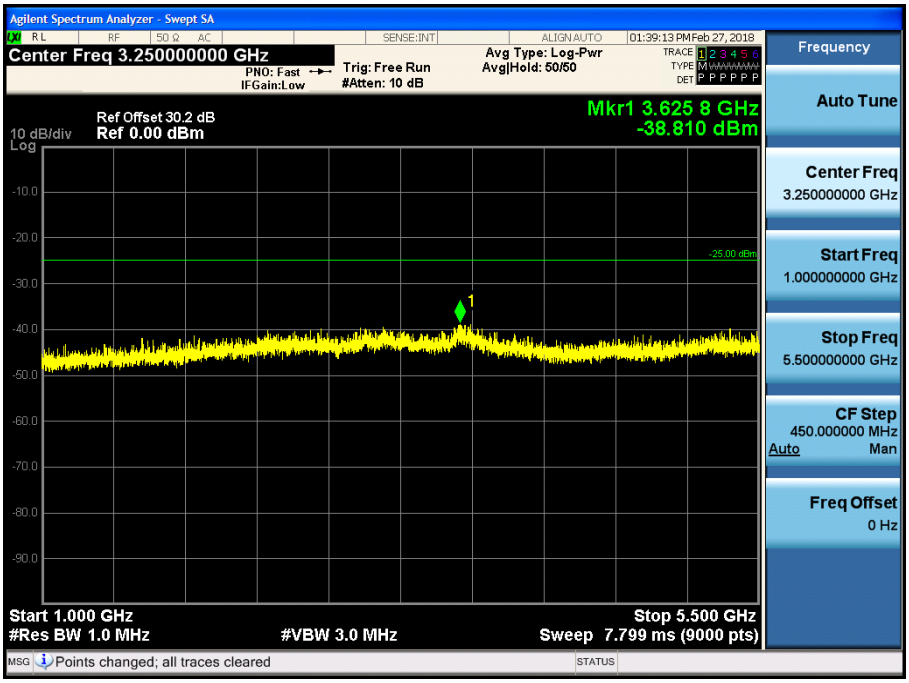
150 kHz~30 MHz



30 MHz~1 GHz

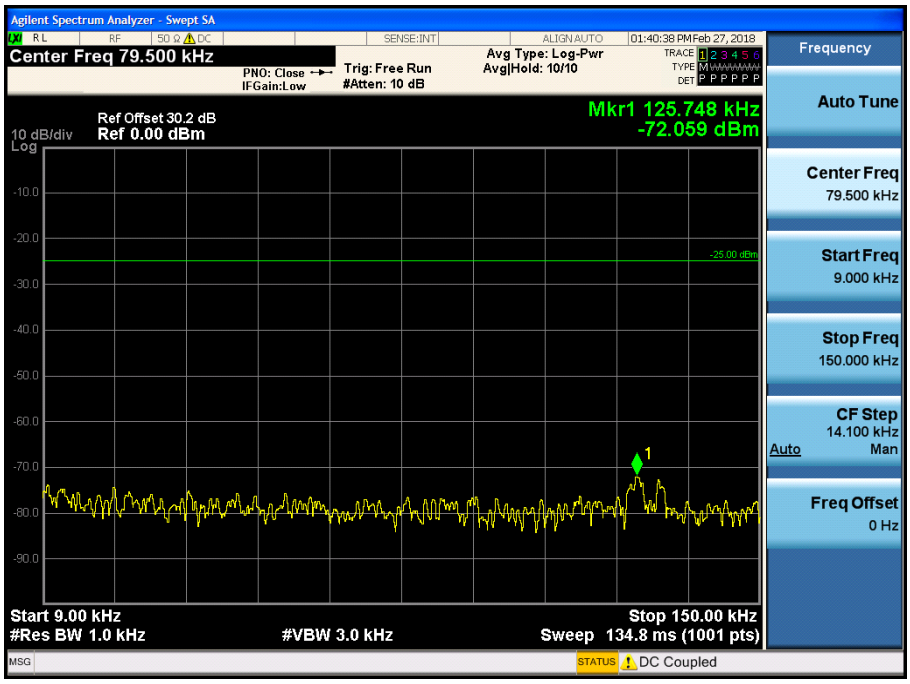


1 GHz~5.5 GHz

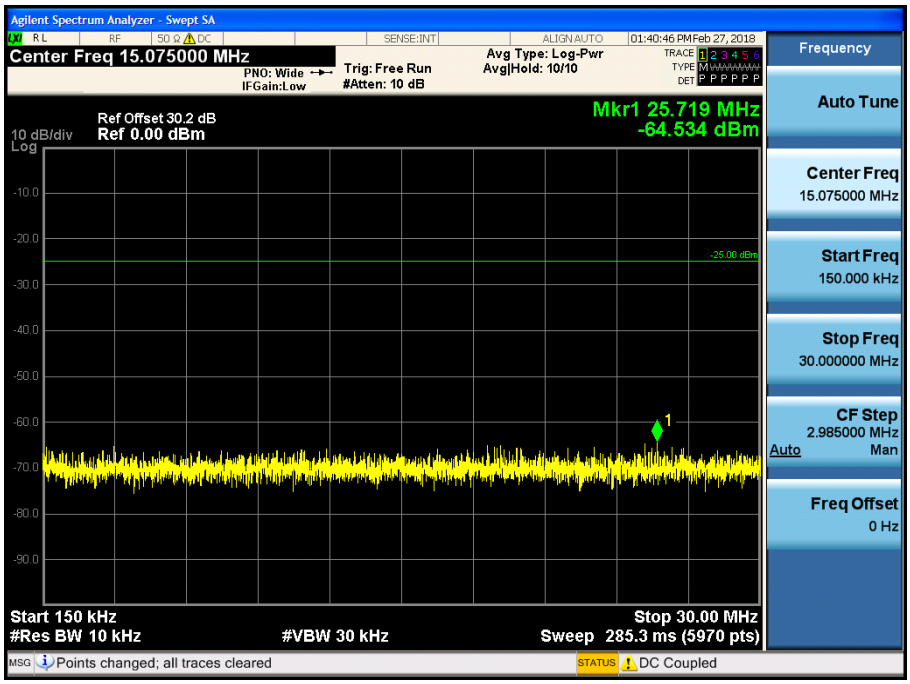


4K00F2D _ 469.95 MHz_Low

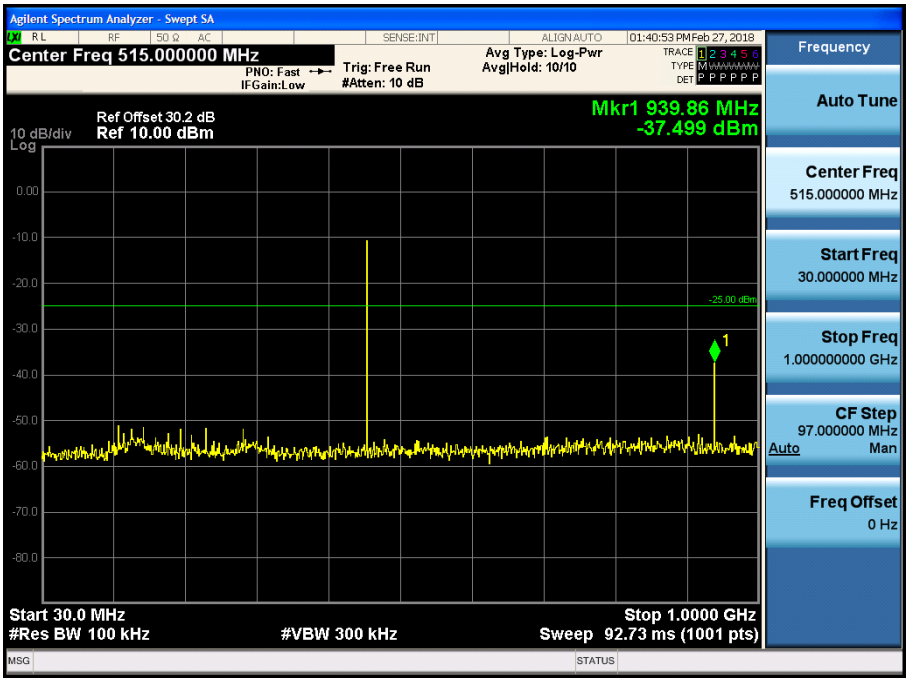
9 kHz~150 kHz



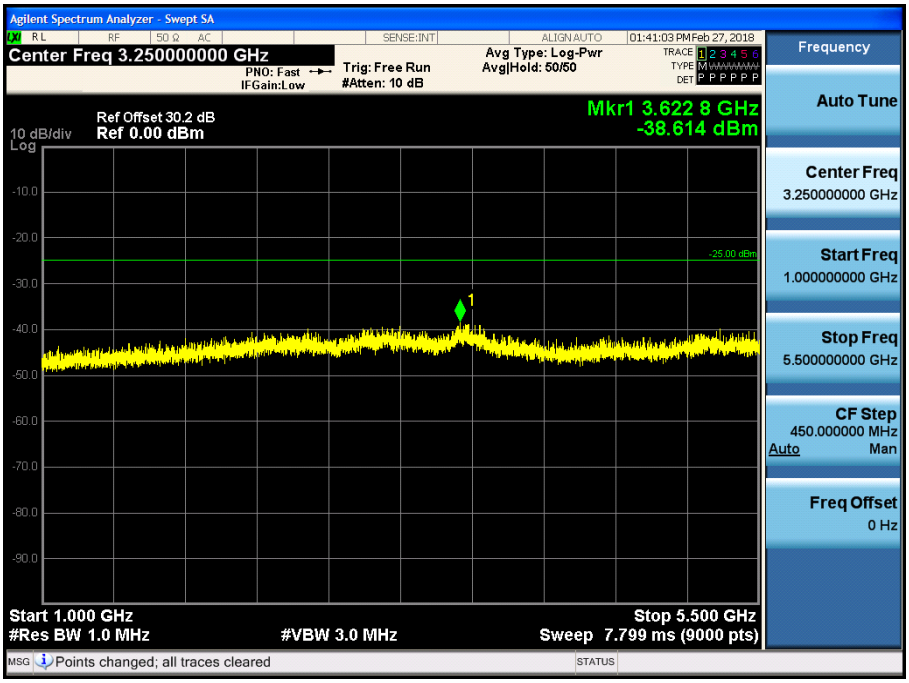
150 kHz~30 MHz



30 MHz~1 GHz



1 GHz~5.5 GHz



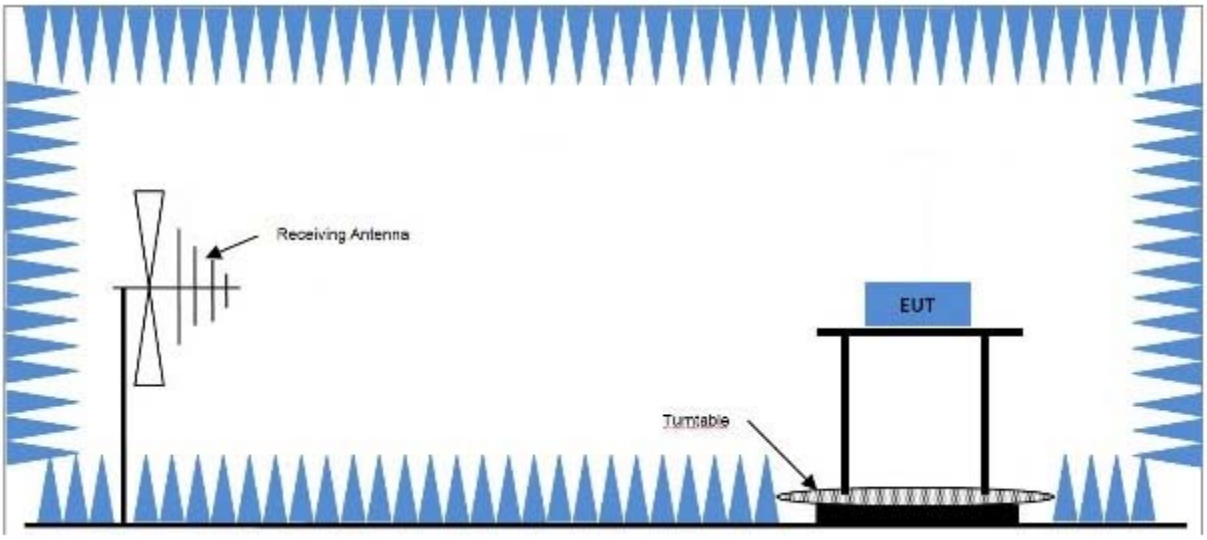
7.10 Unwanted Emissions : Radiated Spurious Emission

▣ Definition

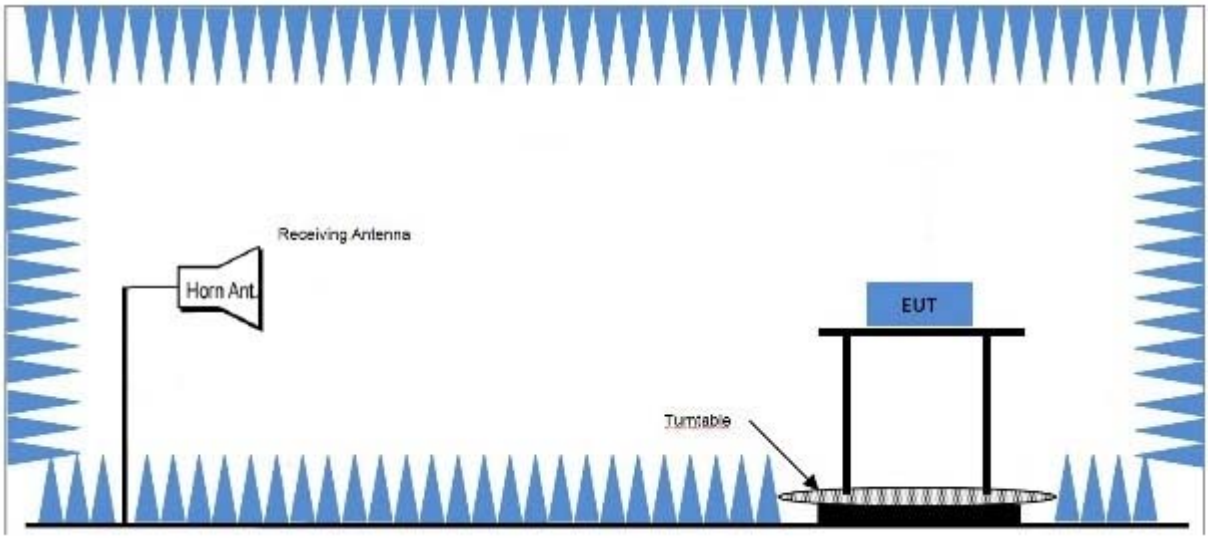
Radiated spurious emissions are emissions from the equipment when transmitting into a non-radiating load on a frequency or frequencies that are outside an occupied band sufficient to ensure transmission of information of required quality for the class of communications desired.

▣ TEST CONFIGURATION

Below 30 MHz



Above 1 GHz



TEST PROCEDURE USED

