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Gyeonggi-Do, Korea 443-742

FCC CFR47 PART 22 & 24 SUBPART CERTIFICATION REPORT

Model Tested:	SCH-R220
FCC ID (Requested):	A3LSCHR220
Report No:	FI-333-R1
Job No:	FI-333
Date issued:	January 3, 2012

- Abstract -

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

Prepared By

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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
- FCC ID: A3LSCHR220
- Model: SCH-R220
- Quantity: Quantity production is planned
- Emission Designators: 1M29F9W(CDMA), 1M28F9W(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: 0.196 W ERP CDMA (22.93 dBm)
0.201 W EIRP PCS (23.04 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: December 25-26, 2011
- Place of Test: SAMSUNG Lab,
- Test Report S/N: FI-333-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	2012-10-25
	E4440A(3Hz~26.5GHz)	MY46187454	2012-03-08
	E4440A(3Hz~26.5GHz)	MY41000236	2012-04-27
Signal Generator	SMR20	835197/030	2012-12-01
Network Analyzer	8753E	JP38160590	2012-06-21
Pre-Amplifier	8449B	3008A00691	2012-12-09
Communication test set	8960	MY47510060	2012-03-08
	8960	GB42360886	2012-09-02
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	2013-09-05
	BBHA9120	9120D-636	2012-07-14
Dipole Antenna	UHA 9105	9105-2412	2013-09-09
	UHA 9105	9105-2413	2012-07-15
Receive Antenna	HL040	353255/019	2013-09-05
Power Supply	E3640A	MY40003594	2012-06-21
	E3640A	MY40003595	2012-05-27
	E3632A	MY40022438	2012-03-08
Divider	11636B	51946	2012-07-04
	11636B	51942	2012-07-05
	11636B	56918	2012-09-28
High Pass Filter	WHK/3.0/18G-10SS	492	Not Required
	WHK/3.5/18G-10SS	4	Not Required
Environmental Chamber	SH-241	92000549	2012-11-14
	SH-241	92000548	2012-11-14
Shielded Fully Anechoic Chamber	CHAMBER	ANT0001	Not Required

5. DESCRIPTION OF TESTS

5.1 Output Power Variation

Test Condition to measure the Output Power

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

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

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
I _{or}	dBm/1.23MHz	-104
Pilot Ec/I _{or}	dB	-7
Traffic Ec/I _{or}	dB	-7.4

Table 5-1
Parameters for Max. Power for RC1

Parameter	Units	Value
I _{or}	dBm/1.23MHz	-86
Pilot Ec/I _{or}	dB	-7
Traffic Ec/I _{or}	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	24.52	24.54	24.50	24.47
		RC3	24.52	24.56		
	384	RC1	24.48	24.47	24.46	24.48
		RC3	24.44	24.47		
	777	RC1	24.55	24.56	24.63	24.63
		RC3	24.61	24.65		
PCS	25	RC1	24.61	24.62	24.51	24.53
		RC3	24.51	24.56		
	600	RC1	24.59	24.57	24.50	24.45
		RC3	24.49	24.47		
	1175	RC1	24.62	24.61	24.58	24.45
		RC3	24.54	24.58		

Table 5-3
Maximum Power Output Table for SCH-R220

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

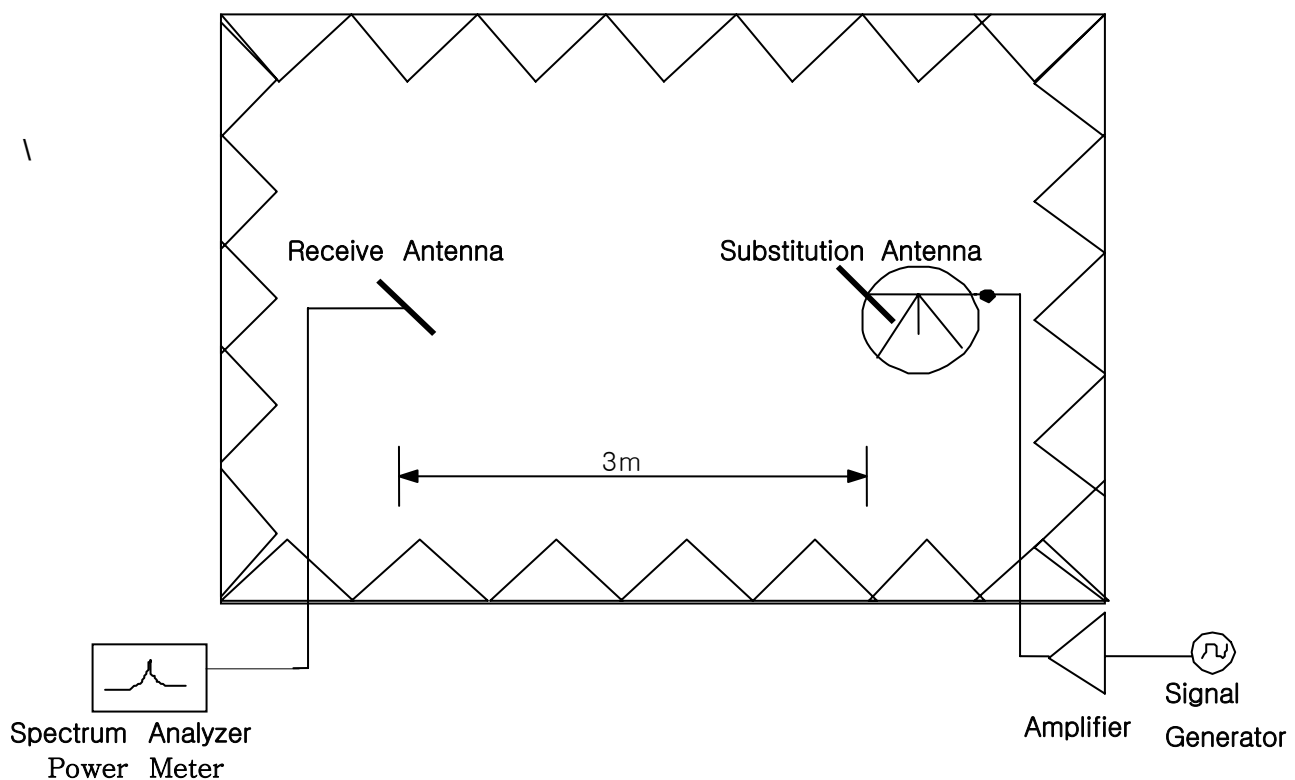


Figure 3. Diagram of ERP/EIRP test Set-up

The EUT was placed on the rotating device at 3-meters from the receive antenna and tested in 3 orthogonal planes. 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

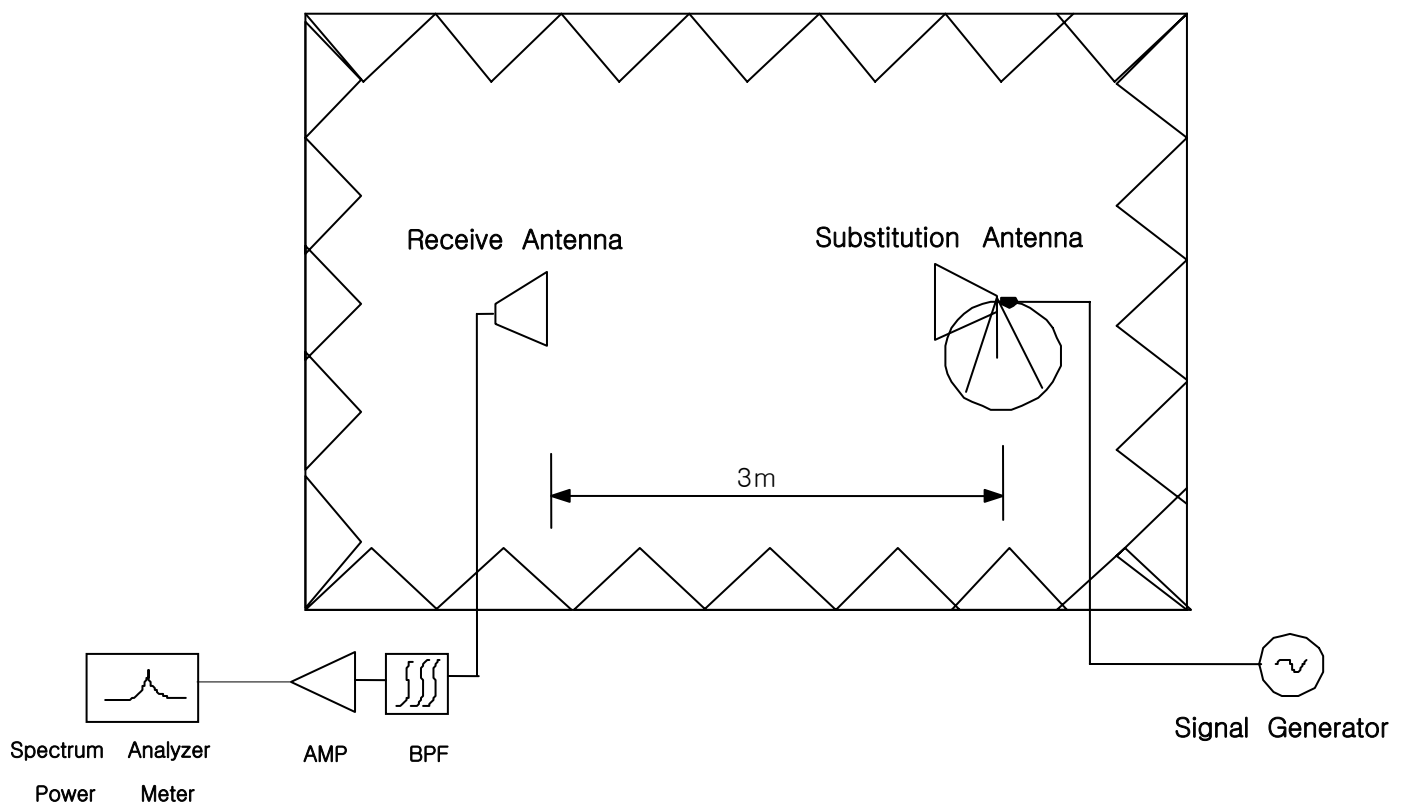


Figure 4. Diagram of Radiated Spurious & Harmonic test Set-up

The EUT was placed on the rotating device at 3-meters from the receive antenna and tested in 3 orthogonal planes. 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. For CDMA signals, the spectrum analyzers Complementary Cumulative Distribution Function(CCDF) measurement profile is used to determine the largest deviation between the An average and the peak power of the EUT in a given bandwidth. The CCDF curve shows how much time the peak waveform spends at or above a given average power level. The percent of time the signal spends at or above the level defines the probability for that particular power level. For GSM signals, 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.

– 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 +50°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 +50°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	23.00	H	-14.53	-0.67	-13.86
		V	-15.40	-0.67	-14.73
836.52	20.00	H	-18.03	-0.73	-17.30
		V	-18.31	-0.73	-17.58
848.31	20.00	H	-20.23	-0.79	-19.44
		V	-19.44	-0.79	-18.65

■Result

Frequency (MHz)	From EUT Tested level (dBm)	Polarization (H/V)	Azimuth (angle)	ERP (dBm)	ERP (W)	Battery
824.70	-13.93	H	284/55	22.93	0.196	Standard
836.52	-17.38	H	286/90	19.92	0.098	Standard
848.31	-19.03	H	290/100	20.41	0.110	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	22.00	H	-17.28	9.60	-26.88
		V	-16.90	9.60	-26.50
1880.00	23.00	H	-15.98	9.60	-25.58
		V	-16.33	9.60	-25.93
1908.75	23.00	H	-16.45	9.60	-26.05
		V	-16.21	9.60	-25.81

■Result

Frequency (MHz)	From EUT Tested level (dBm)	Polarization (H/V)	Azimuth (angle)	EIRP (dBm)	EIRP (W)	Battery
1851.25	-26.53	H	249/20	22.35	0.172	Standard
1880.00	-26.01	H	109/180	22.57	0.181	Standard
1908.75	-26.01	H	261/45	23.04	0.201	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 : 22.93 dBm = 0.196 W

Modulation Signal : CDMA

Limit : $43 + 10\log_{10}(P) = 35.93 \text{ dBc}$

■Result

Channel	Harmonic	Frequency (MHz)	From EUT Tested level (dBm)	POL (H/V)	Result (dBc)
1013	2	1649.40	-64.22	H	74.56
	3	2474.10	-63.67	H	68.77
	4	3298.80	-67.25	V	68.48
	5	4123.50	-	-	-
	6	4948.20	-	-	-
	7	5772.90	-	-	-
384	2	1673.04	-65.94	H	76.03
	3	2509.56	-67.40	H	72.29
	4	3346.08	-66.67	V	67.99
	5	4182.68	-	-	-
	6	5019.12	-	-	-
	7	5855.64	-	-	-
777	2	1696.62	-66.76	H	75.57
	3	2544.93	-67.21	V	72.43
	4	3393.24	-67.18	V	68.36
	5	4241.55	-	-	-
	6	5089.86	-	-	-
	7	5938.17	-	-	-

Radiated Spurious Emission measurements at 3 meters by Substitution Method

6.4 PCS CDMA Radiated Spurious & Harmonic measurement

Field Strength of SPURIOUS Radiation

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

Measured Output Power : 23.04 dBm = 0.201 W

Modulation Signal : PCS

Limit : $43 + 10\log_{10}(P) = 36.04 \text{ dBc}$

■ Result

Channel	Harmonic	Frequency (MHz)	From EUT Tested level (dBm)	POL (H/V)	Result (dBc)
25	2	3702.50	-66.42	H	62.48
	3	5553.75	-66.99	H	59.63
	4	7405.55	-68.66	H	55.99
	5	9256.25	-	-	-
	6	11107.50	-	-	-
	7	12958.75	-	-	-
600	2	3760.00	-67.28	H	63.43
	3	5640.00	-66.81	H	59.11
	4	7520.00	-68.34	H	55.62
	5	9400.00	-	-	-
	6	11280.00	-	-	-
	7	13160.00	-	-	-
1175	2	3817.50	-66.18	H	62.27
	3	5726.25	-67.13	H	58.97
	4	7635.00	-68.80	H	56.59
	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 : December 26, 2011

