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Regulatory Compliance Group
IT R&D Center
416 Maetan3-Dong,
Yeongtong-gu, Suwon city,
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FCC CFR47 PART 22 & 24 SUBPART CERTIFICATION REPORT

Model Tested : SGH-X166
FCC ID(Requested) : A3LSGHX166
Report No : FD-078-R1
Job No : FD-078
Date issued : May 18, 2006

- Abstract -

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

Prepared By

Date

2006.05.18

YE PARK – Test Engineer

Checked By

Date

2006.05.19

WW JANG – Manager

Authorized By

Date

2006.05.19

SH PARK - Senior Manager

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MEASUREMENT REPORT

1. FCC Certification Information

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

1.1. §2.1033 General Information

- Applicant Name : SAMSUNG ELECTRONICS CO., LTD.
- Address : 416 Maetan3-Dong, Yeongtong-gu, Suwon City
Gyeonggi-Do, Korea 443-742
- Attention : SungJoo KIM, Engineering Manager (QA Lab)
- FCC ID : A3LSGHX166
- Quantity : Quantity production is planned
- Emission Designators : 252KGXW(GSM850)
249KGXW(GSM1900)
- Tx Freq. Range : 824.2 - 848.8MHz (GSM850)
1850.2MHz - 1909.8MHz (GSM1900)
- Rx Freq. Range : 869.2 - 893.8 MHz (GSM850)
1930.2MHz - 1989.8MHz (GSM1900)
- Max. Power Rating : 1.754 W ERP GSM850 (32.44dBm)
0.986 W EIRP GSM1900 (29.94dBm)
- FCC Classification(s) : Licensed Portable Tx Held to Ear (PCE)
- Equipment (EUT) Type : Dual-Band GSM850/1900 Phone
- Frequency Tolerance : $\pm 0.00025\%$ (2.5ppm)
- FCC Rule Part(s) : §24(E), §22(H), §2.
- Dates of Test : May 16-18, 2006
- Place of Test : SAMSUNG Lab,
- Test Report S/N : FD-078-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.

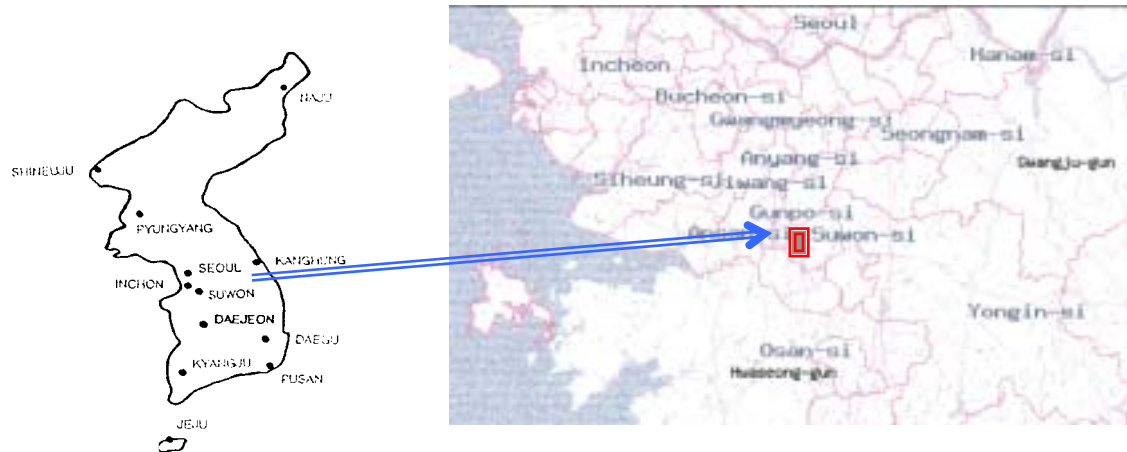


Figure1. Map of the Suwon City area.

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 a Non-conducted 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 at the same position and in vertical polarization. The frequency of the signal generator shall be set to the frequencies that were measured on the EUT. The test antenna shall be raised and lowered, if necessary, to ensure that the maximum signal is still being received. The signal generator, output level, shall be adjusted until an equal or a known related level to what was measured from the EUT is obtained in the spectrum analyzer. This level was recorded.

For readings above 1 GHz, the above procedure is repeated using horn antennas and the difference between the gain of the horn and an isotropic antenna are taken into consideration.

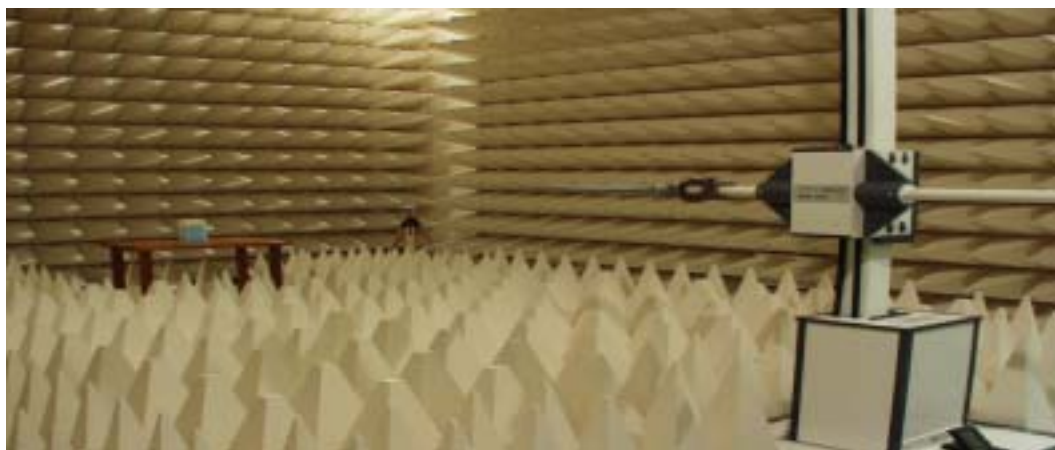


Figure2. Photograph of 3m Fully-Anechoic Chamber

3. MEASURING INSTRUMENT CALIBRATION

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

4. TEST EQUIPMENT LIST

Name Of Equipment	Model	Serial No.	Due Date
Spectrum Analyzer	ESI26	836119/010	2006-09-26
	E4440A(3Hz~26.5GHz)	MY41000236	2007-04-14
	E4440A(3Hz~26.5GHz)	MY41000233	2007-04-05
Signal Generator	SMIQ03B	83824/021	2006-12-07
	SMR20	835197/030	2007-01-10
Power Meter	E4419B	GB41293846	2006-09-07
Power Sensor	8481B	3318A10325	2006-09-08
	8485A	3318A19924	2006-09-08
Amplifier	5S1G4	304866	2006-10-18
Pre-Amplifier	8449B	3008A00691	2007-01-02
Communication test set	8960	GB42230535	2007-01-02
	8960	GB42360886	2007-02-28
Antenna Master	MA240	240/618	Not Required
Controller	HD100	100/756	Not Required
Environmental Chamber	SH-241	92000548	2006-11-22
	SH-241	92000549	2006-11-22
Horn Antenna	HF906	360306/011	2007-03-31
	HF906	100134	2007-05-04
Dipole Antenna	3121C-DB4	9007-587	2006-12-02
	3121C-DB4	9007-588	2006-06-04
Receive Antenna	HL040	353255/019	2006-08-24
	HL040	353255/020	2007-04-25
Divider	11636B	51941	Not Required
	11636B	51942	Not Required
	11636B	51946	Not Required
High Pass Filter	WHK1.0/15G-10SS	1	Not Required
	WHK/3.5/18G-10SS	4	Not Required
Shielded Fully Anechoic Chamber	CHAMBER	ANT0001	Not Required

5. DESCRIPTION OF TESTS

5.1. Effective Radiated Power / Equivalent Isotropic Radiated Power

Test Set-up for the ERP/EIRP TEST

Effective Radiated Power Output and Equivalent Isotropic Radiated Power Measurements by Substitution Method according to ANSI/TIA/EIA-603-A-2001, Aug. 15, 2001:

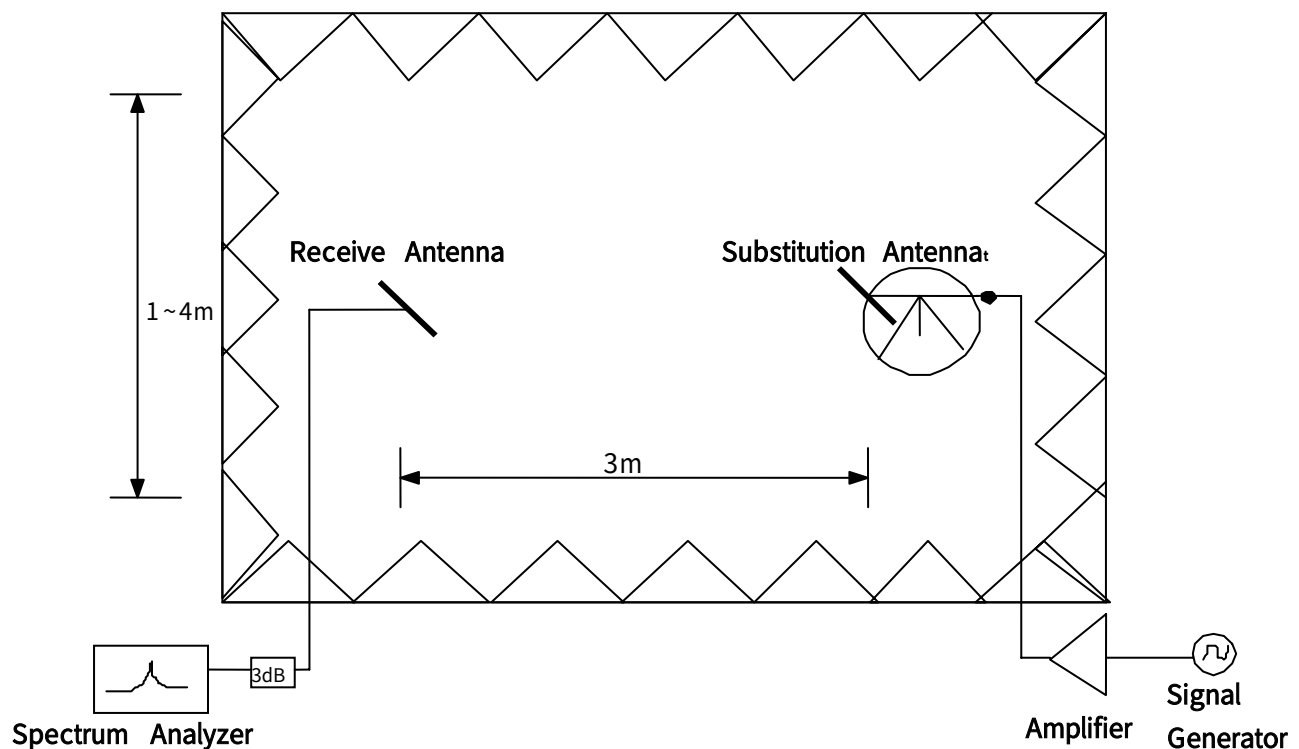


Figure 3. Diagram of ERP/EIRP test Set-up

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. For GSM 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.

5.2. 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

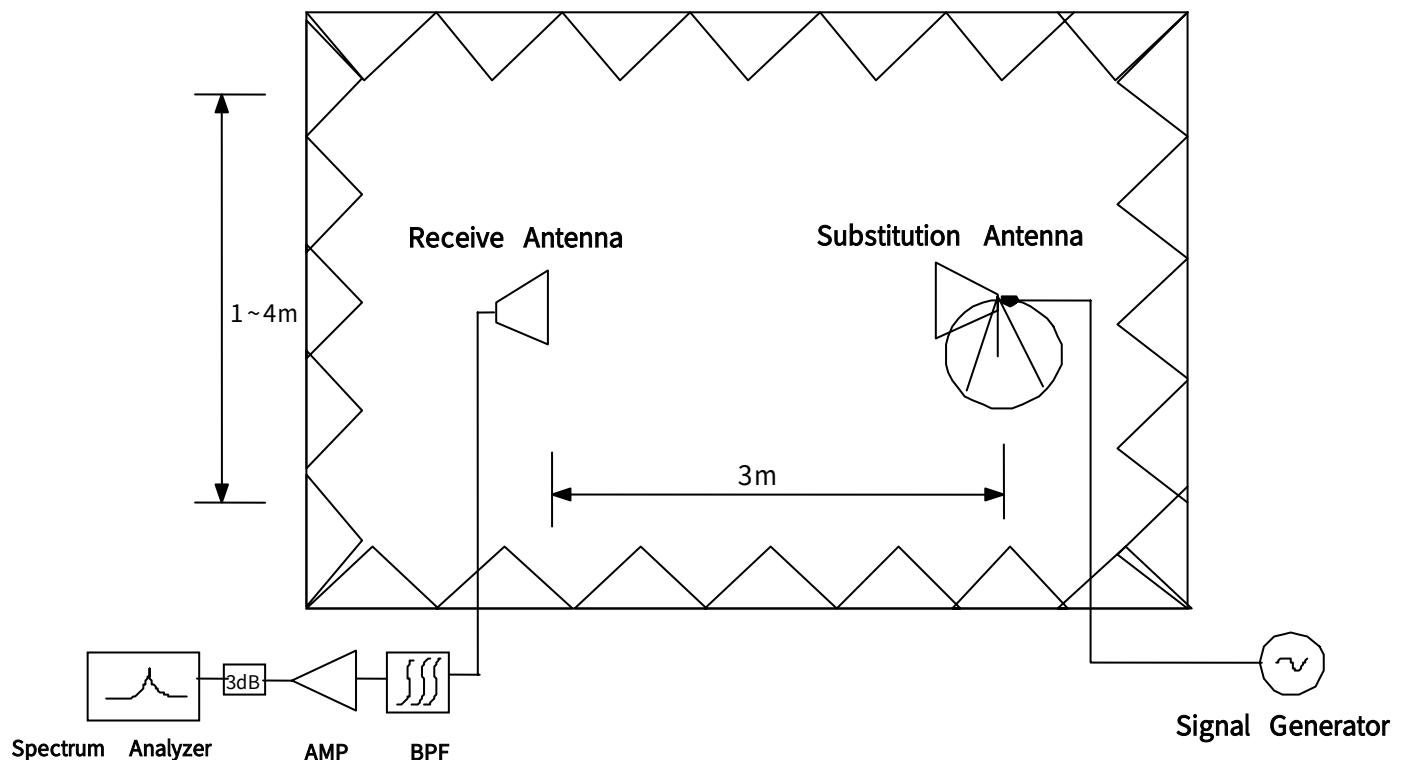


Figure 4. Diagram of Radiated Spurious & Harmonic test Set-up

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 661 , Second Harmonic(3760.00MHz)

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 3760.00MHz . 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 $25.5\text{dBm} - (-24.8) = 50.3\text{dBc}$.

5.3. 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 Emission 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.

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 -13dBm, calculation shown below.

$$43 + 10\log (1.754 \text{ W}) = 45.44 \text{ dB}$$

$$32.44 \text{ dBm} - 45.44 \text{ dB} = -13 \text{ dBm}$$

Compliance with the out-of-band emissions requirement is based on test being performed with an analyzer resolution bandwidth of 1MHz. However in the 1MHz band immediately outside and adjacent to the frequency block a resolution bandwidth of at least 1% of the fundamental emissions bandwidth may be employed.

In case of GSM : $0.01 * 273\text{KHz} = 2.73\text{KHz}$
A Resolution BW of 3KHz was used for measurement at the band edges.

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 -13dBm 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. (GSM1900 Mode : 10MHz to 20GHz). A display line was placed at -13dBm 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 ($\pm 2.5\text{ppm}$) 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.

6. TEST DATA

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

Supply Voltage : 3.7VDC

Modulation : GSM850

■ Reference level

Frequency (MHz)	Output (dBm)	Polarization (H/V)	S/A (dBm)	Ant gain (dBi)	Ref level (dBm)
824.20	25.00	H	-13.96	0.00	-13.96
		V	-13.73	0.00	-13.73
836.60	25.00	H	-13.96	0.00	-13.96
		V	-13.73	0.00	-13.73
848.80	25.00	H	-13.96	0.00	-13.96
		V	-13.73	0.00	-13.73

■ Result

Frequency (MHz)	Tested level (dBm)	Polarization (H/V)	Azimuth (angle)	ERP (dBm)	ERP (W)	Battery
824.20	-7.91	H1	181	31.05	1.274	Standard
836.60	-6.68	H1	181	32.28	1.690	Standard
848.80	-6.52	H1	181	32.44	1.754	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 1900

■ Reference level

Frequency (MHz)	Output (dBm)	Polarization (H/V)	S/A (dBm)	Ant gain (dBi)	Ref level (dBm)
1850.20	27.00	H	-14.53	8.42	-22.95
		V	-14.48	8.42	-22.90
1880.00	27.00	H	-14.87	8.25	-23.12
		V	-14.97	8.25	-23.22
1909.80	27.00	H	-14.54	8.40	-22.94
		V	-14.60	8.40	-23.00

■ Result

Frequency (MHz)	Tested level (dBm)	Polarization (H/V)	Azimuth (angle)	EIRP (dBm)	EIRP (W)	Battery
1850.20	-20.01	H2	14	29.94	0.986	Standard
1880.00	-21.30	H2	20	28.82	0.762	Standard
1909.80	-22.04	H2	28	27.90	0.617	Standard

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

Radiated measurements at 3 meters by Substitution Method

6.3. GSM850 Radiated Spurious & Harmonic measurement

Operating Frequency : 824.20 MHz(Low), 836.60MHz(Middle), 848.80MHz(High)

Measured Output Power : 32.44 dBm = 1.754 W

Modulation Signal : GSM850

Limit : $43 + 10\log_{10}(P) = 45.44 \text{ dBc}$

■ Result

Channel	Harmonic	Frequency (MHz)	From EUT Tested level (dBm)	POL (H/V)	Result (dBc)
128	2	1648.40	-36.27	H2	56.83
	3	2472.60	-60.32	H1	74.96
	4	3296.80	-61.61	H2	71.78
	5	4121.00	-59.49	H2	66.37
	6	4945.20	-67.49	H2	70.55
	7	5769.40	-	-	-
190	2	1673.20	-40.45	H2	60.80
	3	2509.80	-60.3	V	74.53
	4	3346.40	-60.01	H2	71.25
	5	4183.00	-60.66	H2	68.05
	6	5019.60	-67.63	H2	70.76
	7	5856.20	-	-	-
251	2	1697.60	-44.99	H2	63.31
	3	2546.40	-62.57	V	76.73
	4	3395.20	-59	H2	70.18
	5	4244.00	-60.55	H1	68.49
	6	5092.80	-68.52	H1	70.56
	7	5941.60	-	-	-

Radiated Spurious Emission measurements at 3 meters by Substitution Method

6.4. GSM1900 Radiated Spurious & Harmonic measurement

Operating Frequency : 1850.2 MHz(Low), 1880.00 MHz(Middle), 1909.80 MHz(High)

Measured Output Power : 29.94 dBm = 0.986 W

Modulation Signal : GSM1900

Limit : $43 + 10\log_{10}(P) = 42.94 \text{ dBc}$

■ Result

Channel	Harmonic	Frequency (MHz)	From EUT Tested level (dBm)	POL (H/V)	Result (dBc)
512	2	3700.40	-62.72	H2	65.21
	3	5550.60	-61.97	H2	59.24
	4	7400.80	-61.59	V	57.43
	5	9251.00	-65.11	H2	56.06
	6	11101.20	-68.28	H2	54.41
	7	12951.40	-	-	-
661	2	3760.00	-63.19	H2	66.34
	3	5640.00	-61.44	H2	58.92
	4	7520.00	-60.93	H2	55.35
	5	9400.00	-63.76	H2	54.39
	6	11280.00	-67.89	H2	54.05
	7	13160.00	-	-	-
810	2	3819.60	-63.52	H2	66.06
	3	5729.40	-62.21	H2	59.34
	4	7639.20	-61.93	H2	54.66
	5	9549.00	-64.54	H2	54.80
	6	11458.80	-68.03	H1	53.42
	7	13368.60	-	-	-

Radiated Spurious Emission measurements at 3 meters by Substitution Method

6.5. GSM850 Radiated Spurious & Harmonic Conversion Table

Date : 2006. 05. 18

Test Engineer : YE PARK

- ① Tx Cable loss
- ② Tx Horn Ant Gain
- ③ Rx Cable loss + HPF Insertion loss + Attenuator
- ④ Pre-Amp gain
- ⑤ Air loss
- ⑥ Tested Level from EUT
- ⑦ = ⑥ + ⑤ + ③ - ④
- ⑧ = ERP - 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)
128	2	1648.40	7.70	8.03	0.33	-36.27	-38.02	-22.25	-24.18	56.83	58.76
	3	2472.60	9.92	9.55	-0.37	-60.32	-61.64	-40.38	-41.51	74.96	76.09
	4	3296.80	11.67	9.64	-2.03	-61.61	-64.71	-37.20	-39.70	71.78	74.28
	5	4121.00	13.24	10.67	-2.57	-59.49	-62.06	-31.79	-34.64	66.37	69.22
	6	4945.20	14.53	11.05	-3.48	-67.49	-67.41	-35.97	-37.10	70.55	71.68
	7	5769.40	16.87	11.23	-5.64	-	-	-	-	-	-
190	2	1673.20	7.80	8.03	0.23	-40.45	-40.98	-26.22	-26.93	60.80	61.51
	3	2509.80	10.06	9.55	-0.51	-62.77	-60.30	-42.85	-39.95	77.43	74.53
	4	3346.40	11.45	9.64	-1.81	-60.01	-64.83	-36.67	-40.67	71.25	75.25
	5	4183.00	13.72	10.67	-3.05	-60.66	-64.23	-33.47	-37.17	68.05	71.75
	6	5019.60	15.43	11.05	-4.38	-67.63	-67.99	-36.18	-37.06	70.76	71.64
	7	5856.20	17.19	11.23	-5.96	-	-	-	-	-	-
251	2	1697.60	7.96	8.03	0.07	-44.99	-47.38	-28.73	-31.70	63.31	66.28
	3	2546.40	10.15	9.55	-0.60	-62.69	-62.57	-42.36	-42.15	76.94	76.73
	4	3395.20	11.62	9.64	-1.98	-59.00	-65.81	-35.60	-41.42	70.18	76.00
	5	4244.00	13.71	10.67	-3.04	-60.55	-65.21	-33.91	-38.05	68.49	72.63
	6	5092.80	15.71	11.05	-4.66	-68.52	-68.49	-35.98	-37.38	70.56	71.96
	7	5941.60	17.09	11.23	-5.86	-	-	-	-	-	-