According to 2.2.12 in TIA-603-E 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 ± 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(dBm) = *Pg*(dBm) – *cable loss* (dB) + *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) =

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

▣ LIMIT

Frequency Band (MHz)	Channel bandwidth (kHz)	Limit (dB)
450 - 470	12.5	50+10Log(P) or 70 dB
	6.25	55+10Log(P) or 65 dB
	25	43+10Log(p)

▣ Operating Mode

EUT Type	Modulation	Battery	Test frequency (MHz)
Stand alone	11K0F3E 16K0F3E 8K30F1E, 8K30F1D, 8K30F7W 4K00F1E, 4K00F1D, 4K00F7W 4K00F2D	KNB-81L	450 - 470

Note

Tests were performed all power(High & Low). And worst case is High power.

Therefore, this report attached only High power.

▣ TEST RESULTS

11K0F3E

Frequency [MHz] F1 : 450.05_High Battery : KNB-81L						
Frequency (MHz)	**Reading [dBm]**	**Factor (dB)**	**Pol.**	**Result (dBm)**	**Limit (dBm)**	**Margin (dB)**
450.05	-19.28	30.83	X-V	11.55	-	-
900.10	-86.94	39.45		-47.49	-20.00	27.49
1350.15	-34.51	-2.99		-37.50	-20.00	17.50
1800.20	-39.04	-4.31		-43.35	-20.00	23.35
2250.25	-42.89	1.52		-41.37	-20.00	21.37
2700.30	-44.11	0.93		-43.18	-20.00	23.18
3150.35	-47.26	3.68		-43.58	-20.00	23.58
3600.40	-45.73	4.34		-41.39	-20.00	21.39
4050.45	-47.71	5.96		-41.75	-20.00	21.75
4500.50	-54.74	7.84		-46.90	-20.00	26.90
450.05	-1.24	30.83	Z-H	29.59	-	-
900.10	-86.38	39.45		-46.93	-20.00	26.93
1350.15	-33.89	-2.99		-36.88	-20.00	16.88
1800.20	-40.52	-4.31		-44.83	-20.00	24.83
2250.25	-39.59	1.52		-38.07	-20.00	18.07
2700.30	-46.50	0.93		-45.57	-20.00	25.57
3150.35	-44.96	3.68		-41.28	-20.00	21.28
3600.40	-43.57	4.34		-39.23	-20.00	19.23
4050.45	-50.63	5.96		-44.67	-20.00	24.67
4500.50	-57.11	7.84		-49.27	-20.00	29.27