Test Engineer : HK LEE

- 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	-8.77	9.40	-13.60	-27.73	-27.03	-64.22	-64.23	74.56	75.27
	3	2474.10	-11.12	10.60	-12.50	-32.97	-32.23	-63.67	-67.59	68.77	73.43
	4	3298.80	-12.19	12.00	-12.80	-36.08	-36.84	-67.42	-67.25	69.41	68.48
	5	4123.50	-13.85	12.60	-11.80	-39.75	-39.33	-	-	-	-
	6	4948.20	-15.03	12.70	-10.70	-42.44	-42.28	-	-	-	-
	7	5772.90	-17.11	13.10	-9.00	-44.12	-44.43	-	-	-	-
384	2	1673.04	-8.83	9.40	-13.60	-27.98	-27.21	-65.94	-65.24	76.03	76.10
	3	2509.56	-11.24	10.60	-12.40	-33.18	-32.42	-67.40	-67.33	72.29	72.98
	4	3346.08	-12.13	12.00	-12.90	-36.09	-36.75	-67.02	-66.67	69.00	67.99
	5	4182.68	-14.18	12.60	-11.40	-39.47	-39.56	-	-	-	-
	6	5019.12	-15.91	12.70	-9.80	-42.07	-42.44	-	-	-	-
	7	5855.64	-17.15	13.10	-9.00	-45.07	-44.94	-	-	-	-
777	2	1696.62	-8.88	9.40	-13.50	-29.26	-28.45	-66.76	-66.15	75.57	75.77
	3	2544.93	-11.22	10.60	-12.40	-32.63	-32.85	-67.55	-67.21	72.99	72.43
	4	3393.24	-12.28	12.00	-12.70	-36.60	-36.89	-67.41	-67.18	68.88	68.36
	5	4241.55	-14.15	12.60	-11.50	-39.36	-39.77	-	-	-	-
	6	5089.86	-16.16	12.70	-9.50	-42.73	-42.38	-	-	-	-
	7	5938.17	-17.34	13.10	-8.80	-45.37	-45.34	-	-	-	-

6.6 PCS Radiated Spurious & Harmonic Conversion Table

Date : December 26, 2011

Test Engineer : HK LEE

- 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	-12.85	12.60	-12.80	-39.98	-39.03	-66.42	-67.57	62.48	64.58
	3	5553.75	-16.92	12.50	-8.60	-43.40	-42.99	-66.99	-66.62	59.63	59.67
	4	7405.00	-20.20	11.50	-4.30	-48.71	-48.56	-68.66	-68.89	55.99	56.37
	5	9256.25	-23.05	11.90	-1.90	-53.11	-52.12	-	-	-	-
	6	11107.50	-25.08	11.50	0.60	-57.75	-54.90	-	-	-	-
	7	12958.75	-28.10	14.42	0.70	-61.50	-58.01	-	-	-	-
600	2	3760.00	-13.35	12.60	-12.30	-39.89	-39.16	-67.28	-67.89	63.43	64.77
	3	5640.00	-17.07	12.50	-8.40	-43.74	-43.42	-66.81	-67.01	59.11	59.63
	4	7520.00	-20.60	11.50	-3.90	-48.76	-48.06	-68.34	-68.44	55.62	56.42
	5	9400.00	-23.50	11.90	-1.40	-52.65	-51.24	-	-	-	-
	6	11280.00	-26.24	11.50	1.70	-56.66	-54.54	-	-	-	-
	7	13160.00	-28.79	14.42	1.40	-61.01	-57.76	-	-	-	-
1175	2	3817.50	-13.30	12.60	-12.30	-39.95	-39.55	-66.18	-66.31	62.27	62.80
	3	5726.25	-17.16	12.50	-8.30	-44.20	-43.35	-67.13	-66.88	58.97	59.57
	4	7635.00	-20.88	11.50	-3.60	-48.25	-47.92	-68.80	-68.86	56.59	56.98
	5	9543.75	-24.09	11.90	-0.80	-52.88	-51.48	-	-	-	-
	6	11452.50	-26.05	11.50	1.60	-57.49	-54.67	-	-	-	-
	7	13361.25	-28.74	14.42	1.30	-63.03	-59.49	-	-	-	-

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)	-33.00	836,519,967	-0.000004	-0.039
100%		-30	15.60	836,520,016	0.000002	0.019
100%		-20	37.10	836,520,037	0.000004	0.044
100%		-10	-10.20	836,519,990	-0.000001	-0.012
100%		0	33.90	836,520,034	0.000004	0.041
100%		+10	-7.70	836,519,992	-0.000001	-0.009
100%		+20	-33.00	836,519,967	-0.000004	-0.039
100%		+30	-16.20	836,519,984	-0.000002	-0.019
100%		+40	47.90	836,520,048	0.000006	0.057
100%		+50	2.90	836,520,003	0.000000	0.003
100%		+60	47.00	836,520,047	0.000006	0.056
115%	4.26	+20	-48.60	836,519,951	-0.000006	-0.058
Batt. Endpoint	3.35	+20	-9.70	836,519,990	-0.000001	-0.012

Note : The temperature is varied from -30 °C to +50 °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

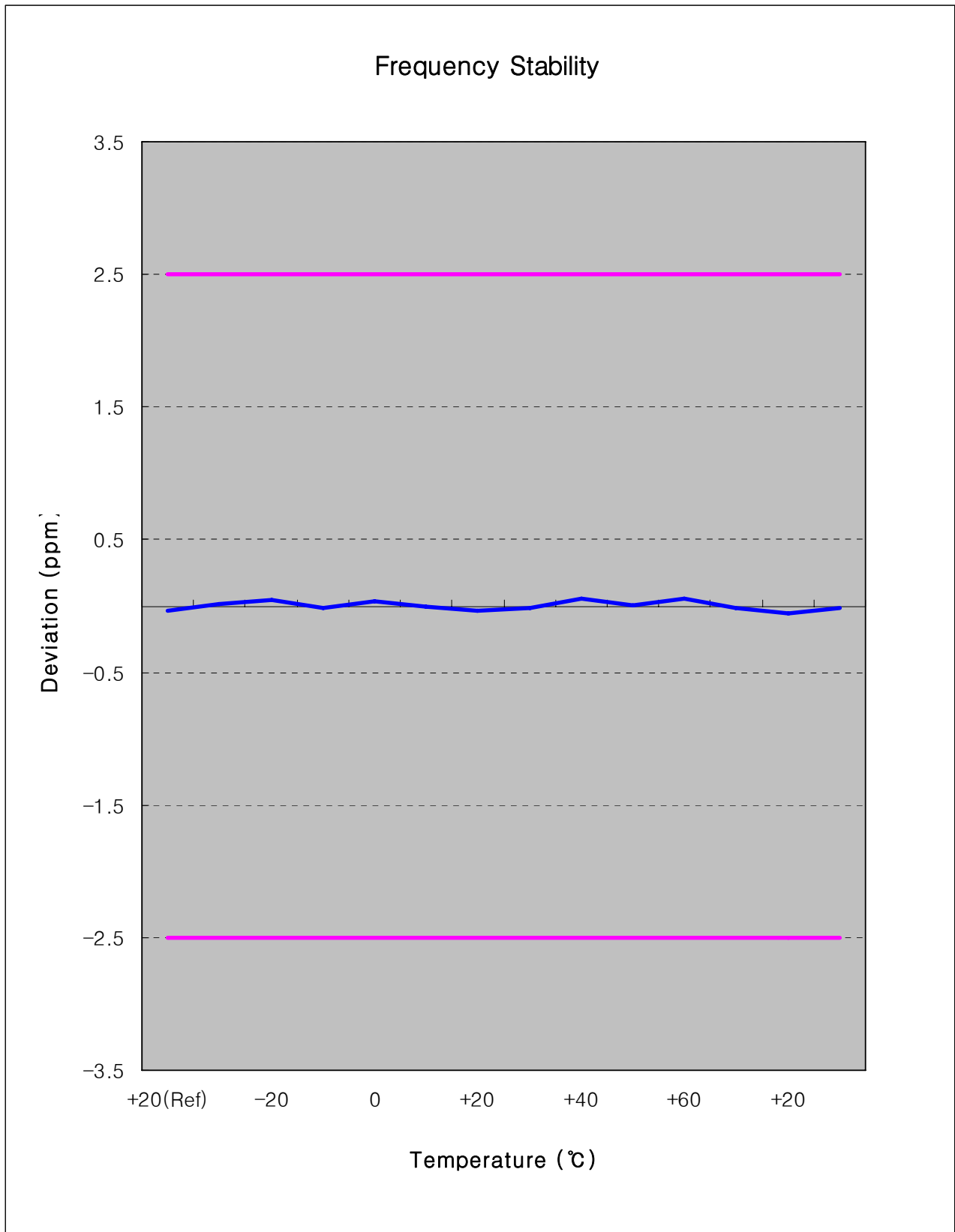
Deviation Limit : ± 0.00025 % or 2.5ppm

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency Error (Hz)	Frequency (Hz)	Deviation (%)	ppm
100%	3.70	+20(Ref)	-44.70	1,879,999,955	-0.000002	-0.024
100%		-30	44.60	1,880,000,045	0.000002	0.024
100%		-20	30.80	1,880,000,031	0.000002	0.016
100%		-10	30.50	1,880,000,031	0.000002	0.016
100%		0	36.30	1,880,000,036	0.000002	0.019
100%		+10	-35.40	1,879,999,965	-0.000002	-0.019
100%		+20	-44.70	1,879,999,955	-0.000002	-0.024
100%		+30	-29.70	1,879,999,970	-0.000002	-0.016
100%		+40	20.40	1,880,000,020	0.000001	0.011
100%		+50	18.80	1,880,000,019	0.000001	0.010
100%		+60	18.90	1,880,000,019	0.000001	0.010
115%	4.26	+20	12.50	1,880,000,013	0.000001	0.007
Batt. Endpoint	3.35	+20	5.10	1,880,000,005	0.000000	0.003

Note : The temperature is varied from -30 °C to +50 °C using an environmental chamber.

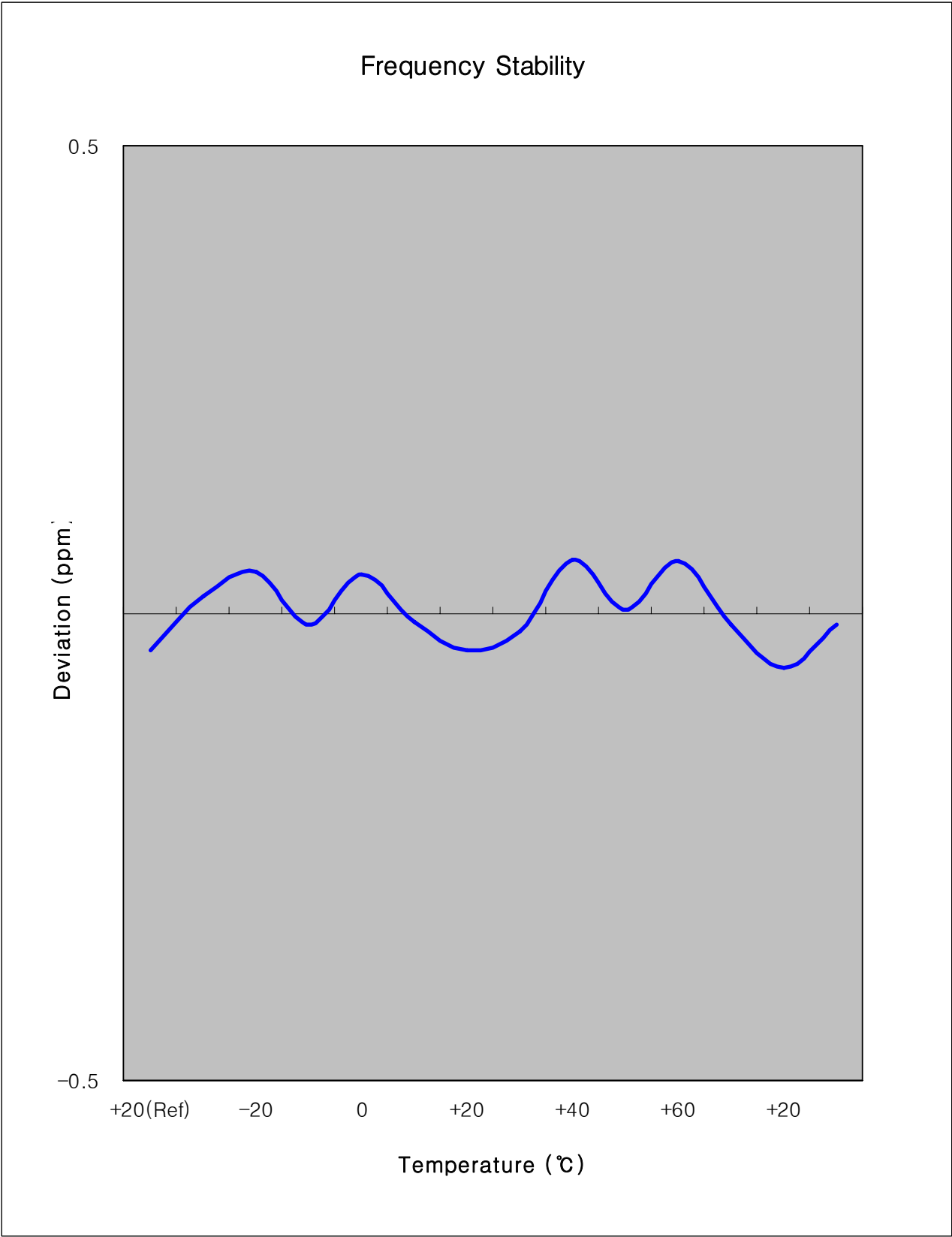
The EUT is tested down to the battery end point

