



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: SPH-M360
FCC ID (Requested): A3LSPHM360
Report No: FH-132-R1
Job No: FH-132
Date issued: June 18, 2010

- 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: A3LSPHM360

- Model: SPH-M360
- 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: 0.132 W ERP CDMA (21.21 dBm)
0.285 W EIRP PCS (24.55 dBm)

- FCC Classification(s): PCS Licensed Portable Tx Held to Ear (PCE)
- Equipment (EUT) Type: Cellular/PCS 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: June 8-9, 2010
- Place of Test: SAMSUNG Lab,
- Test Report S/N: FH-132-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 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 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	2010-10-20
	E4440A(3Hz~26.5GHz)	MY46187454	2011-03-08
	E4440A(3Hz~26.5GHz)	MY41000236	2011-04-13
Network Analyzer	8753E	JP38160590	2010-06-19
Pre-Amplifier	8449B	3008A00691	2010-12-15
Communication test set	8960	MY47510060	2011-03-08
	8960	GB42230535	2010-12-18
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	2011-09-23
Dipole Antenna	UHA 9105	9105-2412	2011-10-06
Power Supply	E3640A	MY40003594	2010-06-19
	E3640A	MY40003595	2011-05-17
	E3632A	MY40022438	2011-03-05
Divider	11636B	51946	2011-06-25
	11636B	51942	2011-07-09
	11636B	56918	2011-08-31
High Pass Filter	WHK/3.0/18G-10SS	492	Not Required
	WHK/3.5/18G-10SS	4	Not Required
Environmental Chamber	SH-241	92000549	2010-11-11
	SH-241	92000548	2010-11-11
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”.

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)
Cellular	1013	RC1	24.48	24.3	-	-
		RC3	24.47	24.35	24.43	24.37
	384	RC1	24.28	24.27	-	-
		RC3	24.35	24.36	24.26	24.26
	777	RC1	24.34	24.22	-	-
		RC3	24.2	24.21	24.20	24.20
PCS	25	RC1	24.66	24.67	-	-
		RC3	24.71	24.8	24.69	24.64
	600	RC1	24.6	24.56	-	-
		RC3	24.61	24.63	24.50	24.44
	1175	RC1	24.45	24.49	-	-
		RC3	24.68	24.69	24.58	24.54

Table 5-3
Maximum Power Output Table for SPH-M360

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

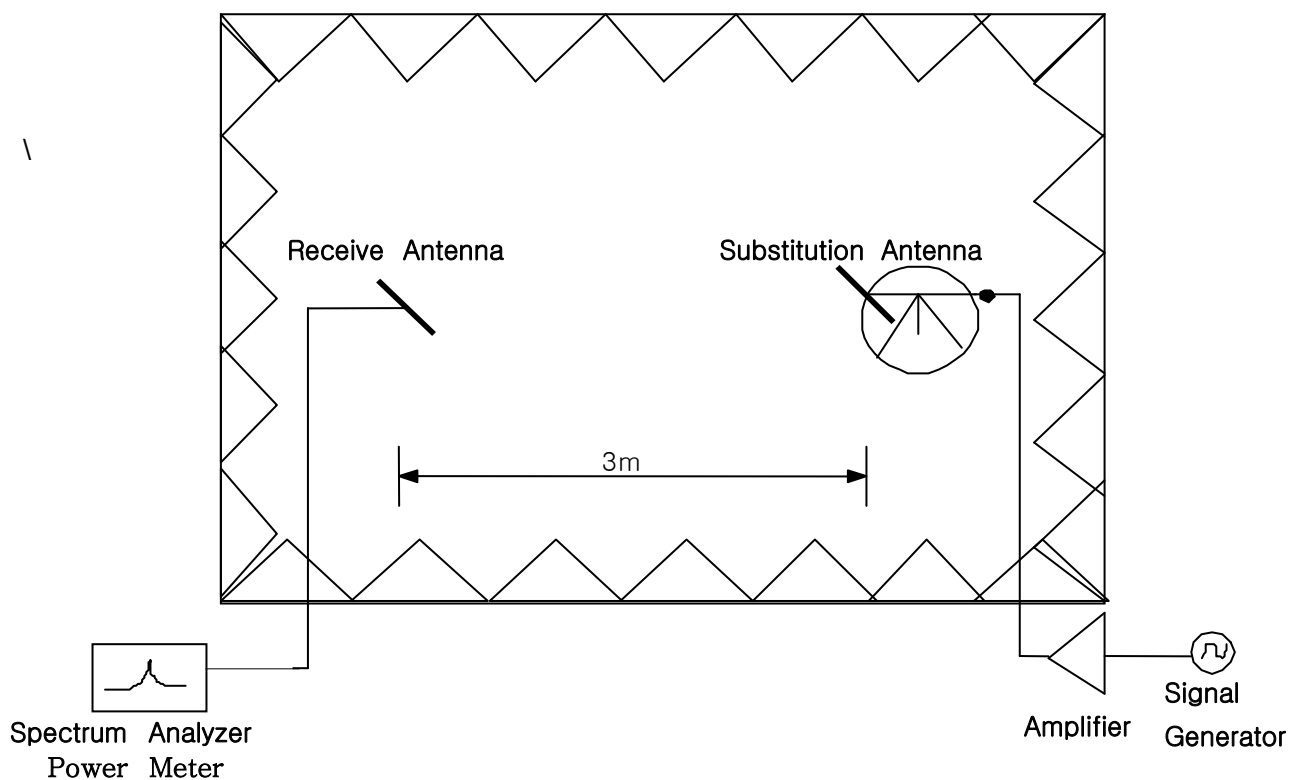


Figure 3. Diagram of ERP/EIRP test Set-up

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

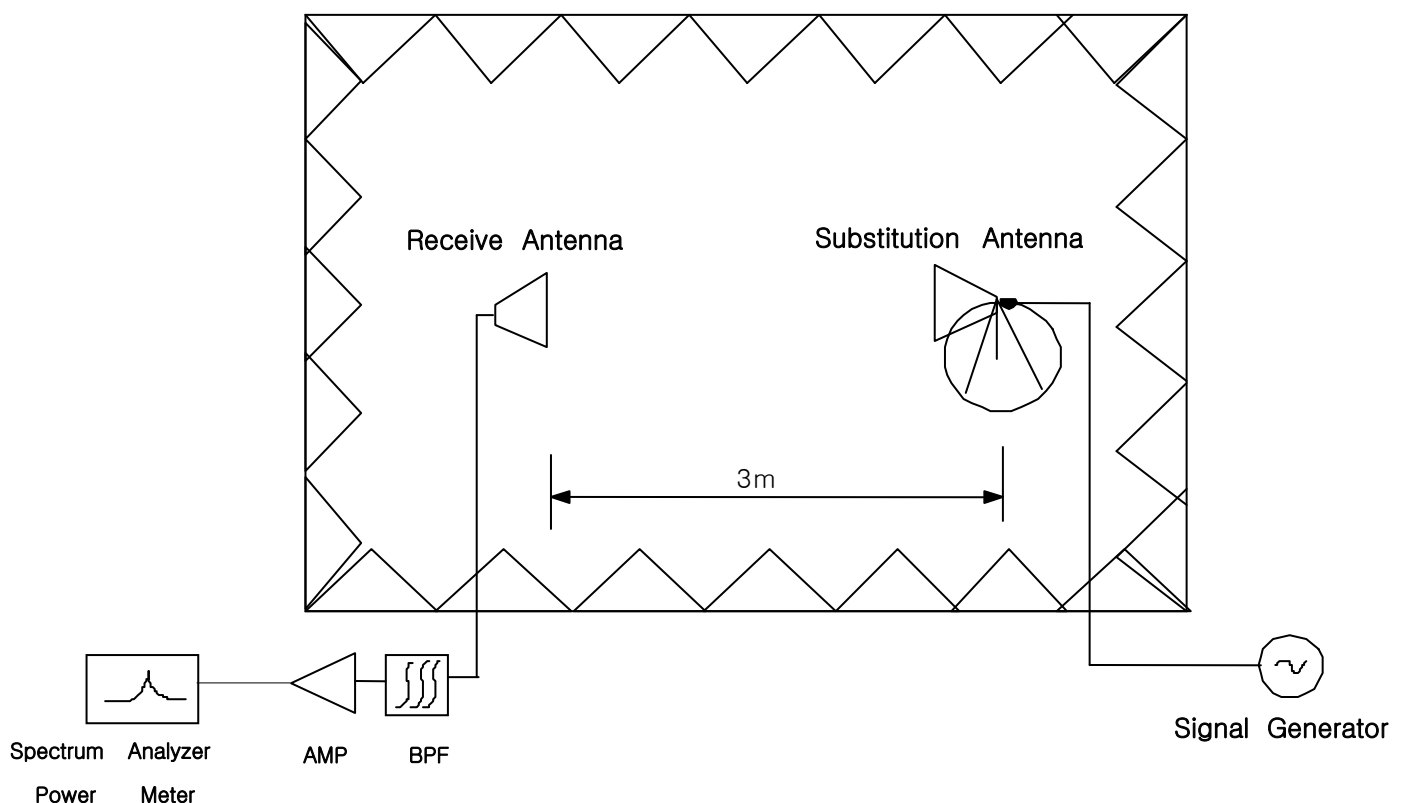


Figure 4. Diagram of Radiated Spurious & Harmonic test Set-up

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	20.00	H	-16.55	-0.67	-15.88
		V	-17.39	-0.67	-16.72
836.52	21.00	H	-16.05	-0.73	-15.32
		V	-16.32	-0.73	-15.59
848.31	21.00	H	-18.27	-0.79	-17.48
		V	-17.40	-0.79	-16.61

■ Result

Frequency (MHz)	From EUT Tested level (dBm)	Polarization (H/V)	Azimuth (angle)	ERP (dBm)	ERP (W)	Battery
824.70	-15.77	H	288/90	20.11	0.103	Standard
836.52	-15.79	H	295/65	20.53	0.113	Standard
848.31	-17.27	H	295/25	21.21	0.132	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	25.00	H	-14.32	9.60	-23.92
		V	-13.91	9.60	-23.51
1880.00	24.00	H	-14.99	9.60	-24.59
		V	-15.28	9.60	-24.88
1908.75	24.00	H	-15.45	9.60	-25.05
		V	-15.19	9.60	-24.79

■ Result

Frequency (MHz)	From EUT Tested level (dBm)	Polarization (H/V)	Azimuth (angle)	EIRP (dBm)	EIRP (W)	Battery
1851.25	-24.37	H	103/180	24.55	0.285	Standard
1880.00	-25.03	H	254/10	23.56	0.227	Standard
1908.75	-24.64	H	264/35	24.41	0.276	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 : 21.21 dBm = 0.132 W

Modulation Signal : CDMA

Limit : $43 + 10\log_{10}(P) = 34.21$ dBc

■ Result

Channel	Harmonic	Frequency (MHz)	From EUT Tested level (dBm)	POL (H/V)	Result (dBc)
1013	2	1649.40	-52.81	H	61.92
	3	2474.10	-51.02	H	55.67
	4	3298.80	-65.11	H	66.50
	5	4123.50	-	-	-
	6	4948.20	-	-	-
	7	5772.90	-	-	-
384	2	1673.04	-48.79	H	57.40
	3	2509.56	-45.39	V	50.10
	4	3346.08	-60.56	H	61.45
	5	4182.68	-	-	-
	6	5019.12	-	-	-
	7	5855.64	-	-	-
777	2	1696.62	-42.83	H	51.23
	3	2544.93	-44.01	V	47.42
	4	3393.24	-63.01	H	64.19
	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 : 24.55 dBm = 0.285 W

Modulation Signal : PCS

Limit : $43 + 10\log_{10}(P) = 37.55$ dBc

■ Result

Channel	Harmonic	Frequency (MHz)	From EUT Tested level (dBm)	POL (H/V)	Result (dBc)
25	2	3702.50	-45.36	V	46.34
	3	5553.75	-62.68	V	57.43
	4	7405.55	-66.61	V	57.20
	5	9256.25	-	-	-
	6	11107.50	-	-	-
	7	12958.75	-	-	-
600	2	3760.00	-52.33	H	52.80
	3	5640.00	-60.26	H	55.08
	4	7520.00	-68.73	V	59.33
	5	9400.00	-	-	-
	6	11280.00	-	-	-
	7	13160.00	-	-	-
1175	2	3817.50	-41.12	H	40.65
	3	5726.25	-60.42	V	54.48
	4	7635.00	-66.81	V	56.92
	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 : June 9, 2010

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+ 2.15 - (-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	⑤Test ed EUT Level : H dBm	⑤Test ed EUT Level : V dBm	⑥ Result EUT : H (dBc)	⑥ Result EUT : V (dBc)
1013	2	1649.40	-9.02	9.50	-13.50	-27.24	-27.10	-52.81	-60.71	61.92	69.96
	3	2474.10	-11.41	10.70	-12.30	-31.70	-31.45	-51.02	-52.18	55.67	57.08
	4	3298.80	-13.59	12.30	-11.70	-34.96	-35.43	-65.11	-65.86	66.50	66.78
	5	4123.50	-15.15	12.50	-10.30	-38.60	-38.90	-	-	-	-
	6	4948.20	-16.71	12.70	-9.00	-40.65	-40.69	-	-	-	-
	7	5772.90	-18.17	12.90	-7.70	-43.29	-43.30	-	-	-	-
384	2	1673.04	-9.07	9.50	-13.40	-27.74	-28.63	-48.79	-53.54	57.40	61.26
	3	2509.56	-11.43	10.70	-12.30	-31.69	-31.64	-45.76	-45.39	50.42	50.10
	4	3346.08	-13.78	12.30	-11.50	-35.46	-35.60	-60.56	-62.01	61.45	62.76
	5	4182.68	-15.26	12.50	-10.20	-38.67	-39.11	-	-	-	-
	6	5019.12	-16.94	12.70	-8.80	-41.28	-41.32	-	-	-	-
	7	5855.64	-18.23	12.90	-7.70	-43.94	-43.84	-	-	-	-
777	2	1696.62	-9.08	9.50	-13.40	-27.95	-27.75	-42.83	-49.51	51.23	58.11
	3	2544.93	-11.41	10.70	-12.30	-31.58	-32.94	-44.81	-44.01	49.58	47.42
	4	3393.24	-13.82	12.30	-11.50	-35.17	-35.46	-63.01	-63.67	64.19	64.56
	5	4241.55	-15.38	12.50	-10.10	-38.81	-39.07	-	-	-	-
	6	5089.86	-17.06	12.70	-8.60	-41.51	-41.42	-	-	-	-
	7	5938.17	-18.41	12.90	-7.50	-43.83	-43.32	-	-	-	-

6.6 PCS Radiated Spurious & Harmonic Conversion Table

Date : June 9, 2010

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	⑤Test ed EUT Level : H dBm	⑤Test ed EUT Level : V dBm	⑥ Result EUT : H (dBc)	⑥ Result EUT : V (dBc)
25	2	3702.50	-14.91	12.40	-10.50	-36.94	-36.57	-51.25	-45.36	51.86	46.34
	3	5553.75	-17.69	12.90	-8.20	-42.68	-42.80	-63.57	-62.68	58.44	57.43
	4	7405.00	-20.43	10.50	-3.10	-47.33	-46.96	-69.03	-66.61	59.25	57.20
	5	9256.25	-23.63	11.20	-0.60	-51.79	-50.45	-	-	-	-
	6	11107.50	-26.86	11.60	2.30	-54.95	-55.26	-	-	-	-
	7	12958.75	-28.80	12.90	2.90	-58.88	-58.56	-	-	-	-
600	2	3760.00	-15.19	12.40	-10.20	-37.08	-37.05	-52.33	-68.22	52.80	68.72
	3	5640.00	-17.78	12.90	-8.10	-42.73	-43.08	-60.26	-67.40	55.08	61.87
	4	7520.00	-20.67	10.60	-2.90	-47.12	-46.95	-69.15	-68.73	59.58	59.33
	5	9400.00	-23.23	11.60	-1.40	-51.75	-52.22	-	-	-	-
	6	11280.00	-26.34	12.10	1.20	-55.98	-56.30	-	-	-	-
	7	13160.00	-28.12	12.80	2.30	-59.32	-58.91	-	-	-	-
1175	2	3817.50	-14.23	12.40	-11.20	-38.02	-38.68	-41.12	-44.72	40.65	43.59
	3	5726.25	-18.11	13.00	-7.90	-43.48	-43.49	-62.03	-60.42	56.10	54.48
	4	7635.00	-21.16	11.20	-3.00	-47.29	-47.44	-68.02	-66.81	58.28	56.92
	5	9543.75	-23.54	11.70	-1.20	-52.60	-52.08	-	-	-	-
	6	11452.50	-26.84	11.70	2.10	-56.26	-56.23	-	-	-	-
	7	13361.25	-28.23	12.30	2.90	-60.44	-59.84	-	-	-	-

