



(SAMSUNG ELECTRONICS Co., Ltd.,
Regulatory Compliance Group
IT R&D Center
416 Maetan3-Dong,
Yeongtong-gu, Suwon city,
Gyeonggi-Do, Korea 443-742

FCC CFR47 PART 22 & 24 SUBPART CERTIFICATION REPORT

Model Tested:	SCH-I920
FCC ID (Requested):	A3LSCHI920
Report No:	FG-147-R1
Job No:	FG-147
Date issued:	June 11 , 2009

- Abstract -

All measurement reported here in accordance with FCC Rules, 47CFR
Part2, Part22, Part24

Prepared By

KJ KWON - Test Engineer

Authorized By

WT JANG - Technical Manager

TABLE OF CONTENT

MEASUREMENT REPORT	Page
1. FCC Certification Information	3
1.1 §2.1033 General Information	3
2. INTRODUCTION	4
2.1 General.....	4
3. MEASURING INSTRUMENT CALIBRATION	5
4. TEST EQUIPMENT LIST	6
5. DESCRIPTION OF TESTS.....	7
5.1 Output Power Variation	7
5.2 Effective Radiated Power / Equivalent Isotropic Radiated Power	8
5.3 Radiated Spurious & Harmonic Emission	9
5.4 Peak-Average Ratio	10
5.5 Occupied Bandwidth.....	11
5.6 Spurious and Harmonic Emissions at Antenna Terminal.....	11
5.6.1 Occupied Bandwidth Emission Limits	11
5.6.2 Conducted Spurious Emission.....	12
5.7 Frequency Stability / Temperature Variation	13
6. TEST DATA	14
6.1 Effective Radiated Power(E.R.P.).....	14
6.2 Equivalent Isotropic Radiated Power(E.I.R.P.)	15
6.3 Cellular CDMA Radiated Spurious & Harmonic measurement.....	16
6.4 PCS CDMA Radiated Spurious & Harmonic measurement	17
6.5 CDMA Radiated Spurious & Harmonic Conversion Table	18
6.6 PCS Radiated Spurious & Harmonic Conversion Table	19
6.7 Frequency Stability	20
6.7.1 CDMA Frequency Stability Table	20
6.7.2 PCS Frequency Stability Table	21
6.7.3 CDMA Frequency Stability Graph.....	22
6.7.4 PCS Frequency Stability Graph	24
7. SAMPLE CALCULATION	26
7.1 Emission Designator	26
8. CONCLUSION	27
9. TEST PLOTS	28



MEASUREMENT REPORT

1. FCC Certification Information

The following information is in accordance with FCC Rules, 47CFR Part2, Subpart J, Sections 2.1033 – 2.1055.

1.1 §2.1033 General Information

- Applicant Name: SAMSUNG ELECTRONICS CO., LTD.
- Address: 416 Maetan3-Dong, Yeongtong-gu, Suwon City
Gyeonggi-Do, Korea 443-742

- FCC ID: A3LSCHI920

- Model: SCH-I920
- Quantity: Quantity production is planned
- Emission Designators: 1M28F9W(CDMA), 1M29F9W(PCS CDMA)

- Tx Freq. Range: 824.70-848.31MHz (CDMA)
1851.25-1908.75MHz (PCS CDMA)

- Rx Freq. Range: 869.70-893.31MHz (CDMA)
1931.25-1988.75MHz (PCS CDMA)

- Max. Power Rating: 0.143 W ERP CDMA (21.54 dBm)
0.226 W EIRP PCS (23.54 dBm)

- FCC Classification(s): PCS Licensed Portable Tx Held to Ear (PCE)
- Equipment (EUT) Type: Cellular/PCS CDMA Phone with Bluetooth, Ev-DO and WLAN.
- Modulation(s): CDMA
- Frequency Tolerance: $\pm 0.00025\%$ (2.5ppm)
- FCC Rule Part(s): §4(E), §2(H), §.
- Dates of Test: May 27-28, 2009
- Place of Test: SAMSUNG Lab,
- Test Report S/N: FG-147-R1

2. INTRODUCTION

2.1 General

These measurement test were conducted at **SAMSUNG ELECTRONICS CO., LTD(SUWON)**. The site address is 416 Maetan3-Dong, Yeongtong-gu, Suwon City, Gyeonggi-Do, Korea 443-742. The site have 1 Fully-anechoic chamber and measurement facility.



Figure1. Map of the Suwon City area.

Measurement Procedure

The radiated and spurious measurements were made Fully-anechoic chamber at a 3-meter test range (see Figure2). The equipment under testing was placed on the rotating device at the same height and at a distance of 3-meters from the receive antenna. The rotating device which can rotate horizontal axis was mounted on the turn unit to facilitate rotation around a vertical axis. The measurement was made for each horizontal/vertical position combination with receive antenna horizontally polarized. This measurement was repeated with receive antenna vertically polarized. The substitution antenna will replace the EUT antenna at the same position and in vertical polarization. The frequency of the signal generator shall be set to the frequencies that were measured on the EUT. The signal generator, output level, shall be adjusted until an equal or a known related level to what was measured from the EUT is obtained in the spectrum analyzer. This level was recorded. For readings above 1 GHz, the above procedure is repeated using horn antennas and the difference between the gain of the horn and an isotropic antenna are taken into consideration.



3. MEASURING INSTRUMENT CALIBRATION

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipment, which is traceable to recognized national standards.

- End of page –

4. TEST EQUIPMENT LIST

Name Of Equipment	Model	Serial No.	Due Date
Spectrum Analyzer	ESI26	836119/010	2009-10-21
	E4440A(3Hz~26.5GHz)	MY46187454	2010-03-06
	E4440A(3Hz~26.5GHz)	MY41000236	2010-04-14
Network Analyzer	8753E	JP38160590	2009-06-20
Pre-Amplifier	8449B	3008A00691	2009-12-15
Communication test set	8960	MY47510060	2010-03-06
	8960	GB42230535	2009-12-18
Controller	CO2000	CO2000/424	Not Required
Turn Unit	CT0800	CT0800/057	Not Required
Rotating Device	DE3600-RH-PR	DE3600-RH-PR/050	Not Required
Antenna Master	MA4000	MA4000/204	Not Required
Horn Antenna	HF906	100134	2009-10-24
	HF906	360306/011	2010-06-13
	BBHA9120	9120D-637	2009-10-24
Dipole Antenna	UHA 9105	9105-2412	2009-11-07
	UHA 9105	9105-2413	2010-06-13
Power Supply	E3640A	MY40003594	2009-06-20
	E3640A	MY40003595	2010-05-25
	E3632A	MY40022438	2010-03-06
Divider	11636B	51946	Not Required
	11636B	56913	Not Required
	11636B	56918	Not Required
High Pass Filter	WHK/3.0/18G-10SS	492	Not Required
	WHK/3.5/18G-10SS	4	Not Required
Environmental Chamber	SH-241	92000549	2009-11-14
	SH-241	92000548	2009-11-14
Shielded Fully Anechoic Chamber	CHAMBER	ANT0001	Not Required

5. DESCRIPTION OF TESTS

5.1 Output Power Variation

Test Condition to measure the Output Power

This device was tested under all R.C.s and S.O.s and worst case is reported with RC3/SO55, with “All Up” power control bits.

The following procedures were followed according to FCC “SAR Measurement Procedures for 3G Devices” , May 2007.

1. If the mobile station (MS) supports Reverse TCH RC 1 and Forward TCH RC 1, set up a call using Fundamental Channel Test Mode 1 (RC=1/1) with 9600 bps data rate only.
2. Under RC1, C.S0011 Table 4.4.5.2-1, Table 5-1 parameters were applied.
3. If the MS supports the RC 3 Reverse FCH, RC3 Reverse SCH0 and demodulation of RC 3,4 or 5, set up a call using Supplemental Channel Test Mode 3 (RC 3/3) with 9600 bps Fundamental Channel and 9600 bps SCH0 data rate.
4. Under RC3, C.S0011 Table 4.4.5.2-2, Table 5-2 was applied.
5. FCHs were configured at full rate for maximum SAR with “All Up” power control bits.

Parameter	Units	Value
$\hat{I}_{or}$	dBm/1.23MHz	-104
Pilot Ec/Ior	dB	-7
Traffic Ec/Ior	dB	-7.4

Table 5-1
Parameters for Max. Power for RC1

Parameter	Units	Value
$\hat{I}_{or}$	dBm/1.23MHz	-86
Pilot Ec/Ior	dB	-7
Traffic Ec/Ior	dB	-7.4

Table 5-2
Parameters for Max. Power for RC1

Band	Channel	CDMA2000 RC	SO2	SO55	TDSO SO32 (F-SCH)	TDSO SO32 (+SCH)	1x EV-DO Rev.0	1x EV-DO Rev.A
Cellular	1013	RC1	24.32	24.29	-	-	-	-
		RC3	24.21	24.2	24.2	24.20	24.28	24.39
	384	RC1	24.31	24.29	-	-	-	-
		RC3	24.28	24.3	24.21	24.23	24.22	24.35
	777	RC1	24.29	24.21	-	-	-	-
		RC3	24.2	24.26	24.21	24.24	24.35	24.40
PCS	25	RC1	24.37	24.4	-	-	-	-
		RC3	24.49	24.39	24.38	24.39	24.55	24.39
	600	RC1	24.58	24.6	-	-	-	-
		RC3	24.56	24.59	24.57	24.52	24.5	24.66
	1175	RC1	24.61	24.63	-	-	-	-
		RC3	24.62	24.66	24.6	24.62	24.58	24.72

Table 5-3
Maximum Power Output Table for SCH-I920

5.2 Effective Radiated Power / Equivalent Isotropic Radiated Power

Test Set-up for the ERP/EIRP TEST

Effective Radiated Power Output and Equivalent Isotropic Radiated Power output Measurements by Substitution Method according to ANSI/TIA/EIA-603-C-2004

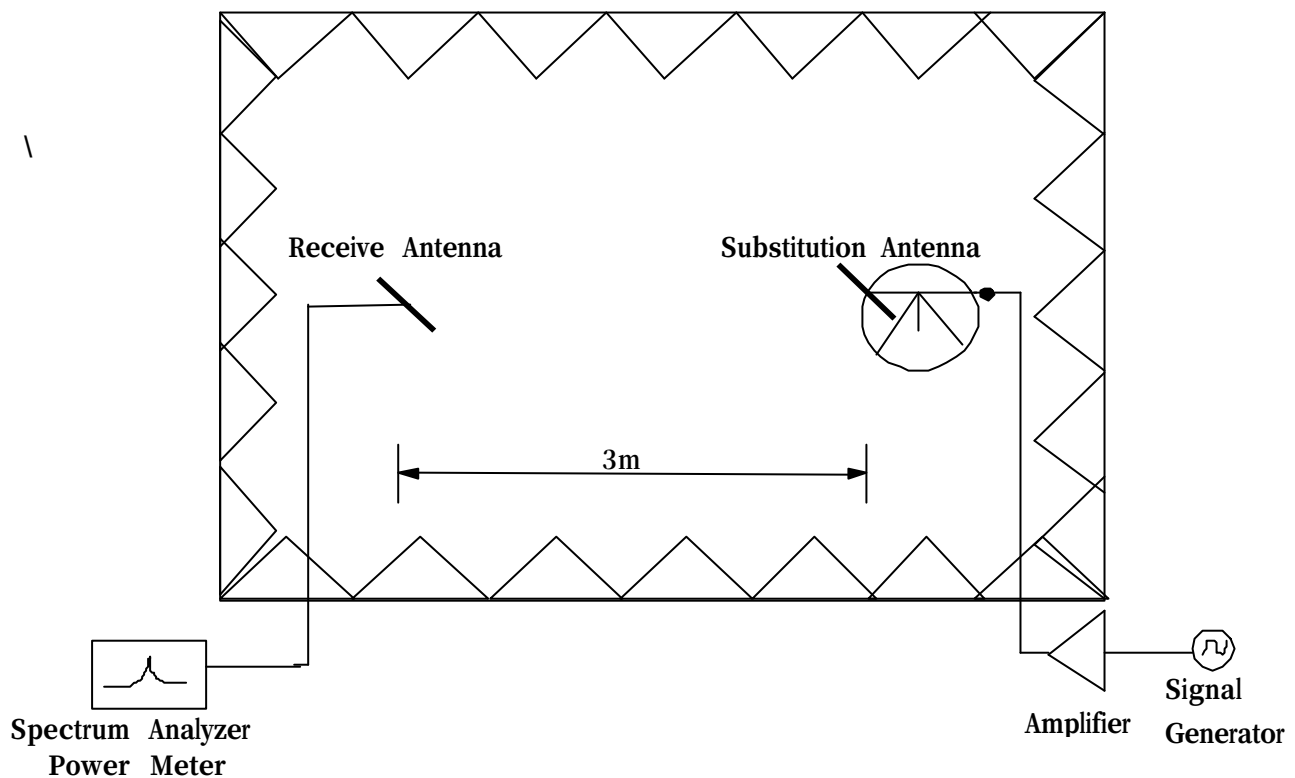


Figure 3. Diagram of ERP/EIRP test Set-up

The EUT was placed on the rotating device at 3-meters from the receive antenna. The turn unit and rotating device was adjusted for the highest reading on the receive spectrum analyzer. For CDMA & PCS signals, an average detector is used, with RBW=VBW=3MHz, SPAN=10MHz. A half-wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same receive spectrum analyzer reading. The conducted power at the terminals of dipole is measured. The ERP and EIRP are recorded. For readings above 1GHz, the above procedure is repeated using horn antennas and the difference between the gain of the horn and an isotropic or dipole antenna are taken into consideration.

5.3 Radiated Spurious & Harmonic Emission

Test Set-up for the Radiated Emission TEST

Radiated Spurious Emission Measurements by Substitution Method according to ANSI/TIA/EIA-603-C-2004

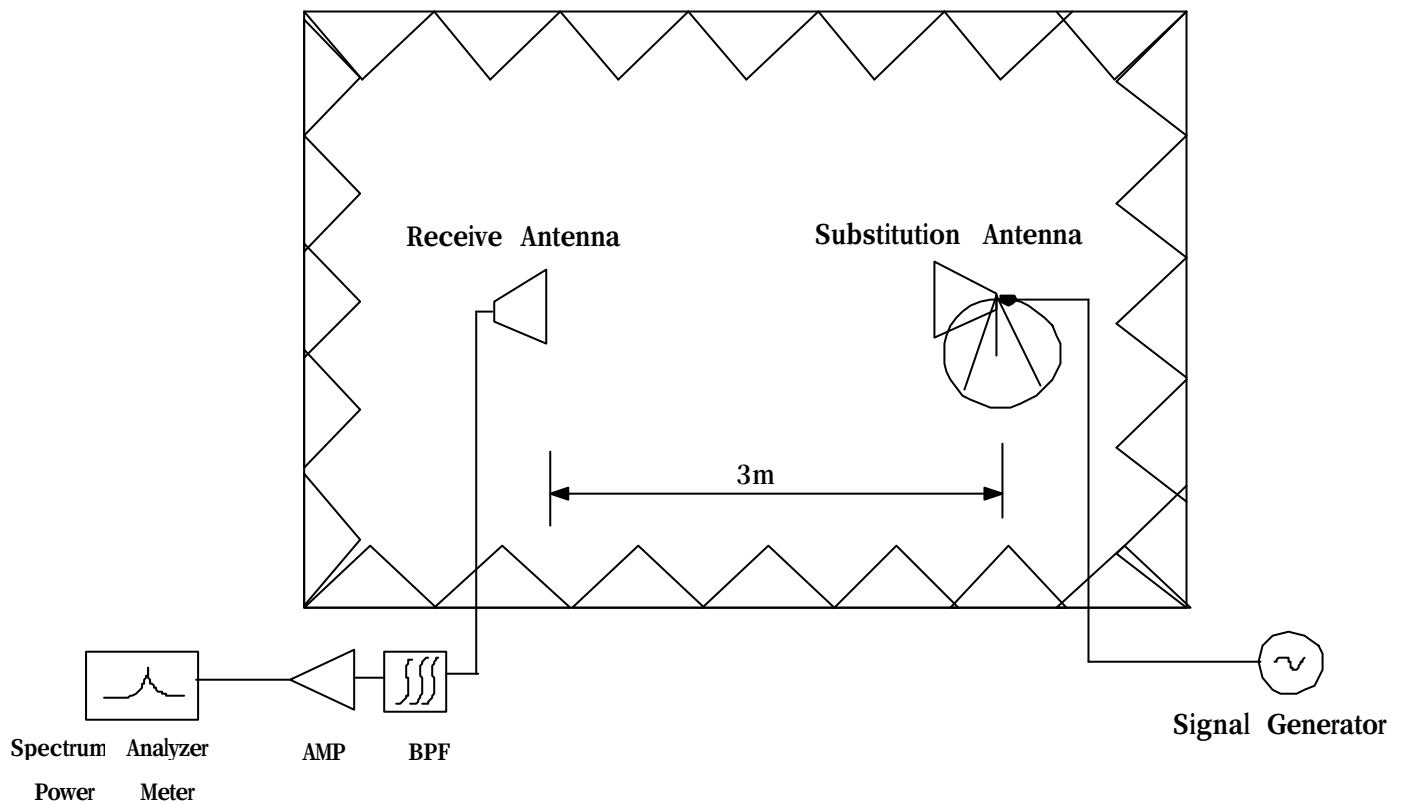


Figure 4. Diagram of Radiated Spurious & Harmonic test Set-up

The EUT was placed on the rotating device at 3-meters from the receive antenna. The turn unit and rotating device was adjusted for the highest reading on the receive spectrum analyzer. The Spectrum was investigated from 30MHz to the 10th Harmonic of the fundamental. A peak detector is used, with RBW=VBW=1MHz. The value that we could measure was only reported. A half-wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same receive spectrum analyzer reading. This spurious level is recorded. For readings above 1GHz, the above procedure is repeated using horn antennas and the difference between the gain of the horn and an isotropic or dipole antenna are taken into consideration.

SAMPLE CALCULATION

Example: Channel 600 PCS Mode 2nd Harmonic(3760MHz)

The receive analyzer reading at 3meters with the EUT on the turntable was -81.0dBm . The gain of the substituted antenna is 8.1dBi . The signal generator connected to the substituted antenna terminals is adjusted to produce a reading of -81.0dBm of the receive analyzer. The loss of the cable between the signal generator and the terminals of the substituted antenna is 2.0dB at 3760MHz. So 6.1dB is added to the signal generator reading of -30.9dBm yielding -24.8dBm . The fundamental EIRP was 25.5dBm so this harmonic was $25.5\text{dBm} - (-24.8) = 50.3\text{dBc}$.

5.4 Peak-Average Ratio

A peak to average ratio measurement is performed at the conducted port of the EUT. An average and a peak trace are used on a spectrum analyzer to determine the largest deviation between the average and the peak power of the EUT in a given bandwidth.

- End of page -

5.5 Occupied Bandwidth

Test Procedure

The EUT was setup to maximum output power at its lowest channel. The occupied bandwidth was measured using a spectrum analyzer. The measurements are repeated for the highest and a middle channel. The EUT's occupied bandwidth is measured as the width of the signal between two points, one below the carrier center frequency and one above the carrier frequency, outside of which all emissions are attenuated at least 26dB below the transmitter power.

Plots of the EUT's occupied bandwidth are shown herein.

5.6 Spurious and Harmonic Emissions at Antenna Terminal

5.6.1 Occupied Bandwidth Emission Limits

- (a) On any frequency outside a licensee's frequency block, the power of any emission shall be attenuated below the transmitter power (P) by at least $43 + 10 \log(P)$ dB.
- (b) Compliance with these provisions is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or greater. However, in the 1MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emission are attenuated at least 26 dB below the transmitter power.
- (c) When measuring the emission limits, the nominal carrier frequency shall be adjusted as close to the licensee's frequency block edges, both upper and lower, as the design permits.
- (d) The measurement of emission power can be expressed in peak or average values, provided they are expressed in the same parameters as the transmitter power.

– End of page –

BLOCK	Freq. Range (MHz) Transmitter (Tx)	Freq. Range (MHz) Receiver (Rx)
A	1850 – 1865	1930 – 1945
B	1870 – 1885	1950 – 1965
C	1895 – 1910	1975 – 1990
D	1865 – 1870	1945 – 1950
E	1885 – 1890	1965 – 1970
F	1890 – 1895	1970 – 1975

Table 1. Broadband PCS Service Frequency Blocks

BLOCK	Freq. Range (MHz) Transmitter (Tx)	Freq. Range (MHz) Receiver (Rx)
A* Low + A	824 – 835	869 – 880
B	835 – 845	880 – 890
A* High	845 – 846.5	890 – 891.5
B*	846.5 – 849	891.5 – 894

Table 2. Cellular Service Frequency Blocks

5.6.2 Conducted Spurious Emission

Minimum standard:

On any frequency outside a license frequency block, the power of any emission shall be attenuated below the transmitter power(P) by at least $43+10\log(P)$ dB. Limit equivalent to -13 dBm, calculation shown below.

$$43 + 10\log(0.333 \text{ W}) = 38.22\text{dB}$$

$$25.22 \text{ dBm} - 38.22 \text{ dB} = -13 \text{ dBm}$$

Test Procedure:

The EUT was setup to maximum output power at its lowest channel. The Resolution BW of the analyzer is set to 1% of the emission bandwidth to show compliance with the -13 dBm limit, in the 1MHz bands immediately outside and adjacent to the edge of the frequency block. The measurements are repeated for the EUT's highest channel. For the Out-of-Band measurements a 1MHz RBW was used to scan from 10MHz to 10GHz. (PCS Mode : 10MHz to 20GHz). A display line was placed at -13 dBm to show compliance. The high, lowest and a middle channel were tested for out of band measurements.

Plots are shown herein.

5.7 Frequency Stability / Temperature Variation

The frequency stability of the transmitter is measured by:

- a.) Temperature: The temperature is carried from -30 °C to +60 °C using an environmental chamber.
- b.) Primary Supply Voltage: The primary supply voltage is varied from 85% to 115% of the voltage normally at the input to the device or at the power supply terminals if cables are not normally supplied.

Specification- The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block. The frequency stability of the transmitter shall be maintained within ± 0.00025 (± 2.5 ppm) of the center frequency.

Time Period and Procedure:

1. The carrier frequency of the transmitter and the individual oscillators is measured at room temperature (25 °C to 27 °C to provide a reference).
2. The equipment is subjected to an overnight "soak" at -30 °C without any power applied.
3. After the overnight "soak" at -30 °C (Usually 14~16 hours), the equipment is turned on in a "standby" condition for one minute before applying power to the transmitter. Measurement of the carrier frequency of the transmitter and the individual oscillators is made within a three minute interval after applying to the transmitter.
4. Frequency measurements are made at 10 °C interval up to room temperature. At least a period of one and one half-hour is provided to allow stabilization of the equipment at each temperature level.
5. Again the transmitter carrier frequency and the individual oscillators is measured at room temperature to begin measurement of the upper temperature levels.
6. Frequency measurements are at 10 intervals starting at -30 °C up to +60 °C allowing at least two hours at each temperature for stabilization. In all measurements the frequency is measured within three minutes after re-applying power to the transmitter.
 - The artificial load is mounted external to the temperature chamber.

NOTE : The EUT is tested down to the battery endpoint.