6.7.3 CDMA Frequency Stability Graph

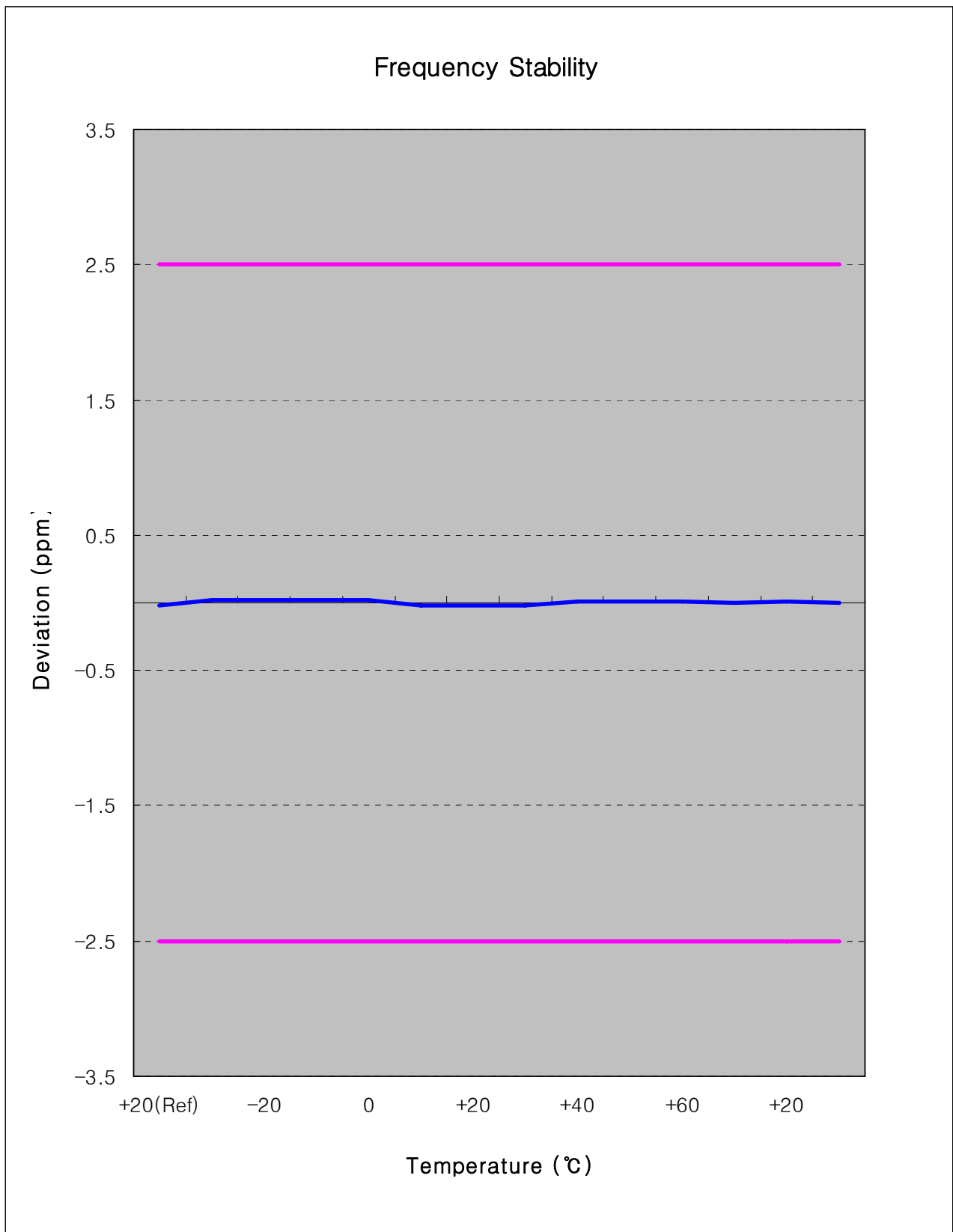


– End of page –

Zoom In

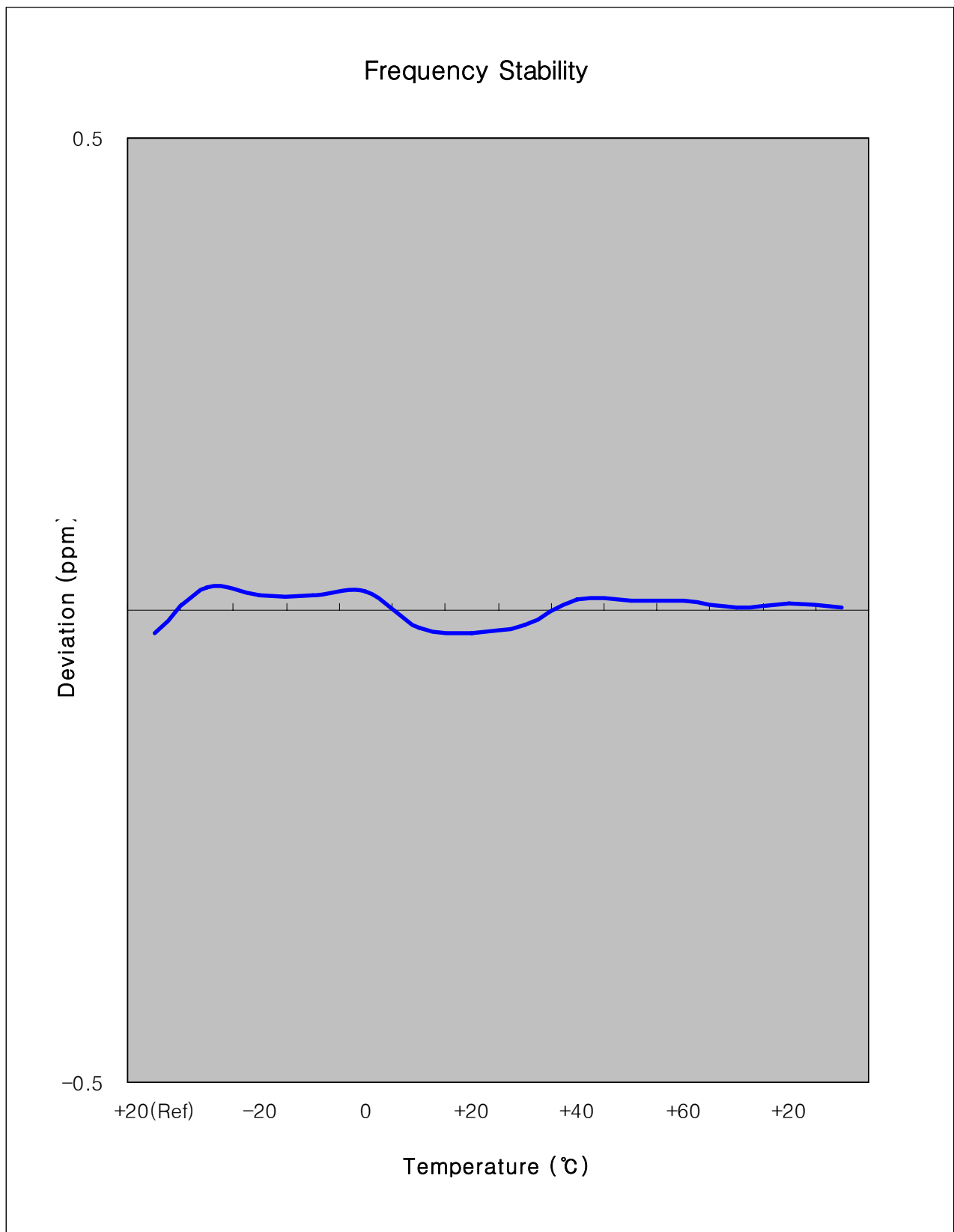


6.7.4 PCS Frequency Stability Graph



– End of page –

Zoom In



7. SAMPLE CALCULATION

7.1 Emission Designator

Emission Designator = 1M25F9W

CDMA BW = 1.25MHz

F = Frequency Modulation

9 = Composite Digital Info

W = Combination(Audio/Data)

(Measured at the 99.75% power bandwidth)

– End of page –



8. CONCLUSION

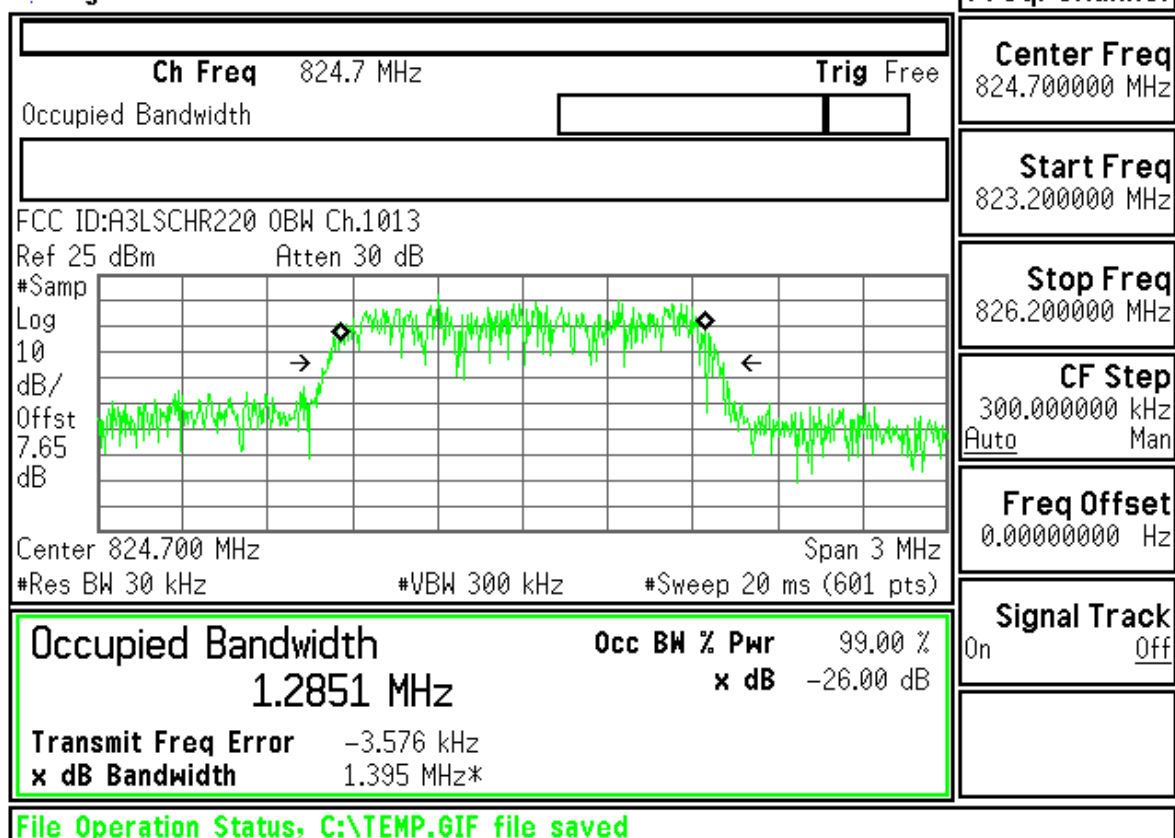
The data collected shows that the SAMSUNG Cellular/PCS CDMA Phone with Bluetooth
FCC ID : A3LSCHR220 complies with all the requirements of Parts 2, 22, 24 of the FCC Rules.

