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IT R&D Center
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Gyeonggi-Do, Korea 442-742

FCC CFR47 PART 22 & 24 SUBPART CERTIFICATION REPORT

Model Tested: SPH-A720
FCC ID (Requested): A3LSPHA720
Report No: FD-058-R1
Job No: FD-058
Date issued: May 24, 2006

- Abstract -

All measurement reported herein accordance with FCC Rules, 47CFR
Part2, Part22, Part24.

Prepared By

YE PARK – Test Engineer

Date 2006.05.24

Checked By

WW JANG –Manager

Date 2006.05.24

Authorized By

SH PARK – Senior Manager

Date 2006.05.25

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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
- Attention: SungJoo KIM, Engineering Manager (QA Lab)
- FCC ID: A3LSPHA720
- Quantity: Quantity production is planned
- Emission Designators: 1M28F9W
- Tx Freq. Range: 824.70-848.31MHz (CDMA)
1851.25-1908.75MHz (PCS CDMA)
- Rx Freq. Range: 869.70-893.31 MHz (CDMA)
1931.25-1988.75 MHz (PCS CDMA)
- Max. Power Rating: 0.209 W ERP CDMA(23.20 dBm)
0.247 W EIRP PCS CDMA (23.92 dBm)
- FCC Classification(s): Licensed Portable Tx Held to Ear (PCE)
- Equipment (EUT) Type: Dual-Band CDMA Phone with Bluetooth
- Modulation(s): CDMA
- Frequency Tolerance: $\pm 0.00025\%$ (2.5ppm)
- FCC Rule Part(s): §24(E), §22(H), §2.
- Dates of Test: May 18-19, 22, 2006
- Place of Test: SAMSUNG Lab,
- Test Report S/N: FD-058-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 442-742
The site have 1 Fully-anechoic chamber and measurement facility.

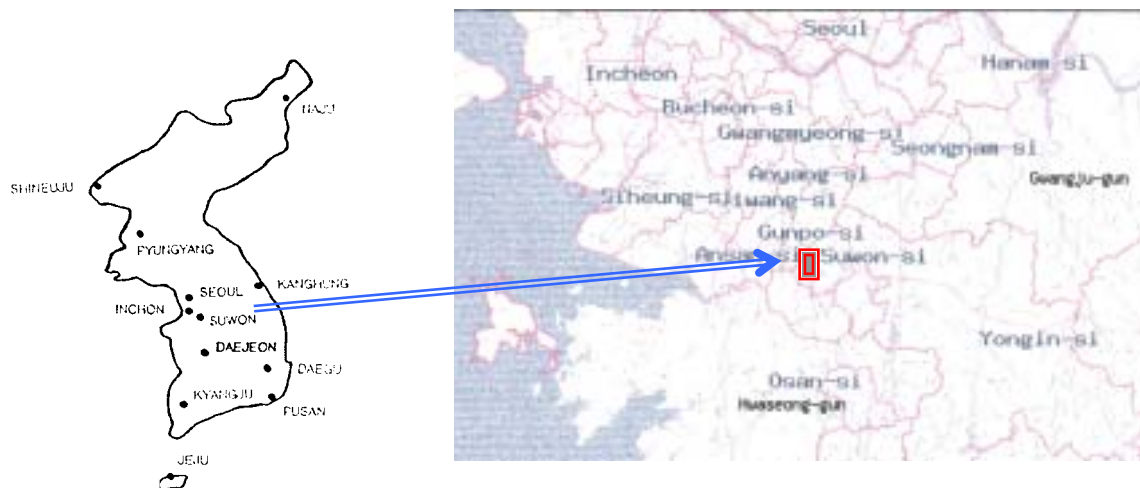


Figure1. Map of the Suwon City area.

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 a wooden turntable 3-meters from the receive antenna. The receive antenna height and turntable rotations were adjusted for the highest reading on the receive spectrum analyzer. The substitution antenna will replace the EUT 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 test antenna shall be raised and lowered, if necessary, to ensure that the maximum signal is still being received. 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.

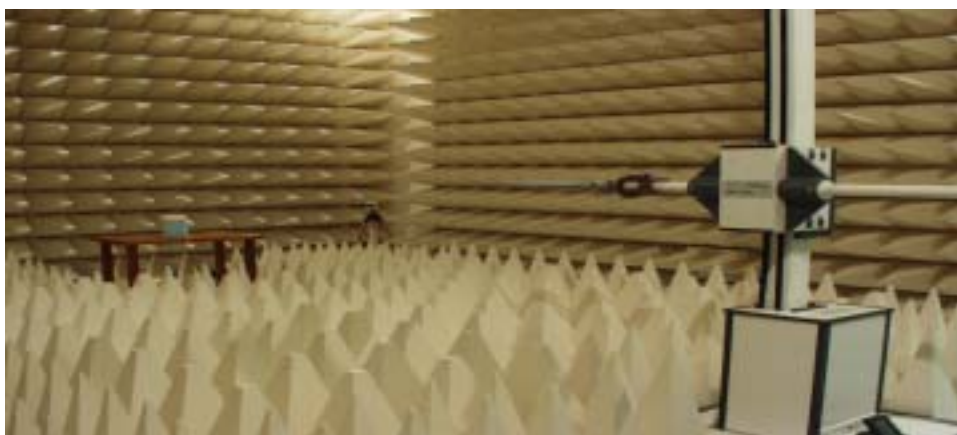


Figure2. Photograph of 3m Fully-Anechoic Chamber

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

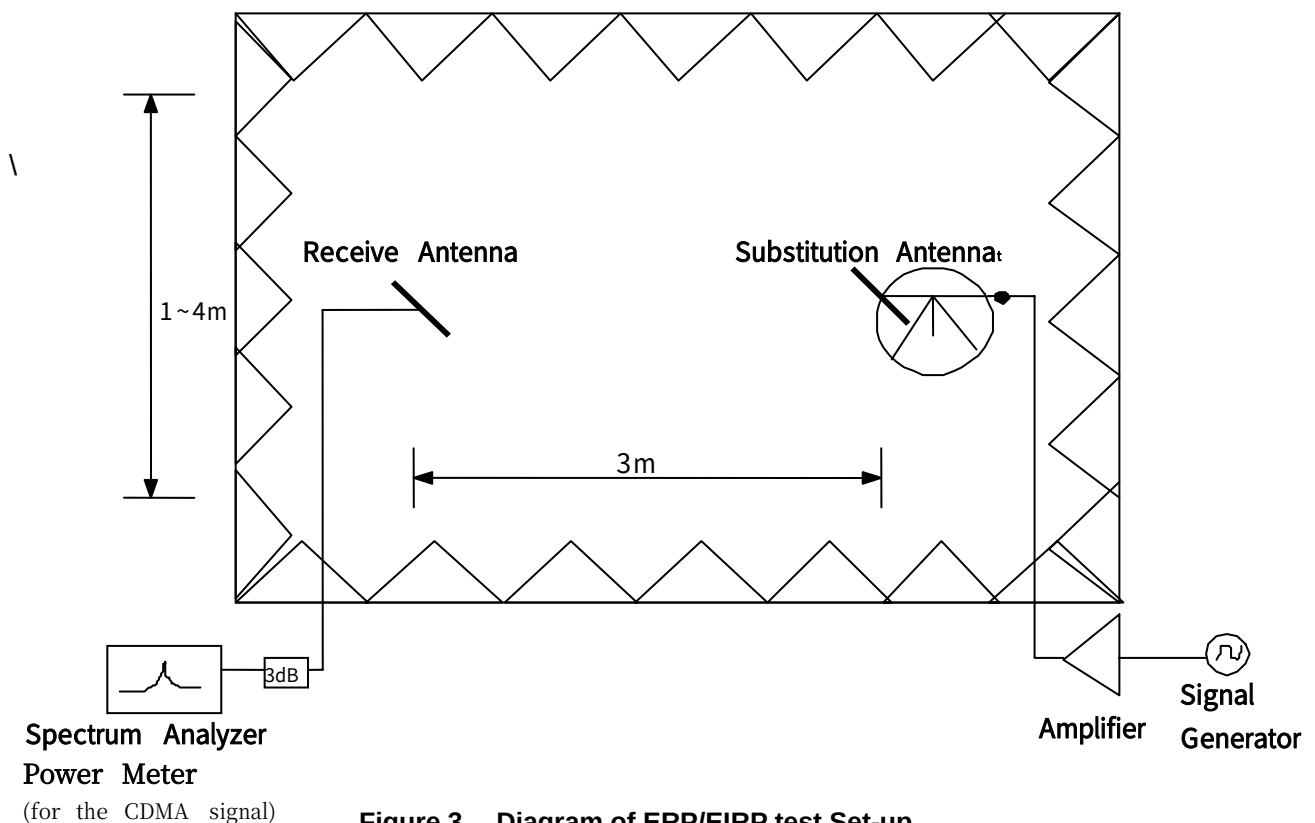
Name Of Equipment	Model	Serial No.	Due Date
Spectrum Analyzer	ESI26	836119/010	2006-09-26
	E4440A(3Hz~26.5GHz)	MY41000236	2007-04-14
	E4440A(3Hz~26.5GHz)	MY41000233	2007-04-05
Signal Generator	SMIQ03B	83824/021	2006-12-07
	SMR20	835197/030	2007-01-10
Power Meter	E4419B	GB41293846	2006-09-07
Power Sensor	8481B	3318A10325	2006-09-08
	8485A	3318A19924	2006-09-08
Amplifier	5S1G4	304866	2006-10-18
Pre-Amplifier	8449B	3008A00691	2007-01-02
Communication test set	8960	GB42230535	2007-01-02
	8960	GB42360886	2006-10-17
Antenna Master	MA240	240/618	Not Required
Controller	HD100	100/756	Not Required
Environmental Chamber	SH-241	92000548	2006-11-22
	SH-241	92000549	2006-11-22
Horn Antenna	HF906	360306/011	2007-03-31
	HF906	100134	2007-05-04
Dipole Antenna	3121C-DB4	9007-587	2006-12-02
	3121C-DB4	9007-588	2006-06-04
Receive Antenna	HL040	353255/019	2006-08-24
	HL040	353255/020	2006-06-21
Attenuator	8494A	3308A31997	2006-12-19
	8496A	3308A14426	2006-12-21
Divider	11636B	51941	Not Required
	11636B	51942	Not Required
	11636B	51946	Not Required
High Pass Filter	WHK1.0/15G-10SS	1	Not Required
	WHK/3.5/18G-10SS	4	Not Required
Shielded Fully Anechoic Chamber	CHAMBER	ANT0001	Not Required

5. DESCRIPTION OF TESTS

5.1 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-A-2001, Aug. 15, 2001:



The EUT was placed on a Non-conducted turntable 3-meters from the receive antenna. The receive antenna height and turntable rotation 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 is recorded.

5.2 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-A-2001, Aug. 15, 2001

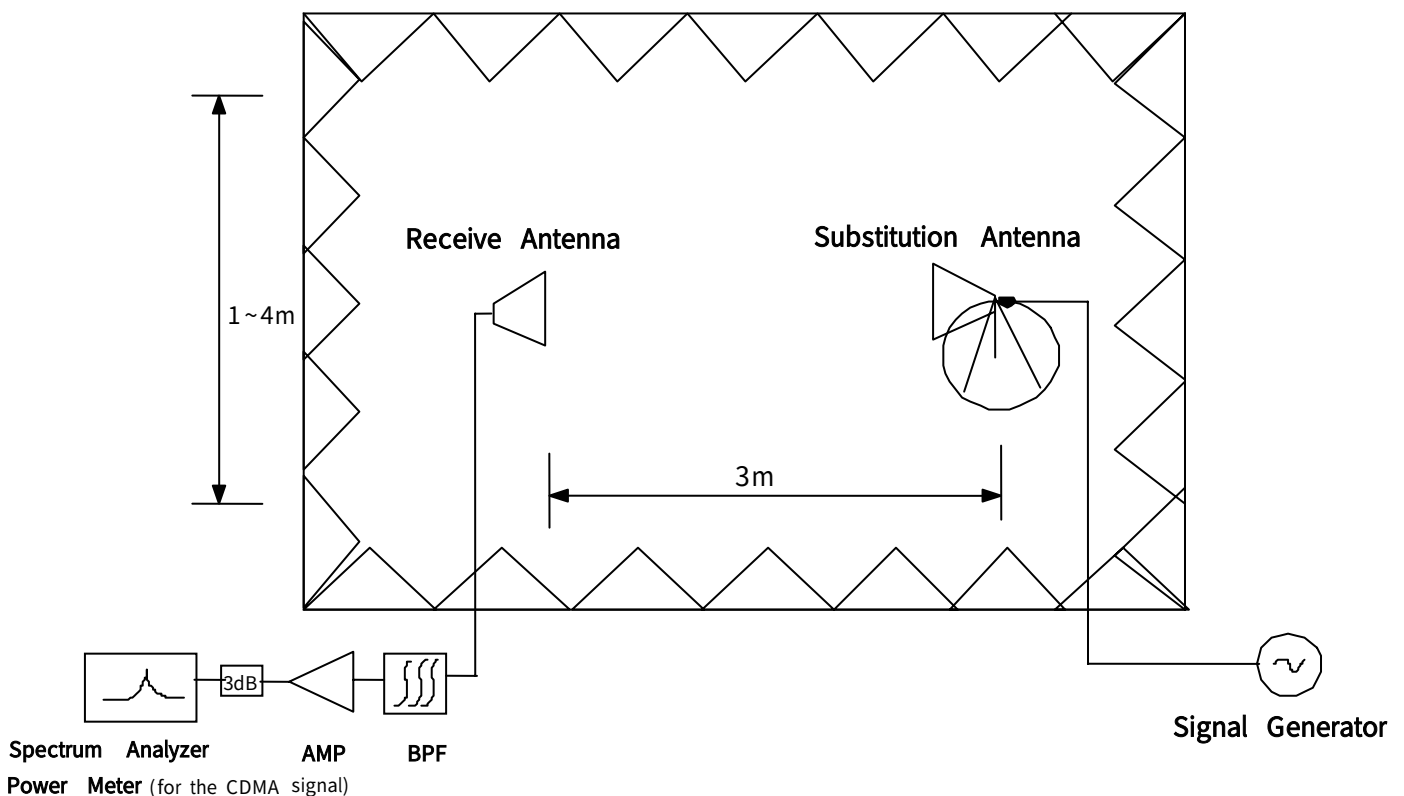


Figure 4. Diagram of Radiated Spurious & Harmonic test Set-up

The EUT was placed on a Non-conducted turntable 3-meters from the receive antenna. The receive antenna height and turntable rotation 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 $25.5\text{dBm} - (-24.8) = 50.3\text{dBc}$.

- End of page -

5.3 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.

5.4 Spurious and Harmonic Emissions at Antenna Terminal

5.4.1 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

5.4.2 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.

$$43 + 10\log(0.209 \text{ W}) = 36.20\text{dB}$$

$$23.20 \text{ dBm} - 36.20 \text{ dB} = -13 \text{ dBm}$$

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.

5.5 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.
7. The artificial load is mounted external to the temperature chamber.

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

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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	-17.03	0.00	-17.03
		V	-16.34	0.00	-16.34
836.52	23.00	H	-16.02	0.00	-16.02
		V	-15.37	0.00	-15.37
848.31	22.50	H	-16.52	0.00	-16.52
		V	-15.85	0.00	-15.85

■ Result

Frequency (MHz)	From EUT Tested level (dBm)	Polarization (H/V)	Azimuth (angle)	ERP (dBm)	ERP (W)	Battery
824.70	-17.74	H1	9	21.29	0.135	Standard
836.52	-15.82	H1	0	23.20	0.209	Standard
848.31	-16.57	H2	180	22.45	0.176	Standard

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

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	-17.12	8.13	-25.25
		V	-17.29	8.13	-25.42
1851.25	24.00	H	-17.55	8.11	-25.66
		V	-17.66	8.11	-25.77
1880.00	24.00	H	-17.26	8.33	-25.59
		V	-17.66	8.33	-25.99

■ Result

Frequency (MHz)	From EUT Tested level (dBm)	Polarization (H/V)	Azimuth (angle)	EIRP (dBm)	EIRP (W)	Battery
1851.25	-25.50	V	315	23.92	0.247	Standard
1880.00	-26.38	V	318	23.39	0.218	Standard
1908.75	-28.18	H2	28	21.41	0.138	Standard

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

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 : 23.20 dBm = 0.209 W

Modulation Signal : CDMA

Limit : $43 + 10\log_{10}(P) = 36.20$ dBc

■ Result

Channel	Harmonic	Frequency (MHz)	From EUT Tested level (dBm)	POL (H/V)	Result (dBc)
1013	2	1649.40	-61.95	H1	73.27
	3	2474.10	-49.69	V	54.90
	4	3298.80	-53.15	H2	54.08
	5	4123.50	-56.86	H2	54.50
	6	4948.20	-66.72	H2	60.54
	7	5772.90	-	-	-
384	2	1673.04	-55.59	H1	66.70
	3	2509.56	-51.58	H2	57.00
	4	3346.08	-60.26	H2	62.26
	5	4182.68	-60.71	H2	58.86
	6	5019.12	-67.20	H1	61.09
	7	5855.64	-	-	-
777	2	1696.62	-55.96	H2	65.04
	3	2544.93	-51.45	V	56.37
	4	3393.24	-57.02	V	57.97
	5	4241.55	-58.16	V	56.34
	6	5089.86	-66.60	H2	59.40
	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 : 23.92dBm = 0.247 W

Modulation Signal : PCS

Limit : $43 + 10\log_{10}(P) = 36.92 \text{ dBc}$

■ Result

Channel	Harmonic	Frequency (MHz)	From EUT Tested level (dBm)	POL (H/V)	Result (dBc)
25	2	3702.50	-45.32	H2	41.66
	3	5553.75	-51.31	H2	43.18
	4	7405.55	-64.80	H1	52.98
	5	9256.25	-63.16	H2	48.27
	6	11107.50	-68.12	H2	48.61
	7	12958.75	-	-	-
600	2	3760.00	-48.18	H2	45.31
	3	5640.00	-53.87	V	46.09
	4	7520.00	-64.56	H1	52.96
	5	9400.00	-66.63	V	51.90
	6	11280.00	-67.79	H1	47.93
	7	13160.00	-	-	-
1175	2	3817.50	-49.10	H2	45.77
	3	5726.25	-52.21	H1	43.79
	4	7635.00	-66.34	H1	53.83
	5	9543.75	-67.92	H1	53.15
	6	11452.50	-68.95	H2	48.87
	7	13361.25	-	-	-