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)	25.60	836,520,026	0.000003	0.031
100%		-30	-23.00	836,519,977	-0.000003	-0.027
100%		-20	18.00	836,520,018	0.000002	0.022
100%		-10	38.70	836,520,039	0.000005	0.046
100%		0	2.40	836,520,002	0.000000	0.003
100%		+10	-22.80	836,519,977	-0.000003	-0.027
100%		+20	27.00	836,520,027	0.000003	0.032
100%		+30	29.80	836,520,030	0.000004	0.036
100%		+40	10.10	836,520,010	0.000001	0.012
100%		+50	5.90	836,520,006	0.000001	0.007
100%		+60	-33.10	836,519,967	-0.000004	-0.040
85%	3.25	+20	-26.70	836,519,973	-0.000003	-0.032
115%	4.26	+20	0.60	836,520,001	0.000000	0.001
Batt. Endpoint	3.25	+20	-22.20	836,519,978	-0.000003	-0.027

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

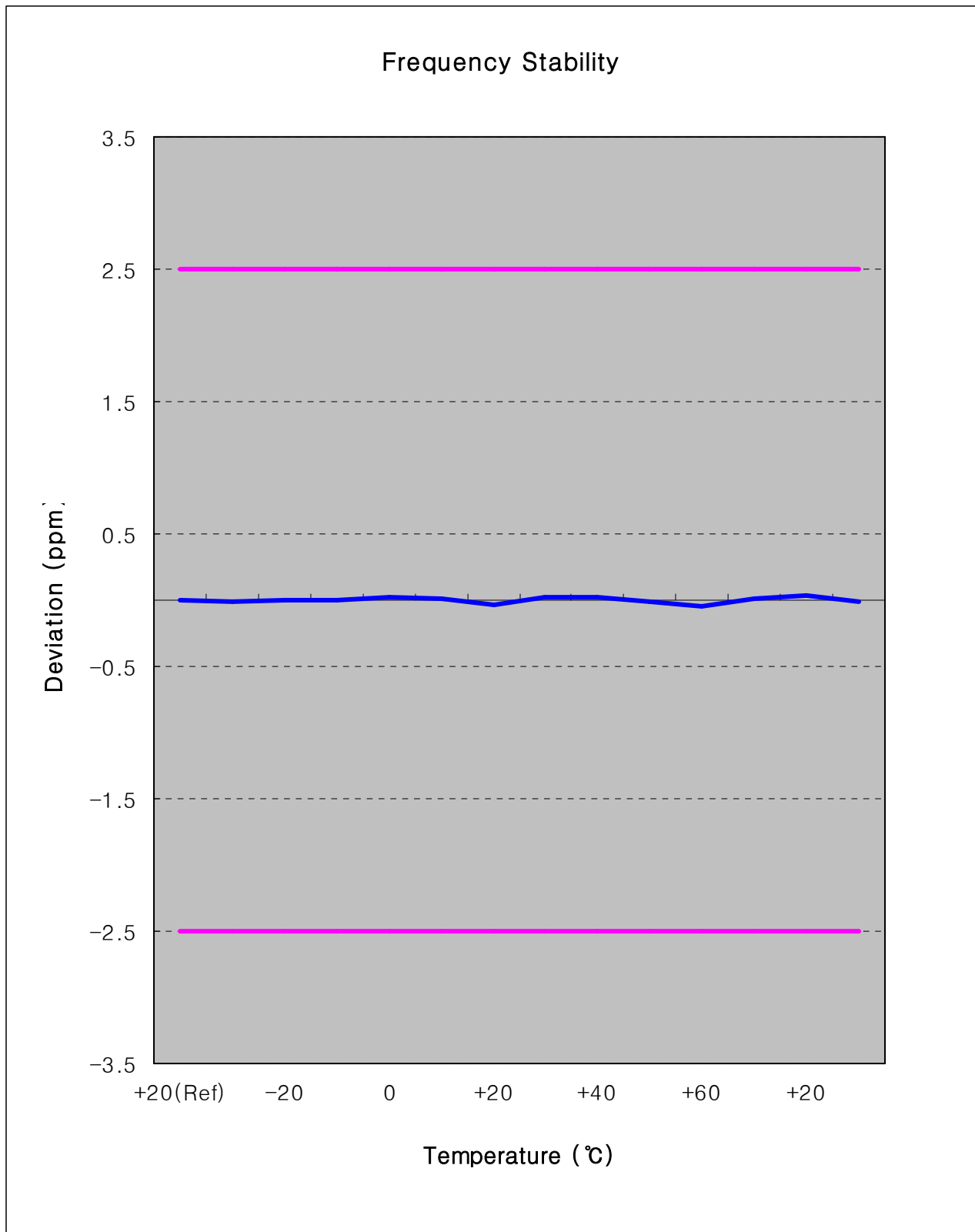
Deviation Limit : ± 0.00025 % or 2.5ppm

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency Error (Hz)	Frequency (Hz)	Deviation (%)	ppm
100%	3.70	+20(Ref)	20.50	1,880,000,021	0.000001	0.011
100%		-30	-38.80	1,879,999,961	-0.000002	-0.021
100%		-20	-32.60	1,879,999,967	-0.000002	-0.017
100%		-10	3.20	1,880,000,003	0.000000	0.002
100%		0	2.60	1,880,000,003	0.000000	0.001
100%		+10	-3.50	1,879,999,997	0.000000	-0.002
100%		+20	-25.40	1,879,999,975	-0.000001	-0.014
100%		+30	-19.60	1,879,999,980	-0.000001	-0.010
100%		+40	-1.50	1,879,999,999	0.000000	-0.001
100%		+50	20.10	1,880,000,020	0.000001	0.011
100%		+60	0.00	1,880,000,000	0.000000	0.000
85%	3.25	+20	-12.90	1,879,999,987	-0.000001	-0.007
115%	4.26	+20	-16.30	1,879,999,984	-0.000001	-0.009
Batt. Endpoint	3.25	+20	-0.60	1,879,999,999	0.000000	0.000

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

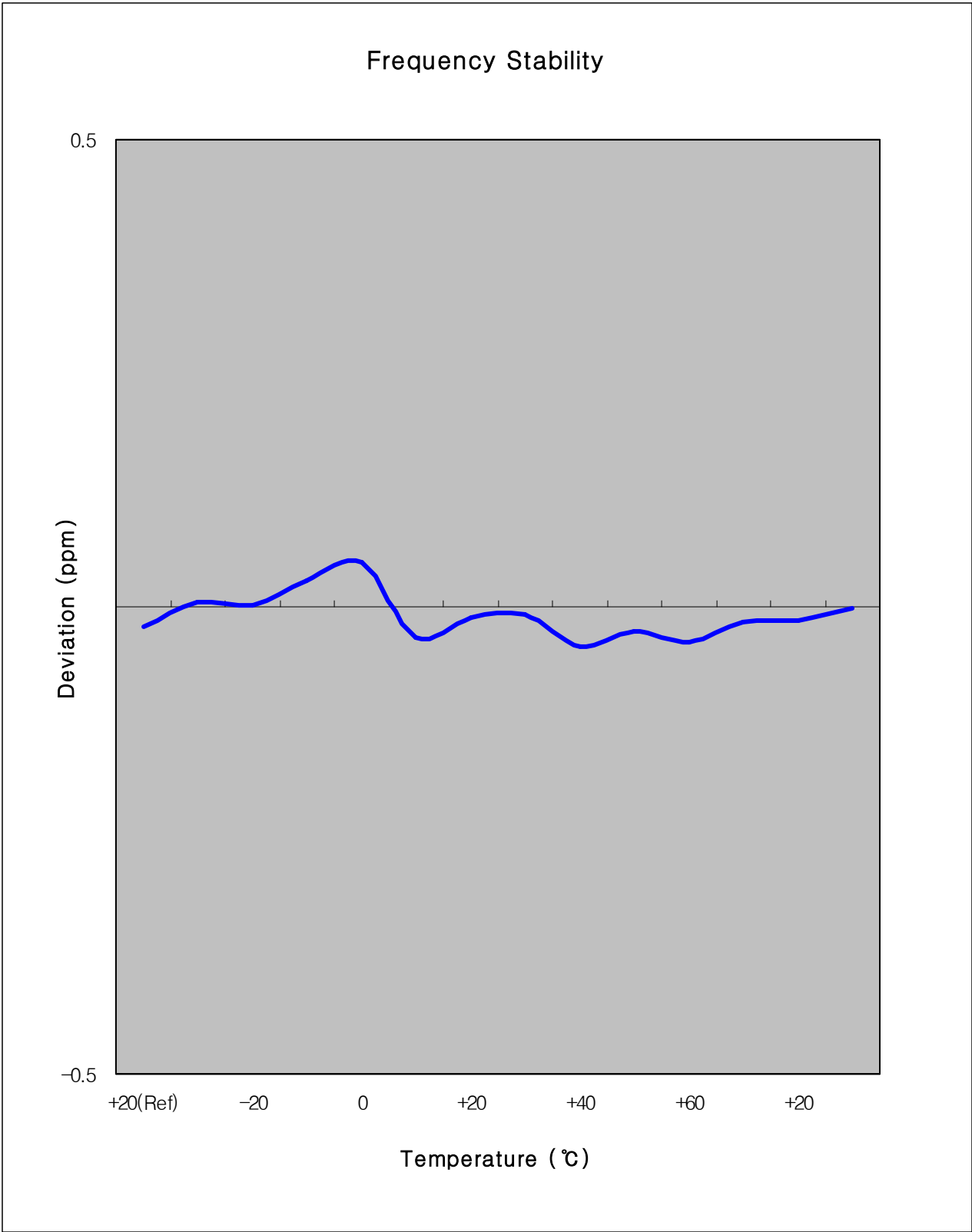
The EUT is tested down to the battery end point