- End of page -

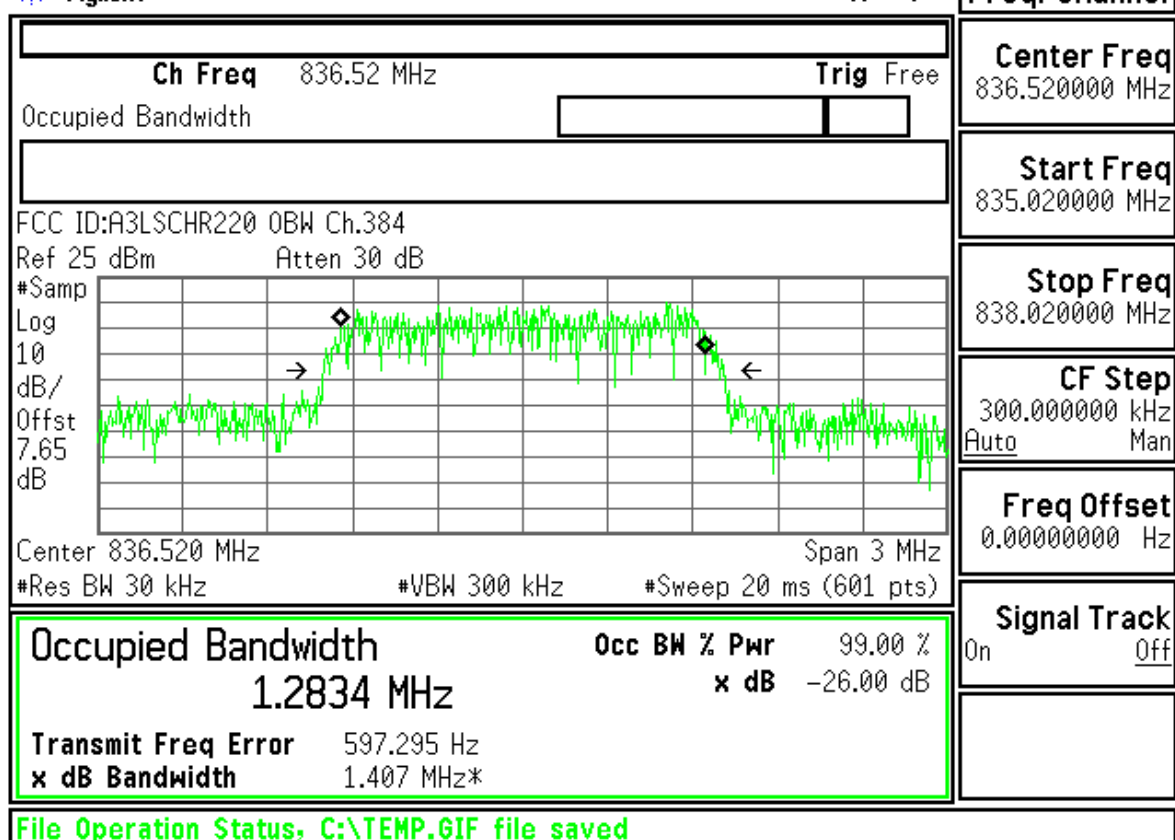
9. TEST PLOTS

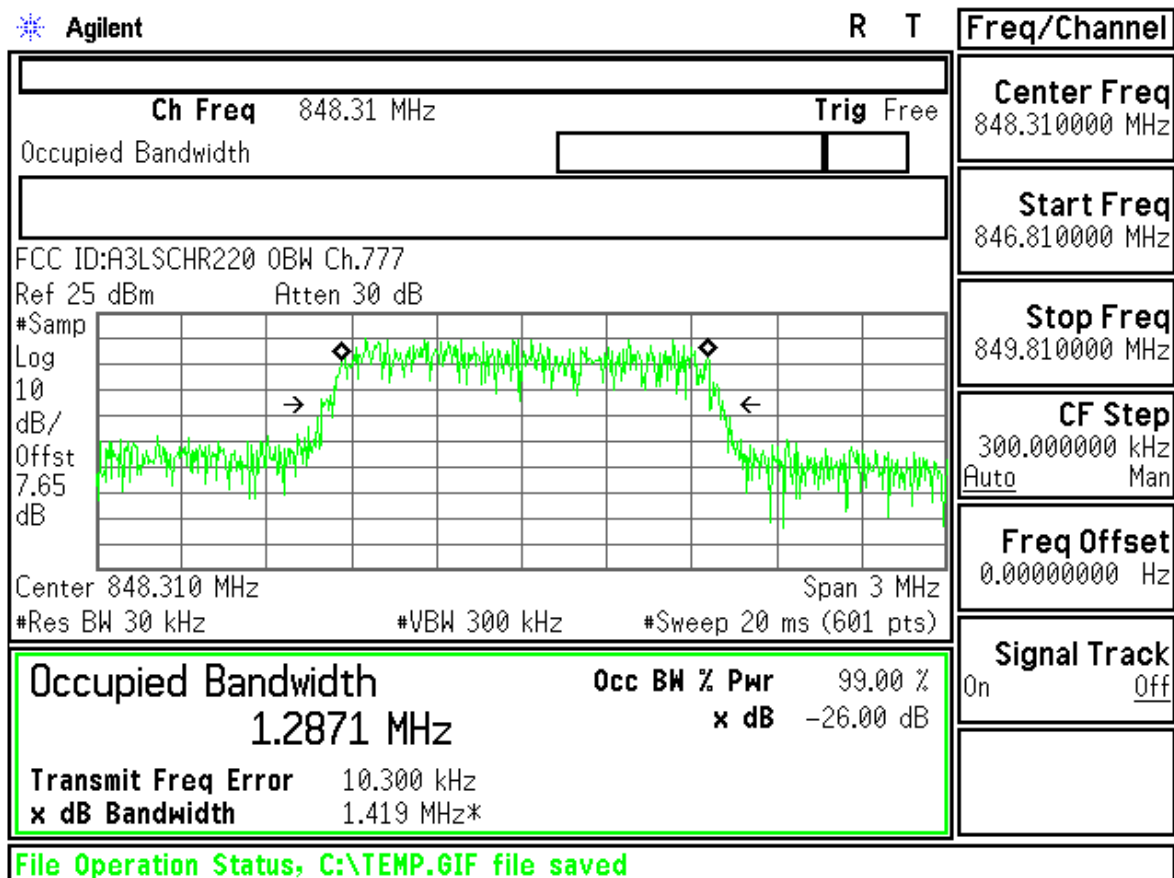
 Agilent

R T


 Agilent

R T





Agilent

R T

Freq/Channel

FCC ID:A3LSCHR220 Cond Spur Ch.1013

Ref 25 dBm

Atten 30 dB

#Peak

Log

10

dB/

Offst

7.65

dB

DI

-13.0

dBm

#LgAv

M1 S2

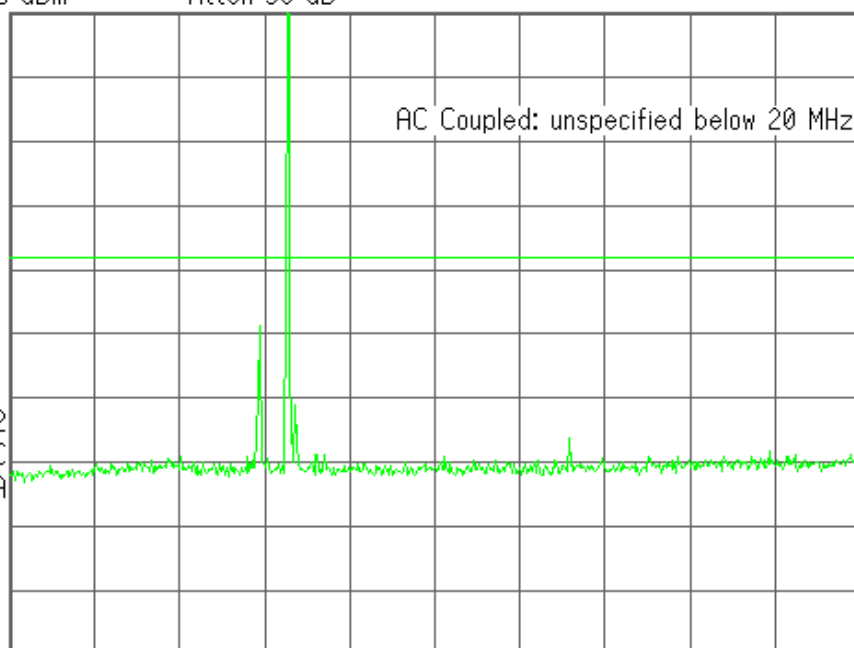
S3 FC

AA

£(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
10.0000000 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 T

Freq/Channel

FCC ID:A3LSCHR220 Cond Spur Ch.1013

Mkr1 466.2 MHz

Ref 25 dBm

Atten 30 dB

-43.26 dBm

#Peak

Log

10

dB/

Offst

7.65

dB

DI

-13.0

dBm

#LgAv

V1 S2

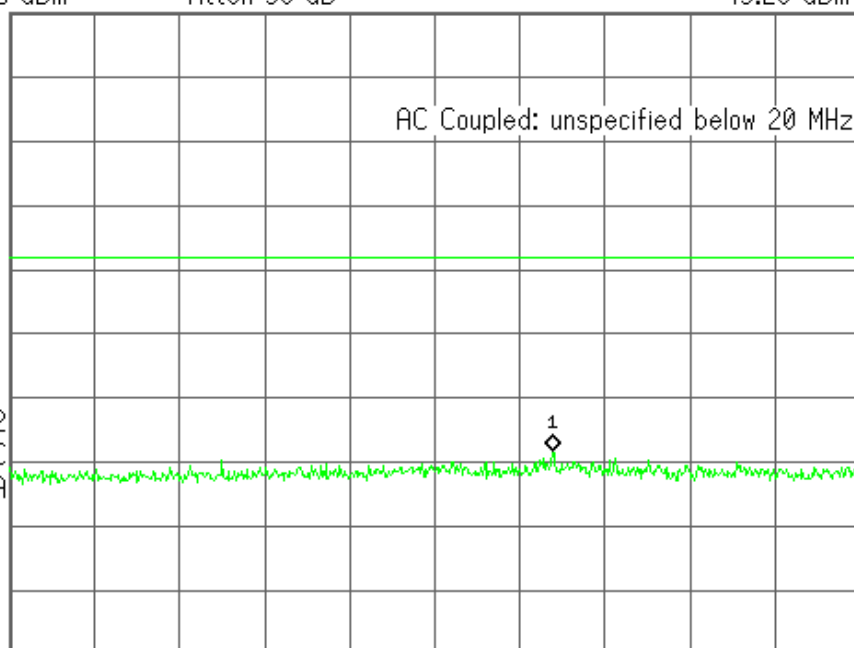
S3 FC

AA

£(f):

FTun

Swp



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

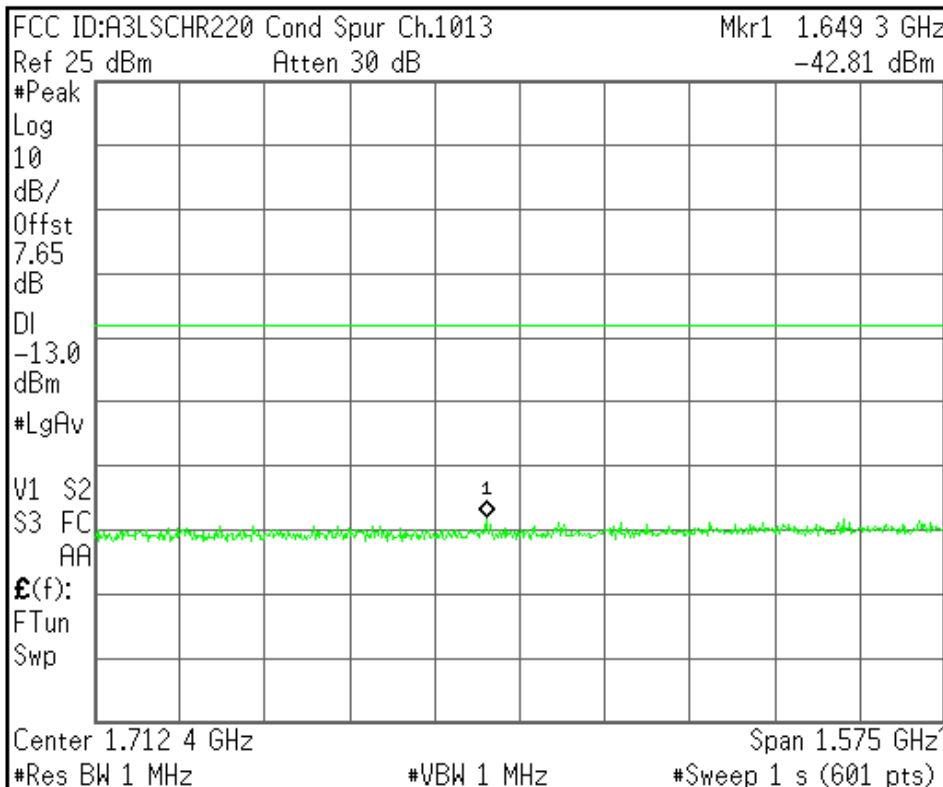
Signal Track
On Off

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

Agilent

R T

Freq/Channel



Center Freq
1.71235000 GHz

Start Freq
924.700000 MHz

Stop Freq
2.50000000 GHz

CF Step
157.530000 MHz
Auto Man

Freq Offset
0.00000000 Hz

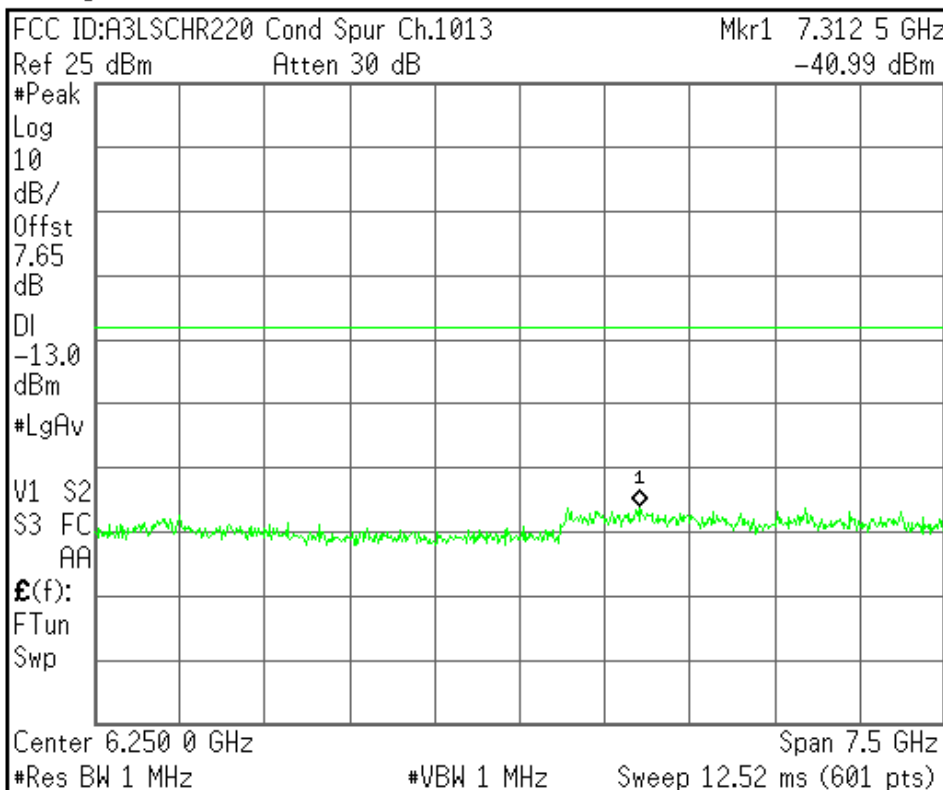
Signal Track
On Off

Suffix not allowed

Agilent

R T

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

FCC ID:A3LSCHR220 Cond Spur Ch.384

Ref 25 dBm

Atten 30 dB

#Peak

Log

10

dB/

Offst

7.65

dB

DI

-13.0

dBm

#LgAv

M1 S2

S3 FC

AA

£(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 T

Freq/Channel

FCC ID:A3LSCHR220 Cond Spur Ch.384

Mkr1 455.6 MHz

Ref 25 dBm

Atten 30 dB

-44.20 dBm

#Peak

Log

10

dB/

Offst

7.65

dB

DI

-13.0

dBm

#LgAv

M1 S2

S3 FC

AA

£(f):

