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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-A960
FCC ID (Requested): A3LSPHA960
Report No: FC-140-R1
Job No: FC-140
Date issued: October 21, 2005

- Abstract -

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

Prepared By	 _____ WW JANG – Test Engineer	Date	2005.10.21 _____
Checked By	 _____ SH PARK – Senior Manager	Date	2005.10.25 _____
Authorized By	 _____ JK CHOI – General Manager	Date	2005.10.25 _____

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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: 16 Maetan3-Dong, Yeongtong-gu, Suwon City
Gyeonggi-Do, Korea 442-742
- Attention: SungJoo KIM, Engineering Manager (QA Lab)
- FCC ID: A3LSPHA960
- Quantity: Quantity production is planned
- Emission Designators: 1M25F9W
- 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: 0.316 W ERP CDMA(25.00 dBm)
0.525 W EIRP PCS CDMA (27.20 dBm)
- FCC Classification(s): Licensed Portable Tx Held to Ear (PCE)
- Equipment (EUT) Type: Dual-Band CDMA Phone
- Modulation(s): CDMA/CDMA PCS
- Frequency Tolerance: $\pm 0.00025\%$ (2.5ppm)
- FCC Rule Part(s): §24(E), §22(H), §2.
- Dates of Test: October 10-13, 2005
- Place of Test: SAMSUNG Lab,
- Test Report S/N: FC-140-R1

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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.

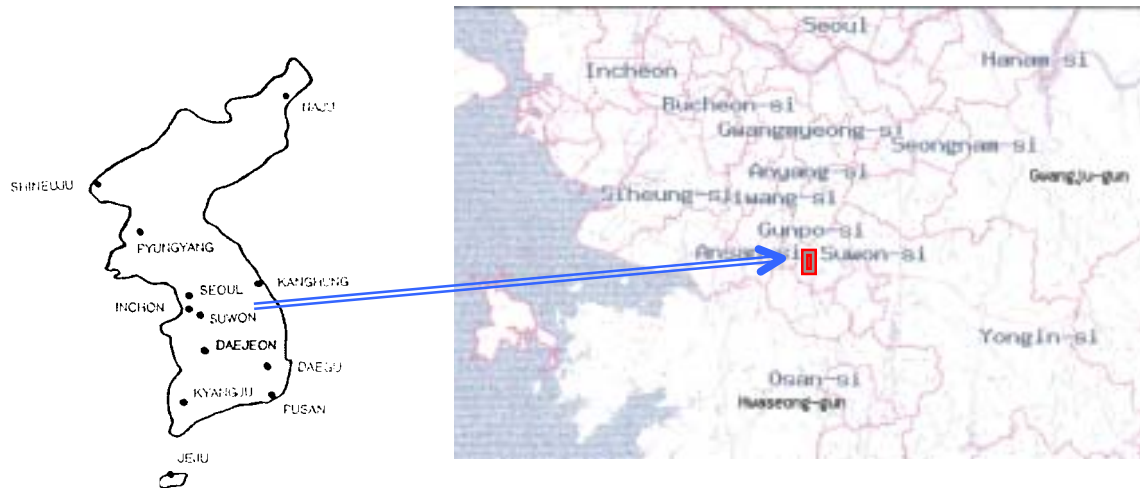


Figure1. Map of the Suwon City area.

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 antenna it 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.

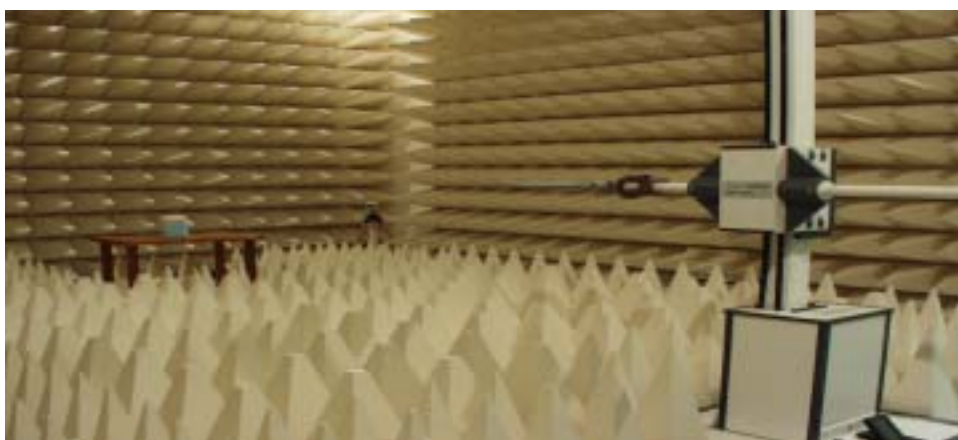


Figure2. Photograph of 3m Fully-Anechoic Chamber

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

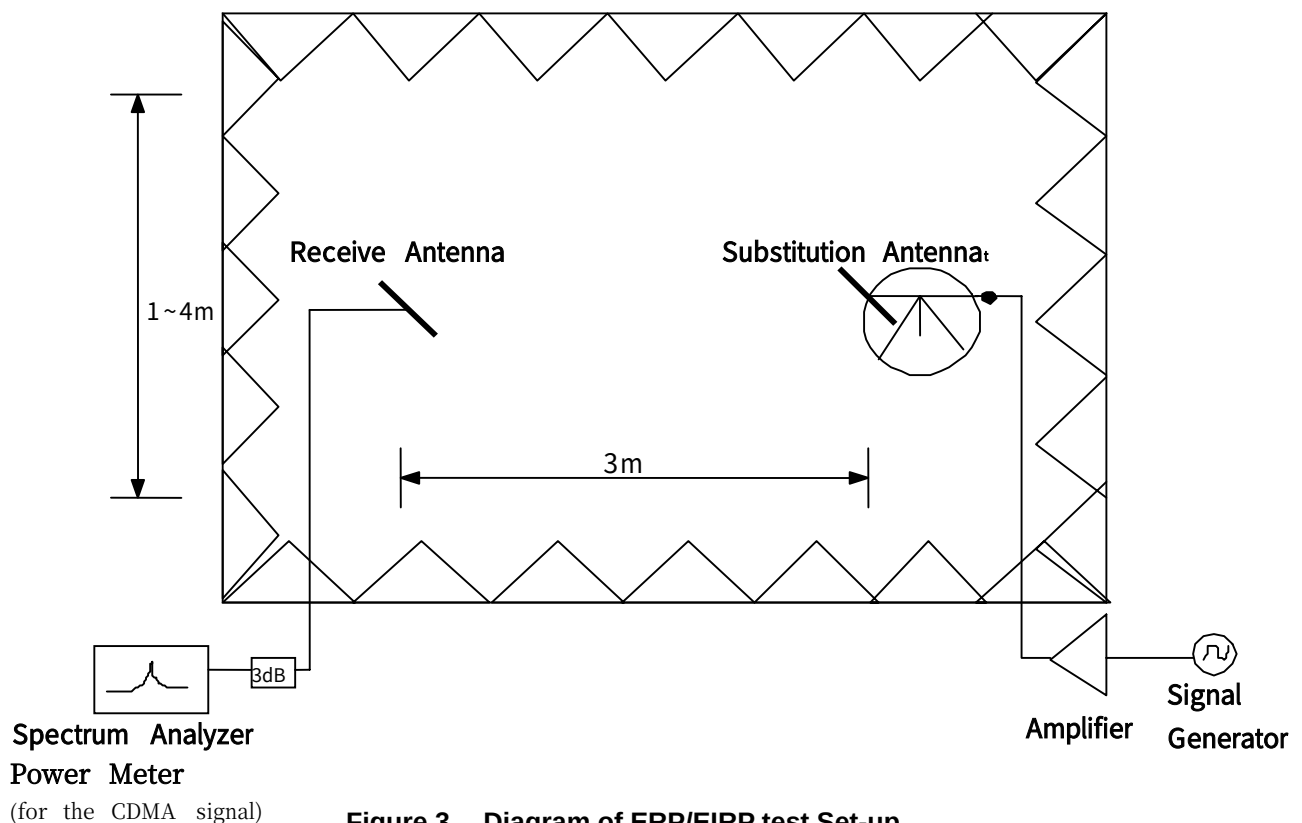
Name of Equipment	Model	Serial No.	Due Date
Spectrum Analyzer	ESI26	836119/010	2006-09-26
	E4440A(3Hz~26.5GHz)	MY41000236	2005-10-27
	E4440A(3Hz~26.5GHz)	MY41000233	2005-11-04
Signal Generator	SMIQ03B	83824/021	2005-12-27
	SMR20	835197/030	2006-01-18
Power Meter	E4419B	GB41293846	2006-09-07
Power Sensor	8481B	3318A10325	2006-09-08
	8485A	3318A19924	2006-09-08
Pre-Amplifier	8449B	3008A00691	2006-01-11
Communication test set	8960	GB42230535	2005-11-04
	8960	GB42360886	2005-10-27
Antenna Master	MA0001	ANT0967	Not Required
Controller	HD100	100/756	Not Required
Environmental Chamber	SH-241	92000548	2005-11-22
	SH-241	92000549	2005-11-22
Horn Antenna	HF906	360306/011	2006-03-17
	HF906	100134	2006-04-25
Dipole Antenna	3121C-DB4	9007-587	2005-12-02
	3121C-DB4	9007-588	2006-06-04
Receive Antenna	HL040	353255/019	2006-08-24
Attenuator	8494A	3308A31997	2006-01-03
	8496A	3308A14426	2006-01-04
Divider	11636B	51941	Not Required
	11636B	51942	Not Required
	11636B	51946	Not Required
High Pass Filter	WHK1.0/15G-10SS	1	Not Required
	WHK1.0/15G-10SS	1	Not Required
	WHK/3.5/18G-10SS	3	Not Required
	WHK/3.5/18G-10SS	4	Not Required
Shielded Fully Anechoic Chamber	RF0002	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

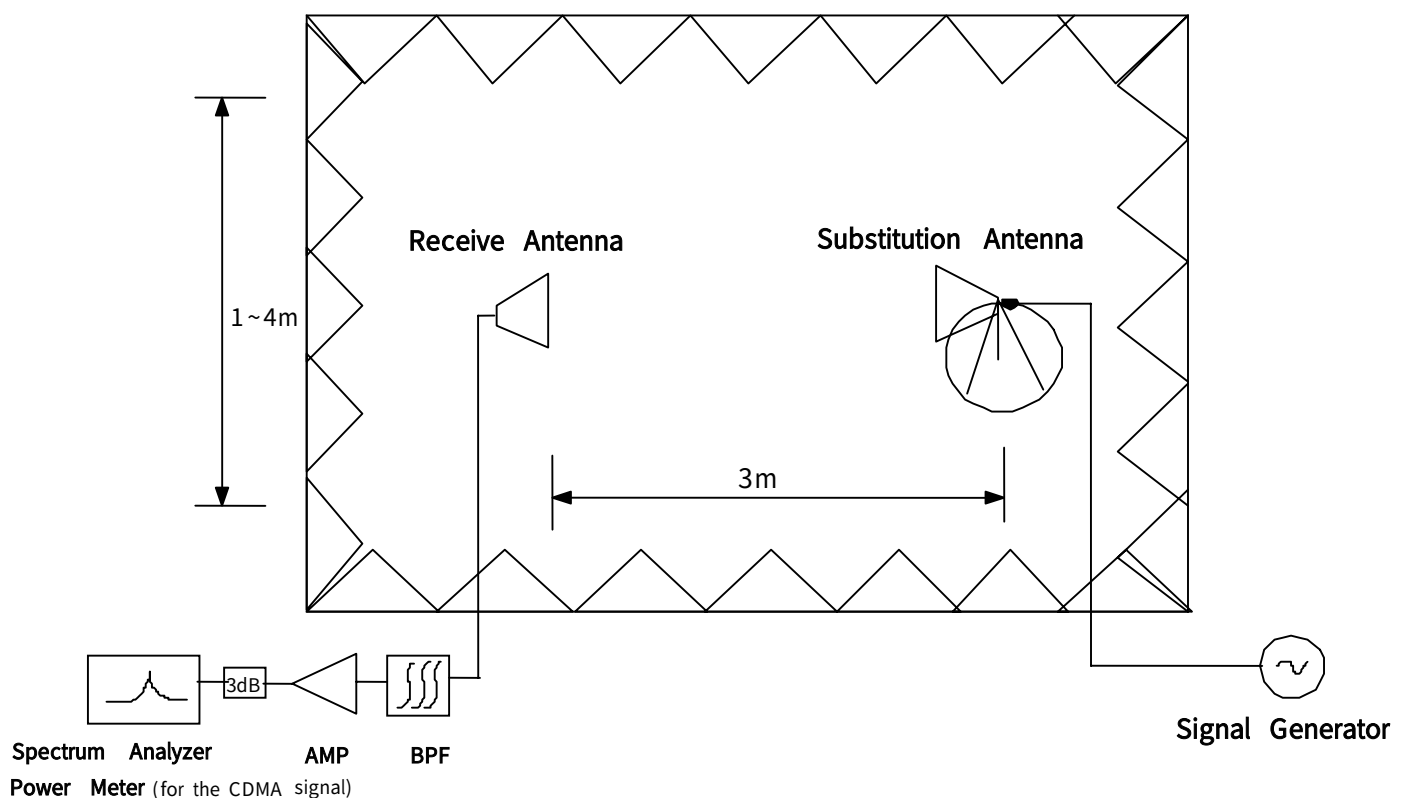


Figure 4. Diagram of Radiated Spurious & Harmonic test Set-up

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.

$$43 + 10\log(0.316 \text{ W}) = 38.00\text{dB}$$

$$25.00 \text{ dBm} - 38.00 \text{ dB} = -13 \text{ dBm}$$

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	24.50	H	-14.28	0.00	-14.28
		V	-13.59	0.00	-13.59
835.89	24.50	H	-14.28	0.00	-14.28
		V	-13.59	0.00	-13.59
848.31	25.00	H	-13.75	0.00	-13.75
		V	-13.17	0.00	-13.17

■ Result

Frequency (MHz)	From EUT Tested level (dBm)	Polarization (H/V)	Azimuth (angle)	ERP (dBm)	ERP (W)	Battery
824.70	-14.50	H1	179	24.28	0.268	Standard
835.89	-14.10	H1	180	24.68	0.294	Standard
848.31	-13.75	H1	180	25.00	0.316	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	S/A (dBm)	Ant gain (dBi)	Ref level (dBm)
1851.25	27.00	H	-13.80	8.42	-22.22
		V	-14.23	8.42	-22.65
1880.00	26.50	H	-14.16	8.25	-22.41
		V	-14.60	8.25	-22.85
1908.75	24.00	H	-16.64	8.40	-25.04
		V	-16.86	8.40	-25.26

■ Result

Frequency (MHz)	From EUT Tested level (dBm)	Polarization (H/V)	Azimuth (angle)	EIRP (dBm)	EIRP (W)	Battery
1851.25	-22.02	H2	175	27.20	0.525	Standard
1880.00	-22.56	H2	169	26.35	0.432	Standard
1908.75	-23.70	H2	159	25.35	0.343	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), 835.89MHz(Middle), 848.31MHz(High)

Measured Output Power : 25.00 dBm = 0.316 W

Modulation Signal : CDMA

Limit : $43 + 10\log_{10}(P) = 38.00$ dBc

■ Result

Channel	Harmonic	Frequency (MHz)	From EUT Tested level (dBm)	POL (H/V)	Result (dBc)
1013	2	1649.40	-43.24	H1	55.85
	3	2474.10	-66.28	H1	73.32
	4	3298.80	-64.13	H1	64.94
	5	4123.50	-	-	-
	6	4948.20	-	-	-
	7	5772.90	-	-	-
363	2	1671.78	-48.76	H1	60.85
	3	2507.67	-68.32	V	73.74
	4	3343.56	-67.53	H1	69.77
	5	4179.45	-	-	-
	6	5015.34	-	-	-
	7	5851.23	-	-	-
777	2	1696.62	-43.22	H1	53.81
	3	2544.93	-66.59	H1	72.49
	4	3393.24	-65.47	H1	68.70
	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 : 27.20 dBm = 0.525 W

Modulation Signal : PCS

Limit : $43 + 10\log_{10}(P) = 40.20$ dBc

■ Result

Channel	Harmonic	Frequency (MHz)	From EUT Tested level (dBm)	POL (H/V)	Result (dBc)
25	2	3702.50	-49.34	V	48.20
	3	5553.75	-59.87	V	55.47
	4	7405.55	-64.59	H2	55.21
	5	9256.25	-66.23	H1	52.61
	6	11107.50	-67.70	H1	50.04
	7	12958.75	-	-	-
600	2	3760.00	-45.70	V	44.86
	3	5640.00	-56.69	V	52.32
	4	7520.00	-61.47	H2	52.33
	5	9400.00	-65.73	H1	52.62
	6	11280.00	-68.25	H1	51.04
	7	13160.00	-	-	-
1175	2	3817.50	-49.15	V	47.82
	3	5726.25	-59.24	H2	54.85
	4	7635.00	-63.63	H2	53.76
	5	9543.75	-65.83	H1	52.41
	6	11452.50	-68.15	H1	49.60
	7	13361.25	-	-	-