6.6. GSM1900 Radiated Spurious & Harmonic Conversion Table

Date : 2006. 05. 18

Test Engineer : YE PARK

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

CH	Har	Frequency (MHz)	① Tx CL (dB)	② Horn Gain (dB)	Tx Level @ (S/G 10dBm)	⑥ Tested Level EUT : H (dBm)	⑥ Tested Level EUT : V (dBm)	⑦ Amplitude of Emission EUT : H (dBm)	⑦ Amplitude of Emission EUT : V (dBm)	⑧ Result EUT : H (dBc)	⑧ Result EUT : V (dBc)
512	2	3700.40	12.22	9.73	7.51	-62.72	-64.57	-35.27	-37.06	65.21	67.00
	3	5550.60	16.91	11.55	4.64	-61.97	-62.02	-29.30	-30.46	59.24	60.40
	4	7400.80	20.66	11.44	0.78	-63.58	-61.59	-27.55	-27.49	57.49	57.43
	5	9251.00	24.06	12.17	-1.89	-65.11	-65.30	-26.12	-26.72	56.06	56.66
	6	11101.20	27.70	13.66	-4.04	-68.28	-67.72	-24.47	-24.48	54.41	54.42
	7	12951.40	31.86	13.27	-8.59	-	-	-	-	-	-
661	2	3760.00	12.40	9.73	7.33	-63.19	-65.50	-36.40	-38.34	66.34	68.28
	3	5640.00	16.83	11.55	4.72	-61.44	-61.71	-28.98	-29.61	58.92	59.55
	4	7520.00	21.17	11.44	0.27	-60.93	-61.06	-25.41	-27.14	55.35	57.08
	5	9400.00	24.51	12.17	-2.34	-63.76	-66.52	-24.45	-27.87	54.39	57.81
	6	11280.00	28.38	13.66	-4.72	-67.89	-68.67	-24.11	-25.09	54.05	55.03
	7	13160.00	33.20	13.27	-9.93	-	-	-	-	-	-
810	2	3819.60	13.76	9.73	5.97	-63.52	-66.71	-36.12	-38.71	66.06	68.65
	3	5729.40	17.34	11.55	4.21	-62.21	-61.97	-29.40	-29.50	59.34	59.44
	4	7639.20	21.14	11.44	0.30	-61.93	-62.18	-24.72	-26.16	54.66	56.10
	5	9549.00	26.03	12.17	-3.86	-64.54	-67.30	-24.86	-28.88	54.80	58.82
	6	11458.80	28.52	13.66	-4.86	-68.03	-68.53	-23.48	-24.84	53.42	54.78
	7	13368.60	32.87	13.27	-9.60	-	-	-	-	-	-

6.7. Frequency Stability

6.7.1. GSM850 Frequency Stability Table

Operating Frequency : 836,600,000 Hz

Channel : 190

Reference Voltage : 3.7VDC

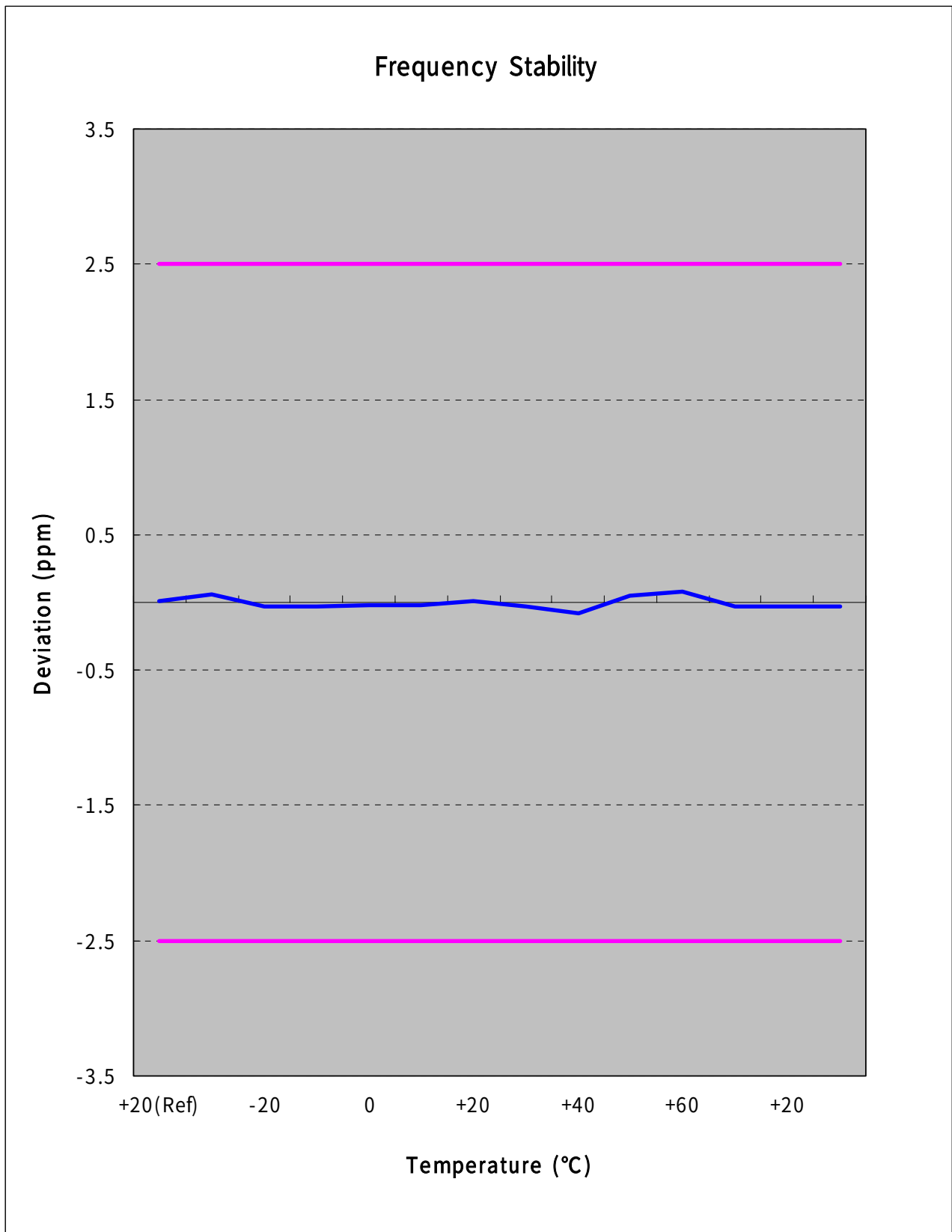
Deviation Limit : ± 0.00025 % or 2.5ppm

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency Error (Hz)	Frequency (Hz)	Deviation (%)	ppm
100%	3.70	+20(Ref)	8.00	836,600,008	0.000001	0.010
100%		-30	51.58	836,600,052	0.000006	0.062
100%		-20	-21.34	836,599,979	-0.000003	-0.026
100%		-10	-24.41	836,599,976	-0.000003	-0.029
100%		0	-16.75	836,599,983	-0.000002	-0.020
100%		+10	-12.94	836,599,987	-0.000002	-0.015
100%		+20	8.00	836,600,008	0.000001	0.010
100%		+30	-26.89	836,599,973	-0.000003	-0.032
100%		+40	-67.60	836,599,932	-0.000008	-0.081
100%		+50	44.95	836,600,045	0.000005	0.054
100%		+60	68.11	836,600,068	0.000008	0.081
85%	3.35	+20	-22.64	836,599,977	-0.000003	-0.027
115%	4.26	+20	-24.56	836,599,975	-0.000003	-0.029
Batt.Endpoint	3.35	+20	-22.64	836,599,977	-0.000003	-0.027

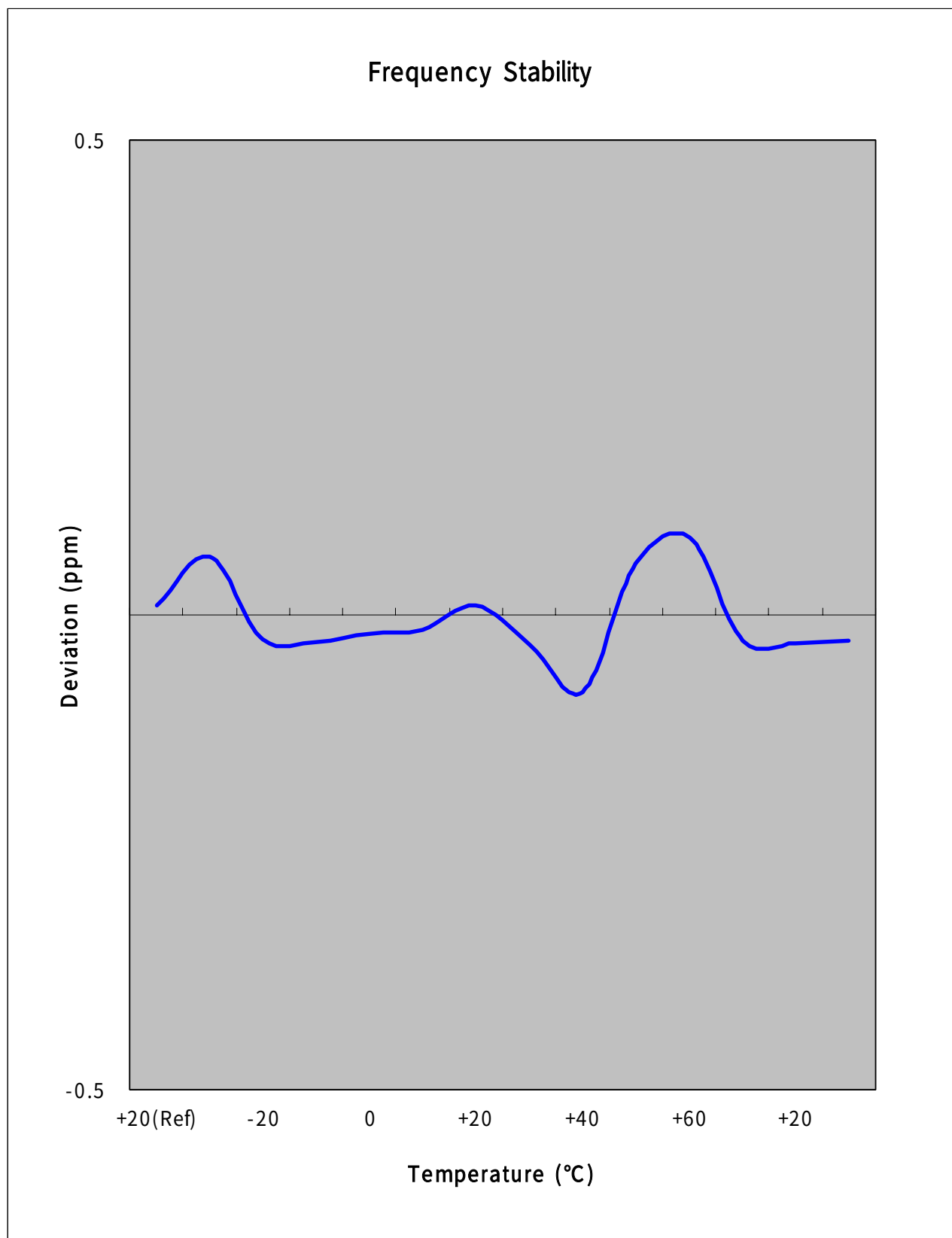
Note : The temperature is varied from -30 °C to +60 °C using an environmental chamber.

The EUT is tested down to the battery end point.

6.7.2. GSM850 Frequency Stability Graph



Zoom IN



6.7.3. GSM1900 Frequency Stability Table

Operating Frequency : 1,880,000,000 Hz

Channel : 661

Reference Voltage : 3.7VDC

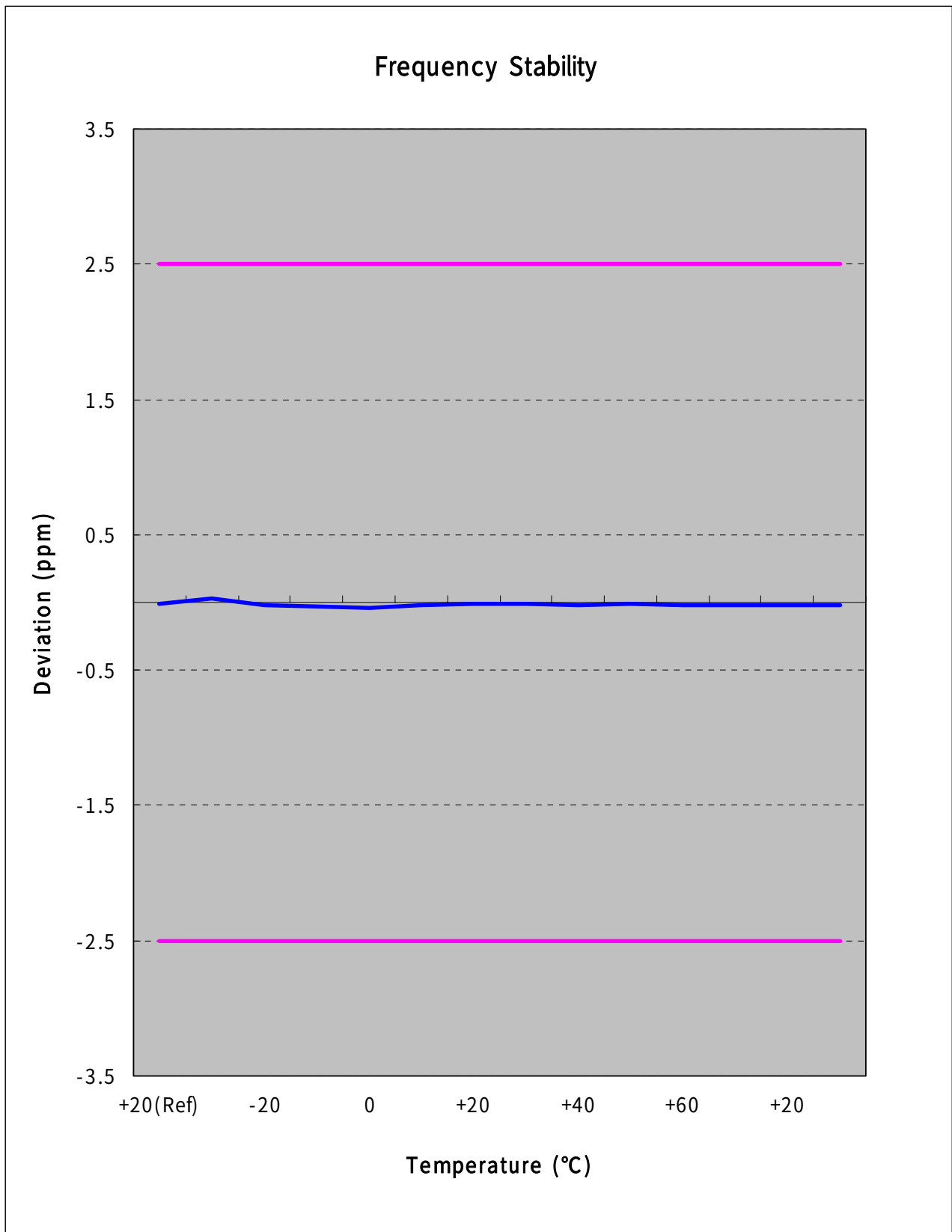
Deviation Limit : ± 0.00025 % or 2.5ppm

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency Error (Hz)	Frequency (Hz)	Deviation (%)	ppm
100%	3.70	+20(Ref)	-25.59	1,879,999,974	-0.000001	-0.014
100%		-30	57.58	1,880,000,058	0.000003	0.031
100%		-20	-30.45	1,879,999,970	-0.000002	-0.016
100%		-10	-48.76	1,879,999,951	-0.000003	-0.026
100%		0	-67.72	1,879,999,932	-0.000004	-0.036
100%		+10	-43.26	1,879,999,957	-0.000002	-0.023
100%		+20	-25.59	1,879,999,974	-0.000001	-0.014
100%		+30	-20.20	1,879,999,980	-0.000001	-0.011
100%		+40	-28.58	1,879,999,971	-0.000002	-0.015
100%		+50	-20.54	1,879,999,979	-0.000001	-0.011
100%		+60	-43.59	1,879,999,956	-0.000002	-0.023
85%	3.35	+20	-46.08	1,879,999,954	-0.000002	-0.025
115%	4.26	+20	-33.72	1,879,999,966	-0.000002	-0.018
Batt.Endpoint	3.35	+20	-46.08	1,879,999,954	-0.000002	-0.025

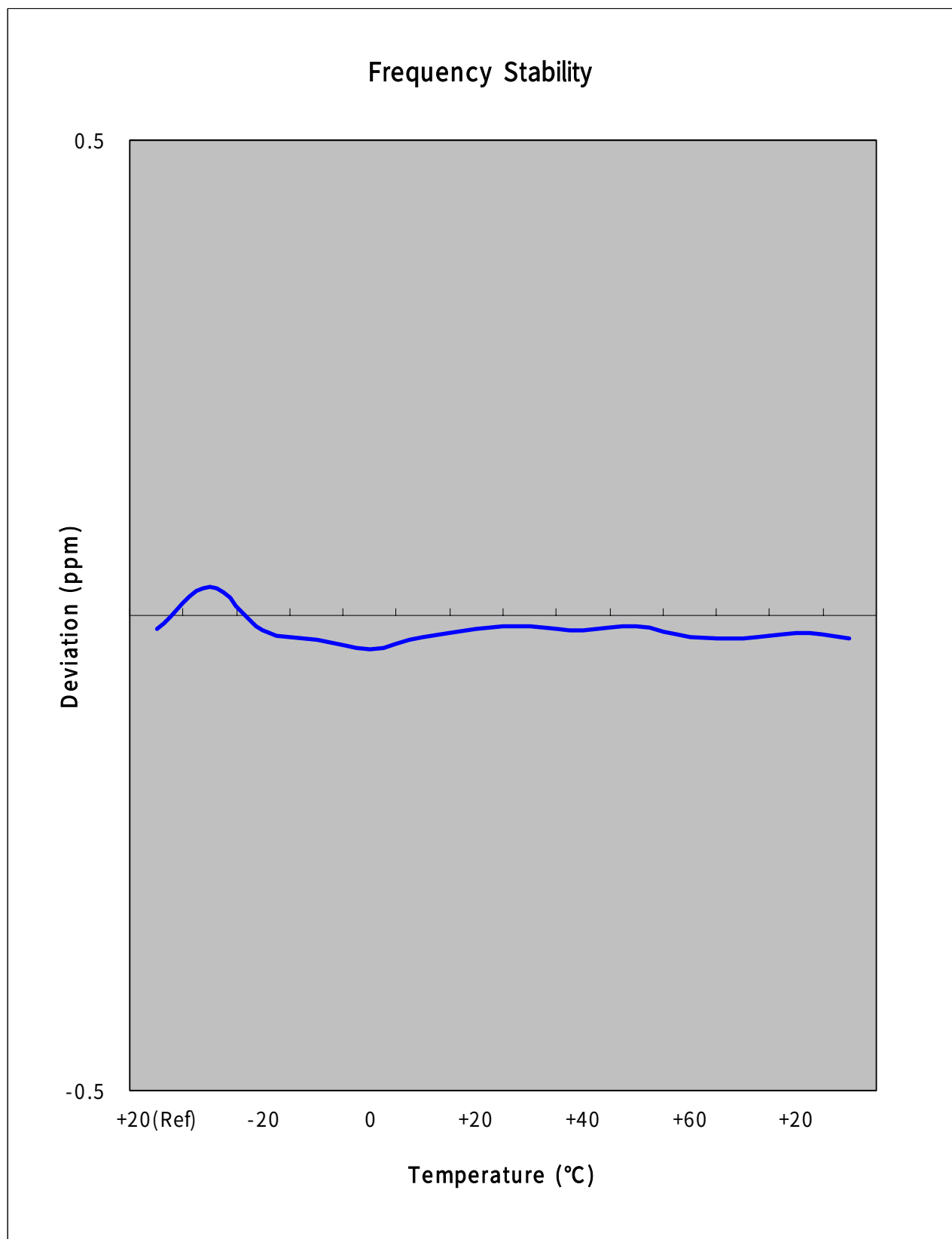
Note : The temperature is varied from -30 °C to +60 °C using an environmental chamber.

The EUT is tested down to the battery end point.