*Note :

1. Limit = P_{dBm} – (50+10 log (P_{watt})) = -20 dBm

Frequency [MHz] F1 : 460.05_High
Battery : KNB-81L

Frequency (MHz)	Reading [dBm]	Factor (dB)	Pol.	Result (dBm)	Limit (dBm)	Margin (dB)
460.05	-0.05	30.92	Z-H	30.87	-	-
920.10	-78.37	39.71		-38.67	-20.00	18.67
1380.15	-32.61	-2.79		-35.40	-20.00	15.40
1840.20	-40.03	-4.44		-44.47	-20.00	24.47
2300.25	-32.72	1.32		-31.40	-20.00	11.40
2760.30	-38.84	1.47		-37.38	-20.00	17.38
3220.35	-36.67	3.07		-33.60	-20.00	13.60
3680.40	-42.65	5.04		-37.61	-20.00	17.61
4140.45	-50.02	6.32		-43.70	-20.00	23.70
4600.50	-53.48	8.69		-44.79	-20.00	24.79
460.05	-14.28	30.92	Z-V	16.64	-	-
920.10	-93.76	39.71		-54.06	-20.00	34.06
1380.15	-36.82	-2.79		-39.61	-20.00	19.61
1840.20	-39.33	-4.44		-43.77	-20.00	23.77
2300.25	-39.56	1.32		-38.24	-20.00	18.24
2760.30	-33.79	1.47		-32.33	-20.00	12.33
3220.35	-37.05	3.07		-33.98	-20.00	13.98
3680.40	-43.30	5.04		-38.26	-20.00	18.26
4140.45	-52.12	6.32		-45.80	-20.00	25.80
4600.50	-53.23	8.69		-44.54	-20.00	24.54

*Note :

1. Limit = P_{dBm} – (50+10 log (P_{watt})) = -20 dBm

Frequency [MHz] F1 : 469.95 _High
Battery : KNB-81L

Frequency (MHz)	Reading [dBm]	Factor (dB)	Pol.	Result (dBm)	Limit (dBm)	Margin (dB)
469.95	0.73	31.19	Y-V	31.92	-	-
939.90	-73.62	40.53		-33.09	-20.00	13.09
1409.85	-32.34	-2.86		-35.20	-20.00	15.20
1879.80	-39.23	-3.70		-42.93	-20.00	22.93
2349.75	-45.56	0.59		-44.98	-20.00	24.98
2819.70	-42.62	1.99		-40.63	-20.00	20.63
3289.65	-37.12	2.43		-34.69	-20.00	14.69
3759.60	-37.81	5.00		-32.81	-20.00	12.81
4229.55	-46.31	6.69		-39.62	-20.00	19.62
4699.50	-48.61	9.07		-39.54	-20.00	19.54
469.95	0.41	31.19	Z-H	31.60	-	-
939.90	-73.39	40.53		-32.86	-20.00	12.86
1409.85	-33.18	-2.86		-36.04	-20.00	16.04
1879.80	-38.19	-3.70		-41.89	-20.00	21.89
2349.75	-43.47	0.59		-42.89	-20.00	22.89
2819.70	-41.49	1.99		-39.50	-20.00	19.50
3289.65	-37.65	2.43		-35.22	-20.00	15.22
3759.60	-39.05	5.00		-34.05	-20.00	14.05
4229.55	-48.20	6.69		-41.51	-20.00	21.51
4699.50	-48.58	9.07		-39.51	-20.00	19.51

*Note :

1. Limit = P_{dBm} – (50+10 log (P_{watt})) = -20 dBm

16K0F3E

Frequency [MHz] F1 : 450.05 _High
Battery : KNB-81L

Frequency (MHz)	Reading [dBm]	Factor (dB)	Pol.	Result (dBm)	Limit (dBm)	Margin (dB)
450.05	-20.24	30.83	X-V	10.59	-	-
900.10	-84.42	39.45		-44.97	-13.00	31.97
1350.15	-32.55	-2.99		-35.54	-13.00	22.54
1800.20	-37.48	-4.31		-41.79	-13.00	28.79
2250.25	-40.60	1.52		-39.08	-13.00	26.08
2700.30	42.60	0.93		-41.67	-13.00	28.67
3150.35	-47.35	3.68		-43.67	-13.00	30.67
3600.40	-44.54	4.34		-40.20	-13.00	27.20
4050.45	-46.64	5.96		-40.68	-13.00	27.68
4500.50	-52.57	7.84		-44.73	-13.00	31.73
450.05	-1.85	30.83	Z-H	28.98	-	-
900.10	-86.04	39.45		-46.59	-13.00	33.59
1350.15	-32.41	-2.99		-35.40	-13.00	22.40
1800.20	-39.08	-4.31		-43.39	-13.00	30.39
2250.25	-37.11	1.52		-35.59	-13.00	22.59
2700.30	-44.87	0.93		-43.94	-13.00	30.94
3150.35	-45.17	3.68		-41.49	-13.00	28.49
3600.40	-42.19	4.34		-37.85	-13.00	24.85
4050.45	-49.07	5.96		-43.11	-13.00	30.11
4500.50	-55.11	7.84		-47.27	-13.00	34.27