Radiated Spurious Emission measurements at 3 meters by Substitution Method

6.5 CDMA Radiated Spurious & Harmonic Conversion Table

Date : 2005 . 10. 13

Test Engineer : W T JANG

- 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	7.10	8.03	0.93	-43.24	-45.81	-28.71	-30.68	55.85	57.82
	3	2474.10	9.22	9.55	0.33	-66.28	-67.51	-46.18	-46.47	73.32	73.61
	4	3298.80	11.69	9.64	-2.05	-64.13	-66.79	-37.80	-42.01	64.94	69.15
	5	4123.50	15.02	10.67	-4.35	-	-	-	-	-	-
	6	4948.20	15.37	11.05	-4.32	-	-	-	-	-	-
	7	5772.90	16.77	11.23	-5.54	-	-	-	-	-	-
363	2	1671.78	7.24	8.03	0.79	-48.76	-51.43	-33.71	-35.89	60.85	63.03
	3	2507.67	9.44	9.55	0.11	-68.02	-68.32	-47.60	-46.60	74.74	73.74
	4	3343.56	11.81	9.64	-2.17	-67.53	-67.81	-42.63	-43.39	69.77	70.53
	5	4179.45	14.76	10.67	-4.09	-	-	-	-	-	-
	6	5015.34	15.55	11.05	-4.50	-	-	-	-	-	-
	7	5851.23	17.11	11.23	-5.88	-	-	-	-	-	-
777	2	1696.62	7.35	8.03	0.68	-43.22	-46.36	-26.67	-29.38	53.81	56.52
	3	2544.93	9.53	9.55	0.02	-66.59	-67.84	-45.35	-45.64	72.49	72.78
	4	3393.24	12.17	9.64	-2.53	-65.47	-67.94	-41.56	-43.70	68.70	70.84
	5	4241.55	14.24	10.67	-3.57	-	-	-	-	-	-
	6	5089.86	15.69	11.05	-4.64	-	-	-	-	-	-
	7	5938.17	17.92	11.23	-6.69	-	-	-	-	-	-

6.6 PCS Radiated Spurious & Harmonic Conversion Table

Date : 2005 . 10. 13

Test Engineer : W T JANG

- 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	12.44	9.73	7.29	-51.56	-49.34	-24.19	-21.00	51.39	48.20
	3	5553.75	16.80	11.15	4.35	-60.33	-59.87	-28.91	-28.27	56.11	55.47
	4	7405.00	19.90	11.44	1.54	-64.59	-66.67	-28.01	-31.73	55.21	58.93
	5	9256.25	23.61	12.17	-1.44	-66.23	-67.30	-25.41	-26.78	52.61	53.98
	6	11107.50	27.10	13.66	-3.44	-67.70	-67.87	-22.84	-23.47	50.04	50.67
	7	12958.75	32.68	13.27	-9.41	-	-	-	-	-	-
600	2	3760.00	12.76	9.73	6.97	-48.48	-45.70	-21.34	-17.66	48.54	44.86
	3	5640.00	16.65	11.15	4.50	-58.51	-56.69	-26.93	-25.12	54.13	52.32
	4	7520.00	20.05	11.44	1.39	-61.47	-65.72	-25.13	-31.05	52.33	58.25
	5	9400.00	23.87	12.17	-1.70	-65.73	-66.53	-25.42	-27.29	52.62	54.49
	6	11280.00	27.29	13.66	-3.63	-68.25	-68.15	-23.84	-23.96	51.04	51.16
	7	13160.00	33.40	13.27	-10.13	-	-	-	-	-	-
1175	2	3817.50	13.12	9.73	6.61	-48.77	-49.15	-21.61	-20.62	48.81	47.82
	3	5726.25	16.80	11.15	4.35	-59.24	-59.74	-27.65	-28.43	54.85	55.63
	4	7635.00	20.41	11.44	1.03	-63.63	-66.44	-26.56	-30.46	53.76	57.66
	5	9543.75	24.47	12.17	-2.30	-65.83	-67.28	-25.21	-27.01	52.41	54.21
	6	11452.50	27.58	13.66	-3.92	-68.15	-68.42	-22.40	-22.87	49.60	50.07
	7	13361.25	33.61	13.27	-10.34	-	-	-	-	-	-

6.7 Frequency Stability

6.7.1 CDMA Frequency Stability Table

Operating Frequency : 835,890,000 Hz

Channel : 363

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)	14.19	835,890,014	0.000002	0.017
100%		-30	-21.32	835,889,979	-0.000003	-0.025
100%		-20	28.61	835,890,029	0.000003	0.034
100%		-10	-15.29	835,889,985	-0.000002	-0.018
100%		0	15.11	835,890,015	0.000002	0.018
100%		+10	-11.24	835,889,989	-0.000001	-0.013
100%		+20	14.19	835,890,014	0.000002	0.017
100%		+30	22.15	835,890,022	0.000003	0.026
100%		+40	-19.14	835,889,981	-0.000002	-0.023
100%		+50	21.41	835,890,021	0.000003	0.026
100%		+60	19.91	835,890,020	0.000002	0.024
85%	3.21	+20	-41.26	835,889,959	-0.000005	-0.049
115%	4.26	+20	25.19	835,890,025	0.000003	0.030
Batt.Endpoint	3.21	+20	-41.26	835,889,959	-0.000005	-0.049

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

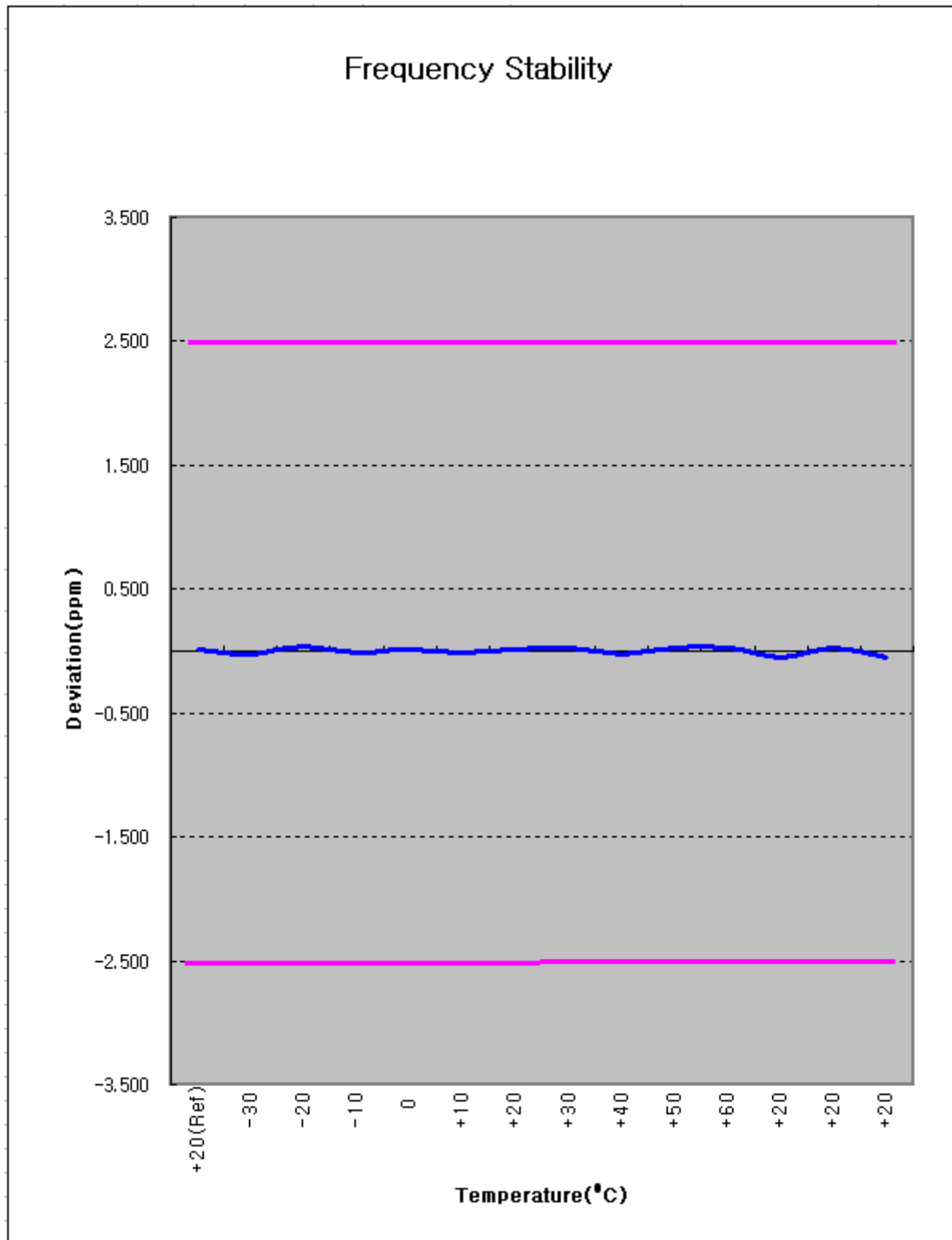
Deviation Limit : ± 0.00025 % or 2.5ppm

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency Error (Hz)	Frequency (Hz)	Deviation (%)	ppm
100%	3.70	+20(Ref)	-18.89	1,879,999,981	-0.000001	-0.010
100%		-30	21.11	1,880,000,021	0.000001	0.011
100%		-20	-15.69	1,879,999,984	-0.000001	-0.008
100%		-10	23.31	1,880,000,023	0.000001	0.012
100%		0	25.59	1,880,000,026	0.000001	0.014
100%		+10	16.41	1,880,000,016	0.000001	0.009
100%		+20	-18.89	1,879,999,981	-0.000001	-0.010
100%		+30	17.74	1,880,000,018	0.000001	0.009
100%		+40	-16.21	1,879,999,984	-0.000001	-0.009
100%		+50	21.13	1,880,000,021	0.000001	0.011
100%		+60	19.24	1,880,000,019	0.000001	0.010
85%	3.21	+20	23.11	1,880,000,023	0.000001	0.012
115%	4.26	+20	-18.29	1,879,999,982	-0.000001	-0.010
Batt.Endpoint	3.21	+20	23.11	1,880,000,023	0.000001	0.012

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

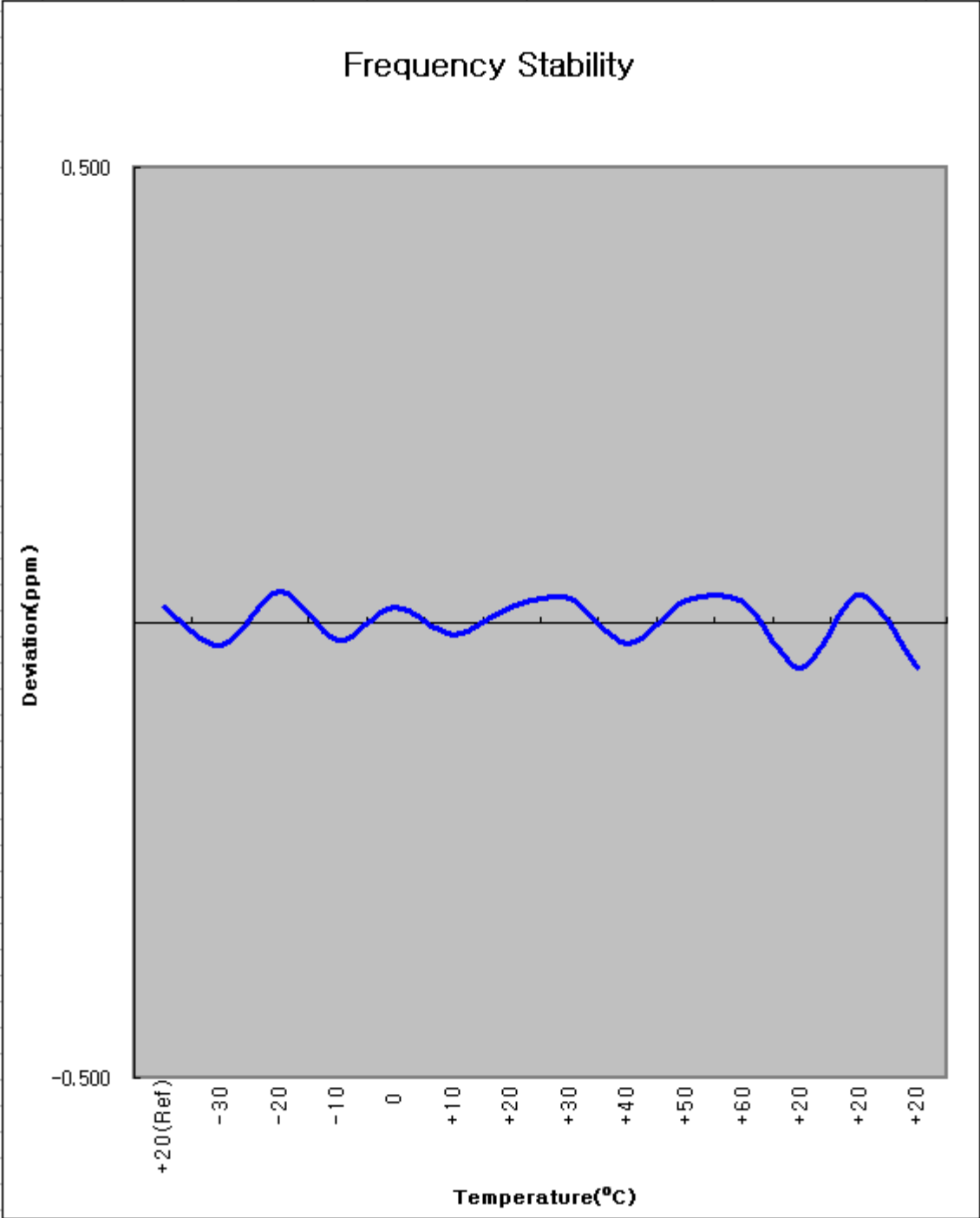
The EUT is tested down to the battery end point