Radiated Spurious Emission measurements at 3 meters by Substitution Method

6.5 CDMA Radiated Spurious & Harmonic Conversion Table

Date : 2006 . 05. 19

Test Engineer : YE PARK

- ① Tx Cable loss
- ② Tx Horn Ant Gain
- ③ Rx Cable loss + HPF Insertion loss + Attenuator
- ④ Pre- Amp gain
- ⑤ Air loss
- ⑥ Tested Level from EUT
- ⑦ = ⑥ + ⑤ + ③ - ④
- ⑧ = ERP + 2.14 - ⑦

CH	Har	Frequency (MHz)	① Tx CL (dB)	② Horn Gain (dB)	Tx Level @ (S/G 0dBm)	⑥ Tested Level EUT : H (dBm)	⑥ Tested Level EUT : V (dBm)	⑦ Amplitude of Emission EUT : H (dBm)	⑦ Amplitude of Emission EUT : V (dBm)	⑧ Result EUT : H (dBc)	⑧ Result EUT : V (dBc)
1013	2	1649.40	7.70	8.03	0.33	-61.95	-65.23	-47.93	-51.39	73.27	76.73
	3	2474.10	9.92	9.55	-0.37	-52.99	-49.69	-33.05	-29.56	58.39	54.90
	4	3298.80	11.67	9.64	-2.03	-53.15	-54.60	-28.74	-29.59	54.08	54.93
	5	4123.50	13.24	10.67	-2.57	-56.86	-58.66	-29.16	-31.24	54.50	56.58
	6	4948.20	14.53	11.05	-3.48	-66.72	-65.86	-35.20	-35.55	60.54	60.89
	7	5772.90	16.87	11.23	-5.64	-	-	-	-	-	-
384	2	1673.04	7.80	8.03	0.23	-55.59	-63.85	-41.36	-49.80	66.70	75.14
	3	2509.56	10.06	9.55	-0.51	-51.58	-62.44	-31.66	-42.09	57.00	67.43
	4	3346.08	11.45	9.64	-1.81	-60.26	-63.36	-36.92	-39.20	62.26	64.54
	5	4182.68	13.72	10.67	-3.05	-60.71	-61.76	-33.52	-34.70	58.86	60.04
	6	5019.12	15.43	11.05	-4.38	-67.20	-67.77	-35.75	-36.84	61.09	62.18
	7	5855.64	17.19	11.23	-5.96	-	-	-	-	-	-
777	2	1696.62	7.96	8.03	0.07	-55.96	-62.86	-39.70	-47.18	65.04	72.52
	3	2544.93	10.15	9.55	-0.60	-51.38	-51.45	-31.05	-31.03	56.39	56.37
	4	3393.24	11.62	9.64	-1.98	-57.14	-57.02	-33.74	-32.63	59.08	57.97
	5	4241.55	13.71	10.67	-3.04	-58.02	-58.16	-31.38	-31.00	56.72	56.34
	6	5089.86	15.71	11.05	-4.66	-66.60	-67.85	-34.06	-36.74	59.40	62.08
	7	5938.17	17.09	11.23	-5.86	-	-	-	-	-	-

6.6 PCS Radiated Spurious & Harmonic Conversion Table

Date : 2006 . 05. 19

Test Engineer : YE PARK

- ① Tx Cable loss
- ② Tx Horn Ant Gain
- ③ Rx Cable loss + HPF Insertion loss + Attenuator
- ④ Pre-Amp gain
- ⑤ Air loss
- ⑥ Tested Level from EUT
- ⑦ = ⑥ + ⑤ + ③ - ④
- ⑧ = EIRP - ⑦

CH	Har	Frequency (MHz)	① Tx CL (dB)	② Horn Gain (dB)	Tx Level @ (S/G 10dBm)	⑥ Tested Level EUT : H (dBm)	⑥ Tested Level EUT : V (dBm)	⑦ Amplitude of Emission EUT : H (dBm)	⑦ Amplitude of Emission EUT : V (dBm)	⑧ Result EUT : H (dBc)	⑧ Result EUT : V (dBc)
25	2	3702.50	12.17	9.73	7.56	-45.32	-47.61	-17.74	-20.01	41.66	43.93
	3	5553.75	16.95	11.15	4.20	-51.31	-53.03	-19.26	-21.67	43.18	45.59
	4	7405.00	20.77	11.44	0.67	-64.80	-65.15	-29.06	-31.15	52.98	55.07
	5	9256.25	24.45	12.17	-2.28	-63.16	-65.23	-24.35	-27.06	48.27	50.98
	6	11107.50	28.18	13.66	-4.52	-68.12	-68.03	-24.69	-25.19	48.61	49.11
	7	12958.75	31.99	13.27	-8.72	-	-	-	-	-	-
600	2	3760.00	12.40	9.73	7.33	-48.18	-50.89	-21.39	-23.73	45.31	47.65
	3	5640.00	16.83	11.15	4.32	-54.43	-53.87	-22.37	-22.17	46.29	46.09
	4	7520.00	21.17	11.44	0.27	-64.56	-65.20	-29.04	-31.28	52.96	55.20
	5	9400.00	24.51	12.17	-2.34	-67.81	-66.63	-28.50	-27.98	52.42	51.90
	6	11280.00	28.38	13.66	-4.72	-67.79	-68.20	-24.01	-24.62	47.93	48.54
	7	13160.00	33.20	13.27	-9.93	-	-	-	-	-	-
1175	2	3817.50	13.69	9.73	6.04	-49.10	-51.59	-21.85	-23.73	45.77	47.65
	3	5726.25	17.30	11.15	3.85	-52.21	-52.11	-19.87	-20.19	43.79	44.11
	4	7635.00	21.23	11.44	0.21	-66.34	-66.56	-29.91	-31.36	53.83	55.28
	5	9543.75	26.48	12.17	-4.31	-67.92	-68.66	-29.23	-31.09	53.15	55.01
	6	11452.50	28.89	13.66	-5.23	-68.95	-69.37	-24.95	-26.06	48.87	49.98
	7	13361.25	32.93	13.27	-9.66	-	-	-	-	-	-

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)	-28.07	836,519,972	-0.0000034	-0.034
100%		-30	51.72	836,520,052	0.0000062	0.062
100%		-20	-23.70	836,519,976	-0.0000028	-0.028
100%		-10	-26.97	836,519,973	-0.0000032	-0.032
100%		0	-35.46	836,519,965	-0.0000042	-0.042
100%		+10	-43.02	836,519,957	-0.0000051	-0.051
100%		+20	-28.07	836,519,972	-0.0000034	-0.034
100%		+30	-20.35	836,519,980	-0.0000024	-0.024
100%		+40	-17.54	836,519,982	-0.0000021	-0.021
100%		+50	-23.06	836,519,977	-0.0000028	-0.028
100%		+60	-18.75	836,519,981	-0.0000022	-0.022
85%	3.25	+20	-27.52	836,519,972	-0.0000033	-0.033
115%	4.26	+20	-32.87	836,519,967	-0.0000039	-0.039
Batt.Endpoint	3.25	+20	-27.52	836,519,972	-0.0000033	-0.033

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

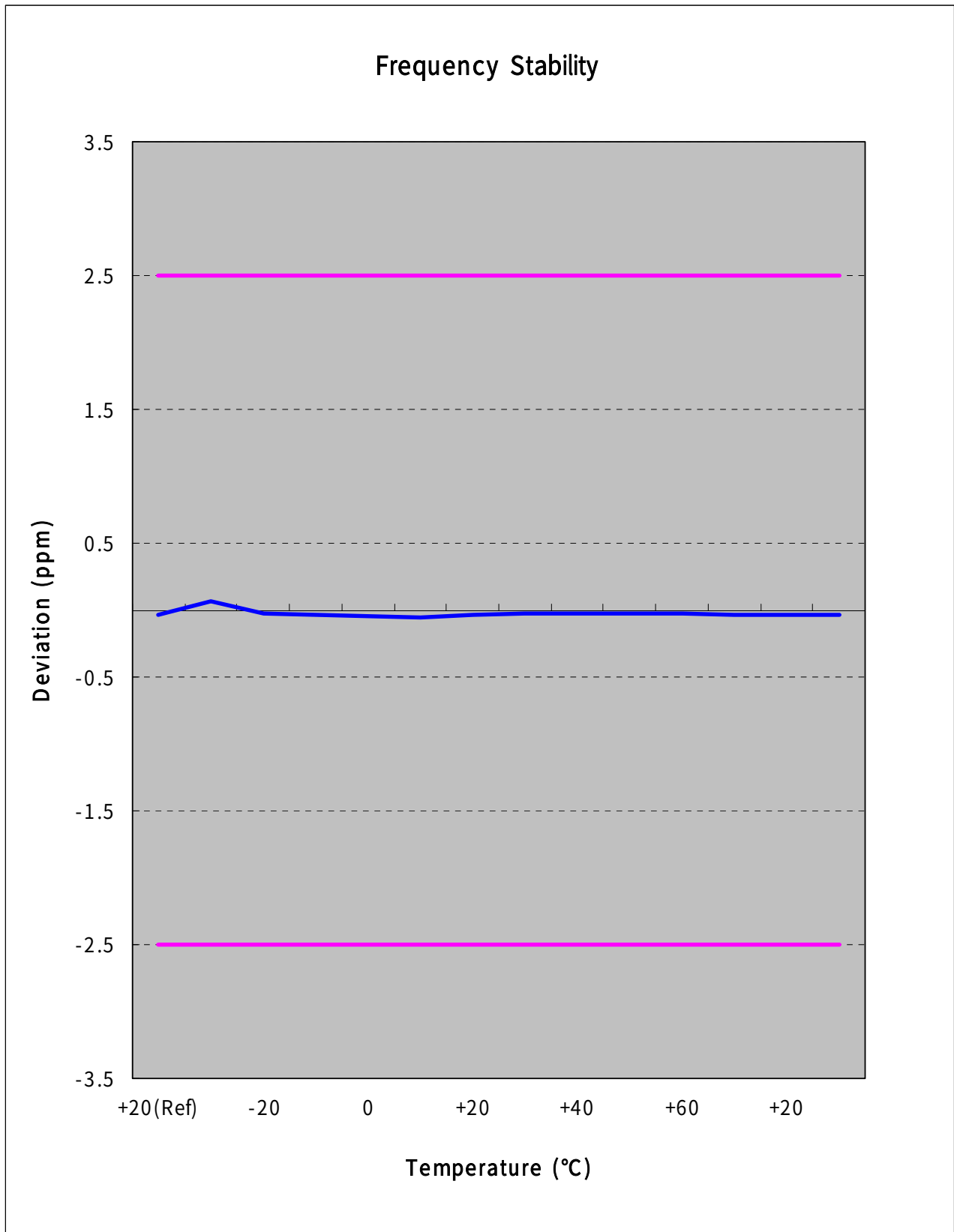
Deviation Limit : ± 0.00025 % or 2.5ppm

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency Error (Hz)	Frequency (Hz)	Deviation (%)	ppm
100%	3.70	+20(Ref)	-16.77	1,879,999,983	-0.0000009	-0.009
100%		-30	32.72	1,880,000,033	0.0000017	0.017
100%		-20	15.83	1,880,000,016	0.0000008	0.008
100%		-10	17.66	1,880,000,018	0.0000009	0.009
100%		0	-76.81	1,879,999,923	-0.0000041	-0.041
100%		+10	-35.87	1,879,999,964	-0.0000019	-0.019
100%		+20	-16.77	1,879,999,983	-0.0000009	-0.009
100%		+30	-21.34	1,879,999,979	-0.0000011	-0.011
100%		+40	-36.24	1,879,999,964	-0.0000019	-0.019
100%		+50	-27.69	1,879,999,972	-0.0000015	-0.015
100%		+60	-32.24	1,879,999,968	-0.0000017	-0.017
85%	3.25	+20	-65.81	1,879,999,934	-0.0000035	-0.035
115%	4.26	+20	33.05	1,880,000,033	0.0000018	0.018
Batt.Endpoint	3.25	+20	-65.81	1,879,999,934	-0.0000035	-0.035

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

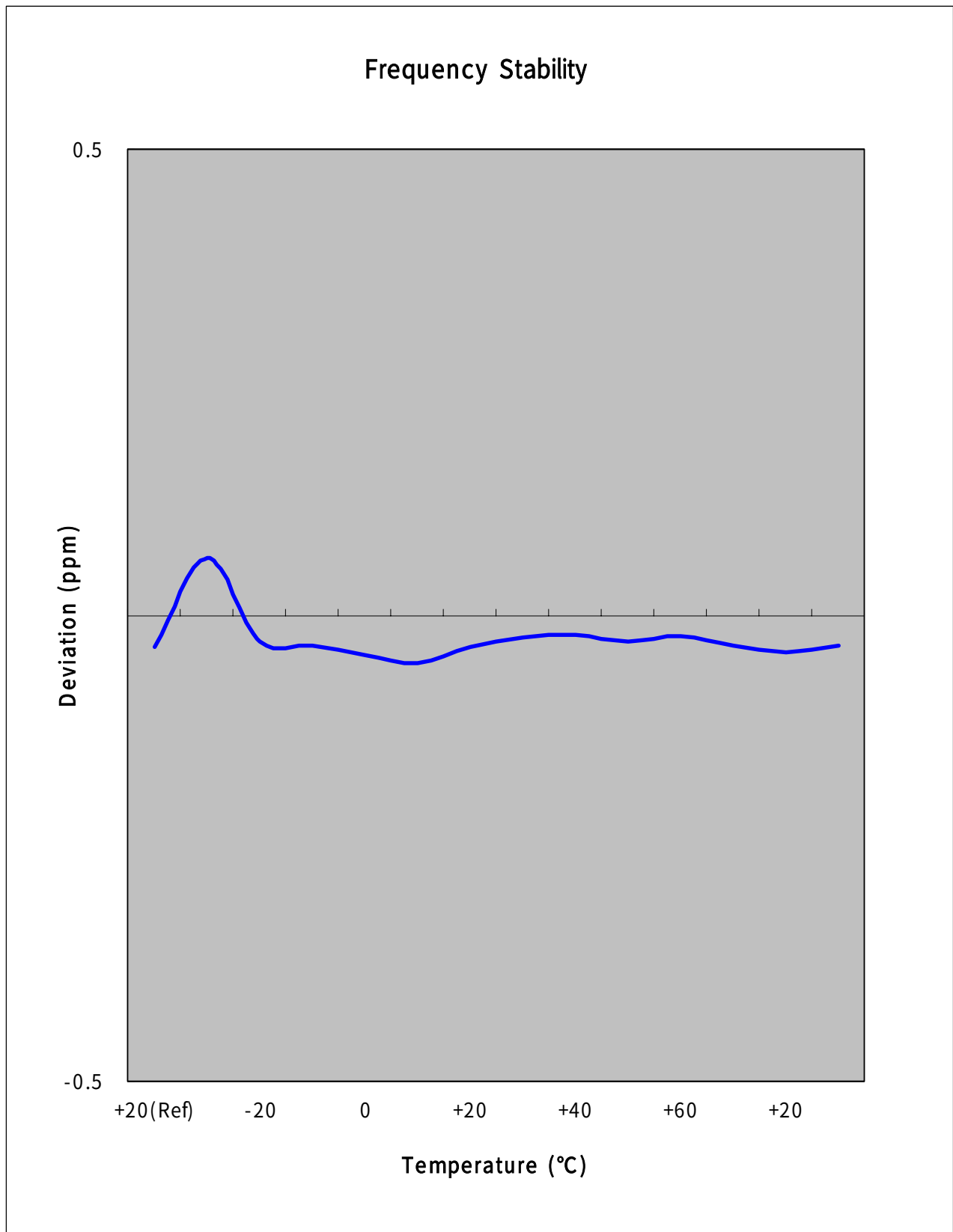
The EUT is tested down to the battery end point