– End of page –

6. TEST DATA

6.1 Effective Radiated Power(E.R.P.)

Supply Voltage : 3.7VDC

Modulation : CDMA

■Reference level

Frequency (MHz)	Output (dBm)	Polarization	P/M (dBm)	Ant gain (dBd)	Ref level (dBm)
824.70	22.00	H	-14.81	-0.67	-14.14
		V	-15.19	-0.67	-14.52
836.52	20.00	H	-17.44	-0.73	-16.71
		V	-17.37	-0.73	-16.64
848.31	20.00	H	-19.41	-0.79	-18.62
		V	-18.45	-0.79	-17.66

■Result

Frequency (MHz)	From EUT Tested level (dBm)	Polarization (H/V)	Azimuth (angle)	ERP (dBm)	ERP (W)	Battery
824.70	-14.60	H	296/160	21.54	0.143	Standard
836.52	-16.45	H	295/180	20.26	0.106	Standard
848.31	-18.92	H	297/160	19.70	0.093	Standard

NOTE : Standard batteries are the only battery options for this phone

- All modes of operation were investigated, and the worst-case results are reported

Radiated measurements at 3 meters by Substitution Method

6.2 Equivalent Isotropic Radiated Power(E.I.R.P.)

Supply Voltage : 3.7VDC

Modulation : PCS

■Reference level

Frequency (MHz)	Output (dBm)	Polarization	P/M (dBm)	Ant gain (dBi)	Ref level (dBm)
1851.25	24.00	H	-14.80	9.70	-24.50
		V	-14.70	9.70	-24.40
1880.00	23.00	H	-16.25	9.70	-25.95
		V	-16.45	9.70	-26.15
1908.75	23.00	H	-16.30	9.70	-26.00
		V	-16.19	9.70	-25.89

■Result

Frequency (MHz)	From EUT Tested level (dBm)	Polarization (H/V)	Azimuth (angle)	EIRP (dBm)	EIRP (W)	Battery
1851.25	-24.96	H	331/170	23.54	0.226	Standard
1880.00	-25.99	H	332/170	22.96	0.198	Standard
1908.75	-25.54	H	331/160	23.46	0.222	Standard

NOTE : Standard batteries are the only battery options for this phone

- All modes of operation were investigated, and the worst-case results are reported

Radiated measurements at 3 meters by Substitution Method

6.3 Cellular CDMA Radiated Spurious & Harmonic measurement

Field Strength of SPURIOUS Radiation

Operating Frequency : 824.70 MHz(Low), 836.52MHz(Middle), 848.31MHz(High)

Measured Output Power : 21.54 dBm = 0.143 W

Modulation Signal : CDMA

Limit : $43 + 10\log_{10}(P) = 34.54$ dBc

■Result

Channel	Harmonic	Frequency (MHz)	From EUT Tested level (dBm)	POL (H/V)	Result (dBc)
1013	2	1649.40	-58.07	H	68.07
	3	2474.10	-58.73	H	63.27
	4	3298.80	-67.10	V	68.35
	5	4123.50	-	-	-
	6	4948.20	-	-	-
	7	5772.90	-	-	-
384	2	1673.04	-62.76	H	71.44
	3	2509.56	-57.01	H	61.29
	4	3346.08	-66.55	V	67.63
	5	4182.68	-	-	-
	6	5019.12	-	-	-
	7	5855.64	-	-	-
777	2	1696.62	-51.92	H	59.77
	3	2544.93	-55.71	H	60.01
	4	3393.24	-67.40	H	68.14
	5	4241.55	-	-	-
	6	5089.86	-	-	-
	7	5938.17	-	-	-

Radiated Spurious Emission measurements at 3 meters by Substitution Method

6.4 PCS CDMA Radiated Spurious & Harmonic measurement

Field Strength of SPURIOUS Radiation

Operating Frequency : 1851.25 MHz(Low), 1880.00 MHz(Middle), 1908.75MHz(High)

Measured Output Power : 23.54 dBm = 0.226 W

Modulation Signal : PCS

Limit : $43 + 10\log_{10}(P) = 36.54$ dBc

■Result

Channel	Harmonic	Frequency (MHz)	From EUT Tested level (dBm)	POL (H/V)	Result (dBc)
25	2	3702.50	-63.69	H	62.51
	3	5553.75	-65.75	V	59.29
	4	7405.55	-68.23	H	57.36
	5	9256.25	-	-	-
	6	11107.50	-	-	-
	7	12958.75	-	-	-
600	2	3760.00	-65.70	V	64.09
	3	5640.00	-58.91	V	52.15
	4	7520.00	-67.58	H	56.49
	5	9400.00	-	-	-
	6	11280.00	-	-	-
	7	13160.00	-	-	-
1175	2	3817.50	-60.11	H	58.35
	3	5726.25	-59.95	V	52.87
	4	7635.00	-68.28	H	56.96
	5	9543.75	-	-	-
	6	11452.50	-	-	-
	7	13361.25	-	-	-

Radiated Spurious Emission measurements at 3 meters by Substitution Method

6.5 CDMA Radiated Spurious & Harmonic Conversion Table

Date : May 28, 2009

Test Engineer : KJ KWON

- ① Tx Cable loss
- ② Tx Horn Ant Gain
- ③ Tx Level to radiate -13dBm
- ④ ESI Level received from Tx with -13dBm
- ⑤ Tested Level from EUT
- ⑥ = ERP+2.14 - (-13 +⑤ - ④)

CH	Har	Frequency (MHz)	① Tx C/L dB	②Tx Horn Gain dBi	③Tx Level dBm	④ ESI Level : H dBm	④ ESI Level : V dBm	⑤Tested EUT Level : H dBm	⑤Tested EUT Level : V dBm	⑥ Result EUT : H (dBc)	⑥ Result EUT : V (dBc)
1013	2	1649.40	-9.02	9.50	-13.50	-26.68	-27.10	-58.07	-59.46	68.07	69.04
	3	2474.10	-11.25	10.70	-12.50	-32.14	-31.45	-58.73	-64.79	63.27	70.02
	4	3298.80	-13.26	12.30	-12.00	-35.31	-35.43	-67.25	-67.10	68.62	68.35
	5	4123.50	-14.79	12.50	-10.70	-38.87	-38.90	-	-	-	-
	6	4948.20	-16.60	12.70	-9.10	-40.93	-40.69	-	-	-	-
	7	5772.90	-18.02	12.90	-7.90	-43.59	-43.30	-	-	-	-
384	2	1673.04	-9.05	9.50	-13.50	-28.00	-28.63	-62.76	-65.08	71.44	73.13
	3	2509.56	-11.31	10.70	-12.40	-32.40	-31.64	-57.01	-62.20	61.29	67.24
	4	3346.08	-13.33	12.30	-12.00	-35.73	-35.60	-66.74	-66.55	67.69	67.63
	5	4182.68	-15.01	12.50	-10.50	-39.30	-39.11	-	-	-	-
	6	5019.12	-16.84	12.70	-8.90	-41.59	-41.32	-	-	-	-
	7	5855.64	-18.26	12.90	-7.60	-43.87	-43.84	-	-	-	-
777	2	1696.62	-9.07	9.50	-13.40	-28.83	-27.75	-51.92	-57.88	59.77	66.81
	3	2544.93	-11.35	10.70	-12.40	-32.38	-32.94	-55.71	-61.26	60.01	65.00
	4	3393.24	-13.26	12.30	-12.00	-35.94	-35.46	-67.40	-67.50	68.14	68.72
	5	4241.55	-15.20	12.50	-10.30	-39.34	-39.07	-	-	-	-
	6	5089.86	-16.99	12.70	-8.70	-41.96	-41.42	-	-	-	-
	7	5938.17	-18.38	12.90	-7.50	-43.98	-43.32	-	-	-	-

6.6 PCS Radiated Spurious & Harmonic Conversion Table

Date : May 28, 2009

Test Engineer : KJ KWON

- ① Tx Cable loss
- ② Tx Horn Ant Gain
- ③ Tx Level to radiate -13dBm
- ④ ESI Level received from Tx with -13dBm
- ⑤ Tested Level from EUT
- ⑥ = EIRP $-(-13 + ⑤ - ④)$

CH	Har	Frequency (MHz)	① Tx C/L dB	②Tx Horn Gain dBi	③Tx Level dBm	④ ESI Level : H dBm	④ ESI Level : V dBm	⑤Tested EUT Level : H dBm	⑤Tested EUT Level : H dBm	⑥ Result EUT : H (dBc)	⑥ Result EUT : V (dBc)
25	2	3702.50	- 14.02	12.40	-11.40	-37.72	-37.72	-63.69	-64.83	62.51	63.65
	3	5553.75	- 17.68	12.90	-8.20	-42.81	-43.00	-66.46	-65.75	60.19	59.29
	4	7405.00	- 20.47	10.50	-3.00	-47.41	-47.39	-68.23	-69.02	57.36	58.17
	5	9256.25	- 23.65	11.20	-0.50	-50.87	-51.74	-	-	-	-
	6	11107.50	- 26.73	11.60	2.10	-55.94	-55.98	-	-	-	-
	7	12958.75	- 28.60	12.90	2.70	-59.18	-59.44	-	-	-	-
600	2	3760.00	- 14.17	12.40	-11.20	-38.11	-38.15	-66.50	-65.70	64.93	64.09
	3	5640.00	- 17.83	12.90	-8.10	-42.84	-43.30	-67.19	-58.91	60.89	52.15
	4	7520.00	- 20.58	10.60	-3.00	-47.63	-47.25	-67.58	-68.34	56.49	57.63
	5	9400.00	- 23.19	11.60	-1.40	-51.86	-52.85	-	-	-	-
	6	11280.00	- 26.31	12.10	1.20	-56.33	-56.80	-	-	-	-
	7	13160.00	- 28.22	12.80	2.40	-59.42	-59.52	-	-	-	-
1175	2	3817.50	- 14.18	12.40	-11.20	-38.30	-38.19	-60.11	-64.07	58.35	62.42
	3	5726.25	- 17.92	13.00	-8.10	-43.67	-43.62	-65.58	-59.95	58.45	52.87
	4	7635.00	- 20.95	11.20	-3.30	-47.83	-48.14	-68.28	-68.56	56.99	56.96
	5	9543.75	- 23.60	11.70	-1.10	-52.43	-52.81	-	-	-	-
	6	11452.50	- 26.67	11.70	2.00	-56.85	-56.63	-	-	-	-
	7	13361.25	- 28.41	12.30	3.10	-60.50	-59.87	-	-	-	-

6.7 Frequency Stability

6.7.1 CDMA Frequency Stability Table

Operating Frequency : 836,520,000 Hz

Channel : 384

Reference Voltage : 3.7VDC

Deviation Limit : ± 0.00025 % or 2.5ppm

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency Error (Hz)	Frequency (Hz)	Deviation (%)	ppm
100%	3.70	+20(Ref)	-36.20	836,519,964	-0.000004	-0.043
100%		-30	22.60	836,520,023	0.000003	0.027
100%		-20	39.20	836,520,039	0.000005	0.047
100%		-10	20.00	836,520,020	0.000002	0.024
100%		0	20.30	836,520,020	0.000002	0.024
100%		+10	34.20	836,520,034	0.000004	0.041
100%		+20	-36.20	836,519,964	-0.000004	-0.043
100%		+30	-7.50	836,519,993	-0.000001	-0.009
100%		+40	-11.00	836,519,989	-0.000001	-0.013
100%		+50	-27.90	836,519,972	-0.000003	-0.033
100%		+60	-9.20	836,519,991	-0.000001	-0.011
85%	3.25	+20	-1.70	836,519,998	0.000000	-0.002
115%	4.26	+20	-17.20	836,519,983	-0.000002	-0.021
Batt. Endpoint	3.25	+20	-1.70	836,519,998	0.000000	-0.002

Note : The temperature is varied from -30 °C to +60 °C using an environmental chamber.

The EUT is tested down to the battery end point

6.7.2 PCS Frequency Stability Table

Operating Frequency : 1,880,000,000 Hz

Channel : 600

Reference Voltage : 3.7VDC

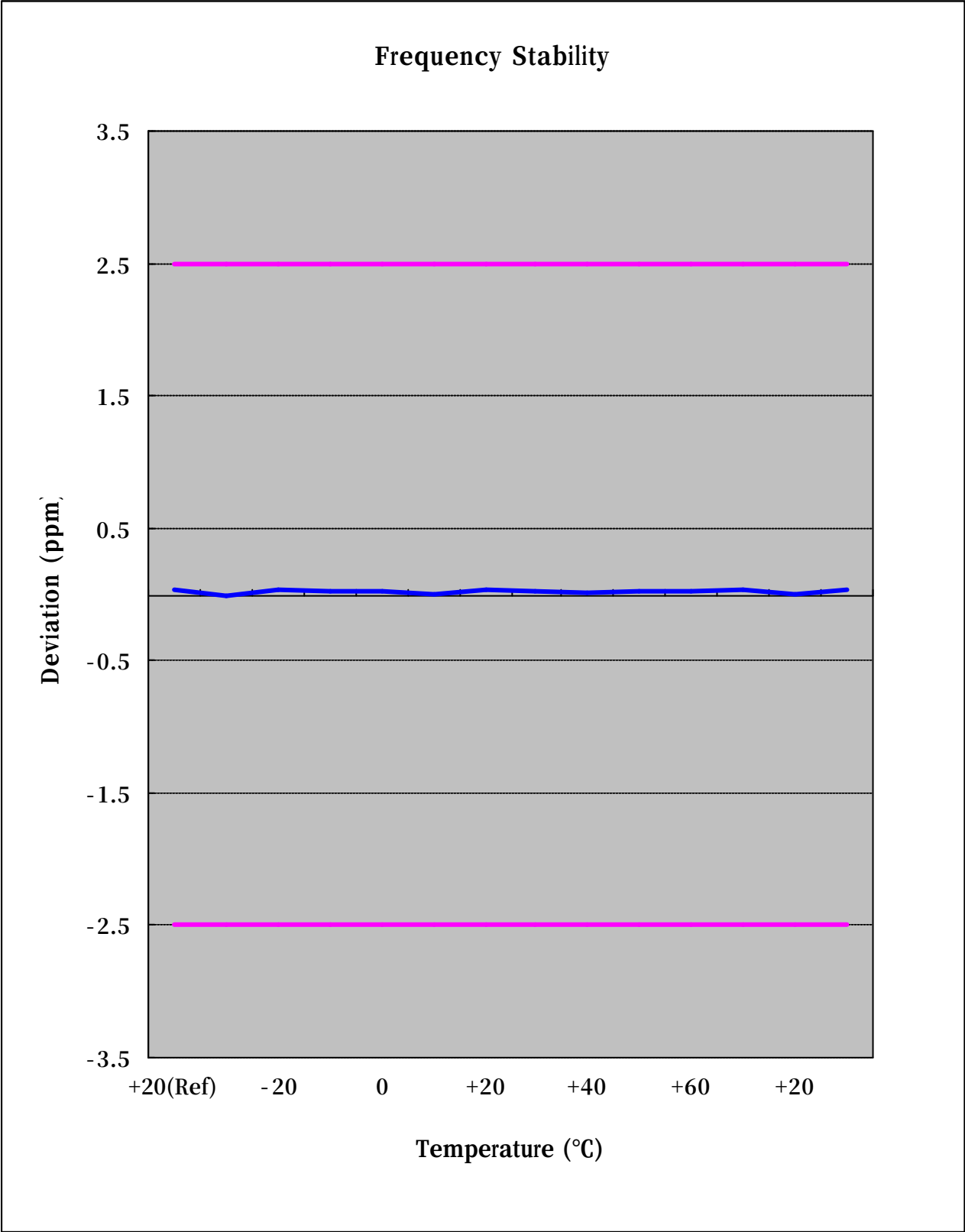
Deviation Limit : ± 0.00025 % or 2.5ppm

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency Error (Hz)	Frequency (Hz)	Deviation (%)	ppm
100%	3.70	+20(Ref)	1.10	1,880,000,001	0.000000	0.001
100%		-30	24.20	1,880,000,024	0.000001	0.013
100%		-20	4.50	1,880,000,005	0.000000	0.002
100%		-10	12.90	1,880,000,013	0.000001	0.007
100%		0	38.30	1,880,000,038	0.000002	0.020
100%		+10	-15.60	1,879,999,984	-0.000001	-0.008
100%		+20	1.10	1,880,000,001	0.000000	0.001
100%		+30	-12.10	1,879,999,988	-0.000001	-0.006
100%		+40	14.30	1,880,000,014	0.000001	0.008
100%		+50	9.50	1,880,000,010	0.000001	0.005
100%		+60	-39.90	1,879,999,960	-0.000002	-0.021
85%	3.25	+20	24.30	1,880,000,024	0.000001	0.013
115%	4.26	+20	25.80	1,880,000,026	0.000001	0.014
Batt. Endpoint	3.25	+20	24.30	1,880,000,024	0.000001	0.013

Note : The temperature is varied from -30 °C to +60 °C using an environmental chamber.

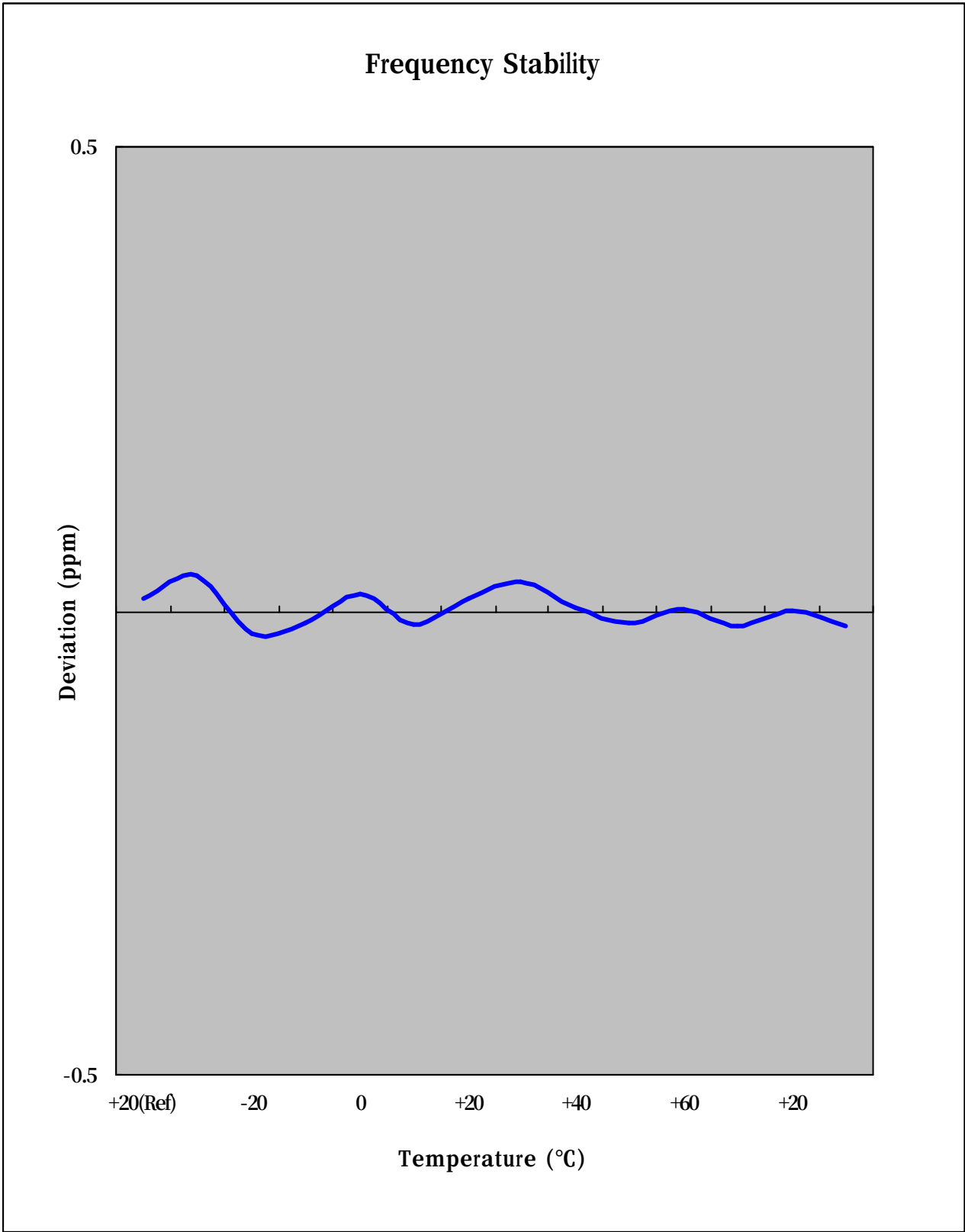
The EUT is tested down to the battery end point

6.7.3 CDMA Frequency Stability Graph



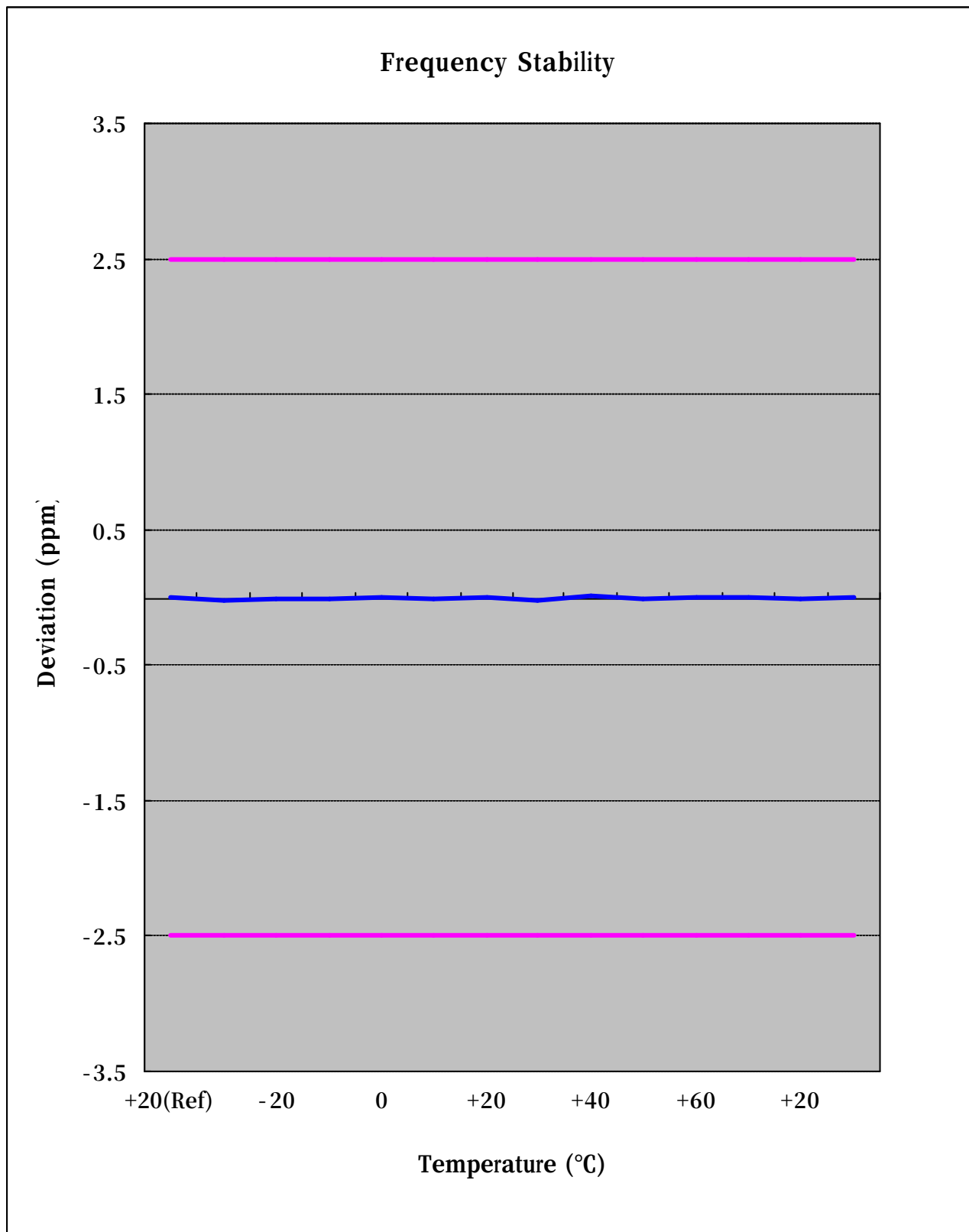
– End of page –

Zoom In



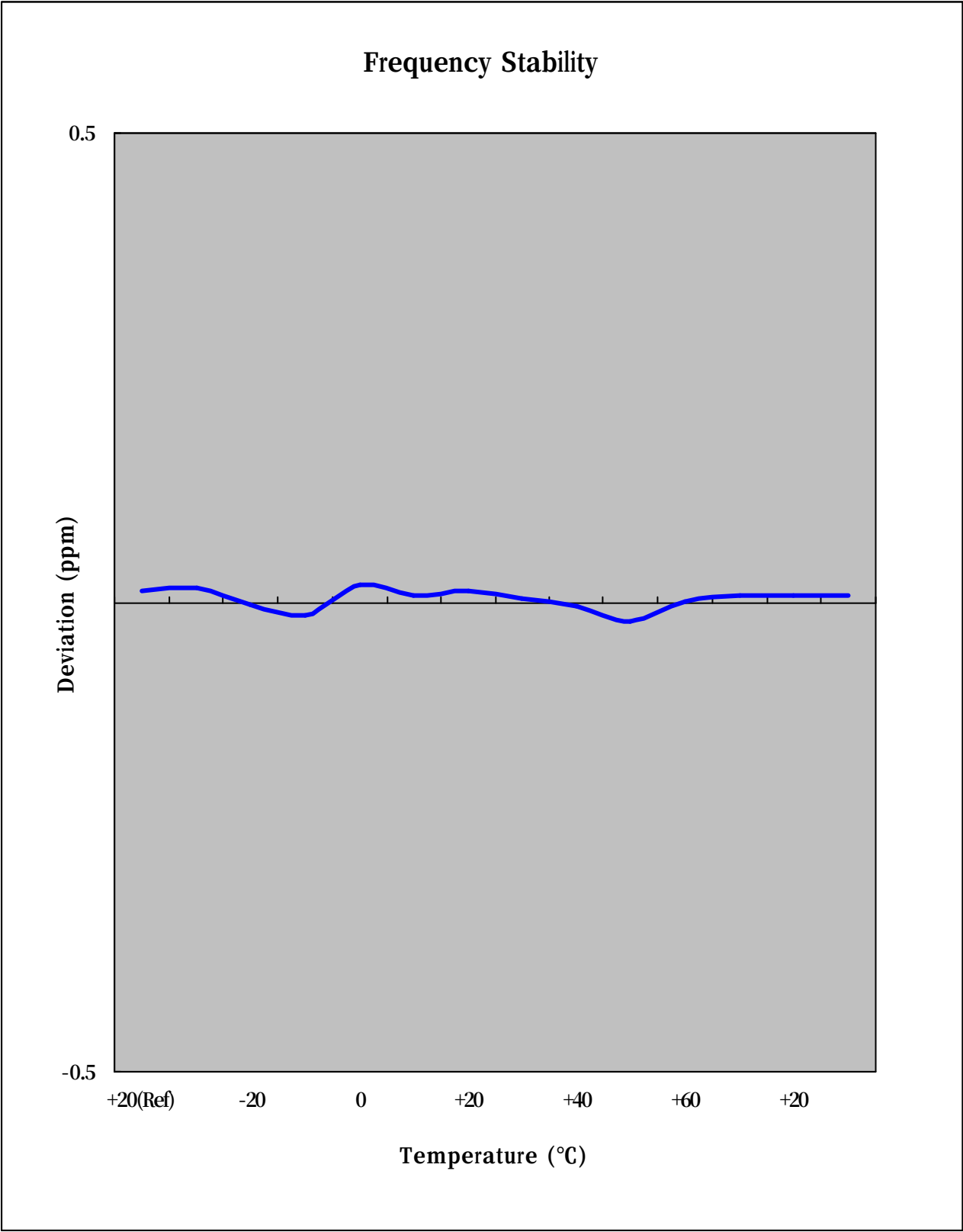
– End of page –

6.7.4 PCS Frequency Stability Graph



– End of page –

Zoom In



7. SAMPLE CALCULATION

7.1 Emission Designator

Emission Designator = 1M25F9W

CDMA BW = 1.25MHz

F = Frequency Modulation

9 = Composite Digital Info

W = Combination(Audio/Data)

(Measured at the 99.75% power bandwidth)

– End of page –



8. CONCLUSION

The data collected shows that the SAMSUNG Cellular/PCS CDMA Phone with Bluetooth, Ev-DO and WLAN.