6.7.3 CDMA Frequency Stability Graph



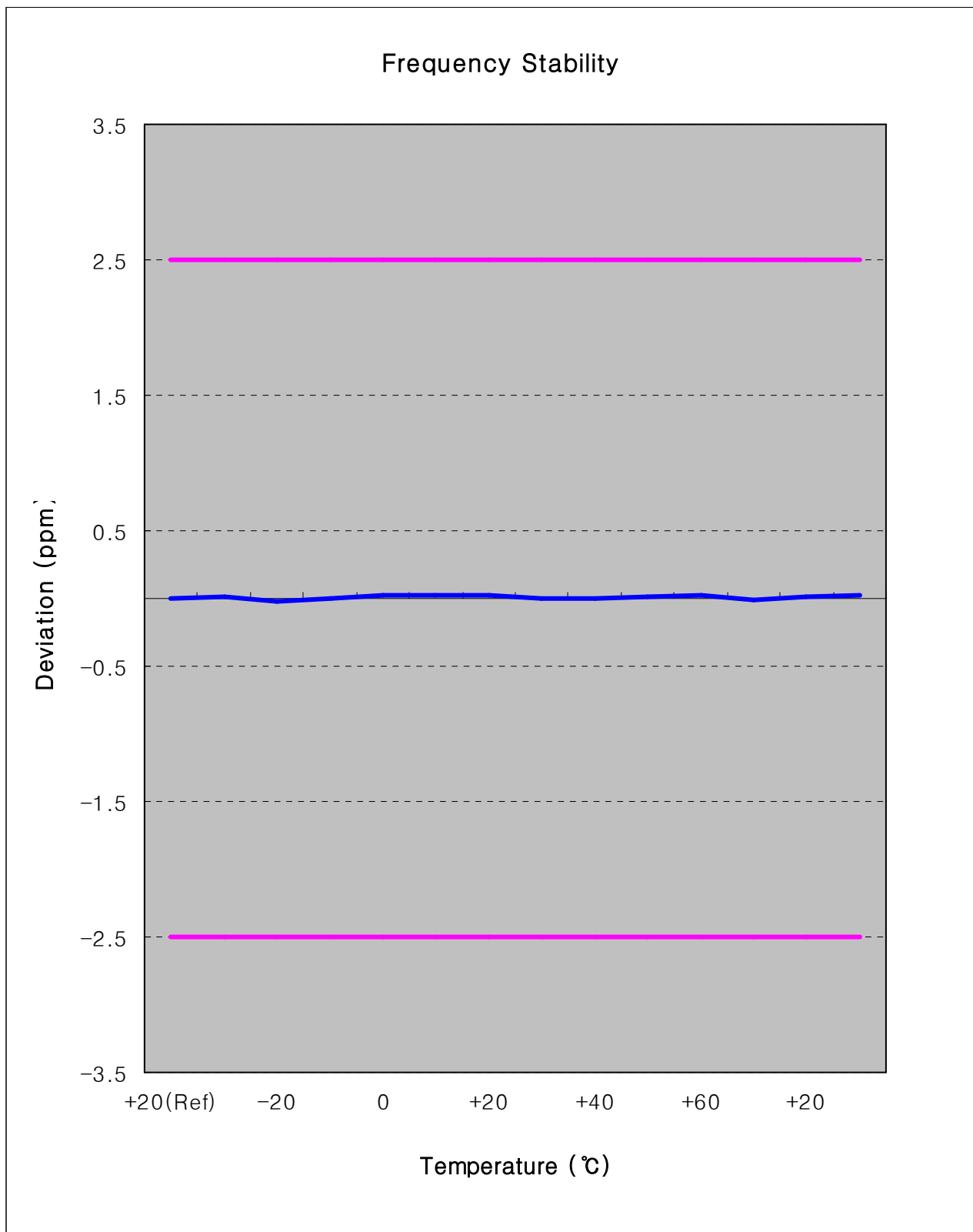
– End of page –

Zoom In



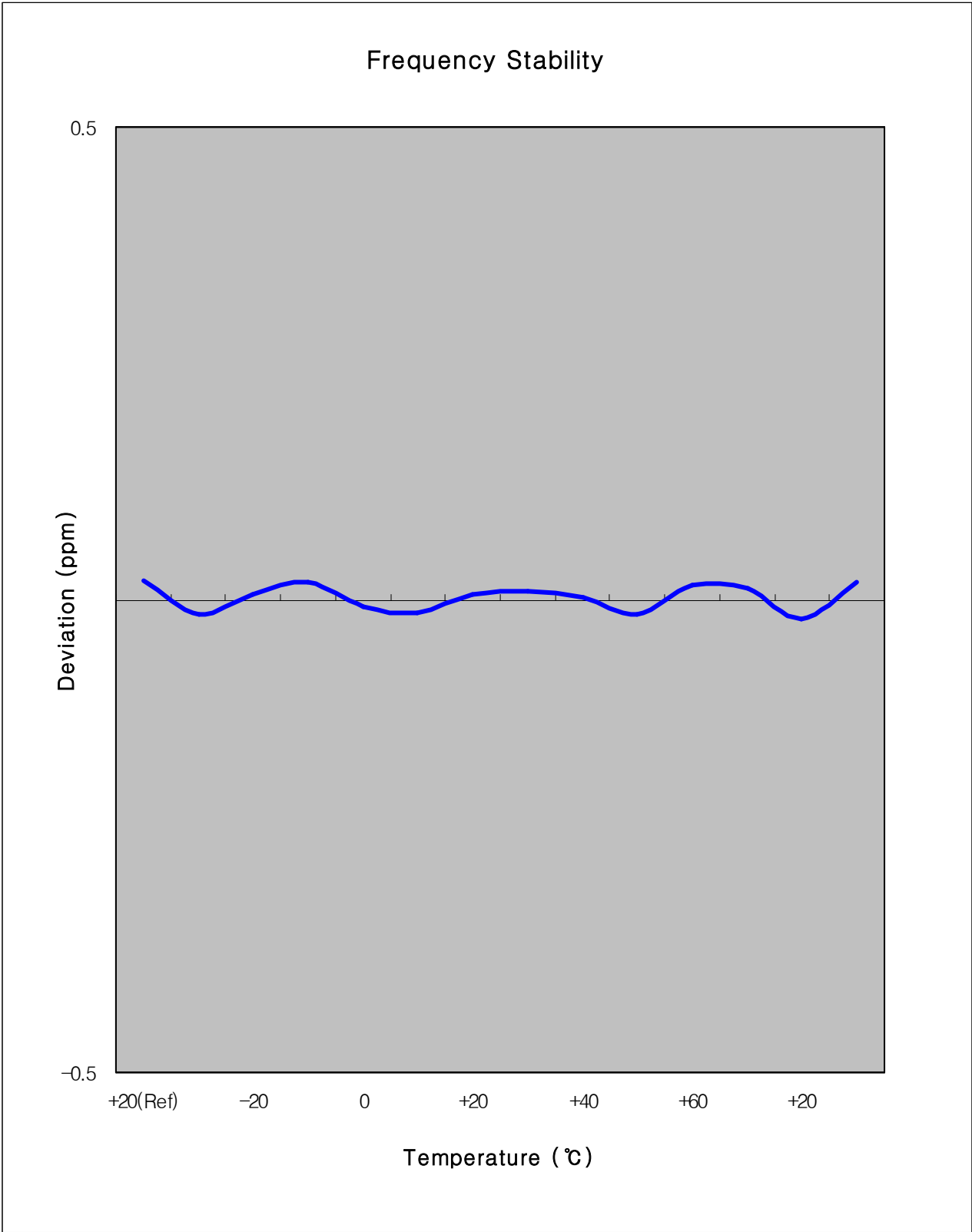
– End of page –

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

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 –

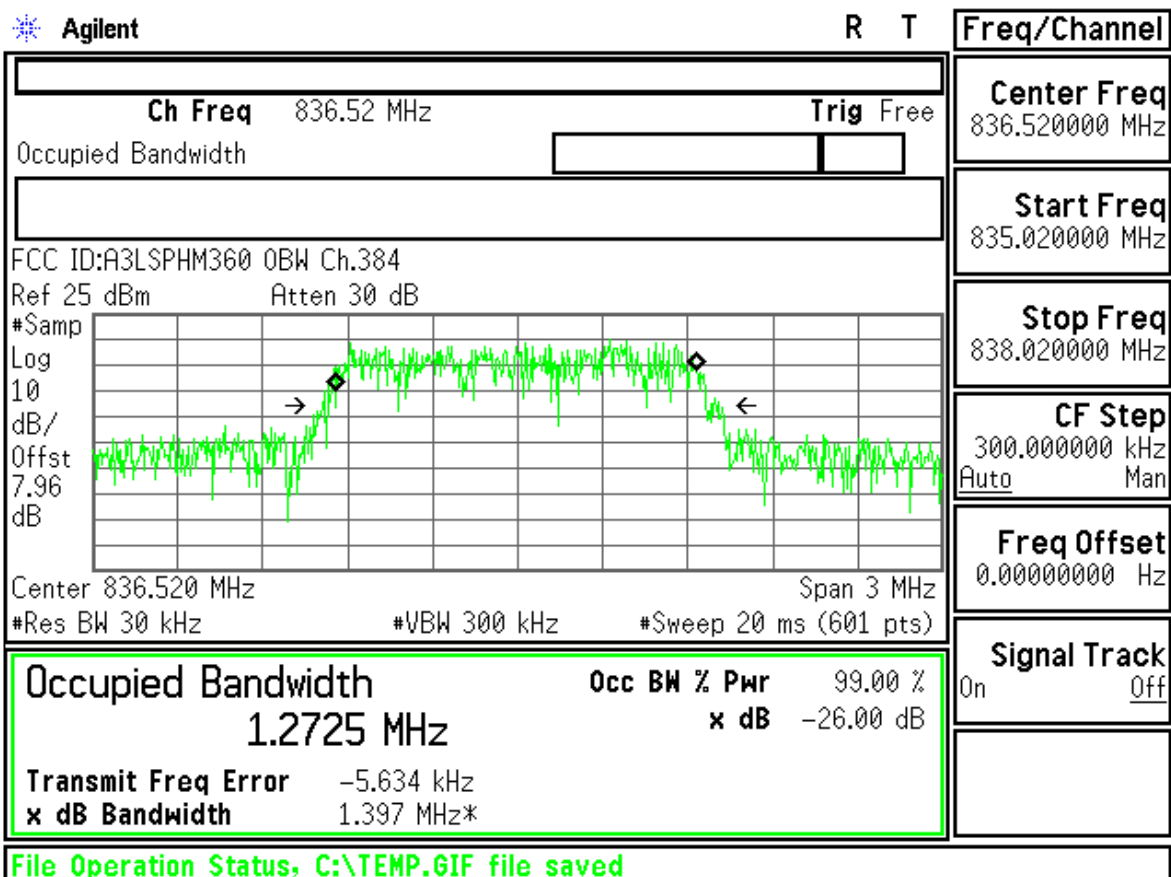
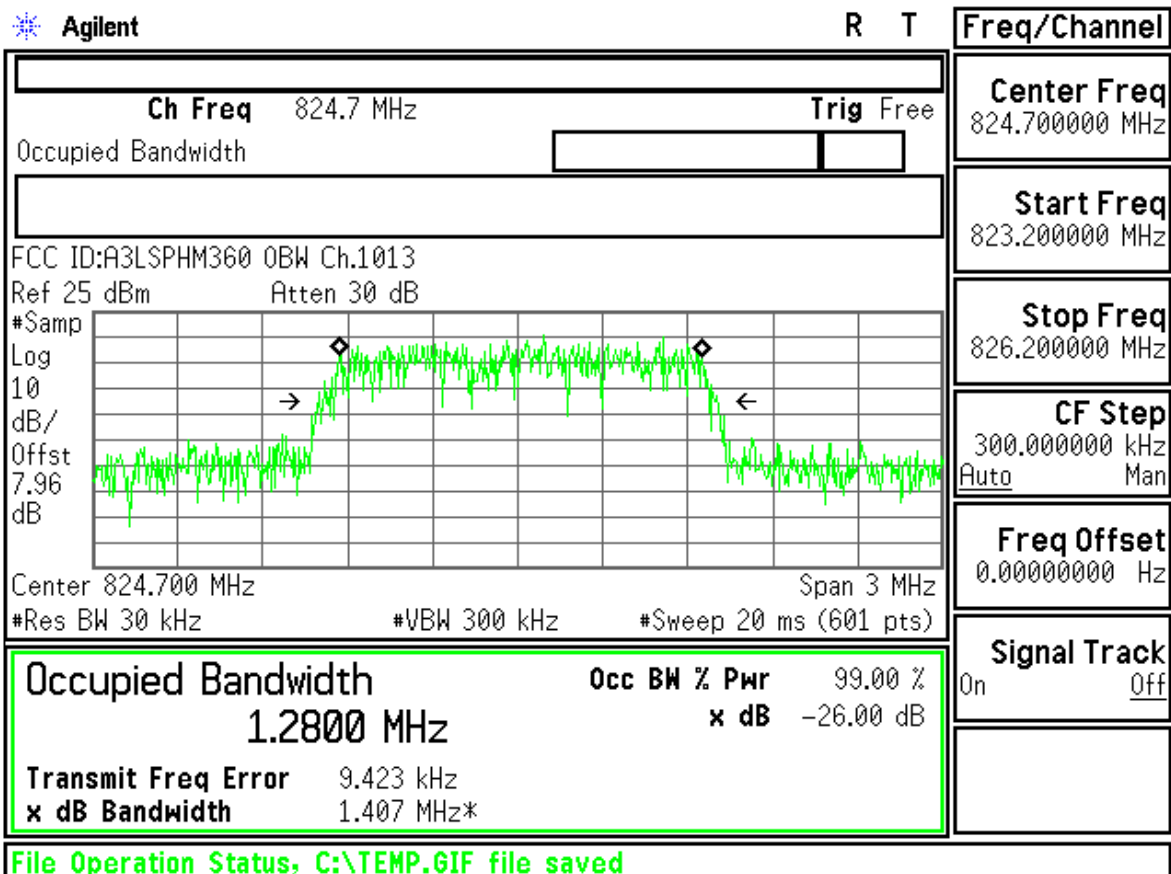


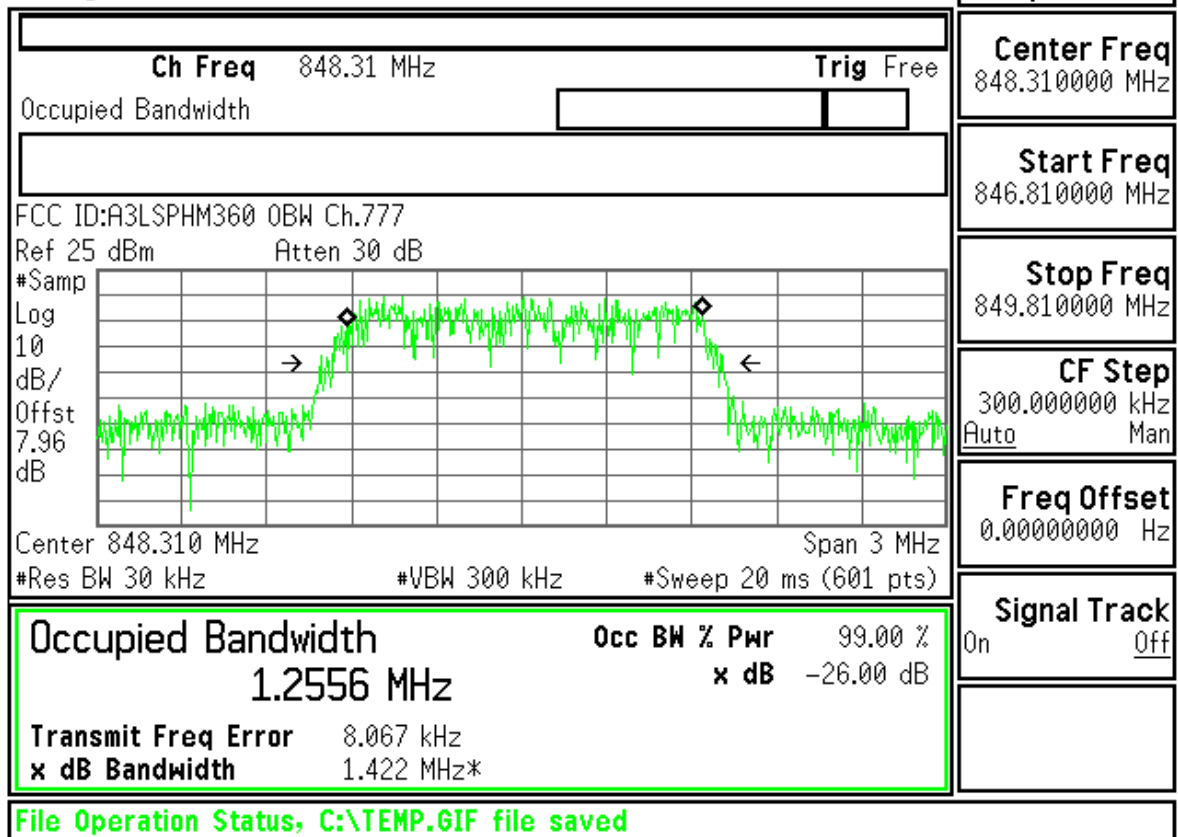
8. CONCLUSION

The data collected shows that the SAMSUNG Cellular/PCS CDMA Phone with Bluetooth
FCC ID : A3LSPHM360 complies with all the requirements of Parts 2, 22, 24 of the FCC Rules.

- End of page -

9. TEST PLOTS





Agilent

R L

Freq/Channel

FCC ID:A3LSPHM360 Cond Spur Ch.1013

Ref 25 dBm

Atten 30 dB

#Peak

Log

10

dB/

Offst

7.96

dB

DI

-13.0

dBm

#LgAv

M1 S2

S3 FC

£(f):

FTun

Swp

AC Coupled: unspecified below 20 MHz

Center 1.255 GHz

Span 2.49 GHz

#Res BW 1 MHz

#VBW 1 MHz

Sweep 4.16 ms (601 pts)

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

Invalid suffix

Agilent

R L

Freq/Channel

FCC ID:A3LSPHM360 Cond Spur Ch.1013

Mkr1 602.0 MHz

Ref 25 dBm

Atten 30 dB

-43.36 dBm

#Peak

Log

10

dB/

Offst

7.96

dB

DI

-13.0

dBm

#LgAv

M1 S2

S3 FC

£(f):

FTun

Swp

AC Coupled: unspecified below 20 MHz

Center 367.4 MHz

Span 714.7 MHz

#Res BW 1 MHz

#VBW 1 MHz

Sweep 1.2 ms (601 pts)

Center Freq
367.350000 MHz

Start Freq
10.0000000 MHz

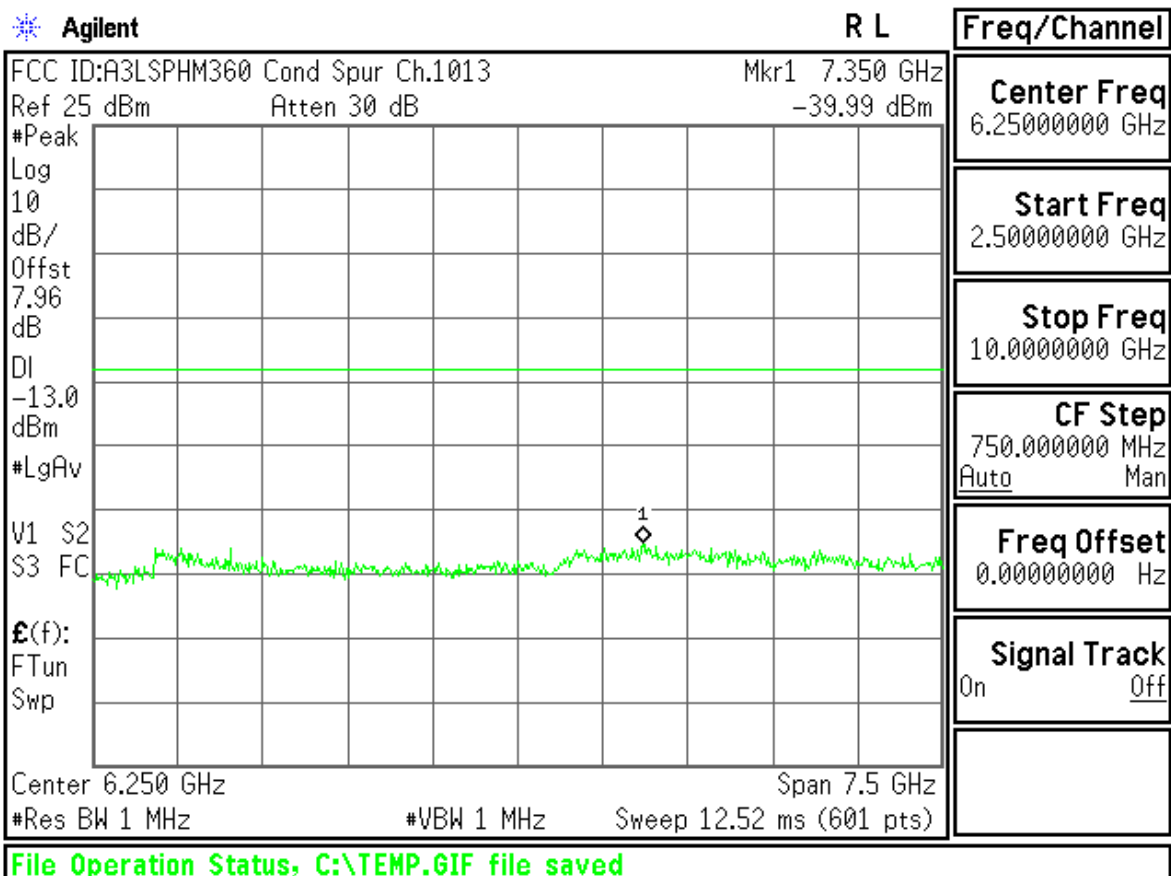
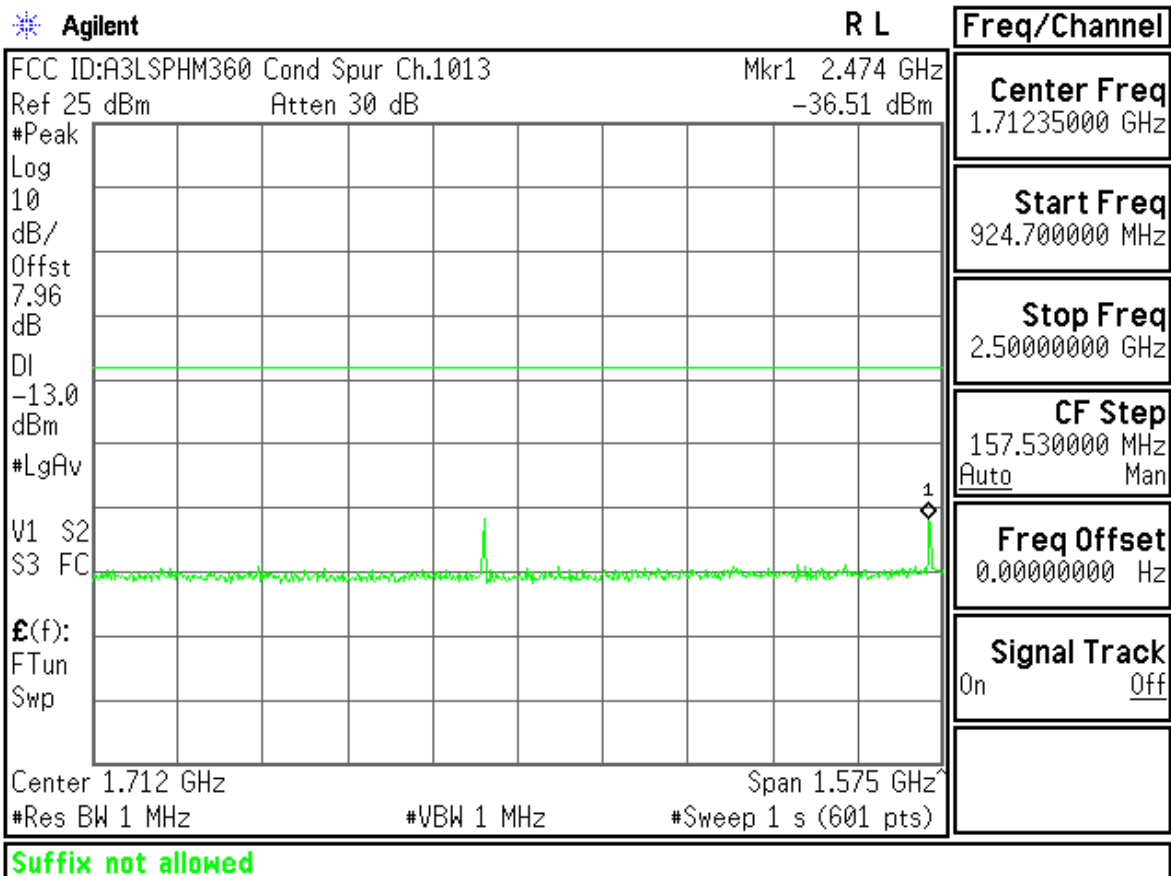
Stop Freq
724.700000 MHz