6.7.3 CDMA Frequency Stability Graph



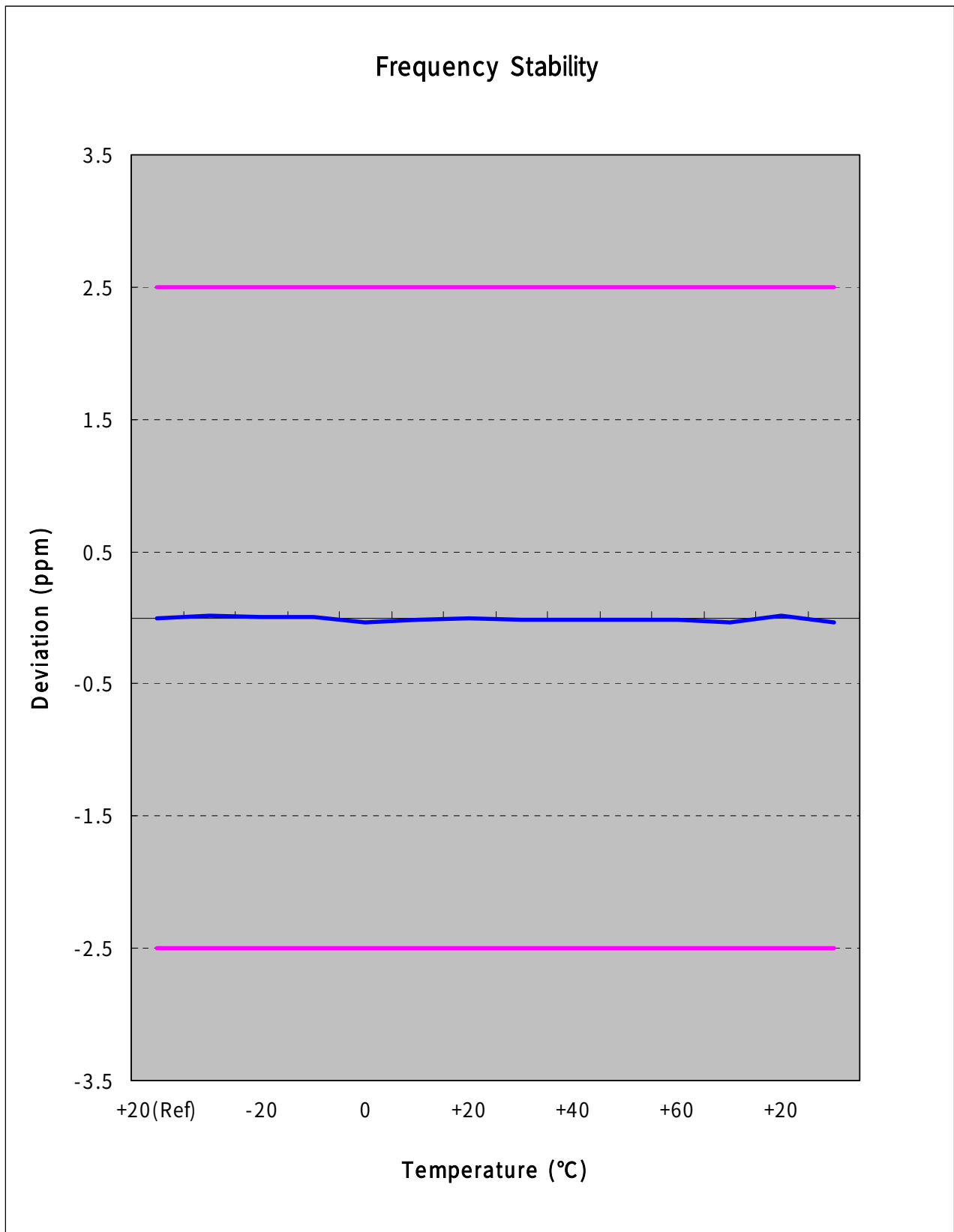
- End of page -

Zoom In



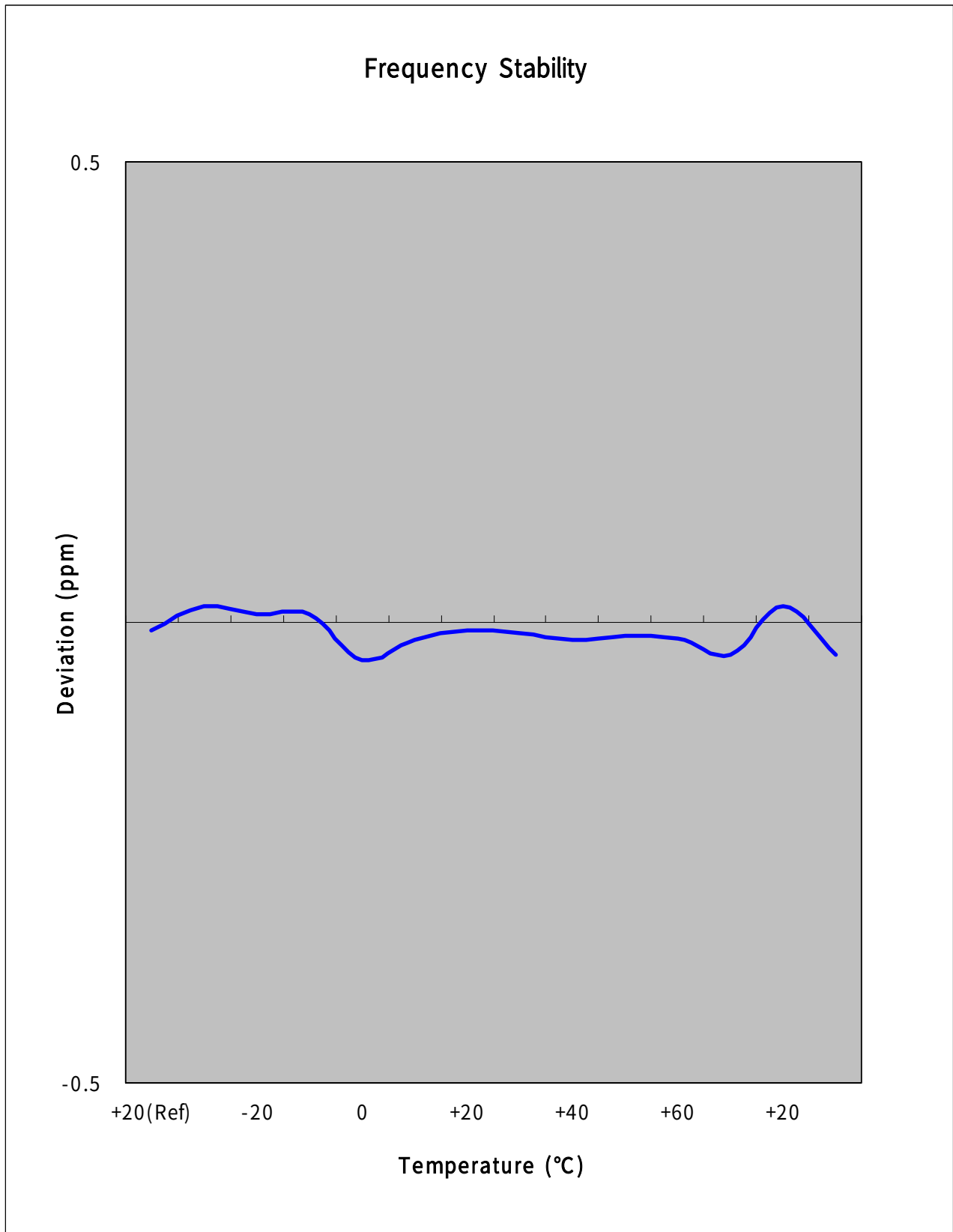
- End of page -

6.7.4 PCS Frequency Stability Graph



- End of page -

Zoom In



- End of page -

7. SAMPLE CALCULATION

7.1 Emission Designator

Emission Designator = 1M25F9W

Calculation : 2M + 2DK

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 Dual-Band CDMA Phone with Bluetooth.
FCC ID : A3LSPHA720 complies with all the requirements of Parts 2,22,24 of the FCC Rules.

- End of page -

9. TEST PLOTS

- End of page -

Agilent

L

Freq/Channel

Ch Freq 824.7 MHz

Trig Free

Channel Power

Center Freq
824.700000 MHzStart Freq
823.200000 MHzStop Freq
826.200000 MHzCF Step
300.000000 kHz
Auto ManFreq Offset
0.00000000 HzSignal Track
On Off

FCC ID:A3LSPHA720 Power Out Ch.1013

Ref 25 dBm

Atten 40 dB

#Avg

Log

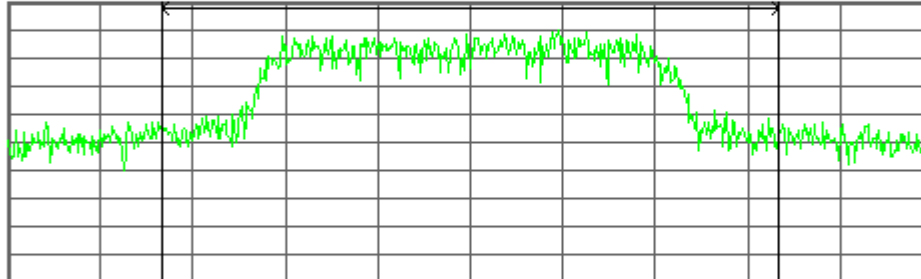
10

dB/

Offst

1.38

dB



Center 824.700 MHz

Span 3 MHz

#Res BW 30 kHz

#VBW 300 kHz

#Sweep 20 ms (601 pts)

Channel Power

Power Spectral Density

25.03 dBm /2.0000 MHz

-37.98 dBm/Hz

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L

Freq/Channel

Ch Freq 836.52 MHz

Trig Free

Channel Power

Center Freq
836.520000 MHzStart Freq
835.020000 MHzStop Freq
838.020000 MHzCF Step
300.000000 kHz
Auto ManFreq Offset
0.00000000 HzSignal Track
On Off

FCC ID:A3LSPHA720 Power Out Ch.384

Ref 25 dBm

Atten 40 dB

#Avg

Log

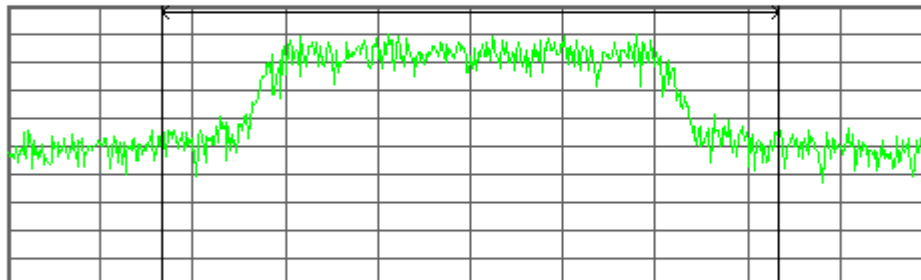
10

dB/

Offst

1.38

dB



Center 836.520 MHz

Span 3 MHz

#Res BW 30 kHz

#VBW 300 kHz

#Sweep 20 ms (601 pts)

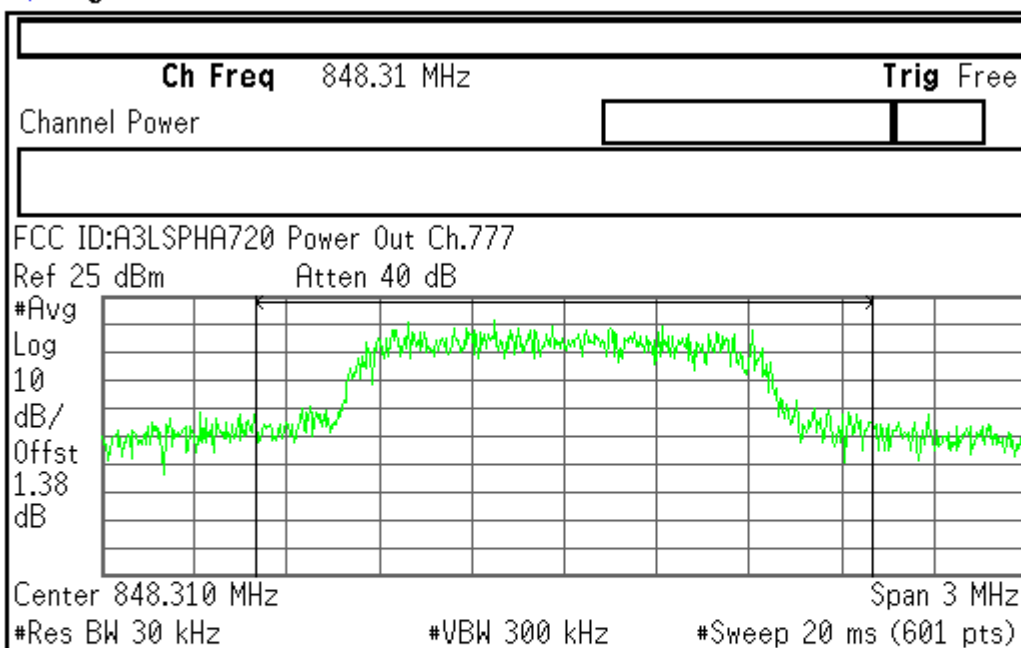
Channel Power

Power Spectral Density

25.02 dBm /2.0000 MHz

-37.99 dBm/Hz

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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

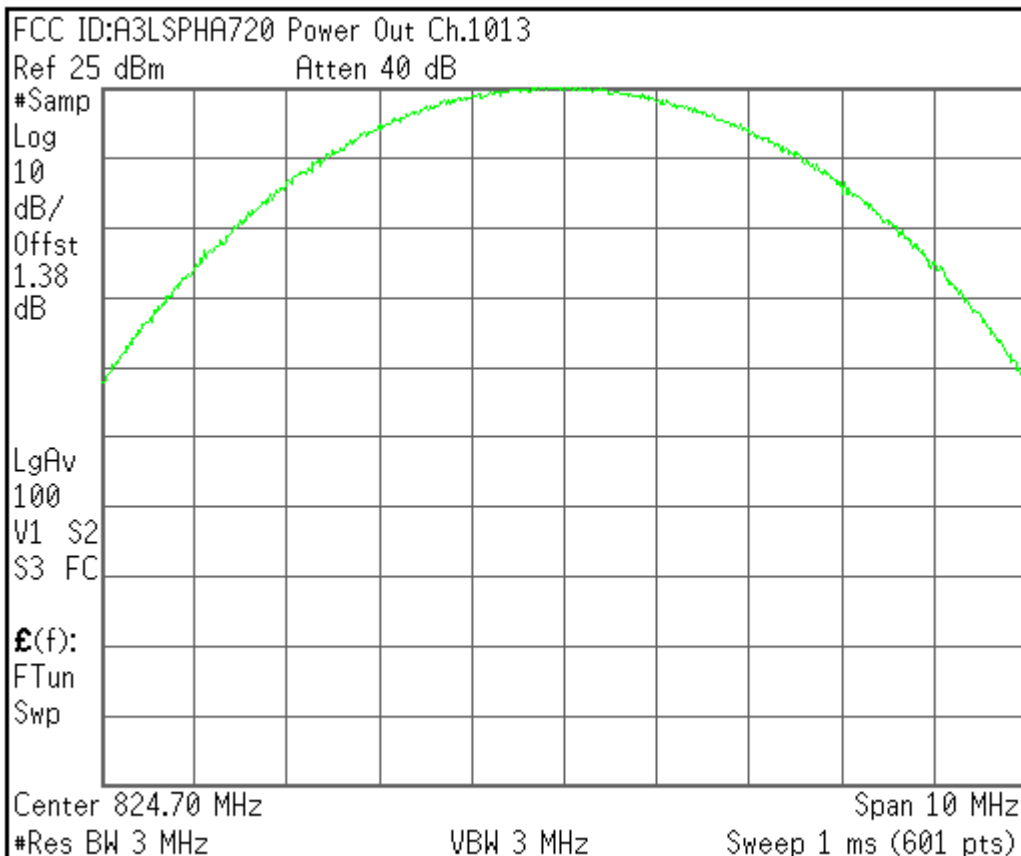
Channel Power

25.02 dBm /2.0000 MHz

Power Spectral Density

-37.99 dBm/Hz

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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

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FCC ID:A3LSPA720 Power Out Ch.384

Ref 25 dBm

Atten 40 dB

#Samp

Log

10

dB/

Offst

1.38

dB

LgAv

100

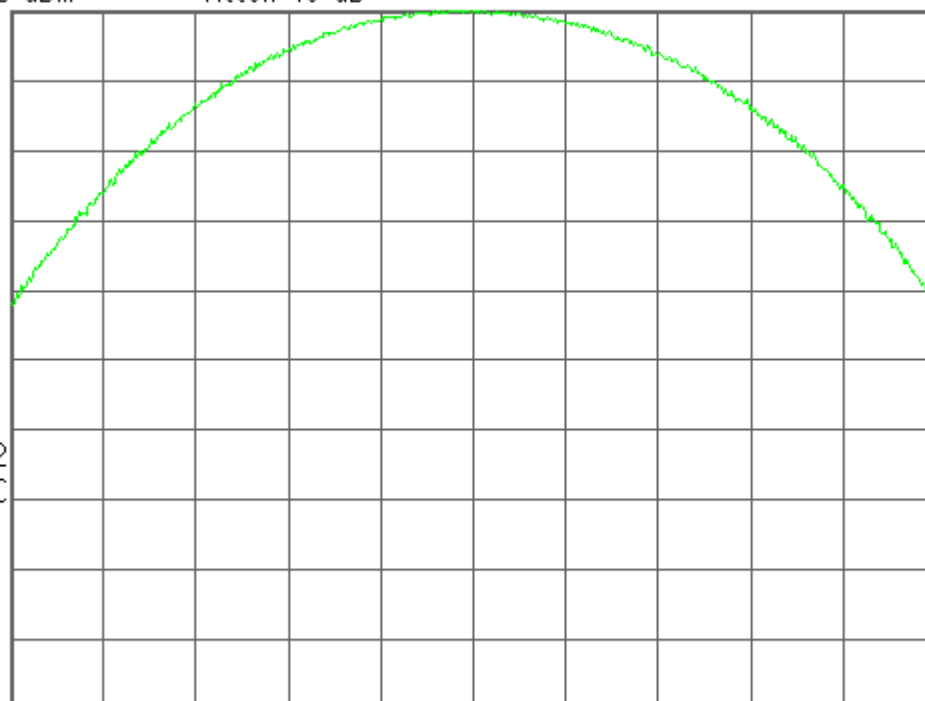
V1 S2

S3 FC

$E(f)$:

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

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FCC ID:A3LSPA720 Power Out Ch.777

Ref 25 dBm

Atten 40 dB

#Samp

Log

10

dB/

Offst

1.38

dB

LgAv

100

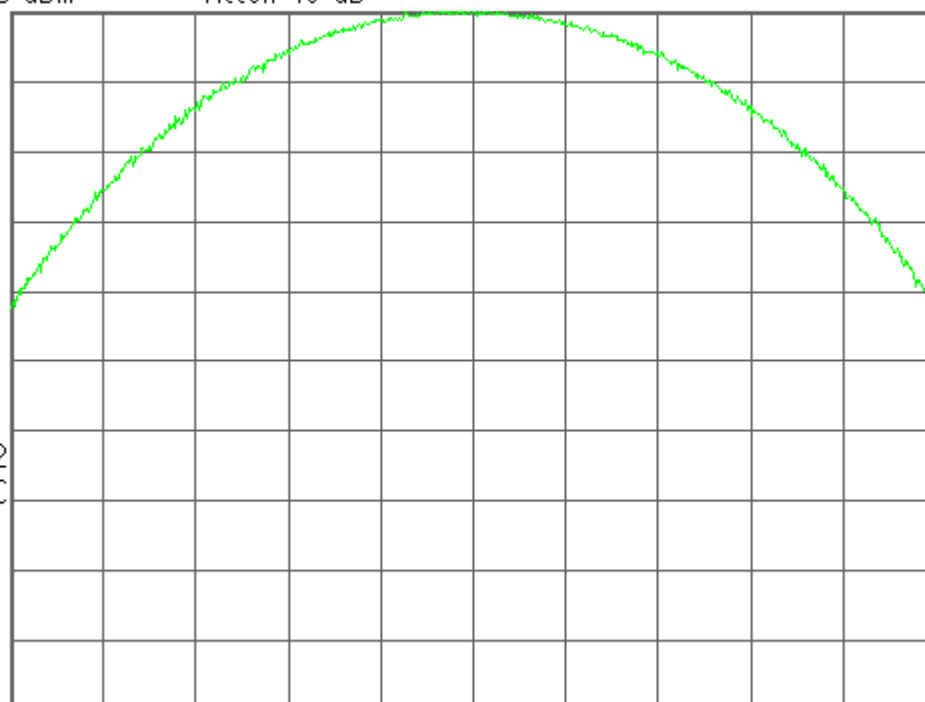
V1 S2

S3 FC

$E(f)$:

FTun

Swp



Start 843.31 MHz

Stop 853.31 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

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Ch Freq 824.7 MHz Trig Free
 Occupied Bandwidth