6.7.4. GSM1900 Frequency Stability Graph



Zoom IN





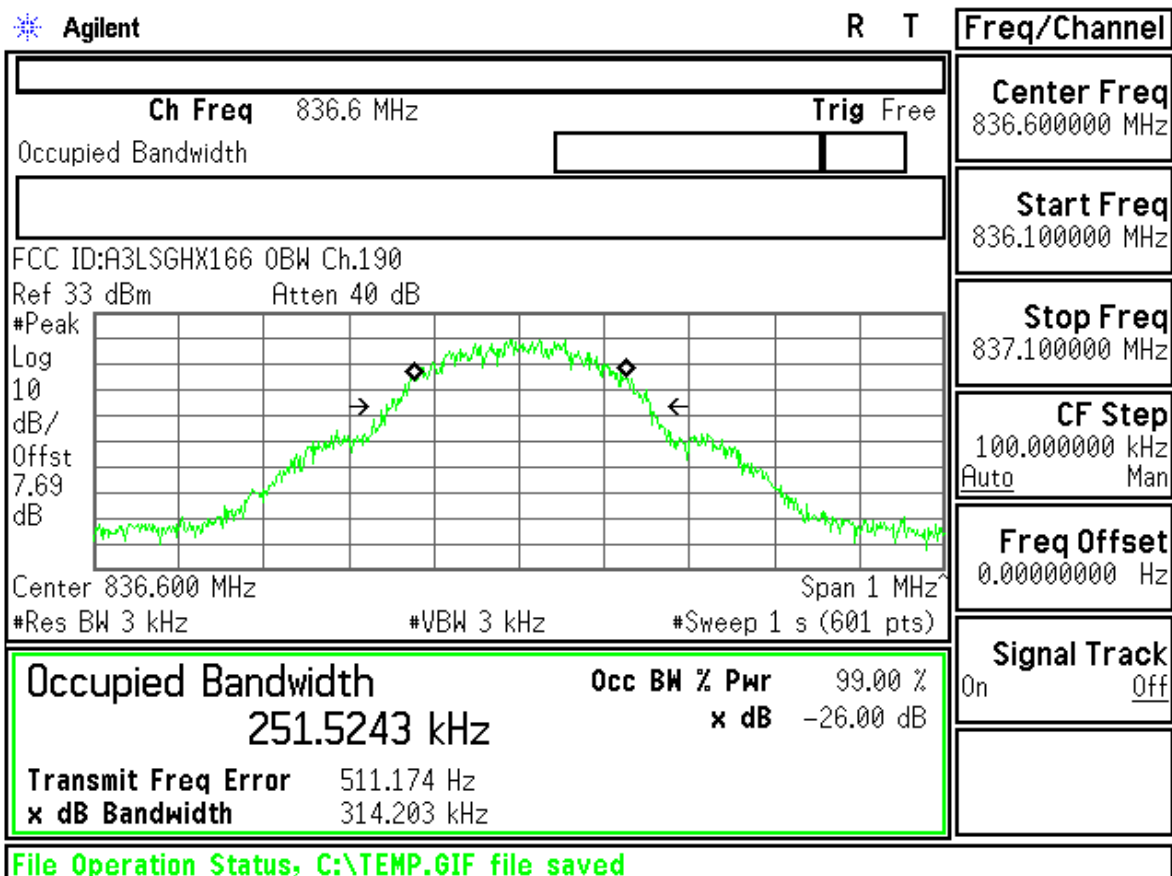
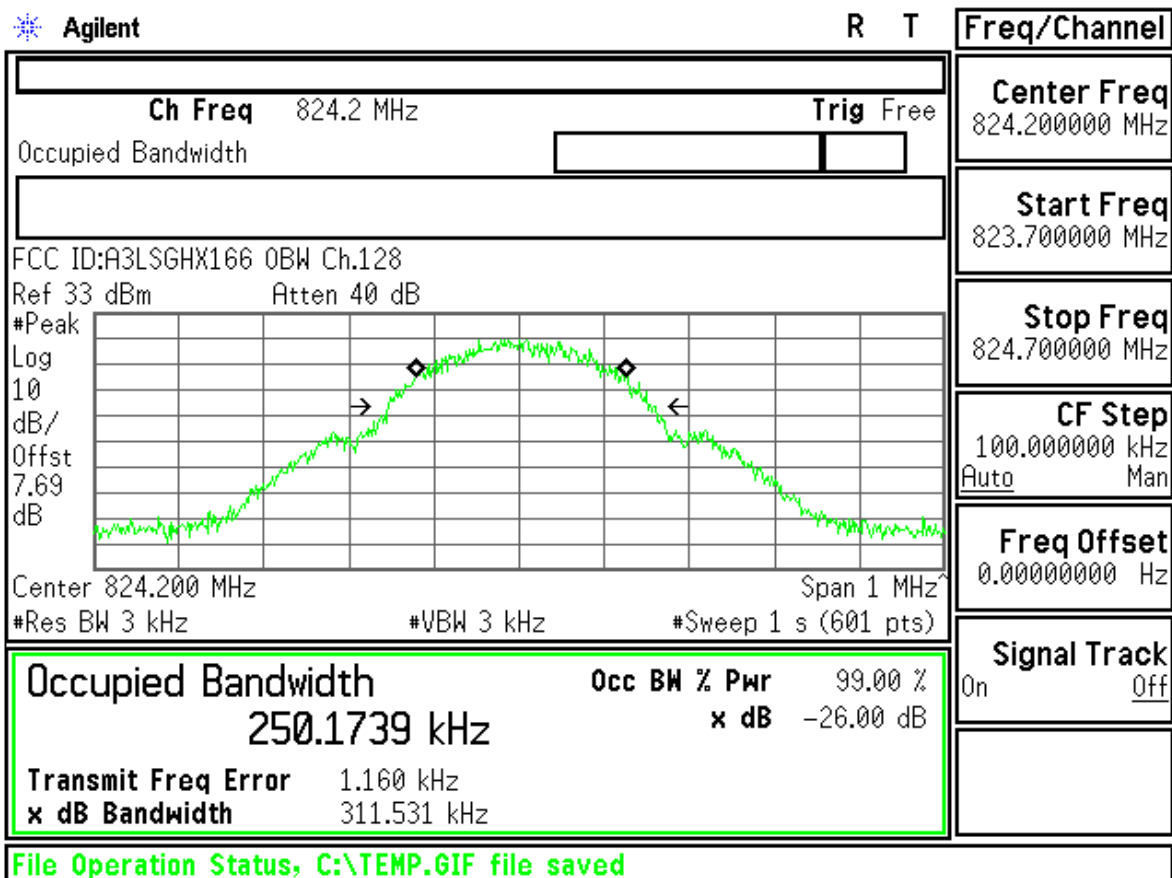
7. CONCLUSION

The data collected shows that the SAMSUNG Dual-Band GSM850/1900 Phone.

FCC ID : A3LSGHX166 complies with all the requirements of Parts 2,22,24 of the FCC Rules.

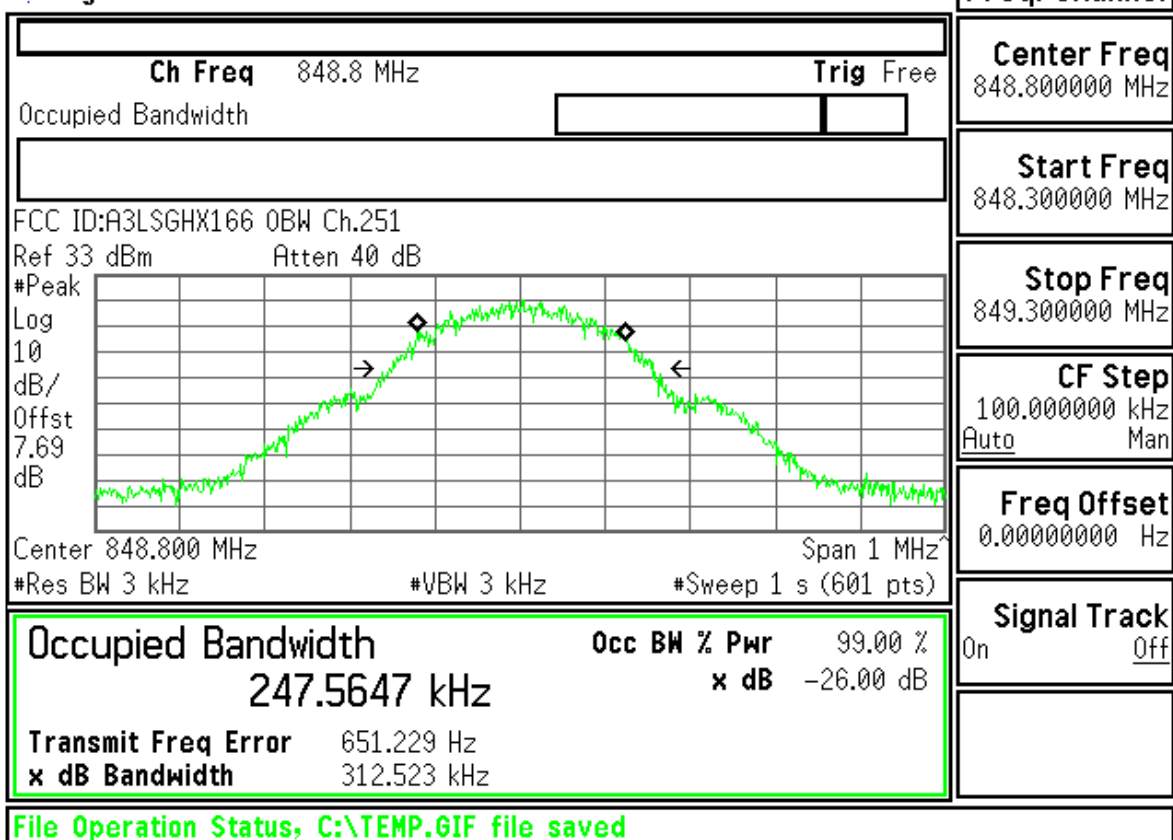
8. TEST PLOTS

GSM850



Agilent

R T



Freq/Channel

Center Freq
848.800000 MHz

Start Freq
848.300000 MHz

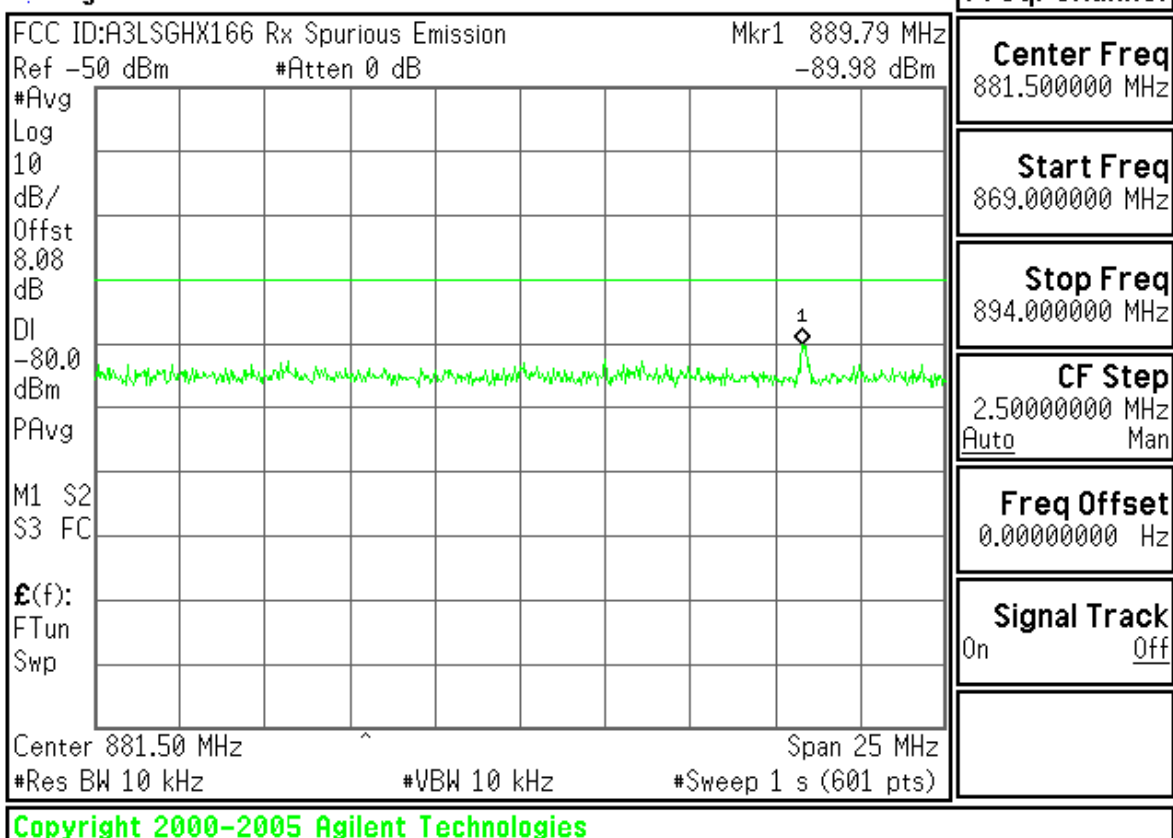
Stop Freq
849.300000 MHz

CF Step
100.000000 kHz
Auto Man

Freq Offset
0.00000000 Hz

Signal Track
On Off

Agilent



Freq/Channel

Center Freq
881.500000 MHz

Start Freq
869.000000 MHz

Stop Freq
894.000000 MHz

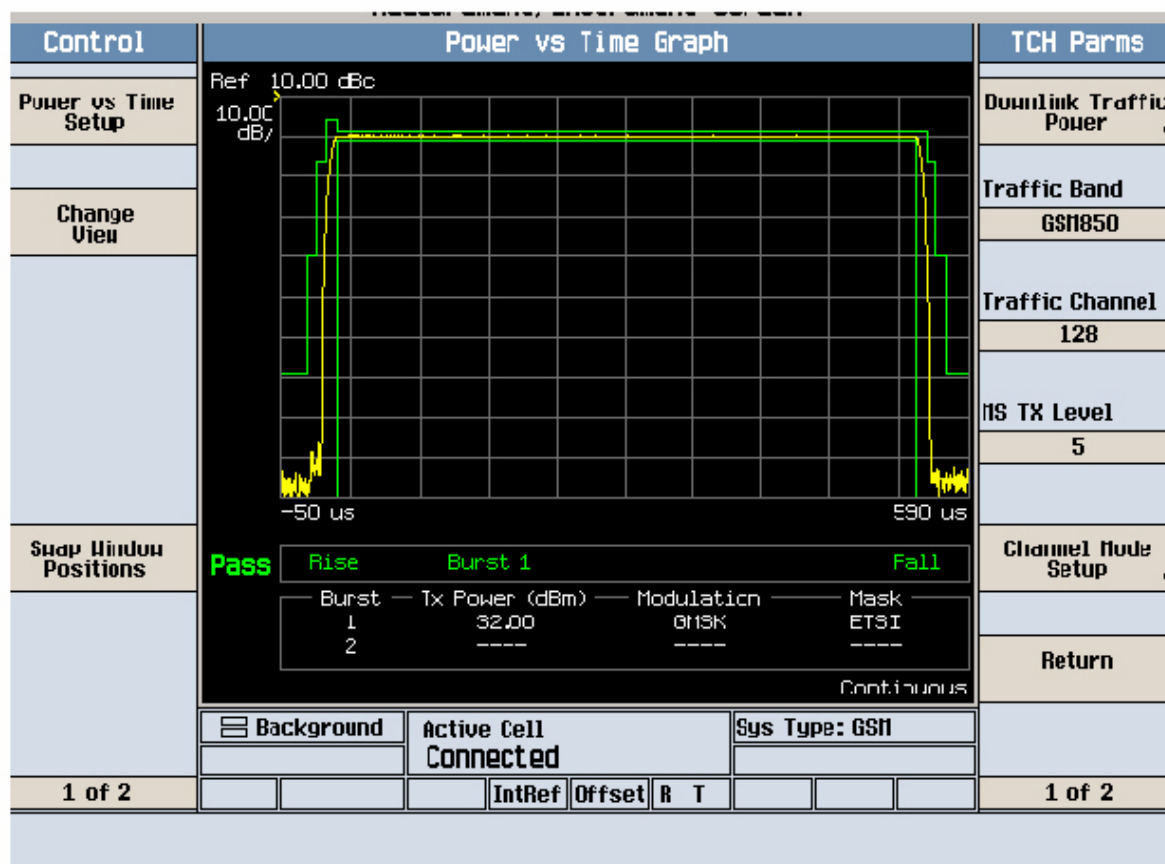
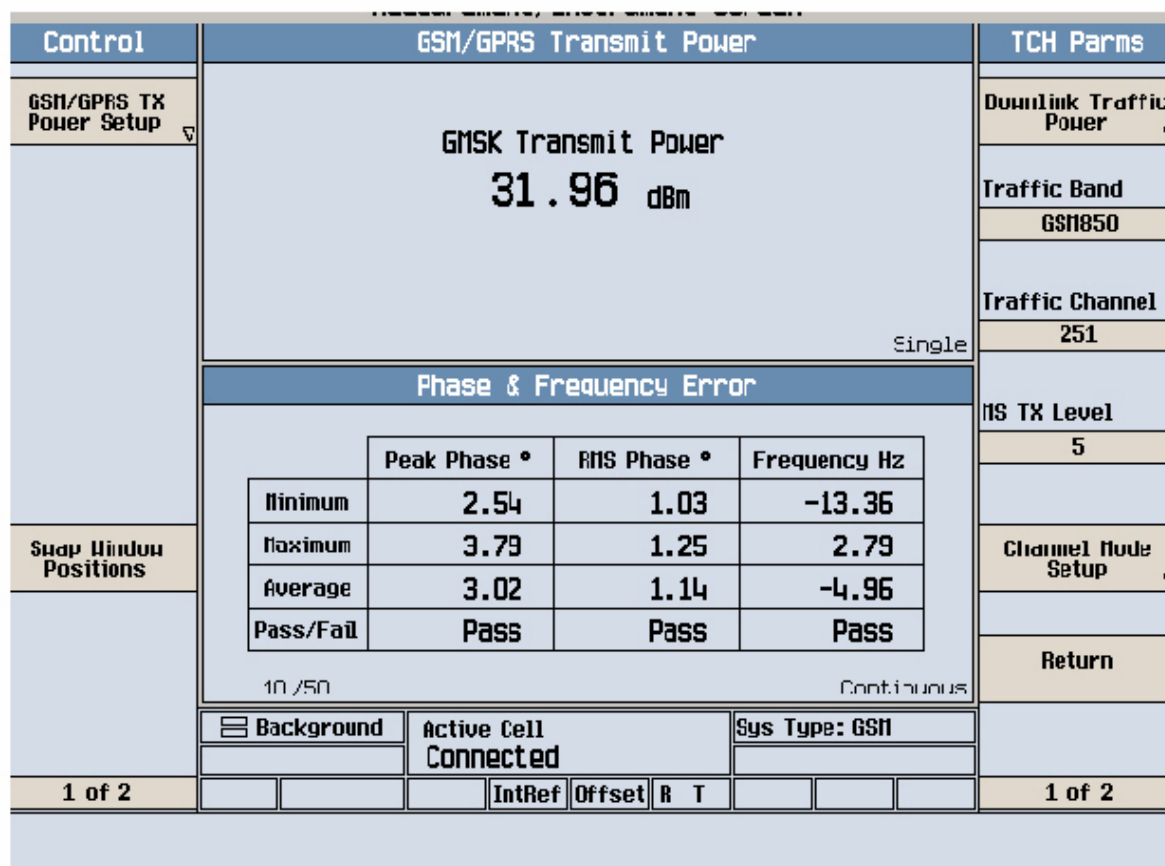
CF Step
2.50000000 MHz
Auto Man

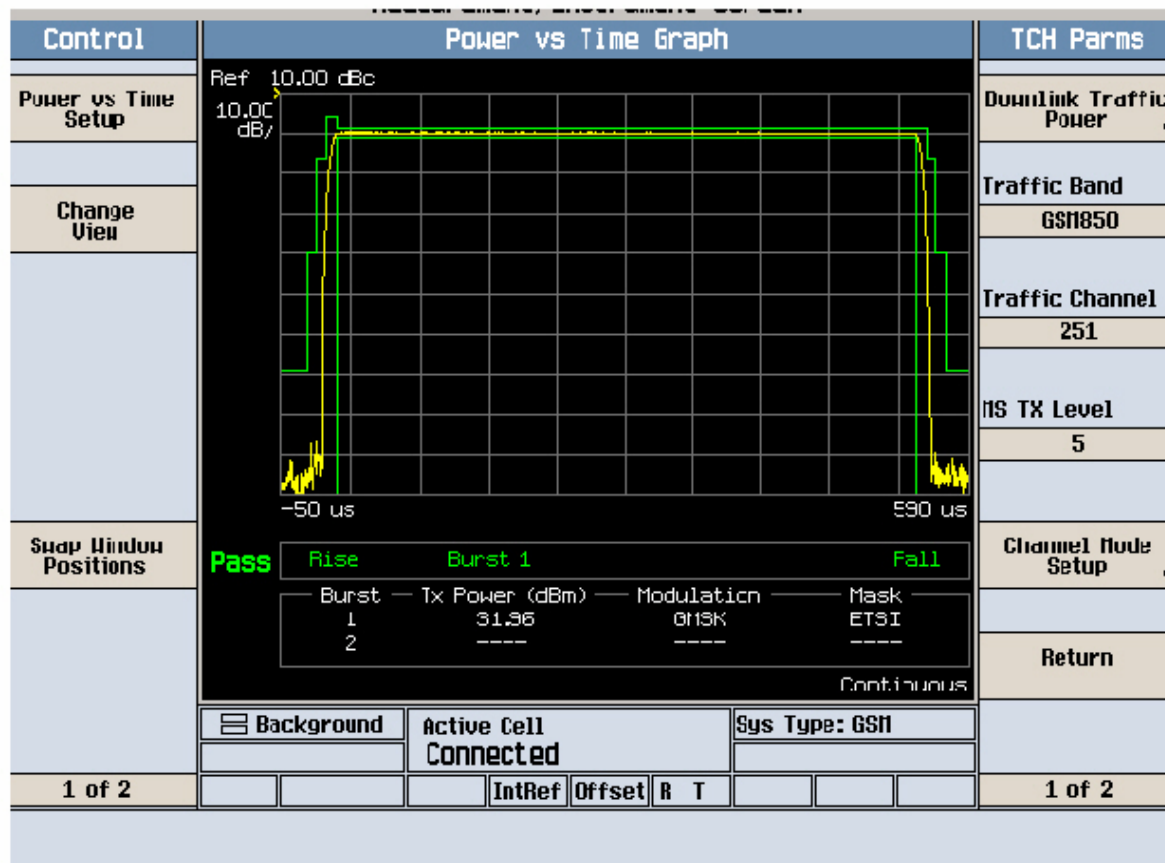
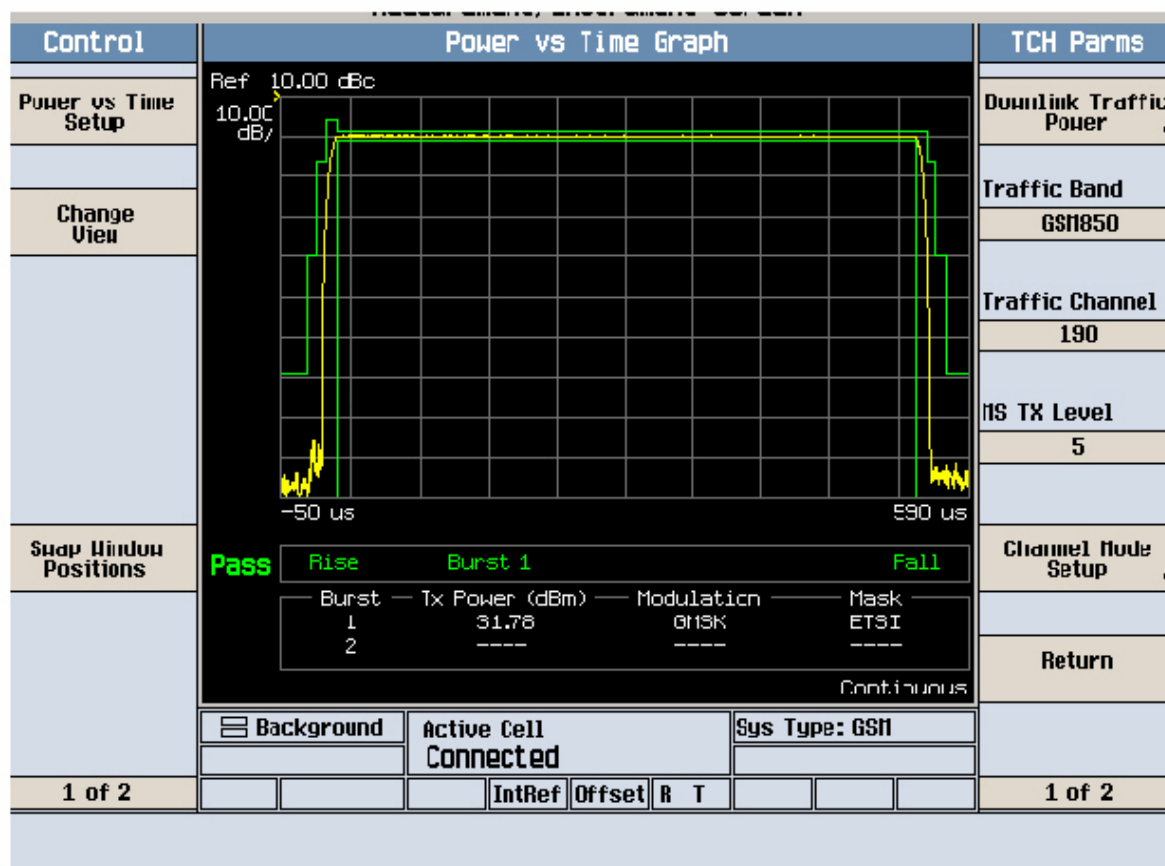
Freq Offset
0.00000000 Hz