CF Step
71.4700000 MHz
Auto Man

Freq Offset
0.00000000 Hz

Signal Track
On Off

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



Agilent

R L

Freq/Channel

FCC ID:A3LSPHM360 Cond Spur Ch.384

Ref 25 dBm

Atten 30 dB

#Peak

Log

10

dB/

Offst

7.96

dB

DI

-13.0

dBm

#LgAv

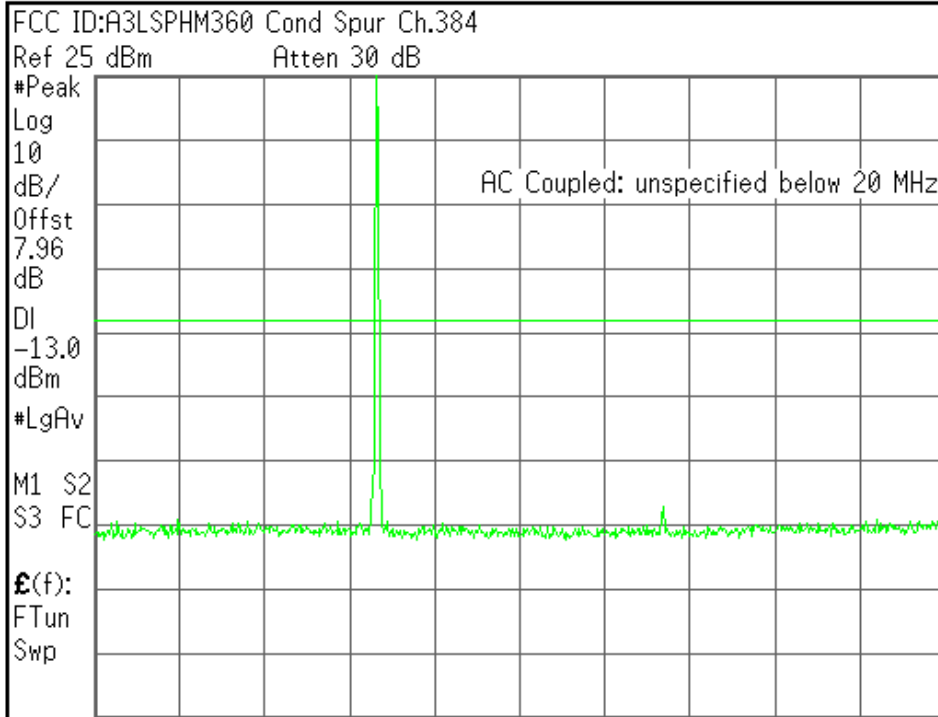
M1 S2

S3 FC

£(f):

FTun

Swp



Center 1.255 GHz

Span 2.49 GHz

#Res BW 1 MHz

#VBW 1 MHz

Sweep 4.16 ms (601 pts)

Center Freq
1.25500000 GHz

Start Freq
10.00000000 MHz

Stop Freq
2.50000000 GHz

CF Step
249.0000000 MHz
Auto Man

Freq Offset
0.00000000 Hz

Signal Track
On Off

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

Agilent

R L

Freq/Channel

FCC ID:A3LSPHM360 Cond Spur Ch.384

Ref 25 dBm

Atten 30 dB

Mkr1 634.8 MHz

-44.08 dBm

#Peak

Log

10

dB/

Offst

7.96

dB

DI

-13.0

dBm

#LgAv

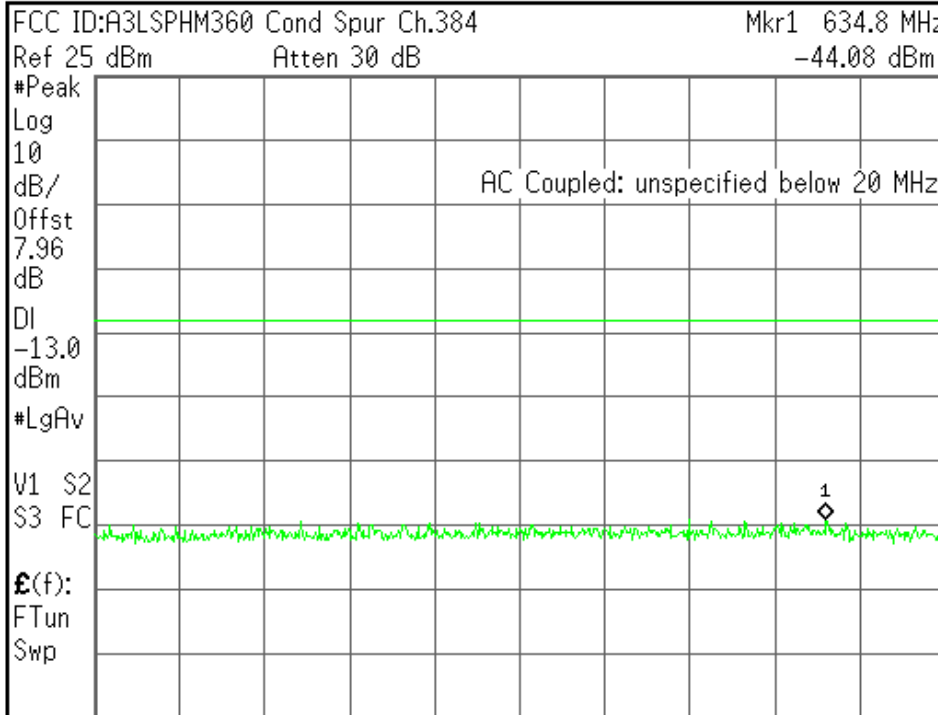
V1 S2

S3 FC

£(f):

FTun

Swp



Center 373.3 MHz

Span 726.5 MHz

#Res BW 1 MHz

#VBW 1 MHz

Sweep 1.24 ms (601 pts)

Center Freq
373.260000 MHz

Start Freq
10.00000000 MHz

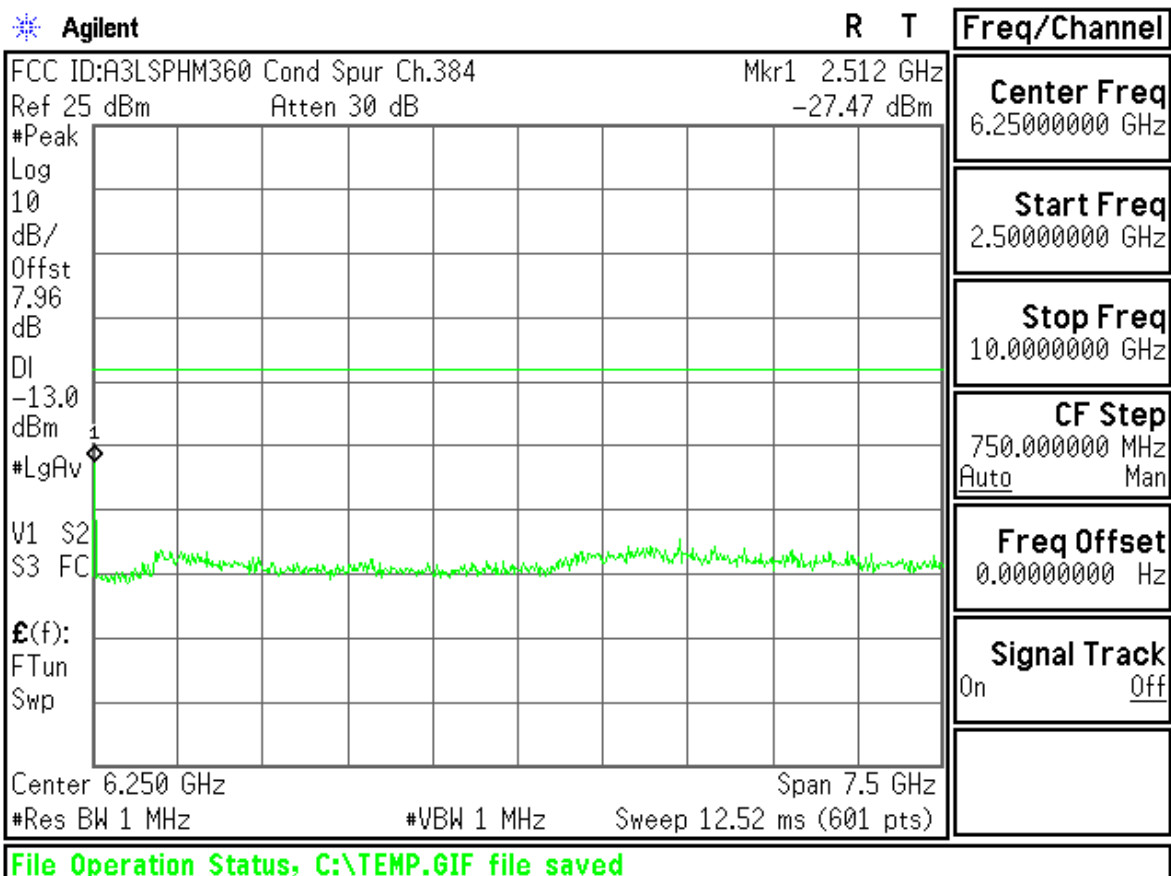
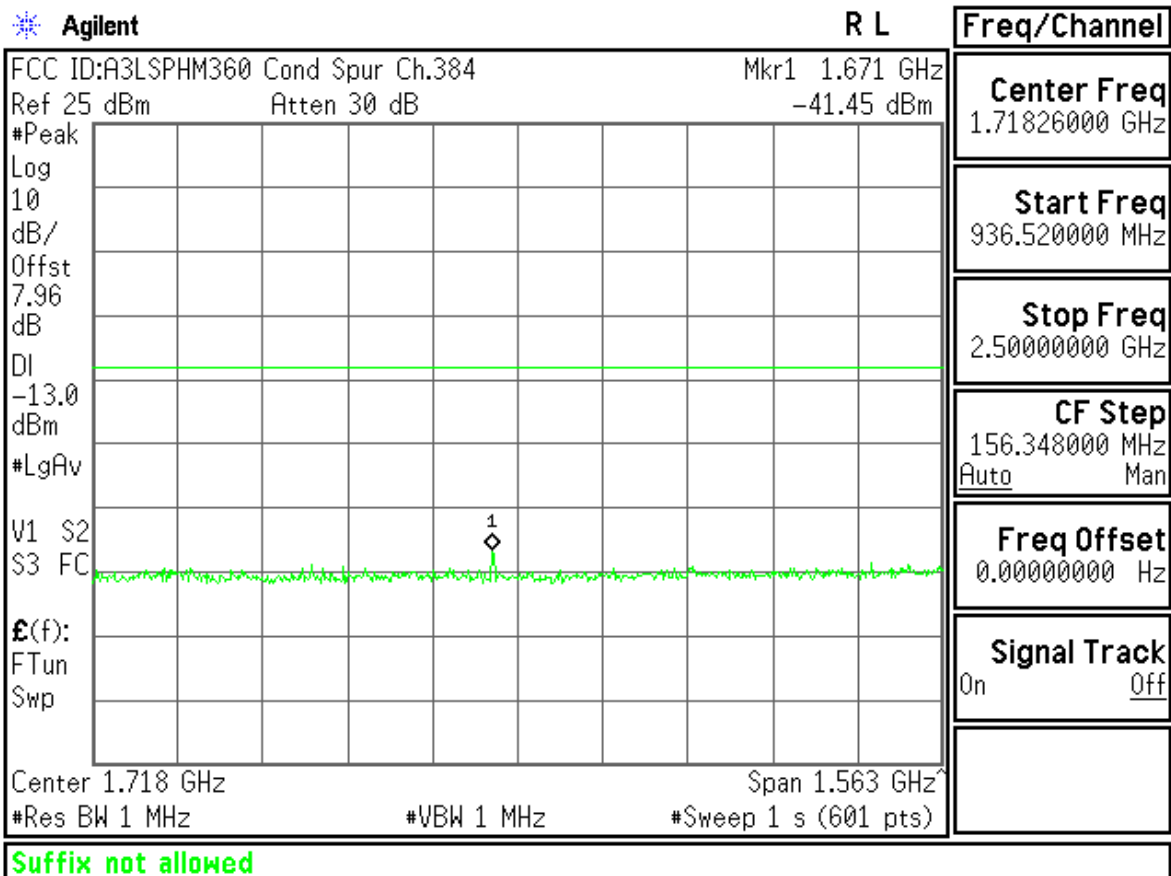
Stop Freq
736.520000 MHz

CF Step
72.6520000 MHz
Auto Man

Freq Offset
0.00000000 Hz

Signal Track
On Off

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



Agilent

R L

Freq/Channel

FCC ID:A3LSPHM360 Cond Spur Ch.777

Ref 25 dBm

Atten 30 dB

#Peak

Log

10

dB/

Offst

7.96

dB

DI

-13.0

dBm

#LgAv

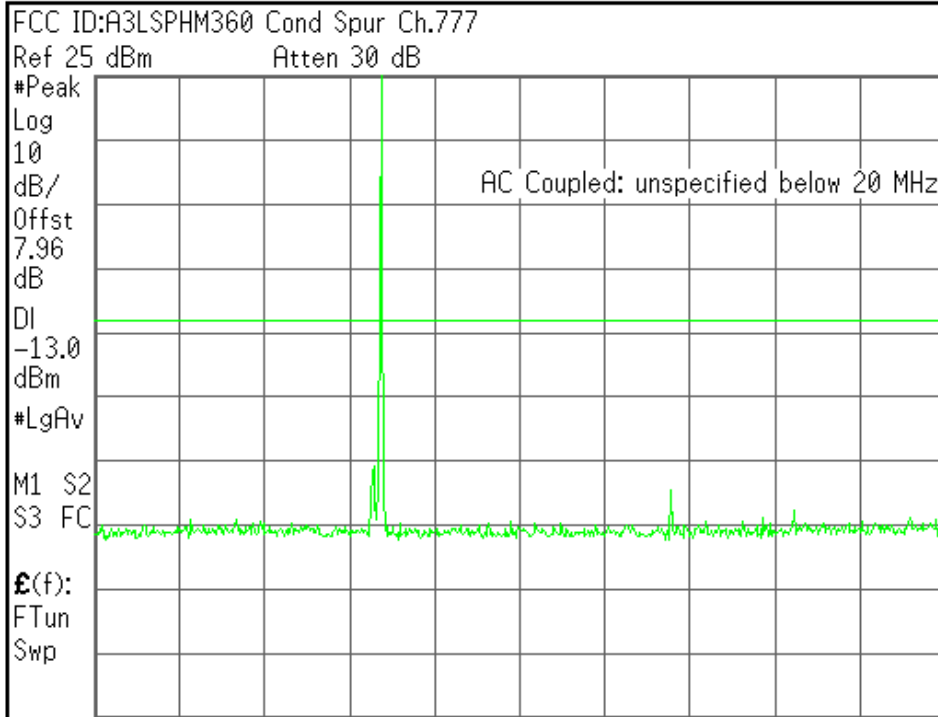
M1 S2

S3 FC

£(f):