6.7.3 CDMA Frequency Stability Graph



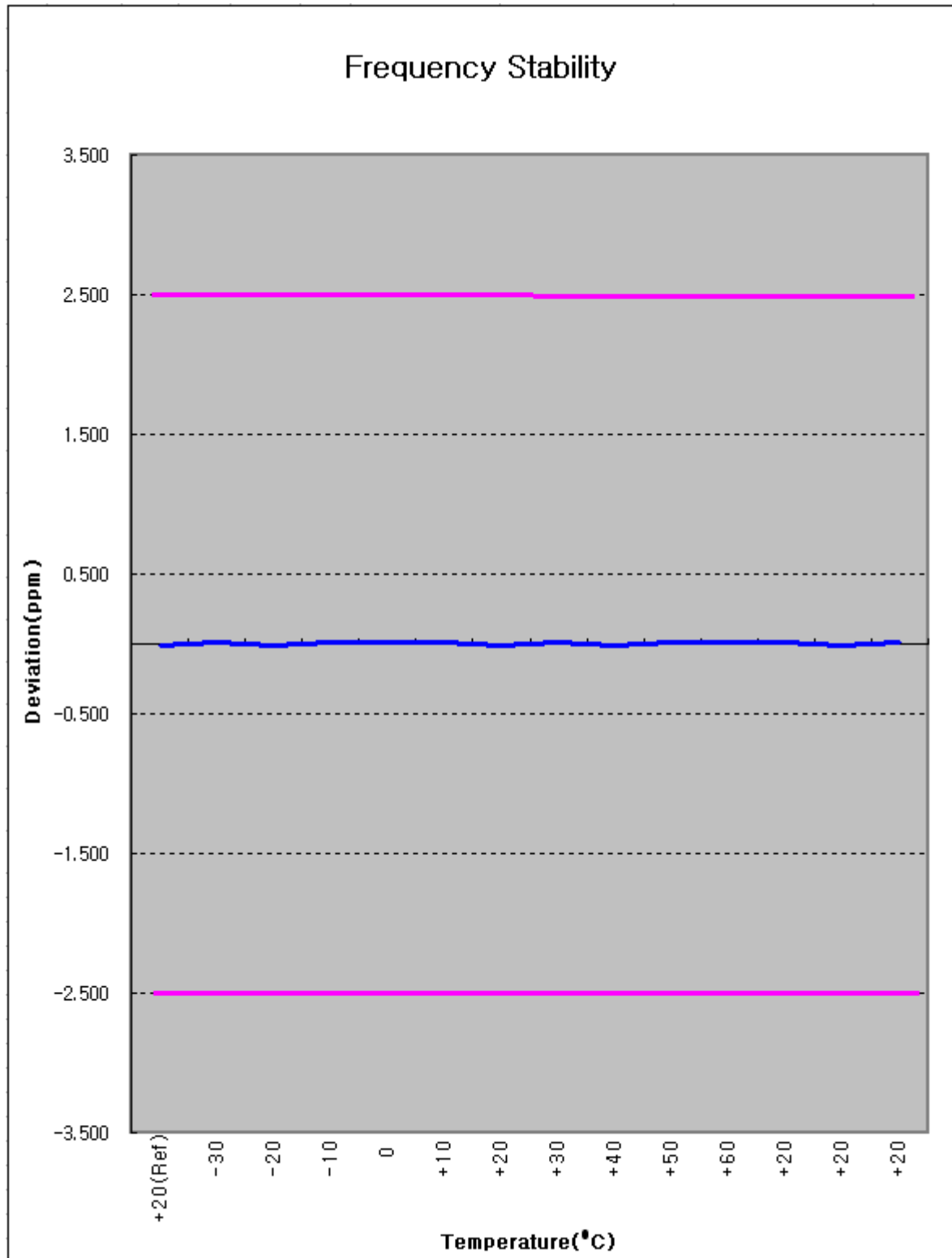
- End of page -

Zoom In



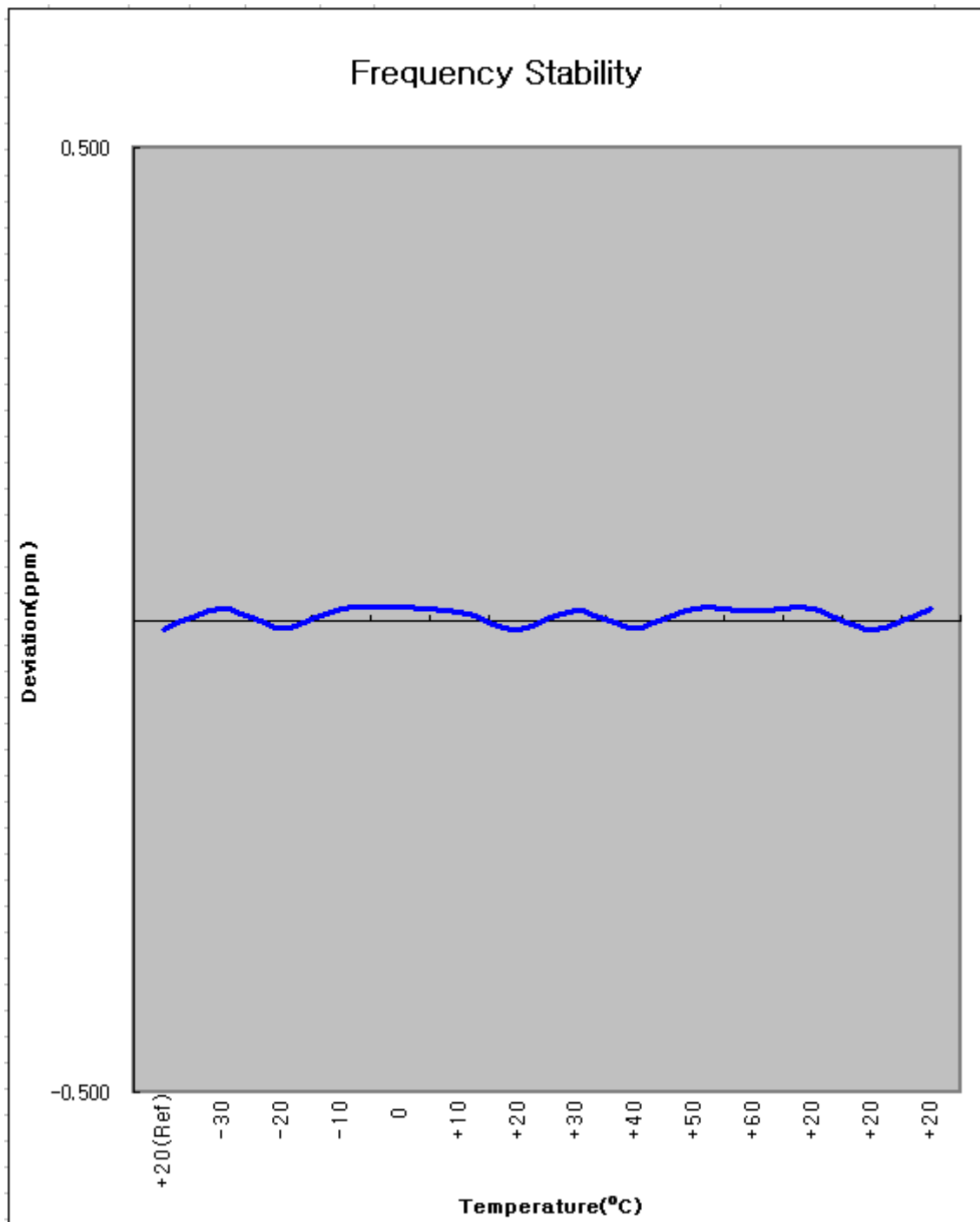
- End of page -

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 -



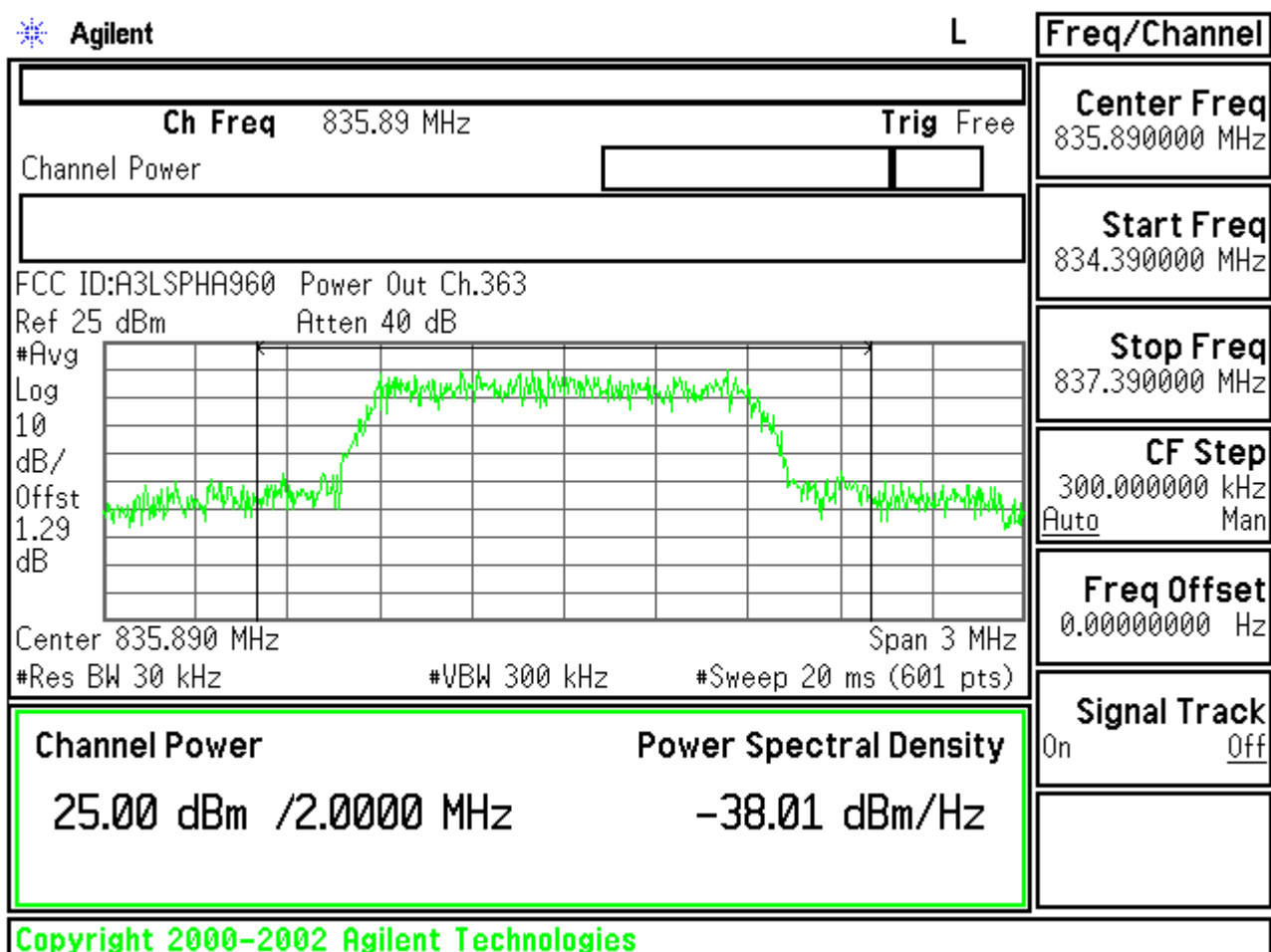
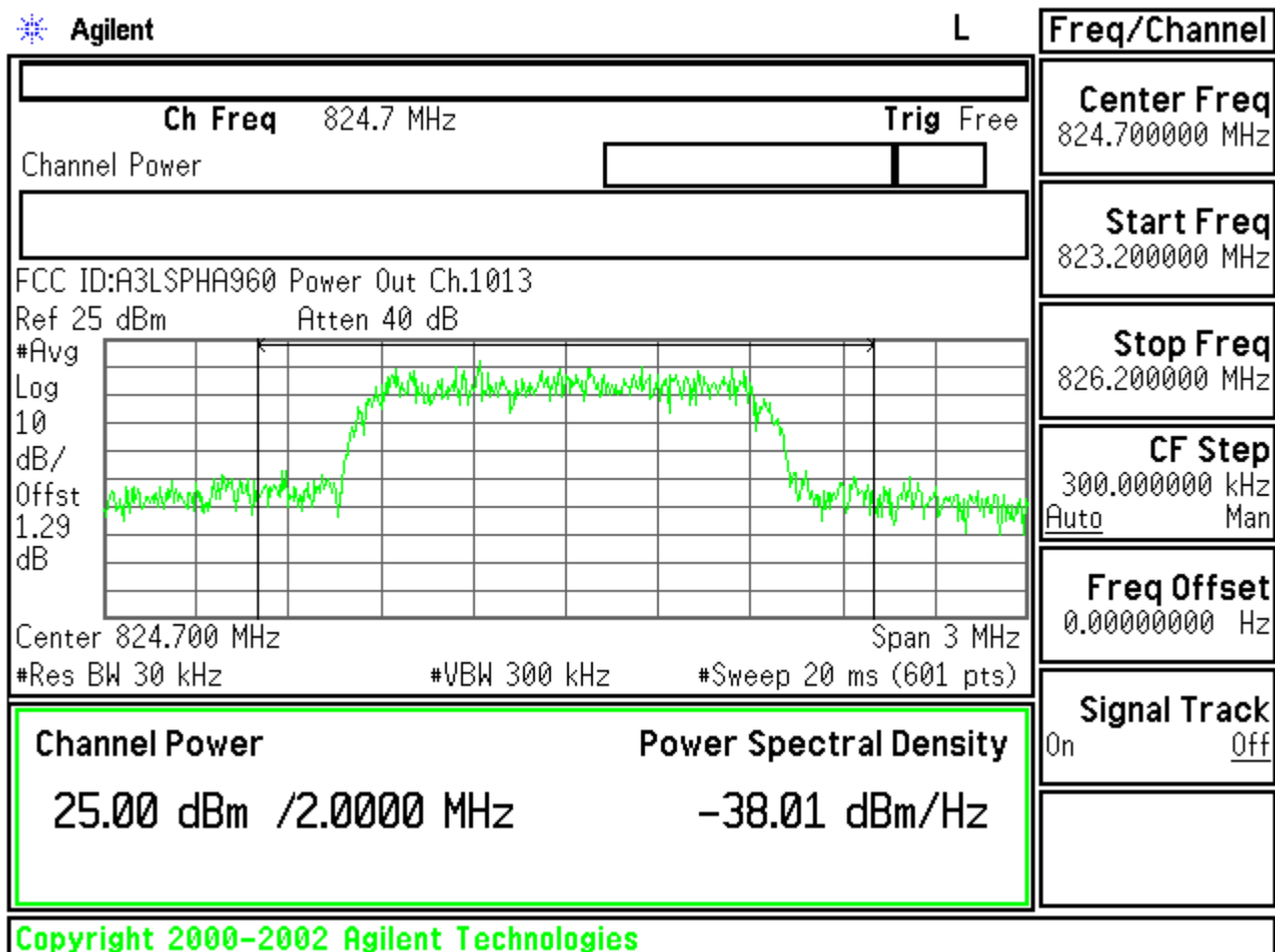
8. CONCLUSION

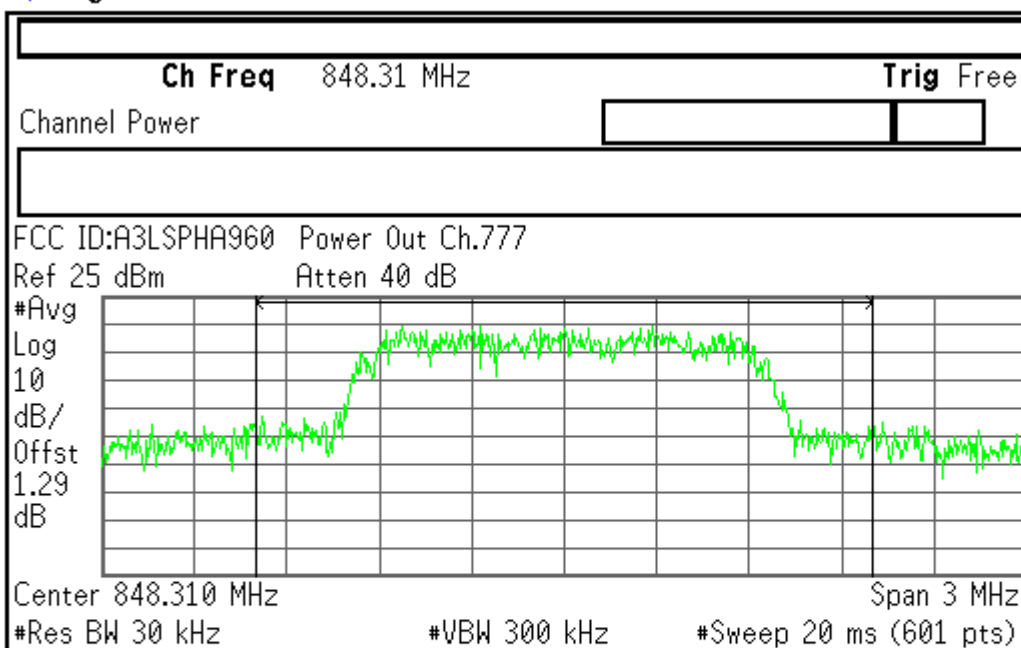
The data collected shows that the SAMSUNG Dual-Band CDMA Phone .
FCC ID : A3LSPHA960 complies with all the requirements of Parts 2,22,24 of the FCC Rules.

- End of page -

9. TEST PLOTS

- End of page -





Channel Power

25.03 dBm /2.0000 MHz

Power Spectral Density

-37.98 dBm/Hz

Freq/Channel

Center Freq
848.310000 MHz

Start Freq
846.810000 MHz

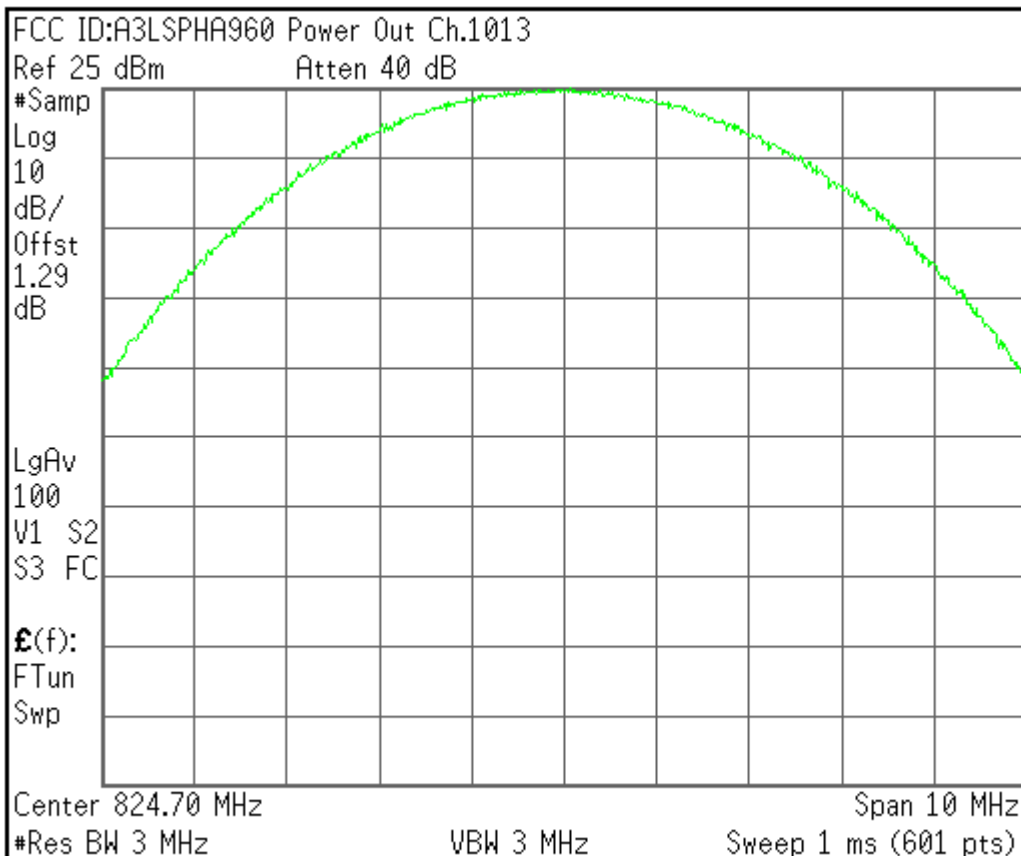
Stop Freq
849.810000 MHz

CF Step
300.000000 kHz
Auto Man

Freq Offset
0.00000000 Hz

Signal Track
On Off

Copyright 2000-2002 Agilent Technologies



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

Copyright 2000-2002 Agilent Technologies

FCC ID:A3LSPHA960 Power Out Ch.363

Ref 25 dBm

Atten 40 dB

#Samp

Log

10

dB/

Offst

1.29

dB

LgAv

100

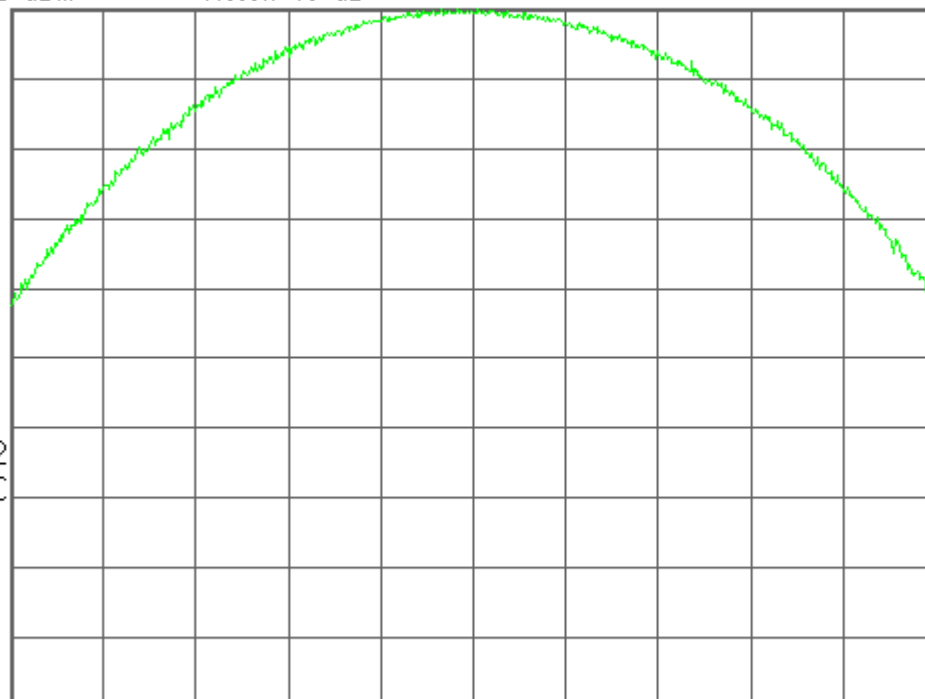
V1 S2

S3 FC

$\mathcal{E}(f)$:

FTun

Swp



Center 835.89 MHz

Span 10 MHz

#Res BW 3 MHz

VBW 3 MHz

Sweep 1 ms (601 pts)

Center Freq

835.890000 MHz

Start Freq

830.890000 MHz

Stop Freq

840.890000 MHz

CF Step

1.00000000 MHz

Auto

Man

Freq Offset

0.00000000 Hz

Signal Track

On

Off

Copyright 2000-2002 Agilent Technologies

FCC ID:A3LSPHA960 Power Out Ch.777

Ref 25 dBm

Atten 40 dB

#Samp

Log

10

dB/

Offst

1.29

dB

LgAv

100

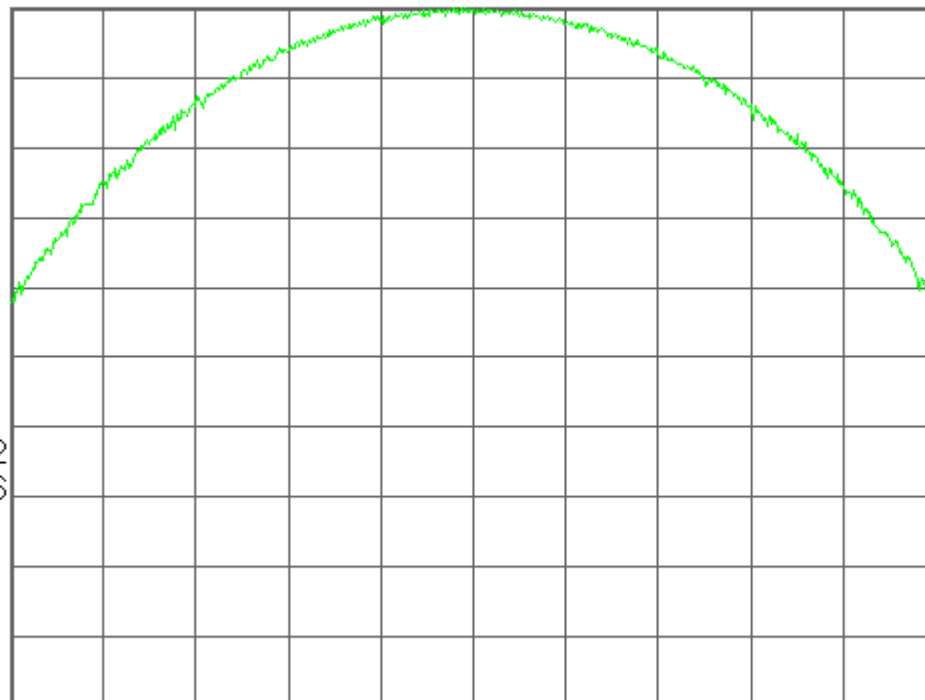
V1 S2

S3 FS

$\mathcal{E}(f)$:

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

Copyright 2000-2002 Agilent Technologies

Ch Freq 824.7 MHz Trig Free
Occupied Bandwidth

Center Freq
824.700000 MHz

Start Freq
823.200000 MHz

Stop Freq
826.200000 MHz

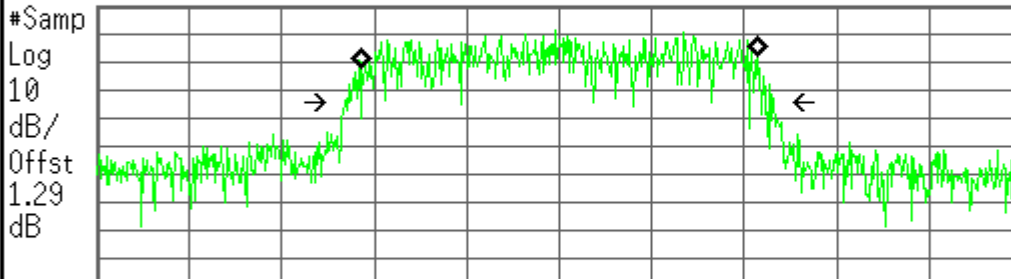
CF Step
300.000000 kHz
Auto Man

Freq Offset
0.00000000 Hz

Signal Track
On Off

FCC ID:A3LSPHA960 0BW Ch.1013

Ref 25 dBm Atten 40 dB



Center 824.700 MHz Span 3 MHz
#Res BW 30 kHz #VBW 300 kHz #Sweep 20 ms (601 pts)

Occupied Bandwidth 1.2775 MHz
Occ BW % Pwr 99.00 %
x dB -26.00 dB
Transmit Freq Error 237.800 Hz
x dB Bandwidth 1.392 MHz*

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Ch Freq 835.89 MHz Trig Free
Occupied Bandwidth

Center Freq
835.890000 MHz

Start Freq
834.390000 MHz

Stop Freq
837.390000 MHz

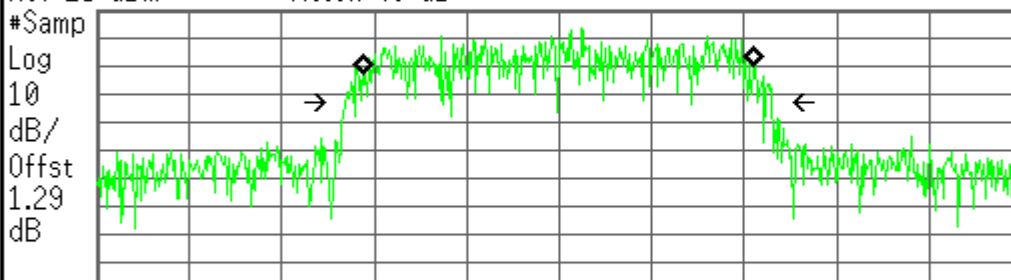
CF Step
300.000000 kHz
Auto Man

Freq Offset
0.00000000 Hz

Signal Track
On Off

FCC ID:A3LSPHA960 0BW Ch.363

Ref 25 dBm Atten 40 dB



Center 835.890 MHz Span 3 MHz
#Res BW 30 kHz #VBW 300 kHz #Sweep 20 ms (601 pts)

Occupied Bandwidth 1.2652 MHz
Occ BW % Pwr 99.00 %
x dB -26.00 dB
Transmit Freq Error -3.188 kHz
x dB Bandwidth 1.387 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

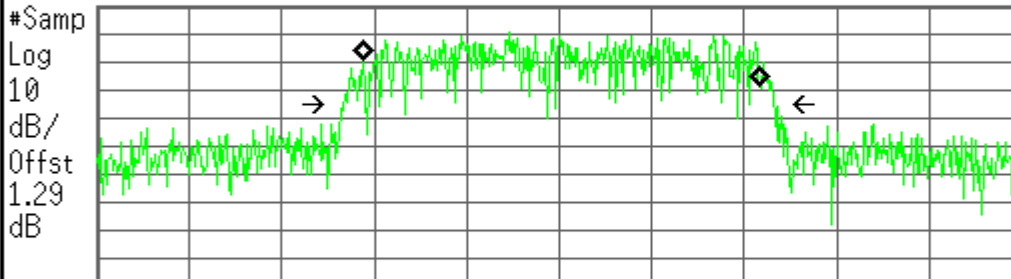
CF Step
300.000000 kHz
Auto Man

Freq Offset
0.00000000 Hz

Signal Track
On Off

FCC ID:A3LSPHA960 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 1.2871 MHz
Occ BW % Pwr 99.00 %
x dB -26.00 dB
Transmit Freq Error 8.194 kHz
x dB Bandwidth 1.396 MHz*

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FCC ID:A3LSPHA960 Rx Spurious Emission Mkr1 874.29 MHz
Ref -50 dBm #Atten 0 dB -82.29 dBm