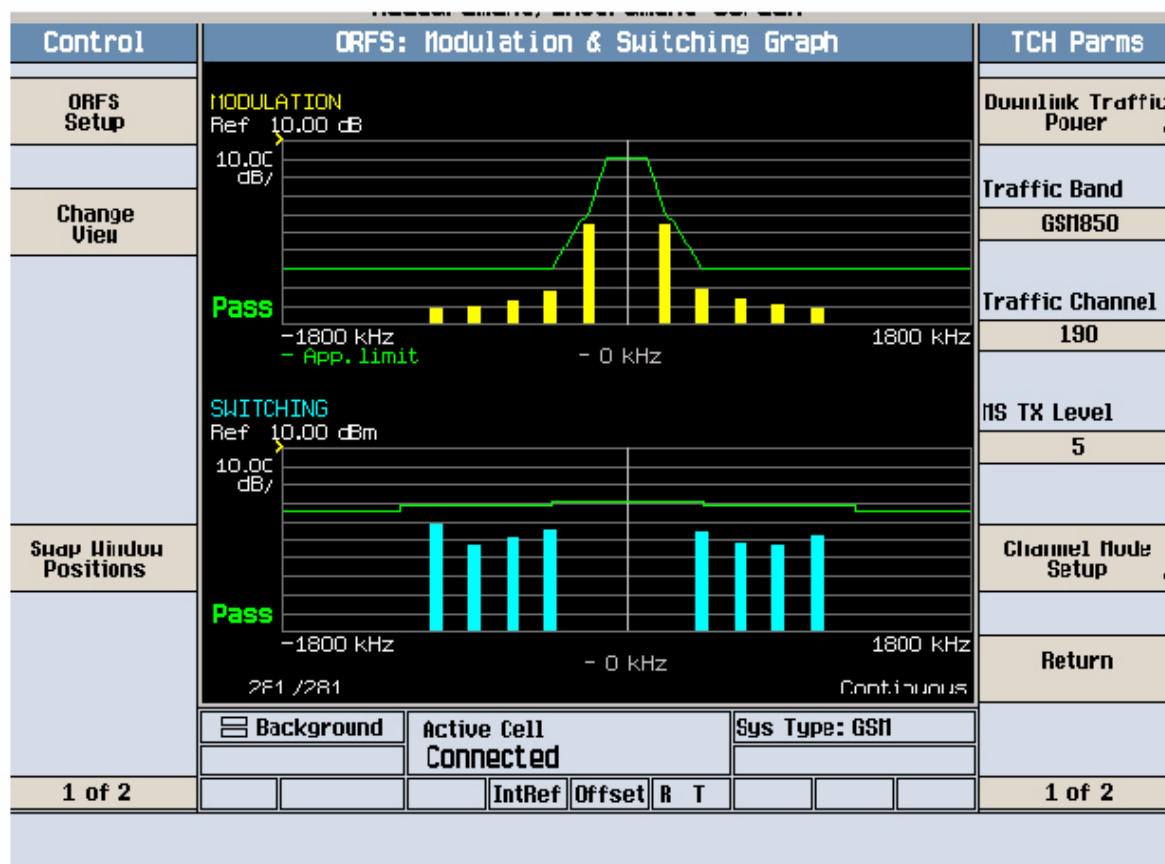
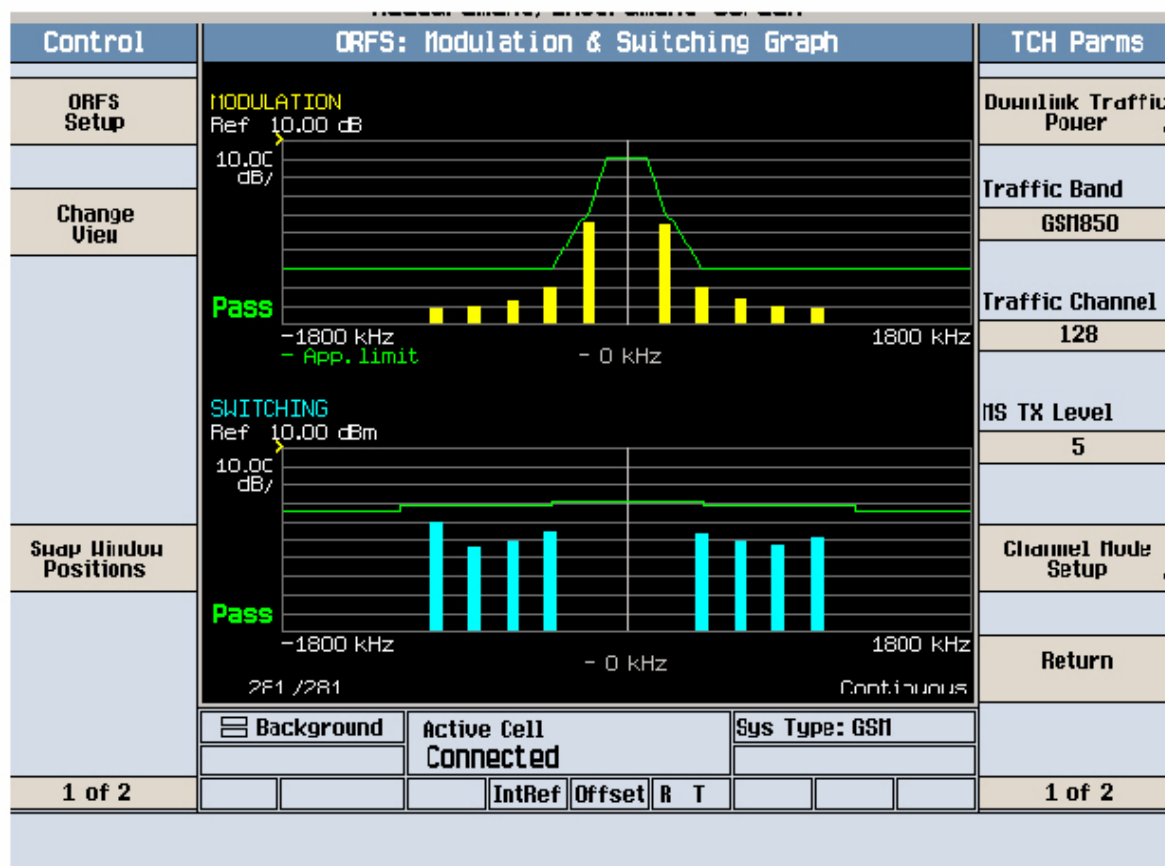
Signal Track
On Off

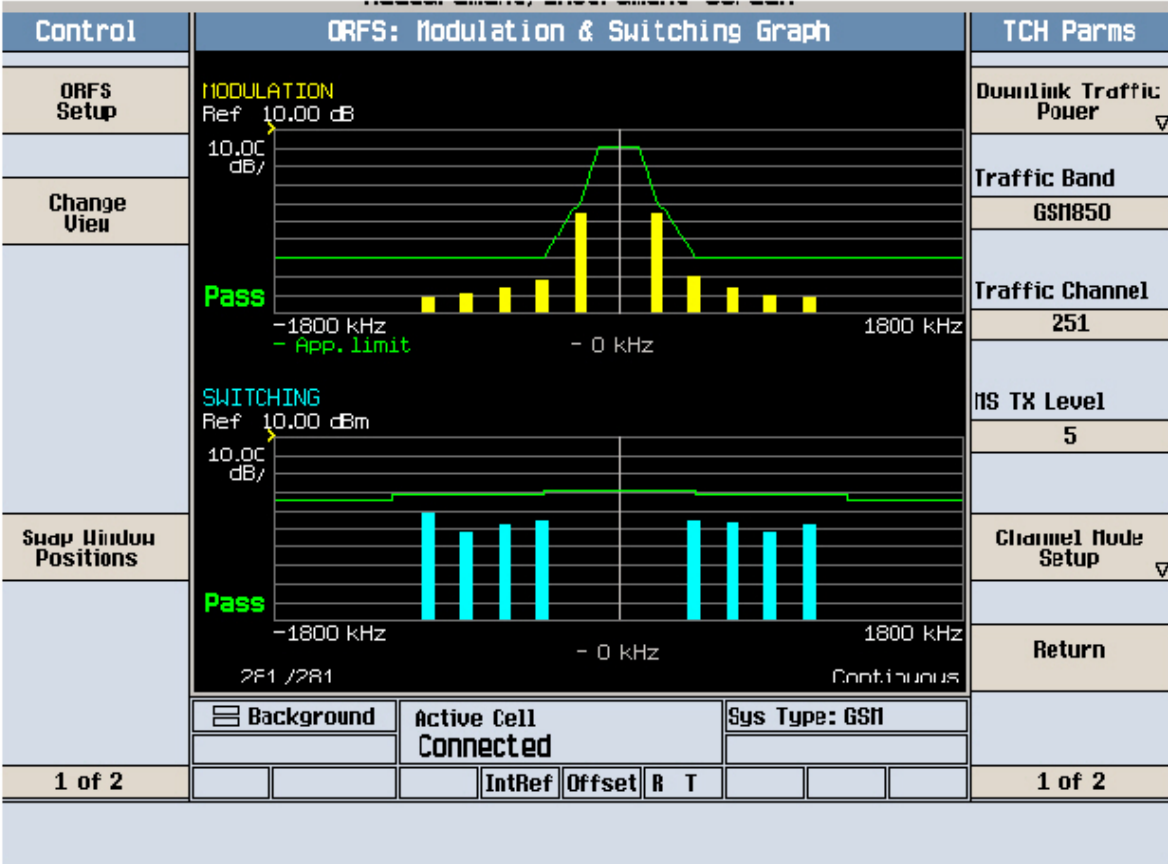
Control	GSM/GPRS Transmit Power										TCH Parms																					
GSM/GPRS TX Power Setup ▾	GMSK Transmit Power 32.02 dBm Single										Downlink Traffic Power ▾																					
											Traffic Band																					
											GSM850																					
											Traffic Channel																					
											128																					
											MS TX Level																					
											5																					
Swap Window Positions	Phase & Frequency Error <table><thead><tr><th></th><th>Peak Phase °</th><th>RMS Phase °</th><th>Frequency Hz</th></tr></thead><tbody><tr><td>Minimum</td><td>2.40</td><td>1.12</td><td>-9.35</td></tr><tr><td>Maximum</td><td>4.39</td><td>1.41</td><td>6.54</td></tr><tr><td>Average</td><td>3.11</td><td>1.24</td><td>0.30</td></tr><tr><td>Pass/Fail</td><td>Pass</td><td>Pass</td><td>Pass</td></tr></tbody></table> 10 / 50 Continuous											Peak Phase °	RMS Phase °	Frequency Hz	Minimum	2.40	1.12	-9.35	Maximum	4.39	1.41	6.54	Average	3.11	1.24	0.30	Pass/Fail	Pass	Pass	Pass	Channel Mode Setup ▾	
											Peak Phase °	RMS Phase °	Frequency Hz																			
Minimum											2.40	1.12	-9.35																			
Maximum											4.39	1.41	6.54																			
Average	3.11	1.24	0.30																													
Pass/Fail	Pass	Pass	Pass																													
											Return																					
1 of 2	Background		Active Cell Connected				Sys Type: GSM				1 of 2																					
				IntRef	Offset	R	T																									

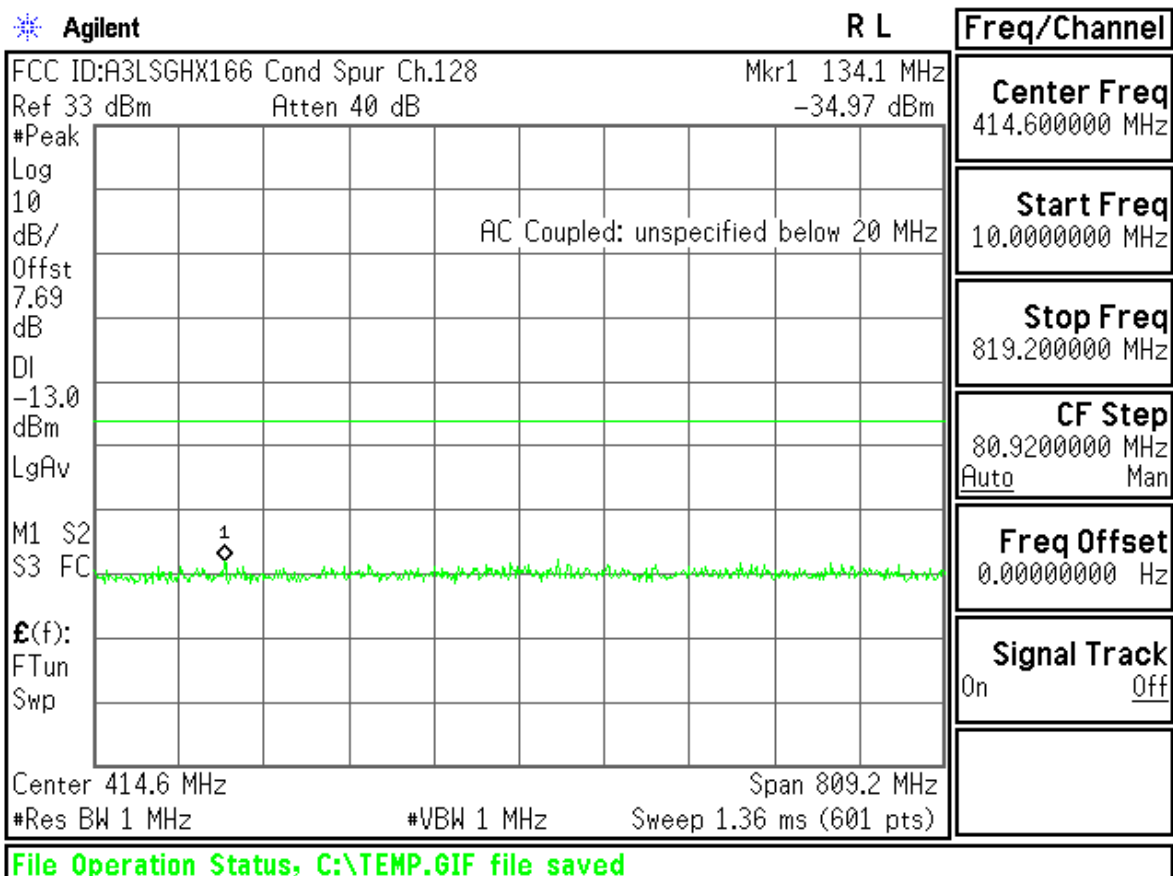
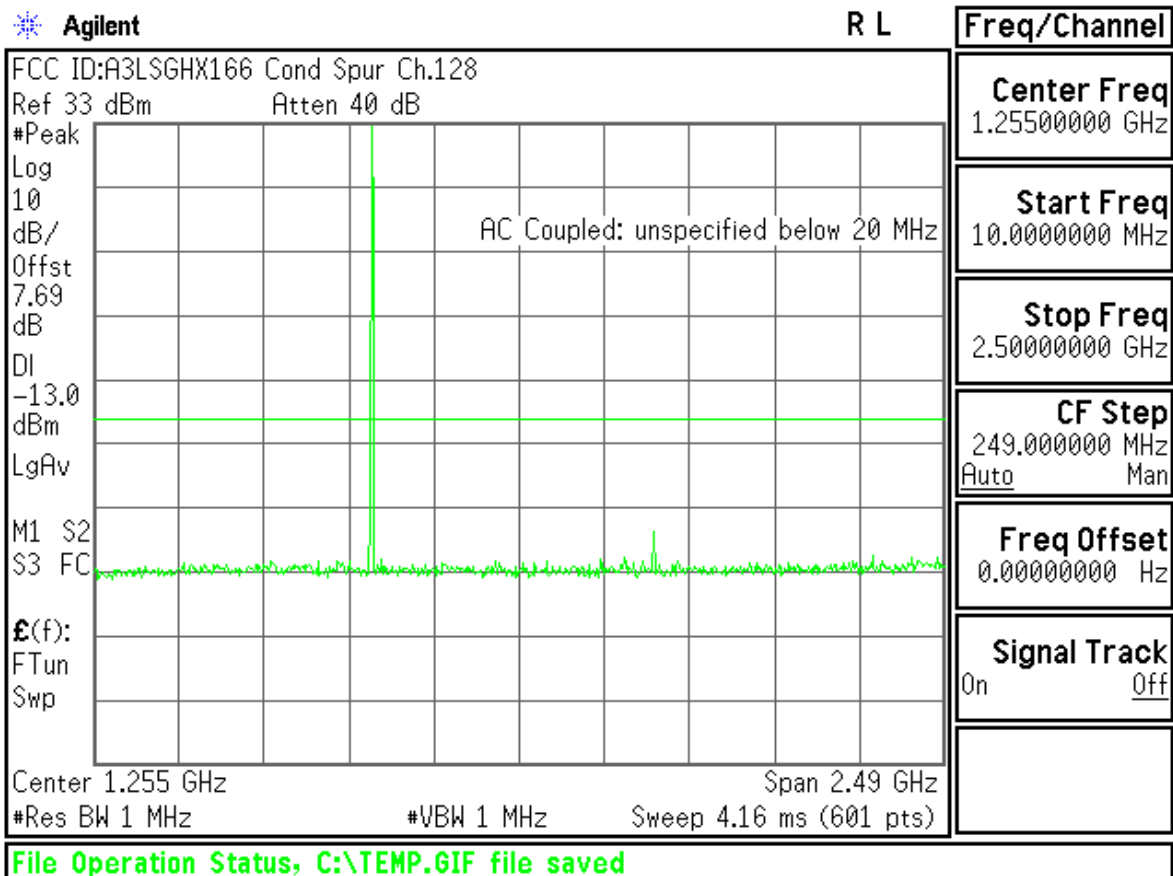
Control	GSM/GPRS Transmit Power										TCH Parms																					
GSM/GPRS TX Power Setup ▾	GMSK Transmit Power 31.78 dBm Single										Downlink Traffic Power ▾																					
											Traffic Band																					
											GSM850																					
											Traffic Channel																					
											190																					
Swap Window Positions	Phase & Frequency Error <table><thead><tr><th></th><th>Peak Phase °</th><th>RMS Phase °</th><th>Frequency Hz</th></tr></thead><tbody><tr><td>Minimum</td><td>2.45</td><td>1.02</td><td>-7.18</td></tr><tr><td>Maximum</td><td>3.69</td><td>1.32</td><td>8.00</td></tr><tr><td>Average</td><td>3.02</td><td>1.17</td><td>2.23</td></tr><tr><td>Pass/Fail</td><td>Pass</td><td>Pass</td><td>Pass</td></tr></tbody></table> 10 / 50 Continuous											Peak Phase °	RMS Phase °	Frequency Hz	Minimum	2.45	1.02	-7.18	Maximum	3.69	1.32	8.00	Average	3.02	1.17	2.23	Pass/Fail	Pass	Pass	Pass	MS TX Level	
												Peak Phase °	RMS Phase °	Frequency Hz																		
											Minimum	2.45	1.02	-7.18																		
											Maximum	3.69	1.32	8.00																		
											Average	3.02	1.17	2.23																		
Pass/Fail	Pass	Pass	Pass																													
5																																
Channel Mode Setup ▾																																
Return																																
1 of 2	Background Active Cell Connected Sys Type: GSM		1 of 2																													