FCC ID : A3LSCH1920 complies with all the requirements of Parts 2, 22, 24 of the FCC Rules.

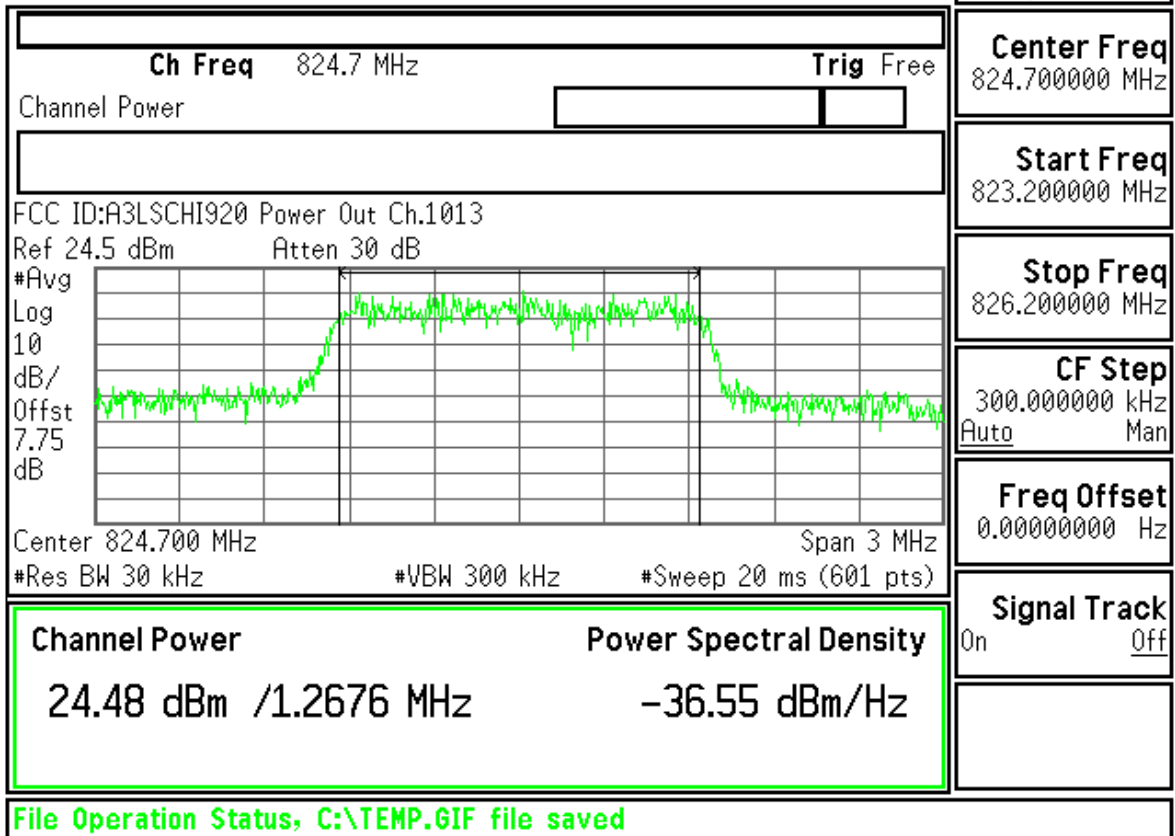
- End of page -

9. TEST PLOTS

A3LSCHI920CDMA

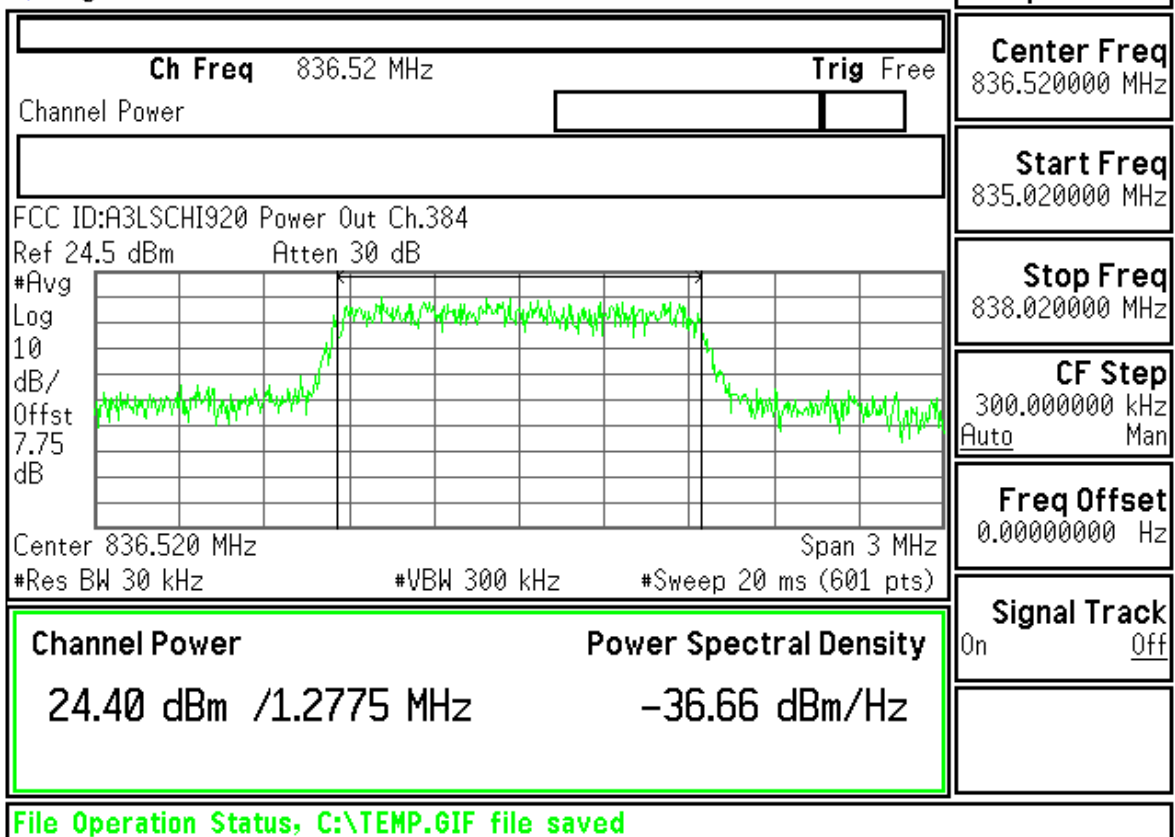
Agilent

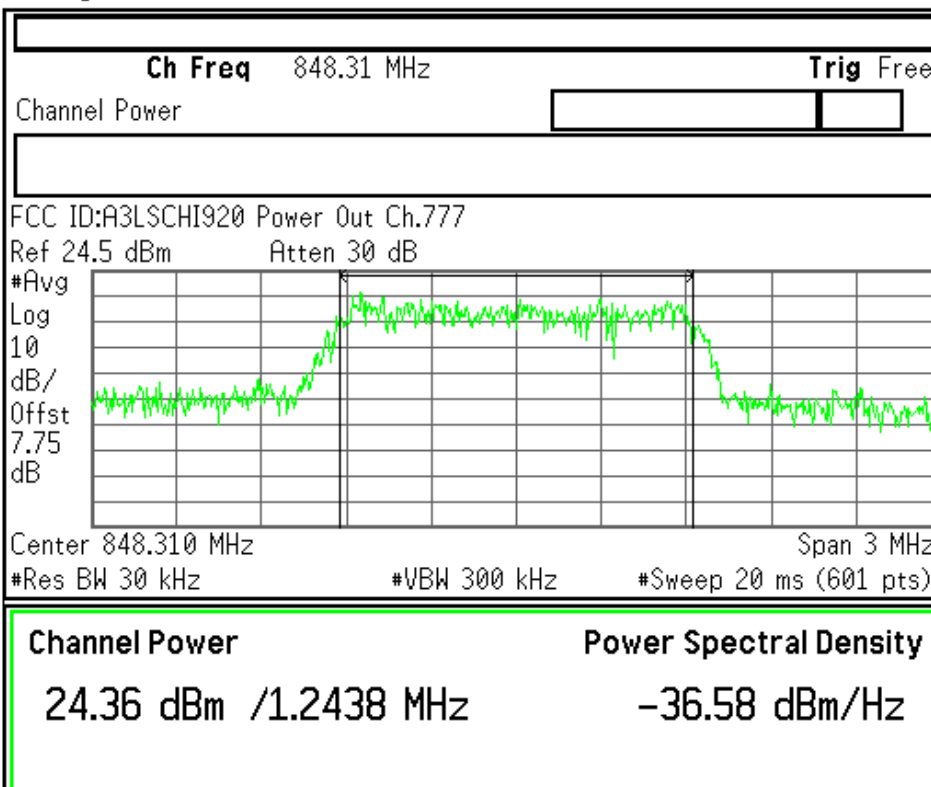
R T



Agilent

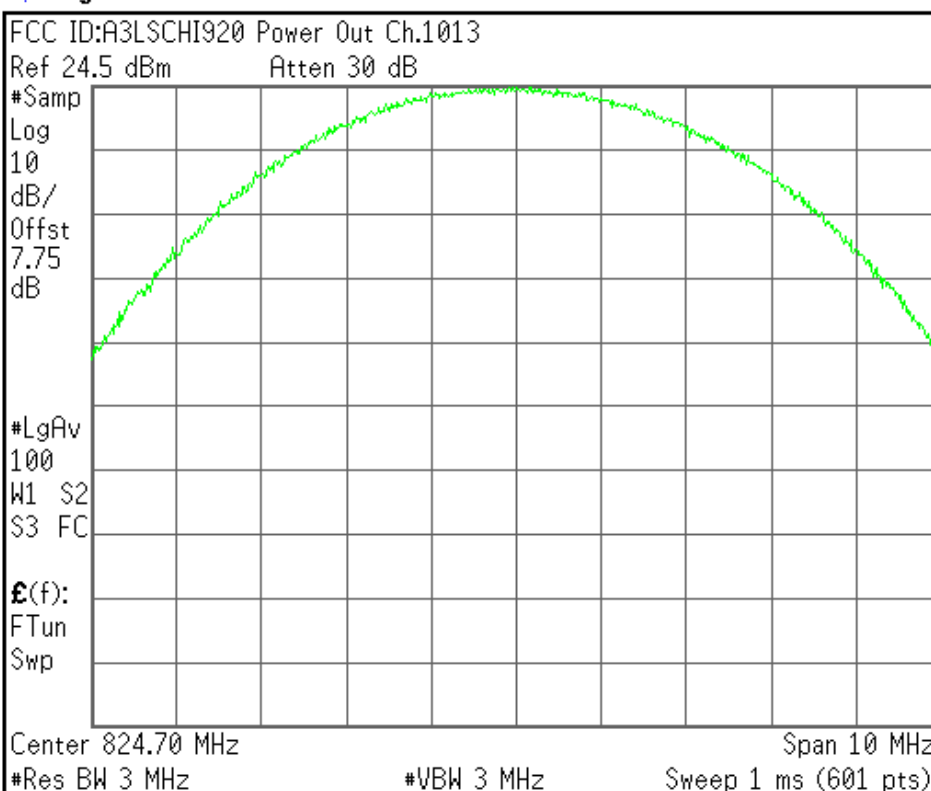
R T





Freq/Channel
Center Freq 848.310000 MHz
Start Freq 846.810000 MHz
Stop Freq 849.810000 MHz
CF Step 300.000000 kHz Auto Man
Freq Offset 0.00000000 Hz
Signal Track On Off

File Operation Status, C:\TEMP.GIF file saved



Freq/Channel
Center Freq 824.700000 MHz
Start Freq 819.700000 MHz
Stop Freq 829.700000 MHz
CF Step 1.00000000 MHz Auto Man
Freq Offset 0.00000000 Hz
Signal Track On Off

File Operation Status, C:\TEMP.GIF file saved

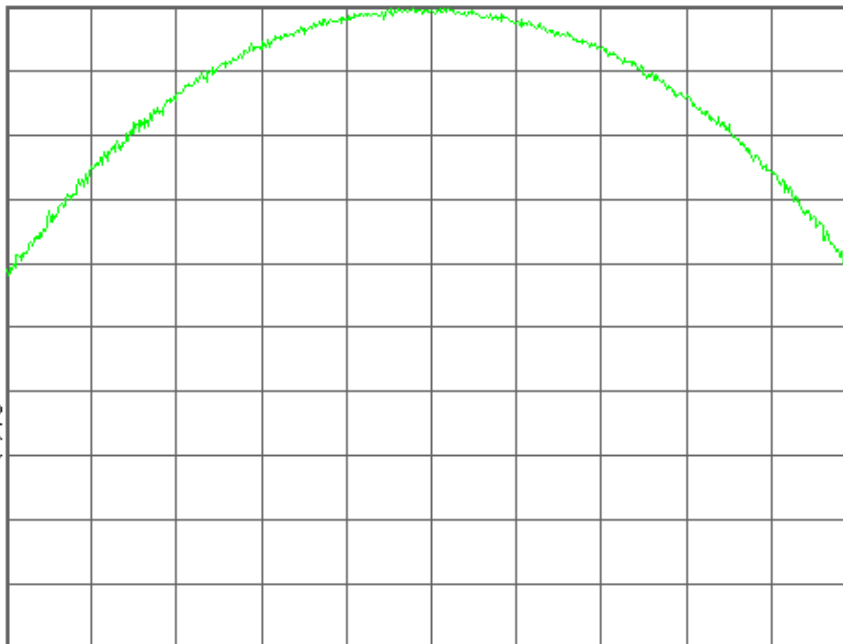
FCC ID:A3LSCHI920 Power Out Ch.384

Ref 24.5 dBm Atten 30 dB

#Samp
Log
10
dB/
Offst
7.75
dB

#LgAv
100
W1 S2
S3 FC

£(f):
FTun
Swp



Center 836.52 MHz

Span 10 MHz

#Res BW 3 MHz

#VBW 3 MHz

Sweep 1 ms (601 pts)

Center Freq
836.520000 MHz

Start Freq
831.520000 MHz

Stop Freq
841.520000 MHz

CF Step
1.00000000 MHz
Auto Man

Freq Offset
0.00000000 Hz

Signal Track
On Off

File Operation Status, C:\TEMP.GIF file saved

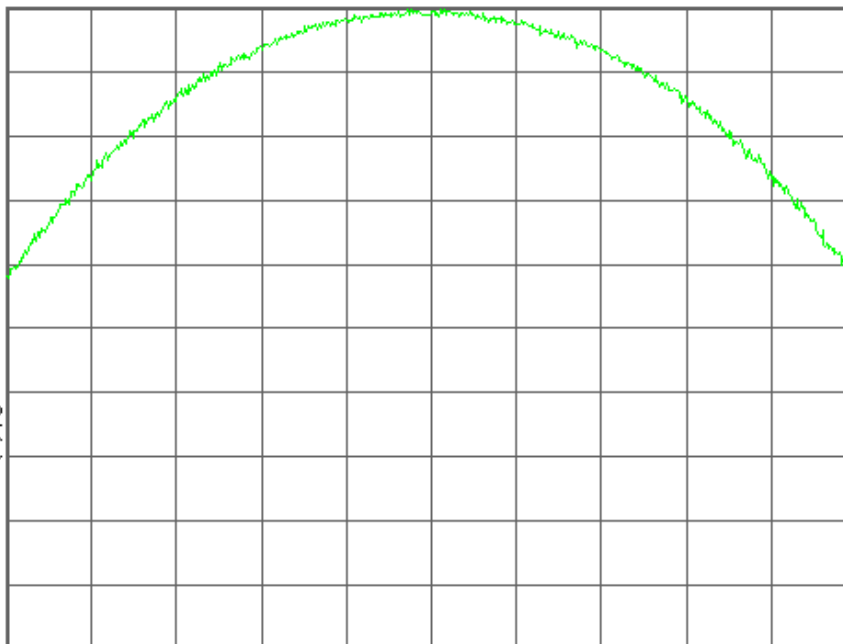
FCC ID:A3LSCHI920 Power Out Ch.777

Ref 24.5 dBm Atten 30 dB

#Samp
Log
10
dB/
Offst
7.75
dB

#LgAv
100
W1 S2
S3 FC

£(f):
FTun
Swp



Center 848.31 MHz

Span 10 MHz

#Res BW 3 MHz

#VBW 3 MHz

Sweep 1 ms (601 pts)

Center Freq
848.310000 MHz

Start Freq
843.310000 MHz

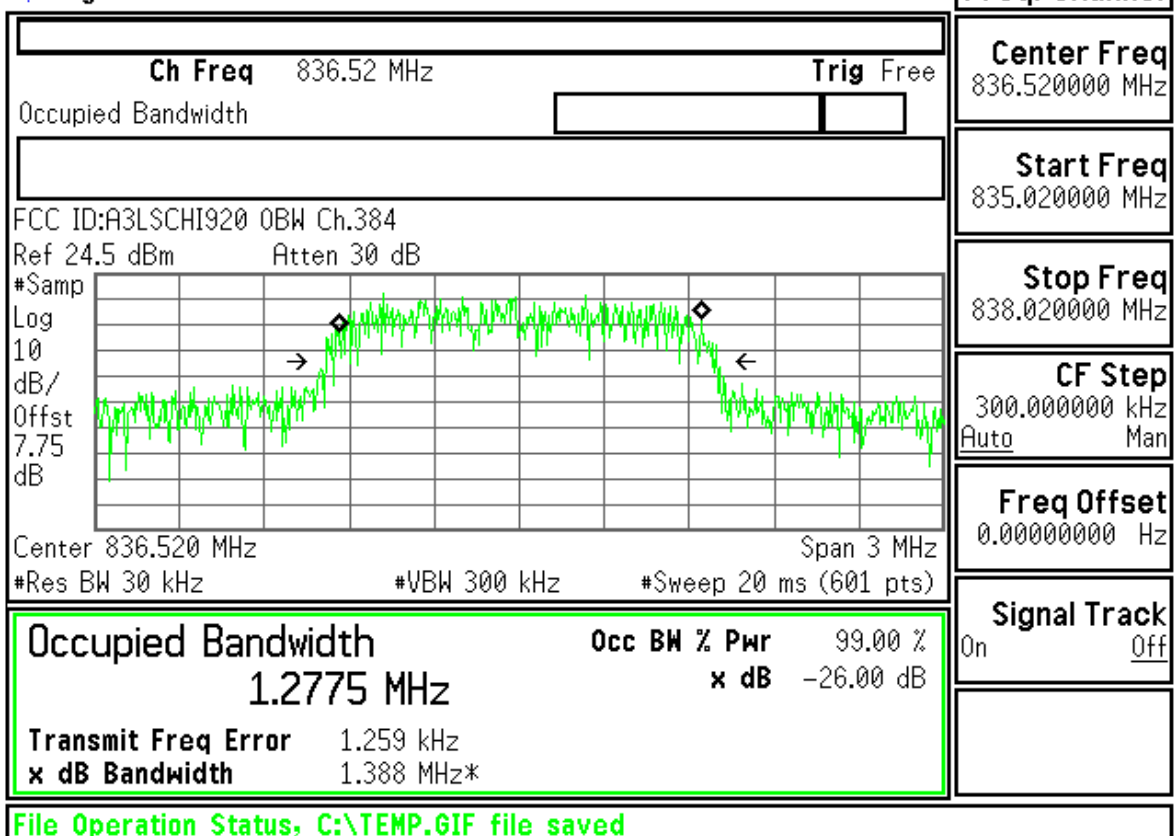
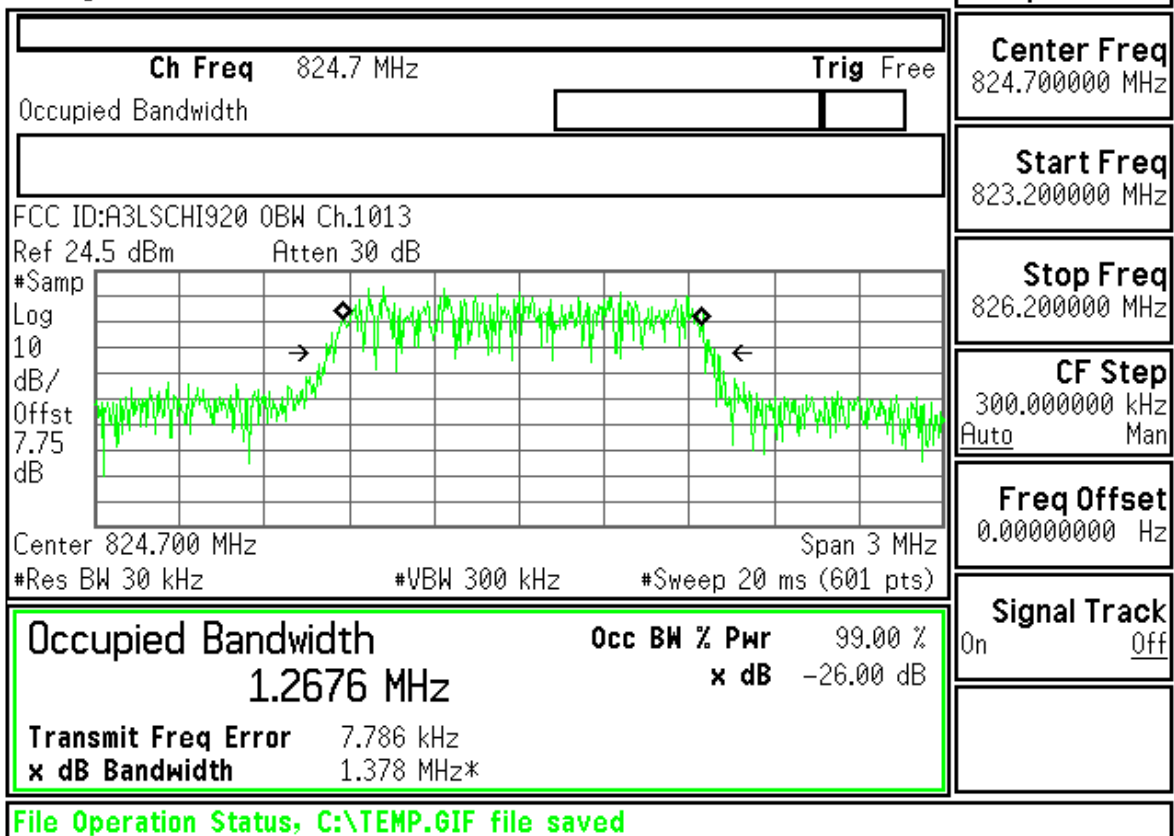
Stop Freq
853.310000 MHz