Center Freq
881.500000 MHz

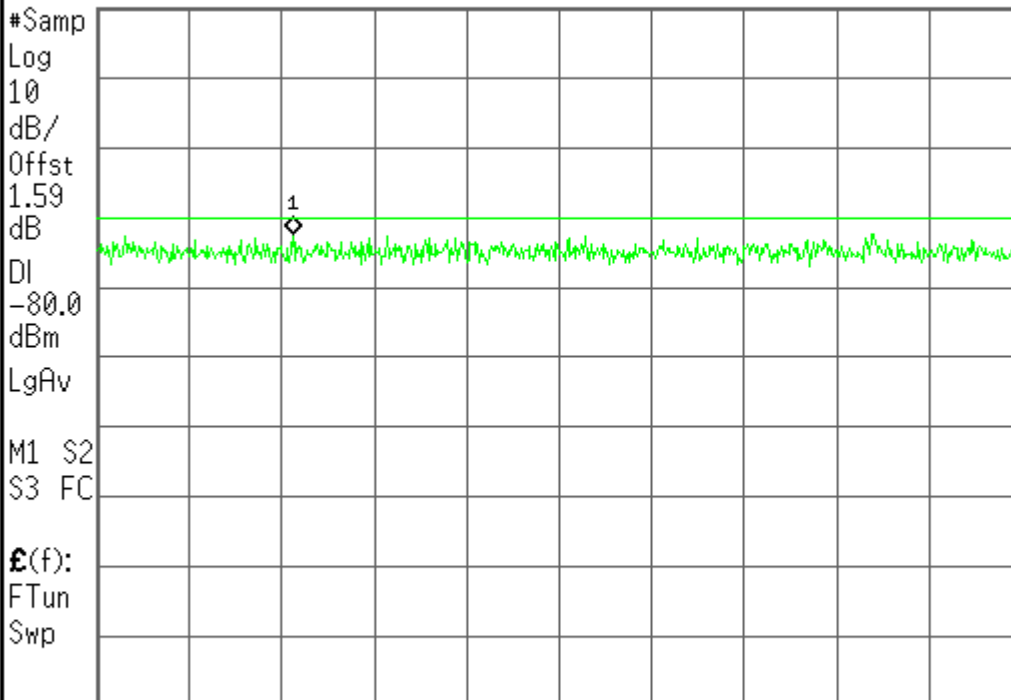
Start Freq
869.000000 MHz

Stop Freq
894.000000 MHz

CF Step
2.50000000 MHz
Auto Man

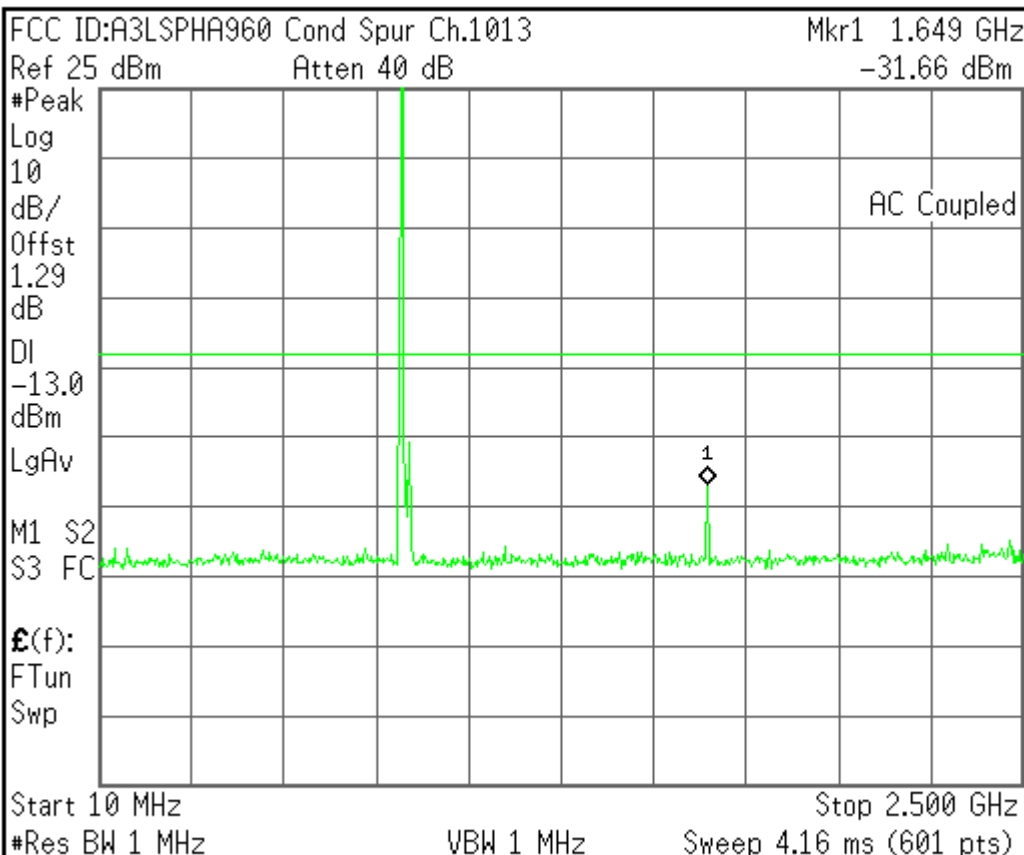
Freq Offset
0.00000000 Hz

Signal Track
On Off



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

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Freq/Channel

Center Freq
 1.25500000 GHz

Start Freq
 10.0000000 MHz

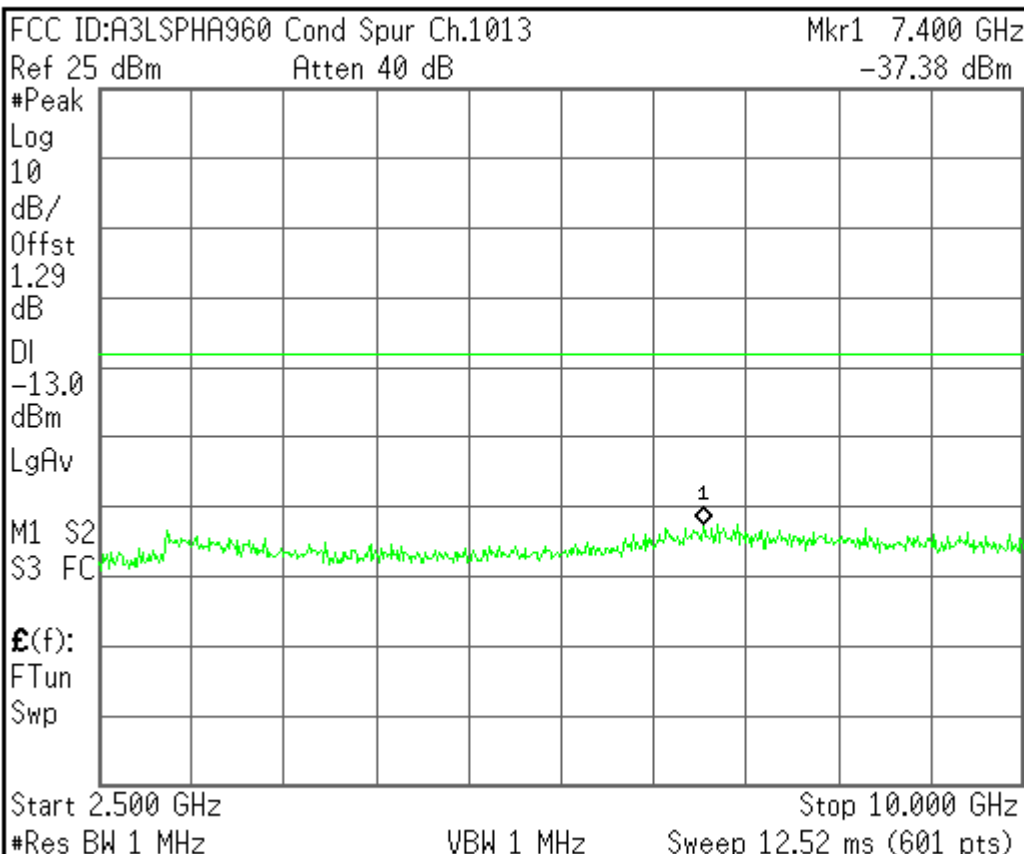
Stop Freq
 2.50000000 GHz

CF Step
 249.000000 MHz
 Auto Man

Freq Offset
 0.00000000 Hz

Signal Track
 On Off

Copyright 2000-2002 Agilent Technologies



Freq/Channel

Center Freq
 6.25000000 GHz

Start Freq
 2.50000000 GHz

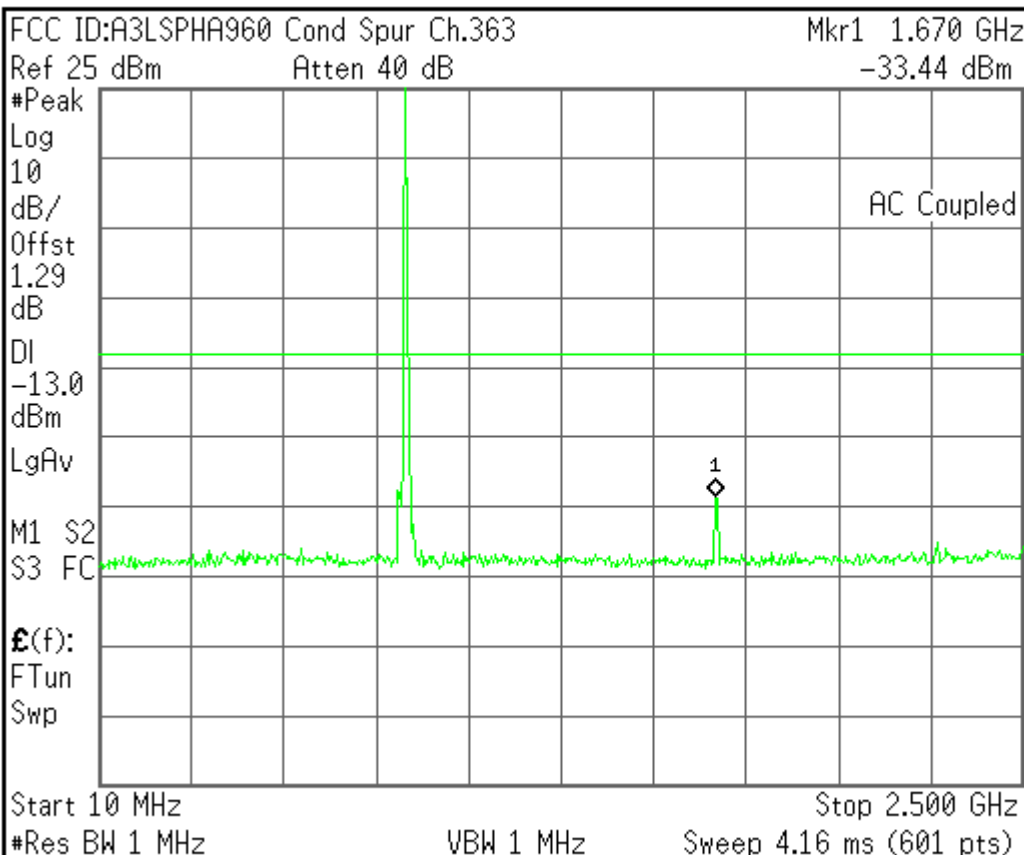
Stop Freq
 10.0000000 GHz

CF Step
 750.000000 MHz
 Auto Man

Freq Offset
 0.00000000 Hz

Signal Track
 On Off

Copyright 2000-2002 Agilent Technologies



Freq/Channel

Center Freq
1.25500000 GHz

Start Freq
10.0000000 MHz

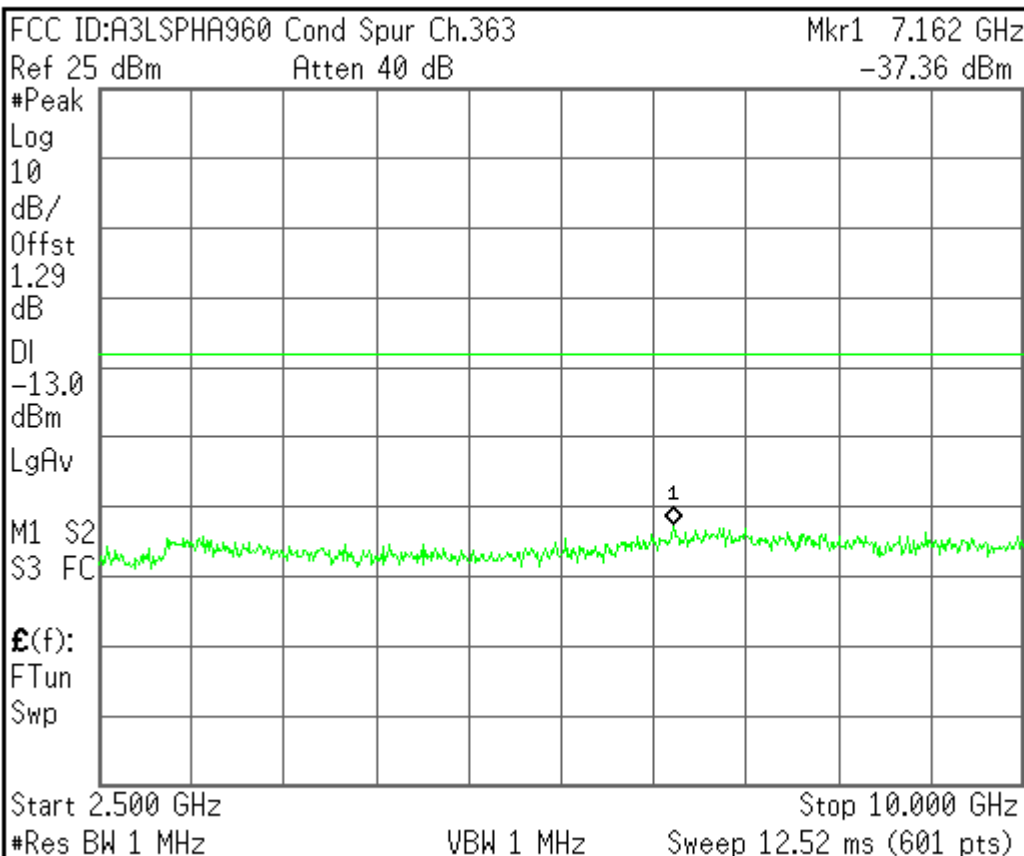
Stop Freq
2.50000000 GHz

CF Step
249.000000 MHz
Auto Man

Freq Offset
0.00000000 Hz

Signal Track
On Off

Copyright 2000-2002 Agilent Technologies



Freq/Channel

Center Freq
6.25000000 GHz

Start Freq
2.50000000 GHz

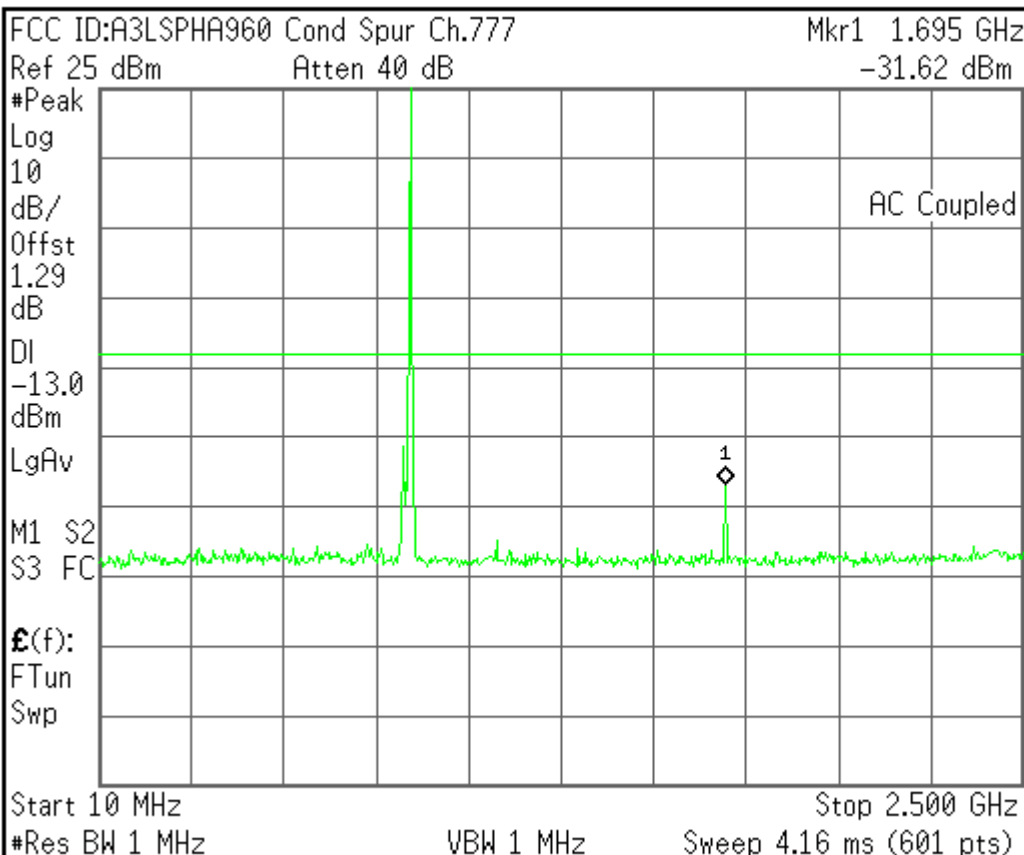
Stop Freq
10.0000000 GHz

CF Step
750.000000 MHz
Auto Man

Freq Offset
0.00000000 Hz

Signal Track
On Off

Copyright 2000-2002 Agilent Technologies



Freq/Channel

Center Freq
 1.25500000 GHz

Start Freq
 10.0000000 MHz

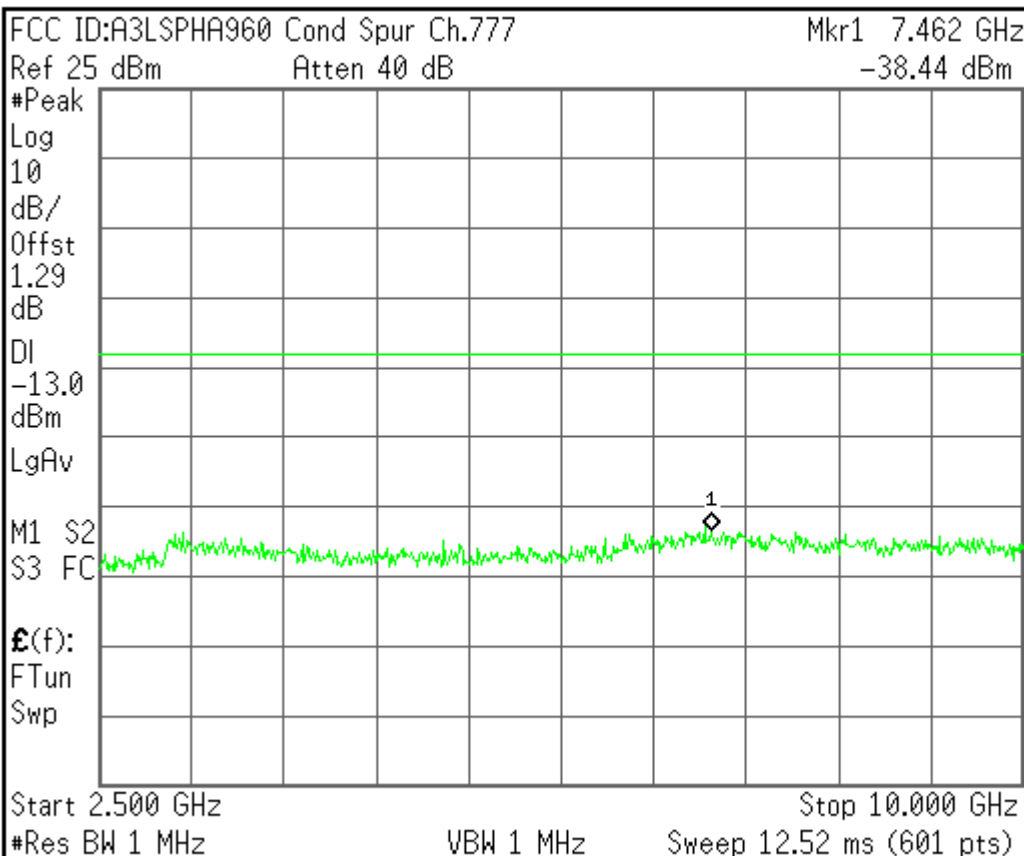
Stop Freq
 2.50000000 GHz

CF Step
 249.000000 MHz
 Auto Man

Freq Offset
 0.00000000 Hz

Signal Track
 On Off

Copyright 2000-2002 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

Copyright 2000-2002 Agilent Technologies

FCC ID:A3LSPA960 Band Edge Ch.1013

Mkr1 824.000 MHz

Ref 25 dBm

Atten 40 dB

-20.293 dBm

#Samp

Log

10

dB/

Offst

1.29

dB

DI

-13.0

dBm

LgAv

100

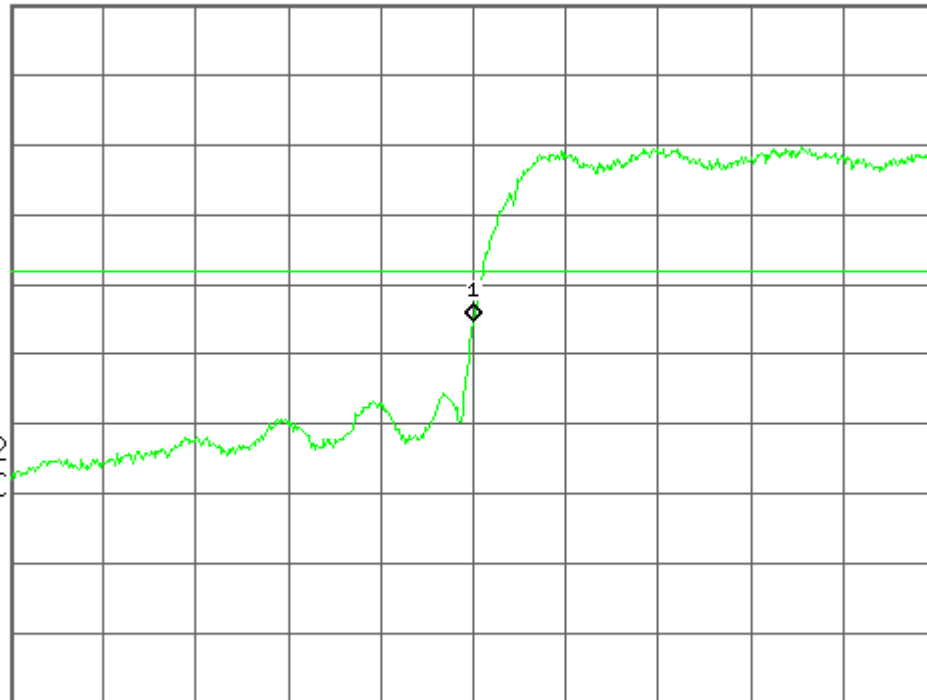
W1 S2

S3 FC

$\mathcal{E}(f)$:

f>50k

Swp



Center 824.000 MHz

Span 2 MHz

#Res BW 13 kHz

VBW 13 kHz

Sweep 45.16 ms (601 pts)

Copyright 2000-2002 Agilent Technologies

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

FCC ID:A3LSPA960 Band Edge Ch.777

Mkr1 849.000 MHz

Ref 25 dBm

Atten 40 dB

-14.322 dBm

#Samp

Log

10

dB/

Offst

1.29

dB

DI

-13.0

dBm

LgAv

100

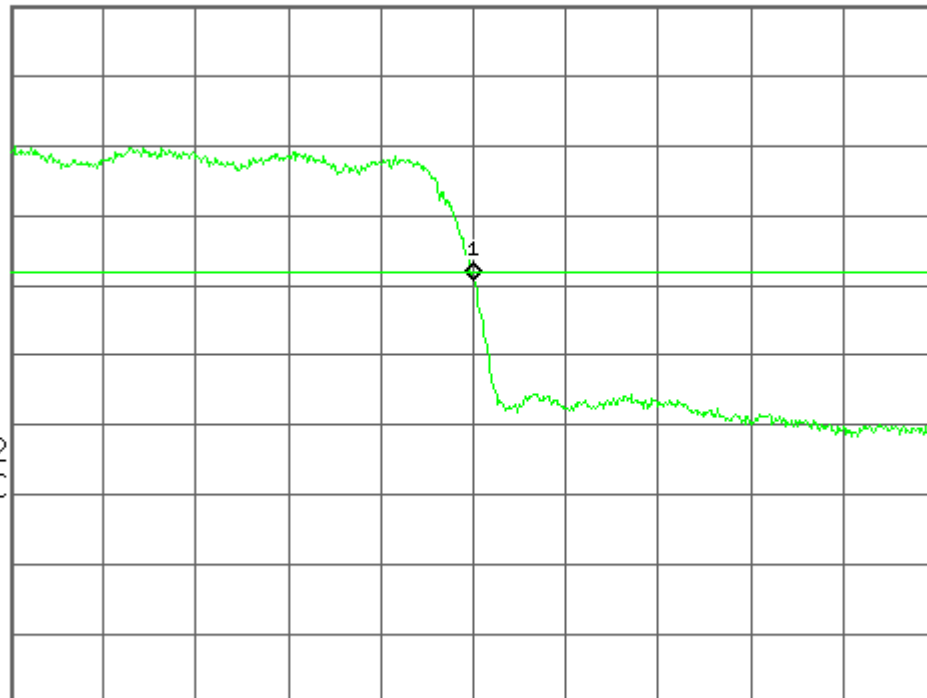
W1 S2

S3 FC

$\mathcal{E}(f)$:

f>50k

Swp



Center 849.000 MHz

Span 2 MHz

#Res BW 13 kHz

VBW 13 kHz

Sweep 45.16 ms (601 pts)