*Note :

1. Limit = P_{dBm} – (43+10 log (P_{watt})) = -13 dBm

Frequency [MHz] F1 : 460.05_High
Battery : KNB-81L

Frequency (MHz)	Reading [dBm]	Factor (dB)	Pol.	Result (dBm)	Limit (dBm)	Margin (dB)
460.05	0.27	30.92	Z-H	31.19	-	-
920.10	-79.56	39.71		-39.86	-13.00	26.86
1380.15	-33.37	-2.79		-36.16	-13.00	23.16
1840.20	-40.44	-4.44		-44.88	-13.00	31.88
2300.25	-34.08	1.32		-32.76	-13.00	19.76
2760.30	-40.28	1.47		-38.82	-13.00	25.82
3220.35	-37.76	3.07		-34.69	-13.00	21.69
3680.40	-44.70	5.04		-39.66	-13.00	26.66
4140.45	-49.77	6.32		-43.45	-13.00	30.45
4600.50	-53.38	8.69		-44.69	-13.00	31.69
460.05	-11.24	30.92	Z-V	19.68	-	-
920.10	-92.92	39.71		-53.22	-13.00	40.22
1380.15	-37.15	-2.79		-39.94	-13.00	26.94
1840.20	-40.15	-4.44		-44.59	-13.00	31.59
2300.25	-40.90	1.32		-39.58	-13.00	26.58
2760.30	-34.75	1.47		-33.29	-13.00	20.29
3220.35	-38.03	3.07		-34.96	-13.00	21.96
3680.40	-45.14	5.04		-40.10	-13.00	27.10
4140.45	-52.75	6.32		-46.43	-13.00	33.43
4600.50	-53.40	8.69		-44.71	-13.00	31.71

*Note :

1. Limit = P_{dBm} – (43+10 log (P_{watt})) = -13 dBm

Frequency [MHz] F1 : 469.95_High
Battery : KNB-81L

Frequency (MHz)	Reading [dBm]	Factor (dB)	Pol.	Result (dBm)	Limit (dBm)	Margin (dB)
469.95	1.02	31.19	Y-V	32.21	-	-
939.90	-73.83	40.53		-33.30	-13.00	20.30
1409.85	-32.63	-2.86		-35.49	-13.00	22.49
1879.80	-40.04	-3.70		-43.74	-13.00	30.74
2349.75	-42.95	0.59		-42.37	-13.00	29.37
2819.70	-42.09	1.99		-40.10	-13.00	27.10
3289.65	-37.10	2.43		-34.67	-13.00	21.67
3759.60	-37.19	5.00		-32.19	-13.00	19.19
4229.55	-44.62	6.69		-37.93	-13.00	24.93
4699.50	-48.20	9.07		-39.13	-13.00	26.13
469.95	0.69	31.19	Z-H	31.88	-	-
939.90	-74.08	40.53		-33.55	-13.00	20.55
1409.85	-33.79	-2.86		-36.65	-13.00	23.65
1879.80	-37.97	-3.70		-41.67	-13.00	28.67
2349.75	-42.90	0.59		-42.32	-13.00	29.32
2819.70	-41.41	1.99		-39.42	-13.00	26.42
3289.65	-37.53	2.43		-35.10	-13.00	22.10
3759.60	-36.90	5.00		-31.90	-13.00	18.90
4229.55	-46.58	6.69		-39.89	-13.00	26.89
4699.50	-47.57	9.07		-38.50	-13.00	25.50

*Note :

1. Limit = P_{dBm} – (43+10 log (P_{watt})) = -13 dBm

8K30F1E, 8K30F1D, 8K30F7W

Frequency [MHz] F1 : 450.05 _High
Battery : KNB-81L

Frequency (MHz)	Reading [dBm]	Factor (dB)	Pol.	Result (dBm)	Limit (dBm)	Margin (dB)
450.05	-1.50	30.83	Y-V	29.33	-	-
900.10	-86.18	39.45		-46.73	-20.00	26.73
1350.15	-32.87	-2.99		-35.86	-20.00	15.86
1800.20	-37.94	-4.31		-42.25	-20.00	22.25
2250.25	-38.45	1.52		-36.93	-20.00	16.93
2700.30	-45.99	0.93		-45.06	-20.00	25.06
3150.35	-45.26	3.68		-41.58	-20.00	21.58
3600.40	-41.22	4.34		-36.88	-20.00	16.88
4050.45	-47.00	5.96		-41.04	-20.00	21.04
4500.50	-54.78	7.84		-46.94	-20.00	26.94
450.05	-1.71	30.83	Z-H	29.12	-	-
900.10	-85.53	39.45		-46.08	-20.00	26.08
1350.15	-32.87	-2.99		-35.86	-20.00	15.86
1800.20	-37.12	-4.31		-41.43	-20.00	21.43
2250.25	-37.79	1.52		-36.27	-20.00	16.27
2700.30	-45.33	0.93		-44.40	-20.00	24.40
3150.35	-44.58	3.68		-40.90	-20.00	20.90
3600.40	-42.50	4.34		-38.16	-20.00	18.16
4050.45	-48.96	5.96		-43.00	-20.00	23.00
4500.50	-56.47	7.84		-48.63	-20.00	28.63

*Note :