Center Freq
 824.700000 MHz

Start Freq
 823.200000 MHz

Stop Freq
 826.200000 MHz

CF Step
 300.000000 kHz
 Auto Man

Freq Offset
 0.00000000 Hz

Signal Track
 On Off

FCC ID:A3LSPA720 0BW Ch.1013

Ref 25 dBm Atten 40 dB

#Samp

Log

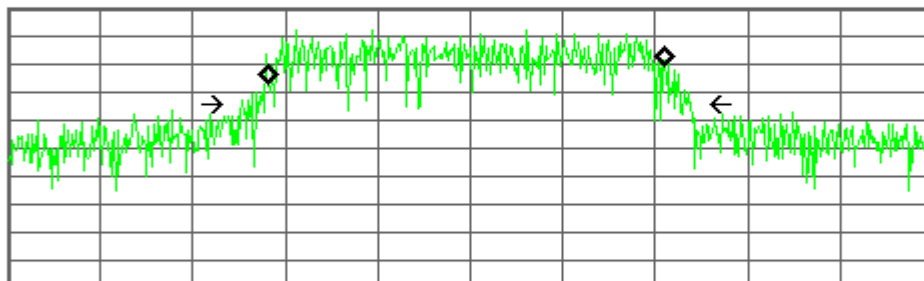
10

dB/

Offst

1.38

dB



Center 824.700 MHz

Span 3 MHz

#Res BW 30 kHz

#VBW 300 kHz

#Sweep 20 ms (601 pts)

Occupied Bandwidth

1.2856 MHz

Occ BW % Pwr 99.00 %
 x dB -26.00 dB

Transmit Freq Error -11.501 kHz

x dB Bandwidth 1.457 MHz*

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Ch Freq 836.52 MHz Trig Free
 Occupied Bandwidth

Center Freq
 836.520000 MHz

Start Freq
 835.020000 MHz

Stop Freq
 838.020000 MHz

CF Step
 300.000000 kHz
 Auto Man

Freq Offset
 0.00000000 Hz

Signal Track
 On Off

FCC ID:A3LSPA720 0BW Ch.384

Ref 25 dBm Atten 40 dB

#Samp

Log

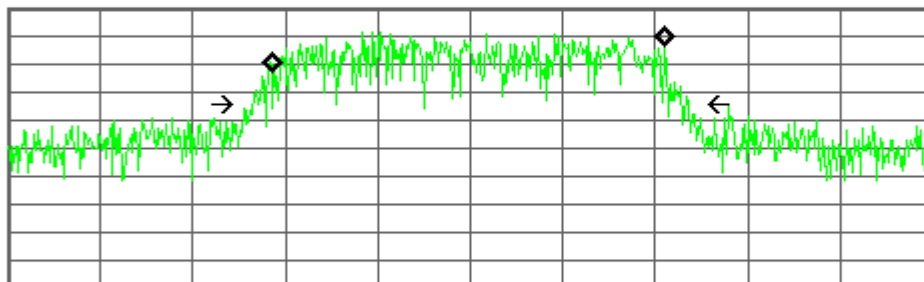
10

dB/

Offst

1.38

dB



Center 836.520 MHz

Span 3 MHz

#Res BW 30 kHz

#VBW 300 kHz

#Sweep 20 ms (601 pts)

Occupied Bandwidth

1.2742 MHz

Occ BW % Pwr 99.00 %
 x dB -26.00 dB

Transmit Freq Error -7.092 kHz

x dB Bandwidth 1.409 MHz*

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Ch Freq 848.31 MHz **Trig** Free
 Occupied Bandwidth

Center Freq
 848.310000 MHz

Start Freq
 846.810000 MHz

Stop Freq
 849.810000 MHz

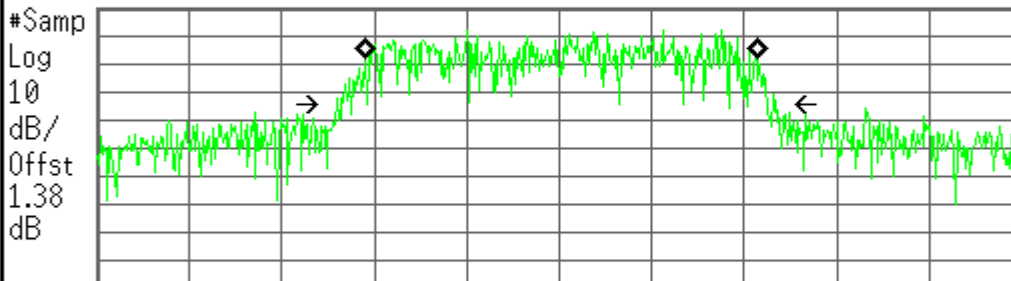
CF Step
 300.000000 kHz
 Auto Man

Freq Offset
 0.00000000 Hz

Signal Track
 On Off

FCC ID:A3LSPA720 0BW Ch.777

Ref 25 dBm Atten 40 dB



Center 848.310 MHz Span 3 MHz
 #Res BW 30 kHz #VBW 300 kHz #Sweep 20 ms (601 pts)

Occupied Bandwidth

1.2702 MHz

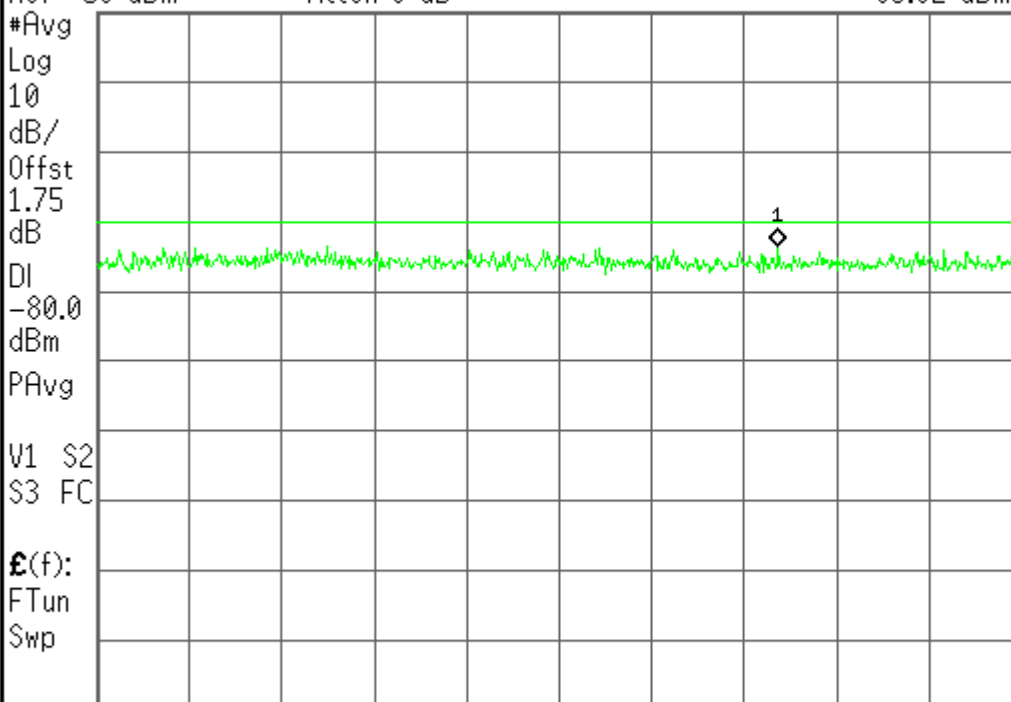
Occ BW % Pwr 99.00 %
x dB -26.00 dB

Transmit Freq Error 4.584 kHz

x dB Bandwidth 1.422 MHz*

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FCC ID:A3LSPA720 Rx Spurious Emission Mkr1 887.42 MHz
 Ref -50 dBm #Atten 0 dB -83.62 dBm



Start 869.00 MHz Stop 894.00 MHz
 #Res BW 1 MHz VBW 1 MHz Sweep 1 ms (601 pts)