Copyright 2000-2002 Agilent Technologies

Freq/Channel

Center Freq

849.000000 MHz

Start Freq

848.000000 MHz

Stop Freq

850.000000 MHz

CF Step

200.000000 kHz

Auto

Man

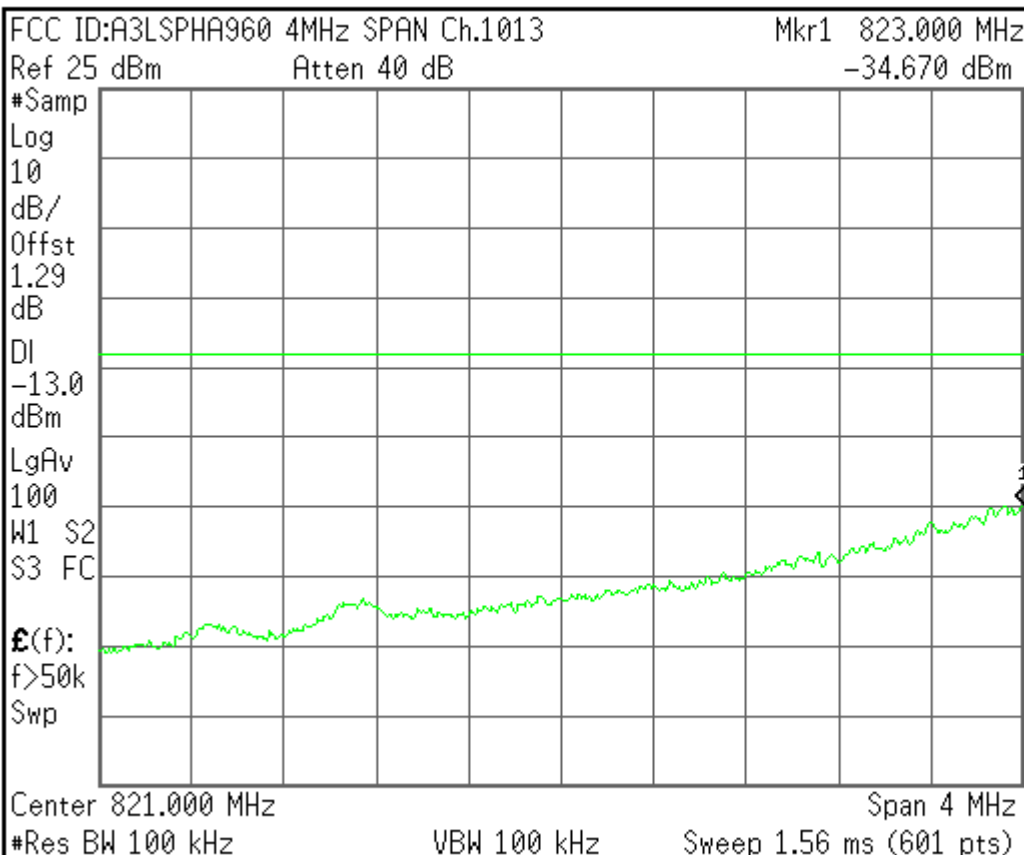
Freq Offset

0.00000000 Hz

Signal Track

On

Off



Freq/Channel

Center Freq
 821.000000 MHz

Start Freq
 819.000000 MHz

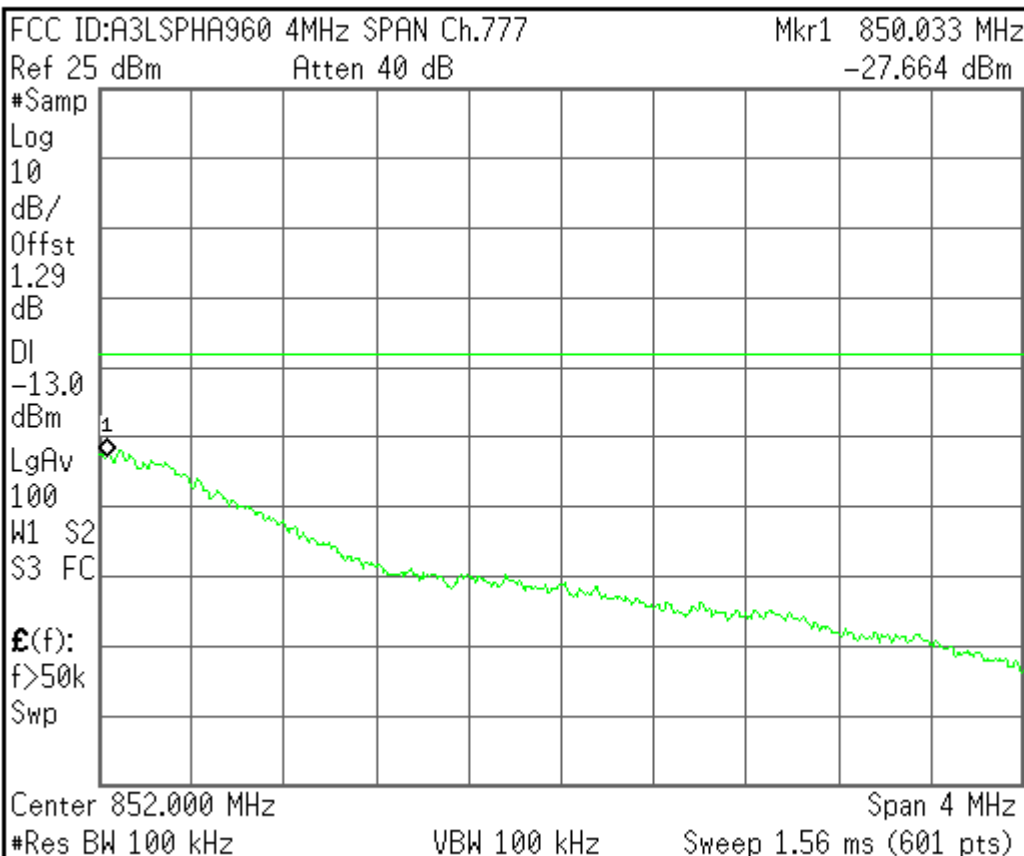
Stop Freq
 823.000000 MHz

CF Step
 400.000000 kHz
 Auto Man

Freq Offset
 0.00000000 Hz

Signal Track
 On Off

Copyright 2000-2002 Agilent Technologies



Freq/Channel

Center Freq
 852.000000 MHz

Start Freq
 850.000000 MHz

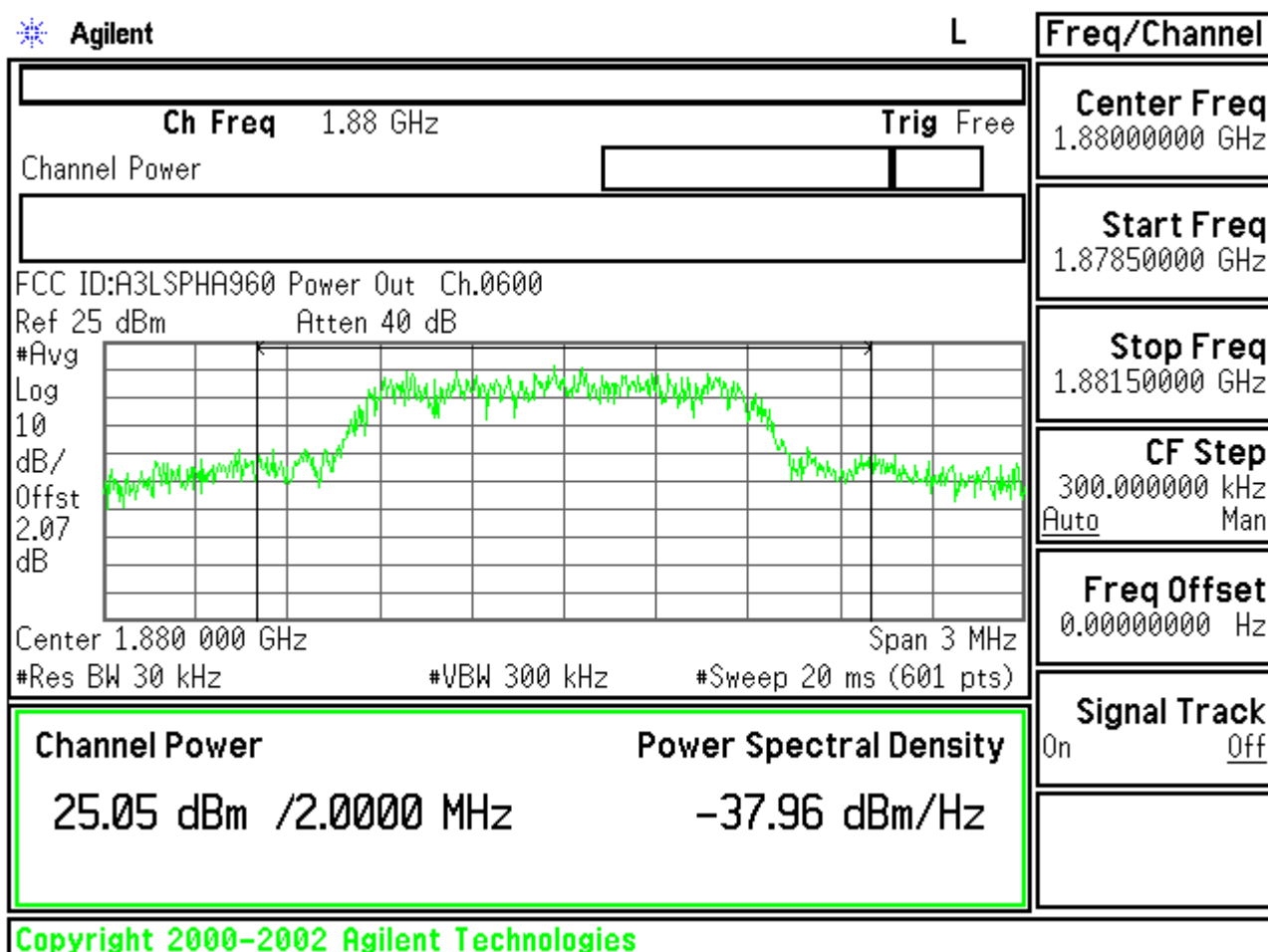
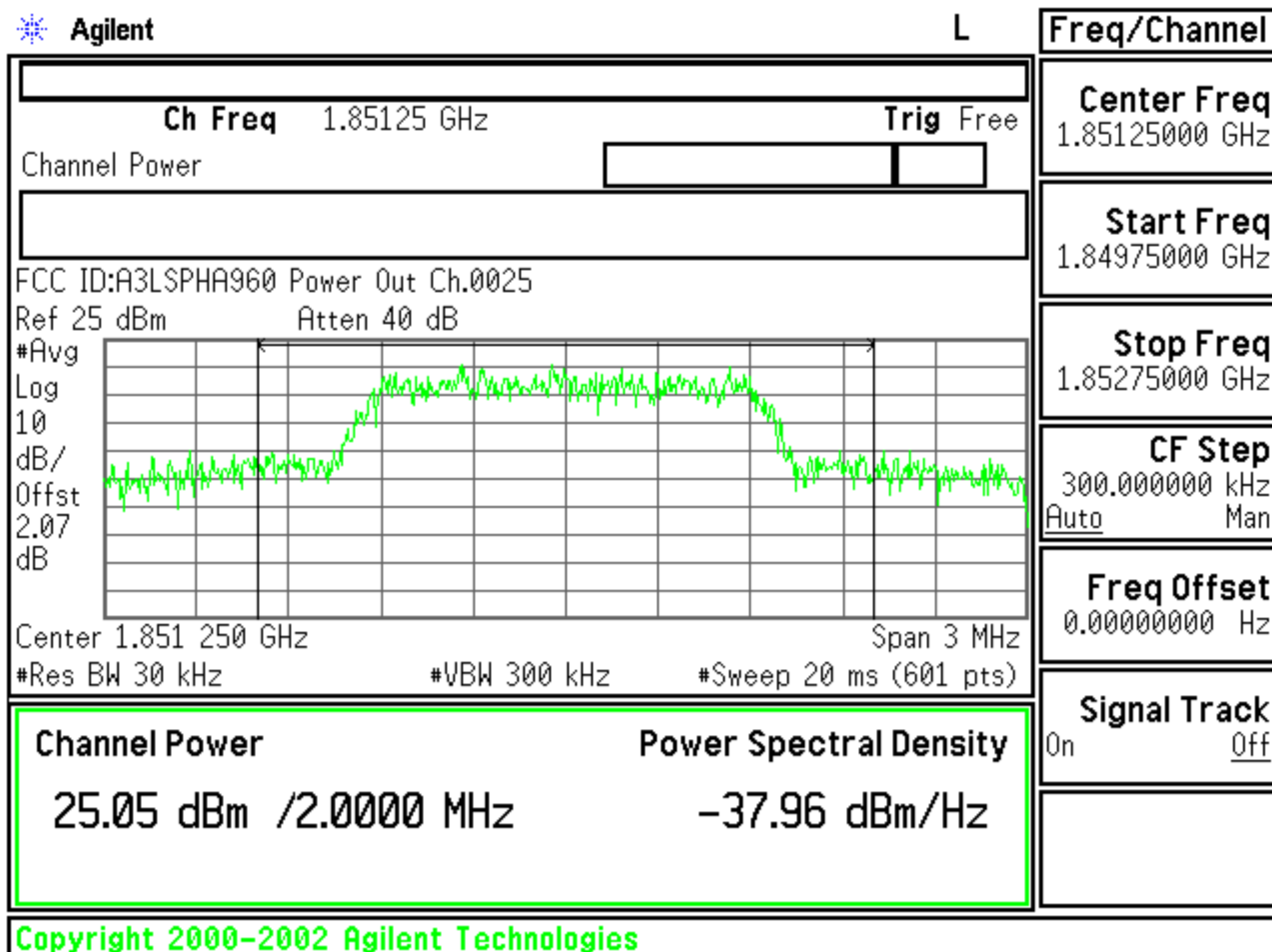
Stop Freq
 854.000000 MHz