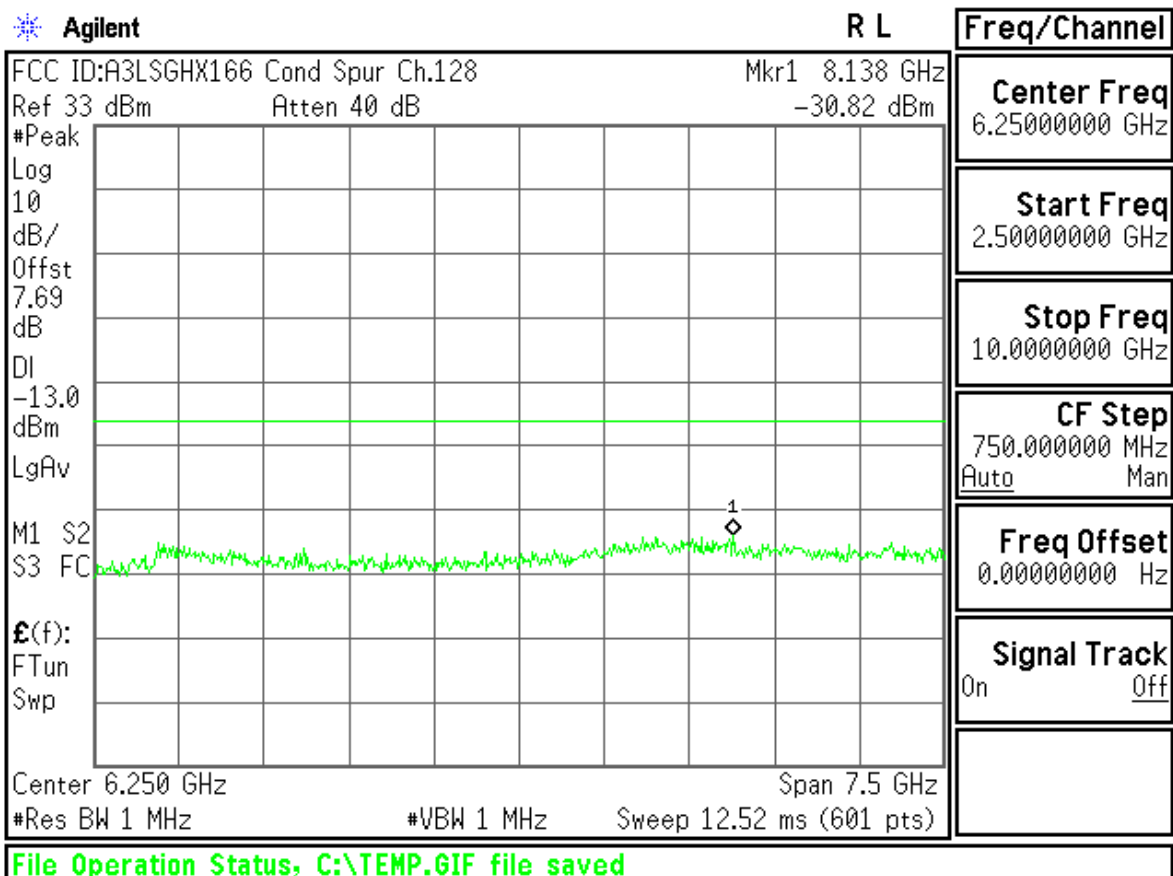
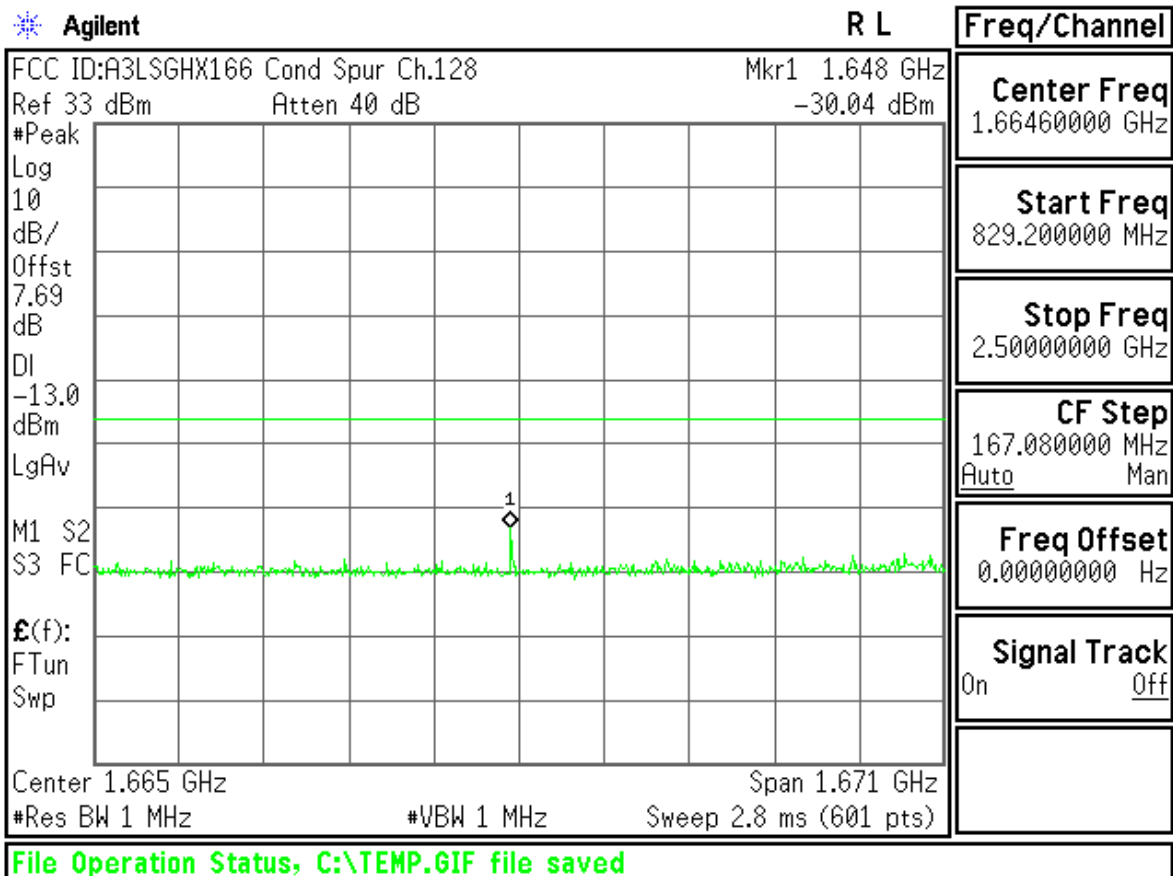












Agilent

R L

Freq/Channel

FCC ID:A3LSGHX166 Cond Spur Ch.190

Ref 33 dBm

Atten 40 dB

#Peak

Log

10

dB/

Offst

7.69

dB

DI

-13.0

dBm

LgAv

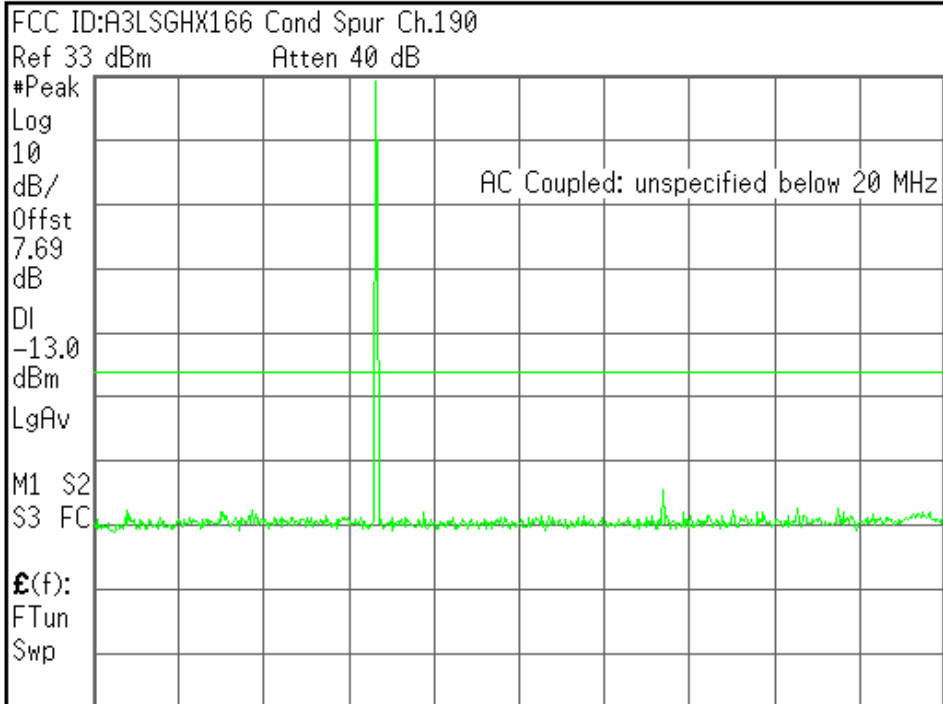
M1 S2

S3 FC

$E(f)$:

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:A3LSGHX166 Cond Spur Ch.190

Mkr1 414.0 MHz

Ref 33 dBm

Atten 40 dB

-34.07 dBm

#Peak

Log

10

dB/

Offst

7.69

dB

DI

-13.0

dBm

LgAv

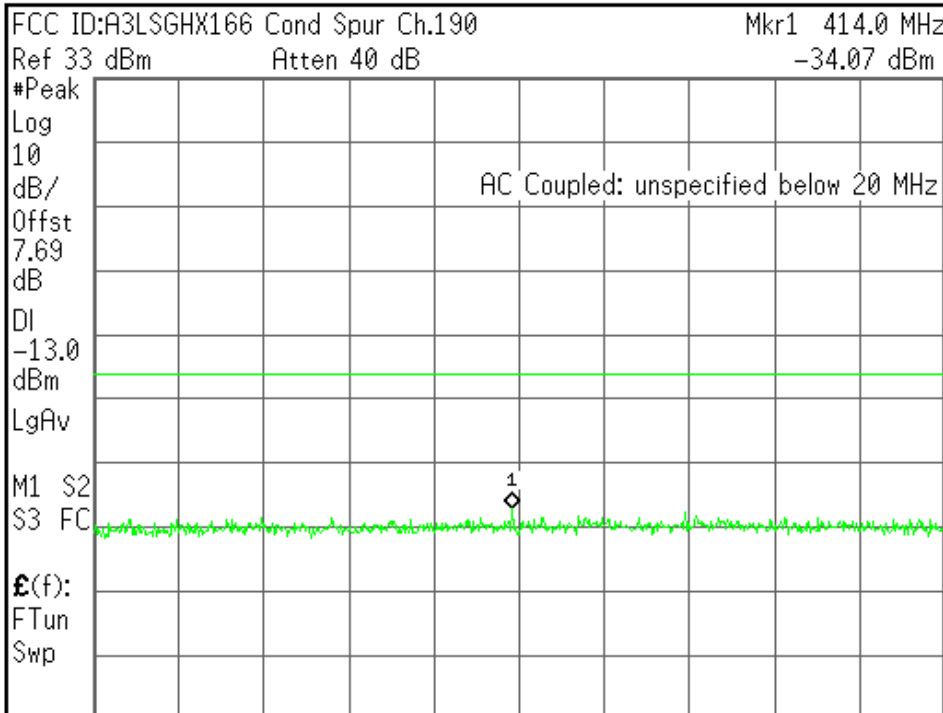
M1 S2

S3 FC

$E(f)$:

FTun

Swp



Center 420.8 MHz

Span 821.6 MHz

#Res BW 1 MHz

#VBW 1 MHz

Sweep 1.4 ms (601 pts)

Center Freq
420.8000000 MHz

Start Freq
10.00000000 MHz

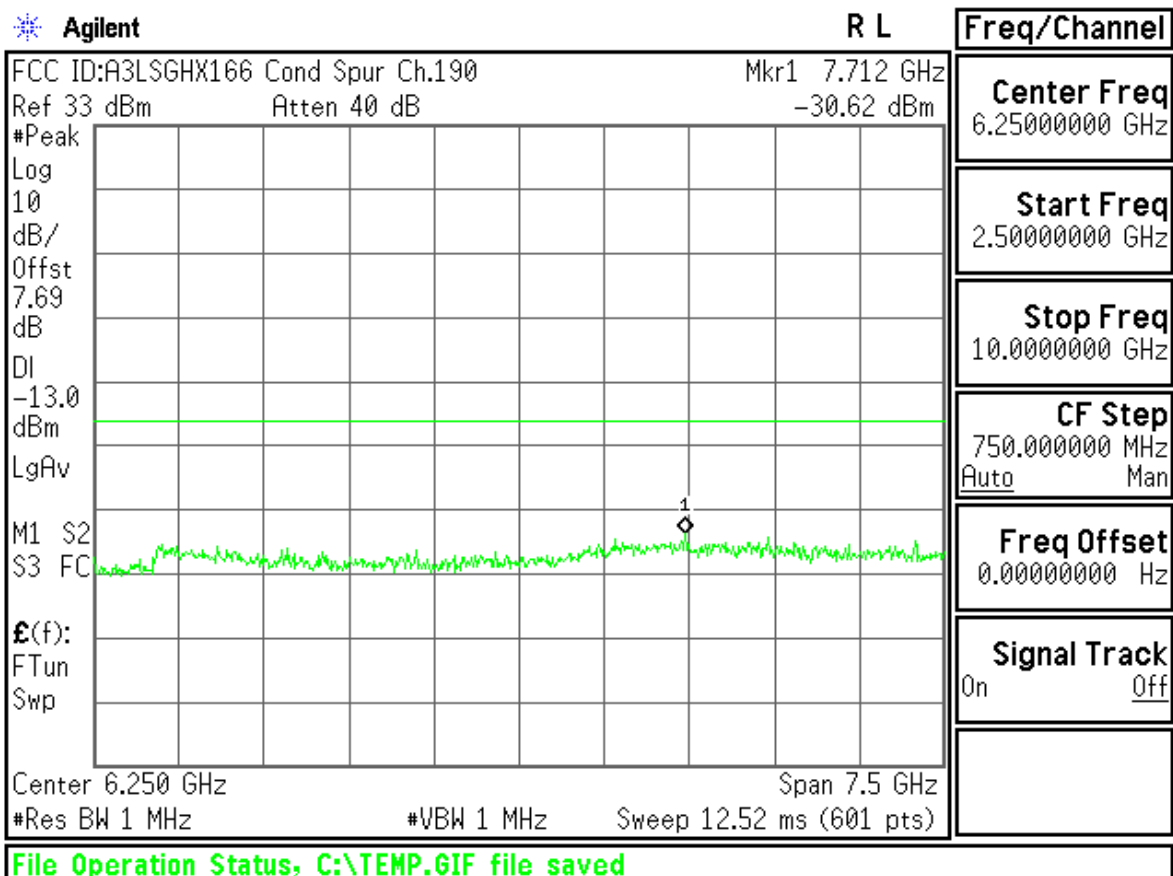
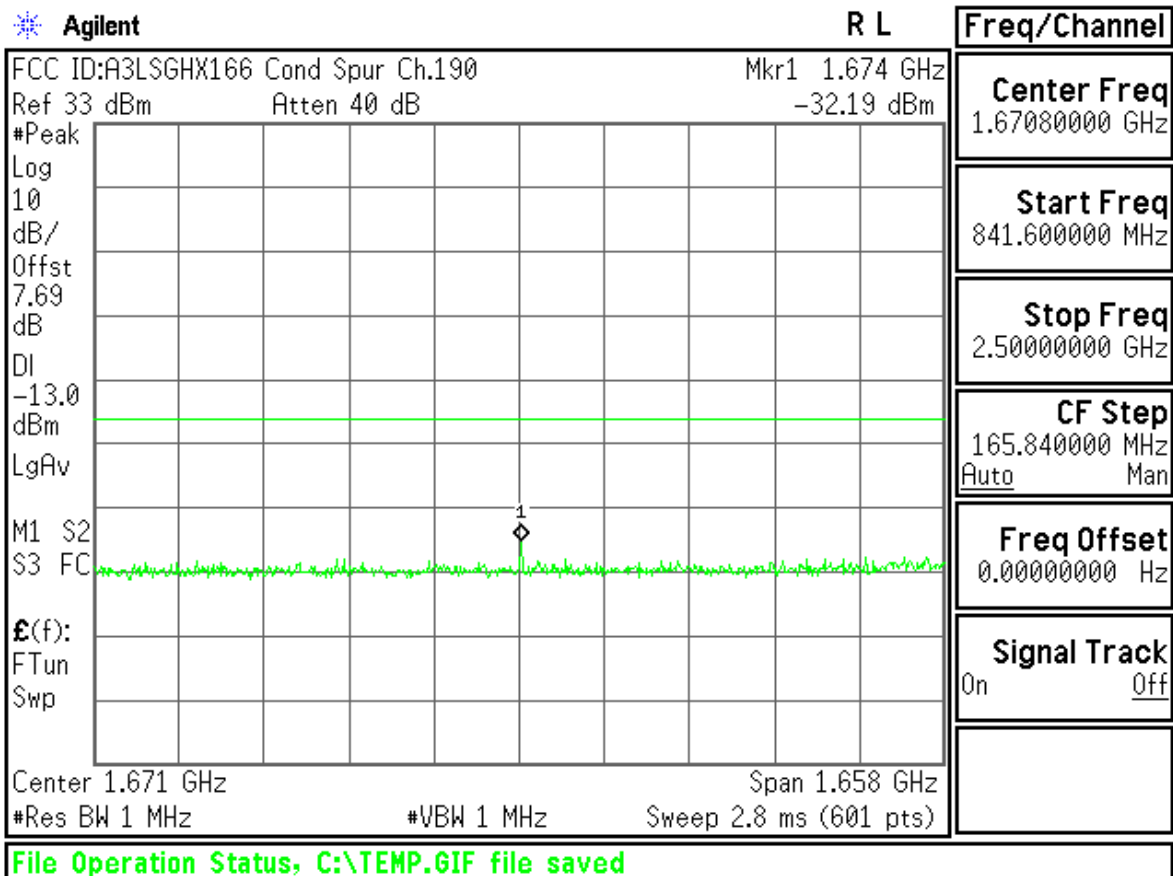
Stop Freq
831.6000000 MHz

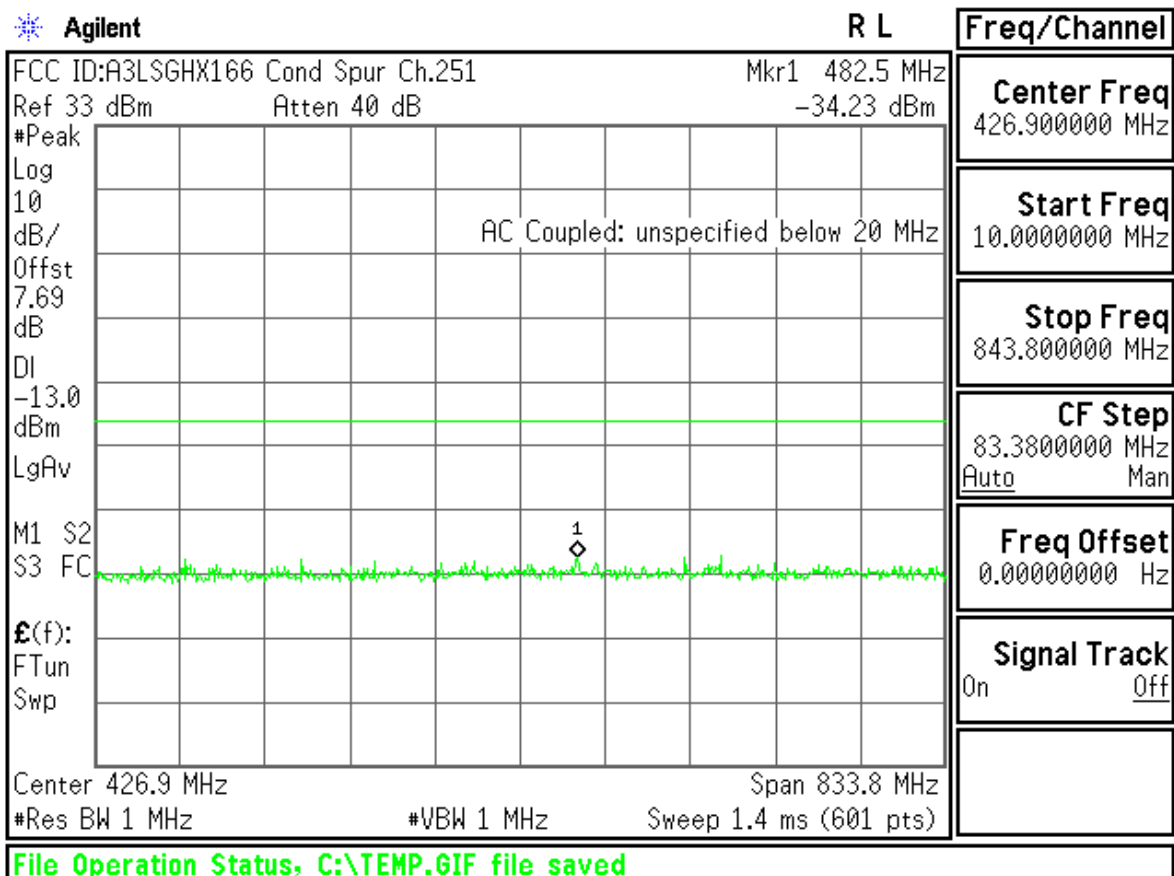
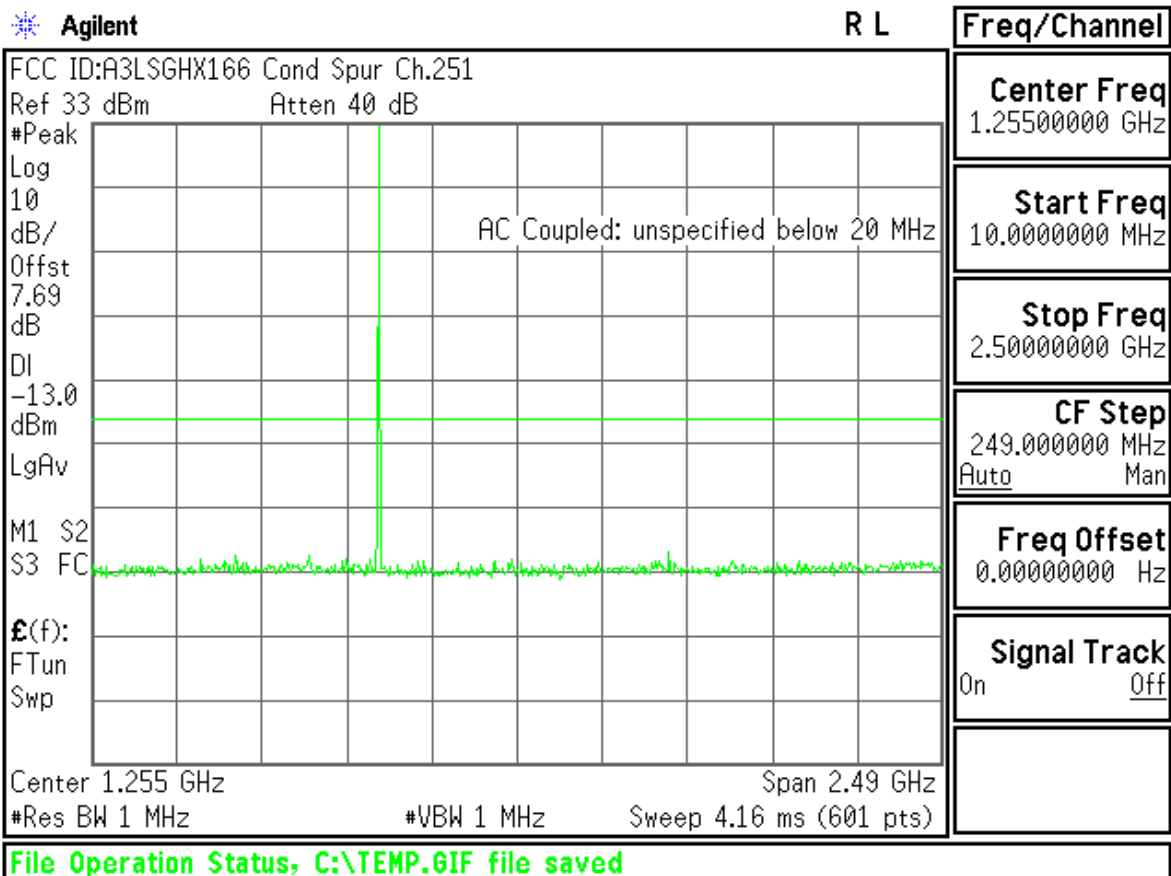
CF Step
82.16000000 MHz
Auto Man