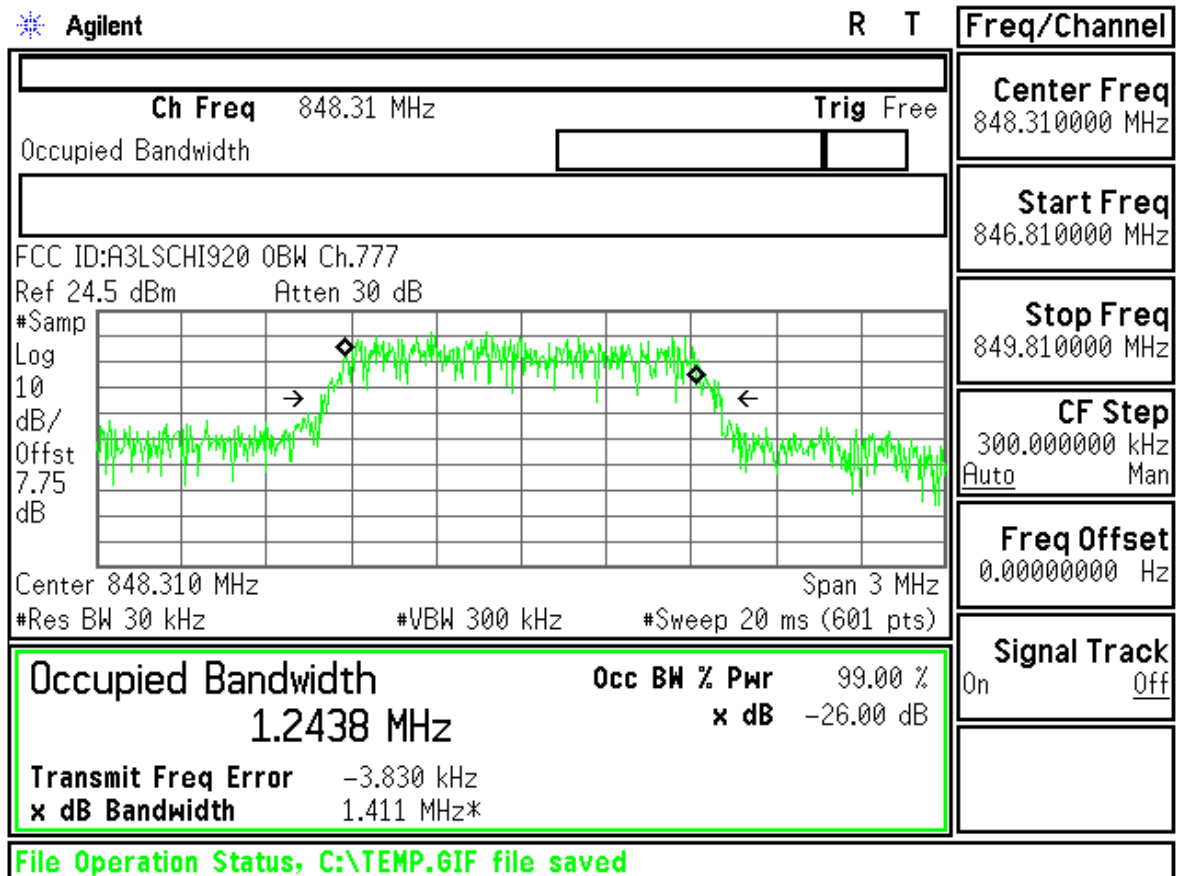
CF Step
1.00000000 MHz
Auto Man

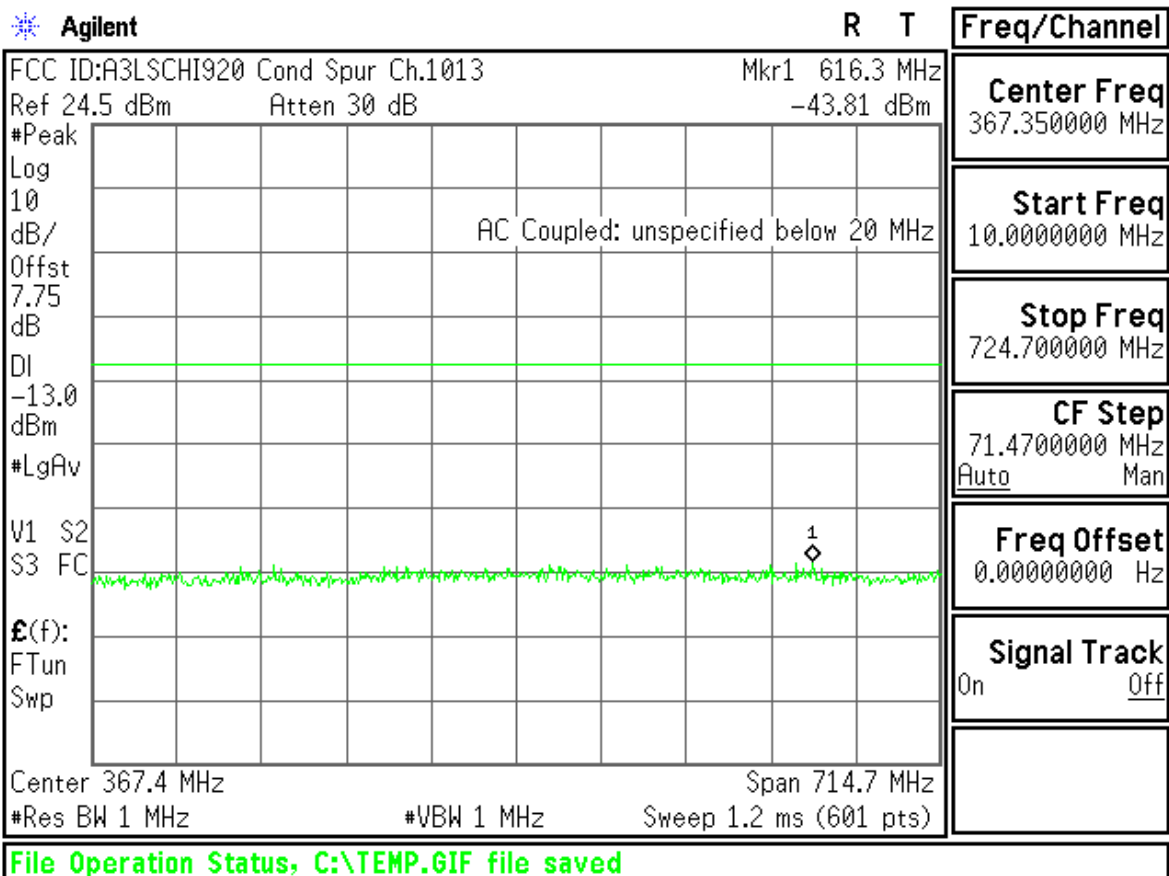
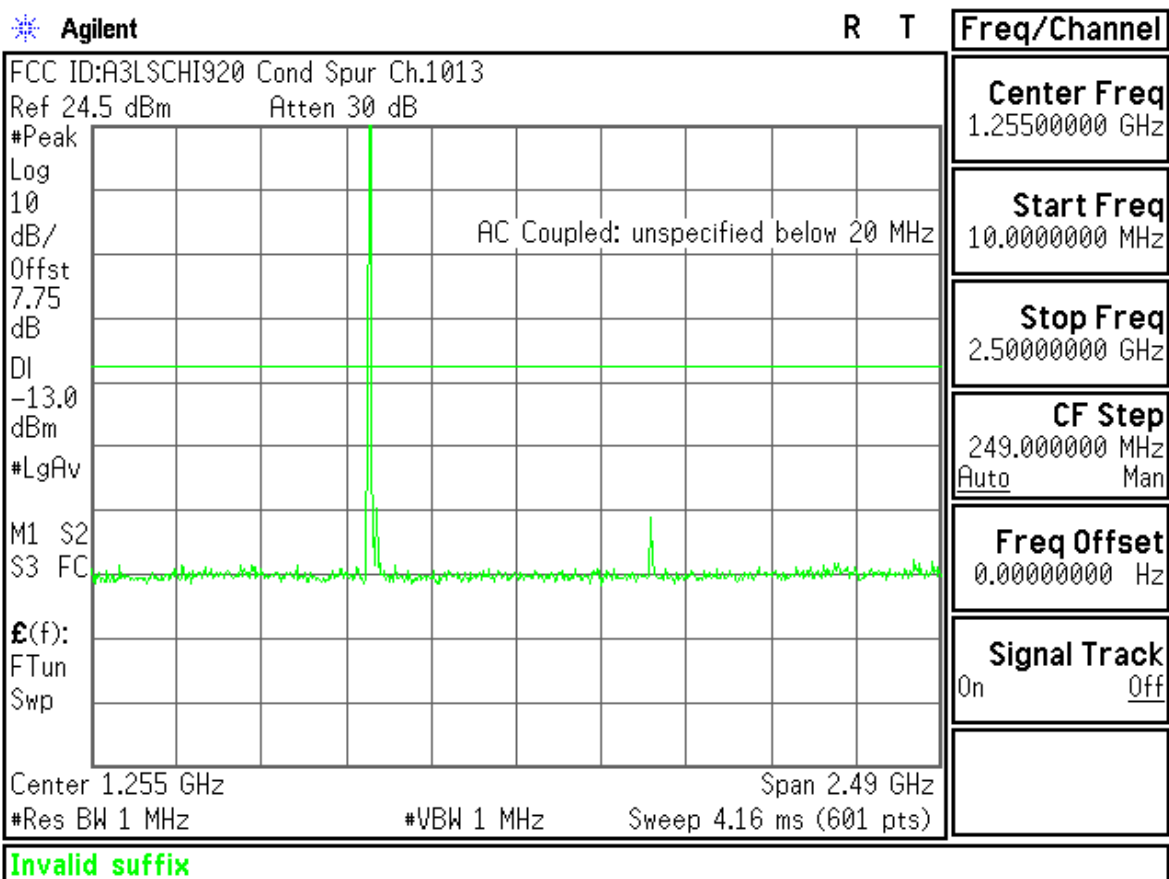
Freq Offset
0.00000000 Hz

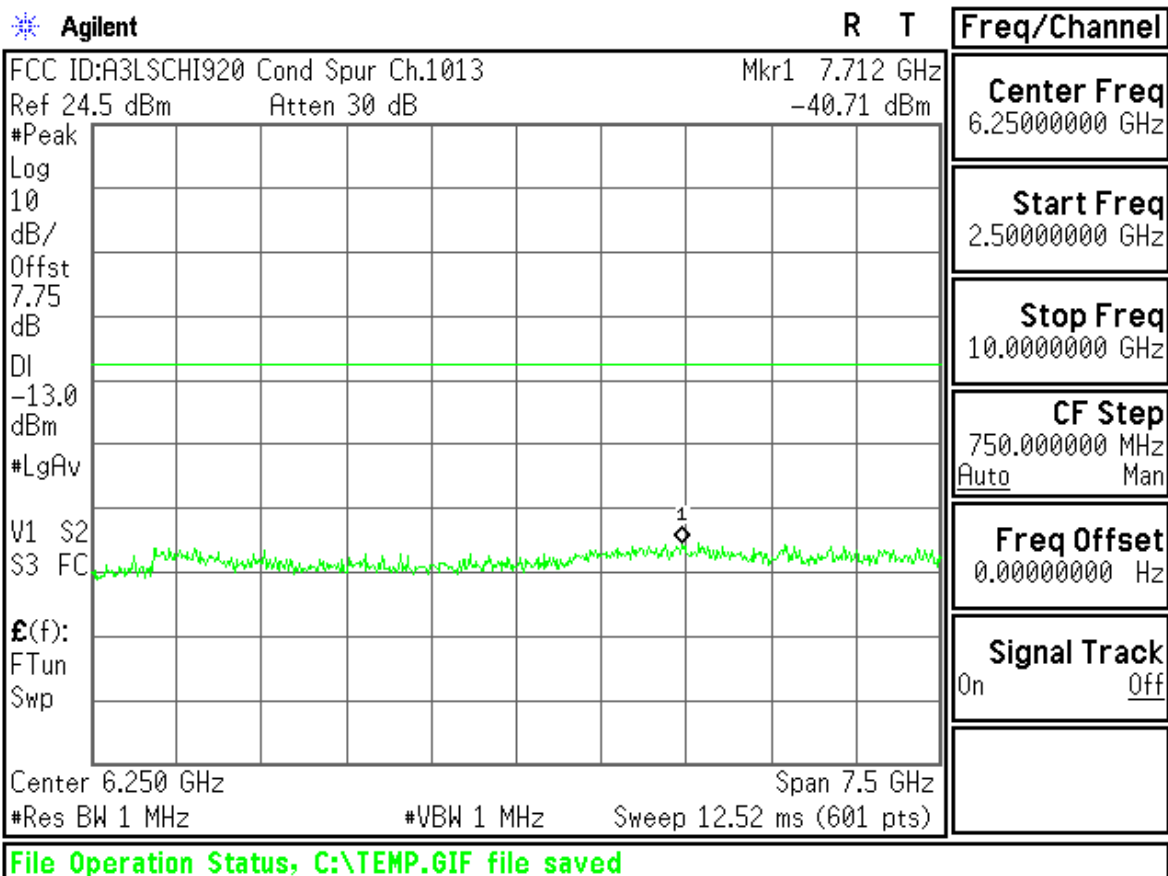
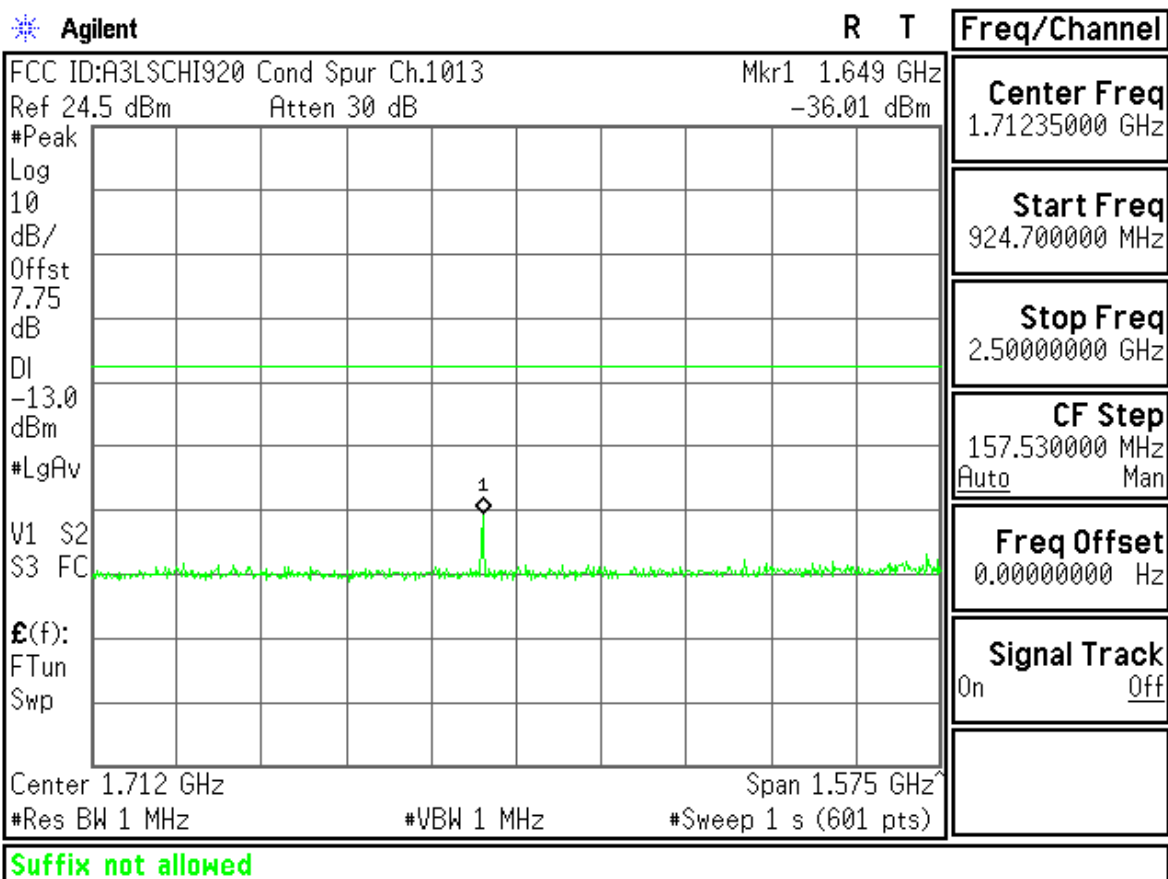
Signal Track
On Off

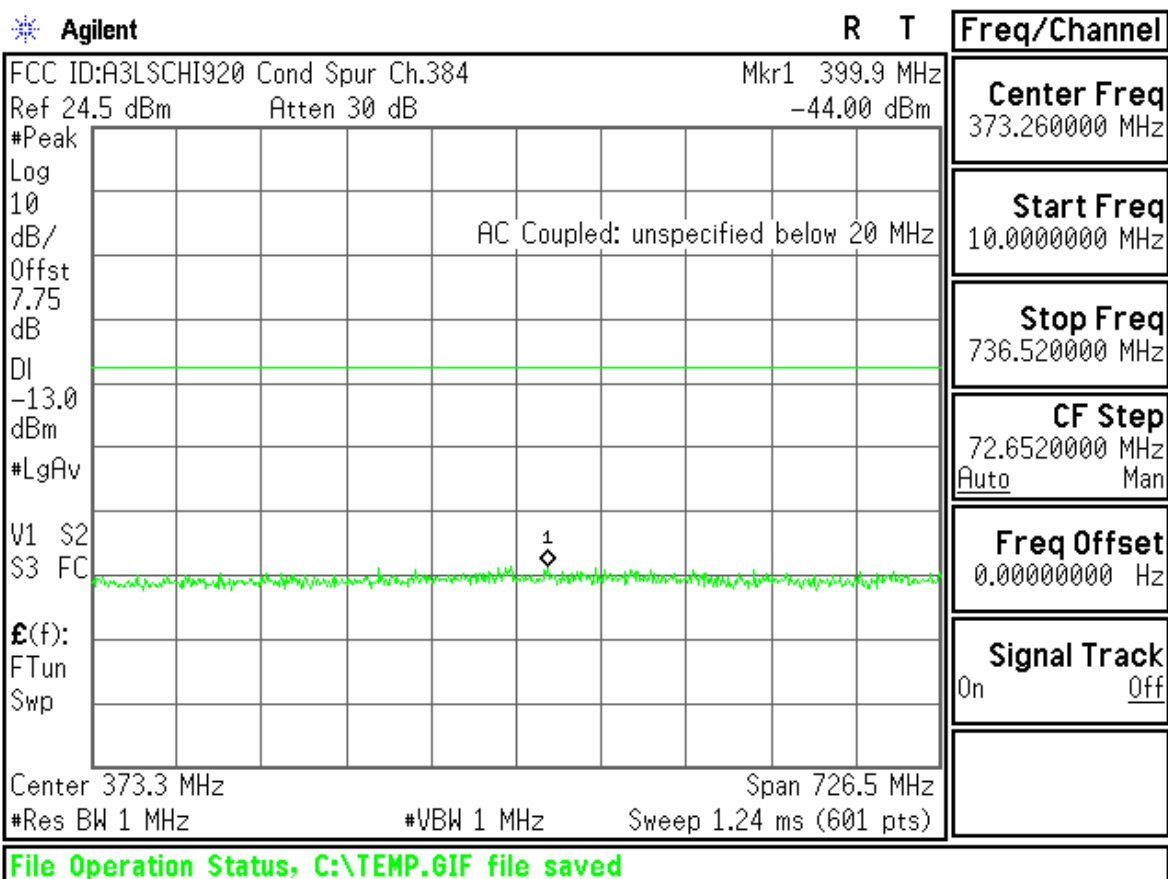
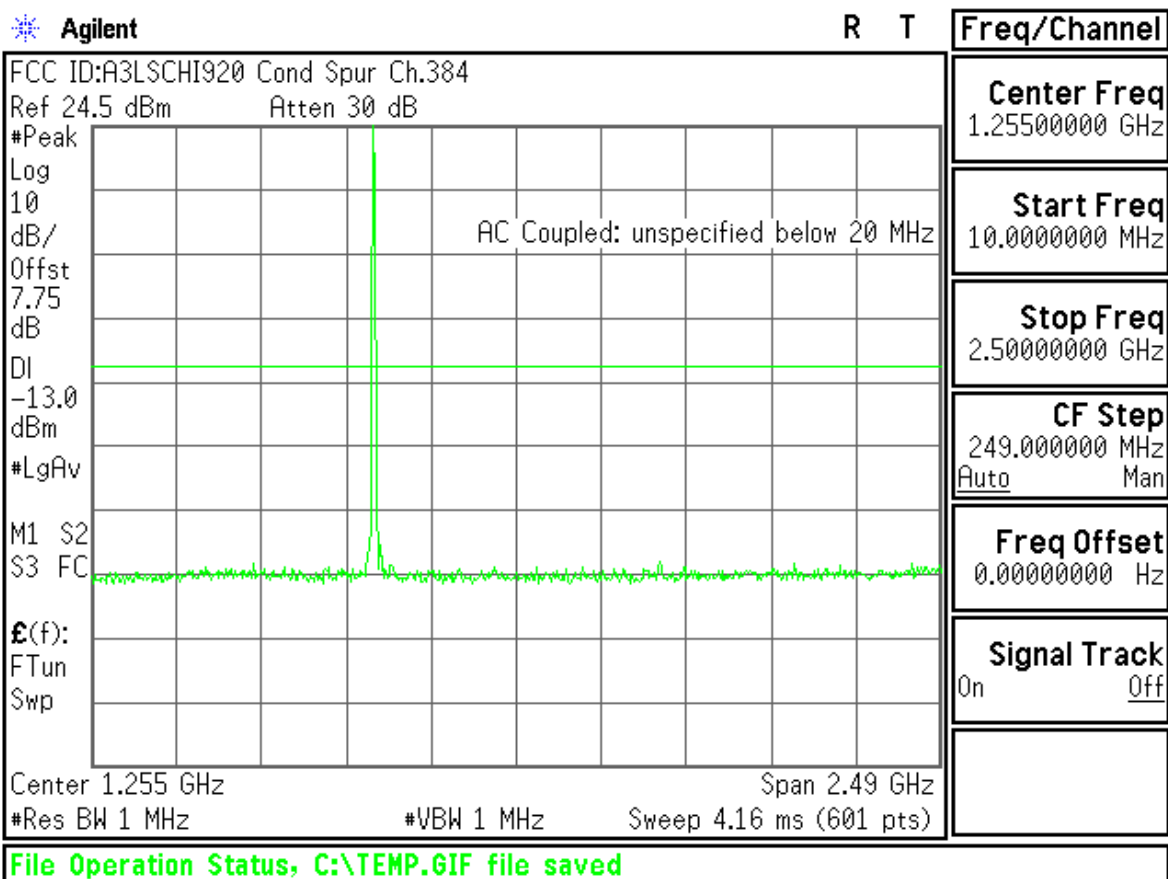
File Operation Status, C:\TEMP.GIF file saved

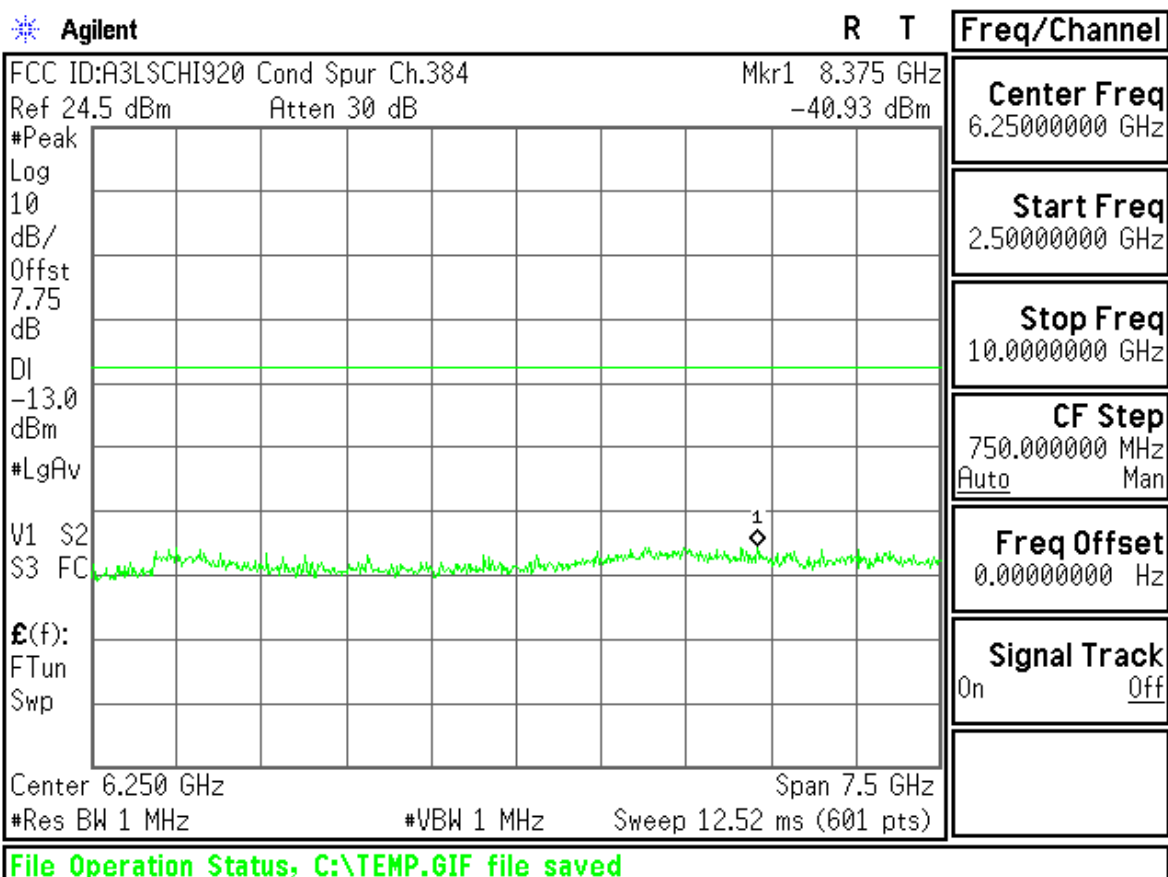
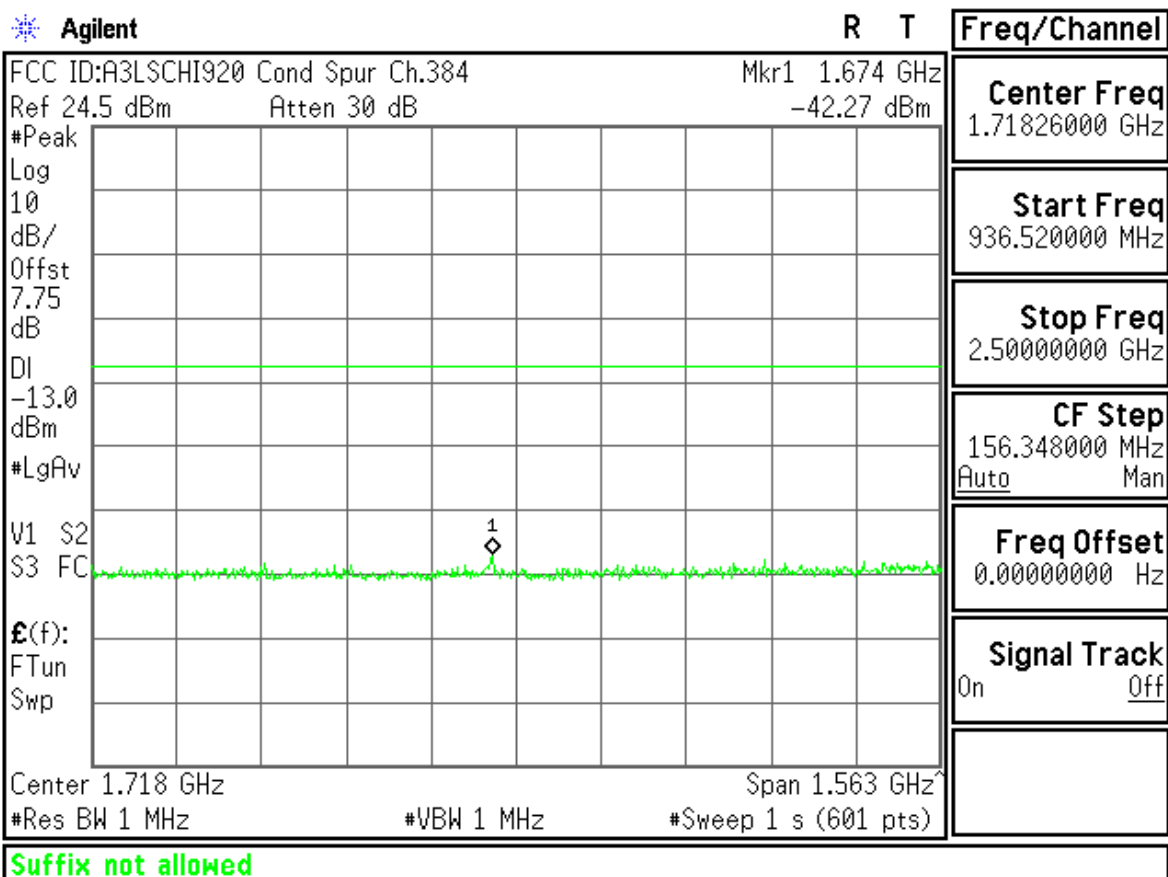