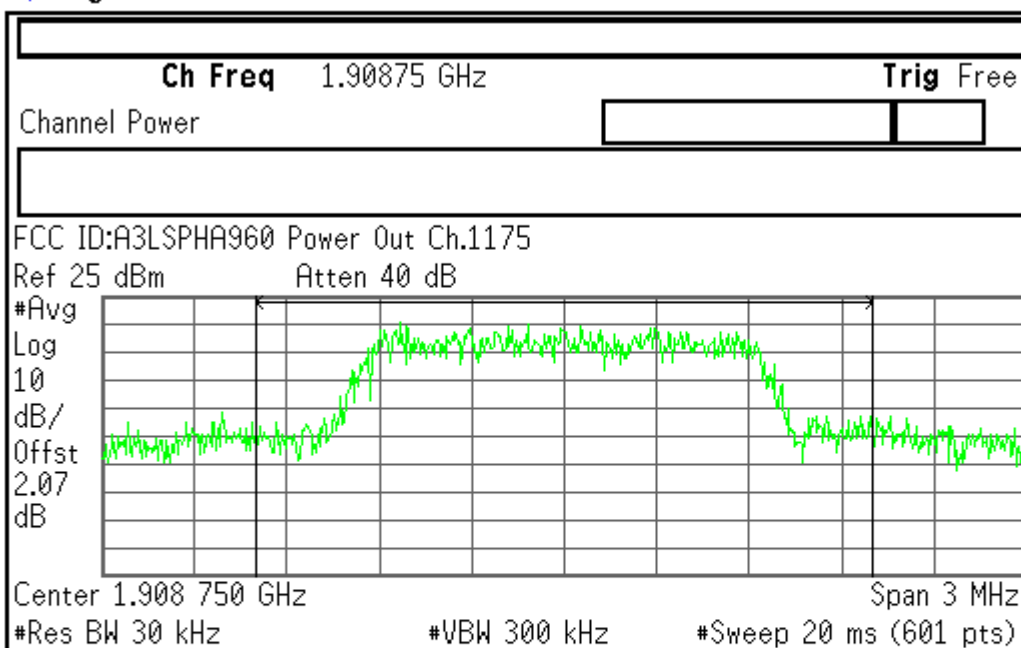
CF Step
 400.000000 kHz
 Auto Man

Freq Offset
 0.00000000 Hz

Signal Track
 On Off

Copyright 2000-2002 Agilent Technologies





Channel Power

25.06 dBm /2.0000 MHz

Power Spectral Density

-37.95 dBm/Hz

Freq/Channel

Center Freq
1.90875000 GHz

Start Freq
1.90725000 GHz

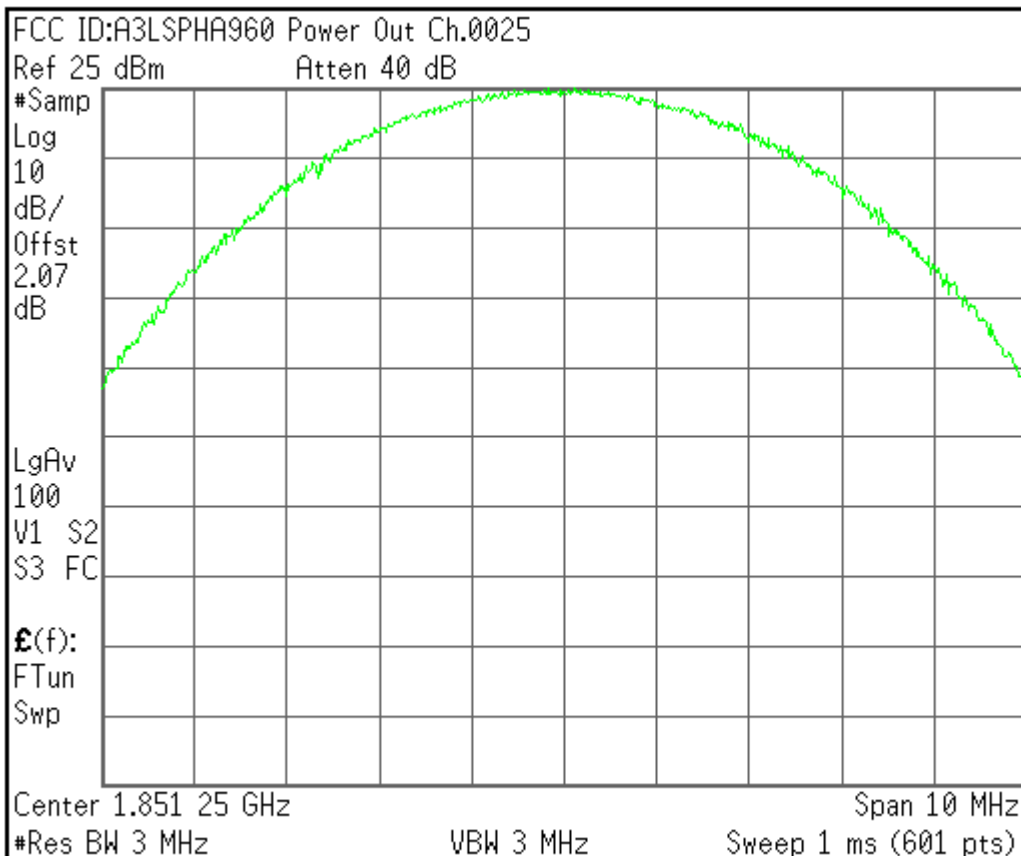
Stop Freq
1.91025000 GHz

CF Step
300.000000 kHz
Auto Man

Freq Offset
0.00000000 Hz

Signal Track
On Off

Copyright 2000-2002 Agilent Technologies



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

Copyright 2000-2002 Agilent Technologies

FCC ID:A3LSPHA960 Power Out Ch.0600

Ref 25 dBm

Atten 40 dB

#Samp

Log

10

dB/

Offst

2.07

dB

LgAv

100

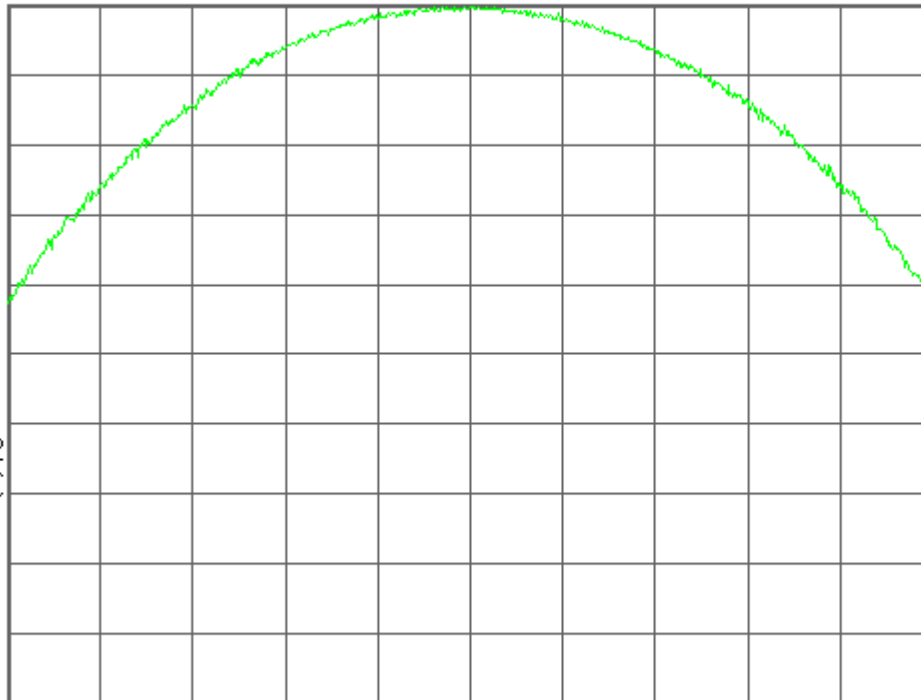
V1 S2

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

Copyright 2000-2002 Agilent Technologies

FCC ID:A3LSPHA960 Power Out Ch.1175

Ref 25 dBm

Atten 40 dB

#Samp

Log

10

dB/

Offst

2.07

dB

LgAv

100

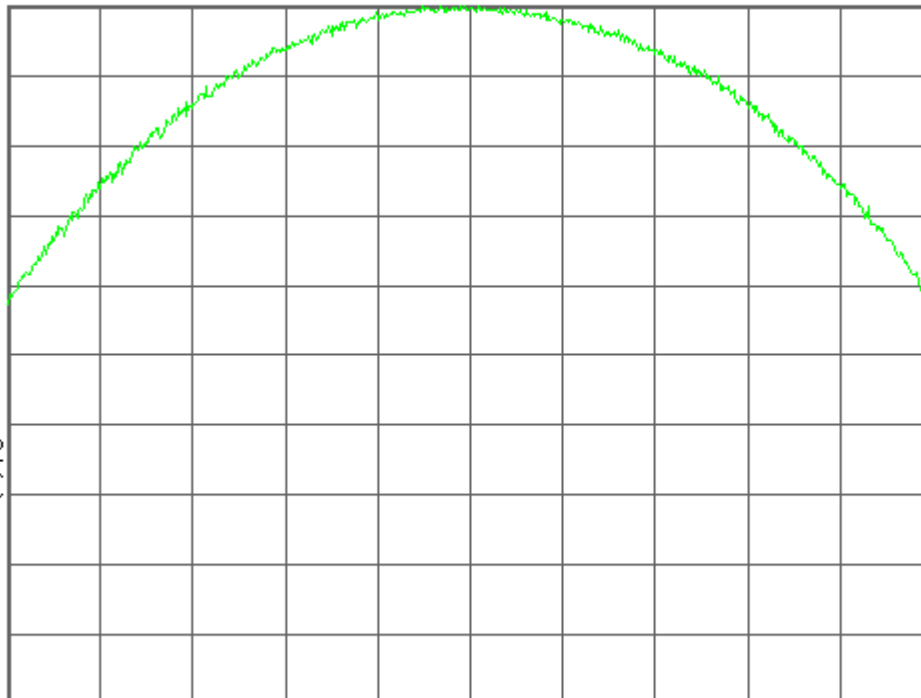
V1 S2

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

Copyright 2000-2002 Agilent Technologies

Ch Freq 1.85125 GHz Trig Free
Occupied Bandwidth

Center Freq
1.85125000 GHz

Start Freq
1.84975000 GHz

Stop Freq
1.85275000 GHz

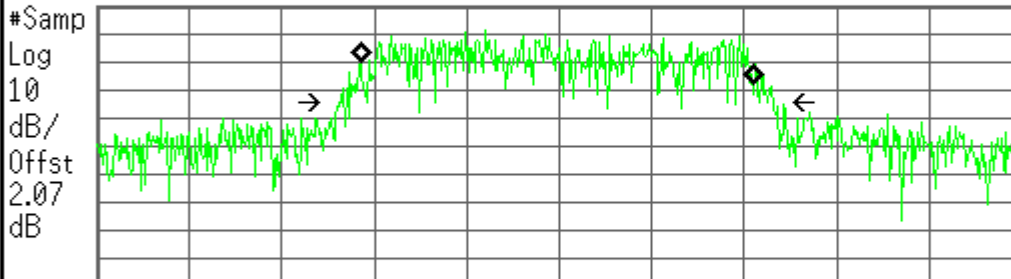
CF Step
300.000000 kHz
Auto Man

Freq Offset
0.00000000 Hz

Signal Track
On Off

FCC ID:A3LSPHA960 0BW Ch.0025

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 1.2764 MHz
Occ BW % Pwr 99.00 %
x dB -26.00 dB
Transmit Freq Error -6.615 kHz
x dB Bandwidth 1.408 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

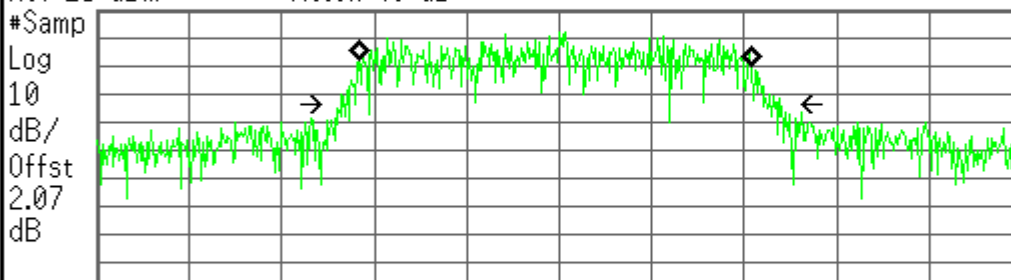
CF Step
300.000000 kHz
Auto Man

Freq Offset
0.00000000 Hz

Signal Track
On Off

FCC ID:A3LSPHA960 0BW Ch.0600

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 1.2746 MHz
Occ BW % Pwr 99.00 %
x dB -26.00 dB
Transmit Freq Error -12.969 kHz
x dB Bandwidth 1.426 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:A3LSPHA960 0BW Ch.1175

Ref 25 dBm Atten 40 dB

#Samp

Log

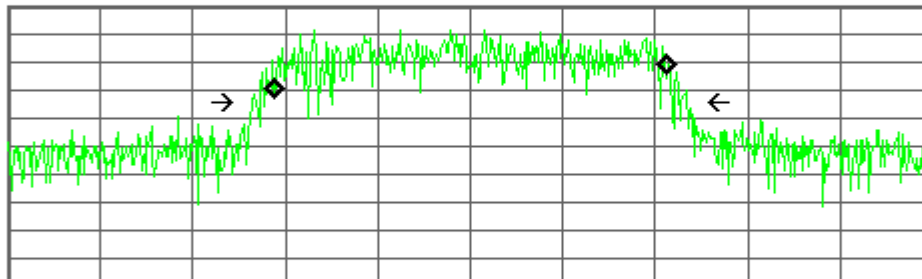
10

dB/

Offst

2.07

dB



Center 1.908 750 GHz

Span 3 MHz

#Res BW 30 kHz

#VBW 300 kHz

#Sweep 20 ms (601 pts)