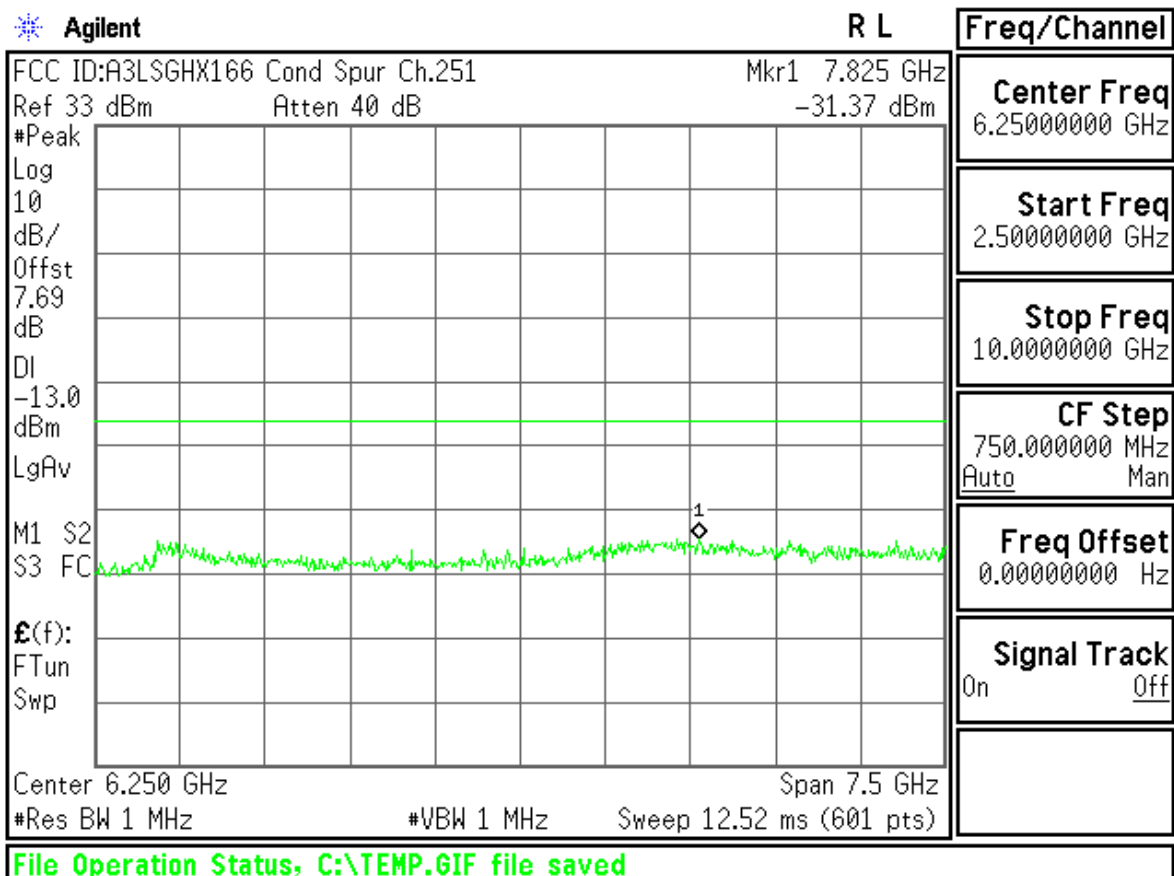
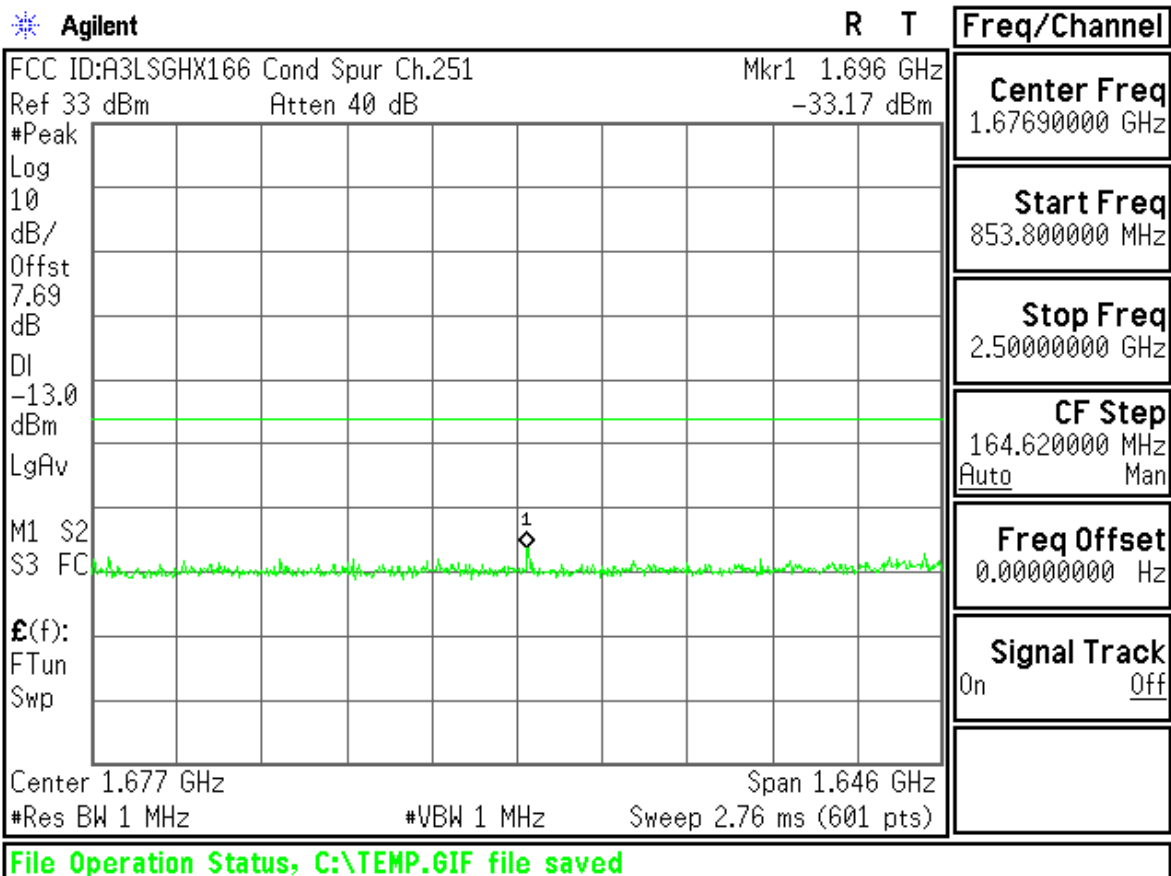
Freq Offset
0.00000000 Hz

Signal Track
On Off

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







Agilent

R L

Freq/Channel

FCC ID:A3LSGHX166 Band Edge Ch.128

Ref 33 dBm

Atten 40 dB

#Avg

Log

10

dB/

Offst

7.69

dB

DI

-13.0

dBm

PAvg

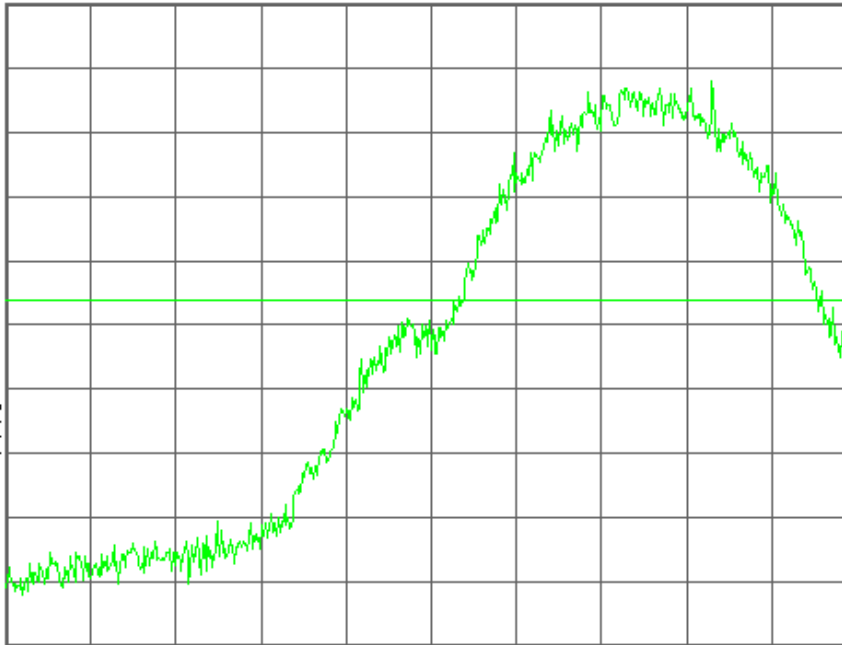
M1 S2

S3 FC

$E(f)$:

f>50k

Swp



Center 824.000 0 MHz

Span 810 kHz

#Res BW 3 kHz

#VBW 3 kHz

Sweep 343.2 ms (601 pts)

Center Freq
824.000000 MHz

Start Freq
823.595000 MHz

Stop Freq
824.405000 MHz

CF Step
81.0000000 kHz
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:A3LSGHX166 Band Edge Ch.128

Mkr1 823.975 9 MHz

Ref 33 dBm

Atten 40 dB

-15.65 dBm

#Avg

Log

10

dB/

Offst

7.69

dB

DI

-13.0

dBm

PAvg

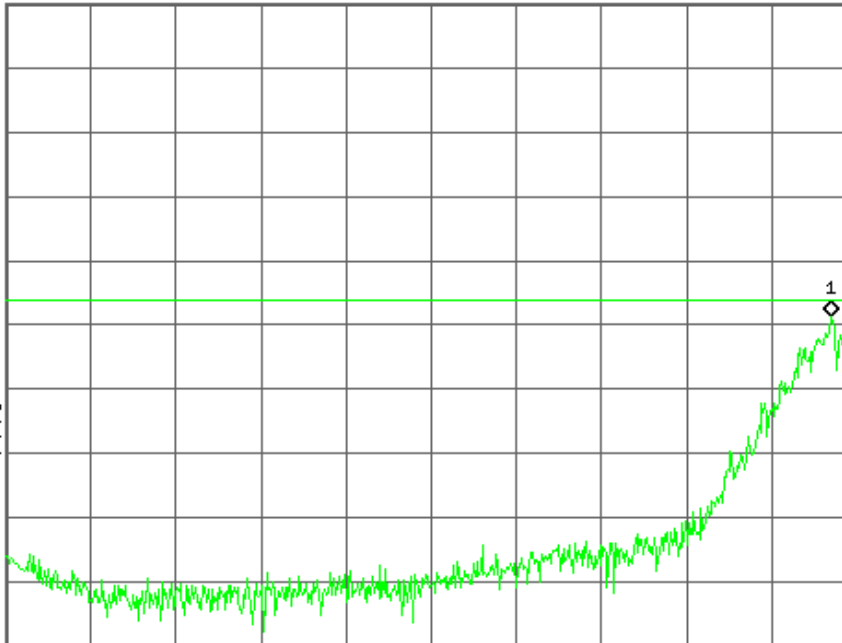
M1 S2

S3 FC

$E(f)$:

f>50k

Swp



Center 823.595 0 MHz

Span 810 kHz

#Res BW 3 kHz

#VBW 3 kHz

Sweep 343.2 ms (601 pts)

Center Freq
823.595000 MHz

Start Freq
823.190000 MHz

Stop Freq
824.000000 MHz

CF Step
81.0000000 kHz
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:A3LSGHX166 Band Edge Ch.251

Ref 33 dBm

Atten 40 dB

#Avg

Log

10

dB/

Offst

7.69

dB

DI

-13.0

dBm

PAvg

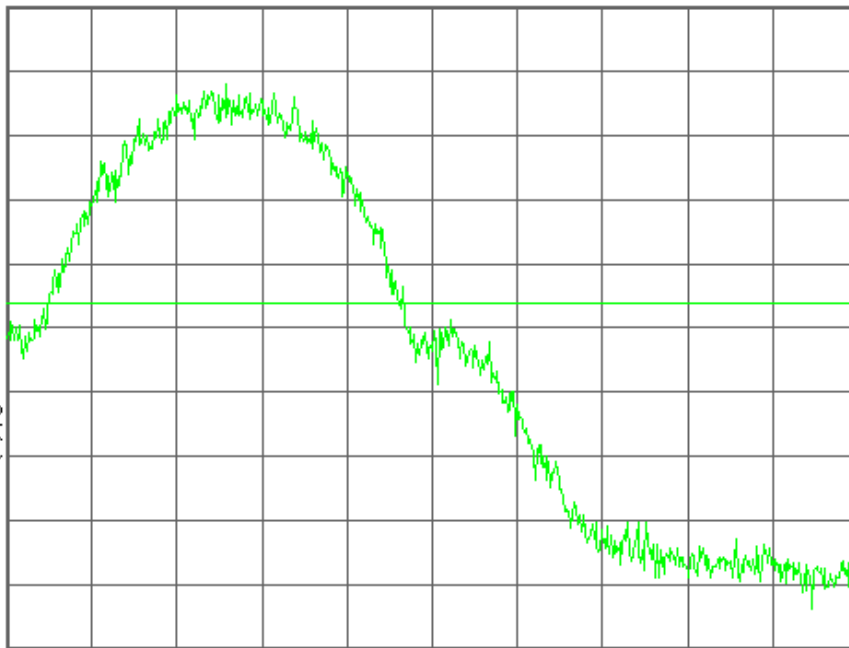
M1 S2

S3 FC

$E(f)$:

f>50k

Swp



Center 849.000 0 MHz

Span 810 kHz

#Res BW 3 kHz

#VBW 3 kHz

Sweep 343.2 ms (601 pts)

Center Freq
849.000000 MHz

Start Freq
848.595000 MHz

Stop Freq
849.405000 MHz

CF Step
81.0000000 kHz
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:A3LSGHX166 Band Edge Ch.251

Mkr1 849.004 0 MHz

Ref 33 dBm

Atten 40 dB

-16.23 dBm

#Avg

Log

10

dB/

Offst

7.69

dB

DI

-13.0

dBm

PAvg

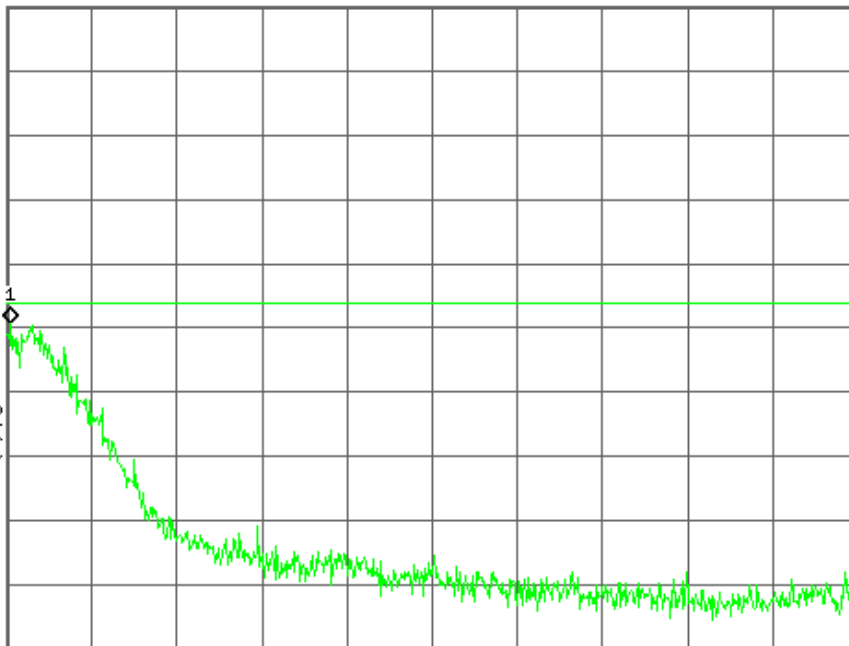
M1 S2

S3 FC

$E(f)$:

f>50k

Swp



Center 849.405 0 MHz

Span 810 kHz

#Res BW 3 kHz

#VBW 3 kHz

Sweep 343.2 ms (601 pts)

Center Freq
849.405000 MHz

Start Freq
849.000000 MHz

Stop Freq
849.810000 MHz

CF Step
81.0000000 kHz
Auto Man

Freq Offset
0.00000000 Hz

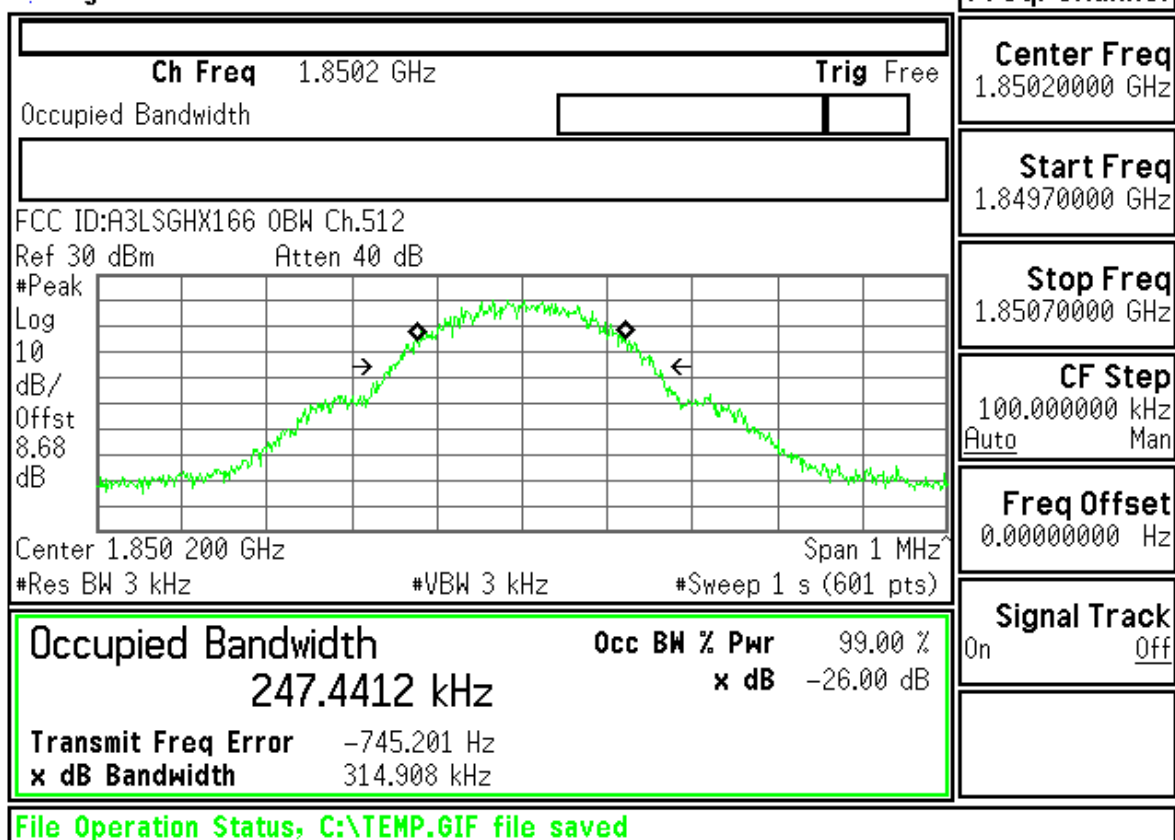
Signal Track
On Off

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

GSM1900

Agilent

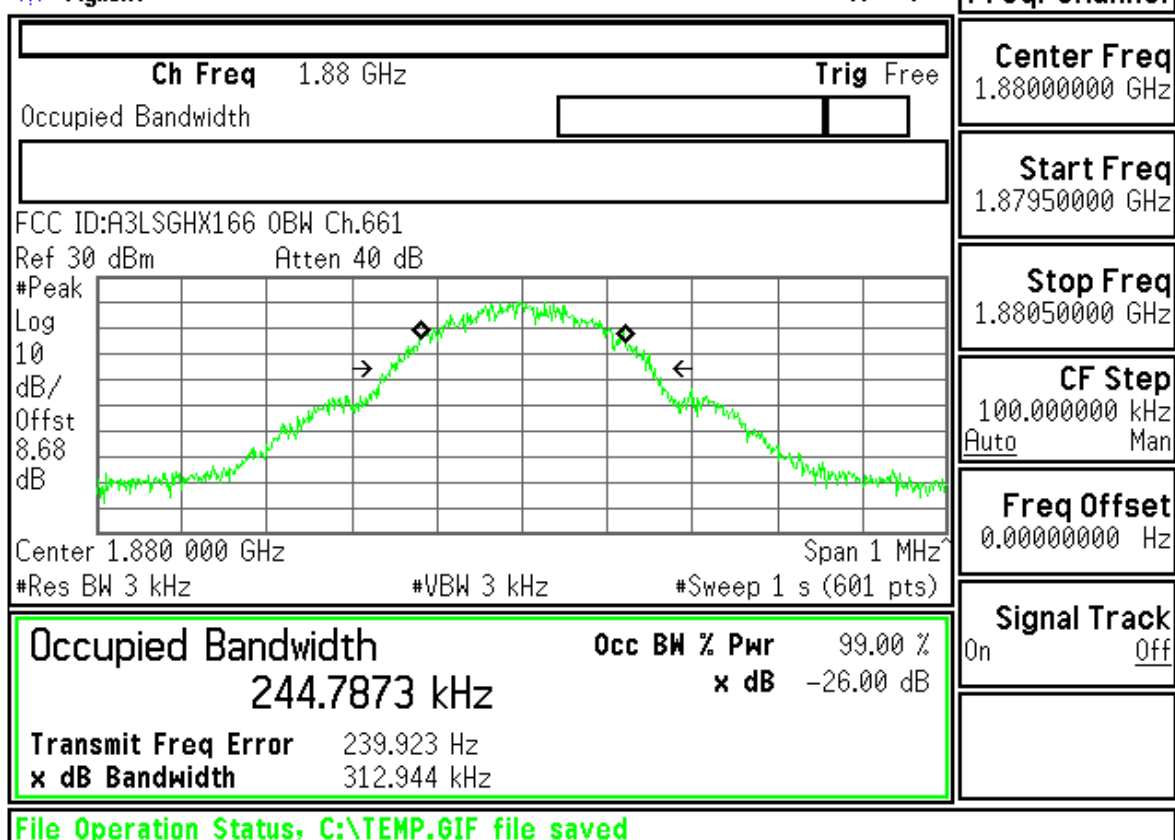
R T



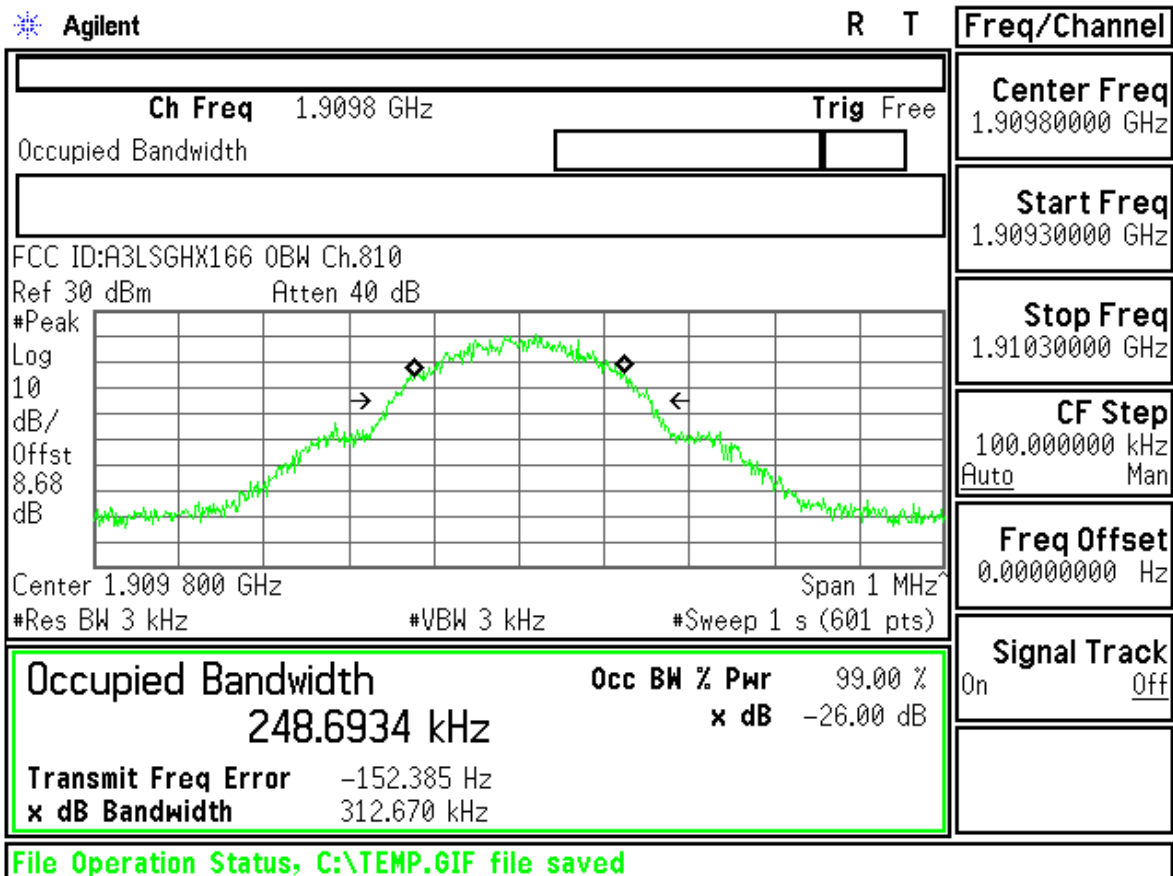
Freq/Channel
Center Freq 1.85020000 GHz
Start Freq 1.84970000 GHz
Stop Freq 1.85070000 GHz
CF Step 100.000000 kHz Auto Man
Freq Offset 0.00000000 Hz
Signal Track On Off