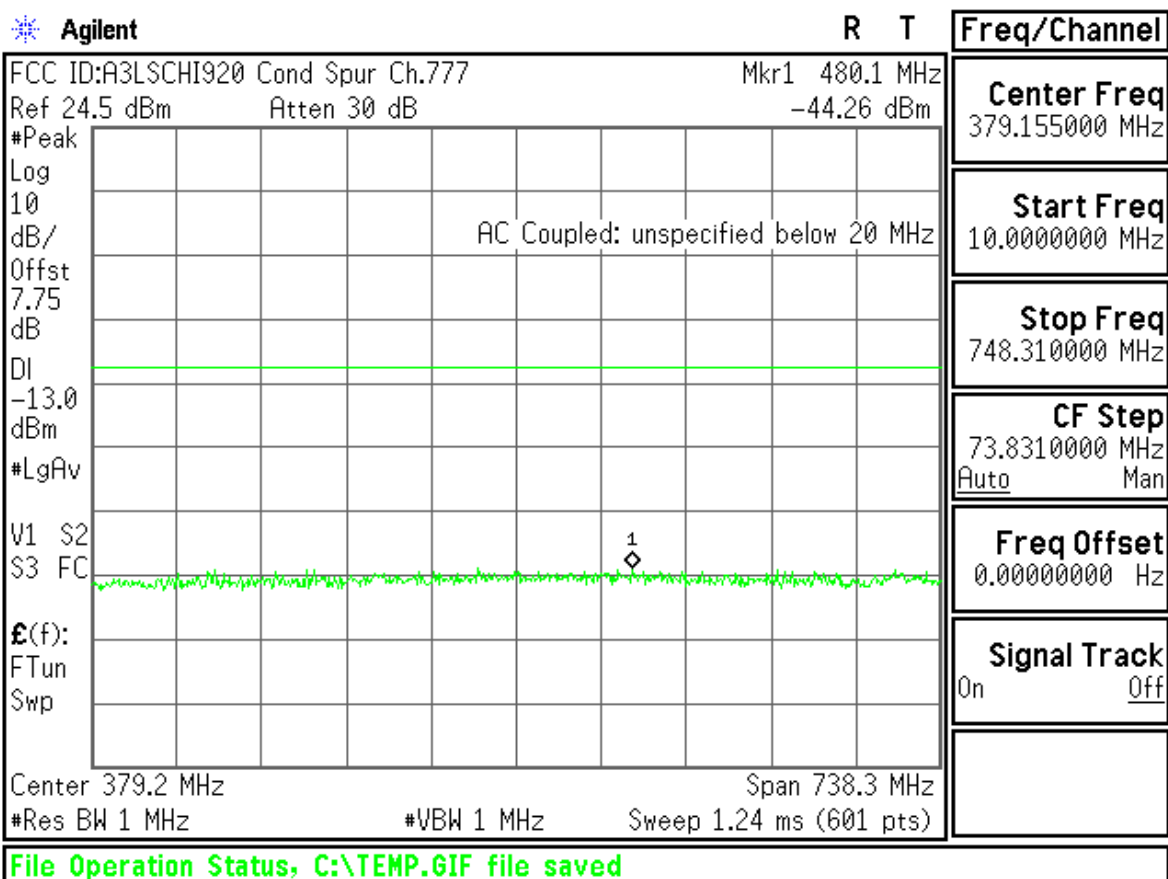
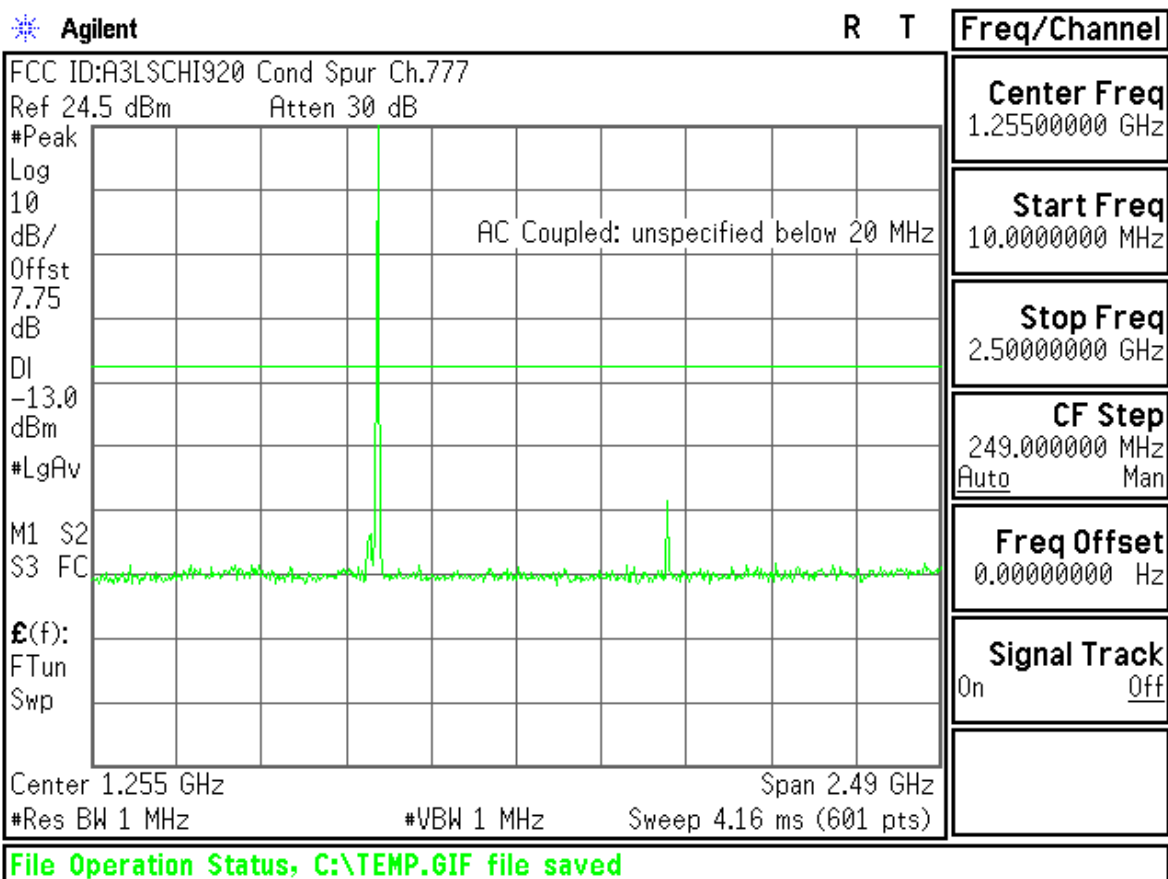


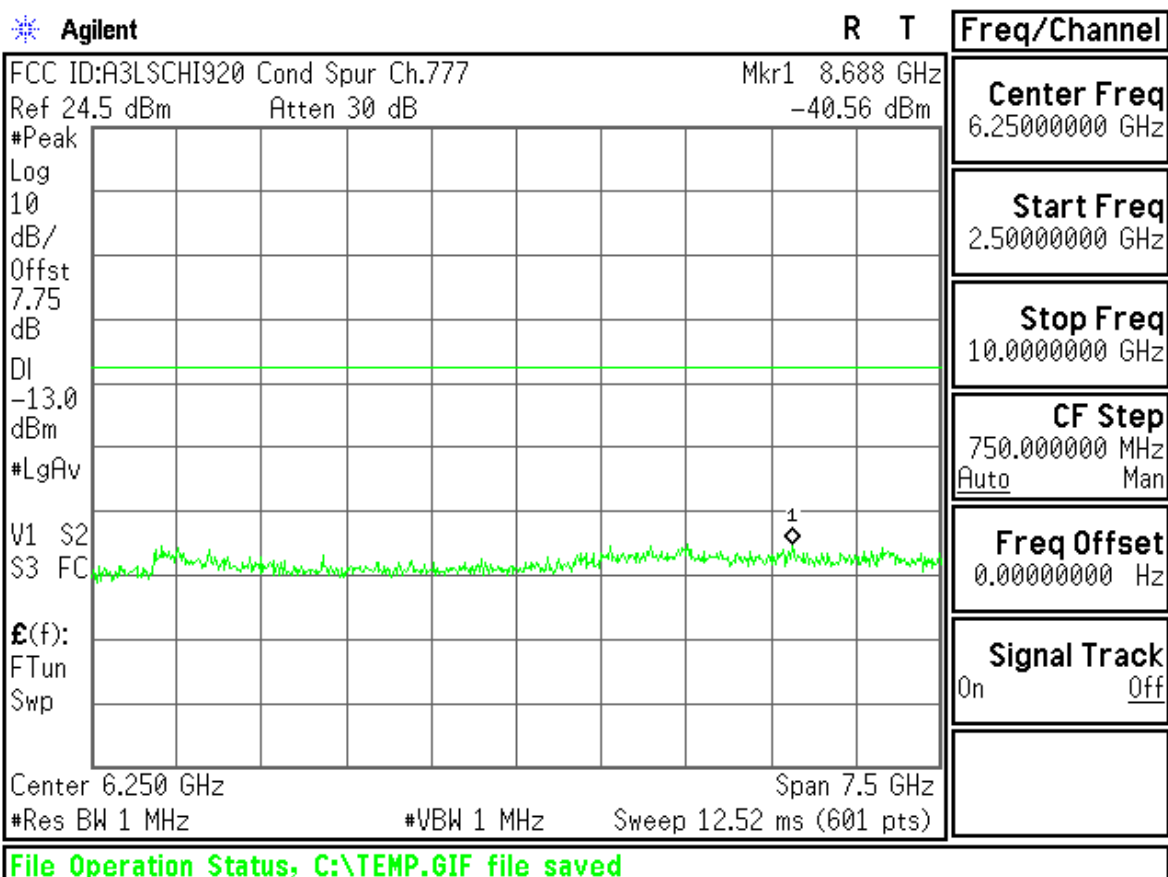
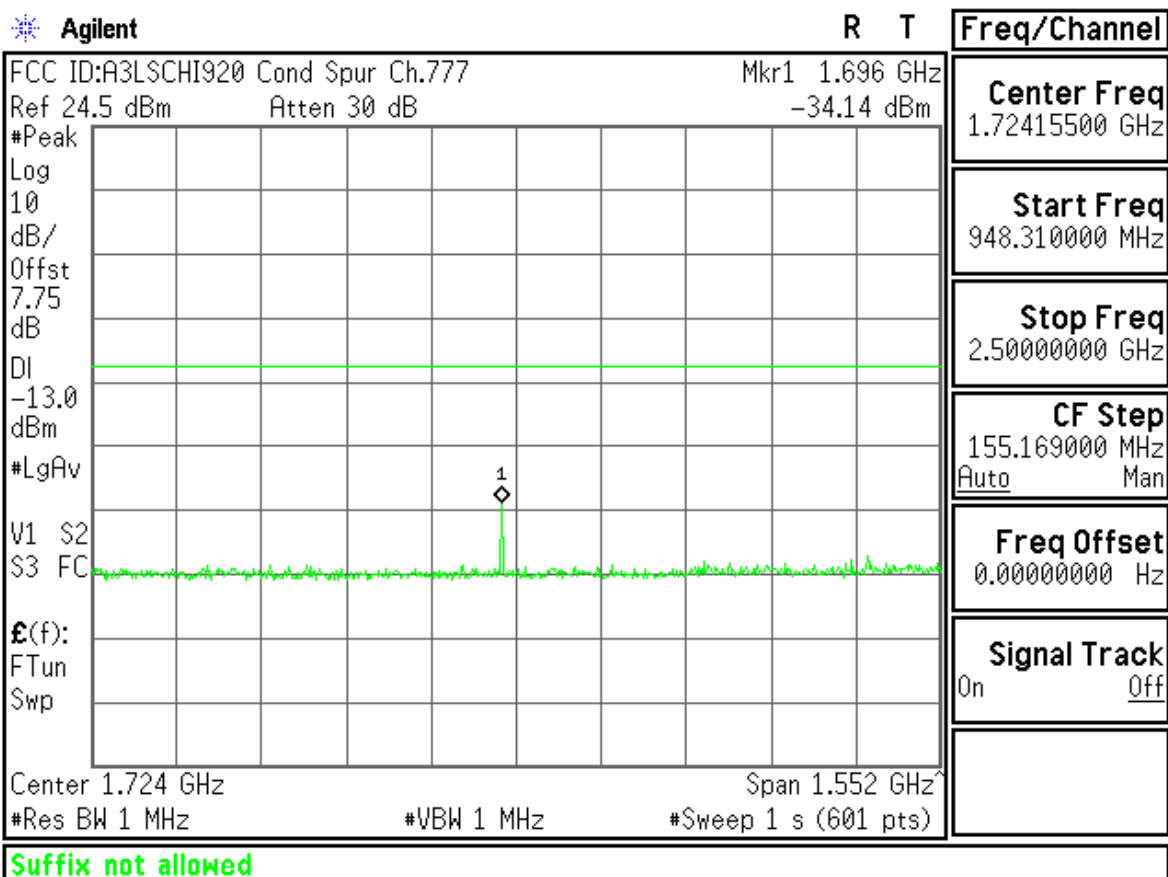












Agilent

R T

Freq/Channel

FCC ID:A3LSCHI920 Band Edge Ch.1013

Mkr1 824.000 MHz

Ref 24.5 dBm

Atten 30 dB

-18.840 dBm

#Samp

Log

10

dB/

Offst

7.75

dB

DI

-13.0

dBm

#LgAv

100

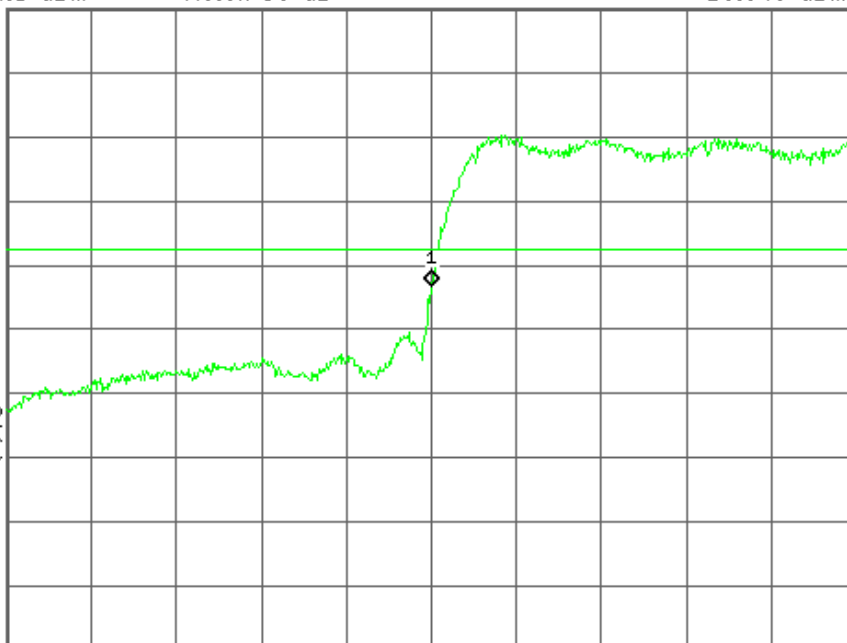
W1 S2

S3 FC

£(f):

f>50k

Swp



Center 824.000 MHz

Span 2 MHz

#Res BW 13 kHz

#VBW 13 kHz

Sweep 45.16 ms (601 pts)

Invalid suffix

Center Freq
824.000000 MHz

Start Freq
823.000000 MHz

Stop Freq
825.000000 MHz

CF Step
200.000000 kHz
Auto Man

Freq Offset
0.00000000 Hz

Signal Track
On Off

Agilent

R T

Freq/Channel

FCC ID:A3LSCHI920 Band Edge Ch.777

Mkr1 849.000 MHz

Ref 24.5 dBm

Atten 30 dB

-14.978 dBm

#Samp

Log

10

dB/

Offst

7.75

dB

DI

-13.0

dBm

#LgAv

100

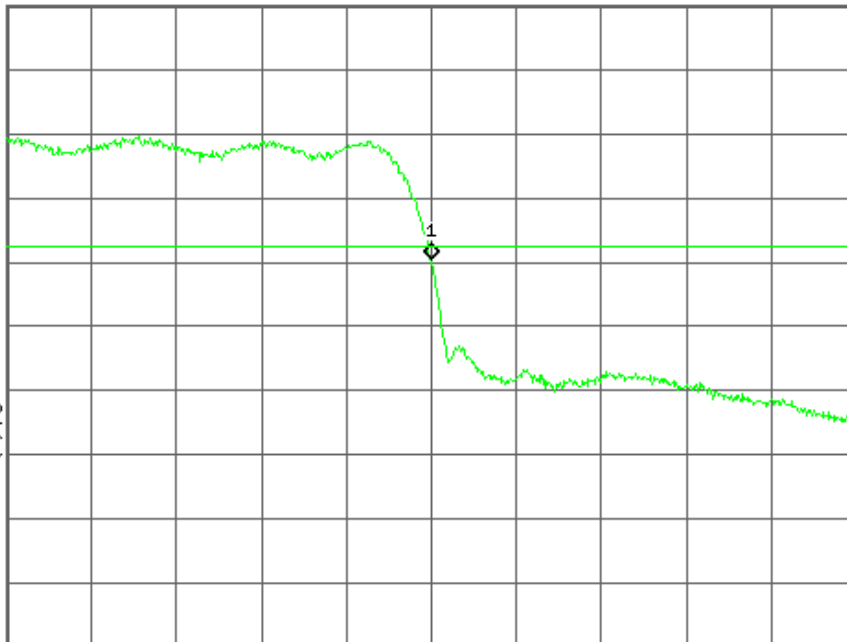
W1 S2

S3 FC

£(f):

f>50k

Swp



Center 849.000 MHz

Span 2 MHz

#Res BW 13 kHz

#VBW 13 kHz

Sweep 45.16 ms (601 pts)

Invalid suffix

Center Freq
849.000000 MHz

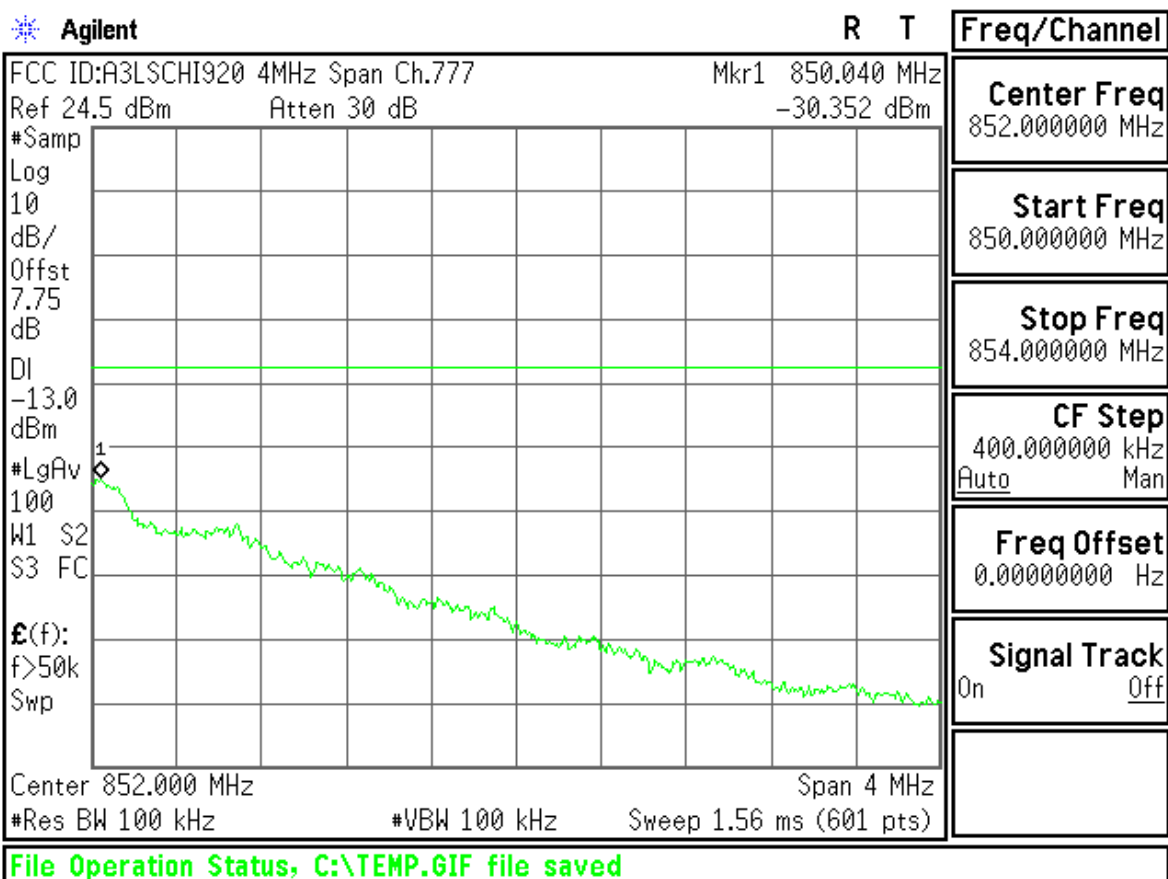
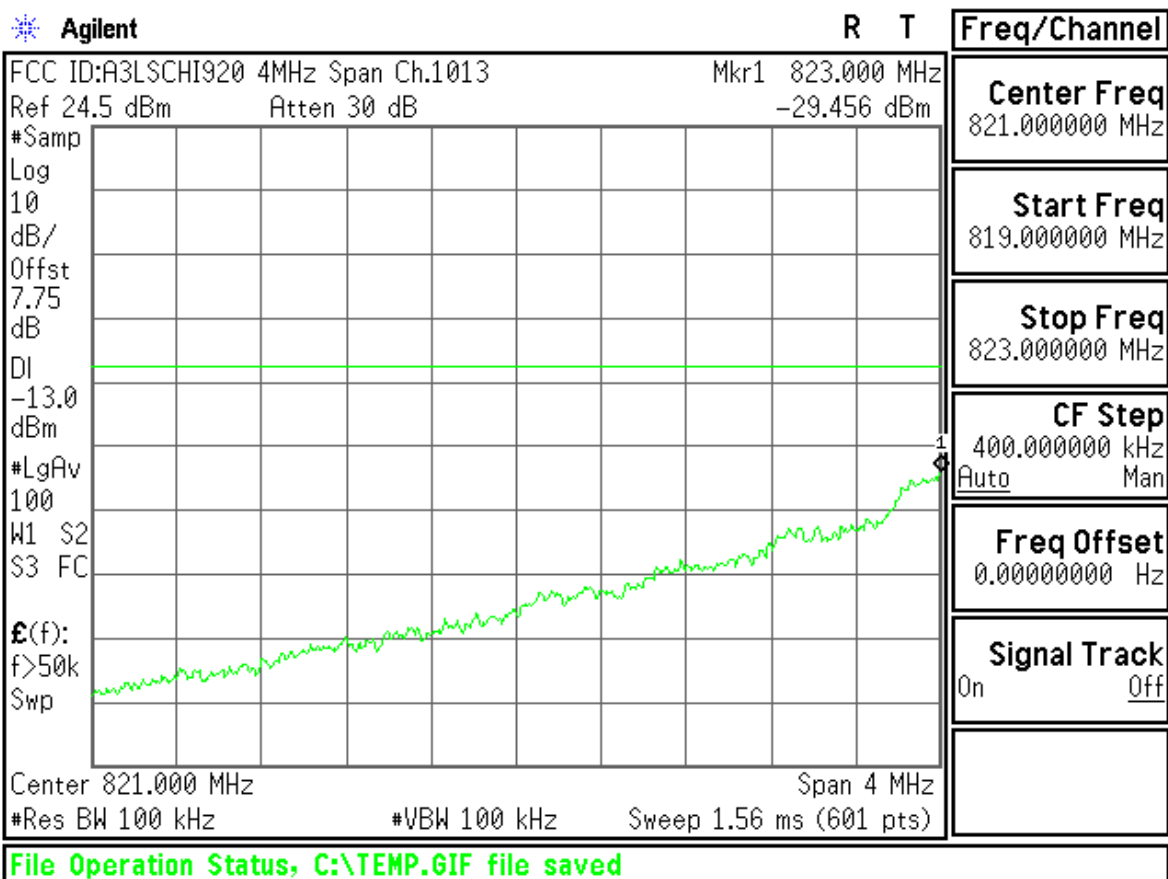
Start Freq
848.000000 MHz