FTun

Swp



Center 1.255 GHz

Span 2.49 GHz

#Res BW 1 MHz

#VBW 1 MHz

Sweep 4.16 ms (601 pts)

Center Freq
1.25500000 GHz

Start Freq
10.00000000 MHz

Stop Freq
2.50000000 GHz

CF Step
249.000000 MHz
Auto Man

Freq Offset
0.00000000 Hz

Signal Track
On Off

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

Agilent

R L

Freq/Channel

FCC ID:A3LSPHM360 Cond Spur Ch.777

Ref 25 dBm

Atten 30 dB

Mkr1 737.2 MHz

-44.12 dBm

#Peak

Log

10

dB/

Offst

7.96

dB

DI

-13.0

dBm

#LgAv

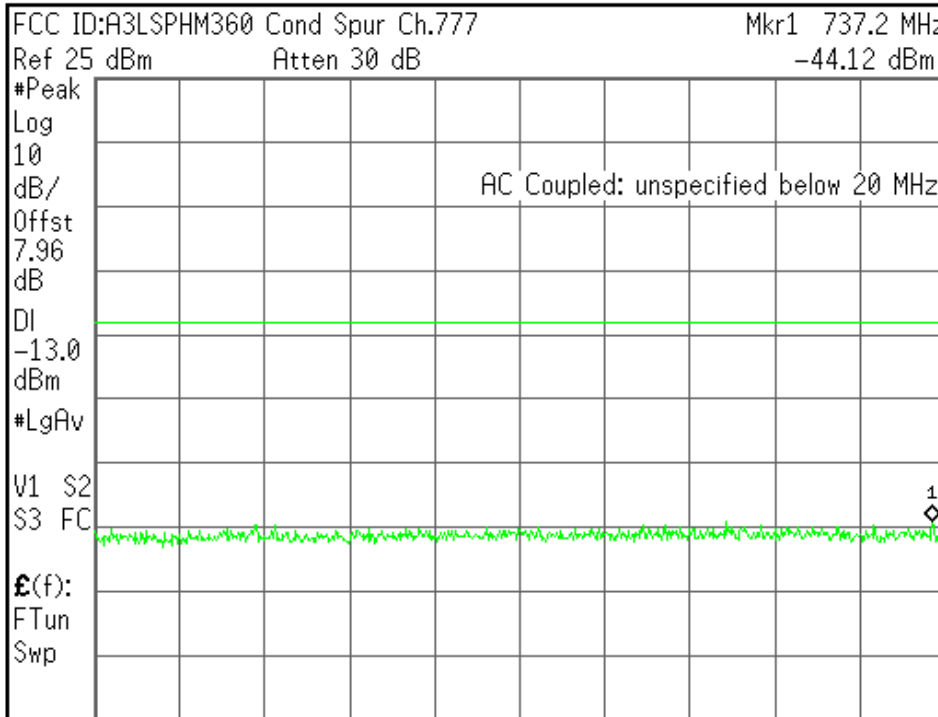
V1 S2

S3 FC

£(f):

FTun

Swp



Center 379.2 MHz

Span 738.3 MHz

#Res BW 1 MHz

#VBW 1 MHz

Sweep 1.24 ms (601 pts)