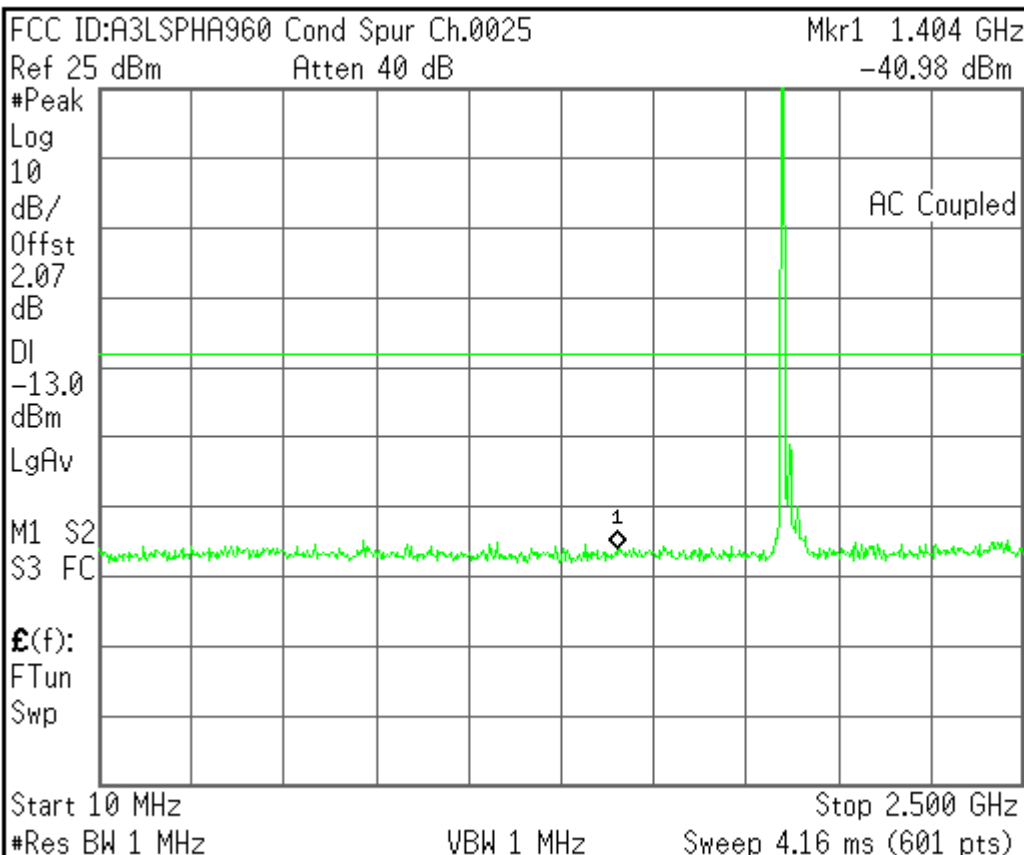
Occupied Bandwidth

1.2710 MHz

Occ BW % Pwr 99.00 %
x dB -26.00 dB

Transmit Freq Error 933.771 Hz

x dB Bandwidth 1.410 MHz*



Freq/Channel

Center Freq
 1.25500000 GHz

Start Freq
 10.0000000 MHz

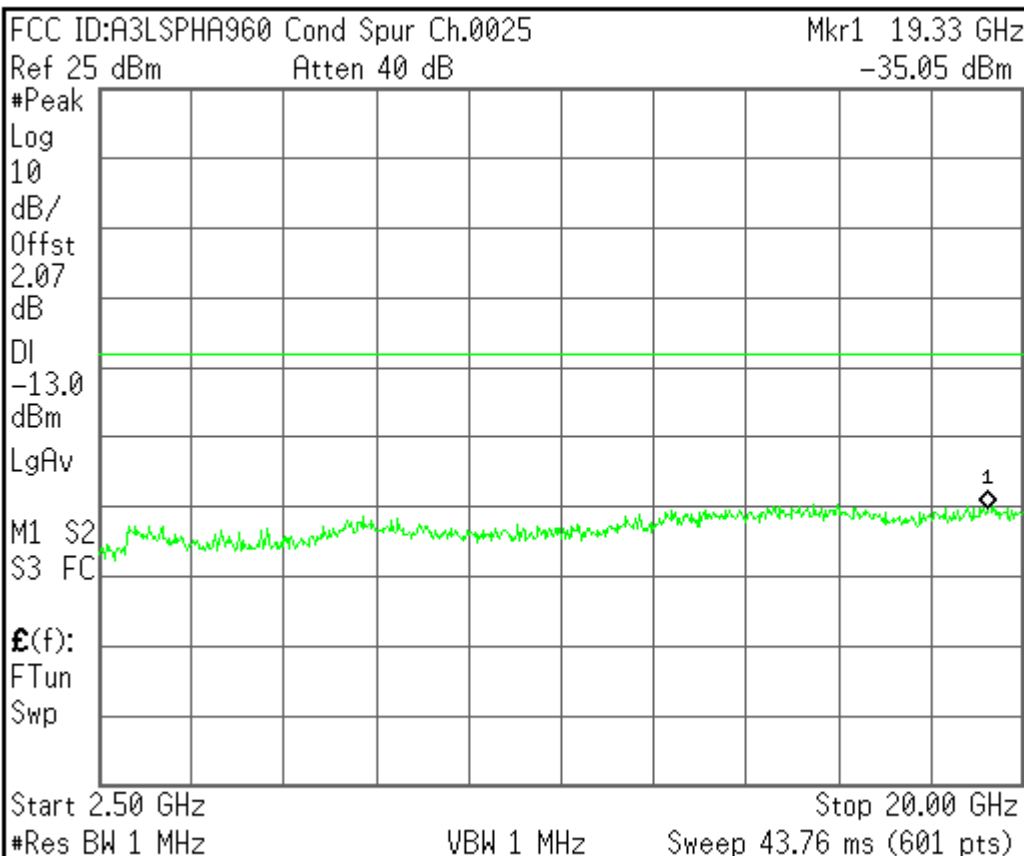
Stop Freq
 2.50000000 GHz

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

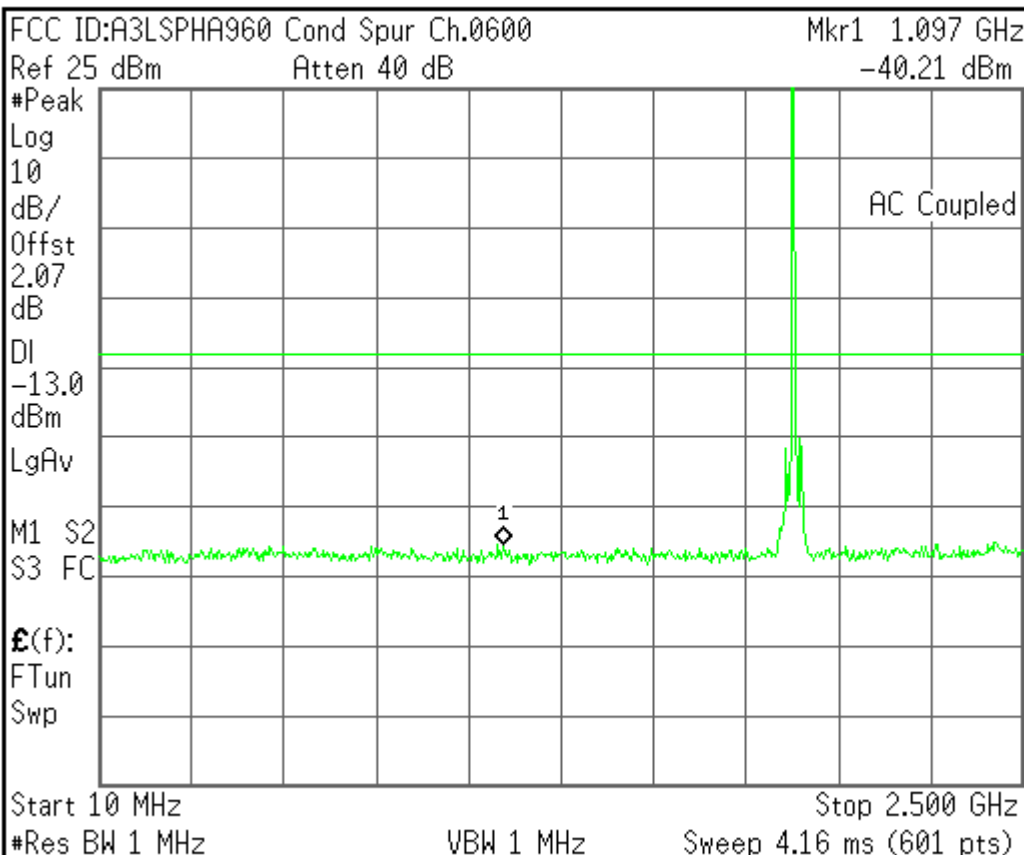
Stop Freq
 20.0000000 GHz

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

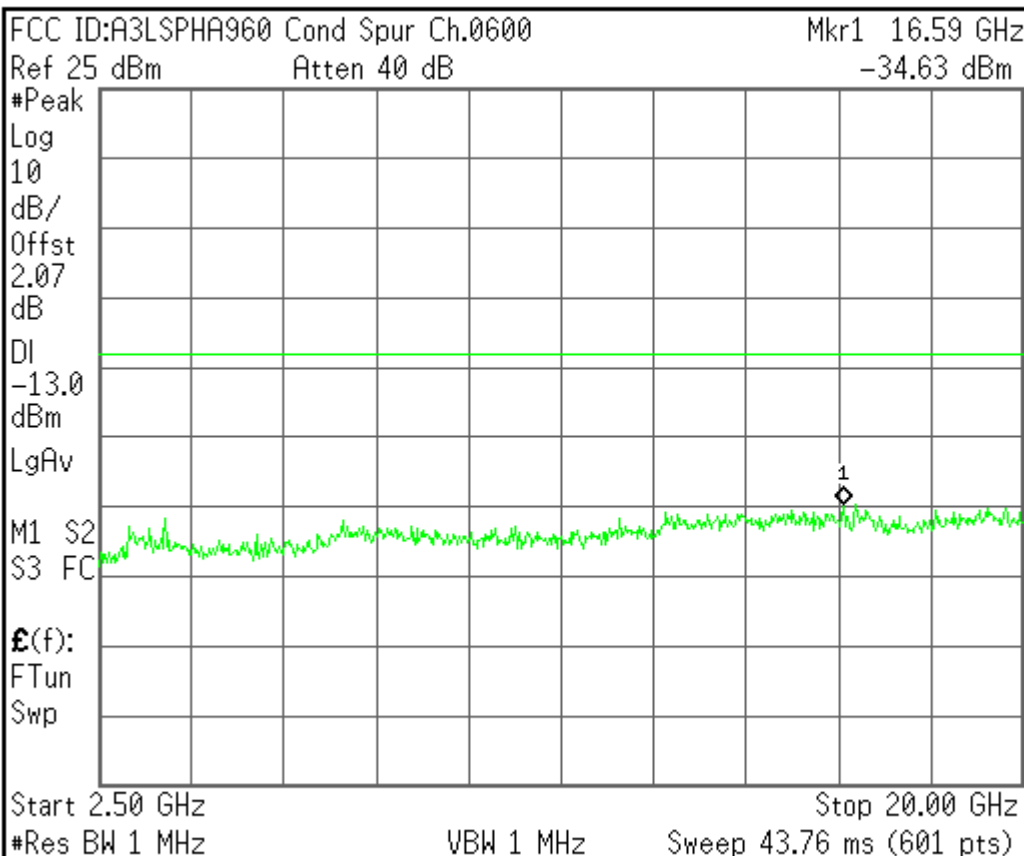
Stop Freq
 2.50000000 GHz

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

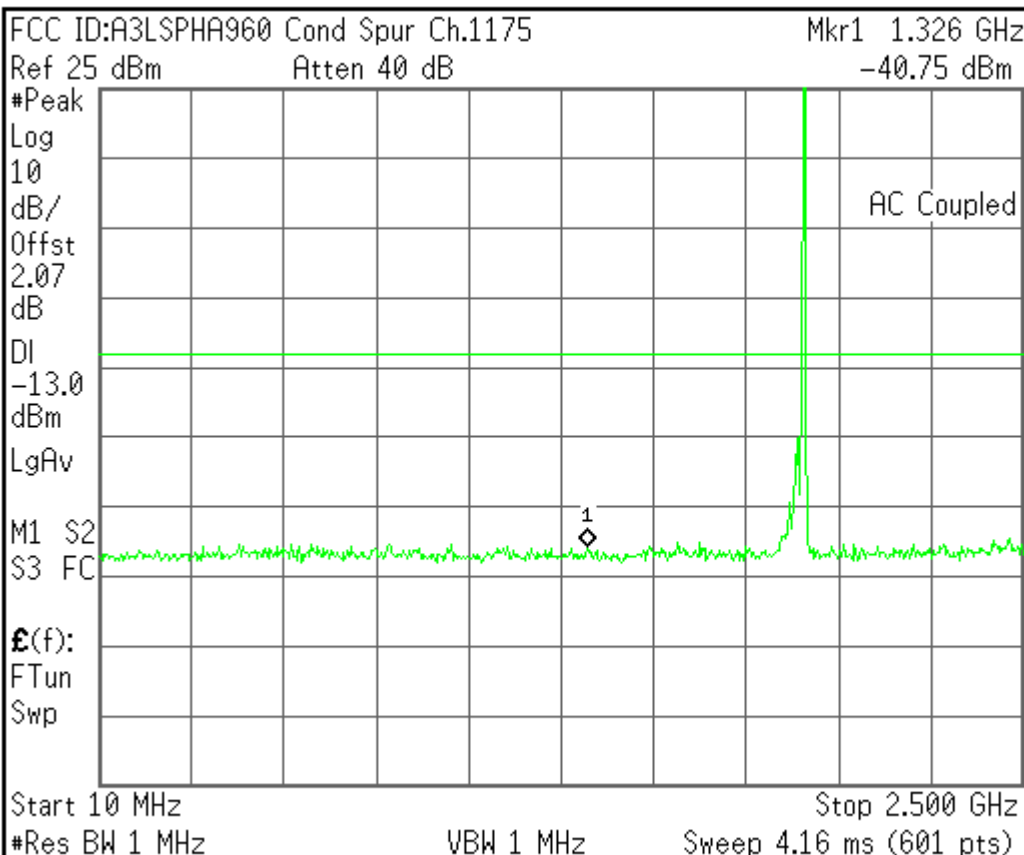
Stop Freq
 20.0000000 GHz

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

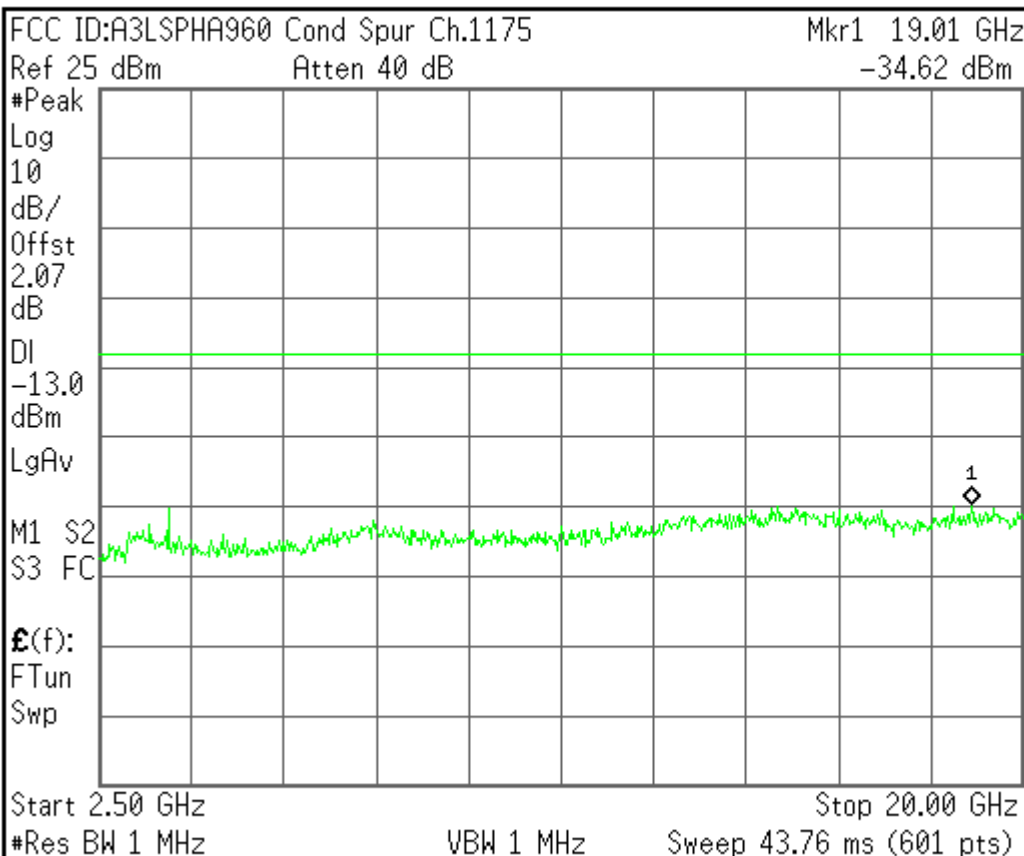
Stop Freq
 2.50000000 GHz

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

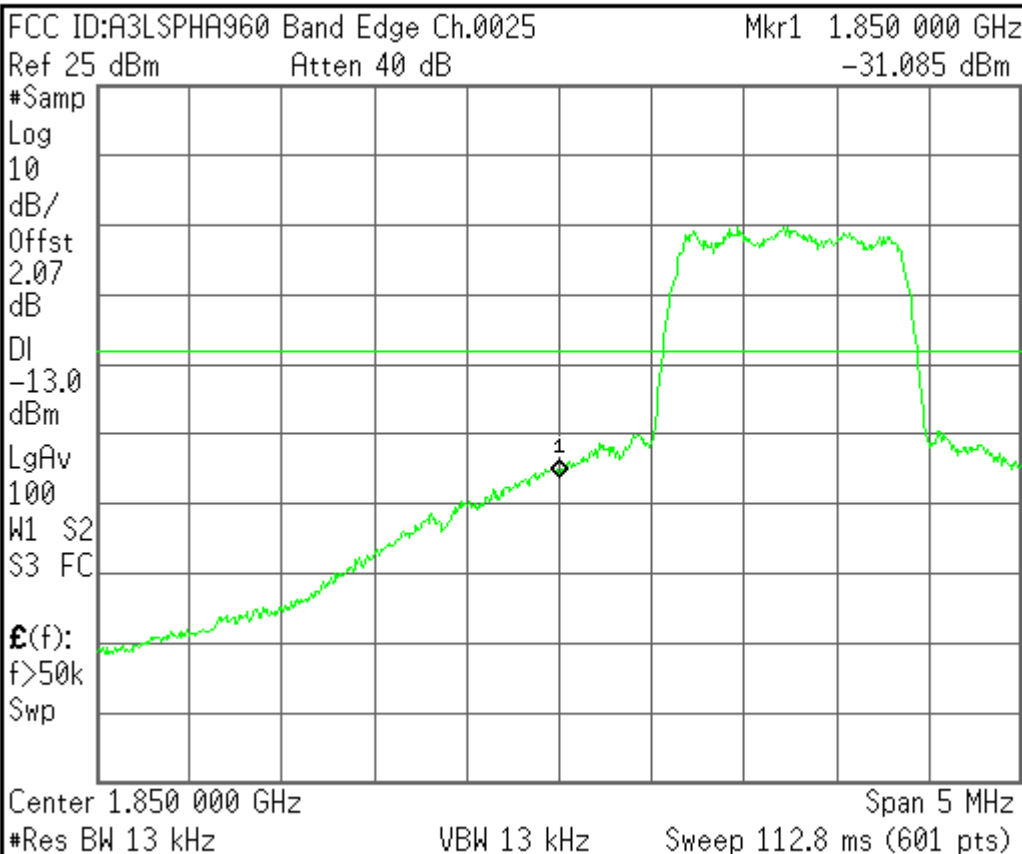
Stop Freq
 20.0000000 GHz

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

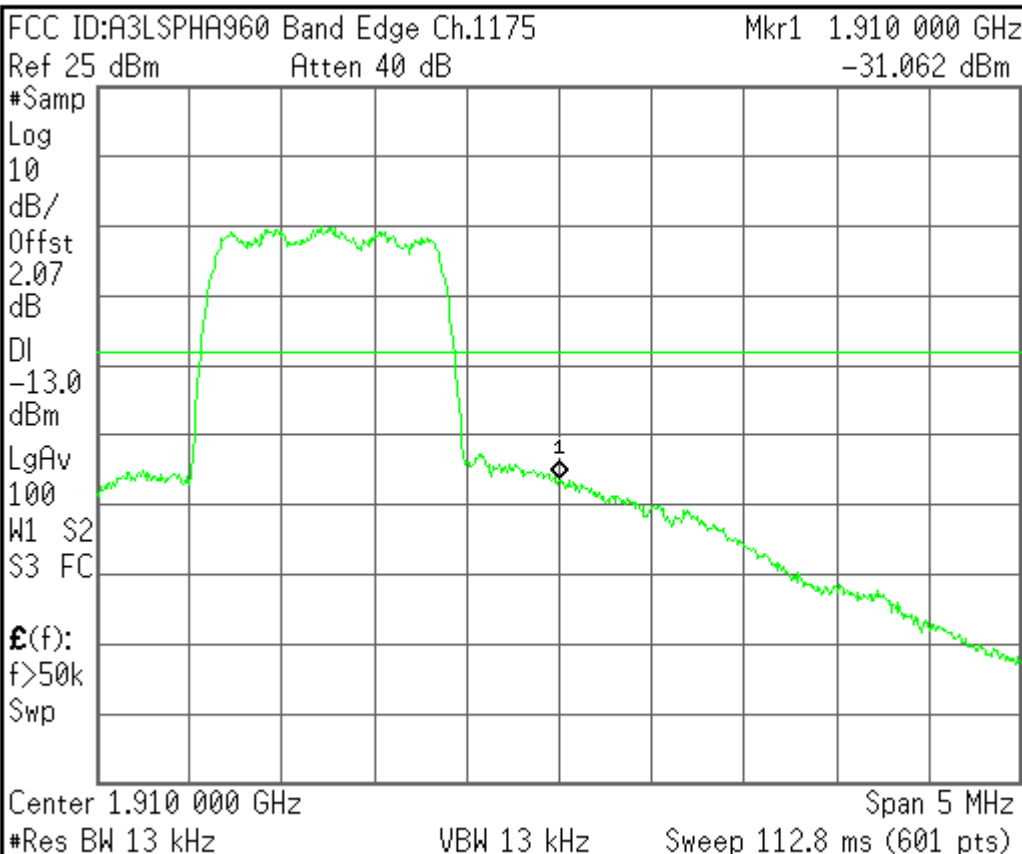
Stop Freq
1.85250000 GHz

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

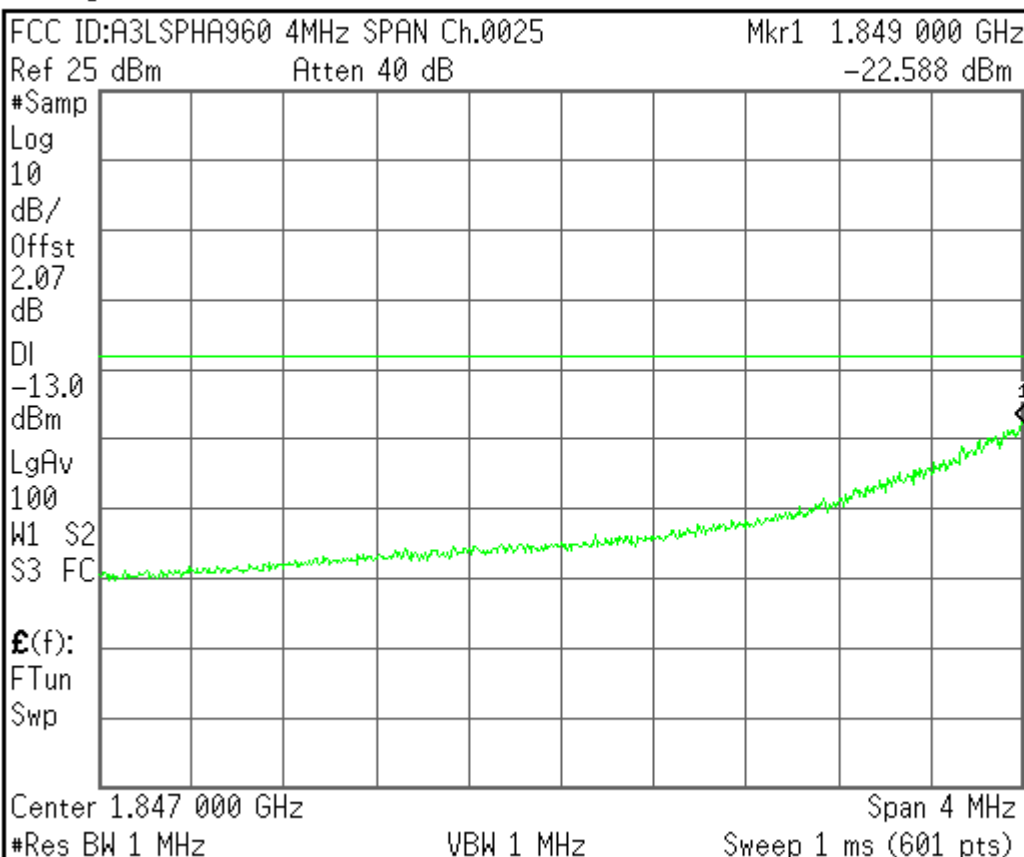
Stop Freq
1.91250000 GHz

CF Step
500.000000 kHz
Auto Man

Freq Offset
0.00000000 Hz

Signal Track
On Off

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Freq/Channel

Center Freq
 1.84700000 GHz

Start Freq
 1.84500000 GHz

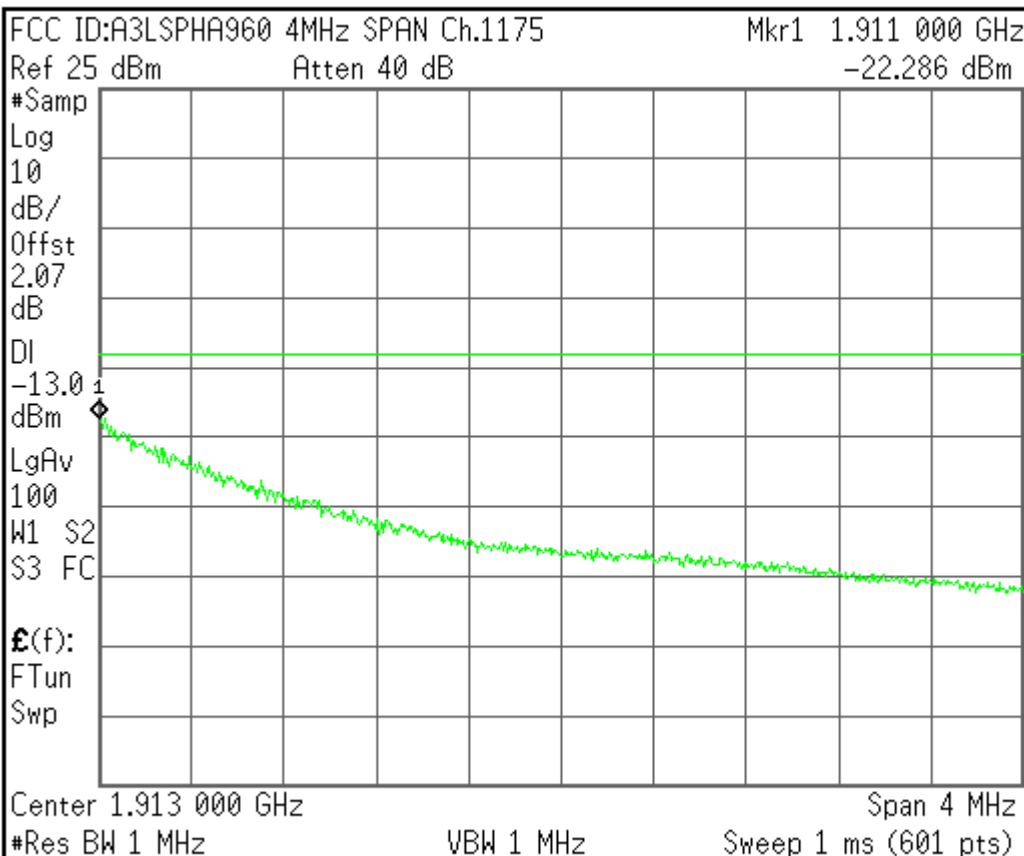
Stop Freq
 1.84900000 GHz

CF Step
 400.000000 kHz
 Auto Man

Freq Offset
 0.00000000 Hz

Signal Track
 On Off

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Freq/Channel

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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