Center Freq
 881.500005 MHz

Start Freq
 869.000000 MHz

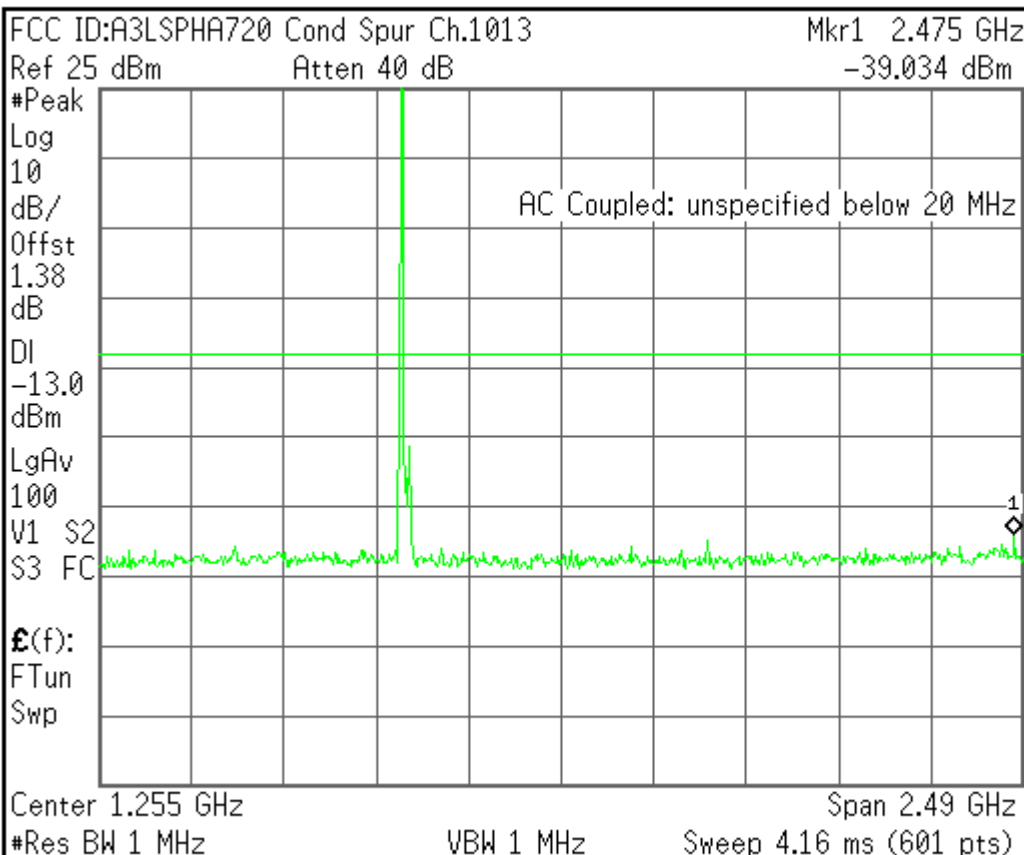
Stop Freq
 894.000010 MHz

CF Step
 2.50000100 MHz
 Auto Man

Freq Offset
 0.00000000 Hz

Signal Track
 On Off

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Freq/Channel

Center Freq
 1.25500000 GHz

Start Freq
 10.0000000 MHz

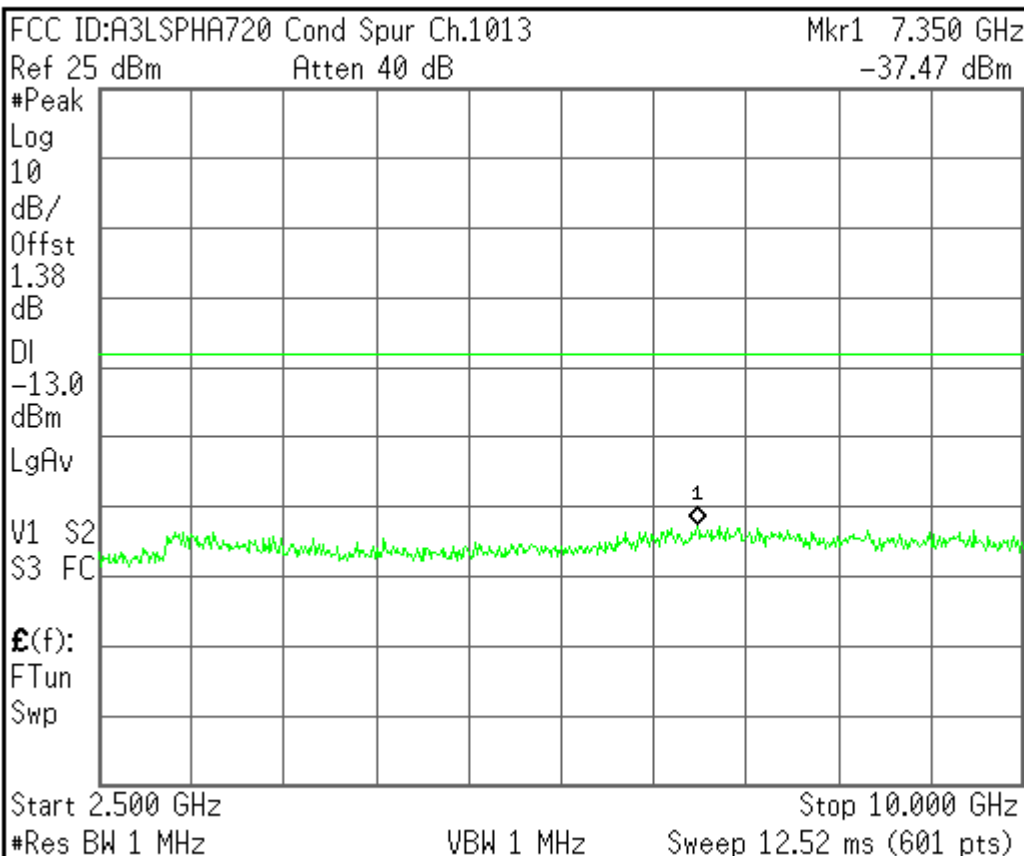
Stop Freq
 2.50000000 GHz

CF Step
 249.000000 MHz
 Auto Man

Freq Offset
 0.00000000 Hz

Signal Track
 On Off

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Freq/Channel

Center Freq
 6.25000000 GHz

Start Freq
 2.50000000 GHz

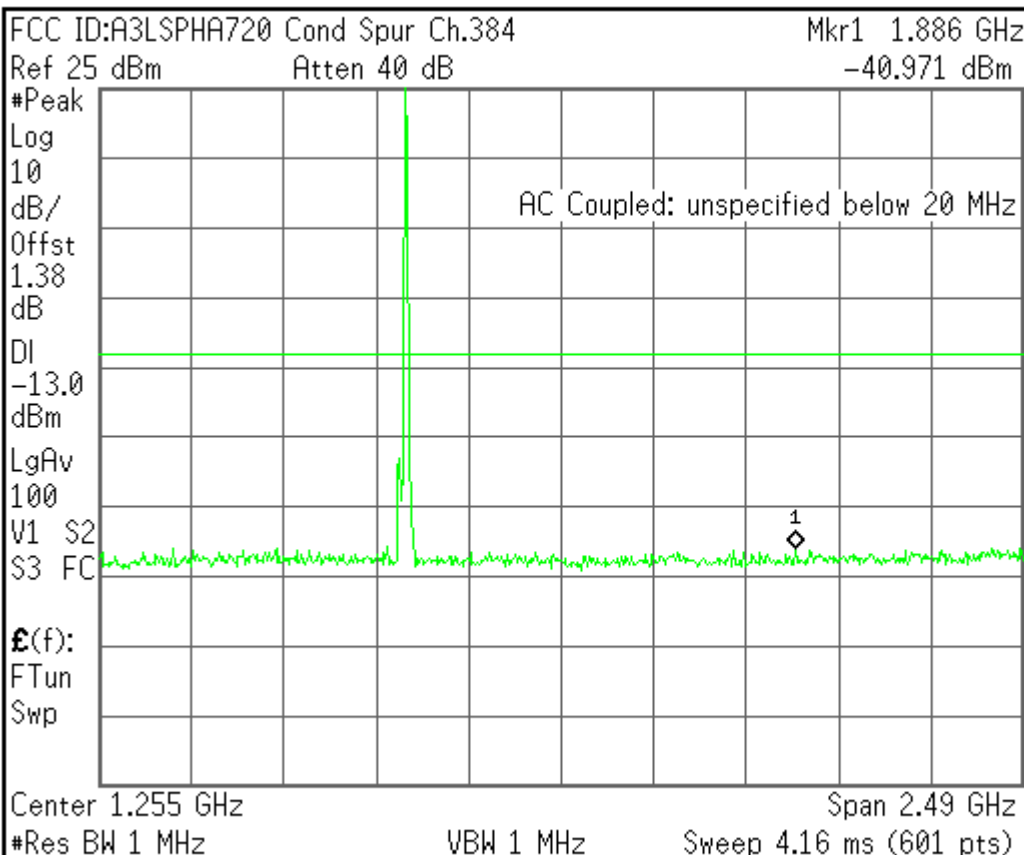
Stop Freq
 10.0000000 GHz

CF Step
 750.000000 MHz
 Auto Man

Freq Offset
 0.00000000 Hz

Signal Track
 On Off

Copyright 2000-2005 Agilent Technologies



Freq/Channel

Center Freq
 1.25500000 GHz

Start Freq
 10.0000000 MHz

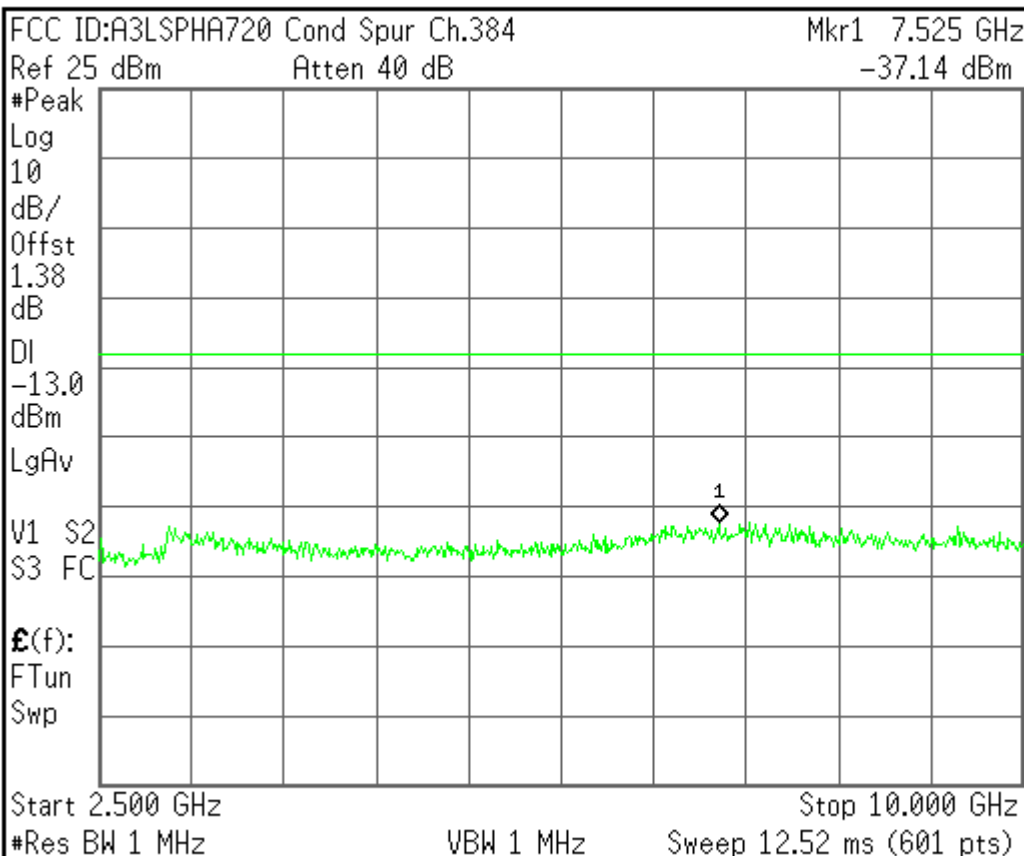
Stop Freq
 2.50000000 GHz

CF Step
 249.000000 MHz
 Auto Man

Freq Offset
 0.00000000 Hz

Signal Track
 On Off

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Freq/Channel

Center Freq
 6.25000000 GHz

Start Freq
 2.50000000 GHz

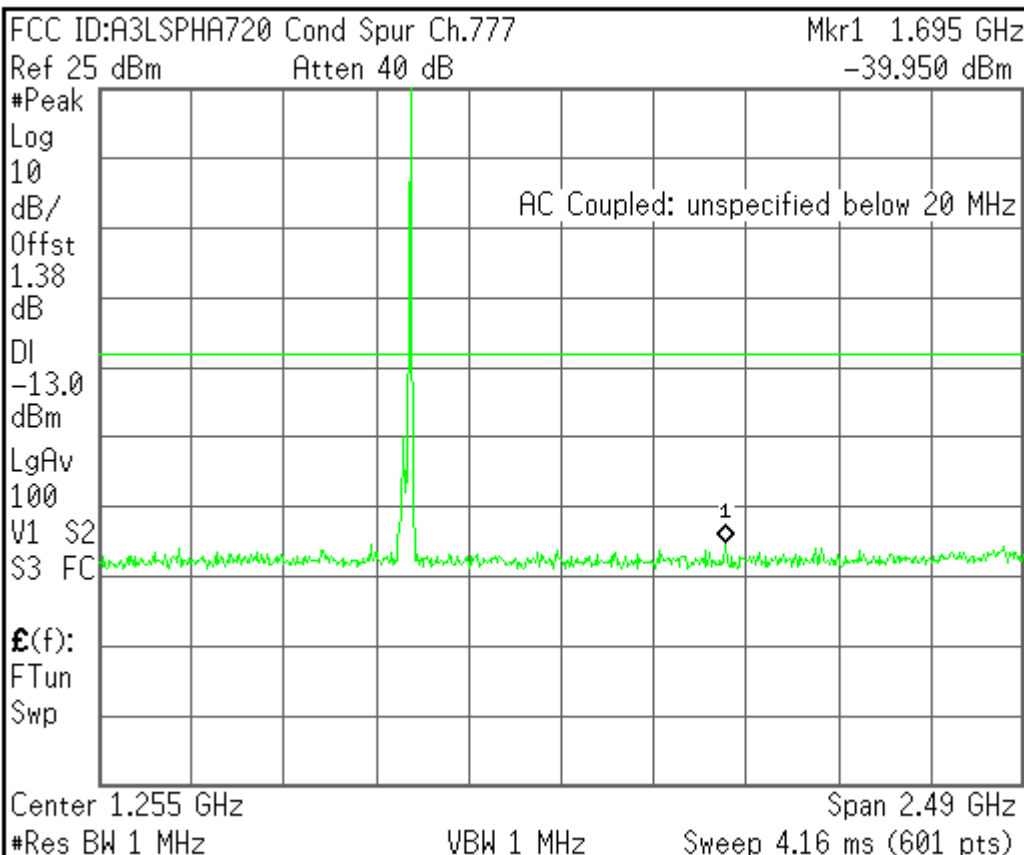
Stop Freq
 10.0000000 GHz

CF Step
 750.000000 MHz
 Auto Man

Freq Offset
 0.00000000 Hz

Signal Track
 On Off

Copyright 2000-2005 Agilent Technologies



Freq/Channel

Center Freq
 1.25500000 GHz

Start Freq
 10.0000000 MHz

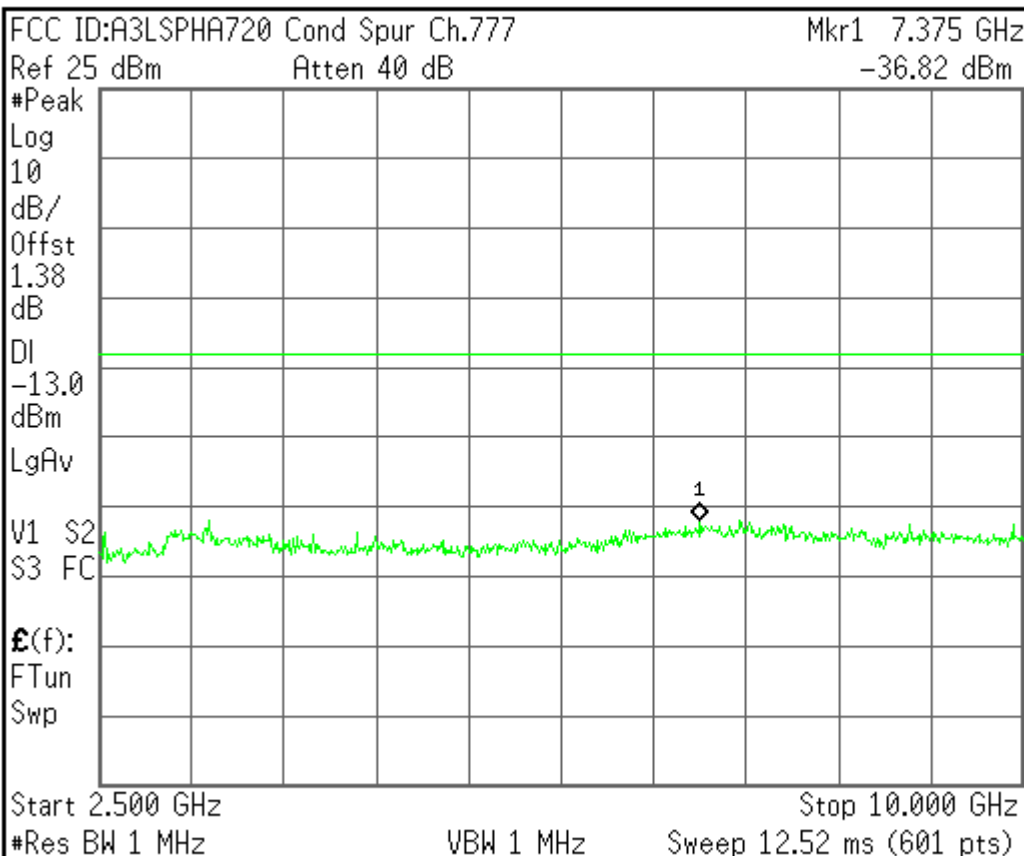
Stop Freq
 2.50000000 GHz

CF Step
 249.000000 MHz
 Auto Man

Freq Offset
 0.00000000 Hz

Signal Track
 On Off

Copyright 2000-2005 Agilent Technologies



Freq/Channel

Center Freq
 6.25000000 GHz

Start Freq
 2.50000000 GHz

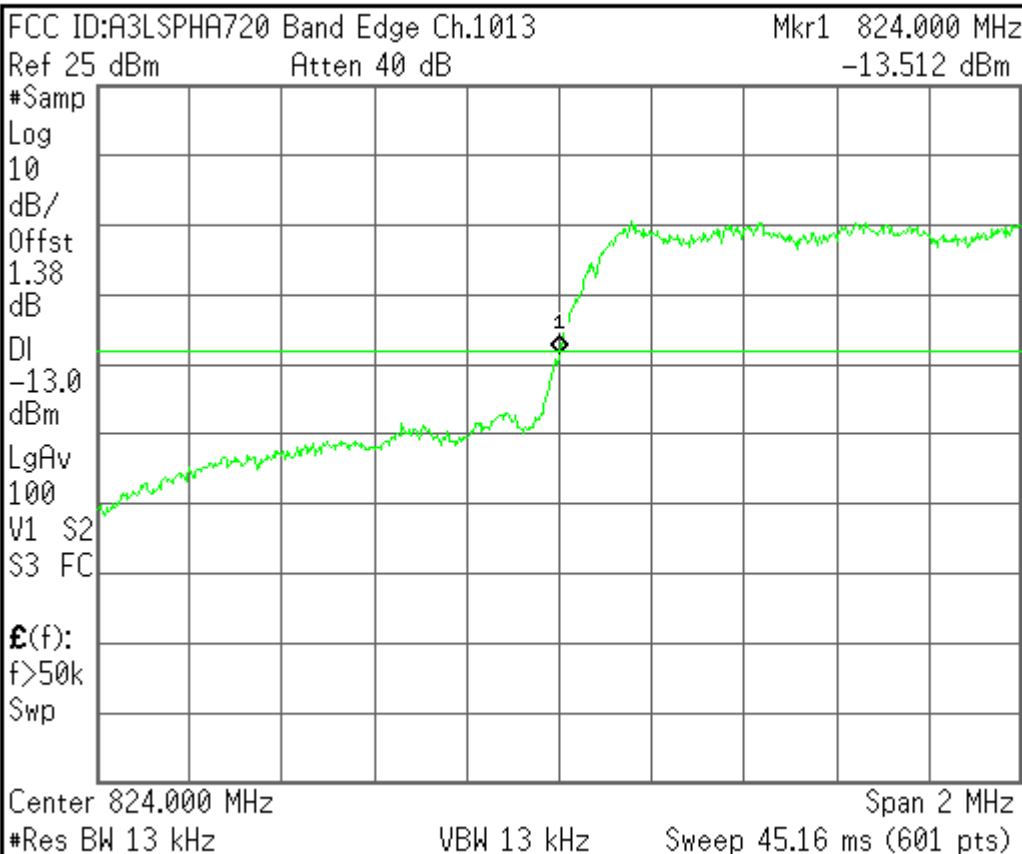
Stop Freq
 10.0000000 GHz

CF Step
 750.000000 MHz
 Auto Man

Freq Offset
 0.00000000 Hz

Signal Track
 On Off

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Freq/Channel

Center Freq
 824.000000 MHz

Start Freq
 823.000000 MHz

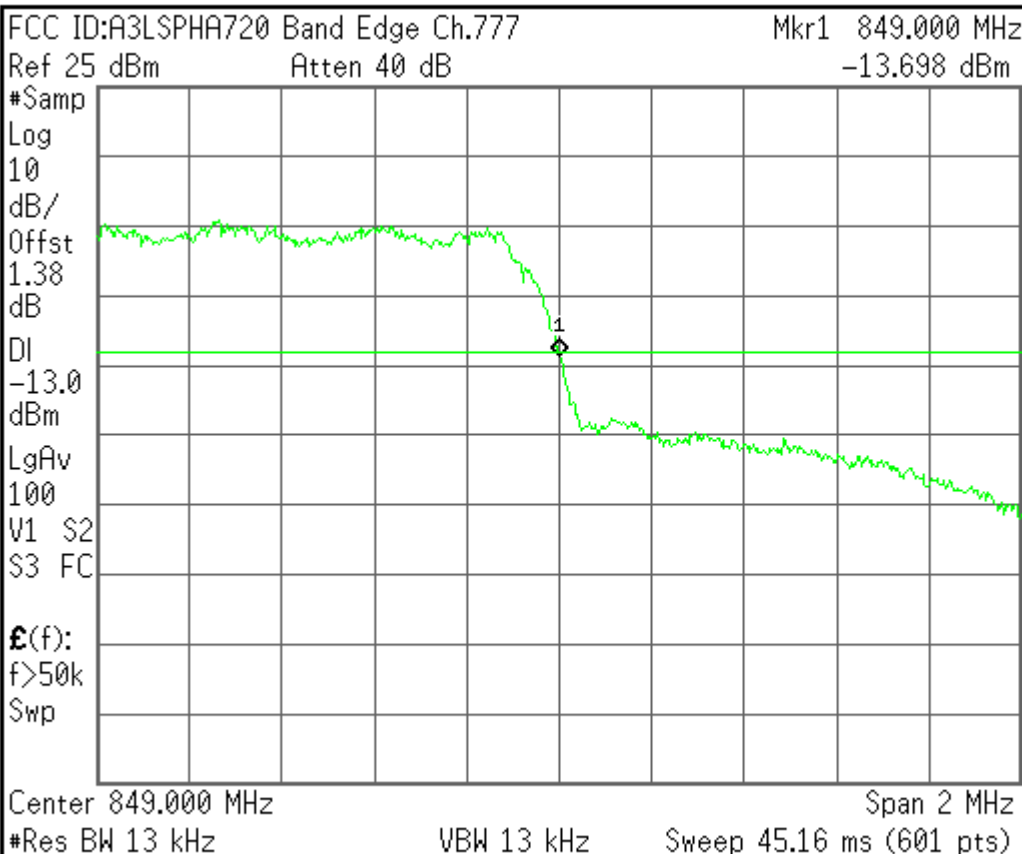