Center Freq
379.155000 MHz

Start Freq
10.00000000 MHz

Stop Freq
748.310000 MHz

CF Step
73.8310000 MHz
Auto Man

Freq Offset
0.00000000 Hz

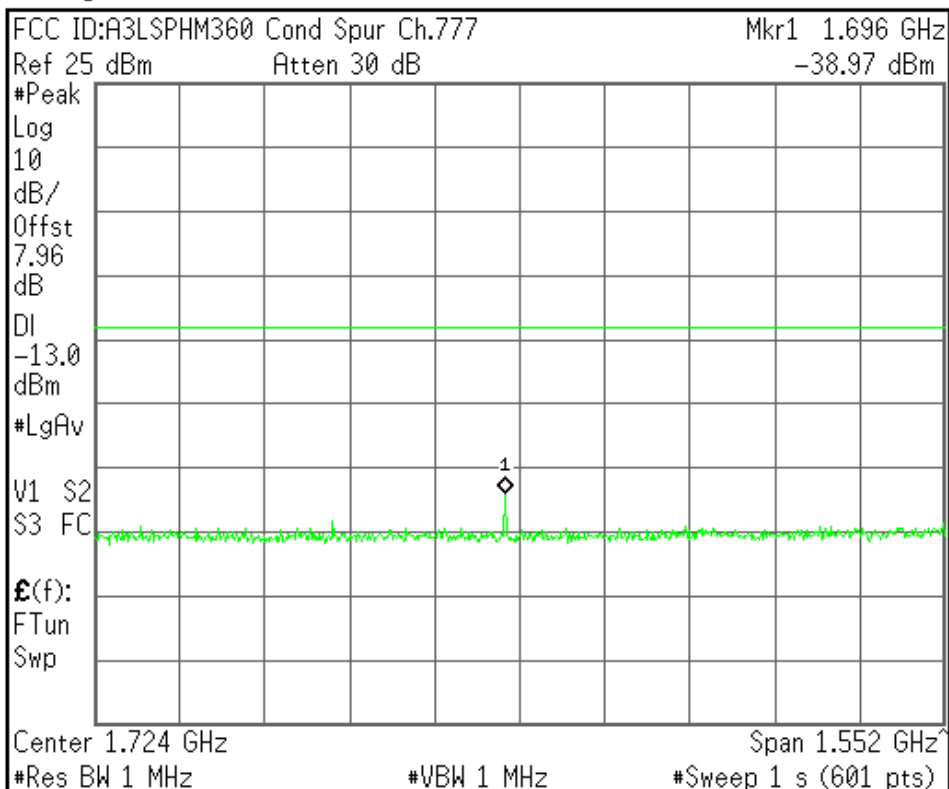
Signal Track
On Off

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

Agilent

R T

Freq/Channel



Center Freq
1.72415500 GHz

Start Freq
948.310000 MHz

Stop Freq
2.50000000 GHz

CF Step
155.169000 MHz
Auto Man

Freq Offset
0.00000000 Hz

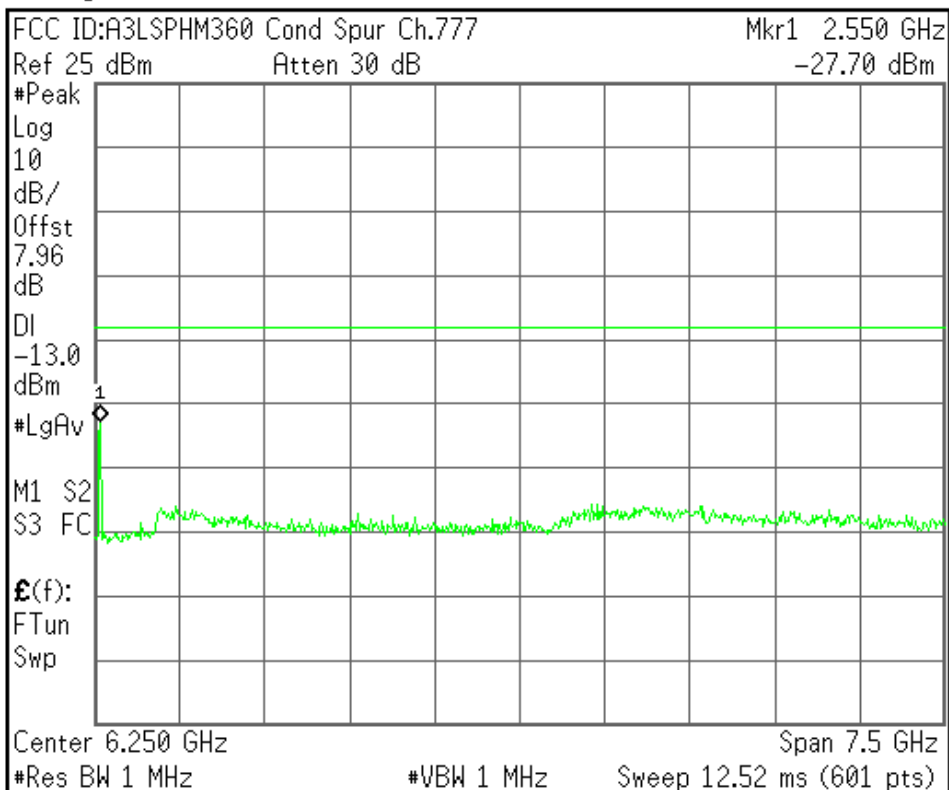
Signal Track
On Off

Suffix not allowed

Agilent

R L

Freq/Channel



Center Freq
6.25000000 GHz

Start Freq
2.50000000 GHz

Stop Freq
10.00000000 GHz

CF Step
750.000000 MHz
Auto Man

Freq Offset
0.00000000 Hz

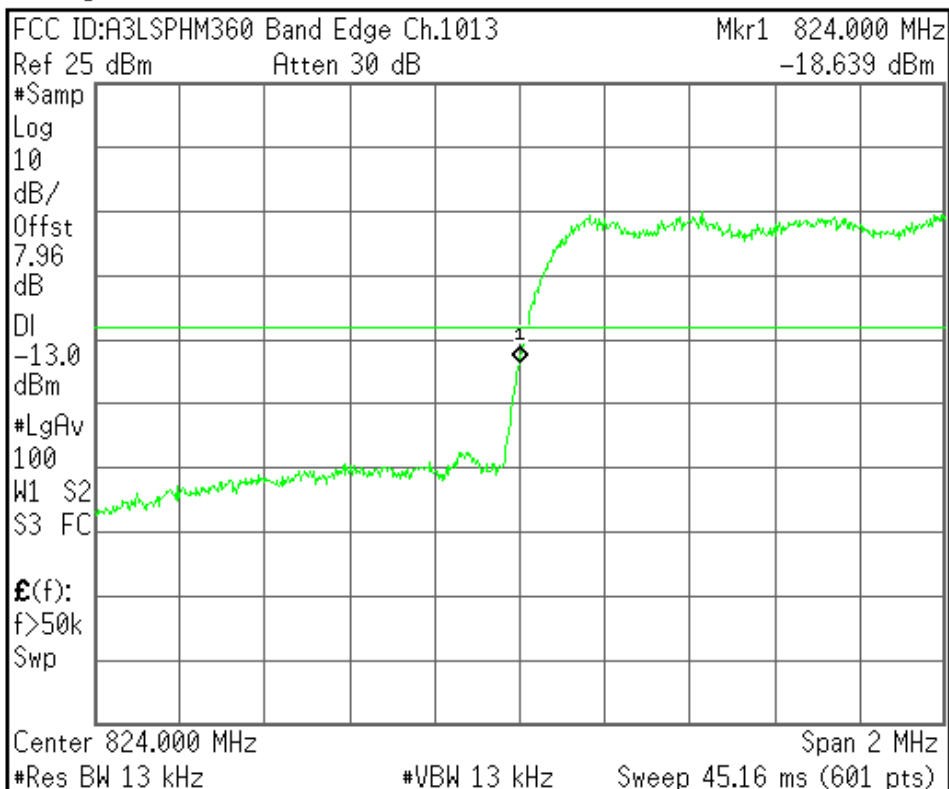
Signal Track
On Off

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

Agilent

R T

Freq/Channel



Center Freq
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

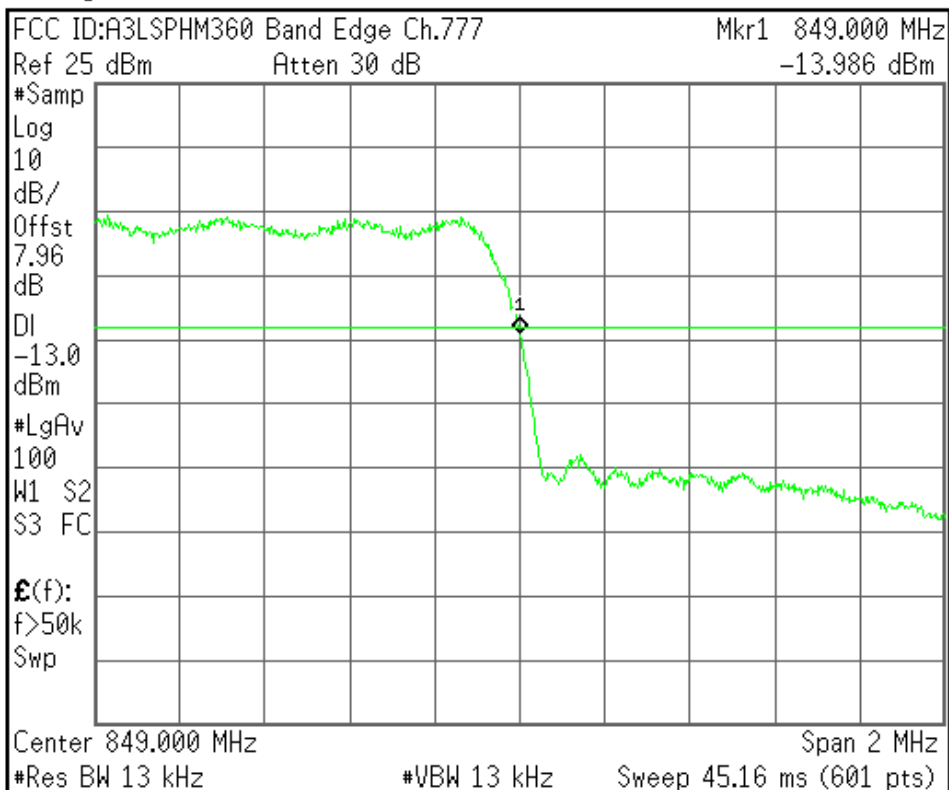
Signal Track
On Off

Invalid suffix

Agilent

R L

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

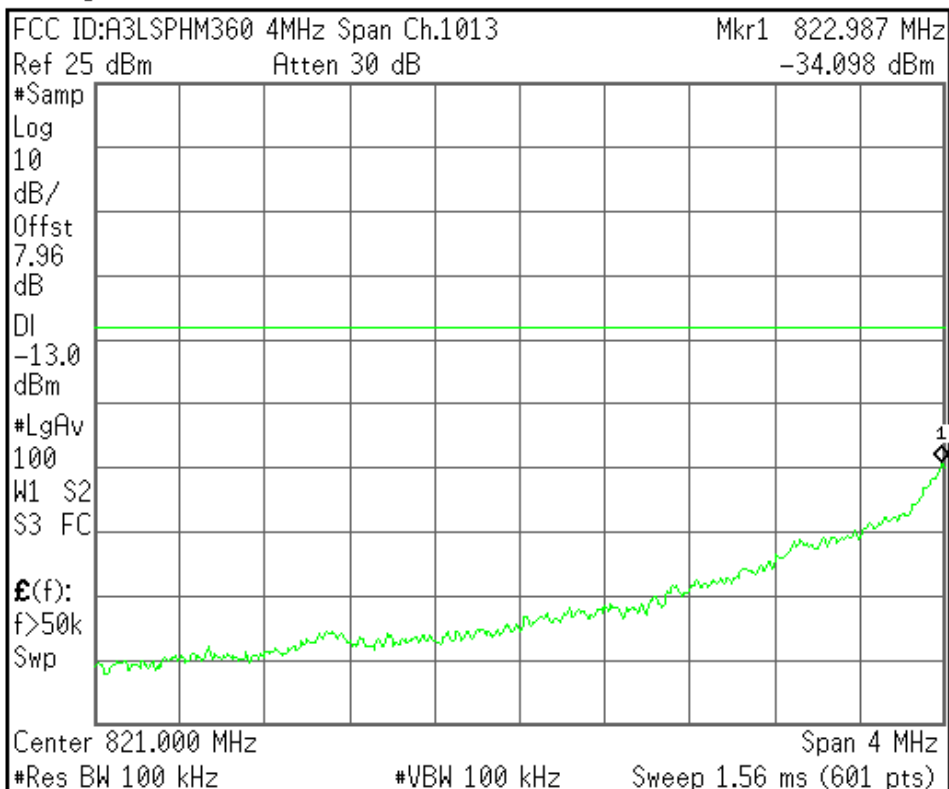
Signal Track
On Off

Invalid suffix

Agilent

R T

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

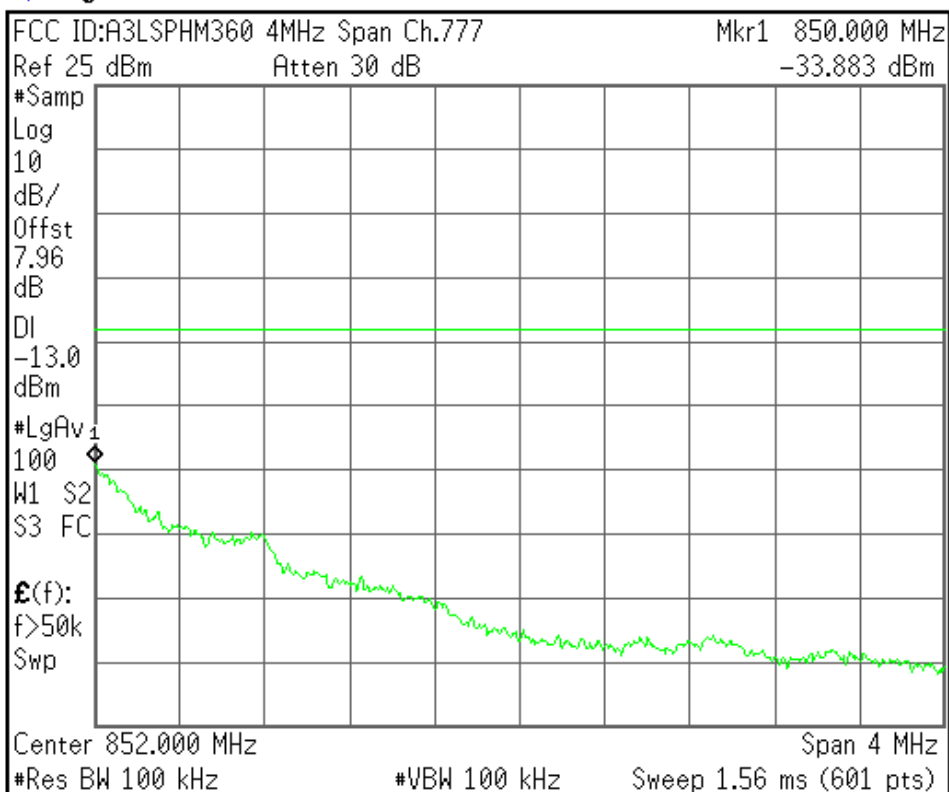
Signal Track
On Off

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

Agilent

R T

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

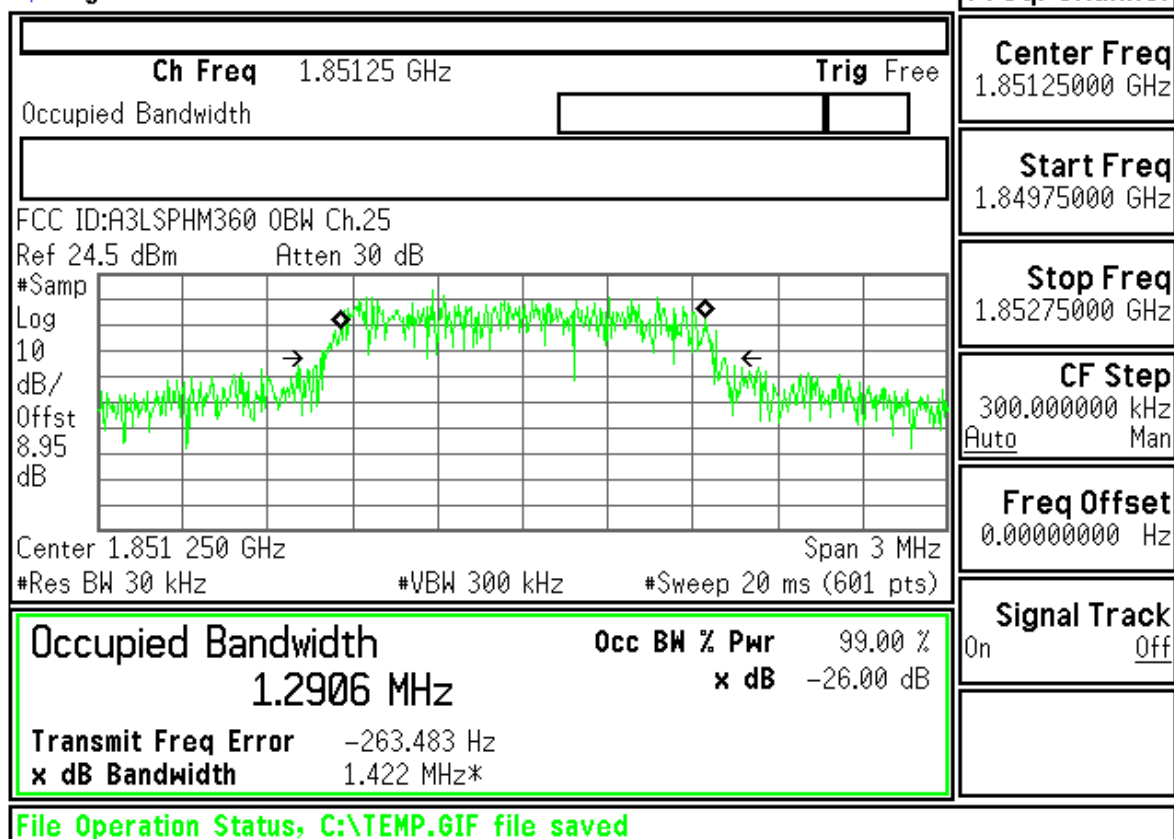
Signal Track
On Off

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

 Agilent

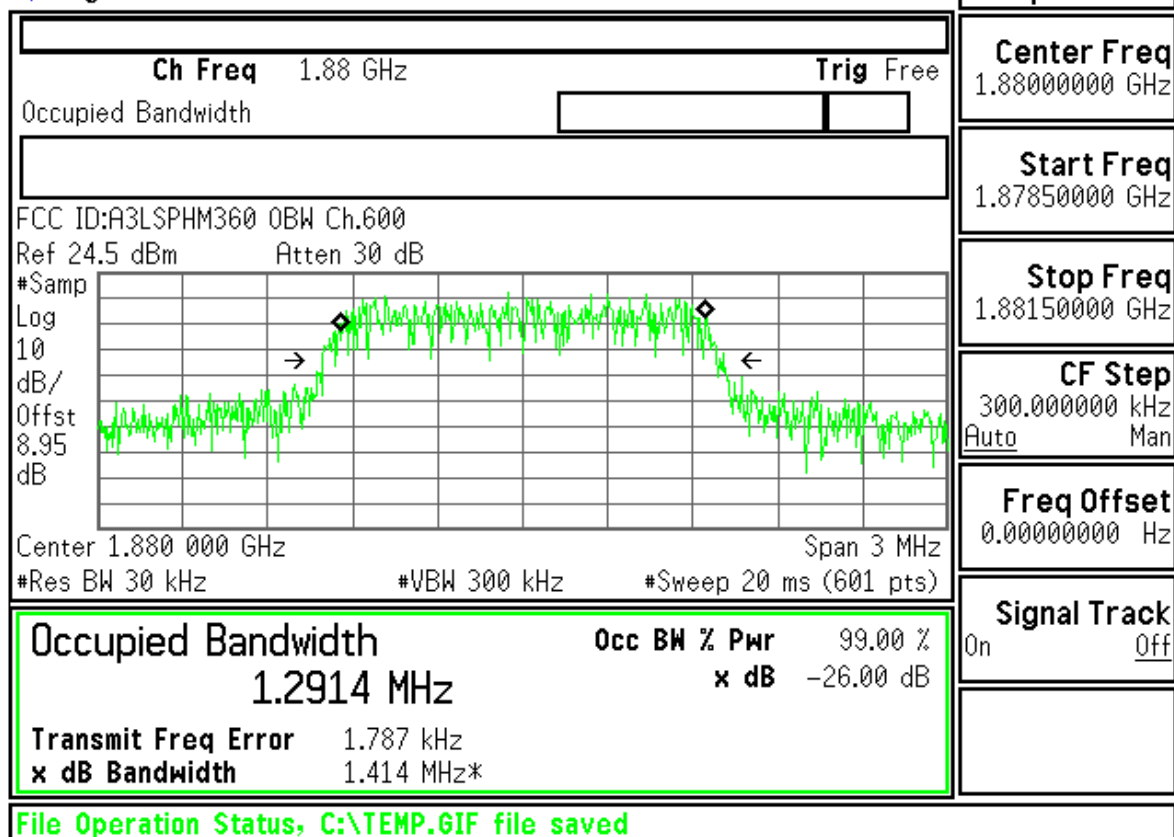
R T

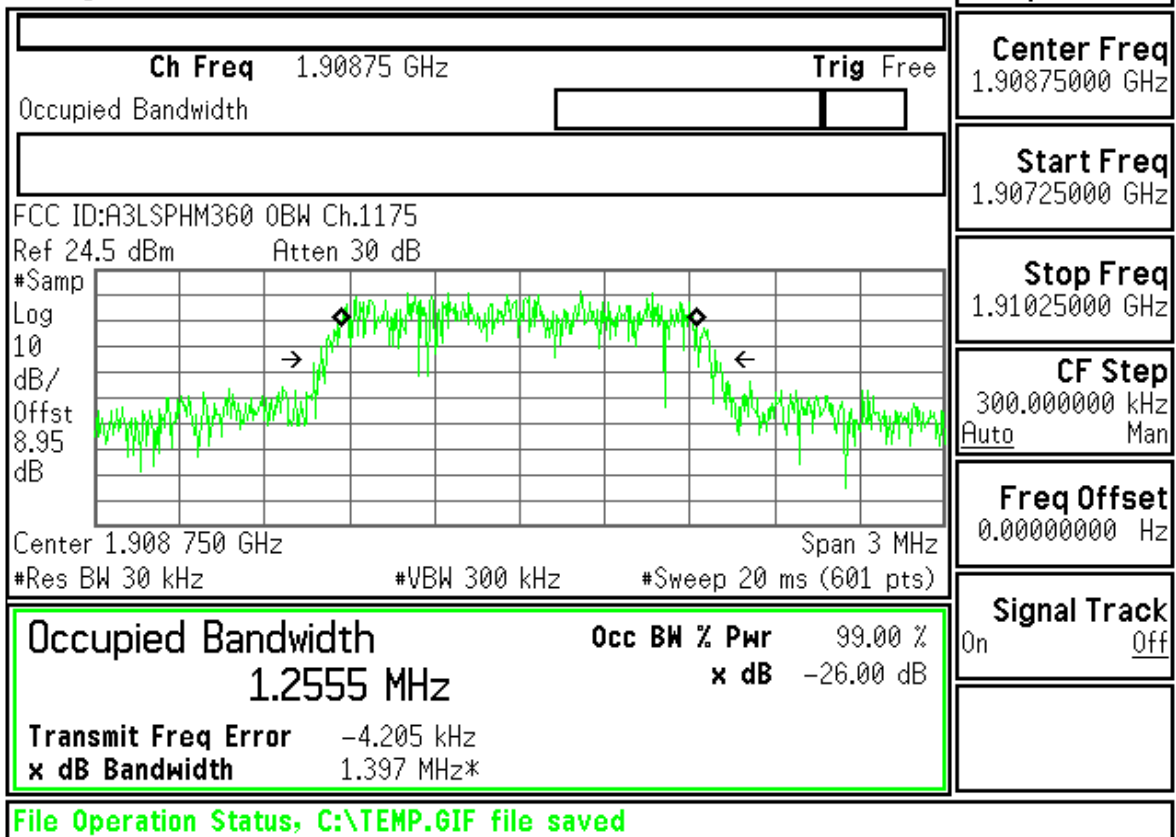
Freq/Channel


 Agilent

R T

Freq/Channel





Agilent

R L

Freq/Channel

FCC ID:A3LSPHM360 Cond Spur Ch.25
Ref 24.5 dBm Atten 30 dB



Center 1.255 GHz Span 2.49 GHz
#Res BW 1 MHz #VBW 1 MHz Sweep 4.16 ms (601 pts)

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

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

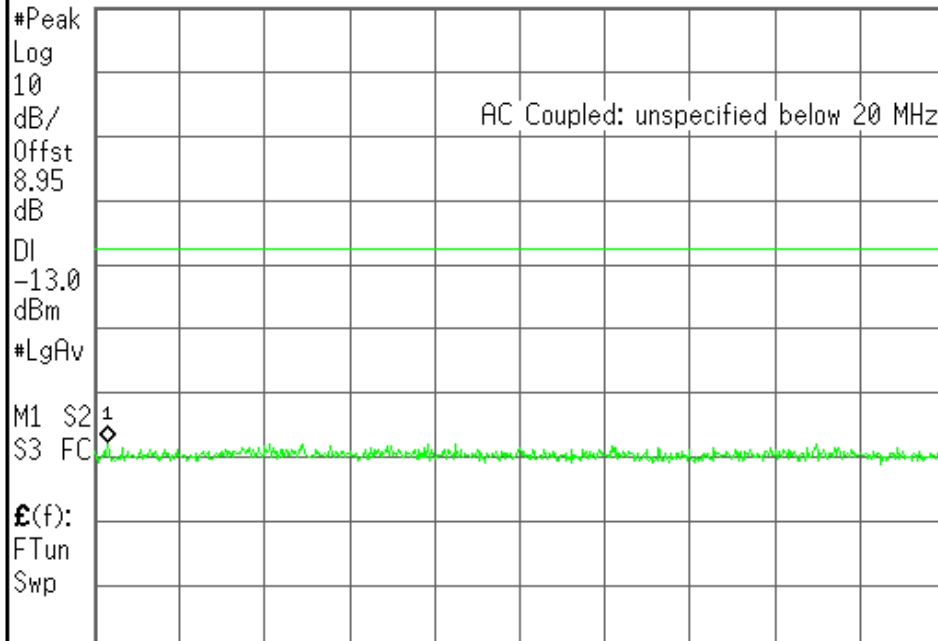
Agilent

R L

Freq/Channel

FCC ID:A3LSPHM360 Cond Spur Ch.25
Ref 24.5 dBm Atten 30 dB

Mkr1 36 MHz
-43.22 dBm



Center 881 MHz Span 1.741 GHz
#Res BW 1 MHz #VBW 1 MHz Sweep 2.92 ms (601 pts)