Agilent

R T



Freq/Channel
Center Freq 1.88000000 GHz
Start Freq 1.87950000 GHz
Stop Freq 1.88050000 GHz
CF Step 100.000000 kHz Auto Man
Freq Offset 0.00000000 Hz
Signal Track On Off



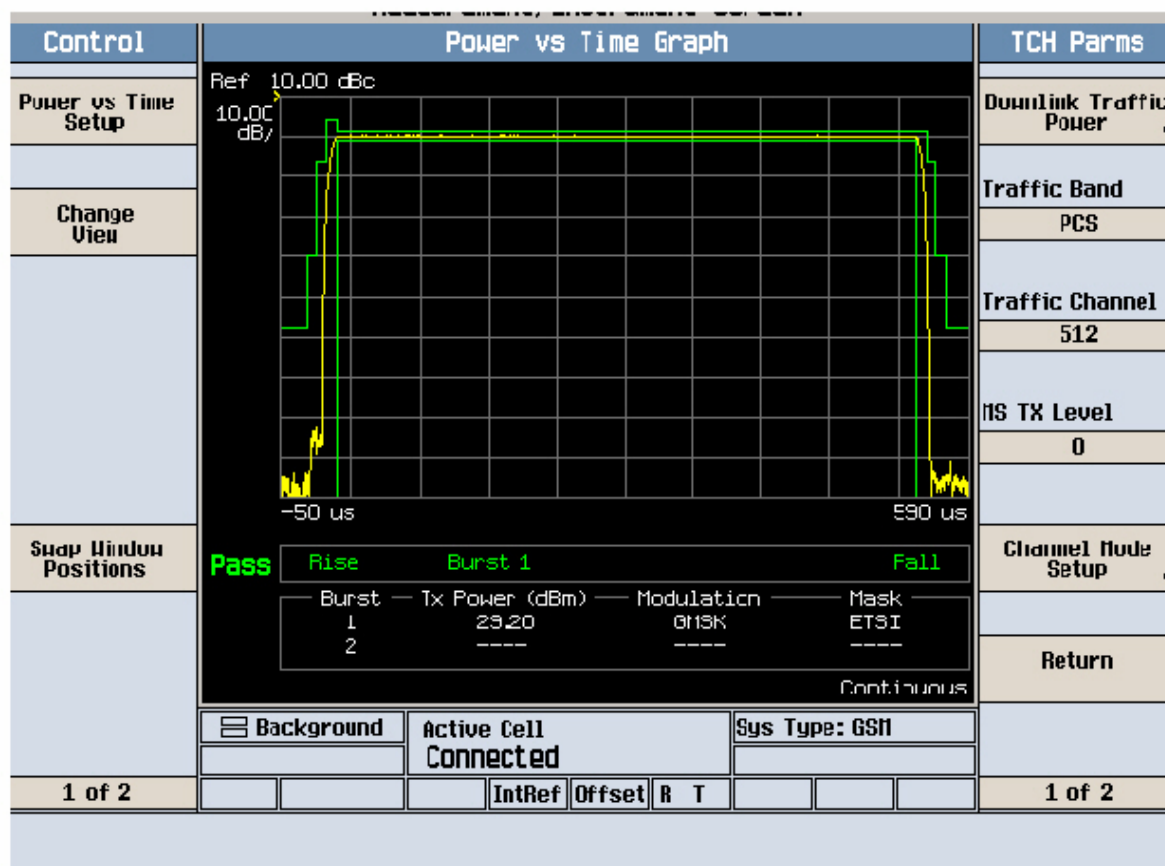
FCC ID : A3LSGHX166 Transmit Power 512CH

Control	GSM/GPRS Transmit Power							TCH Parms																						
GSM/GPRS TX Power Setup	GMSK Transmit Power 29.20 dBm Single							Downlink Traffic Power																						
								Traffic Band																						
								PCS																						
								Traffic Channel																						
								512																						
								MS TX Level																						
								0																						
Swap Window Positions	Phase & Frequency Error <table><thead><tr><th></th><th>Peak Phase °</th><th>RMS Phase °</th><th>Frequency Hz</th></tr></thead><tbody><tr><td>Minimum</td><td>3.58</td><td>1.38</td><td>-14.12</td></tr><tr><td>Maximum</td><td>6.68</td><td>1.97</td><td>20.13</td></tr><tr><td>Average</td><td>4.53</td><td>1.59</td><td>3.02</td></tr><tr><td>Pass/Fail</td><td>Pass</td><td>Pass</td><td>Pass</td></tr></tbody></table> 50 / 50 Continuous								Peak Phase °	RMS Phase °	Frequency Hz	Minimum	3.58	1.38	-14.12	Maximum	6.68	1.97	20.13	Average	4.53	1.59	3.02	Pass/Fail	Pass	Pass	Pass	Channel Mode Setup		
								Peak Phase °	RMS Phase °	Frequency Hz																				
Minimum								3.58	1.38	-14.12																				
Maximum								6.68	1.97	20.13																				
Average								4.53	1.59	3.02																				
Pass/Fail	Pass	Pass	Pass																											
								Return																						
1 of 2								1 of 2																						

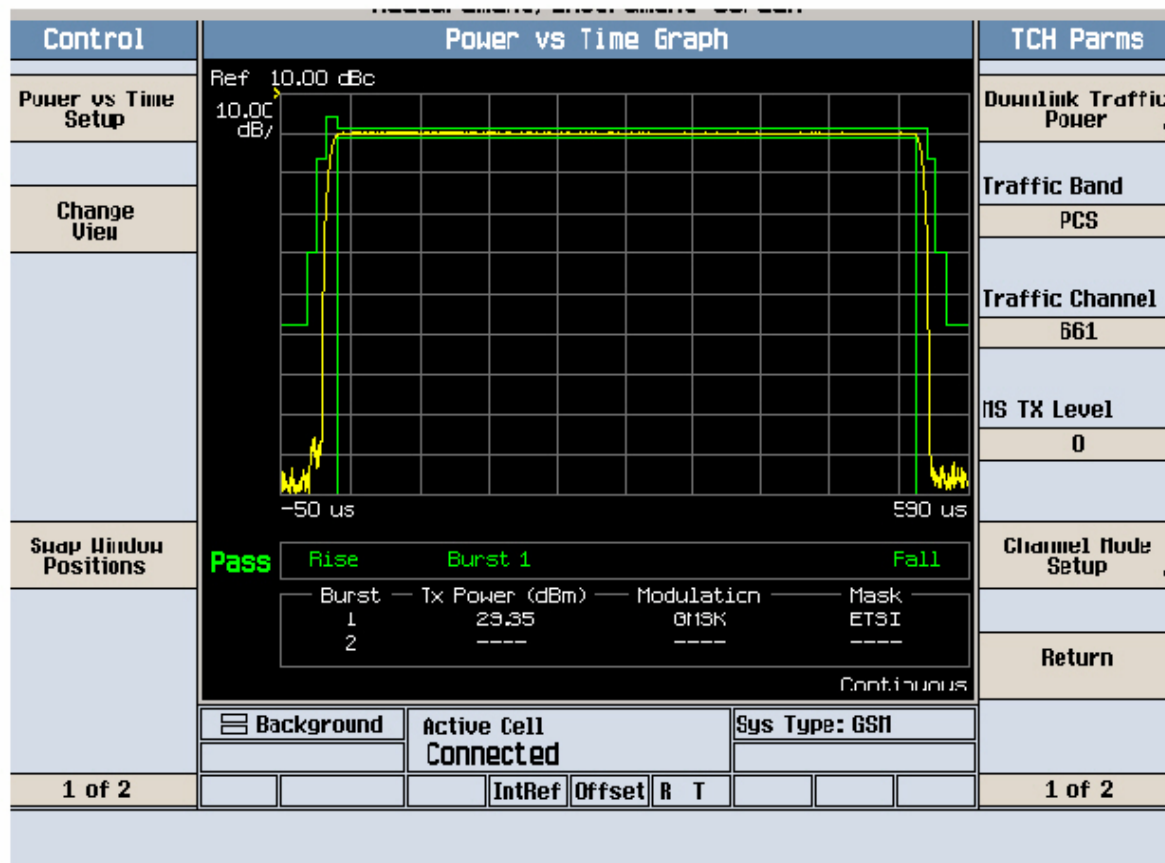
Control	GSM/GPRS Transmit Power										TCH Parms																					
GSM/GPRS TX Power Setup ▾	GMSK Transmit Power 29.35 dBm Single										Downlink Traffic Power ▾																					
											Traffic Band																					
											PCS																					
											Traffic Channel																					
											661																					
											MS TX Level																					
											0																					
Swap Window Positions	Phase & Frequency Error <table><thead><tr><th></th><th>Peak Phase °</th><th>RMS Phase °</th><th>Frequency Hz</th></tr></thead><tbody><tr><td>Minimum</td><td>3.67</td><td>1.38</td><td>-13.87</td></tr><tr><td>Maximum</td><td>6.23</td><td>1.83</td><td>13.34</td></tr><tr><td>Average</td><td>4.54</td><td>1.56</td><td>-2.24</td></tr><tr><td>Pass/Fail</td><td>Pass</td><td>Pass</td><td>Pass</td></tr></tbody></table> 10 / 50 Continuous											Peak Phase °	RMS Phase °	Frequency Hz	Minimum	3.67	1.38	-13.87	Maximum	6.23	1.83	13.34	Average	4.54	1.56	-2.24	Pass/Fail	Pass	Pass	Pass	Channel Mode Setup ▾	
											Peak Phase °	RMS Phase °	Frequency Hz																			
Minimum											3.67	1.38	-13.87																			
Maximum											6.23	1.83	13.34																			
Average											4.54	1.56	-2.24																			
Pass/Fail	Pass	Pass	Pass																													
											Return																					
1 of 2			Active Cell Connected				Sys Type: GSM				1 of 2																					
				IntRef	Offset	RL																										

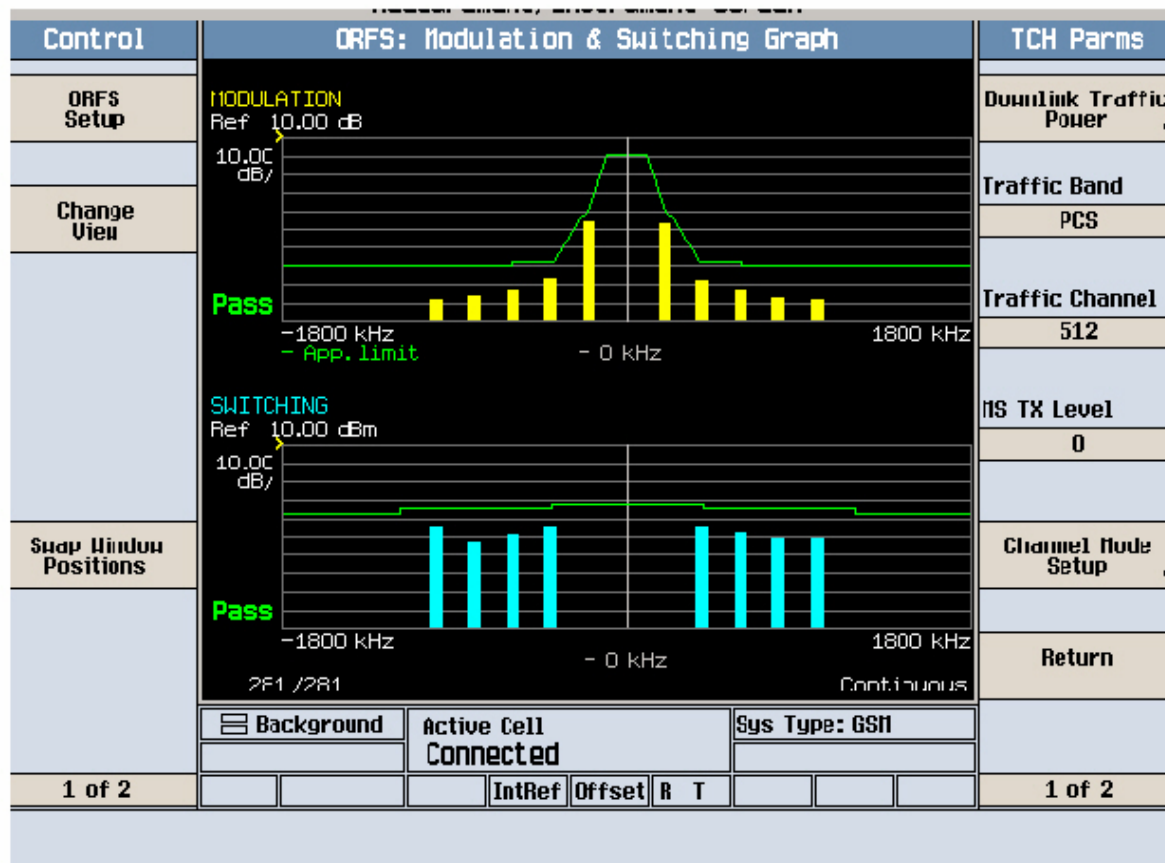
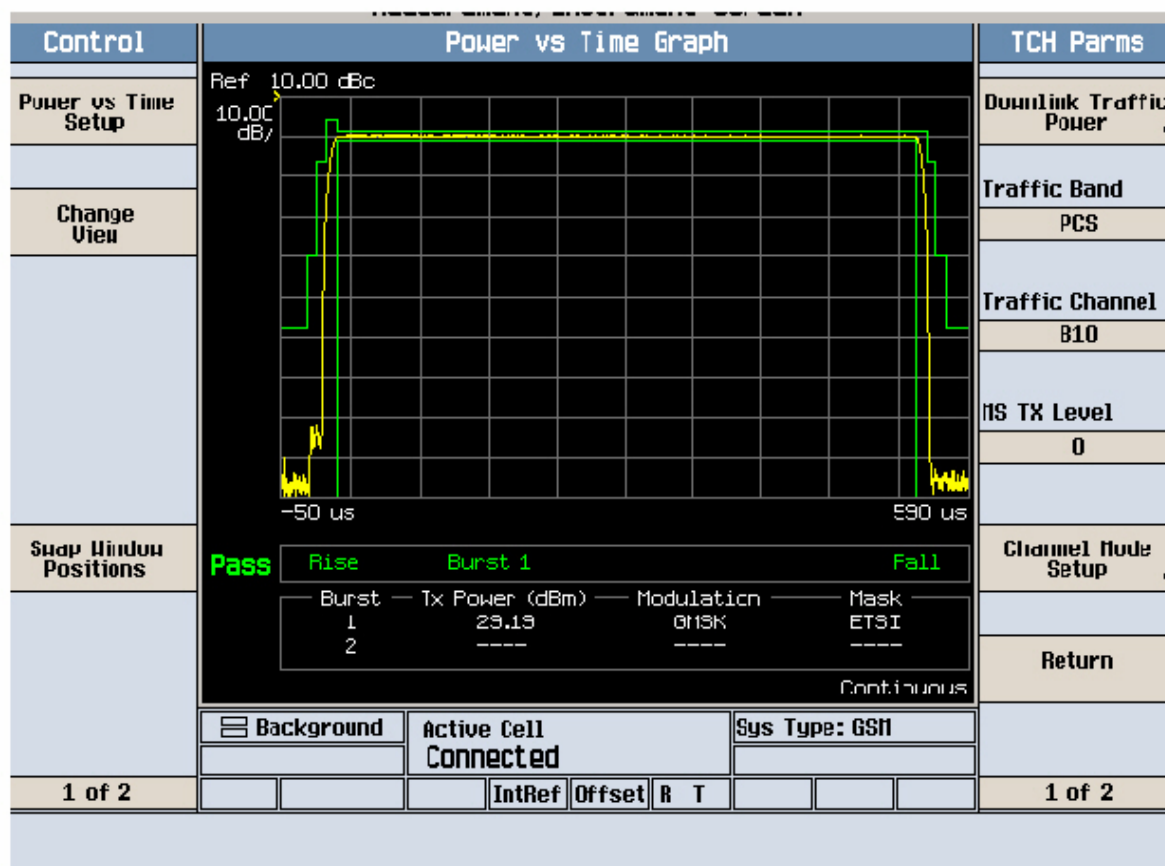
Control	GSM/GPRS Transmit Power								TCH Parms																					
GSM/GPRS TX Power Setup ▾	GMSK Transmit Power 29.20 dBm								Downlink Traffic Power ▾																					
									Traffic Band																					
									PCS																					
	Single								Traffic Channel																					
									810																					
	Phase & Frequency Error								MS TX Level																					
									0																					
	<table><thead><tr><th></th><th>Peak Phase °</th><th>RMS Phase °</th><th>Frequency Hz</th></tr></thead><tbody><tr><td>Minimum</td><td>3.55</td><td>1.35</td><td>-16.70</td></tr><tr><td>Maximum</td><td>6.38</td><td>1.75</td><td>19.96</td></tr><tr><td>Average</td><td>4.73</td><td>1.58</td><td>-0.60</td></tr><tr><td>Pass/Fail</td><td>Pass</td><td>Pass</td><td>Pass</td></tr></tbody></table>									Peak Phase °	RMS Phase °	Frequency Hz	Minimum	3.55	1.35	-16.70	Maximum	6.38	1.75	19.96	Average	4.73	1.58	-0.60	Pass/Fail	Pass	Pass	Pass	Channel Mode Setup ▾	
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Pass/Fail	Pass	Pass	Pass																											
Swap Window Positions	50 / 50								Return																					
	Continuous																													
			Active Cell Connected			Sys Type: GSM																								
1 of 2				IntRef	Offset	RL				1 of 2																				