FTun

Swp

AC Coupled: unspecified below 20 MHz

Center Freq
373.260000 MHz

Start Freq
10.0000000 MHz

Stop Freq
736.520000 MHz

CF Step
72.6520000 MHz
Auto Man

Freq Offset
0.00000000 Hz

Signal Track
On Off

Center 373.3 MHz

Span 726.5 MHz

#Res BW 1 MHz

#VBW 1 MHz

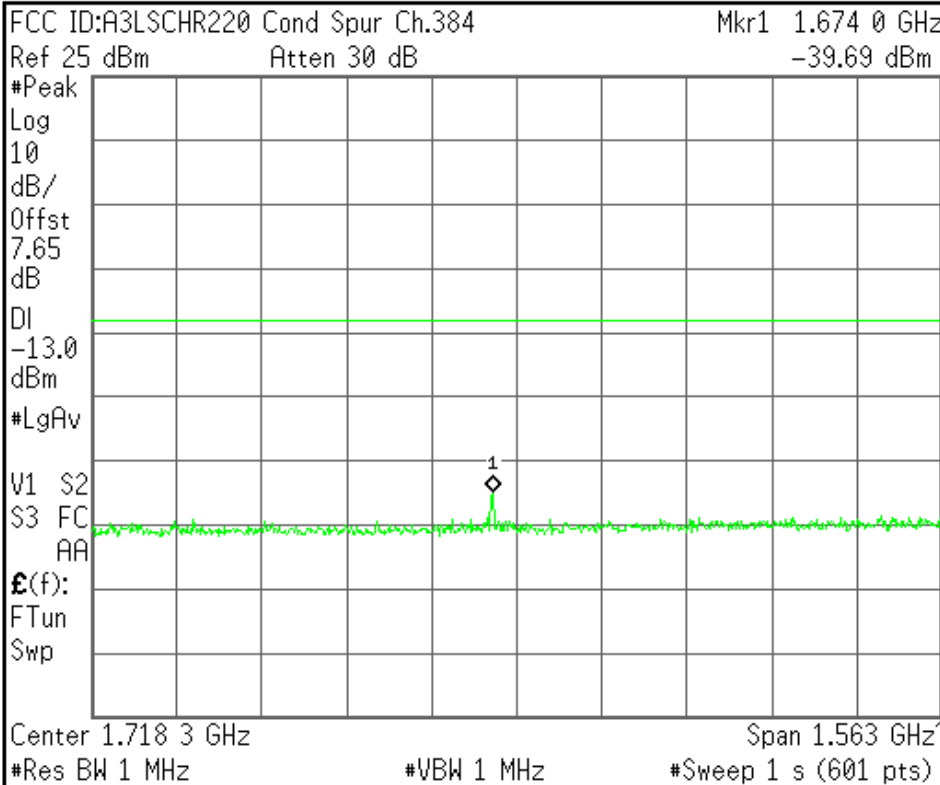
Sweep 1.24 ms (601 pts)

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

Agilent

R T

Freq/Channel



Center Freq
1.71826000 GHz

Start Freq
936.520000 MHz

Stop Freq
2.50000000 GHz

CF Step
156.348000 MHz
Auto Man

Freq Offset
0.00000000 Hz

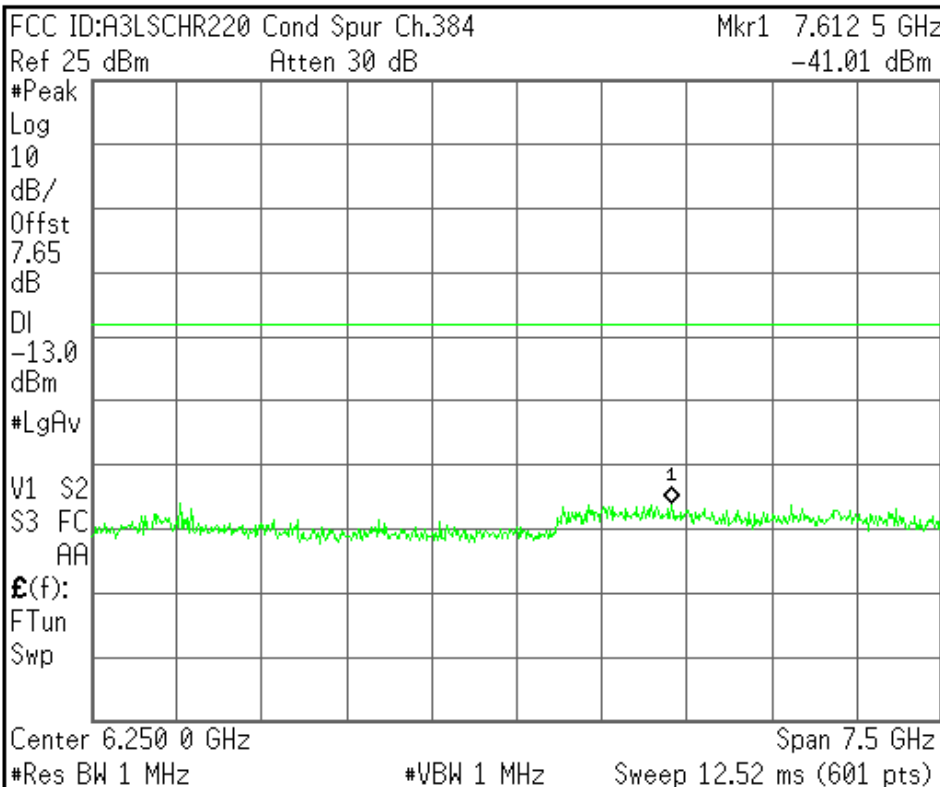
Signal Track
On Off

Suffix not allowed

Agilent

R T

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

FCC ID:A3LSCHR220 Cond Spur Ch.777

Ref 25 dBm

Atten 30 dB

#Peak

Log

10

dB/

Offst

7.65

dB

DI

-13.0

dBm

#LgAv

M1 S2

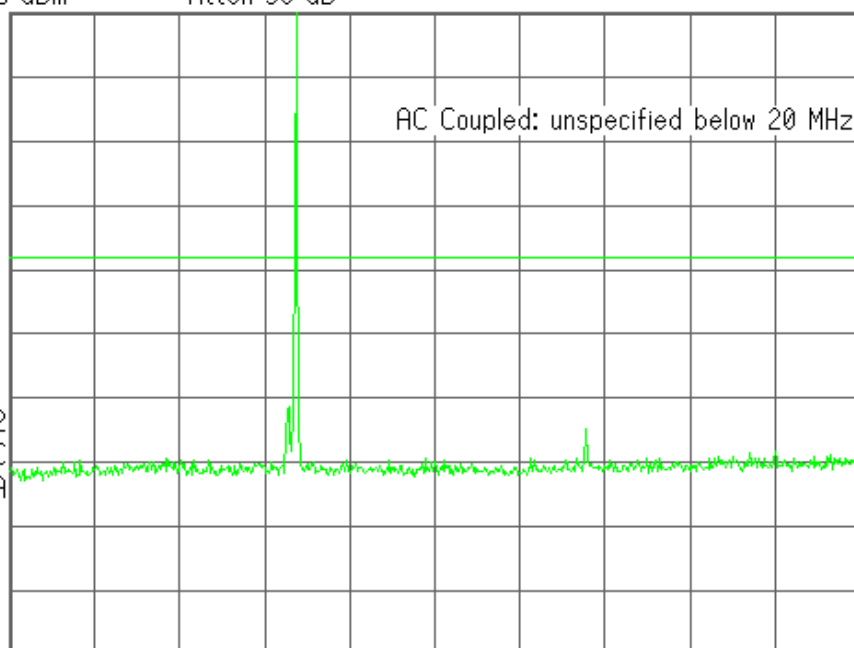
S3 FC

AA

£(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
10.0000000 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 T