Center Freq
880.625000 MHz

Start Freq
10.0000000 MHz

Stop Freq
1.75125000 GHz

CF Step
174.125000 MHz
Auto Man

Freq Offset
0.00000000 Hz

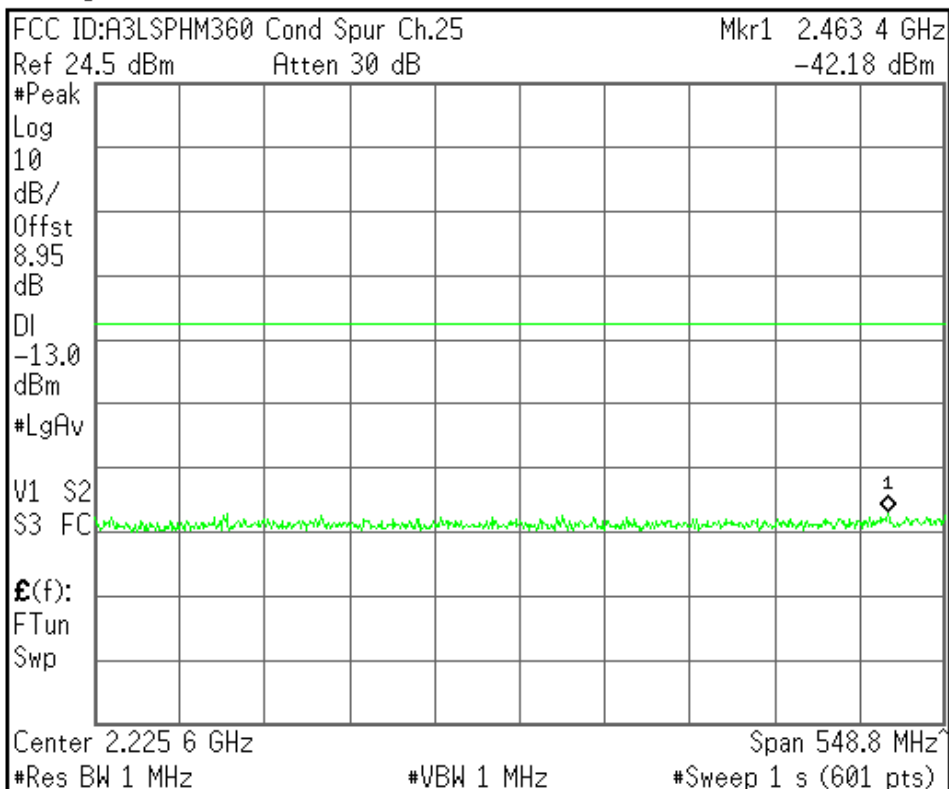
Signal Track
On Off

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

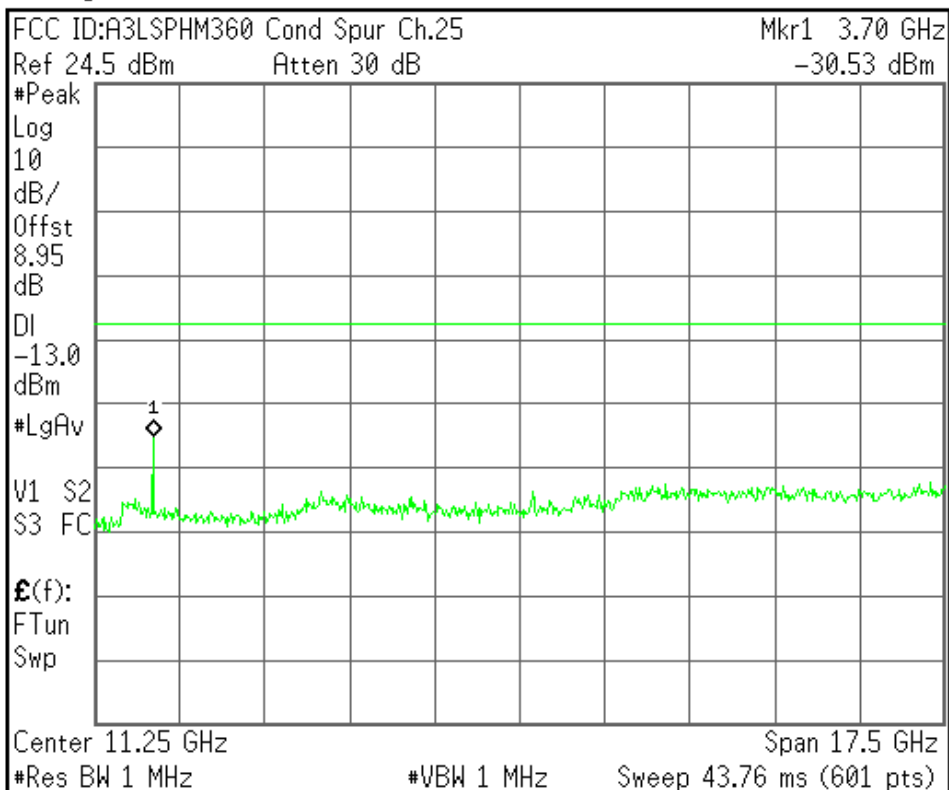
Signal Track
On Off

Suffix not allowed

Agilent

R T

Freq/Channel



Center Freq
11.2500000 GHz

Start Freq
2.50000000 GHz

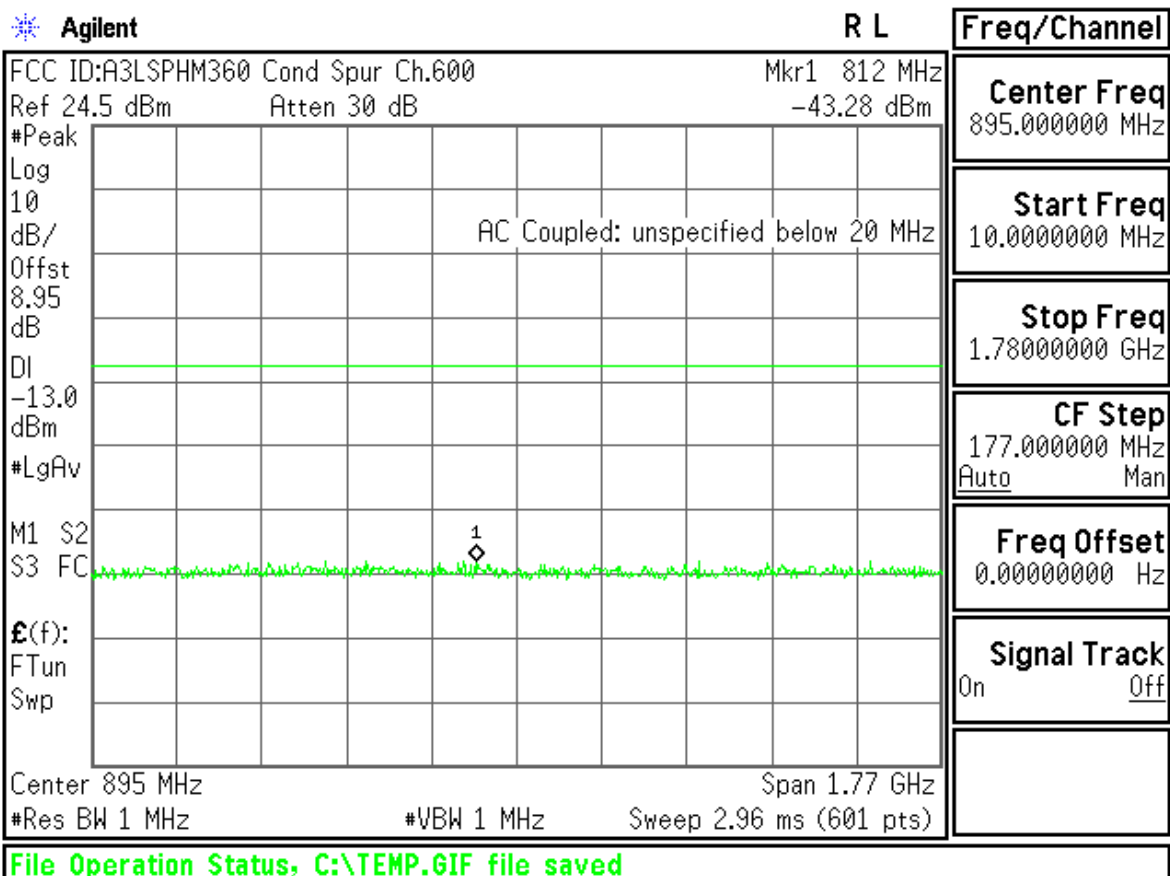
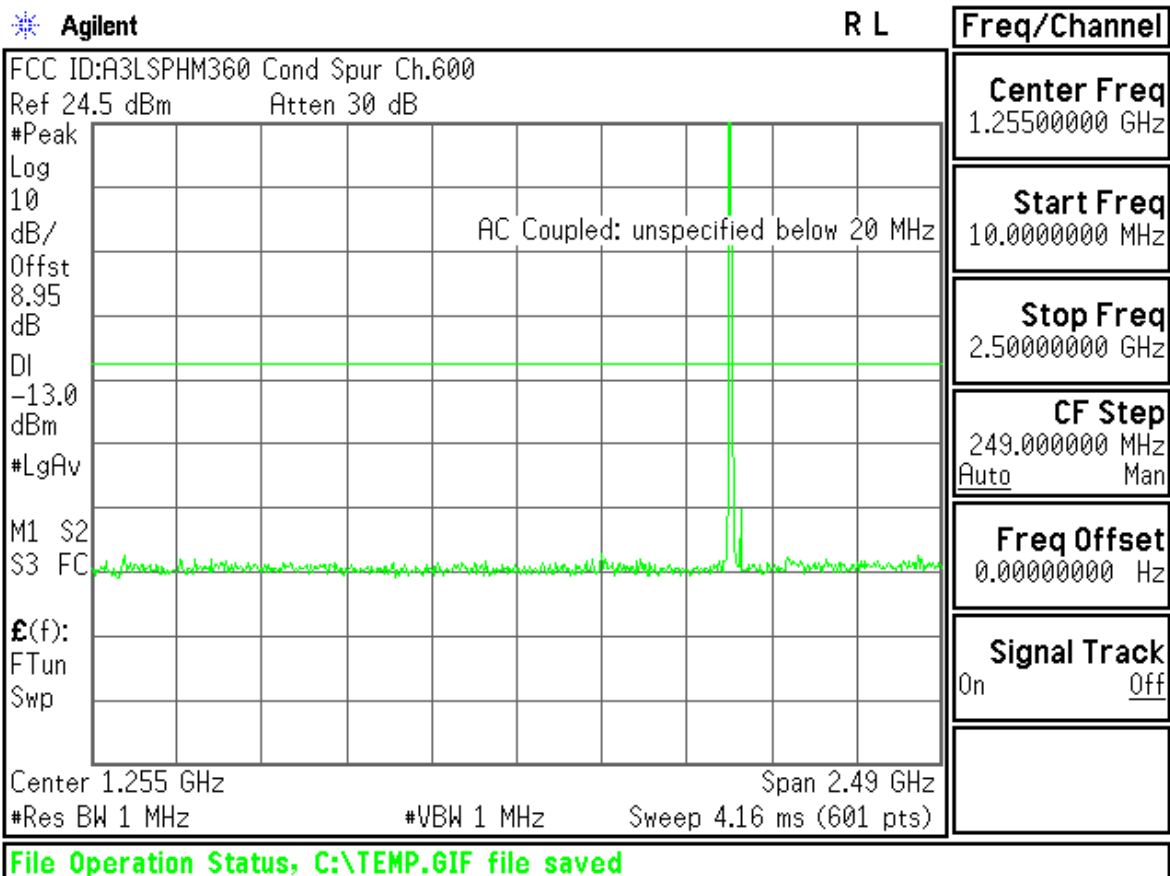
Stop Freq
20.0000000 GHz

CF Step
1.75000000 GHz
Auto Man

Freq Offset
0.00000000 Hz

Signal Track
On Off

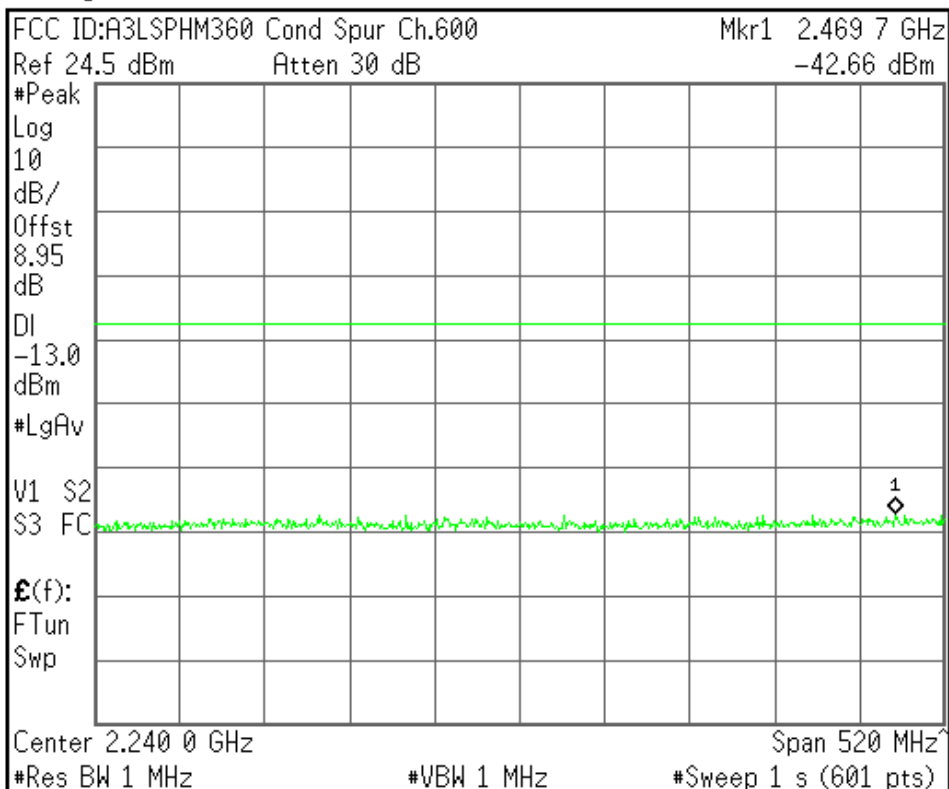
File Operation Status, C:\TEMP.GIF file saved



Agilent

R L

Freq/Channel



Center Freq
2.24000000 GHz

Start Freq
1.98000000 GHz

Stop Freq
2.50000000 GHz

CF Step
52.0000000 MHz
Auto Man

Freq Offset
0.00000000 Hz

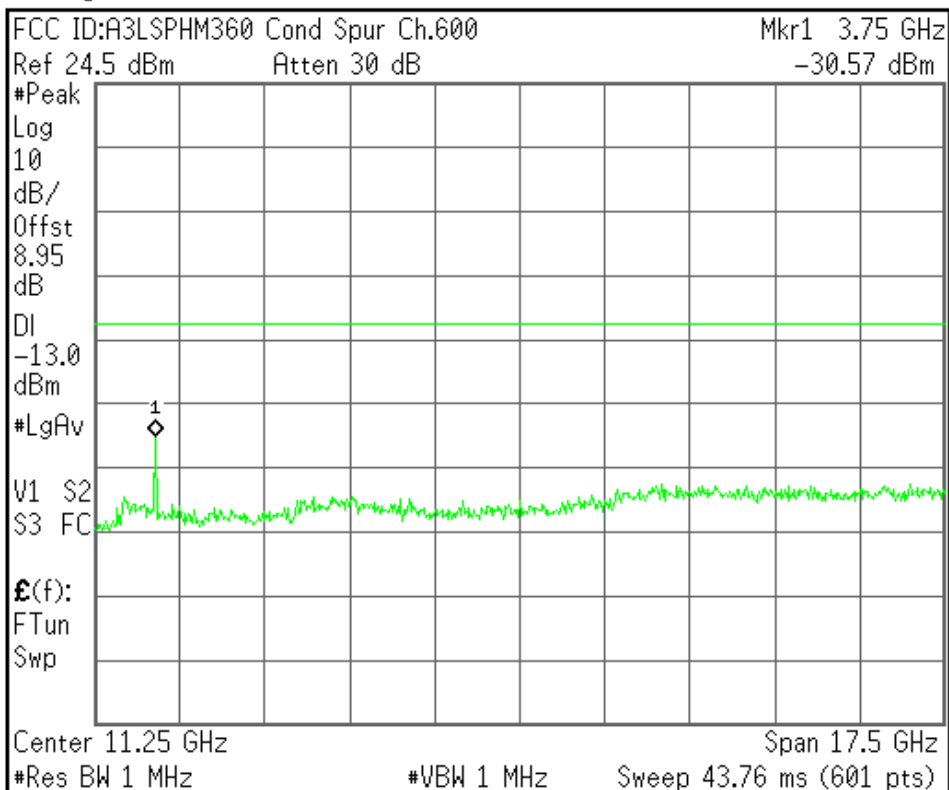
Signal Track
On Off

Suffix not allowed

Agilent

R L

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

Agilent

R L

Freq/Channel

FCC ID:A3LSPHM360 Cond Spur Ch.1175

Ref 24.5 dBm Atten 30 dB

#Peak

Log

10

dB/

Offst

8.95

dB

DI

-13.0

dBm

#LgAv

M1 S2

S3 FC

£(f):

FTun

Swp

AC Coupled: unspecified below 20 MHz

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

Center 1.255 GHz

Span 2.49 GHz

#Res BW 1 MHz

#VBW 1 MHz

Sweep 4.16 ms (601 pts)

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

Agilent

R L

Freq/Channel

FCC ID:A3LSPHM360 Cond Spur Ch.1175

Ref 24.5 dBm Atten 30 dB

Mkr1 208 MHz

-43.24 dBm

#Peak

Log

10

dB/

Offst

8.95

dB

DI

-13.0

dBm

#LgAv

V1 S2

S3 FC

£(f):