Stop Freq
850.000000 MHz

CF Step
200.000000 kHz
Auto Man

Freq Offset
0.00000000 Hz

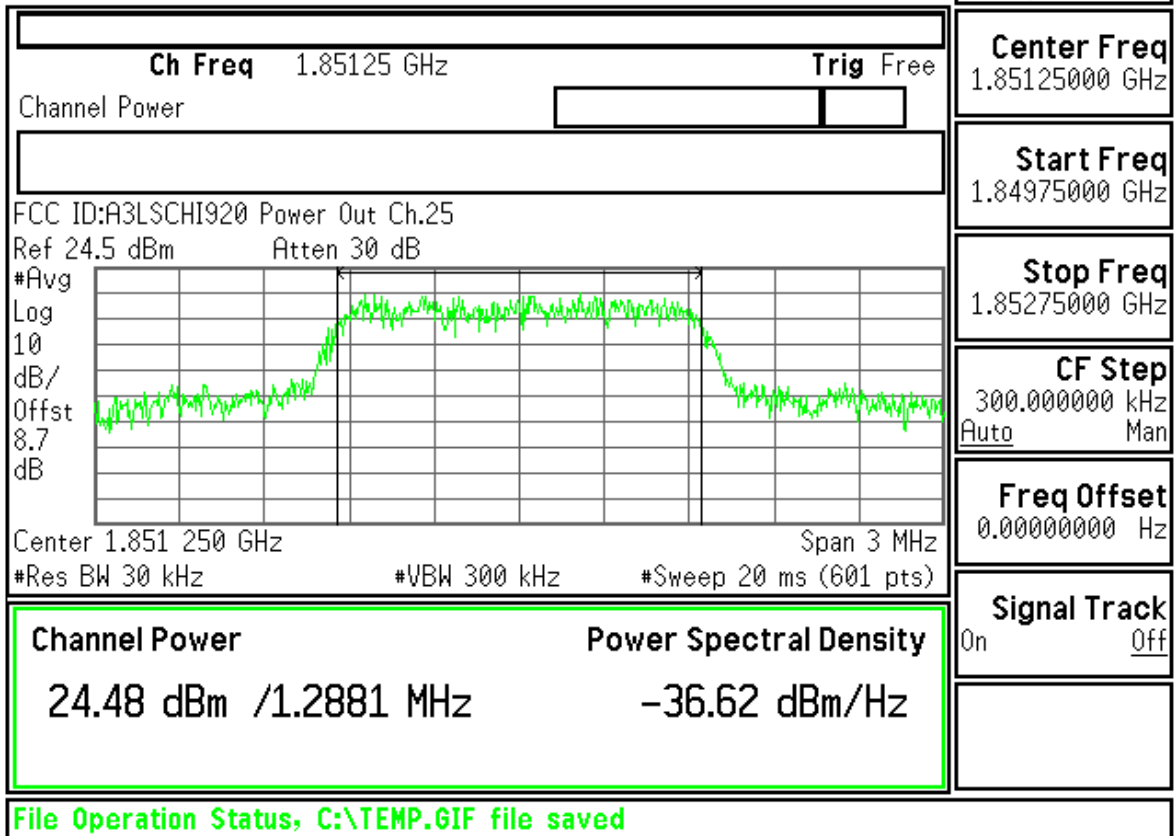
Signal Track
On Off



A3LSCHI920PCS

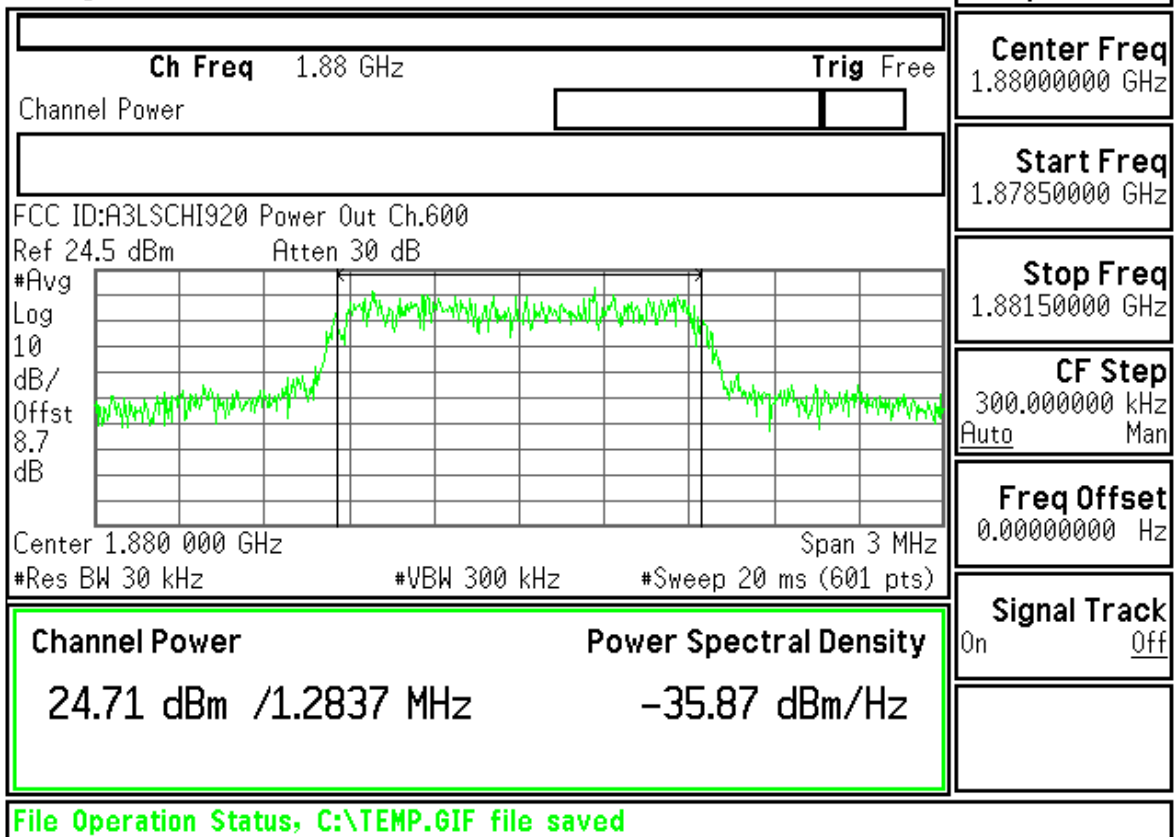
Agilent

R T



Agilent

R T



Agilent

R T

Freq/Channel

Ch Freq 1.90875 GHz Trig Free
Channel Power

Center Freq
1.90875000 GHz

Start Freq
1.90725000 GHz

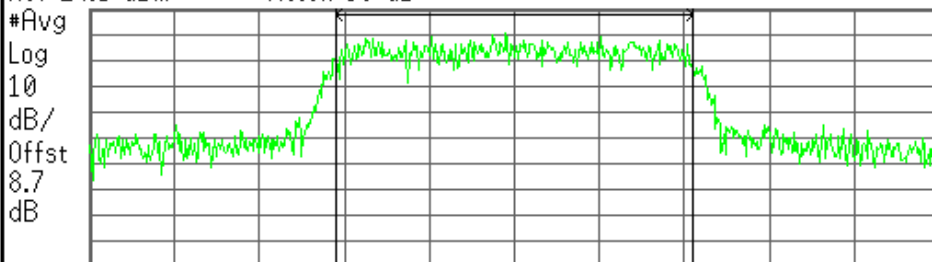
Stop Freq
1.91025000 GHz

CF Step
300.000000 kHz
Auto Man

Freq Offset
0.00000000 Hz

Signal Track
On Off

FCC ID:A3LSCHI920 Power Out Ch.1175
Ref 24.5 dBm Atten 30 dB



Center 1.908 750 GHz Span 3 MHz
#Res BW 30 kHz #VBW 300 kHz #Sweep 20 ms (601 pts)

Channel Power Power Spectral Density
24.73 dBm /1.2620 MHz -36.28 dBm/Hz

File Operation Status, C:\TEMP.GIF file saved

Agilent

R T

Freq/Channel

FCC ID:A3LSCHI920 Power Out Ch.25
Ref 24.5 dBm Atten 30 dB

Center Freq
1.85125000 GHz

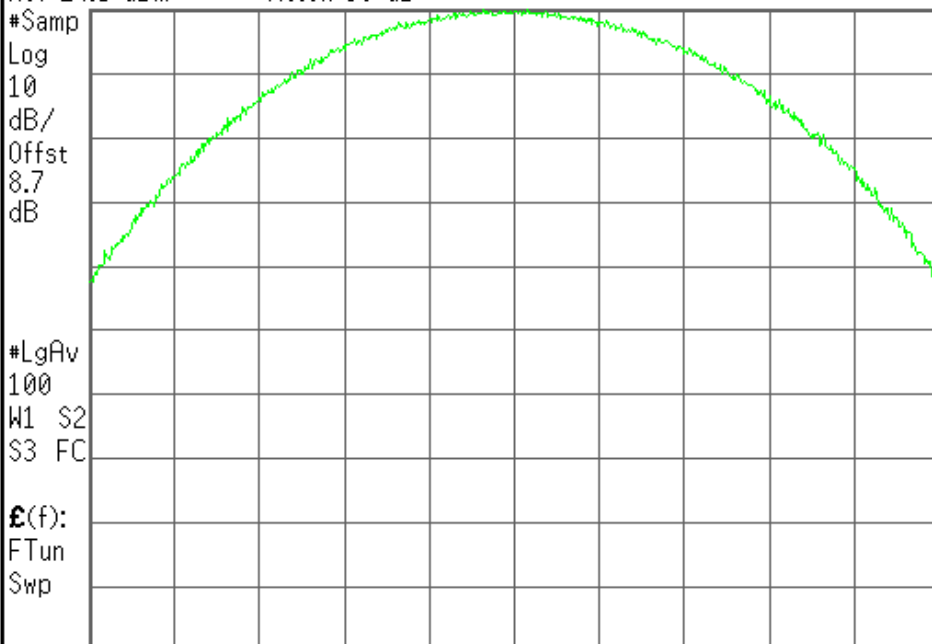
Start Freq
1.84625000 GHz

Stop Freq
1.85625000 GHz

CF Step
1.00000000 MHz
Auto Man

Freq Offset
0.00000000 Hz

Signal Track
On Off



Center 1.851 25 GHz Span 10 MHz
#Res BW 3 MHz #VBW 3 MHz Sweep 1 ms (601 pts)

File Operation Status, C:\TEMP.GIF file saved

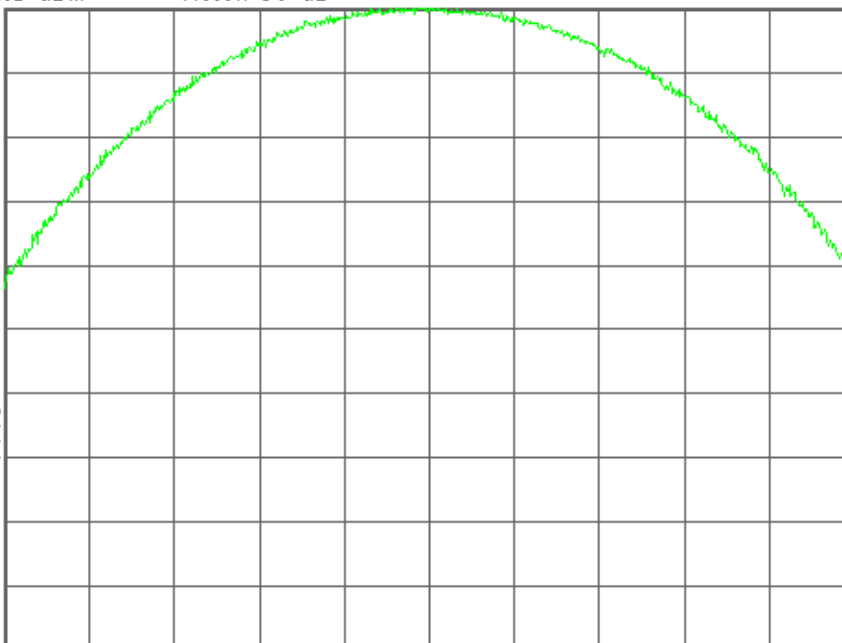
FCC ID:A3LSCHI920 Power Out Ch.600

Ref 24.5 dBm Atten 30 dB

#Samp
Log
10
dB/
Offst
8.7
dB

#LgAv
100
W1 S2
S3 FC

£(f):
FTun
Swp



Center 1.880 00 GHz

Span 10 MHz

#Res BW 3 MHz

#VBW 3 MHz

Sweep 1 ms (601 pts)

Center Freq
1.88000000 GHz

Start Freq
1.87500000 GHz

Stop Freq
1.88500000 GHz

CF Step
1.00000000 MHz
Auto Man

Freq Offset
0.00000000 Hz

Signal Track
On Off

File Operation Status, C:\TEMP.GIF file saved

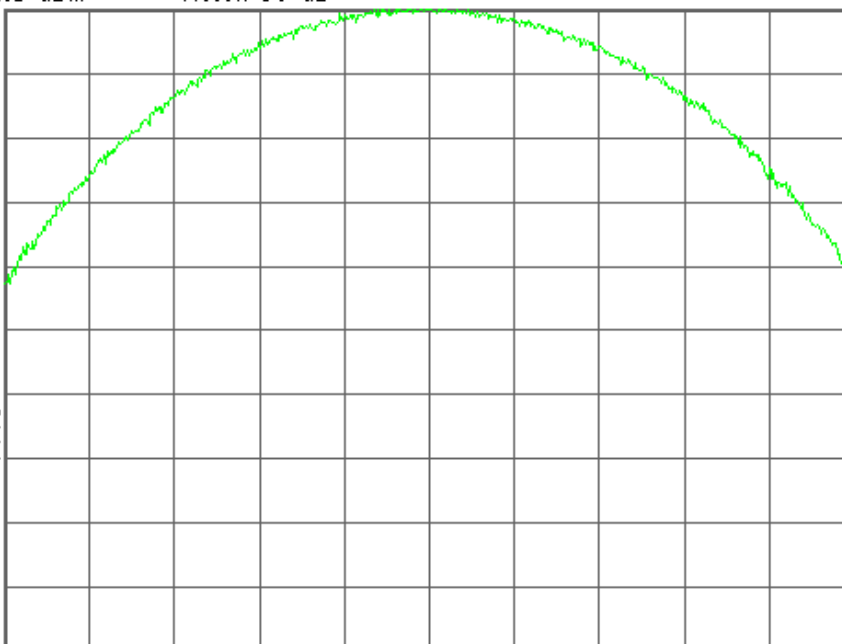
FCC ID:A3LSCHI920 Power Out Ch.1175

Ref 24.5 dBm Atten 30 dB

#Samp
Log
10
dB/
Offst
8.7
dB

#LgAv
100
W1 S2
S3 FC

£(f):
FTun
Swp



Center 1.908 75 GHz

Span 10 MHz

#Res BW 3 MHz

#VBW 3 MHz

Sweep 1 ms (601 pts)

Center Freq
1.90875000 GHz

Start Freq
1.90375000 GHz

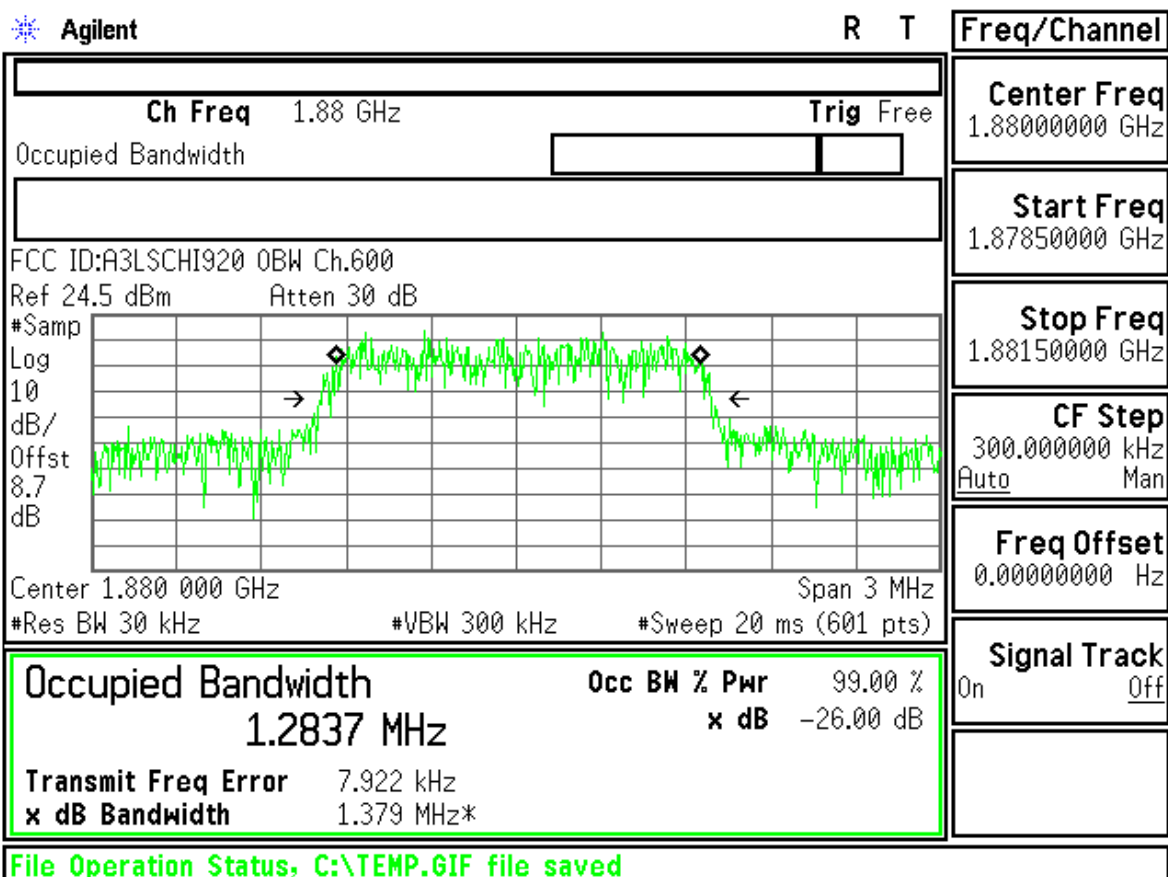
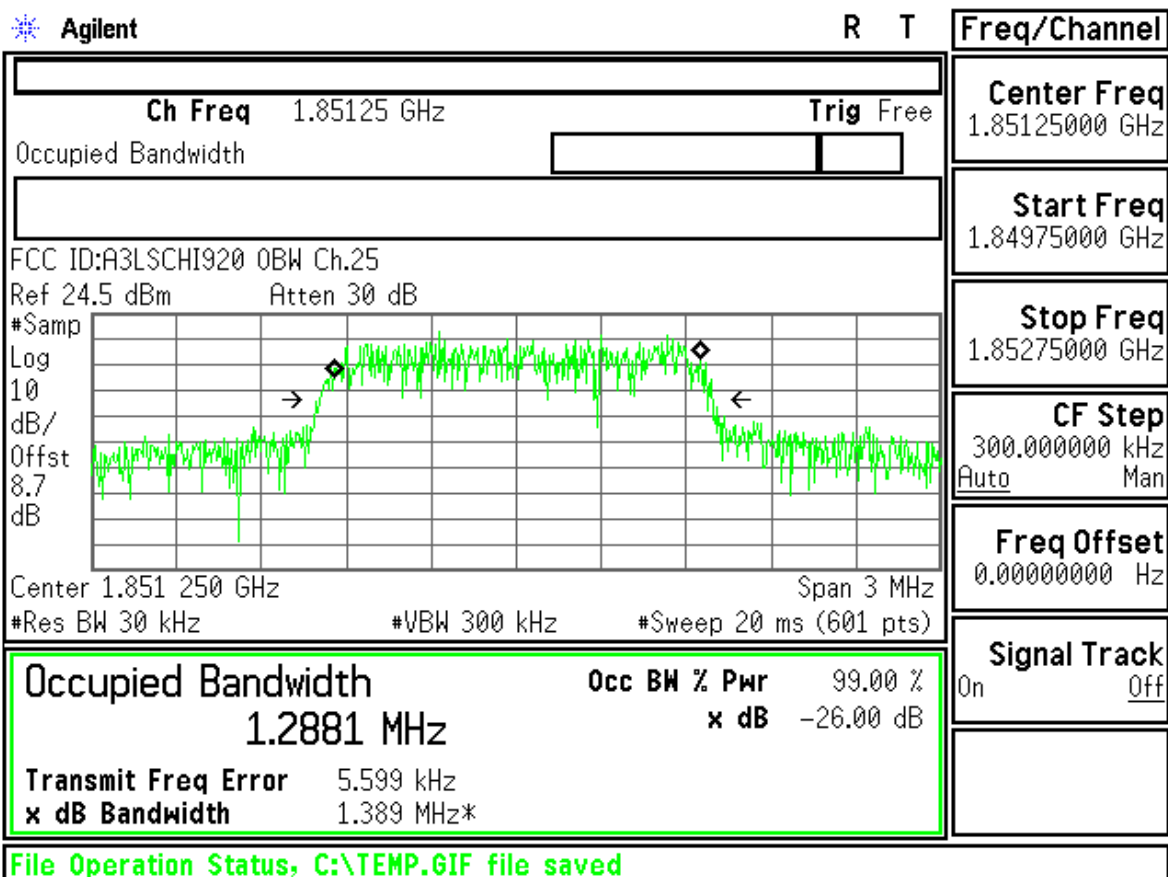
Stop Freq
1.91375000 GHz