Stop Freq
 825.000000 MHz

CF Step
 200.000000 kHz
 Auto Man

Freq Offset
 0.00000000 Hz

Signal Track
 On Off

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Freq/Channel

Center Freq
 849.000000 MHz

Start Freq
 848.000000 MHz

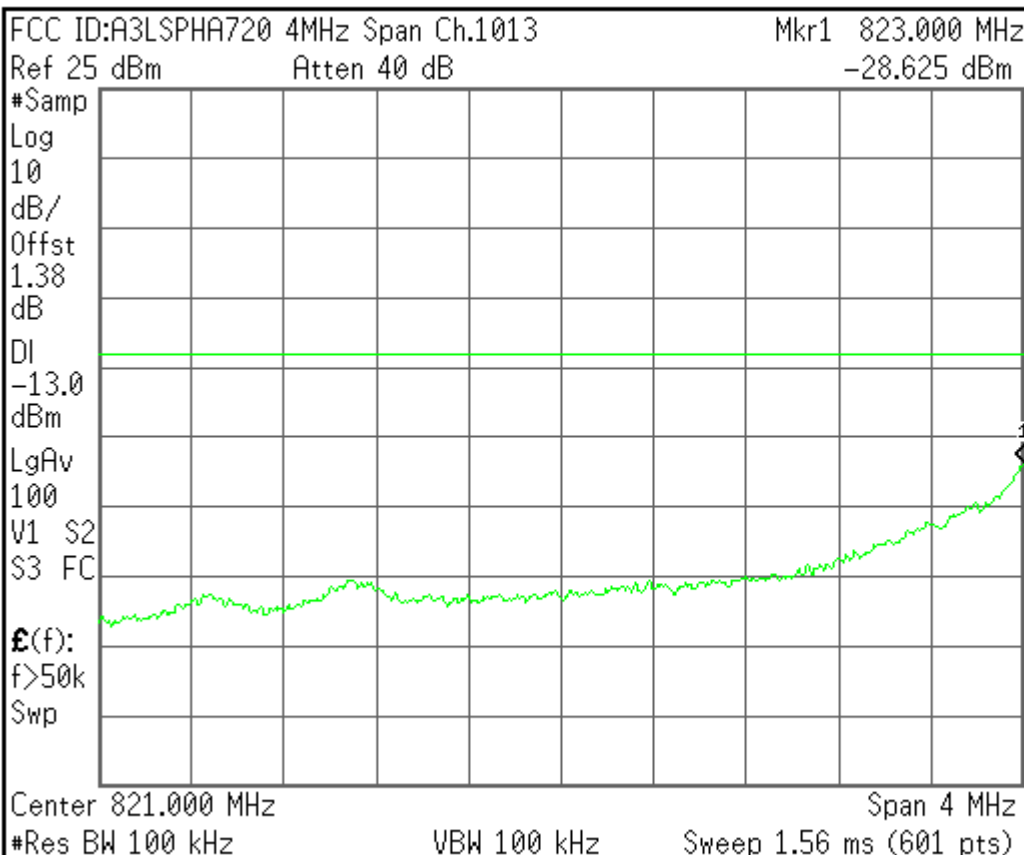
Stop Freq
 850.000000 MHz

CF Step
 200.000000 kHz
 Auto Man

Freq Offset
 0.00000000 Hz

Signal Track
 On Off

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Freq/Channel

Center Freq
 821.000000 MHz

Start Freq
 819.000000 MHz

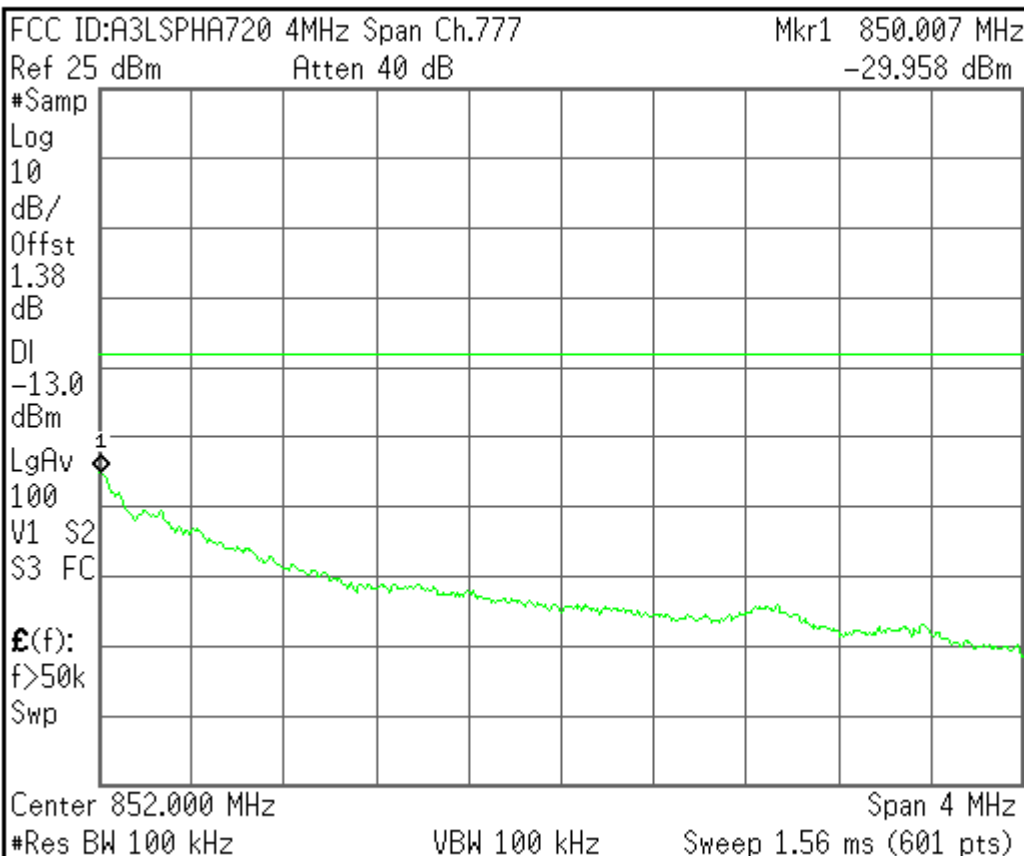
Stop Freq
 823.000000 MHz

CF Step
 400.000000 kHz
 Auto Man

Freq Offset
 0.00000000 Hz

Signal Track
 On Off

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Freq/Channel

Center Freq
 852.000000 MHz

Start Freq
 850.000000 MHz

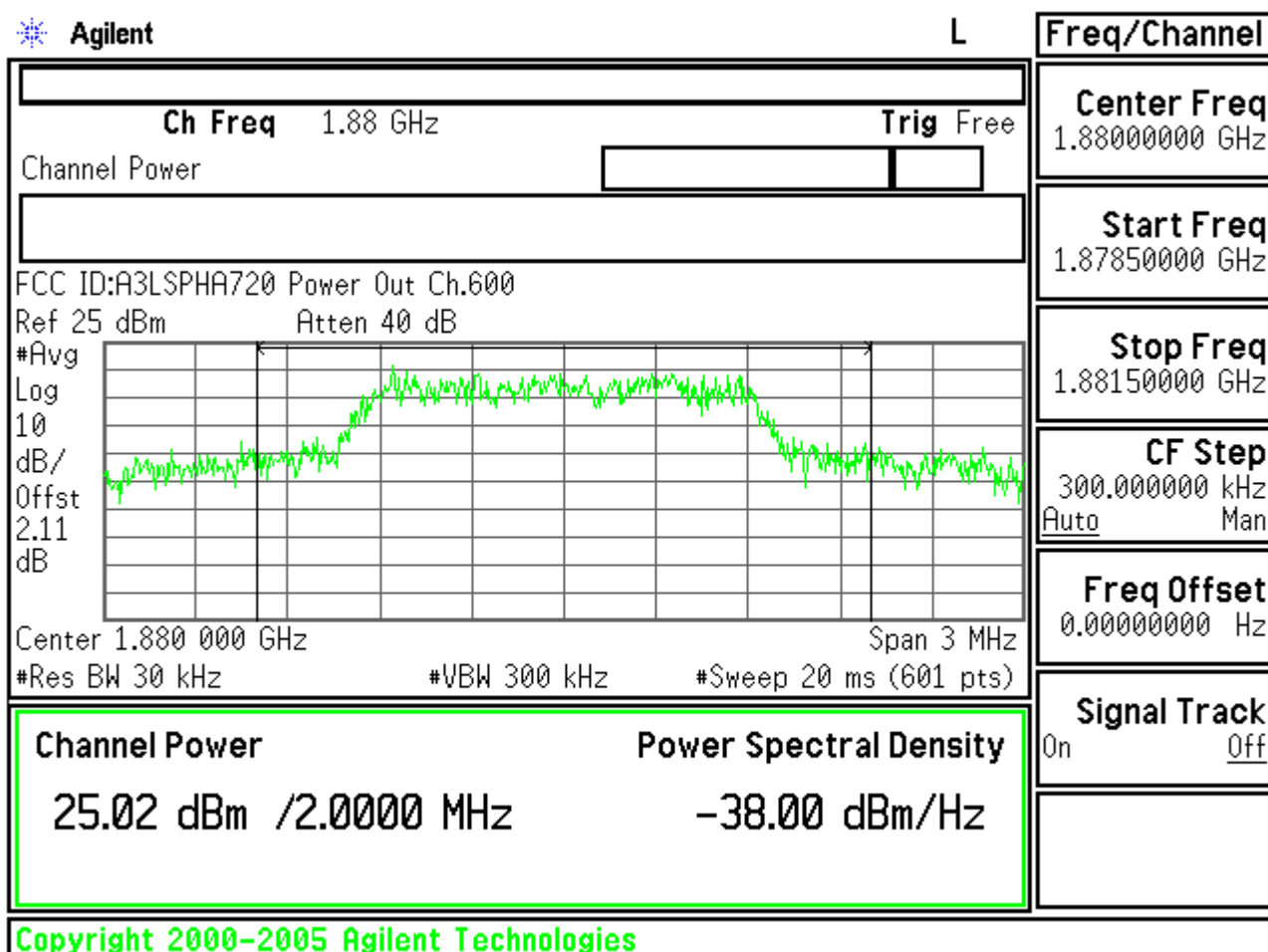
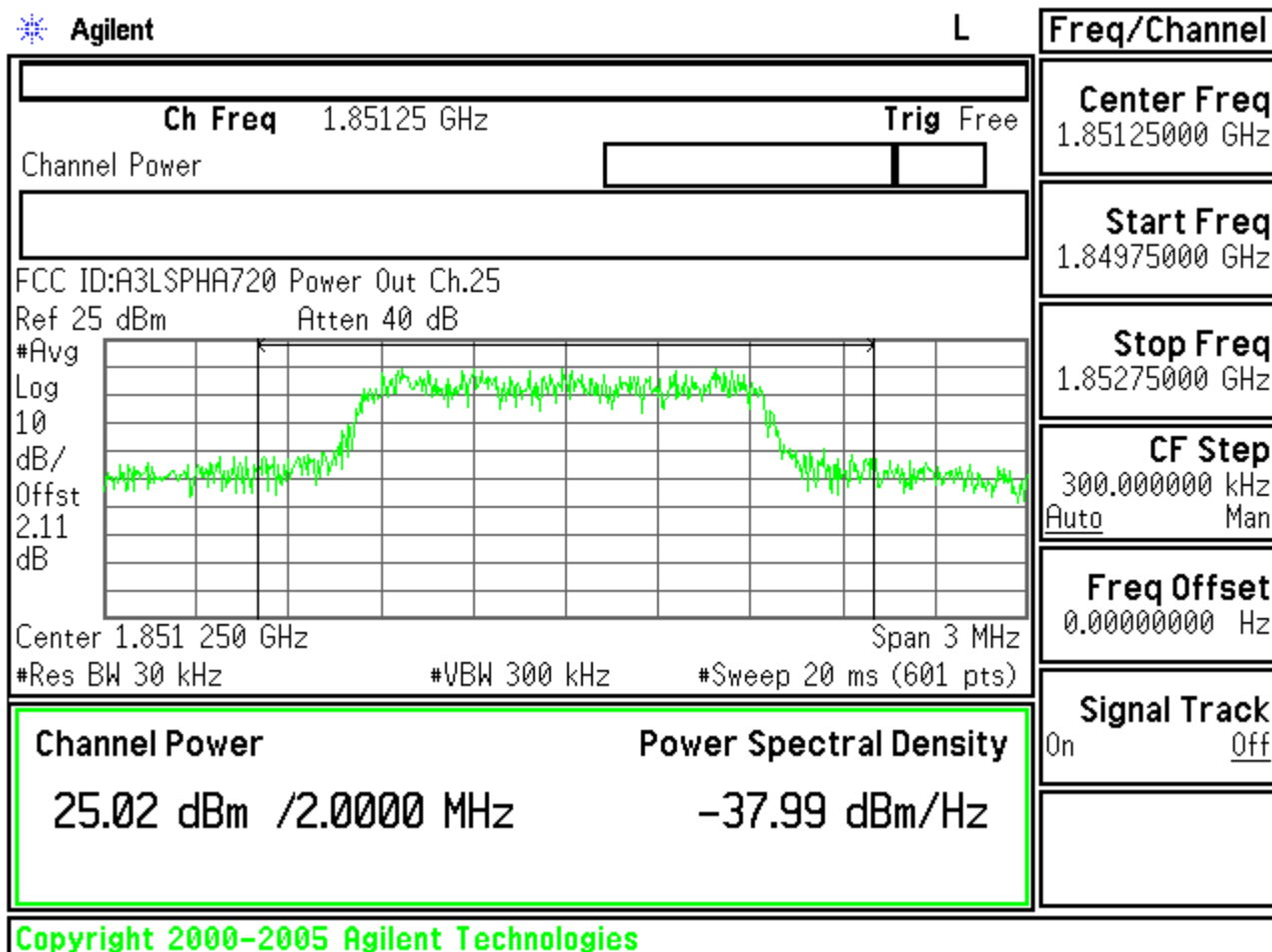
Stop Freq
 854.000000 MHz

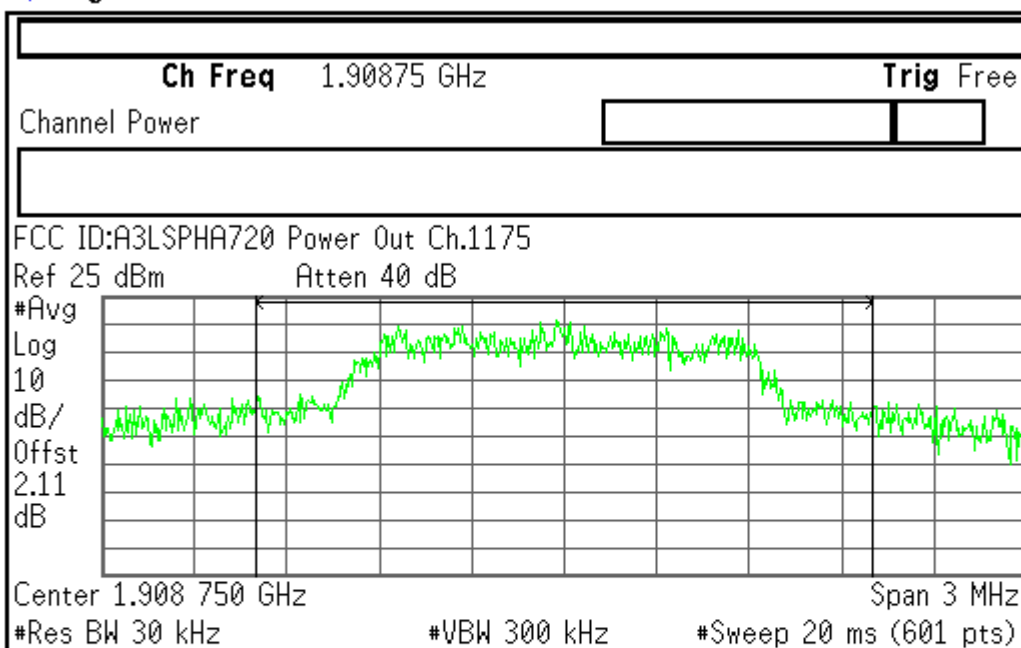
CF Step
 400.000000 kHz
 Auto Man

Freq Offset
 0.00000000 Hz

Signal Track
 On Off

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Channel Power

25.02 dBm /2.0000 MHz

Power Spectral Density

-37.99 dBm/Hz

Freq/Channel

Center Freq
1.90875000 GHz

Start Freq
1.90725000 GHz

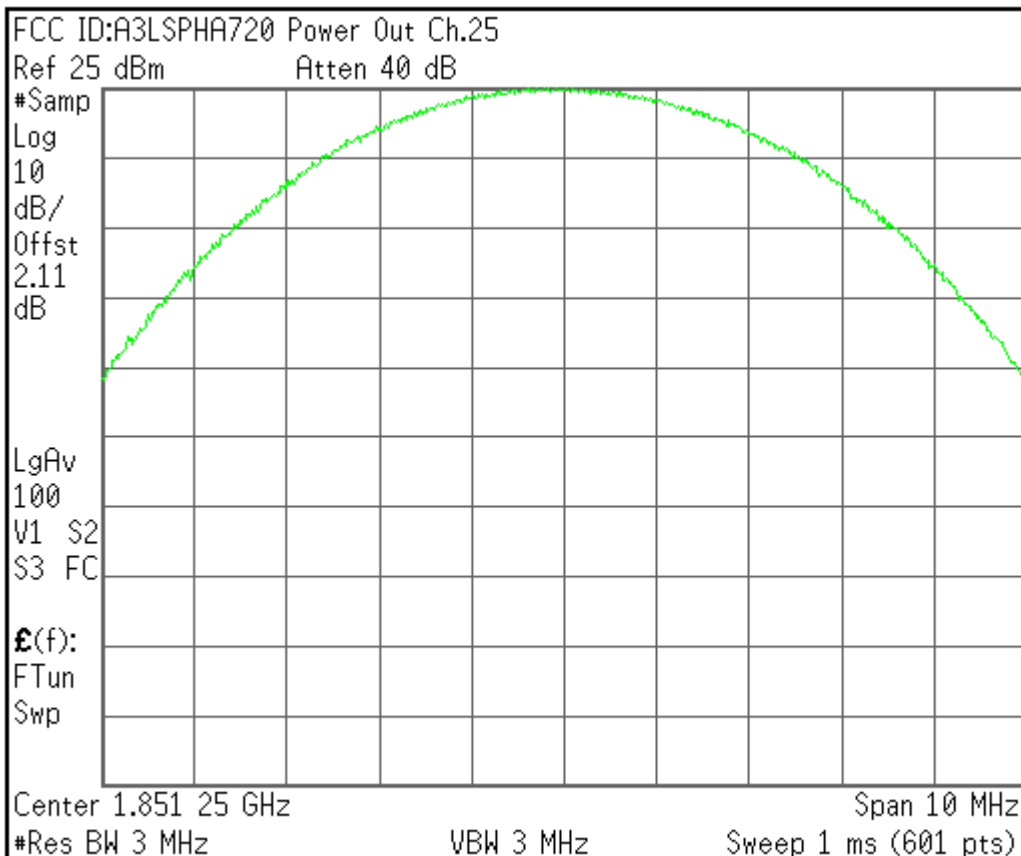
Stop Freq
1.91025000 GHz

CF Step
300.000000 kHz
Auto Man

Freq Offset
0.00000000 Hz

Signal Track
On Off

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Freq/Channel

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

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FCC ID:A3LSPA720 Power Out Ch.600

Ref 25 dBm

Atten 40 dB

#Samp

Log

10

dB/

Offst

2.11

dB

LgAv

100

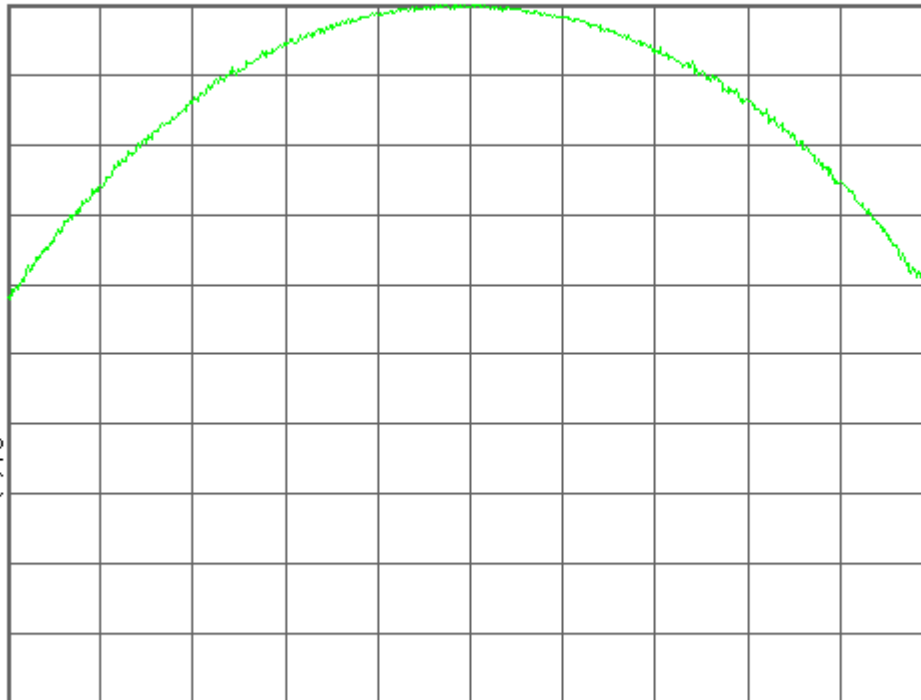
V1 S2

S3 FC

$E(f)$:

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

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FCC ID:A3LSPA720 Power Out Ch.1175

Ref 25 dBm

Atten 40 dB

#Samp

Log

10

dB/

Offst

2.11

dB

LgAv

100

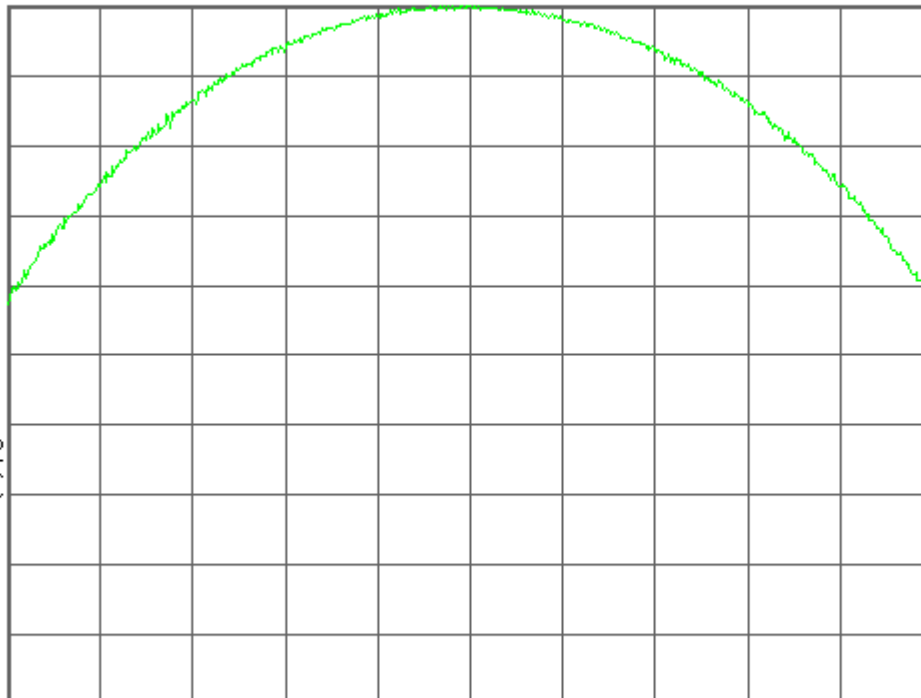
V1 S2

S3 FC

$E(f)$:

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

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Ch Freq 1.85125 GHz **Trig** Free
 Occupied Bandwidth

Center Freq
 1.85125000 GHz

Start Freq
 1.84975000 GHz

Stop Freq
 1.85275000 GHz

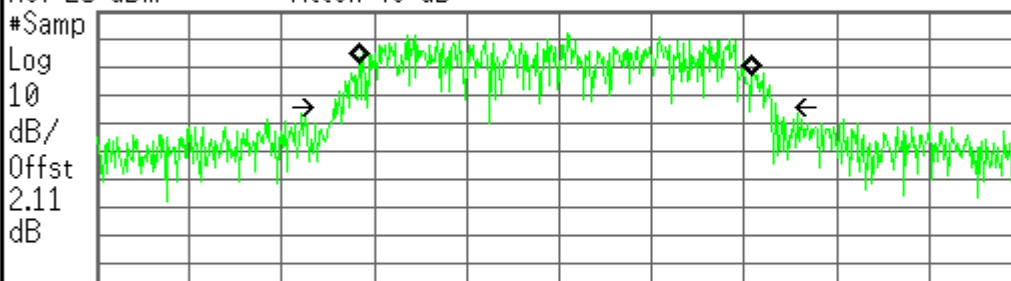
CF Step
 300.000000 kHz
 Auto Man

Freq Offset
 0.00000000 Hz

Signal Track
 On Off

FCC ID:A3LSPA720 0BW Ch.25

Ref 25 dBm Atten 40 dB



Center 1.851 250 GHz Span 3 MHz
 #Res BW 30 kHz #VBW 300 kHz #Sweep 20 ms (601 pts)

Occupied Bandwidth
 1.2763 MHz

Occ BW % Pwr 99.00 %
x dB -26.00 dB

Transmit Freq Error -11.265 kHz
x dB Bandwidth 1.435 MHz*

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Ch Freq 1.88 GHz **Trig** Free
 Occupied Bandwidth

Center Freq
 1.88000000 GHz

Start Freq
 1.87850000 GHz

Stop Freq
 1.88150000 GHz

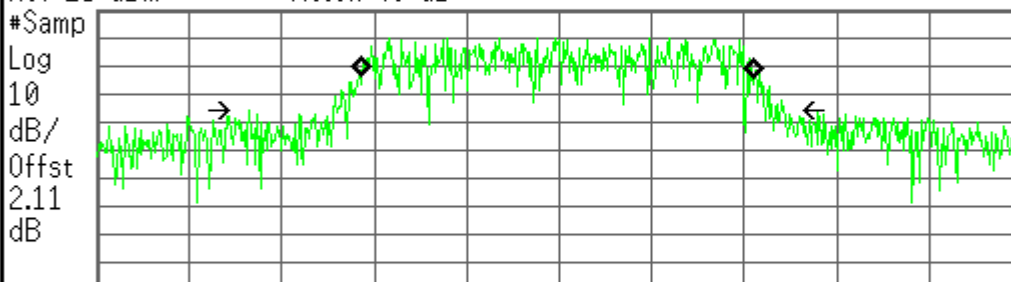
CF Step
 300.000000 kHz
 Auto Man

Freq Offset
 0.00000000 Hz

Signal Track
 On Off

FCC ID:A3LSPA720 0BW Ch.600

Ref 25 dBm Atten 40 dB



Center 1.880 000 GHz Span 3 MHz
 #Res BW 30 kHz #VBW 300 kHz #Sweep 20 ms (601 pts)

Occupied Bandwidth
 1.2758 MHz

Occ BW % Pwr 99.00 %
x dB -26.00 dB

Transmit Freq Error -5.600 kHz
x dB Bandwidth 1.737 MHz*

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Ch Freq 1.90875 GHz **Trig** Free
Occupied Bandwidth

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:A3LSPA720 0BW Ch.1175

Ref 25 dBm Atten 40 dB

#Samp

Log

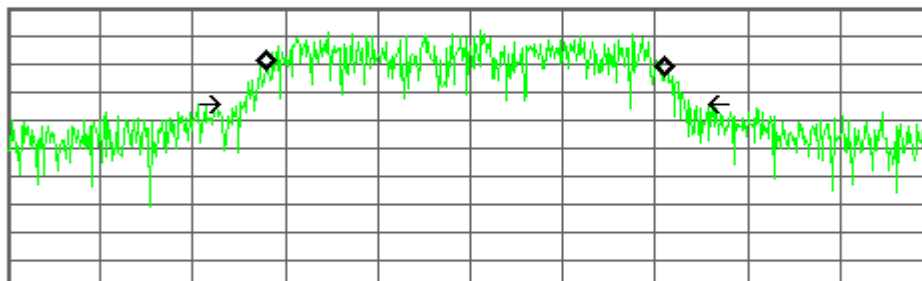
10

dB/

Offst

2.11

dB



Center 1.908 750 GHz

Span 3 MHz

#Res BW 30 kHz

#VBW 300 kHz

#Sweep 20 ms (601 pts)