Freq/Channel

FCC ID:A3LSCHR220 Cond Spur Ch.777

Mkr1 488.7 MHz

Ref 25 dBm

Atten 30 dB

-44.42 dBm

#Peak

Log

10

dB/

Offst

7.65

dB

DI

-13.0

dBm

#LgAv

V1 S2

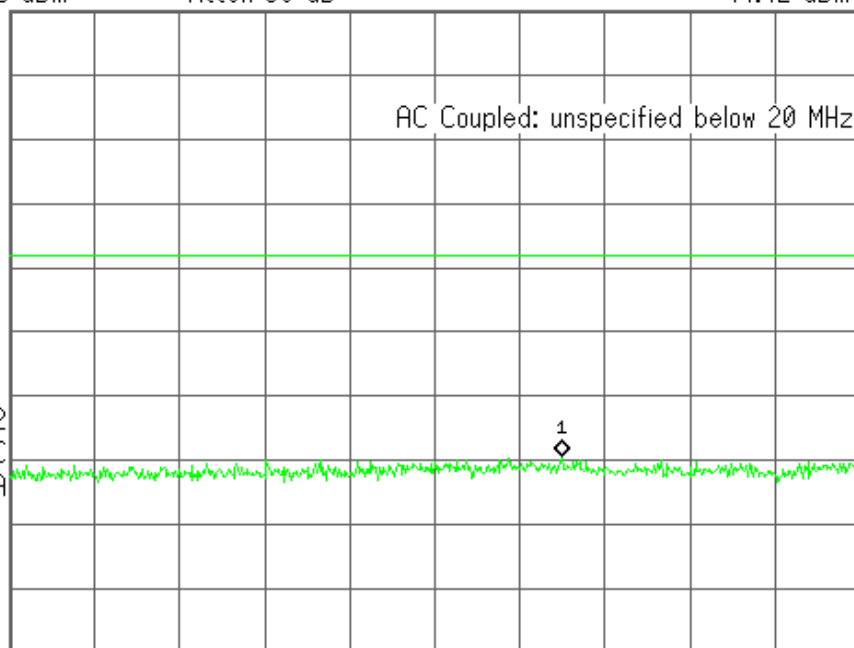
S3 FC

AA

£(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
10.0000000 MHz

Stop Freq
748.310000 MHz

CF Step
73.8310000 MHz
Auto Man

Freq Offset
0.00000000 Hz

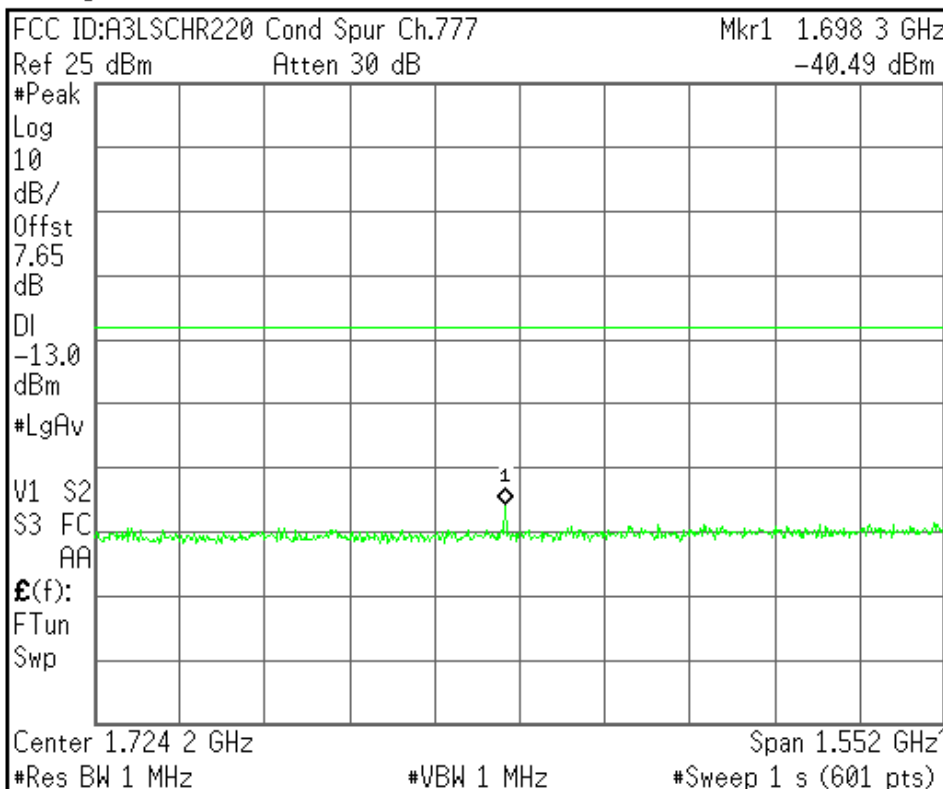
Signal Track
On Off

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

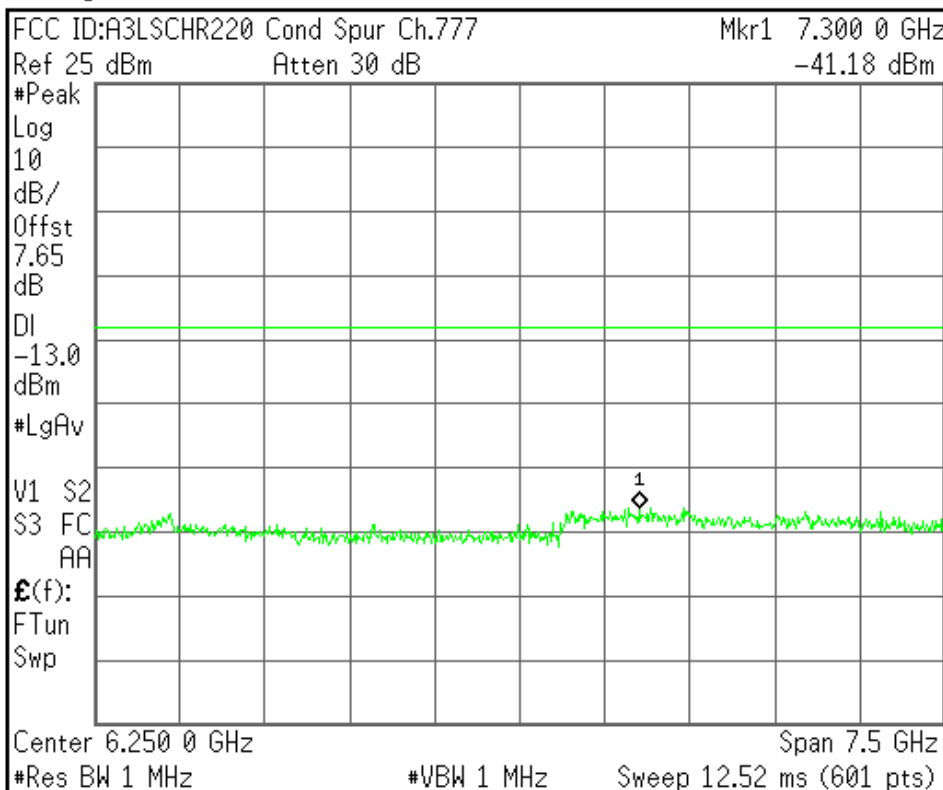
Signal Track
On Off

Suffix not allowed

Agilent

R T

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

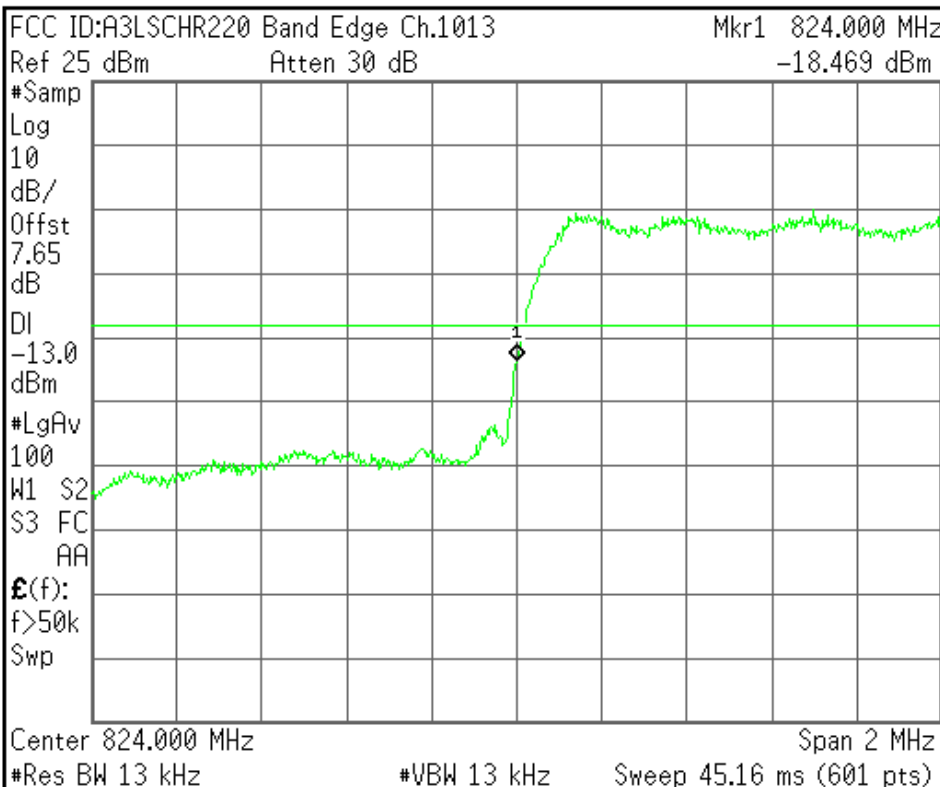
Signal Track
On Off

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

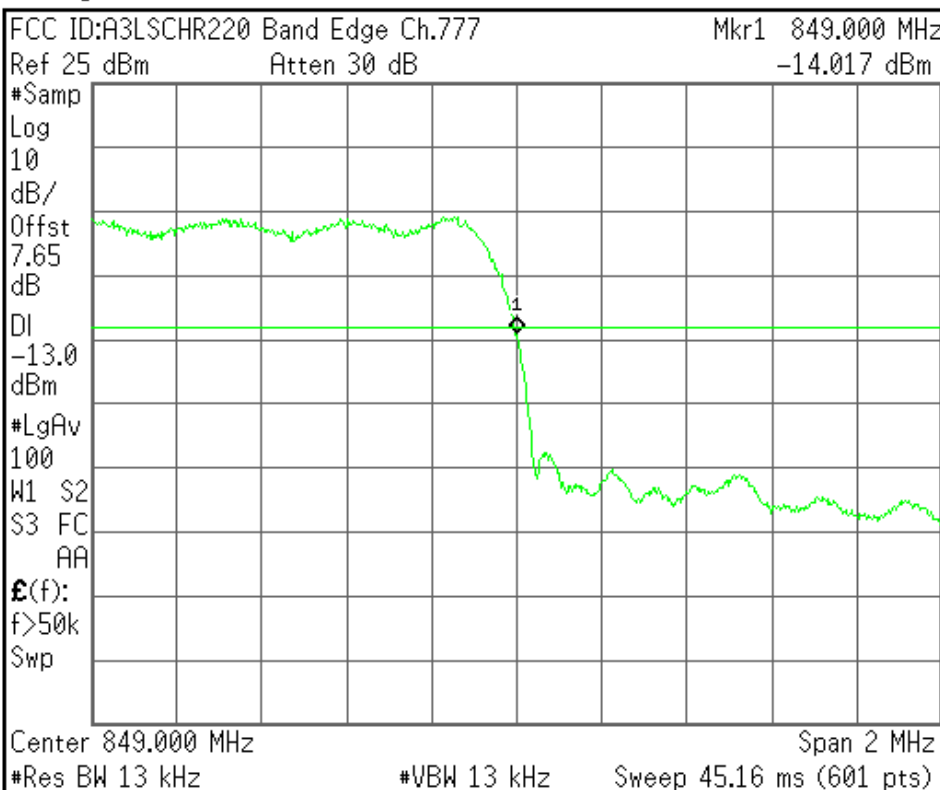
Signal Track
 On Off

Invalid suffix

Agilent

R T

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

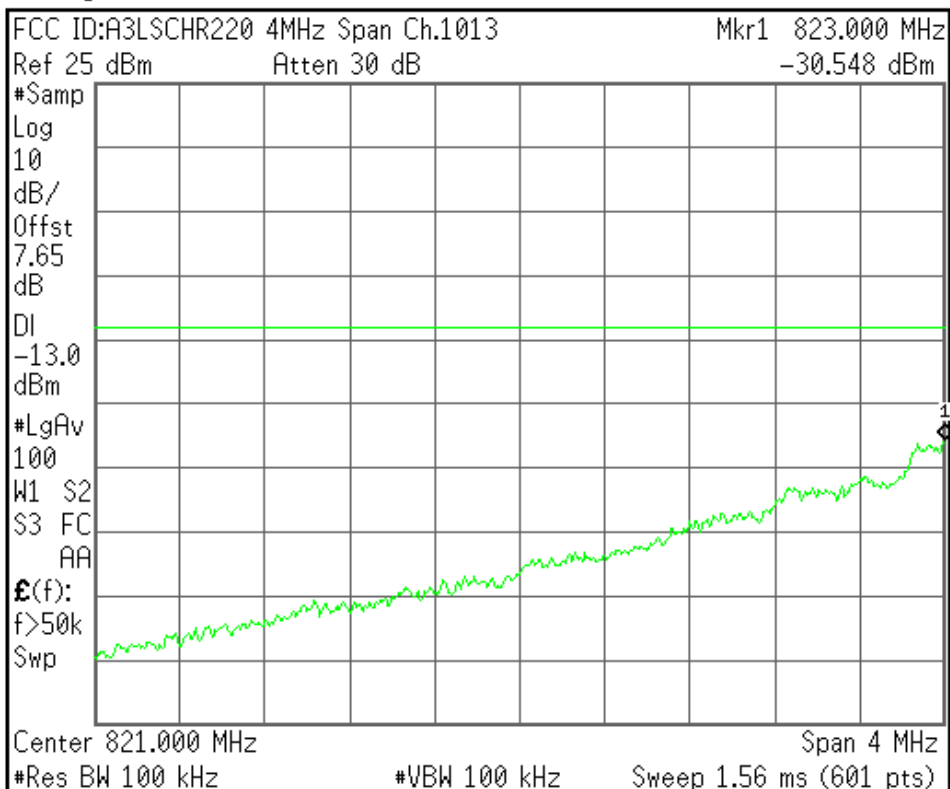
Signal Track
 On Off

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

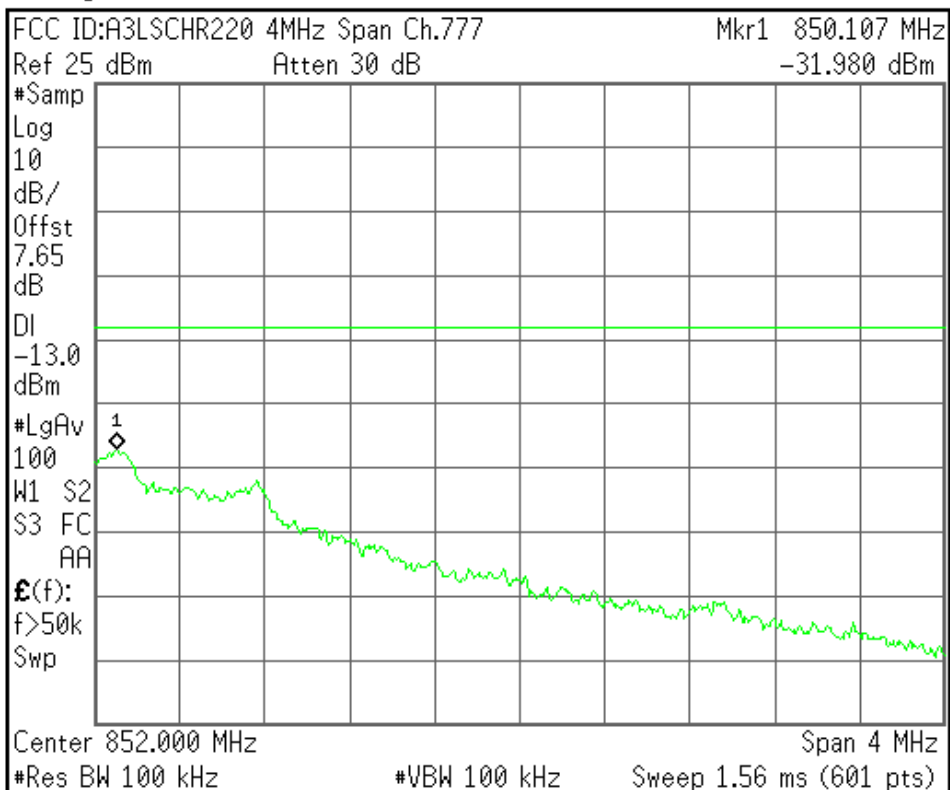
Signal Track
On Off

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

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:A3LSCHR220 0BW Ch.25

Ref 25 dBm

Atten 30 dB

#Samp

Log

10

dB/

Offst

8.67

dB

Center 1.851 250 GHz

Span 3 MHz

#Res BW 30 kHz

#VBW 300 kHz

#Sweep 20 ms (601 pts)

Occupied Bandwidth

Occ BW % Pwr 99.00 %

1.2615 MHz

x dB -26.00 dB

Transmit Freq Error 15.475 kHz

x dB Bandwidth 1.402 MHz*

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

Agilent

R T

Freq/Channel

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:A3LSCHR220 0BW Ch.600

Ref 25 dBm

Atten 30 dB

#Samp

Log

10

dB/

Offst

8.67

dB

Center 1.880 000 GHz

Span 3 MHz

#Res BW 30 kHz

#VBW 300 kHz

#Sweep 20 ms (601 pts)

Occupied Bandwidth

Occ BW % Pwr 99.00 %

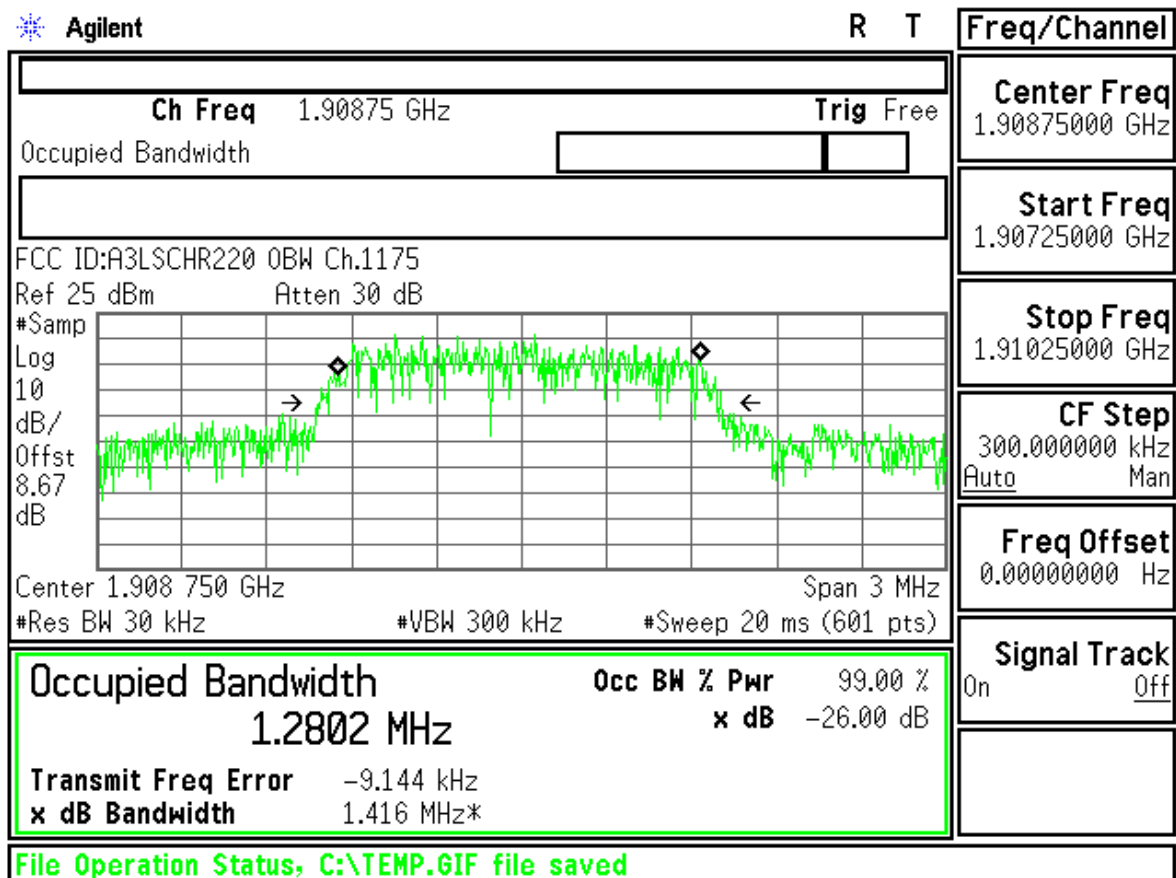
1.2626 MHz

x dB -26.00 dB

Transmit Freq Error 10.682 kHz

x dB Bandwidth 1.375 MHz*

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



Agilent

R T

Freq/Channel

FCC ID:A3LSCHR220 Cond Spur Ch.25

Ref 25 dBm

Atten 30 dB

#Peak

Log

10

dB/

Offst

8.67

dB

DI

-13.0

dBm

#LgAv

M1 S2

S3 FC

AA

E(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 T

Freq/Channel

FCC ID:A3LSCHR220 Cond Spur Ch.25

Mkr1 454.0 MHz

Ref 25 dBm

Atten 30 dB

-42.93 dBm

#Peak

Log

10

dB/

Offst

8.67

dB

DI

-13.0

dBm

#LgAv

V1 S2

S3 FC

AA

E(f):