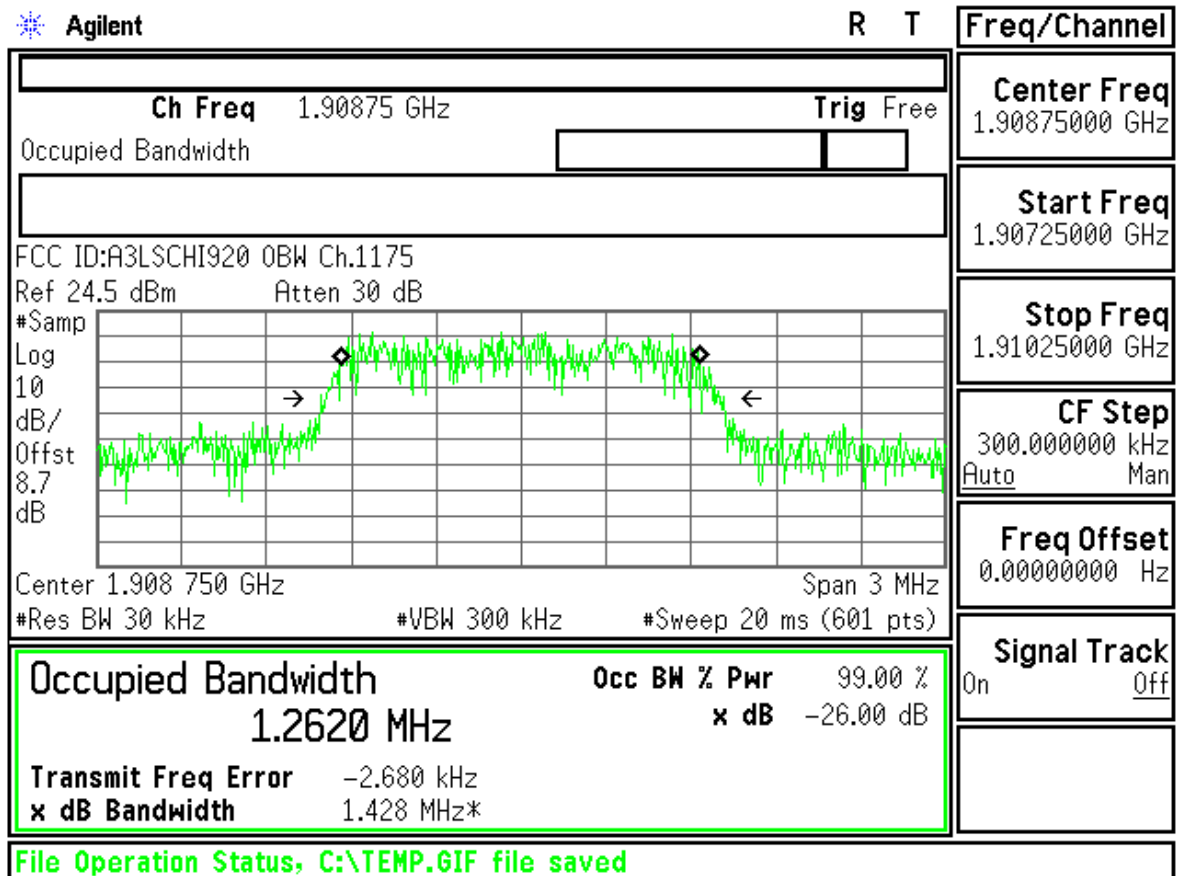
CF Step
1.00000000 MHz
Auto Man

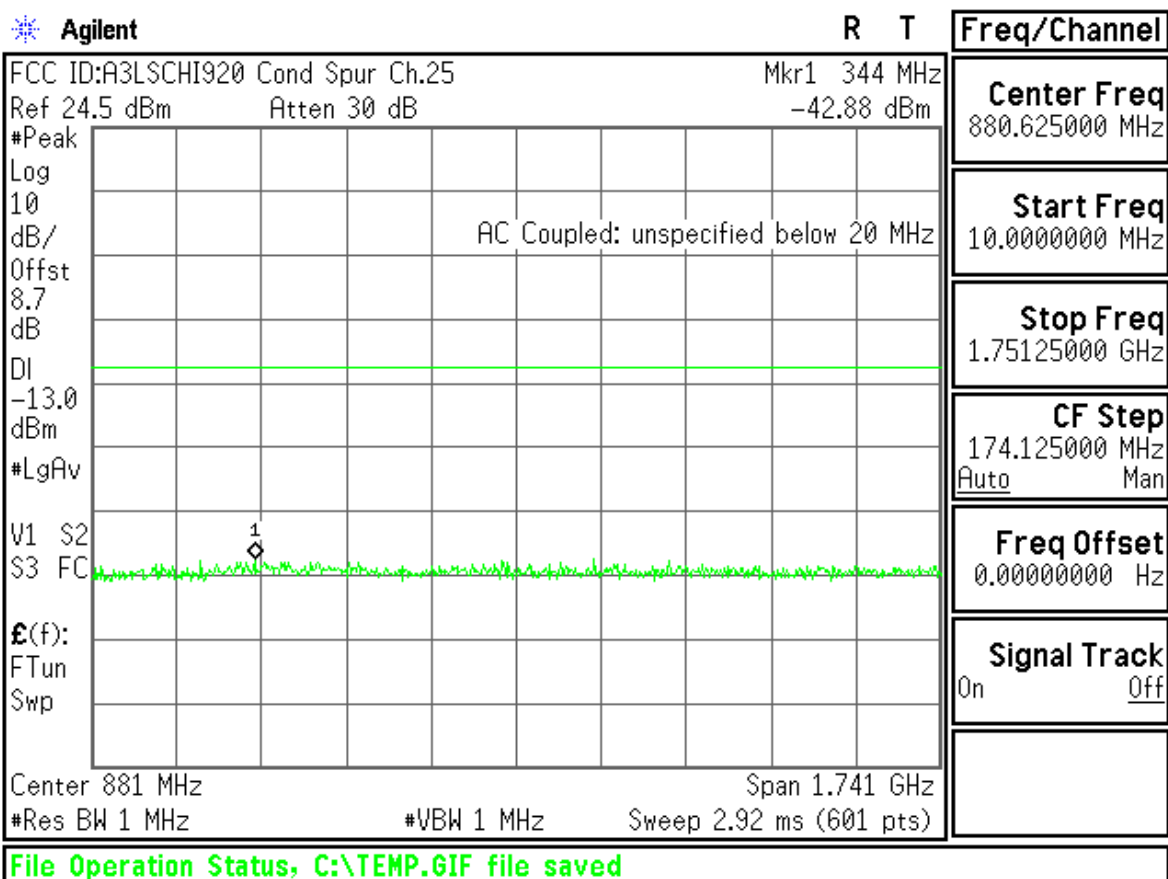
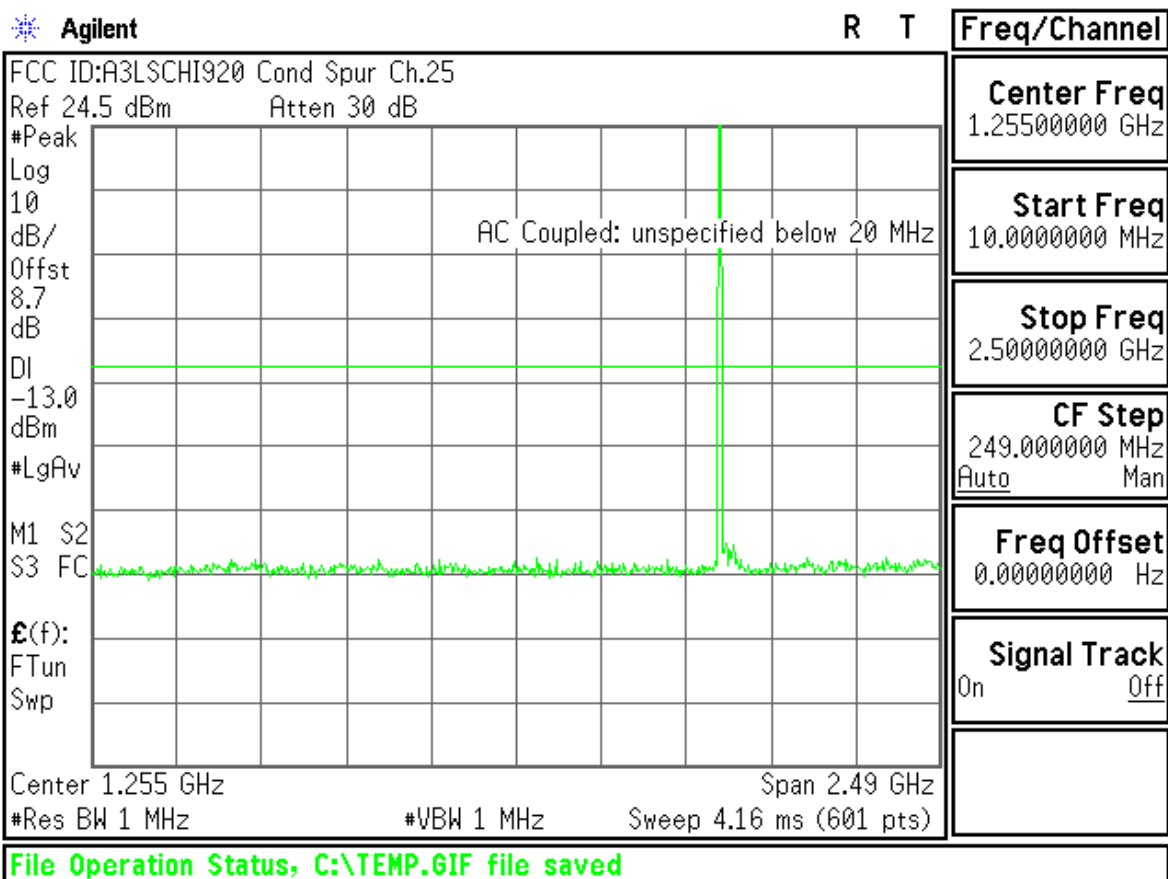
Freq Offset
0.00000000 Hz

Signal Track
On Off

File Operation Status, C:\TEMP.GIF file saved



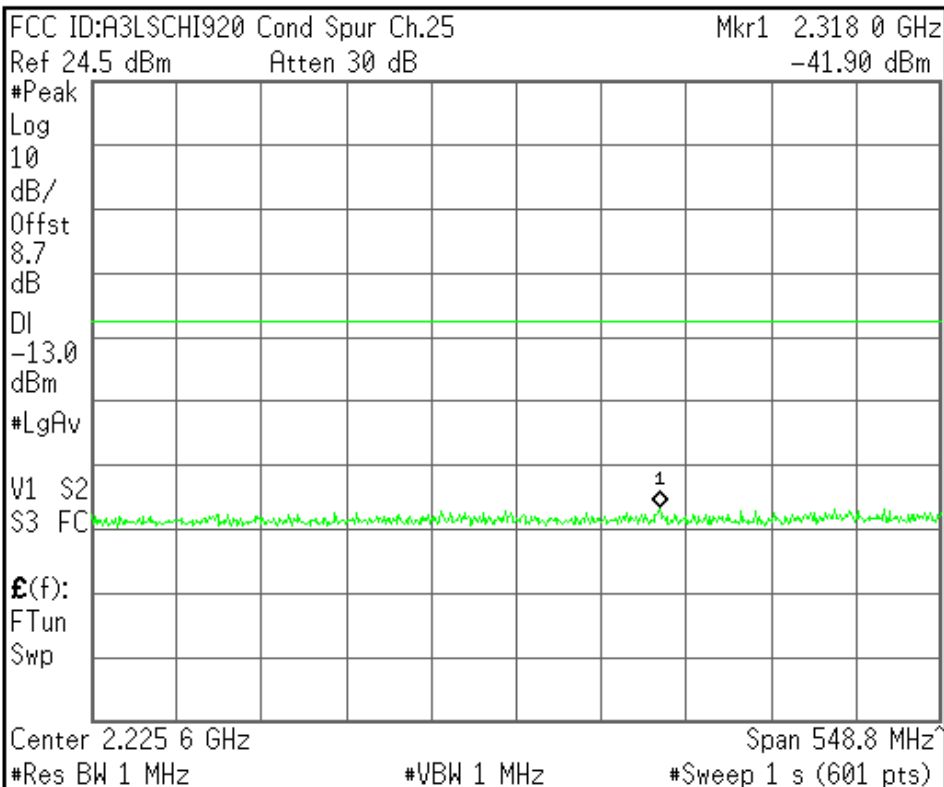




Agilent

R T

Freq/Channel



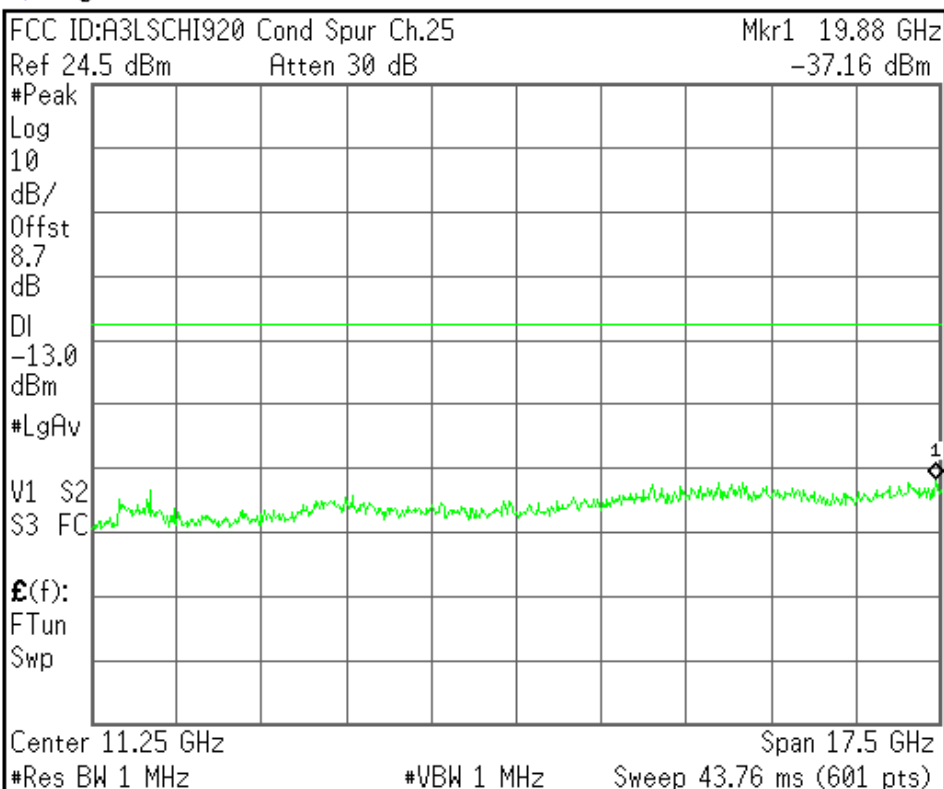
Center Freq 2.22562500 GHz
Start Freq 1.95125000 GHz
Stop Freq 2.50000000 GHz
CF Step 54.8750000 MHz Auto Man
Freq Offset 0.00000000 Hz
Signal Track On Off

Suffix not allowed

Agilent

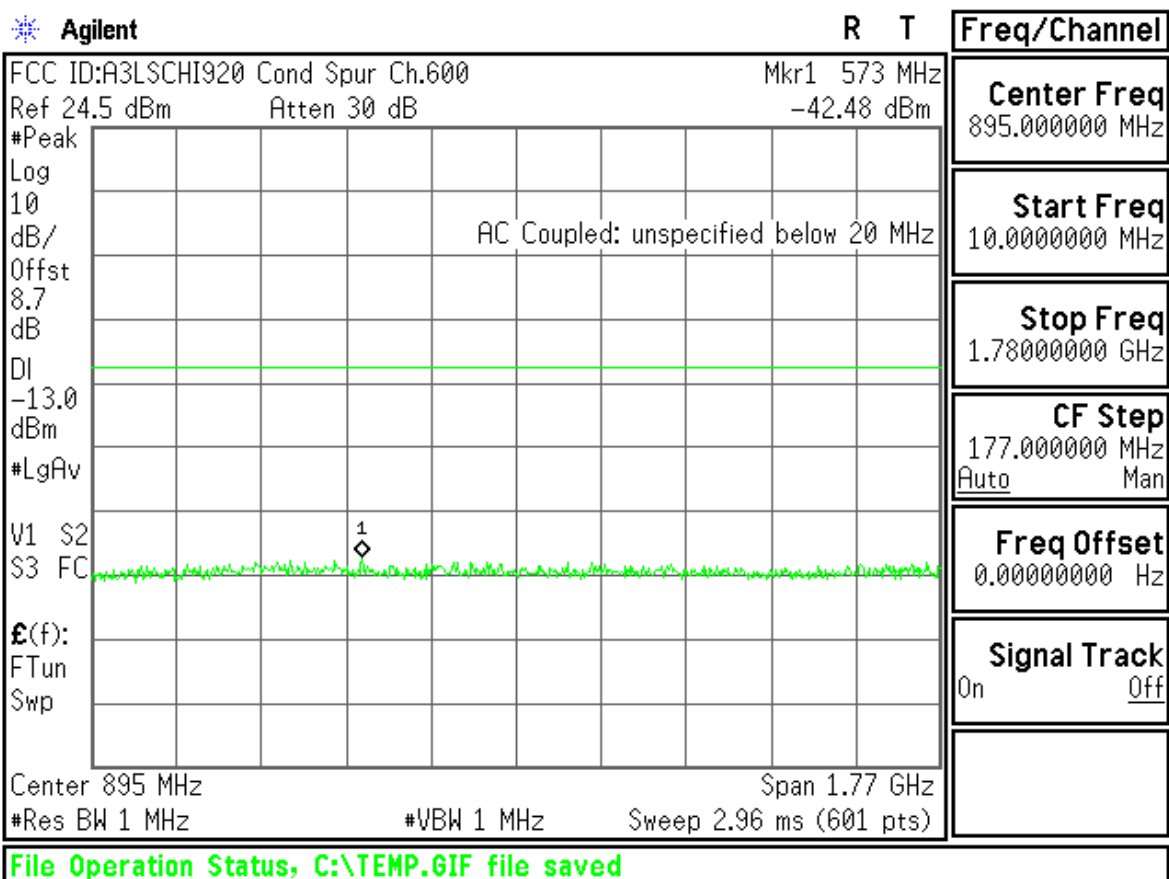
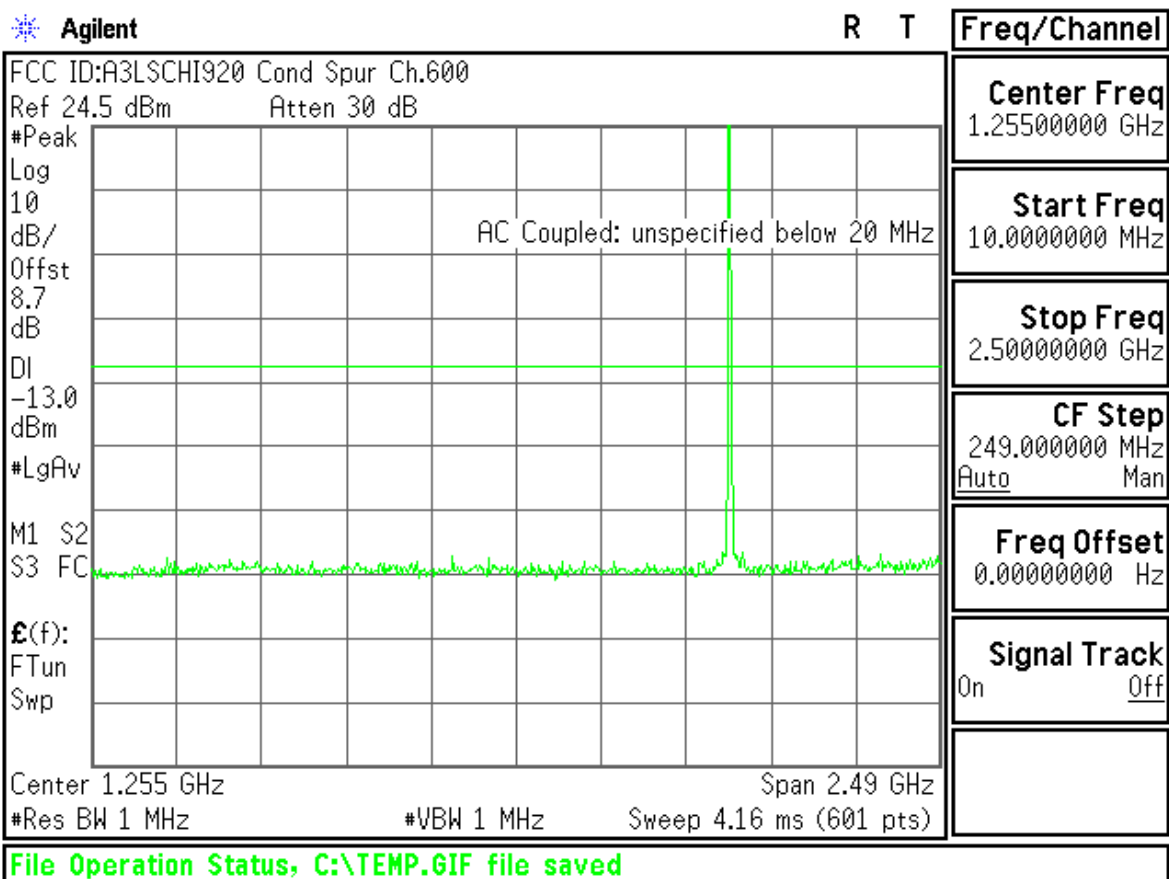
R T

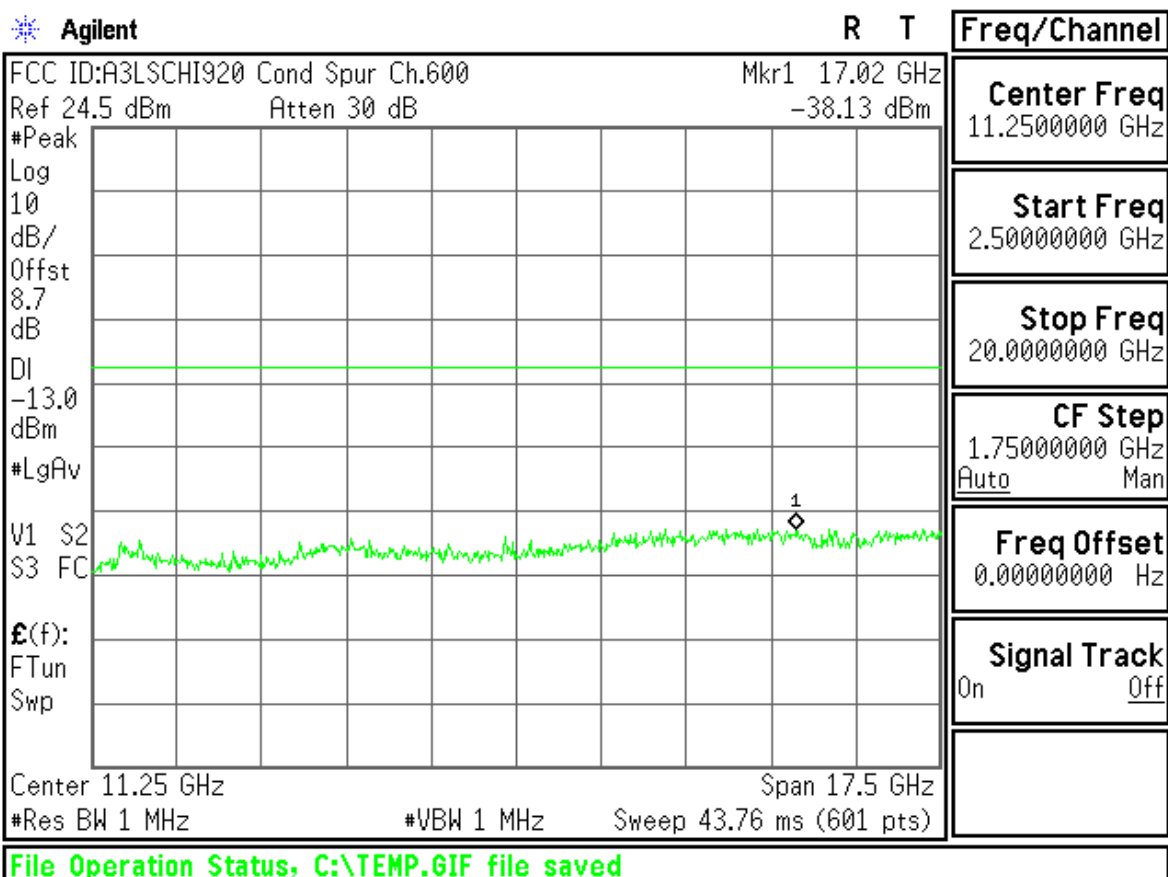
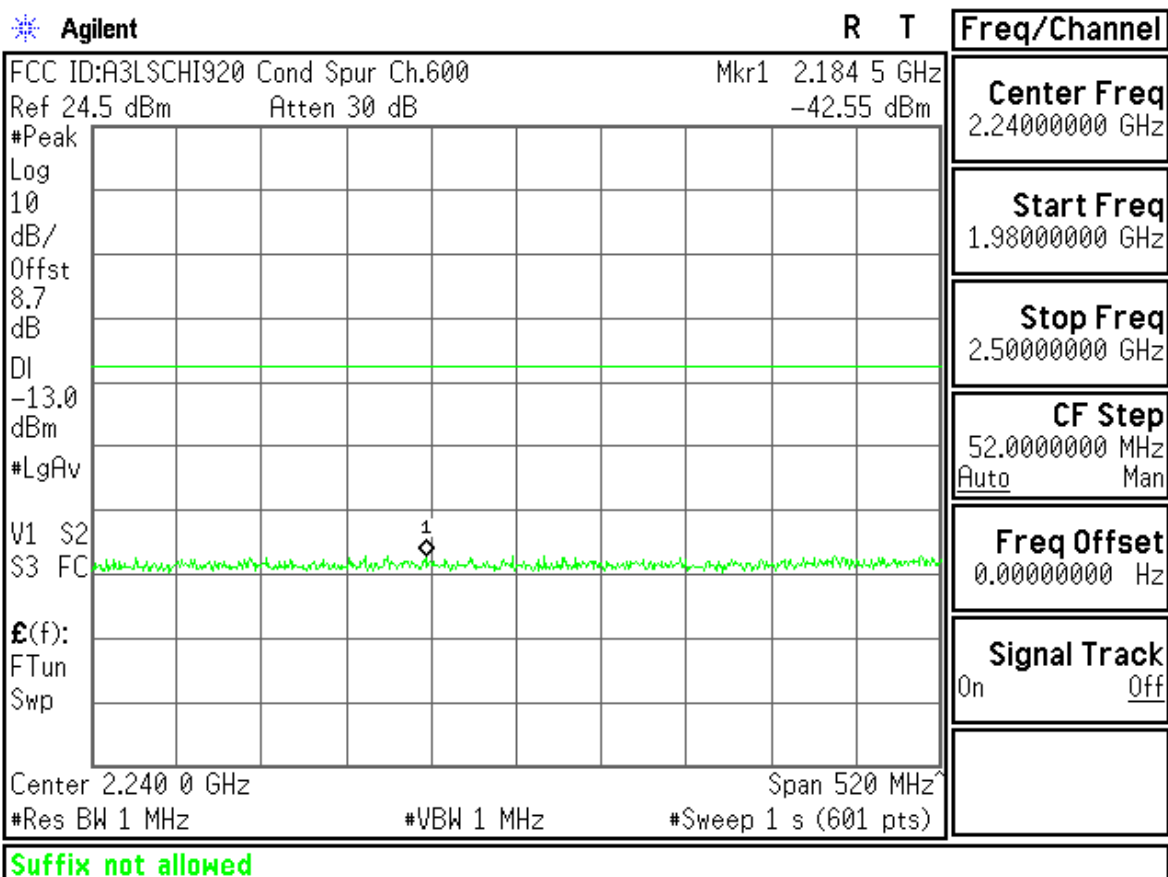
Freq/Channel