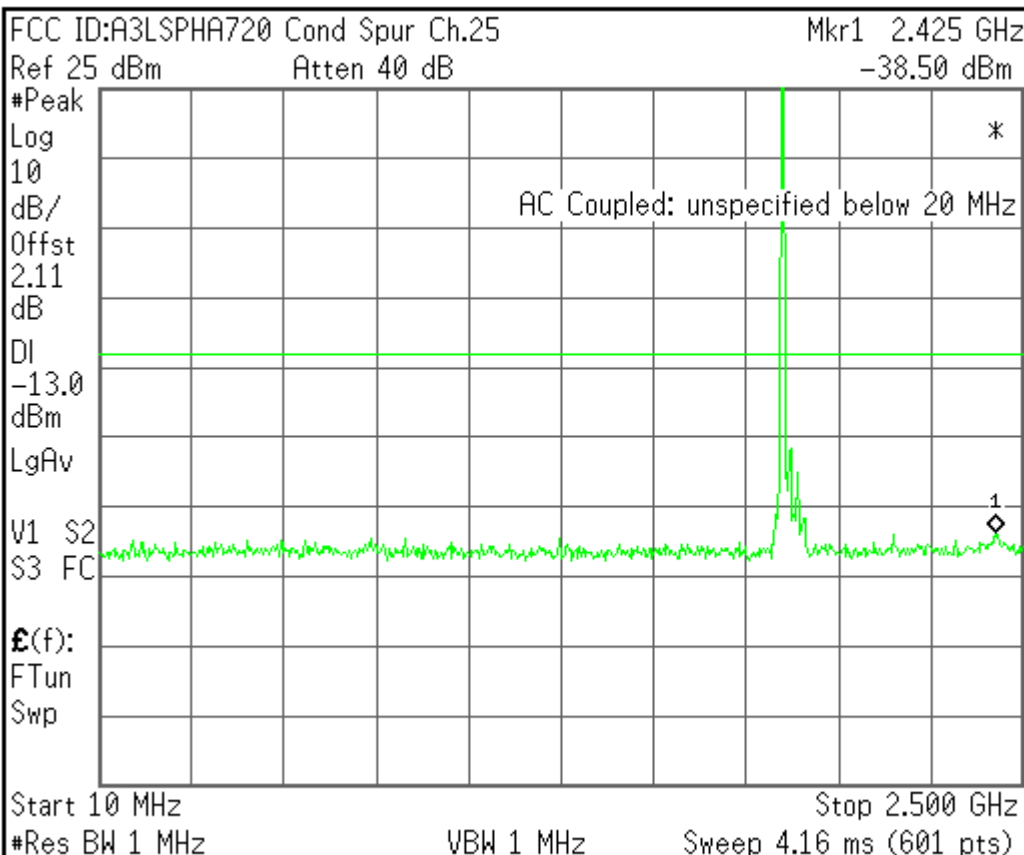
Occupied Bandwidth

1.2982 MHz

Occ BW % Pwr 99.00 %
x dB -26.00 dB

Transmit Freq Error -17.563 kHz

x dB Bandwidth 1.457 MHz*



Freq/Channel

Center Freq
1.25500000 GHz

Start Freq
10.0000000 MHz

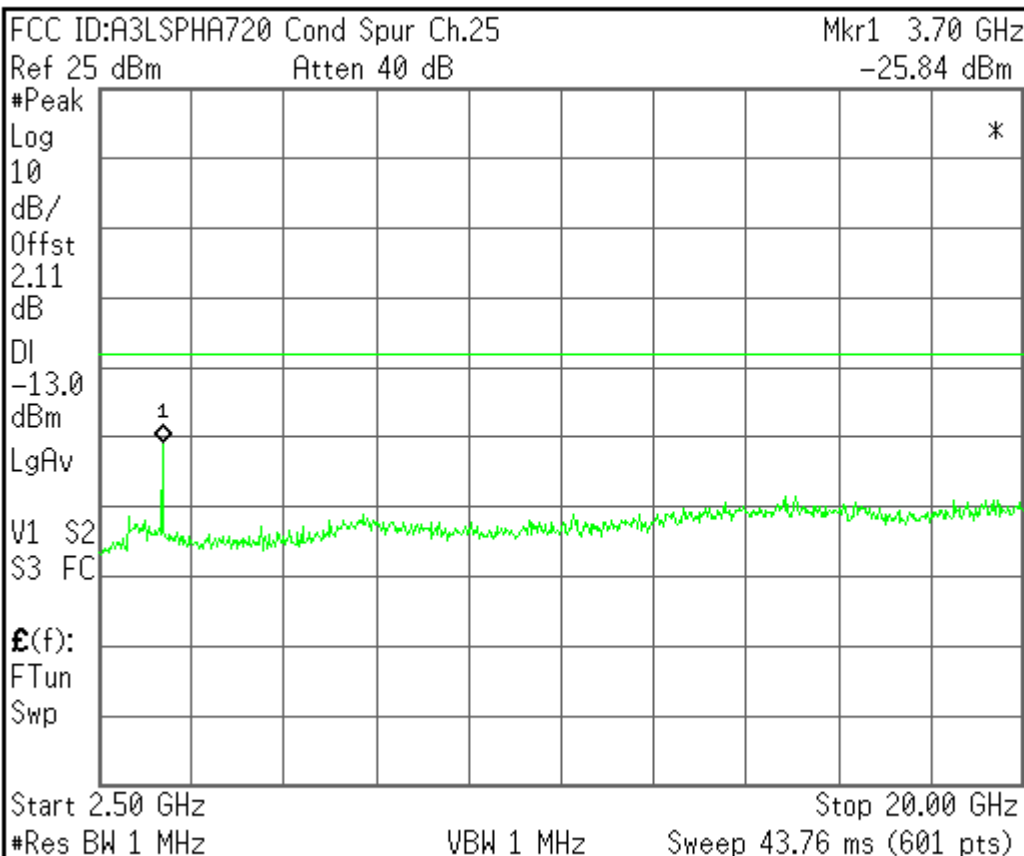
Stop Freq
2.50000000 GHz

CF Step
249.000000 MHz
Auto Man

Freq Offset
0.00000000 Hz

Signal Track
On Off

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Freq/Channel

Center Freq
11.2500000 GHz

Start Freq
2.50000000 GHz

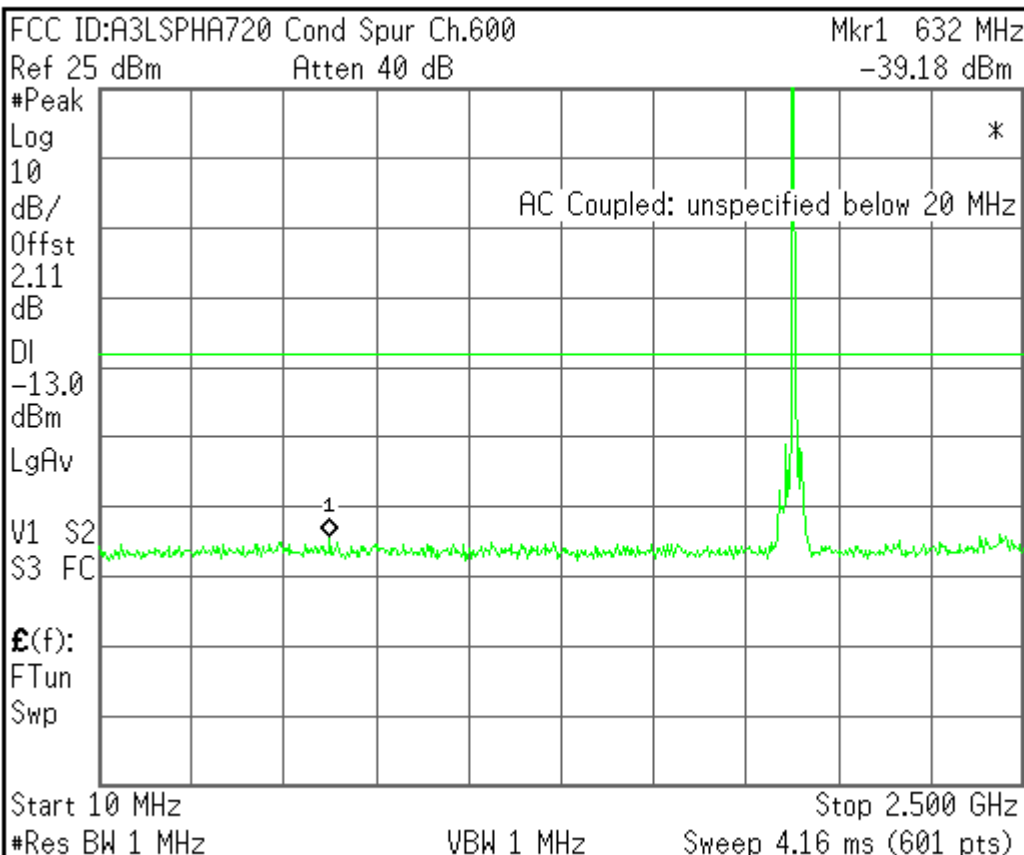
Stop Freq
20.0000000 GHz

CF Step
1.75000000 GHz
Auto Man

Freq Offset
0.00000000 Hz

Signal Track
On Off

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Freq/Channel

Center Freq
1.25500000 GHz

Start Freq
10.0000000 MHz

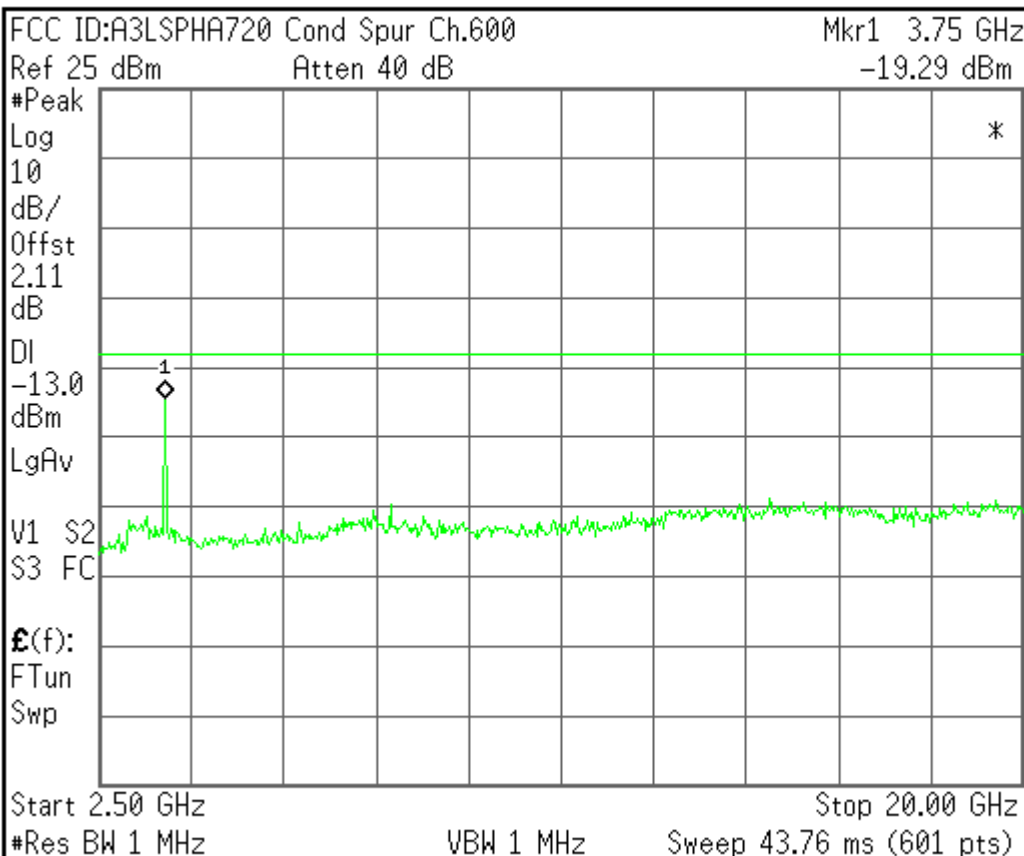
Stop Freq
2.50000000 GHz

CF Step
249.000000 MHz
Auto Man

Freq Offset
0.00000000 Hz

Signal Track
On Off

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Freq/Channel

Center Freq
11.2500000 GHz

Start Freq
2.50000000 GHz

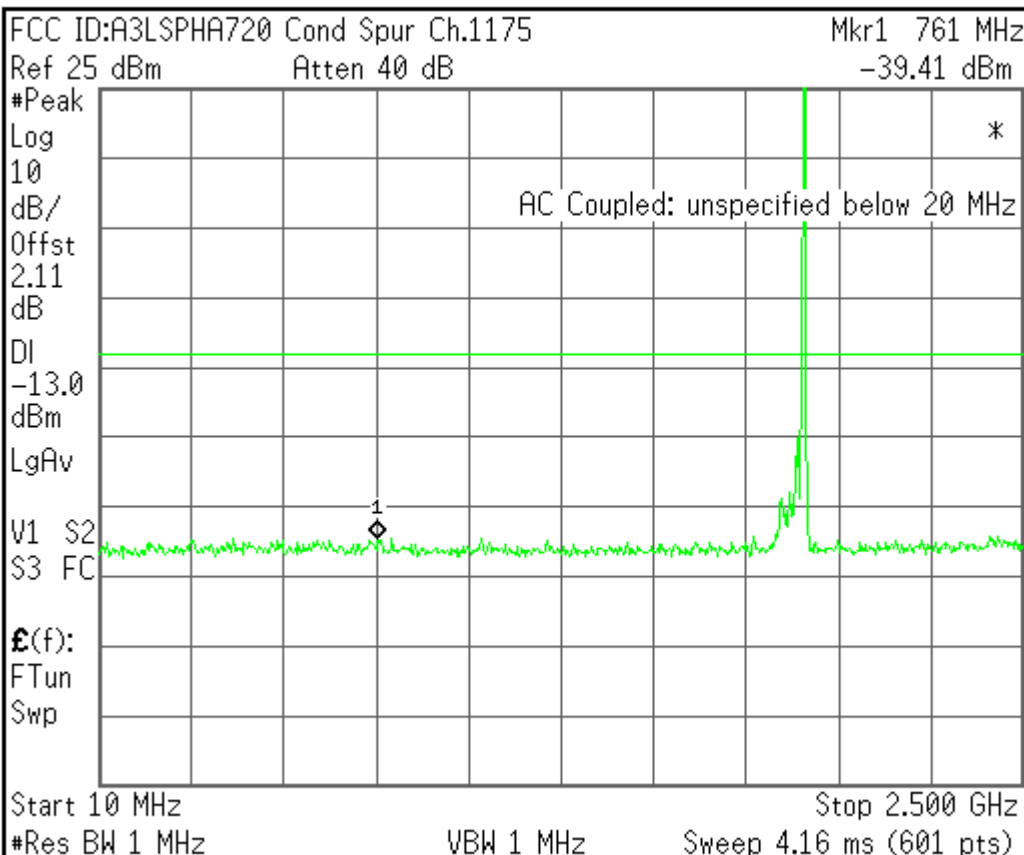
Stop Freq
20.0000000 GHz

CF Step
1.75000000 GHz
Auto Man

Freq Offset
0.00000000 Hz

Signal Track
On Off

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Freq/Channel

Center Freq
 1.25500000 GHz

Start Freq
 10.0000000 MHz

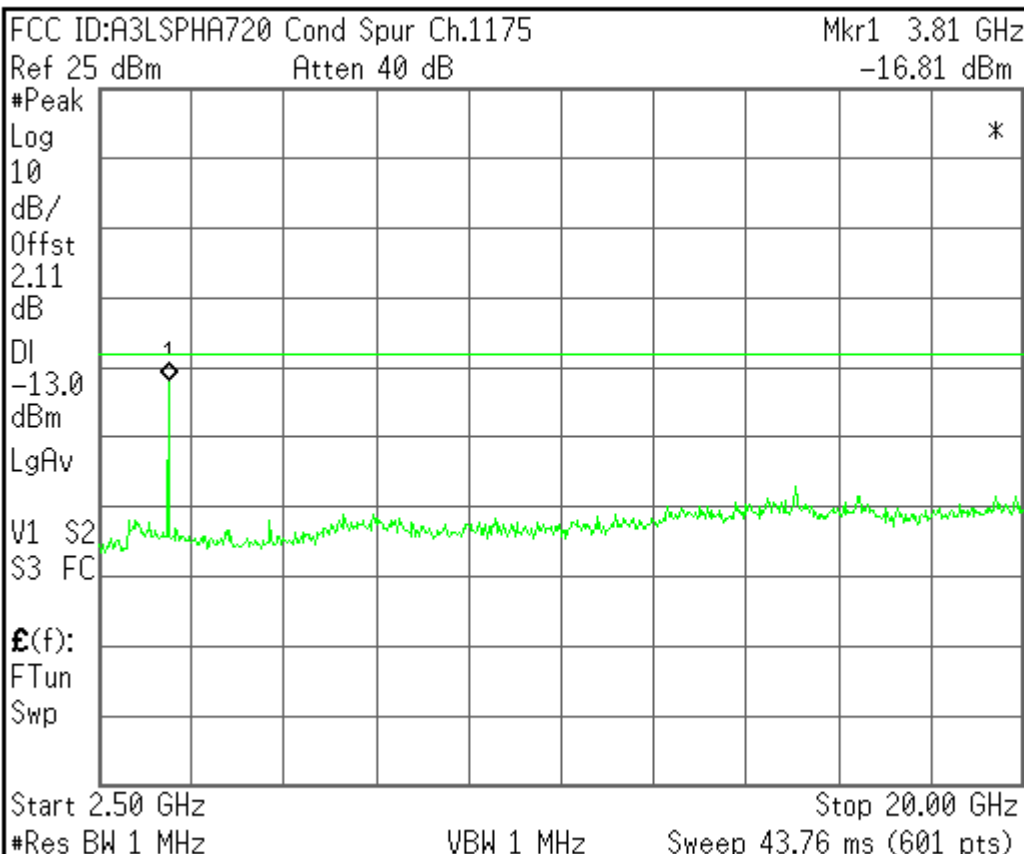
Stop Freq
 2.50000000 GHz

CF Step
 249.000000 MHz
 Auto Man

Freq Offset
 0.00000000 Hz

Signal Track
 On Off

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Freq/Channel

Center Freq
 11.2500000 GHz

Start Freq
 2.50000000 GHz

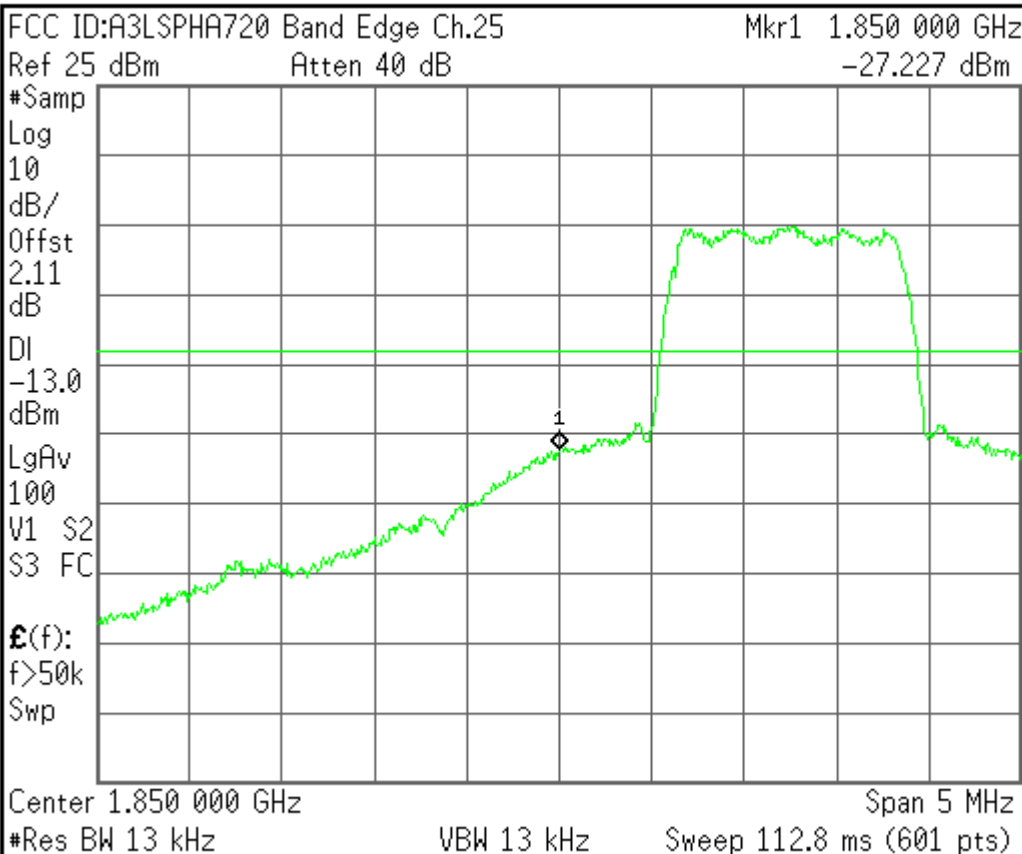
Stop Freq
 20.0000000 GHz

CF Step
 1.75000000 GHz
 Auto Man

Freq Offset
 0.00000000 Hz

Signal Track
 On Off

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Freq/Channel

Center Freq
 1.85000000 GHz

Start Freq
 1.84750000 GHz

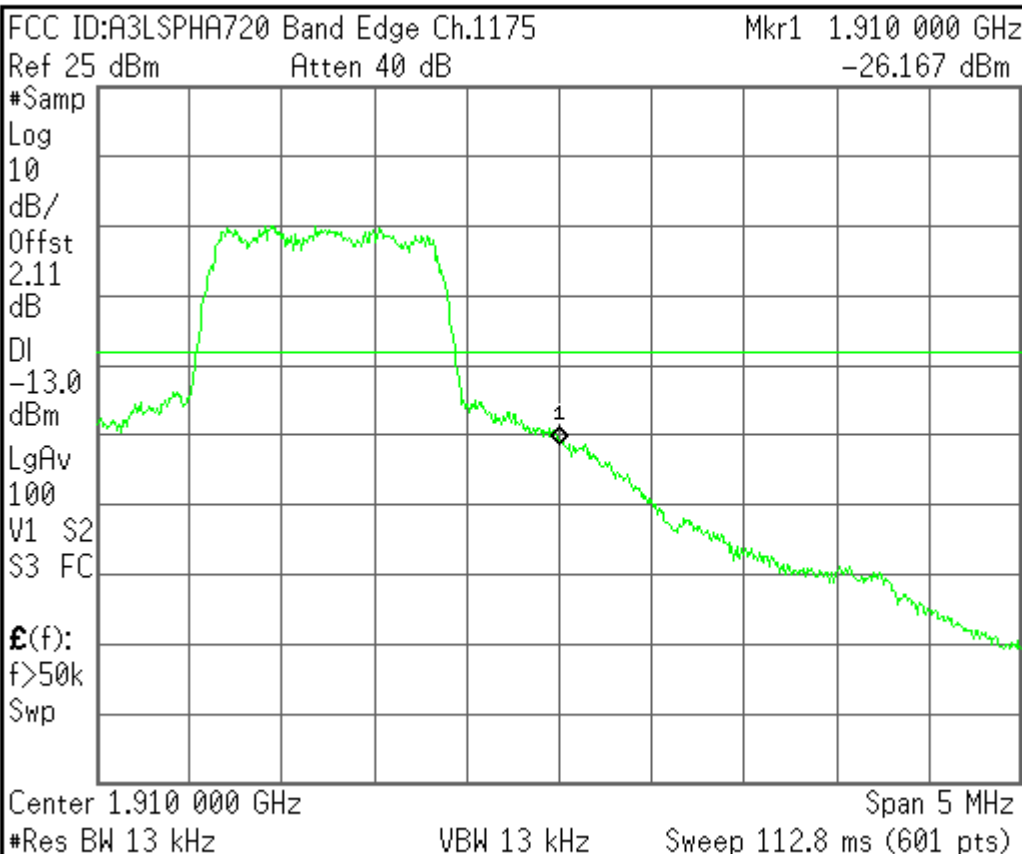
Stop Freq
 1.85250000 GHz

CF Step
 500.000000 kHz
 Auto Man

Freq Offset
 0.00000000 Hz

Signal Track
 On Off

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Freq/Channel

Center Freq
 1.91000000 GHz

Start Freq
 1.90750000 GHz

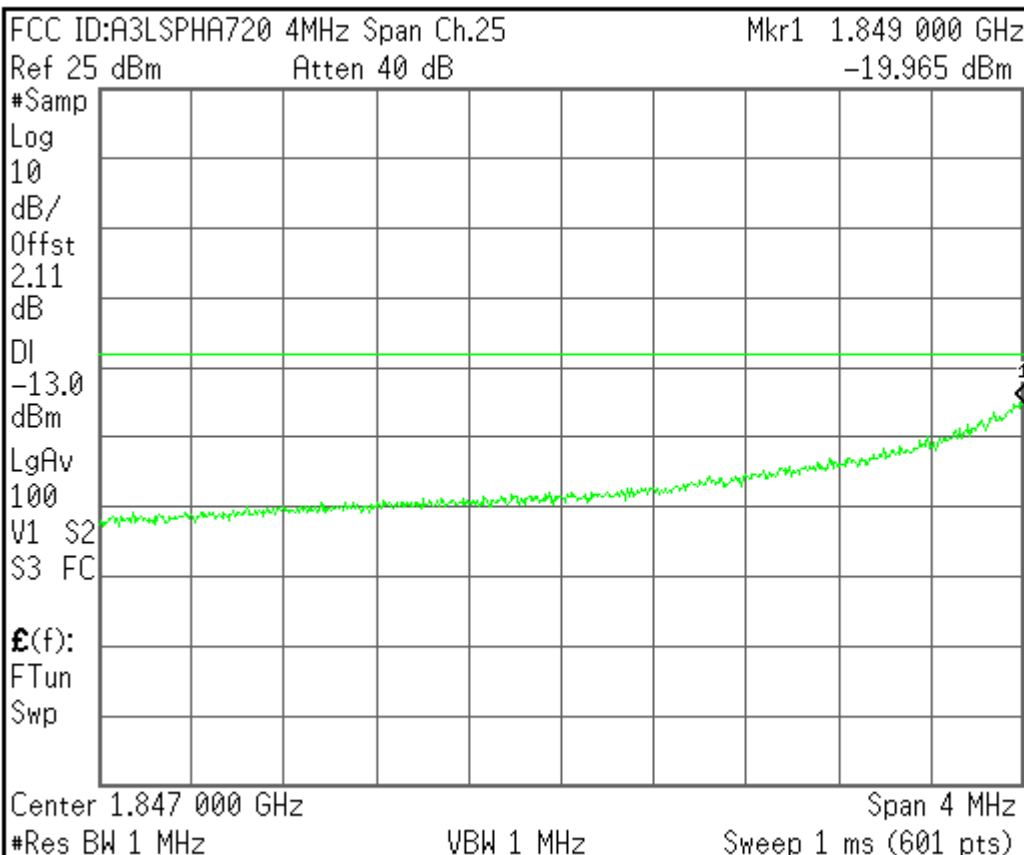
Stop Freq
 1.91250000 GHz

CF Step
 500.000000 kHz
 Auto Man

Freq Offset
 0.00000000 Hz

Signal Track
 On Off

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Center Freq
 1.84700000 GHz

Start Freq
 1.84500000 GHz

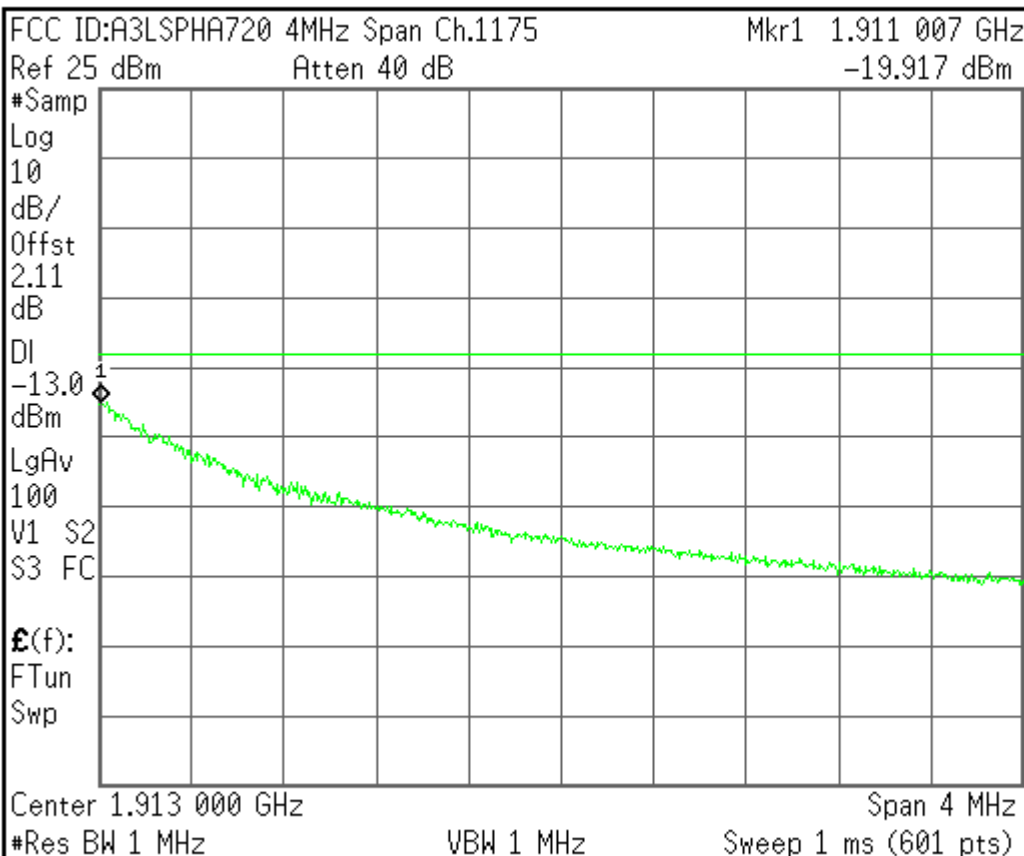
Stop Freq
 1.84900000 GHz

CF Step
 400.000000 kHz
 Auto Man

Freq Offset
 0.00000000 Hz

Signal Track
 On Off

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Center Freq
 1.91300000 GHz

Start Freq
 1.91100000 GHz

Stop Freq
 1.91500000 GHz

CF Step
 400.000000 kHz
 Auto Man

Freq Offset
 0.00000000 Hz

Signal Track
 On Off

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Appendix

RC/SO Table

Model : SPH-A720

Band	Channel	1x EvDO (153.6kbps)	CDMA2000 RC	SO2 Loopback	SO55 Loopback	TDSO SO32 Loopback
CDMA	1013	24.97	RC1	24.90	24.95	-
			RC3	24.91	25.01	24.96
	384	24.92	RC1	24.80	24.87	-
			RC3	24.89	24.92	24.89
	777	24.91	RC1	24.87	24.88	-
			RC3	24.91	24.95	24.93

Band	Channel	1x EvDO (153.6kbps)	CDMA2000 RC	SO2 Loopback	SO55 Loopback	TDSO SO32 Loopback
PCS	25	24.96	RC1	24.85	24.90	-
			RC3	24.89	25.01	24.96
	600	24.92	RC1	24.88	24.87	-
			RC3	24.83	24.92	24.89
	1175	24.93	RC1	24.91	24.90	-
			RC3	24.93	24.95	24.93