1. Limit = P_{dBm} – (50+10 log (P_{watt})) = -20 dBm

Frequency [MHz] F1 : 460.05 _High
Battery : KNB-81L

Frequency (MHz)	Reading [dBm]	Factor (dB)	Pol.	Result (dBm)	Limit (dBm)	Margin (dB)
460.05	0.36	30.92	Z-H	31.28	-	-
920.10	-78.99	39.71		-39.29	-20.00	19.29
1380.15	-32.51	-2.79		-35.30	-20.00	15.30
1840.20	-38.76	-4.44		-43.20	-20.00	23.20
2300.25	-33.40	1.32		-32.08	-20.00	12.08
2760.30	-39.03	1.47		-37.57	-20.00	17.57
3220.35	-36.29	3.07		-33.22	-20.00	13.22
3680.40	-43.37	5.04		-38.33	-20.00	18.33
4140.45	-47.82	6.32		-41.50	-20.00	21.50
4600.50	-52.40	8.69		-43.71	-20.00	23.71
460.05	-12.87	30.92	Z-V	18.05	-	-
920.10	-92.92	39.71		-53.22	-20.00	33.22
1380.15	-35.26	-2.79		-38.05	-20.00	18.05
1840.20	-39.78	-4.44		-44.22	-20.00	24.22
2300.25	-39.29	1.32		-37.97	-20.00	17.97
2760.30	-33.32	1.47		-31.86	-20.00	11.86
3220.35	-35.78	3.07		-32.71	-20.00	12.71
3680.40	-43.43	5.04		-38.39	-20.00	18.39
4140.45	-50.46	6.32		-44.14	-20.00	24.14
4600.50	-53.30	8.69		-44.61	-20.00	24.61

*Note :

1. Limit = P_{dBm} – (50+10 log (P_{watt})) = -20 dBm

Frequency [MHz] F1 : 469.95_High
Battery : KNB-81L

Frequency (MHz)	Reading [dBm]	Factor (dB)	Pol.	Result (dBm)	Limit (dBm)	Margin (dB)
469.95	-13.33	31.19	Y-H	17.86	-	-
939.90	-81.18	40.53		-40.65	-20.00	20.65
1409.85	-35.09	-2.86		-37.95	-20.00	17.95
1879.80	-39.13	-3.70		-42.83	-20.00	22.83
2349.75	-42.79	0.59		-42.21	-20.00	22.21
2819.70	-33.43	1.99		-31.44	-20.00	11.44
3289.65	-36.80	2.43		-34.37	-20.00	14.37
3759.60	-35.36	5.00		-30.36	-20.00	10.36
4229.55	-48.24	6.69		-41.55	-20.00	21.55
4699.50	-47.31	9.07		-38.24	-20.00	18.24
469.95	1.02	31.19	Y-V	32.21	-	-
939.90	-73.08	40.53		-32.55	-20.00	12.55
1409.85	-34.60	-2.86		-37.46	-20.00	17.46
1879.80	-38.09	-3.70		-41.79	-20.00	21.79
2349.75	-37.53	0.59		-36.95	-20.00	16.95
2819.70	-40.01	1.99		-38.02	-20.00	18.02
3289.65	-35.29	2.43		-32.86	-20.00	12.86
3759.60	-33.51	5.00		-28.51	-20.00	8.51
4229.55	-44.17	6.69		-37.48	-20.00	17.48
4699.50	-44.64	9.07		-35.57	-20.00	15.57

*Note :

1. Limit = P_{dBm} – (50+10 log (P_{watt})) = -20 dBm

4K00F1E, 4K00F1D, 4K00F7W

Frequency [MHz] F1 : 450.05 _High
Battery : KNB-81L

Frequency (MHz)	Reading [dBm]	Factor (dB)	Pol.	Result (dBm)	Limit (dBm)	Margin (dB)
450.05	-1.42	30.83	Y-V	29.41	-	-
900.10	-84.58	39.45		-45.13	-25.00	20.13
1350.15	-33.11	-2.99		-36.10	-25.00	11.10
1800.20	-38.62	-4.31		-42.93	-25.00	17.93
2250.25	-39.37	1.52		-37.85	-25.00	12.85
2700.30	-47.06	0.93		-46.13	-25.00	21.13
3150.35	-45.43	3.68		-41.75	-25.00	16.75
3600.40	-41.14	4.34		-36.80	-25.00	11.80
4050.45	-47.19	5.96		-41.23	-25.00	16.23
4500.50	-55.43	7.84		-47.59	-25.00	22.59
450.05	-1.67	30.83	Z-H	29.16	-	-
900.10	-85.27	39.45		-45.82	-25.00	20.82
1350.15	-34.11	-2.99		-37.10	-25.00	12.10
1800.20	-39.18	-4.31		-43.49	-25.00	18.49
2250.25	-40.69	1.52		-39.17	-25.00	14.17
2700.30	-47.39	0.93		-46.46	-25.00	21.46
3150.35	-45.20	3.68		-41.52	-25.00	16.52
3600.40	-44.76	4.34		-40.42	-25.00	15.42
4050.45	-50.45	5.96		-44.49	-25.00	19.49
4500.50	-57.20	7.84		-49.36	-25.00	24.36

*Note :