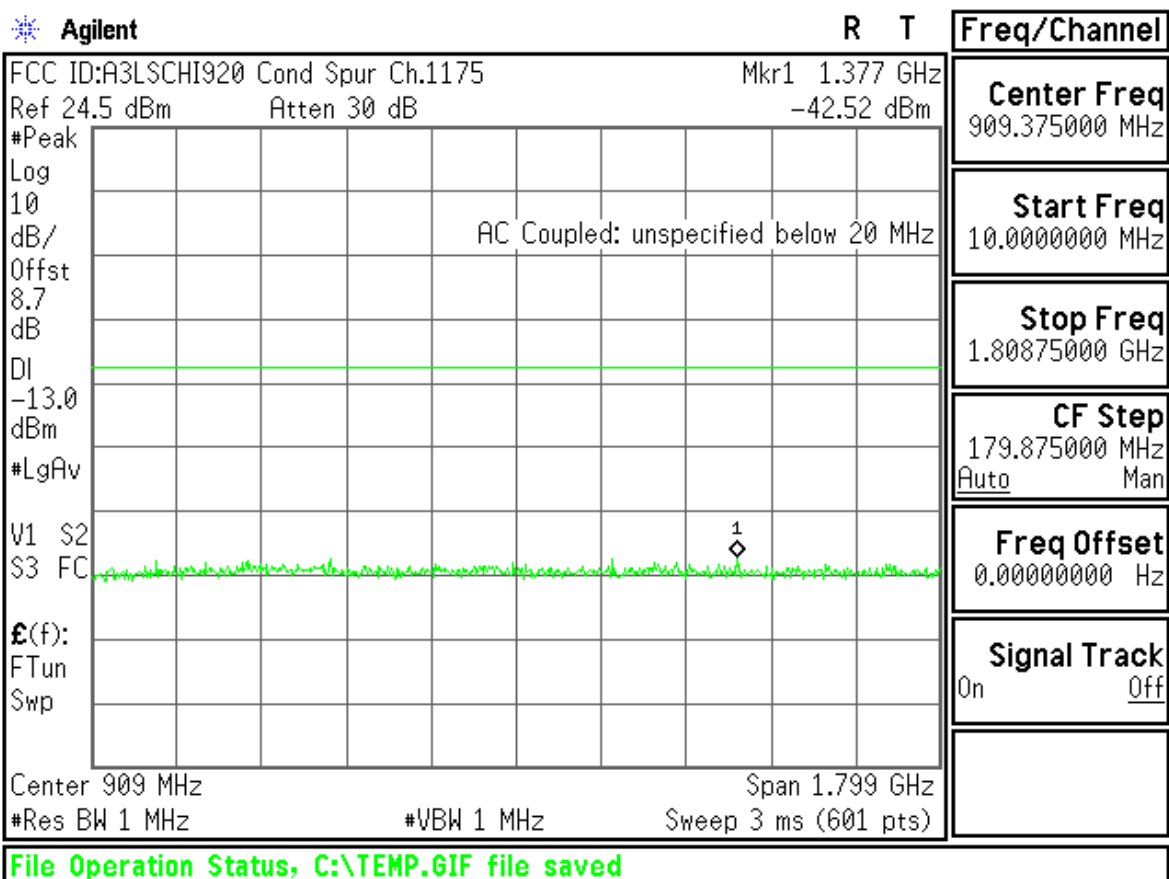
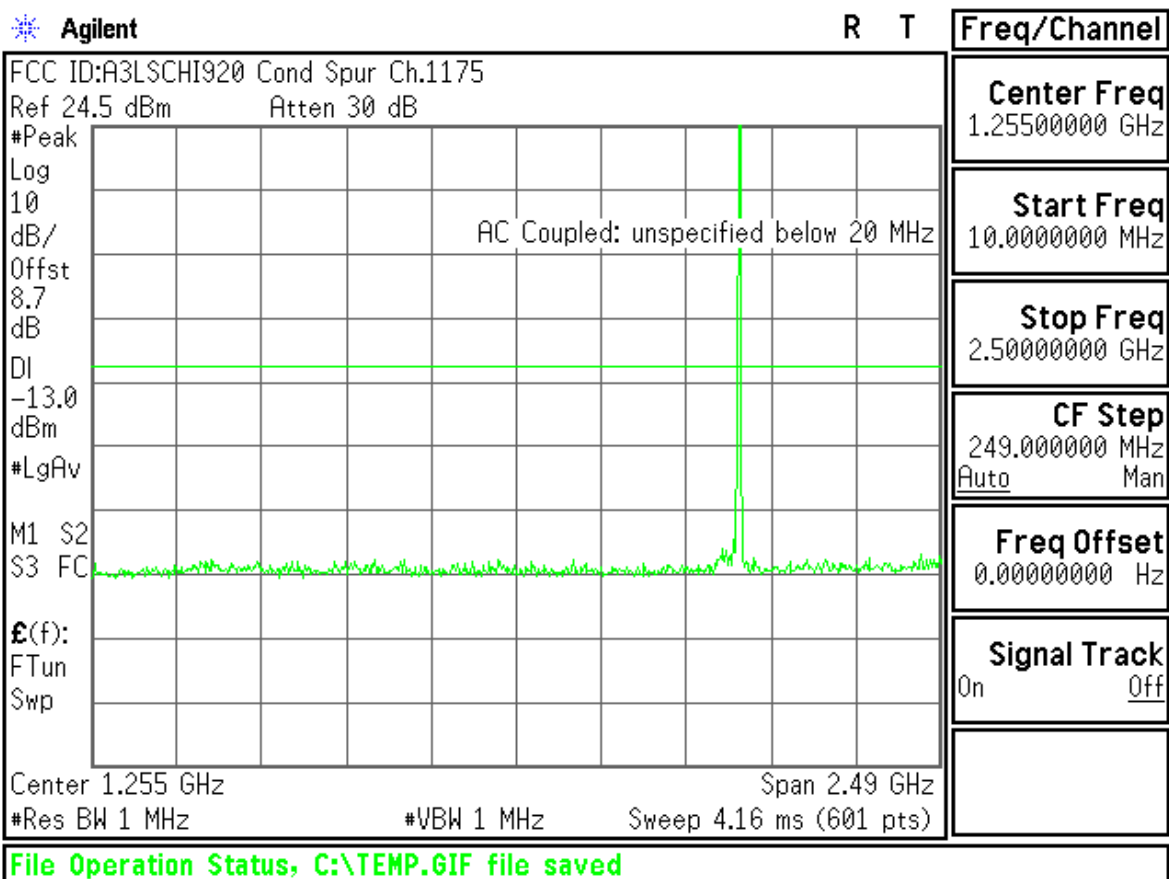


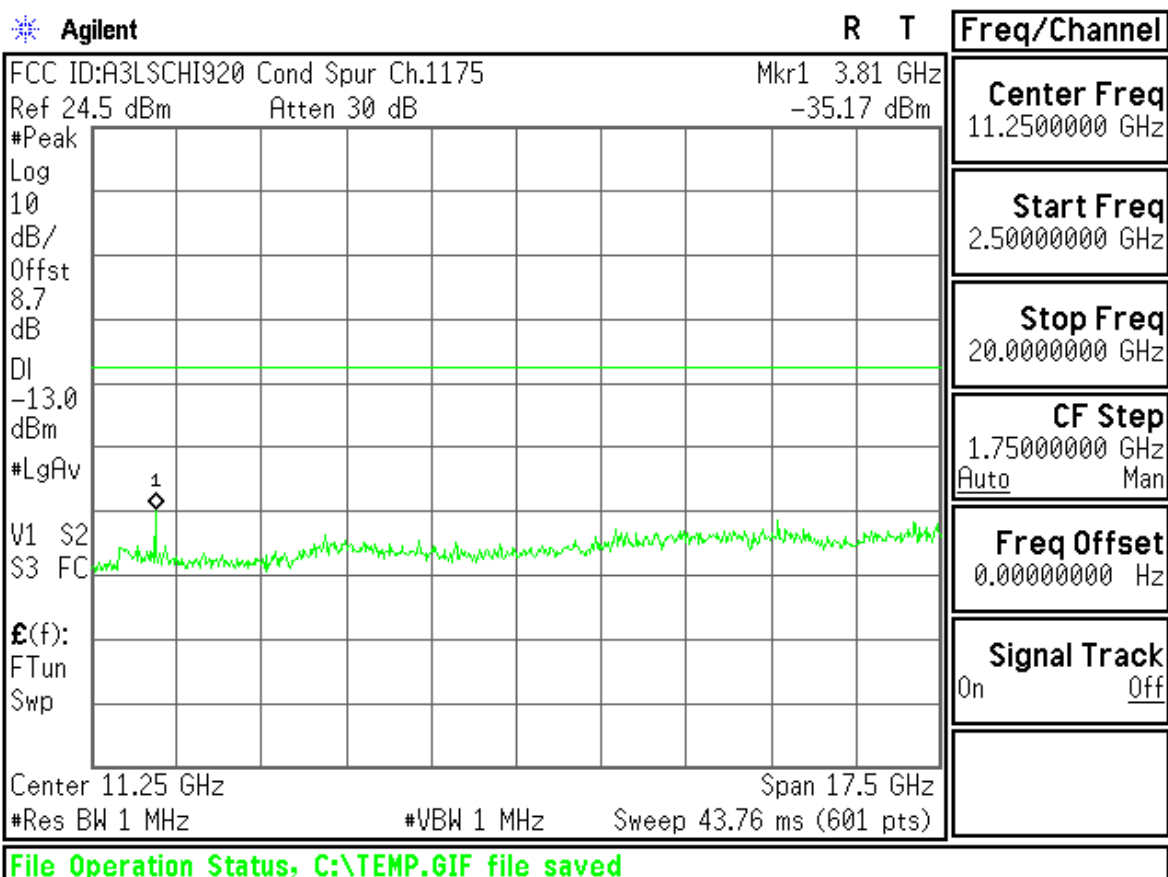
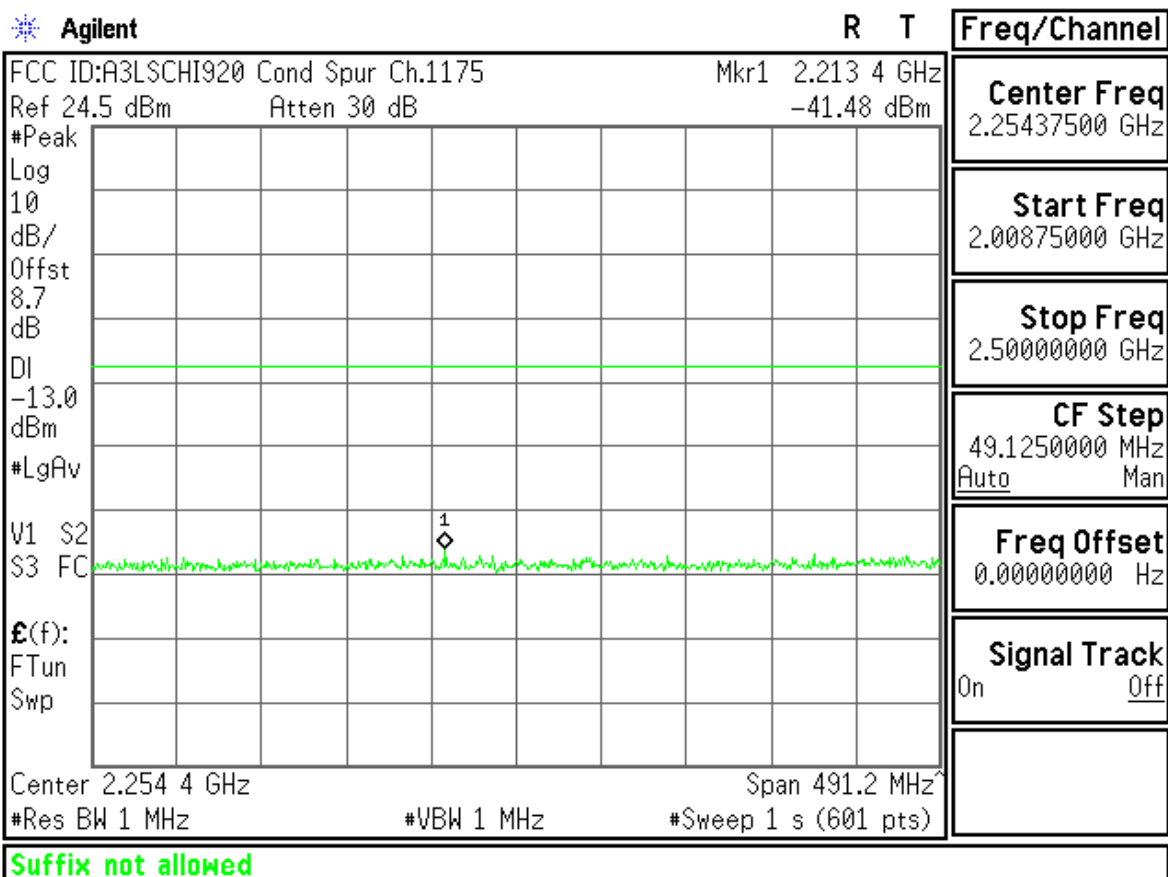
Center Freq 11.2500000 GHz
Start Freq 2.50000000 GHz
Stop Freq 20.0000000 GHz
CF Step 1.75000000 GHz Auto Man
Freq Offset 0.00000000 Hz
Signal Track On Off

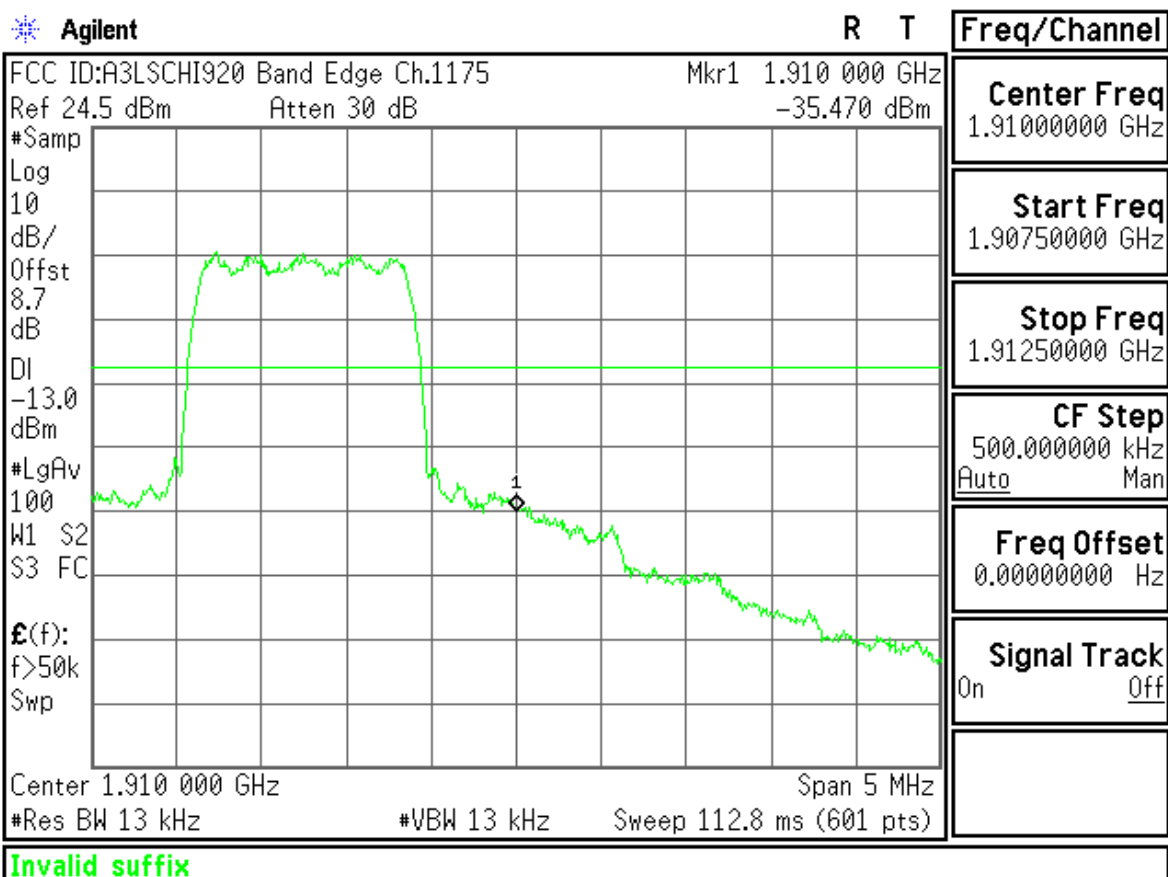
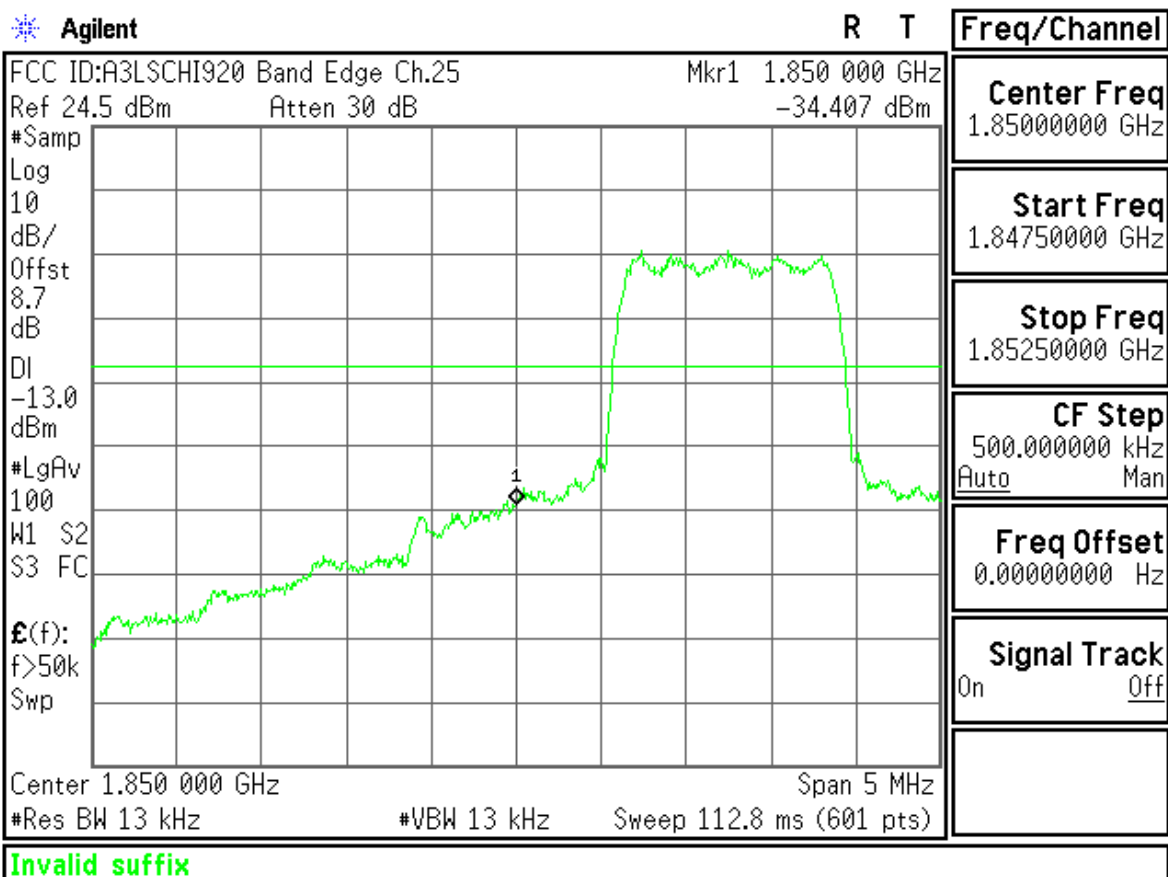
File Operation Status, C:\TEMP.GIF file saved

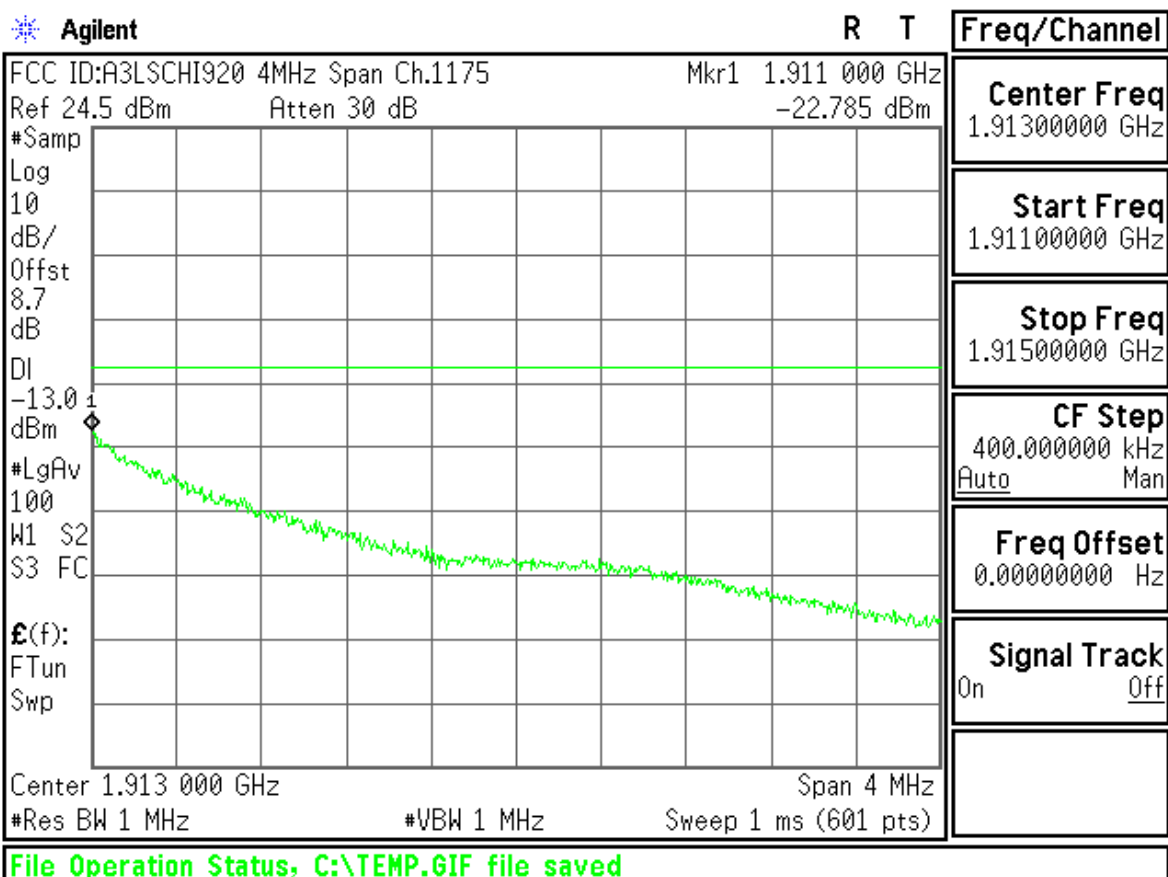
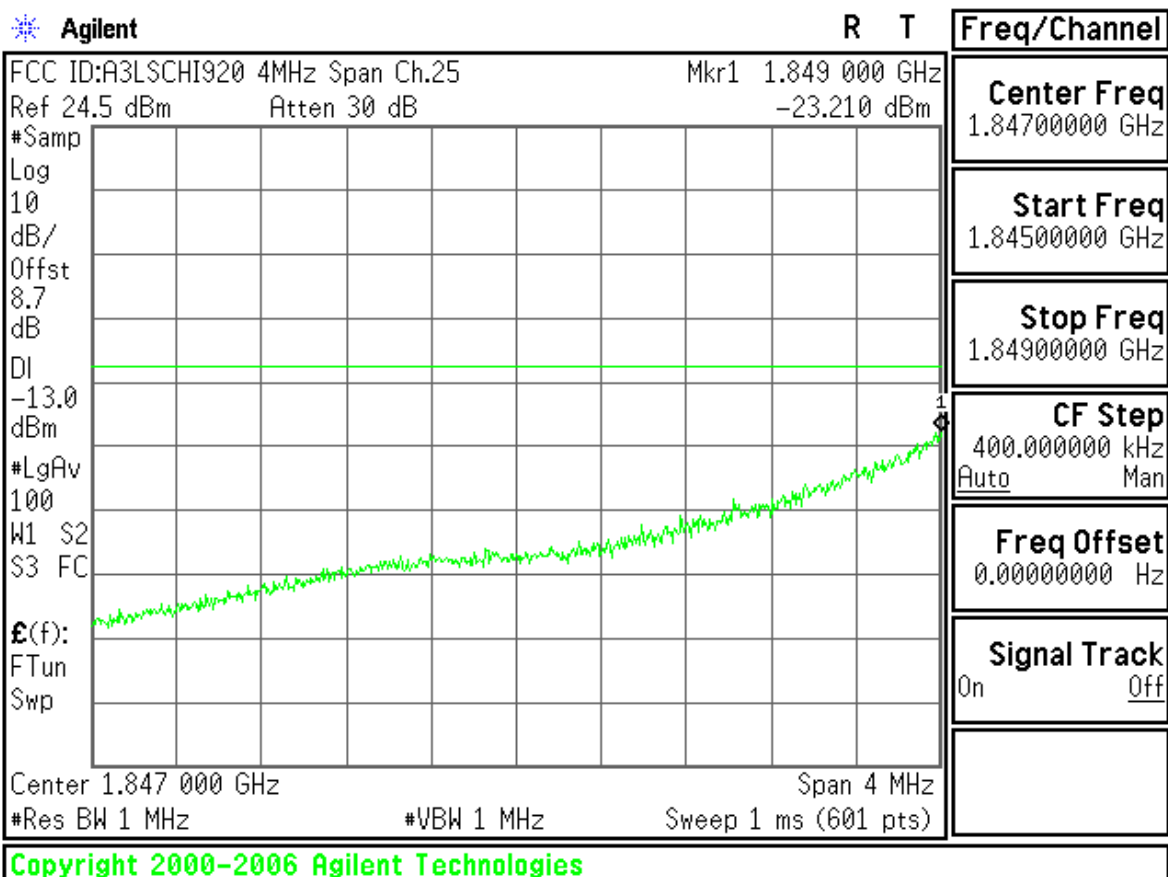


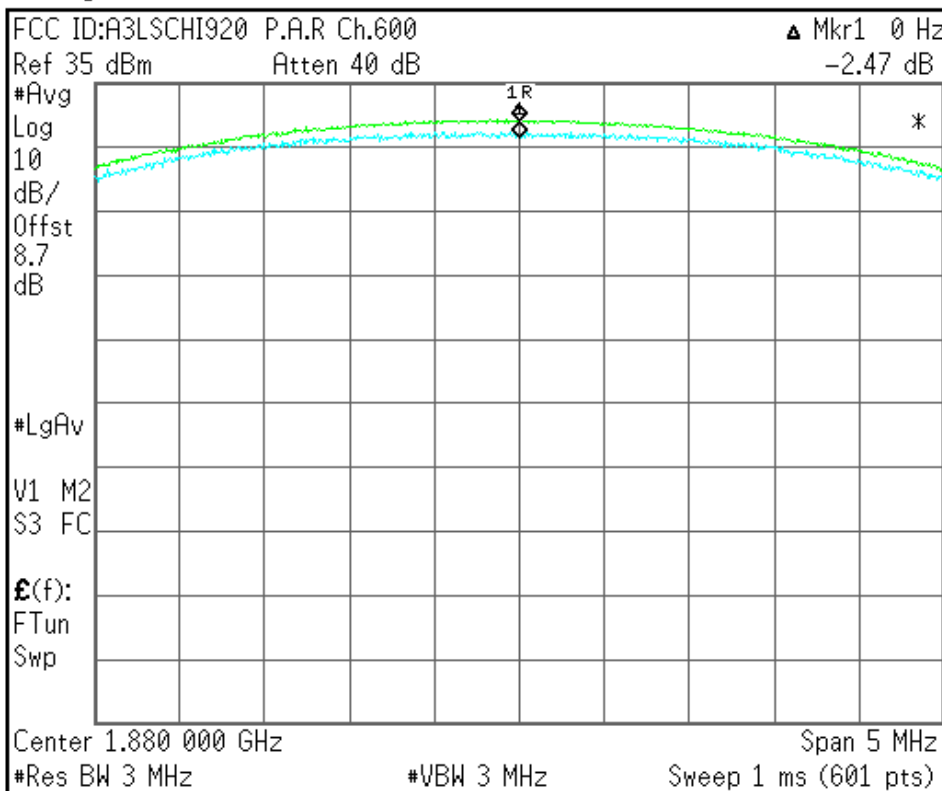












Freq/Channel
Center Freq 1.88000000 GHz
Start Freq 1.87750000 GHz
Stop Freq 1.88250000 GHz
CF Step 500.000000 kHz Auto Man
Freq Offset 0.00000000 Hz
Signal Track On Off