FTun

Swp

AC Coupled: unspecified below 20 MHz

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

Center 880.6 MHz

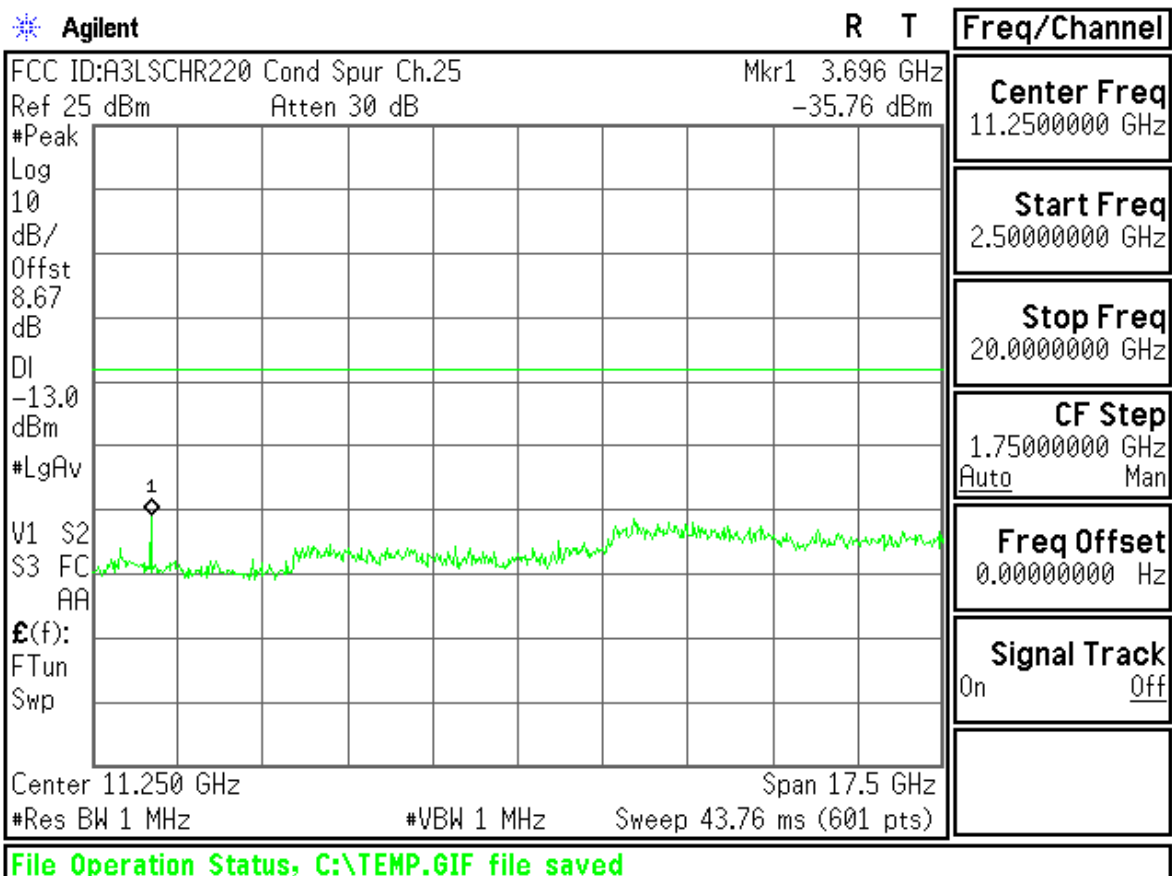
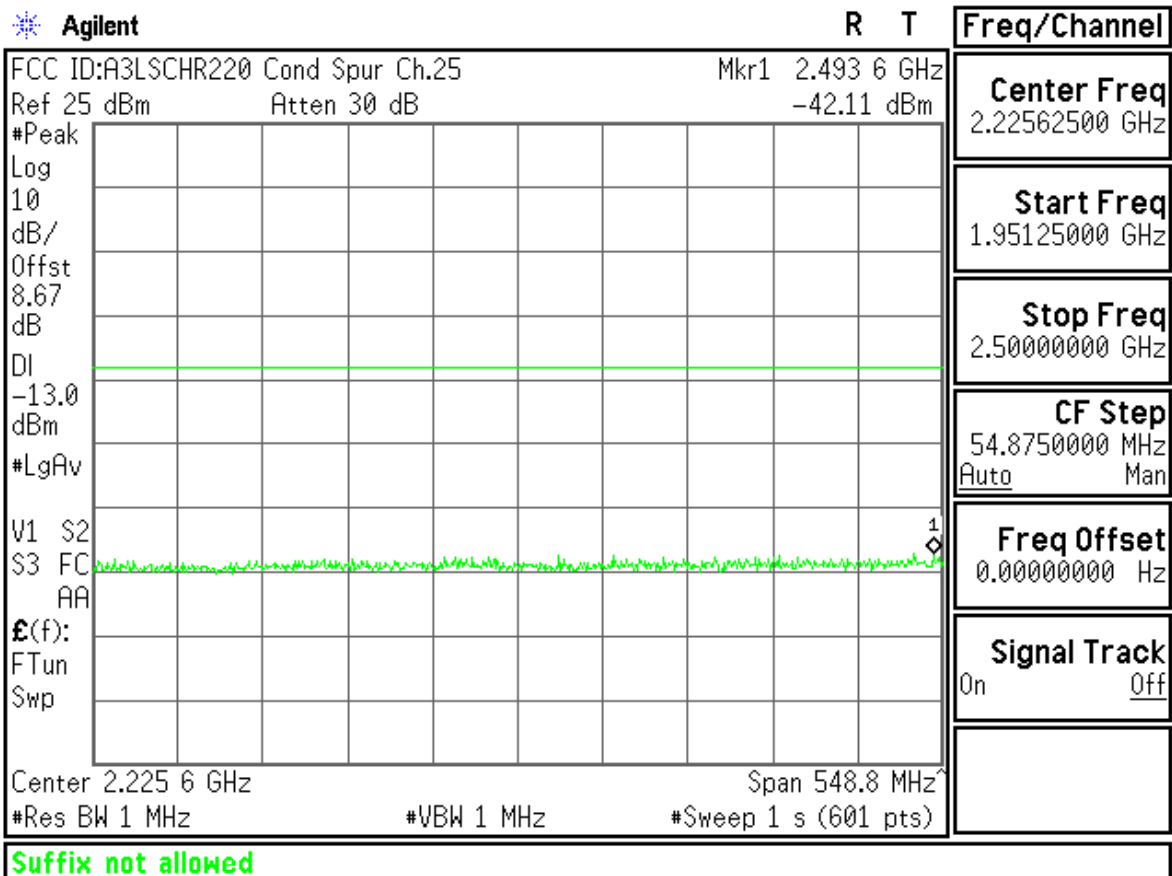
Span 1.741 GHz

#Res BW 1 MHz

#VBW 1 MHz

Sweep 2.92 ms (601 pts)

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



Agilent

R T

Freq/Channel

FCC ID:A3LSCHR220 Cond Spur Ch.600

Ref 25 dBm Atten 30 dB

#Peak

Log

10

dB/

Offst

8.67

dB

DI

-13.0

dBm

#LgAv

M1 S2

S3 FC

AA

$\mathcal{E}(f)$:

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 T

Freq/Channel

FCC ID:A3LSCHR220 Cond Spur Ch.600

Mkr1 364.00 MHz

Ref 25 dBm

Atten 30 dB

-43.13 dBm

#Peak

Log

10

dB/

Offst

8.67

dB

DI

-13.0

dBm

#LgAv

V1 S2

S3 FC

AA

$\mathcal{E}(f)$:

FTun

Swp

AC Coupled: unspecified below 20 MHz

Center Freq

895.000000 MHz

Start Freq

10.0000000 MHz

Stop Freq

1.78000000 GHz

CF Step

177.000000 MHz

Auto

Man

Freq Offset

0.00000000 Hz

Signal Track

On

Off

Center 895.00 MHz

Span 1.77 GHz

#Res BW 1 MHz

#VBW 1 MHz

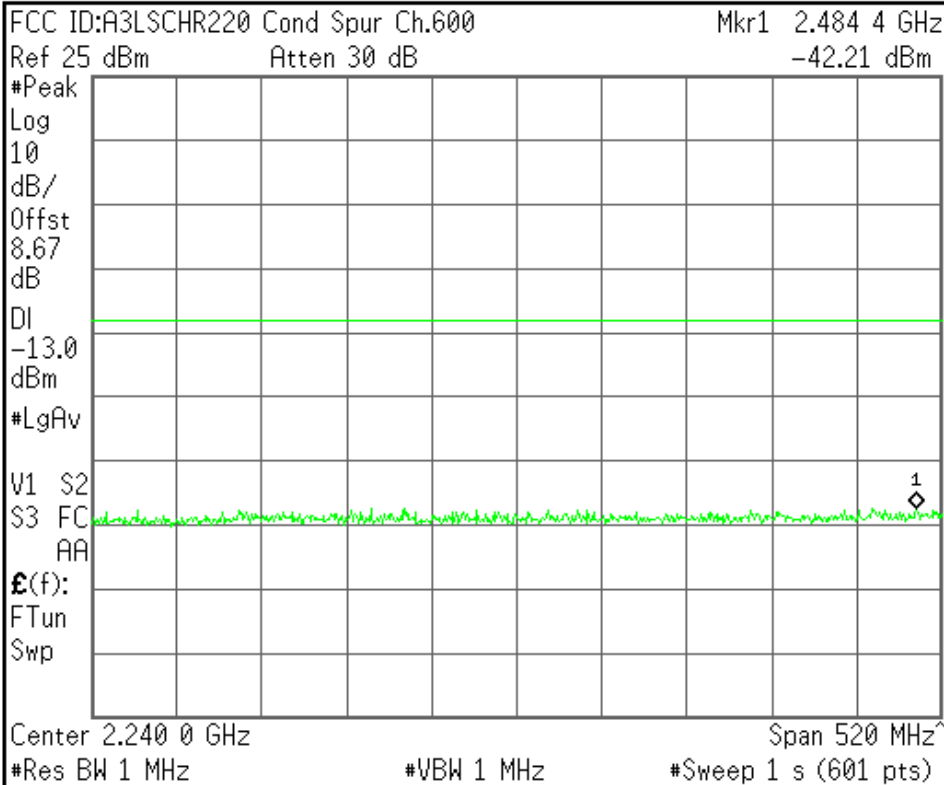
Sweep 2.96 ms (601 pts)

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

Agilent

R T

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

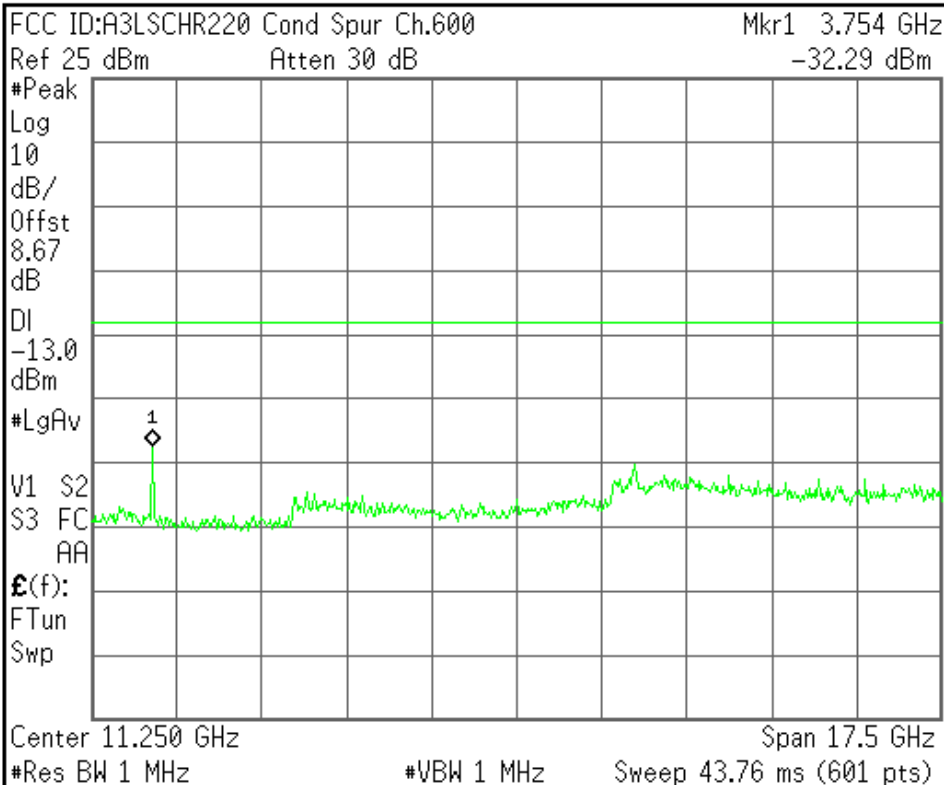
Signal Track
On Off

Suffix not allowed

Agilent

R 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 T

Freq/Channel

FCC ID:A3LSCHR220 Cond Spur Ch.1175

Ref 25 dBm

Atten 30 dB

#Peak

Log

10

dB/

Offst

8.67

dB

DI

-13.0

dBm

#LgAv

M1 S2

S3 FC

AA

£(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

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

Agilent

R T

Freq/Channel

FCC ID:A3LSCHR220 Cond Spur Ch.1175

Ref 25 dBm

Atten 30 dB

Mkr1 1.667 8 GHz

-42.52 dBm

#Peak

Log

10

dB/

Offst

8.67

dB

DI

-13.0

dBm

#LgAv

M1 S2

S3 FC

AA

£(f):

FTun

Swp

AC Coupled: unspecified below 20 MHz

Center 909.4 MHz

Span 1.799 GHz

#Res BW 1 MHz

#VBW 1 MHz

Sweep 3 ms (601 pts)