FTun

Swp

AC Coupled: unspecified below 20 MHz

Center Freq

909.375000 MHz

Start Freq

10.0000000 MHz

Stop Freq

1.80875000 GHz

CF Step

179.875000 MHz

Auto

Man

Freq Offset

0.00000000 Hz

Signal Track

On

Off

Center 909 MHz

Span 1.799 GHz

#Res BW 1 MHz

#VBW 1 MHz

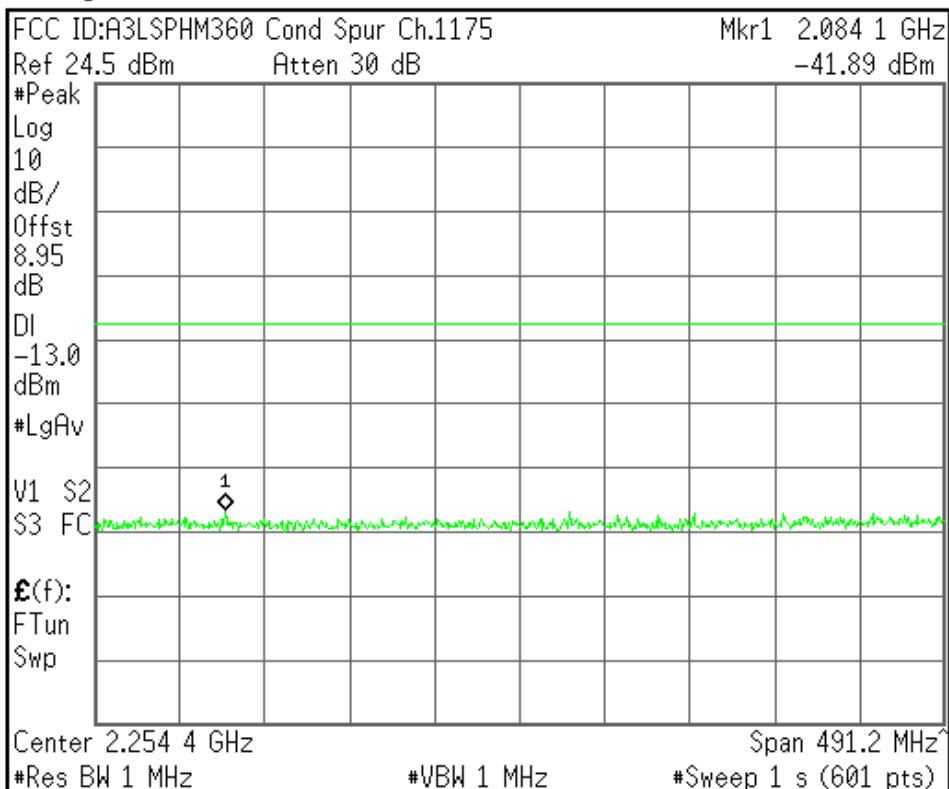
Sweep 3 ms (601 pts)

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

Agilent

R T

Freq/Channel



Center Freq
2.25437500 GHz

Start Freq
2.00875000 GHz

Stop Freq
2.50000000 GHz

CF Step
49.1250000 MHz
Auto Man

Freq Offset
0.00000000 Hz

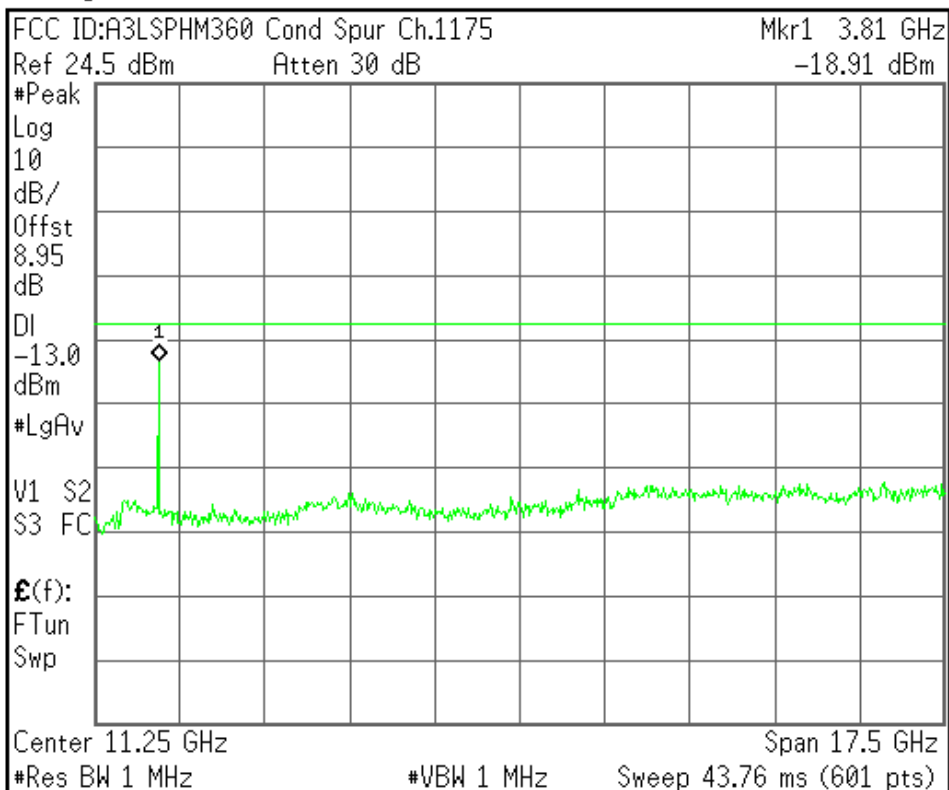
Signal Track
On Off

Suffix not allowed

Agilent

R L

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

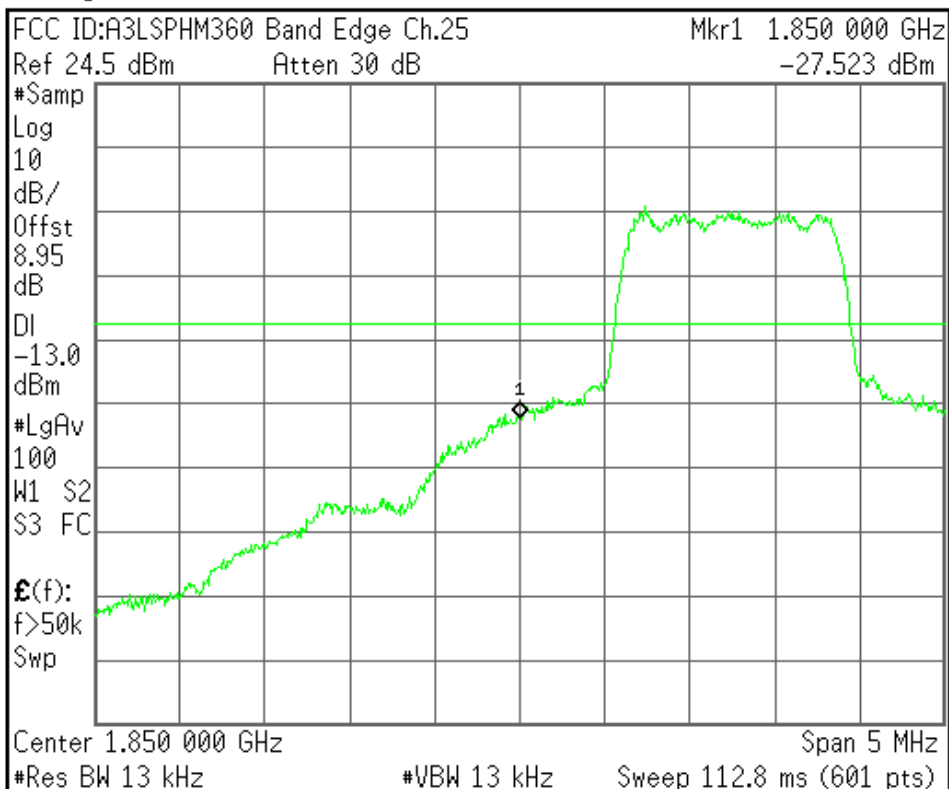
Signal Track
On Off

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

Agilent

R T

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

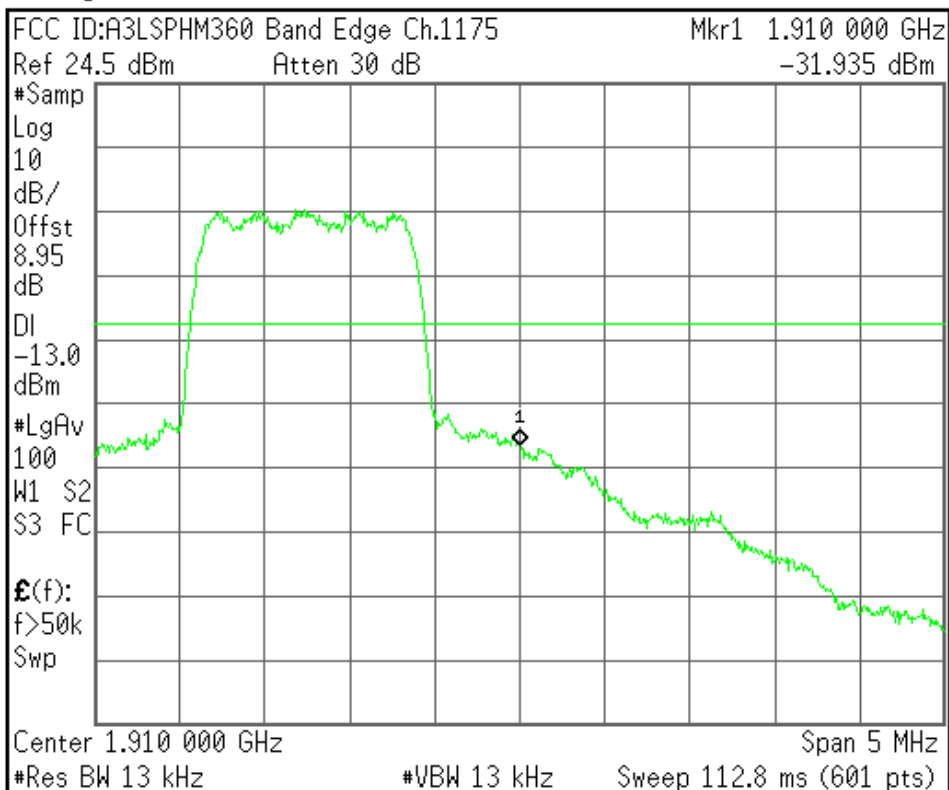
Signal Track
On Off

Invalid suffix

Agilent

R T

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

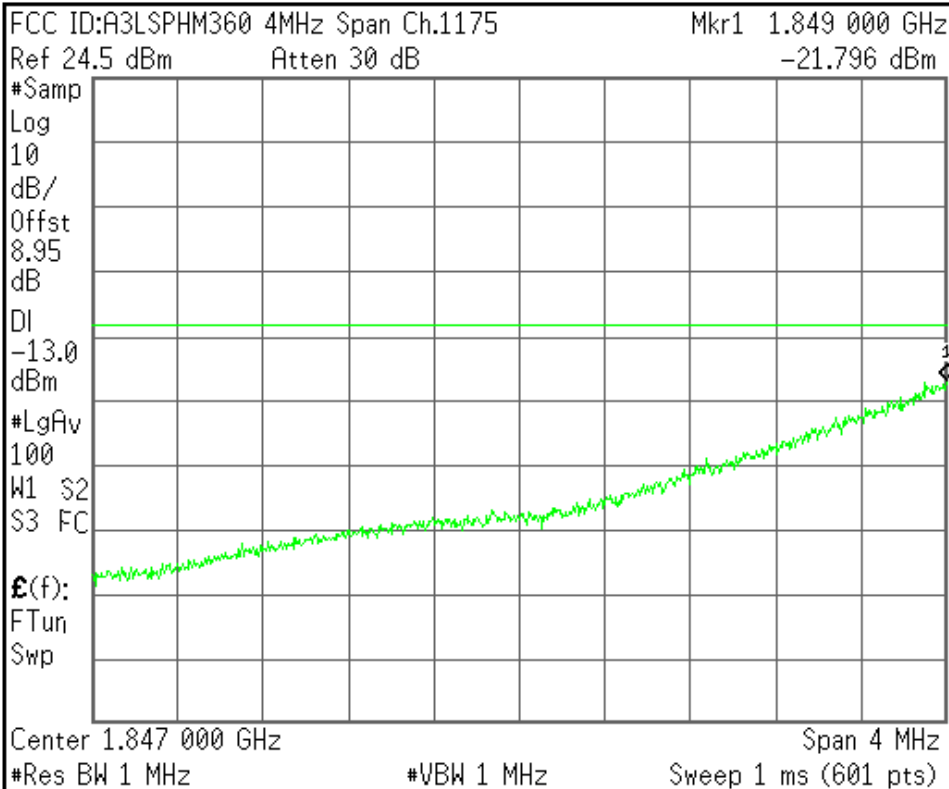
Signal Track
On Off

Invalid suffix

Agilent

R T

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

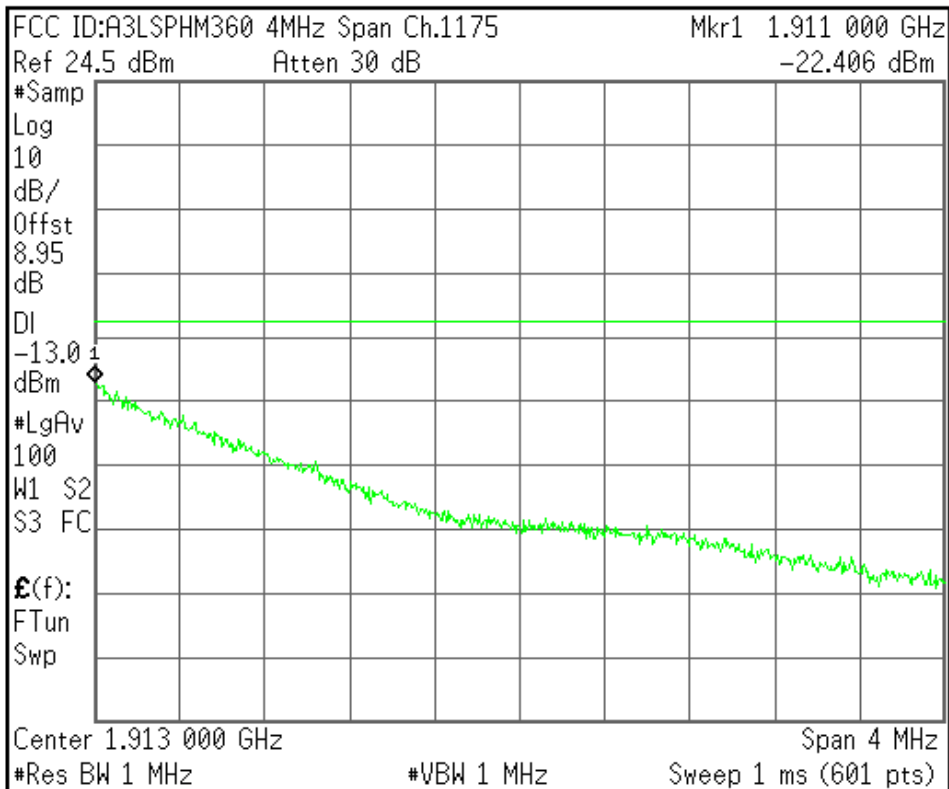
Signal Track
On Off

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

Agilent

R T

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

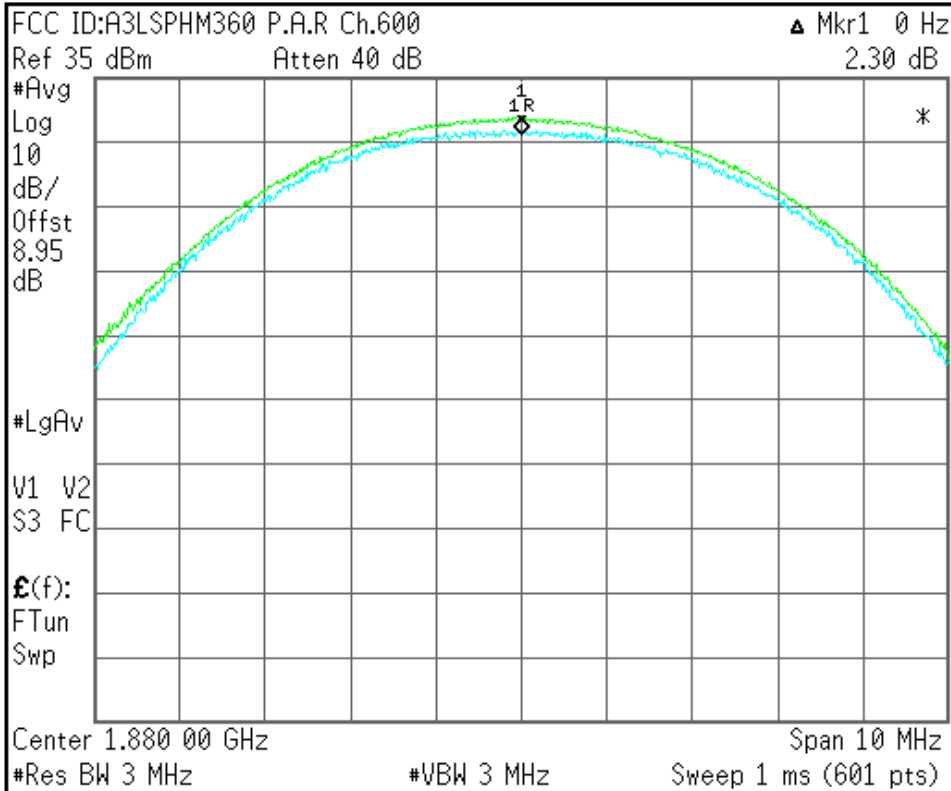
Signal Track
On Off

File exists

Agilent

R L

Freq/Channel



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 2000-2005 Agilent Technologies