1. Limit = P_{dBm} – (55+10 log (P_{watt})) = -25 dBm

Frequency [MHz] F1 : 460.05 _High
Battery : KNB-81L

Frequency (MHz)	Reading [dBm]	Factor (dB)	Pol.	Result (dBm)	Limit (dBm)	Margin (dB)
460.05	0.73	30.92	Y-V	31.65	-	-
920.10	-82.71	39.71		-43.01	-25.00	18.01
1380.15	-31.39	-2.79		-34.18	-25.00	9.18
1840.20	-37.31	-4.44		-41.75	-25.00	16.75
2300.25	-37.59	1.32		-36.27	-25.00	11.27
2760.30	-36.74	1.47		-35.28	-25.00	10.28
3220.35	-34.56	3.07		-31.49	-25.00	6.49
3680.40	-42.01	5.04		-36.97	-25.00	11.97
4140.45	-48.83	6.32		-42.51	-25.00	17.51
4600.50	-50.76	8.69		-42.07	-25.00	17.07
460.05	0.36	30.92	Z-H	31.28	-	-
920.10	-87.16	39.71		-47.46	-25.00	22.46
1380.15	-33.47	-2.79		-36.26	-25.00	11.26
1840.20	-37.73	-4.44		-42.17	-25.00	17.17
2300.25	-38.42	1.32		-37.10	-25.00	12.10
2760.30	-33.91	1.47		-32.45	-25.00	7.45
3220.35	-35.79	3.07		-32.72	-25.00	7.72
3680.40	-42.32	5.04		-37.28	-25.00	12.28
4140.45	-52.05	6.32		-45.73	-25.00	20.73
4600.50	-54.68	8.69		-45.99	-25.00	20.99

*Note :

1. Limit = P_{dBm} – (55+10 log (P_{watt})) = -25 dBm

Frequency [MHz] F1 : 469.95 _High
Battery : KNB-81L

Frequency (MHz)	Reading [dBm]	Factor (dB)	Pol.	Result (dBm)	Limit (dBm)	Margin (dB)
469.95	0.63	31.19	Y-V	31.82	-	-
939.90	-73.23	40.53		-32.70	-25.00	7.70
1409.85	-35.88	-2.86		-38.74	-25.00	13.74
1879.80	-38.71	-3.70		-42.41	-25.00	17.41
2349.75	-40.89	0.59		-40.31	-25.00	15.31
2819.70	-41.48	1.99		-39.49	-25.00	14.49
3289.65	-39.51	2.43		-37.08	-25.00	12.08
3759.60	-34.45	5.00		-29.45	-25.00	4.45
4229.55	-43.99	6.69		-37.30	-25.00	12.30
4699.50	-46.29	9.07		-37.22	-25.00	12.22
469.95	0.31	31.19	Z-H	31.50	-	-
939.90	-73.63	40.53		-33.10	-25.00	8.10
1409.85	-34.43	-2.86		-37.29	-25.00	12.29
1879.80	-36.81	-3.70		-40.51	-25.00	15.51
2349.75	-38.43	0.59		-37.85	-25.00	12.85
2819.70	-40.31	1.99		-38.32	-25.00	13.32
3289.65	-37.09	2.43		-34.66	-25.00	9.66
3759.60	-34.24	5.00		-29.24	-25.00	4.24
4229.55	-45.91	6.69		-39.22	-25.00	14.22
4699.50	-45.70	9.07		-36.63	-25.00	11.63

*Note :

1. Limit = P_{dBm} – (55+10 log (P_{watt})) = -25 dBm

4K00F2D

Frequency [MHz] F1 : 450.05_ High
Battery : KNB-81L

Frequency (MHz)	Reading [dBm]	Factor (dB)	Pol.	Result (dBm)	Limit (dBm)	Margin (dB)
450.05	-2.45	30.83	Z-H	28.38	-	-
900.10	-83.56	39.45		-44.11	-25.00	19.11
1350.15	-35.52	-2.99		-38.51	-25.00	13.51
1800.20	-42.60	-4.31		-46.91	-25.00	21.91
2250.25	-44.25	1.52		-42.73	-25.00	17.73
2700.30	-42.80	0.93		-41.87	-25.00	16.87
3150.35	-43.09	3.68		-39.41	-25.00	14.41
3600.40	-47.37	4.34		-43.03	-25.00	18.03
4050.45	-54.63	5.96		-48.67	-25.00	23.67
4500.50	-57.96	7.84		-50.12	-25.00	25.12
450.05	-2.37	30.83	Y-V	27.95	-	-
900.10	-82.81	39.45		-43.36	-25.00	18.36
1350.15	-34.33	-2.99		-37.32	-25.00	12.32
1800.20	-42.18	-4.31		-46.49	-25.00	21.49
2250.25	-42.03	1.52		-40.51	-25.00	15.51
2700.30	-47.61	0.93		-46.68	-25.00	21.68
3150.35	-44.20	3.68		-40.52	-25.00	15.52
3600.40	-45.39	4.34		-41.05	-25.00	16.05
4050.45	-53.27	5.96		-47.31	-25.00	22.31
4500.50	-57.04	7.84		-49.20	-25.00	24.20

*Note :

1. Limit = P_{dBm} – (55+10 log (P_{watt})) = -25 dBm

Frequency [MHz] F1 : 460.05_ High
Battery : KNB-81L

Frequency (MHz)	Reading [dBm]	Factor (dB)	Pol.	Result (dBm)	Limit (dBm)	Margin (dB)
460.05	-1.89	30.92	Y-V	29.03	-	-
920.10	-81.65	39.71		-41.95	-25.00	16.95
1380.15	-32.76	-2.79		-35.55	-25.00	10.55
1840.20	-39.78	-4.44		-44.22	-25.00	19.22
2300.25	-34.77	1.32		-33.45	-25.00	8.45
2760.30	-46.93	1.47		-45.47	-25.00	20.47
3220.35	-41.58	3.07		-38.51	-25.00	13.51
3680.40	-38.84	5.04		-33.80	-25.00	8.80
4140.45	-46.60	6.32		-40.28	-25.00	15.28
4600.50	-49.39	8.69		-40.70	-25.00	15.70
460.05	-5.92	30.92	Z-H	25.00	-	-
920.10	-81.16	39.71		-41.46	-25.00	16.46
1380.15	-32.56	-2.79		-35.35	-25.00	10.35
1840.20	-39.84	-4.44		-44.28	-25.00	19.28
2300.25	-34.72	1.32		-33.40	-25.00	8.40
2760.30	-44.90	1.47		-43.44	-25.00	18.44
3220.35	-44.43	3.07		-41.36	-25.00	16.36
3680.40	-40.10	5.04		-35.06	-25.00	10.06
4140.45	-46.90	6.32		-40.58	-25.00	15.58
4600.50	-51.72	8.69		-43.03	-25.00	18.03