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

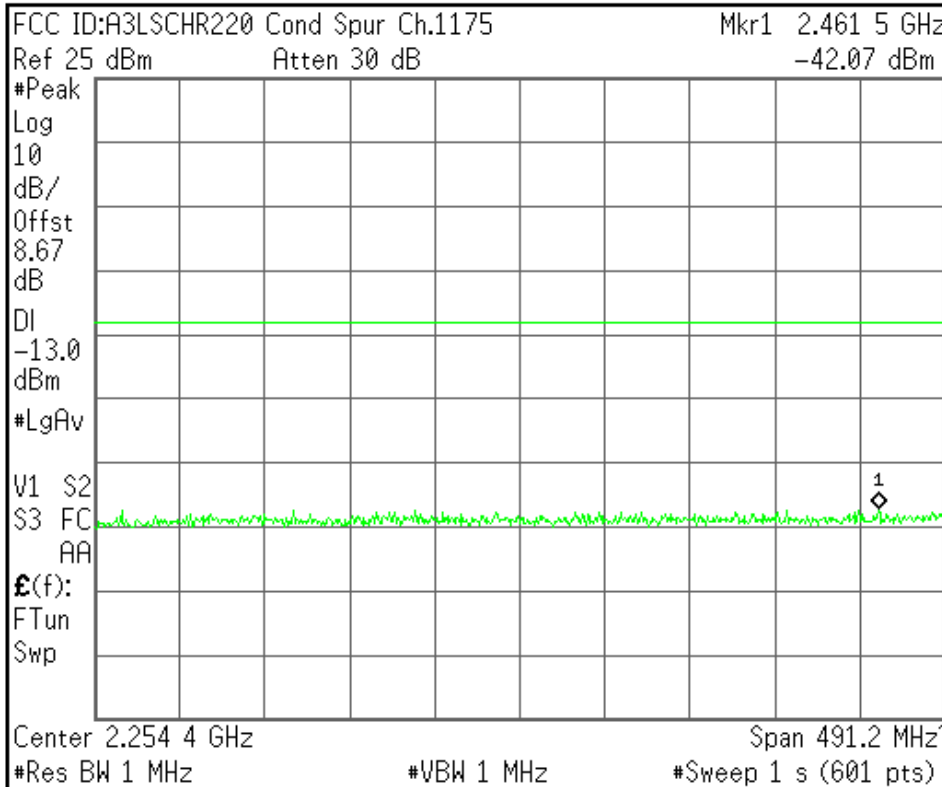
Signal Track
On Off

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

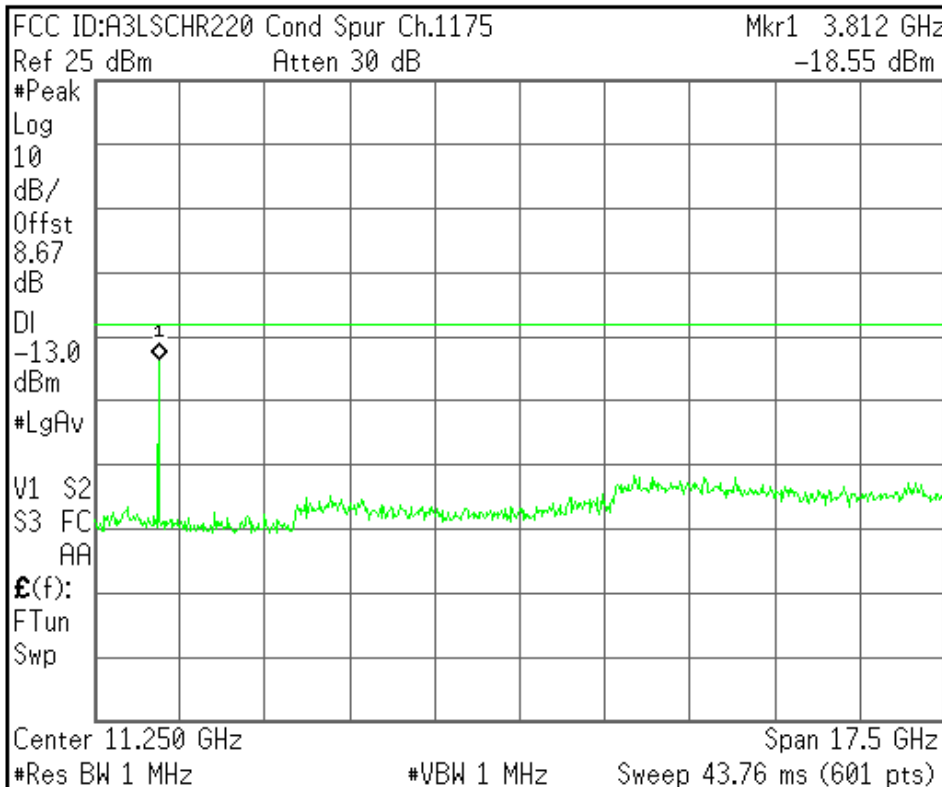
Signal Track
On Off

Suffix not allowed

Agilent

R 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

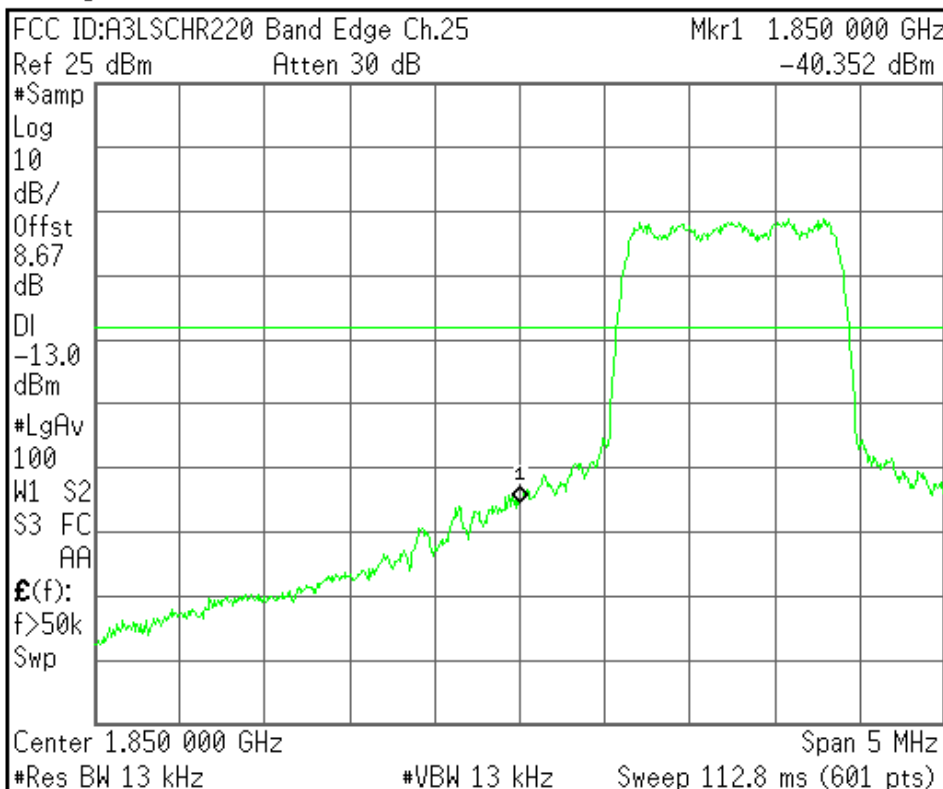
Signal Track
On Off

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

Agilent

R 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

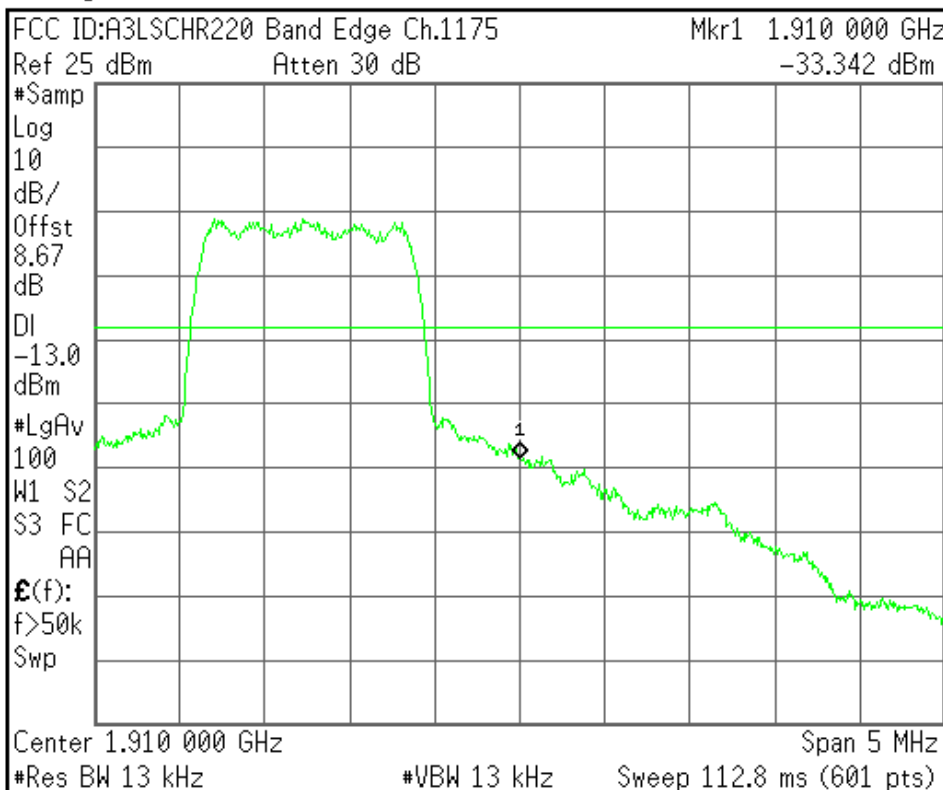
Signal Track
On Off

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

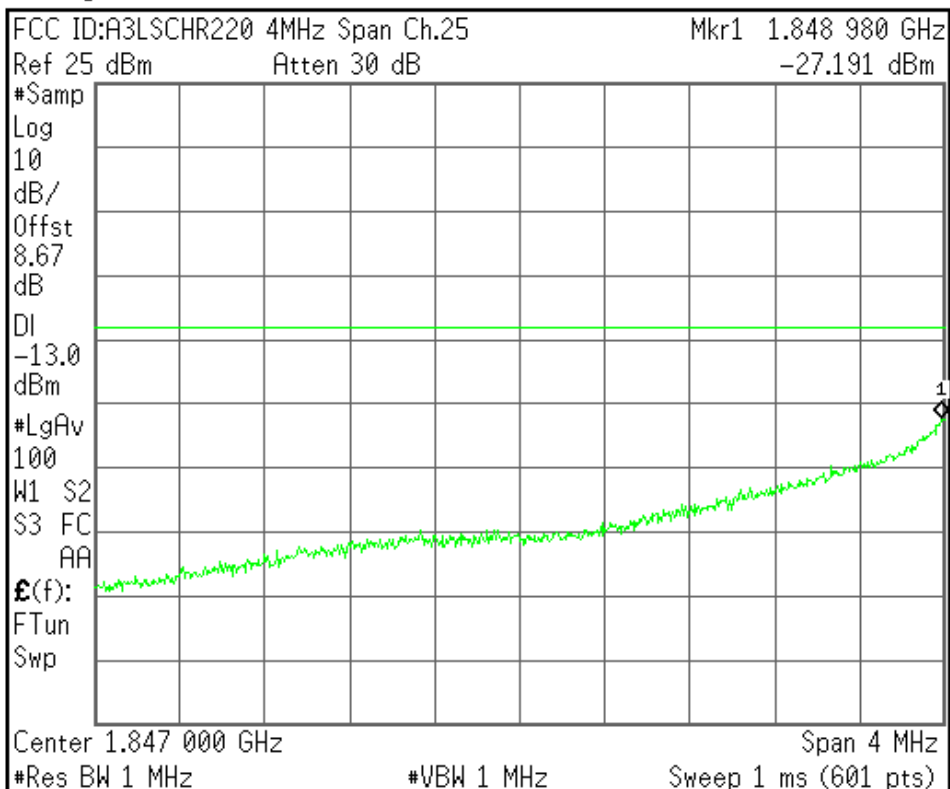
Signal Track
On Off

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

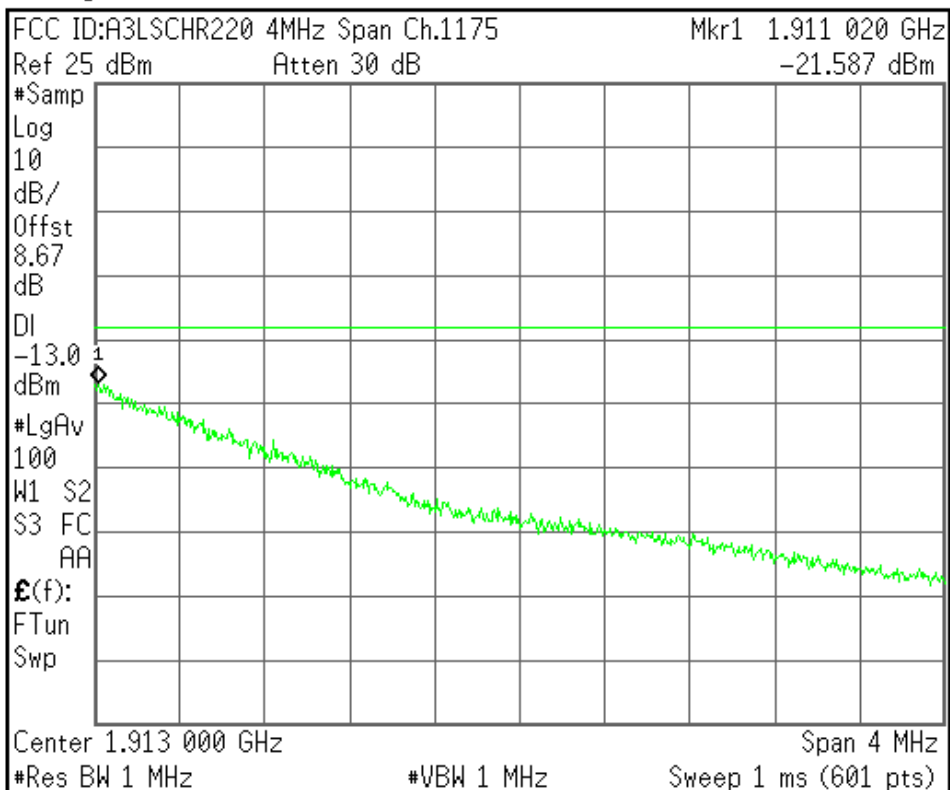
Signal Track
 On Off

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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 Operation Status, C:\TEMP.GIF file saved