*Note :

1. Limit = P_{dBm} – (55+10 log (P_{watt})) = -25 dBm

Frequency [MHz] F1 : 469.95 High
Battery : KNB-81L

Frequency (MHz)	Reading [dBm]	Factor (dB)	Pol.	Result (dBm)	Limit (dBm)	Margin (dB)
469.95	0.12	31.19	Y-V	31.31	-	-
939.90	-78.95	40.53		-38.42	-25.00	13.42
1409.85	-39.65	-2.86		-42.51	-25.00	17.51
1879.80	-44.85	-3.70		-48.55	-25.00	23.55
2349.75	-42.21	0.59		-41.63	-25.00	16.63
2819.70	-37.13	1.99		-35.14	-25.00	10.14
3289.65	-33.65	2.43		-31.22	-25.00	6.22
3759.60	-39.14	5.00		-34.14	-25.00	9.14
4229.55	-48.82	6.69		-42.13	-25.00	17.13
4699.50	-53.57	9.07		-44.50	-25.00	19.50
469.95	-0.35	31.19	Z-H	30.84	-	-
939.90	-74.44	40.53		-33.91	-25.00	8.91
1409.85	-36.33	-2.86		-39.19	-25.00	14.19
1879.80	-38.49	-3.70		-42.19	-25.00	17.19
2349.75	-44.28	0.59		-43.70	-25.00	18.70
2819.70	-42.38	1.99		-40.39	-25.00	15.39
3289.65	-38.30	2.43		-35.87	-25.00	10.87
3759.60	-37.65	5.00		-32.65	-25.00	7.65
4229.55	-47.94	6.69		-41.25	-25.00	16.25
4699.50	-48.60	9.07		-39.53	-25.00	14.53

*Note :

1. Limit = P_{dBm} – (55+10 log (P_{watt})) = -25 dBm

7.11 Unwanted Emissions : Receiver Radiated Spurious Emission

Test Settings

ISED Rule(s)	RSS-Gen(7.0)
Chamber	Semi Anechoic Chamber
Operating conditions:	Under normal test conditions
Operation Mode:	Receive
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 (Average)
Mode of operation:	Receive

Test Limit

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

Test Result

Frequency Range : 30 MHz ~ 1 GHz

Frequency	Reading	Ant. factor+Cable loss- Amp Gain	Ant. POL	Total	Limit	Margin
MHz	dB μN	dB /m	(H/V)	dB μN/m	dB μN/m	dB
No Peak Found						

Frequency Range : Above 1 GHz

Frequency	Reading	Ant. factor+Cable loss- Amp Gain	Ant. POL	Total	Limit	Margin
MHz	dB μN	dB /m	(H/V)	dB μN/m	dB μN/m	dB
No Peak Found						

7.12 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	(2xM)+(2xDxK) = 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	(2xM)+(2xDxK) = 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/log2S)+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/log2S)+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	(2xM)+(2xDxK) = 4.0

8. LIST OF TEST EQUIPMENT

Manufacturer	Model / Equipment	Calibration Date	Calibration Interval	Calibration Due	Serial No.
Agilent	N9020A/ SIGNAL ANALYZER	06/13/2017	Annual	06/13/2018	MY51110085
Agilent	N1911A/Power Meter	04/16/2018	Annual	04/16/2019	MY45100523
Agilent	N1921A /POWER SENSOR	04/16/2018	Annual	04/16/2019	MY45241059
TEKTRONIX	RSA3408A/SPECTRUM ANALYZER	09/14/2017	Annual	09/14/2018	B010198
Hewlett Packard	8903B/Audio Analyzer	10/27/2017	Annual	10/27/2018	3413A13913
Hewlett Packard	8901B/Modulation Analyzer	10/17/2017	Annual	10/17/2018	3438A05231
Agilent	8498A/30 dB Attenuator	02/19/2018	Annual	02/19/2019	51161
Hewlett Packard	8493C/ATTENUATOR(20dB)	06/22/2017	Annual	06/22/2018	17280
EAGLE	230NFNM/Tuneable Notch Filter	10/13/2017	Annual	10/13/2018	H00564-9
EAGLE	230NFNM/Tuneable Notch Filter	10/12/2017	Annual	10/12/2018	H00564-10
ESPEC	SU-642 / Chamber	03/30/2018	Annual	03/30/2019	0093008124
CERNEX	CBLU1183540B-01/AMP	06/12/2017	Annual	06/12/2018	26822
Wainwright	WHKX10-900-1000-15000/H.P.F	07/21/2017	Annual	07/21/2018	5
Schwarzbeck	VULB9160/ Bilog Antenna	09/30/2016	Biennial	09/30/2018	3150
Schwarzbeck	VULB9160/ Bilog Antenna	10/14/2016	Biennial	10/14/2018	9360-3368
Schwarzbeck	BBHA 9120D/ Horn Antenna(1~18GHz)	09/09/2016	Biennial	09/09/2018	147
Schwarzbeck	BBHA 9120D/ Horn Antenna(1~18GHz)	10/14/2016	Biennial	10/14/2018	9120D-1298
REOHDE&SCHWARZ	FSV30/Spectrum Analyzer	05/18/2017	Annual	05/18/2018	100854
Inn-co GmbH	DE 3260/Turn table	N/A	N/A	N/A	7860504
EMERSON&CUMING	10m×5m×5m/ Full anechoic chamber	N/A	N/A	N/A	N/A