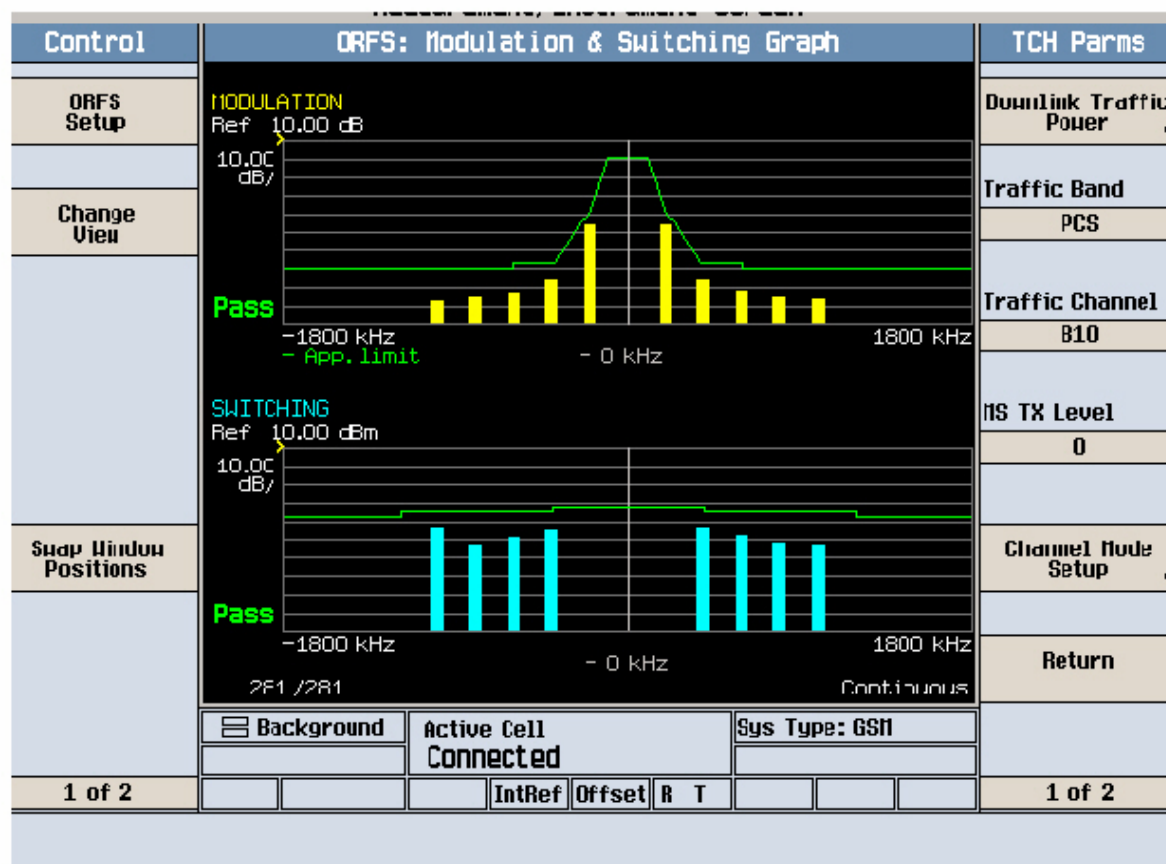
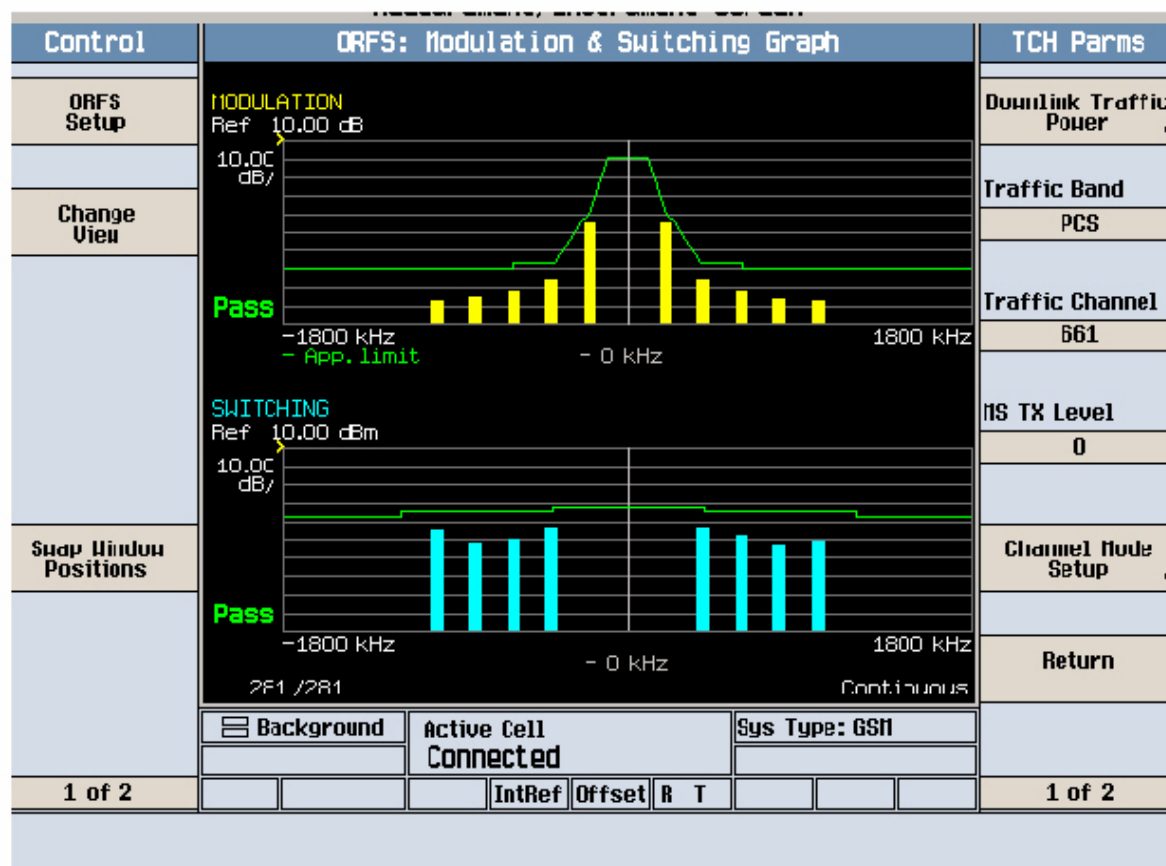
FCC ID : A3LSGHX166 GMSK Power vs Time 512CH

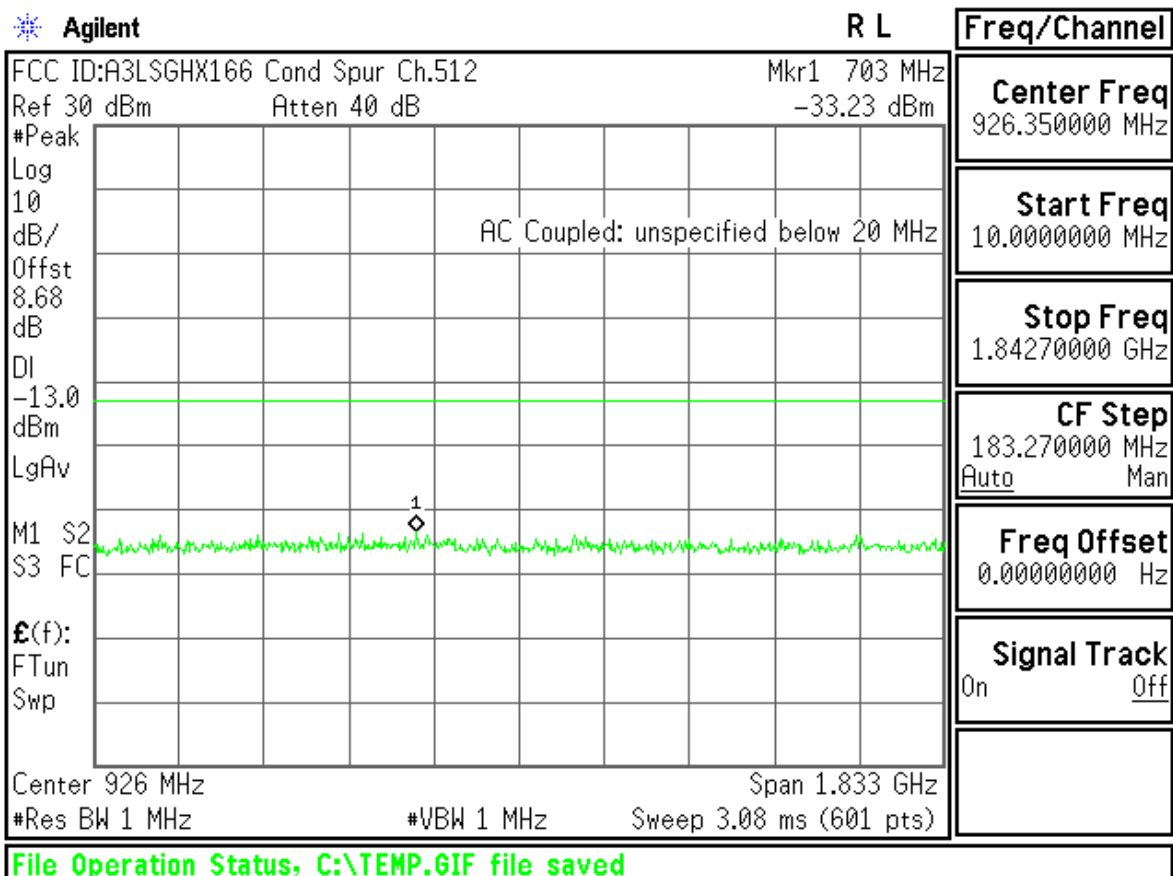
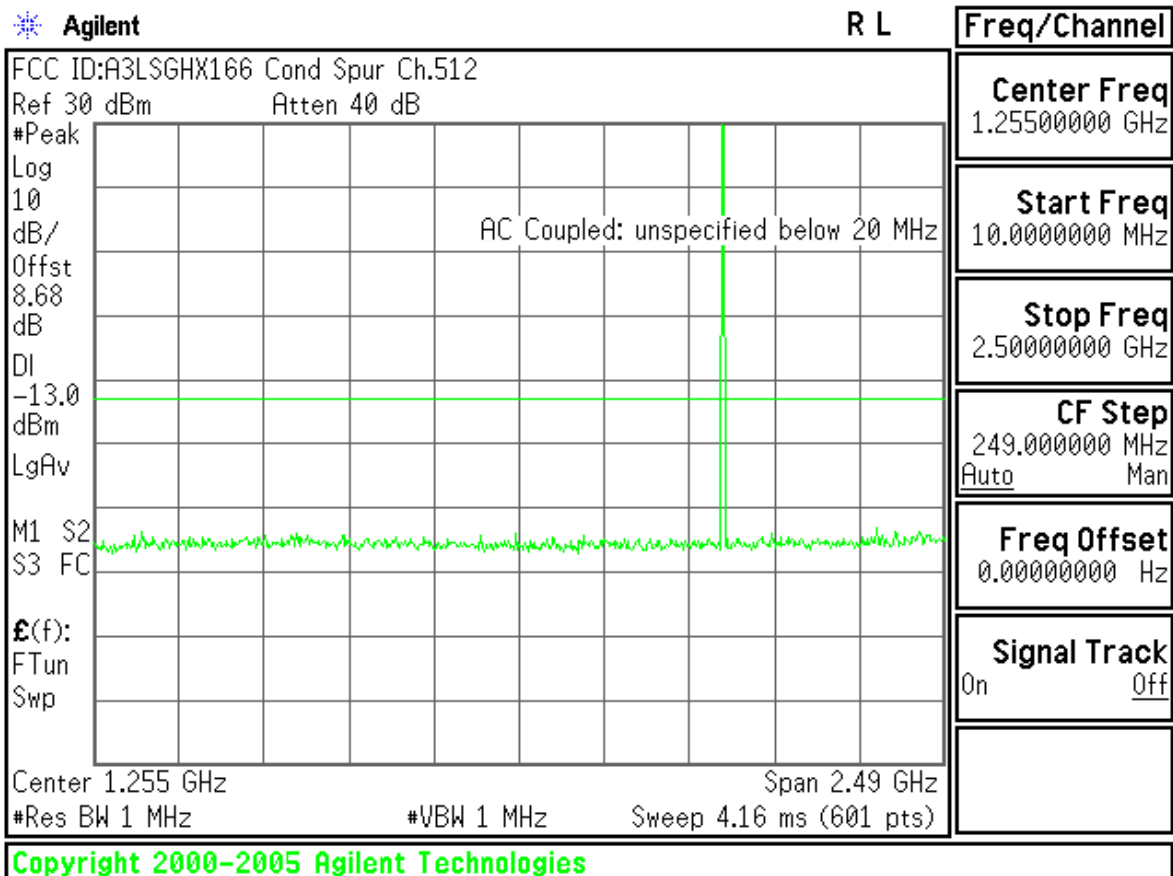


FCC ID : A3LSGHX166 GMSK Power vs Time 661CH





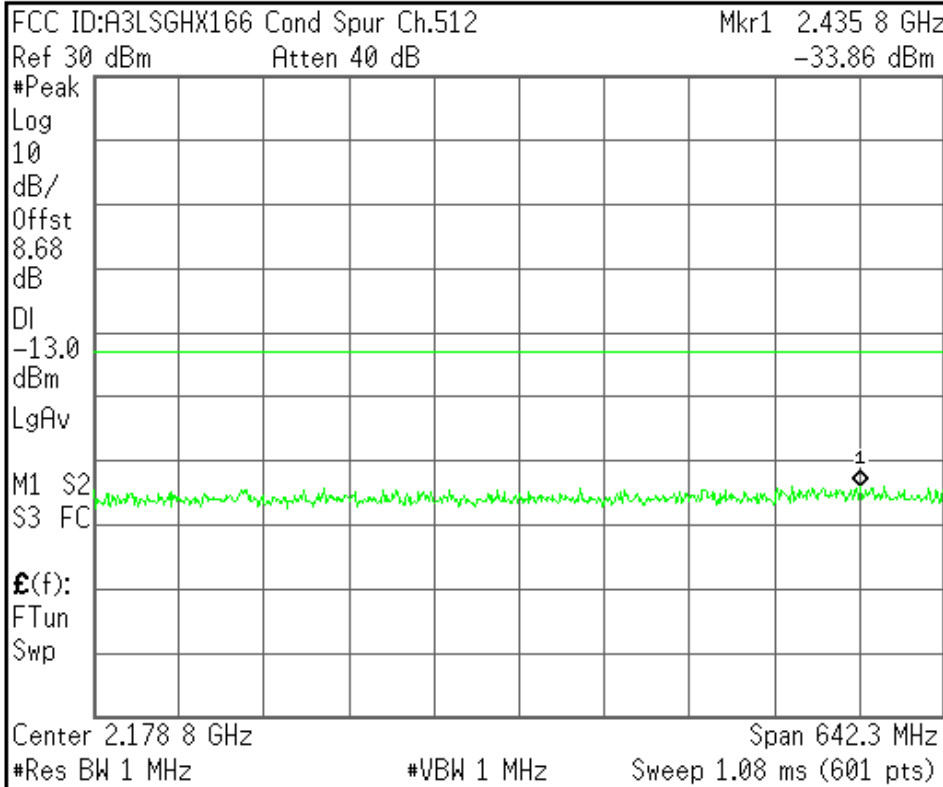




Agilent

R L

Freq/Channel



Center Freq
2.17885000 GHz

Start Freq
1.85770000 GHz

Stop Freq
2.50000000 GHz

CF Step
64.2300000 MHz
Auto Man

Freq Offset
0.00000000 Hz

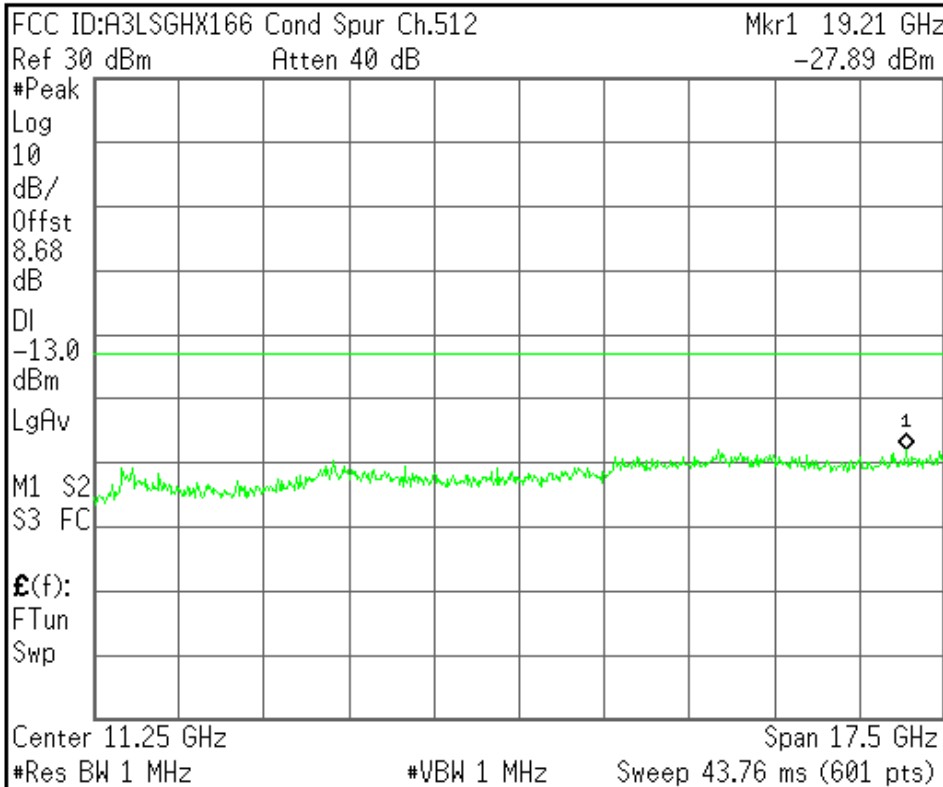
Signal Track
On Off

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

Agilent

R L

Freq/Channel



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:A3LSGHX166 Cond Spur Ch.661

Ref 30 dBm

Atten 40 dB

#Peak

Log

10

dB/

Offst

8.68

dB

DI

-13.0

dBm

LgAv

M1 S2

S3 FC

$\mathcal{E}(f)$:

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
10.00000000 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:A3LSGHX166 Cond Spur Ch.661

Mkr1 1.692 GHz

Ref 30 dBm

Atten 40 dB

-33.16 dBm

#Peak

Log

10

dB/

Offst

8.68

dB

DI

-13.0

dBm

LgAv

M1 S2

S3 FC

$\mathcal{E}(f)$:

FTun

Swp

AC Coupled: unspecified below 20 MHz

Center 941 MHz

Span 1.863 GHz

#Res BW 1 MHz

#VBW 1 MHz

Sweep 3.12 ms (601 pts)

Center Freq
941.250000 MHz

Start Freq
10.00000000 MHz

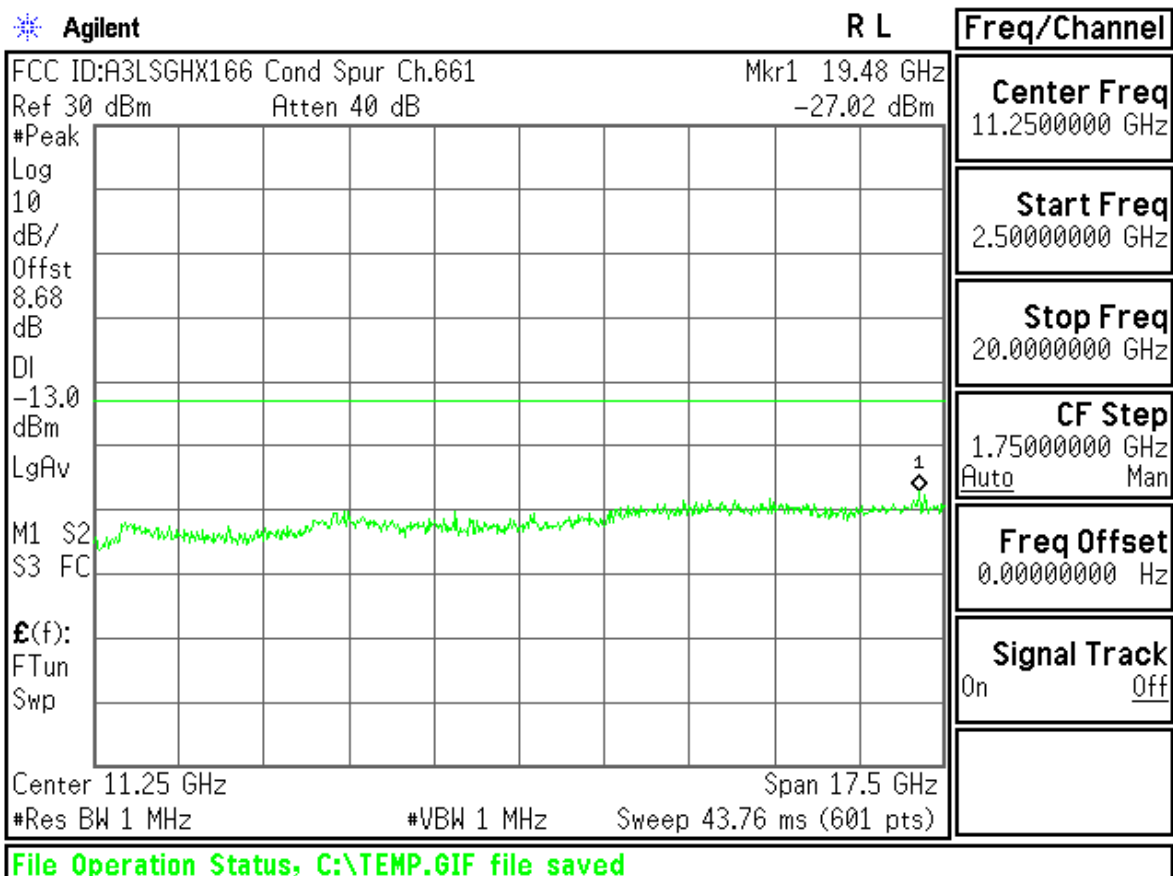
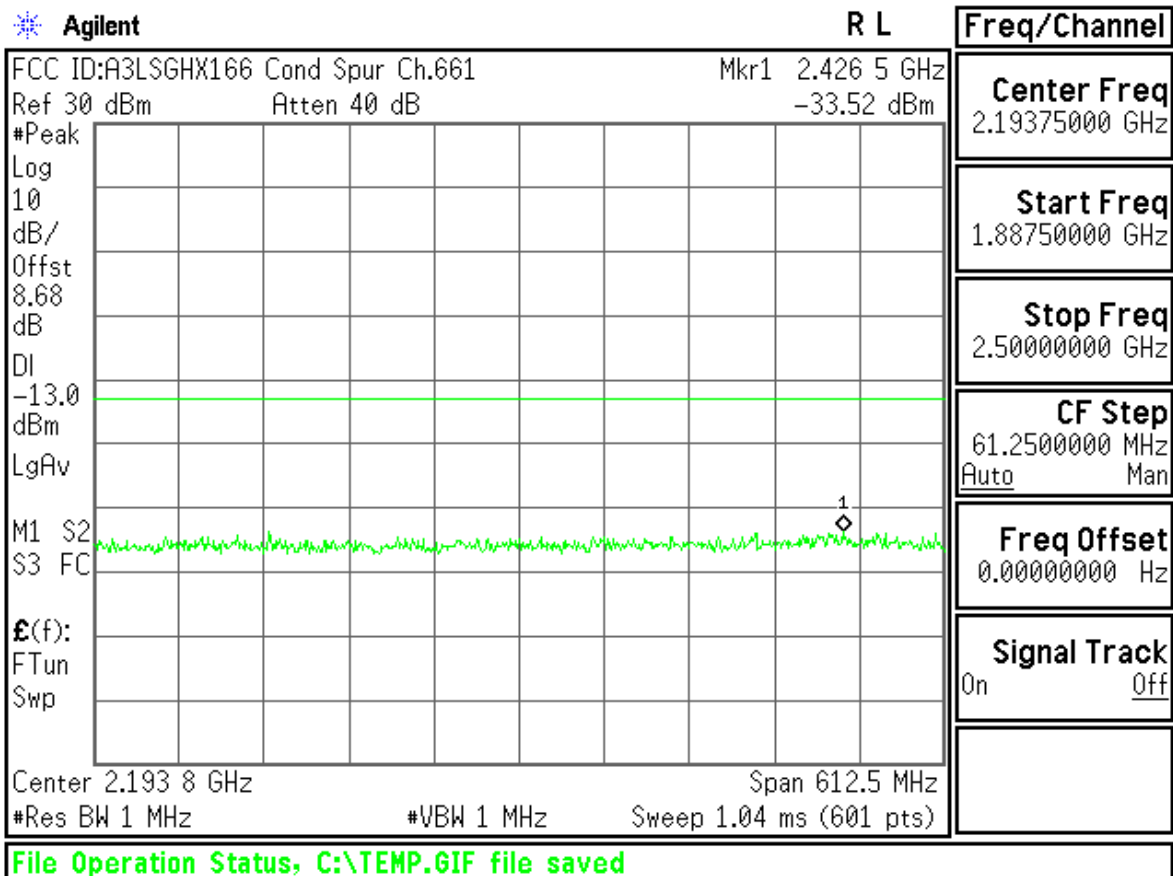
Stop Freq
1.87250000 GHz

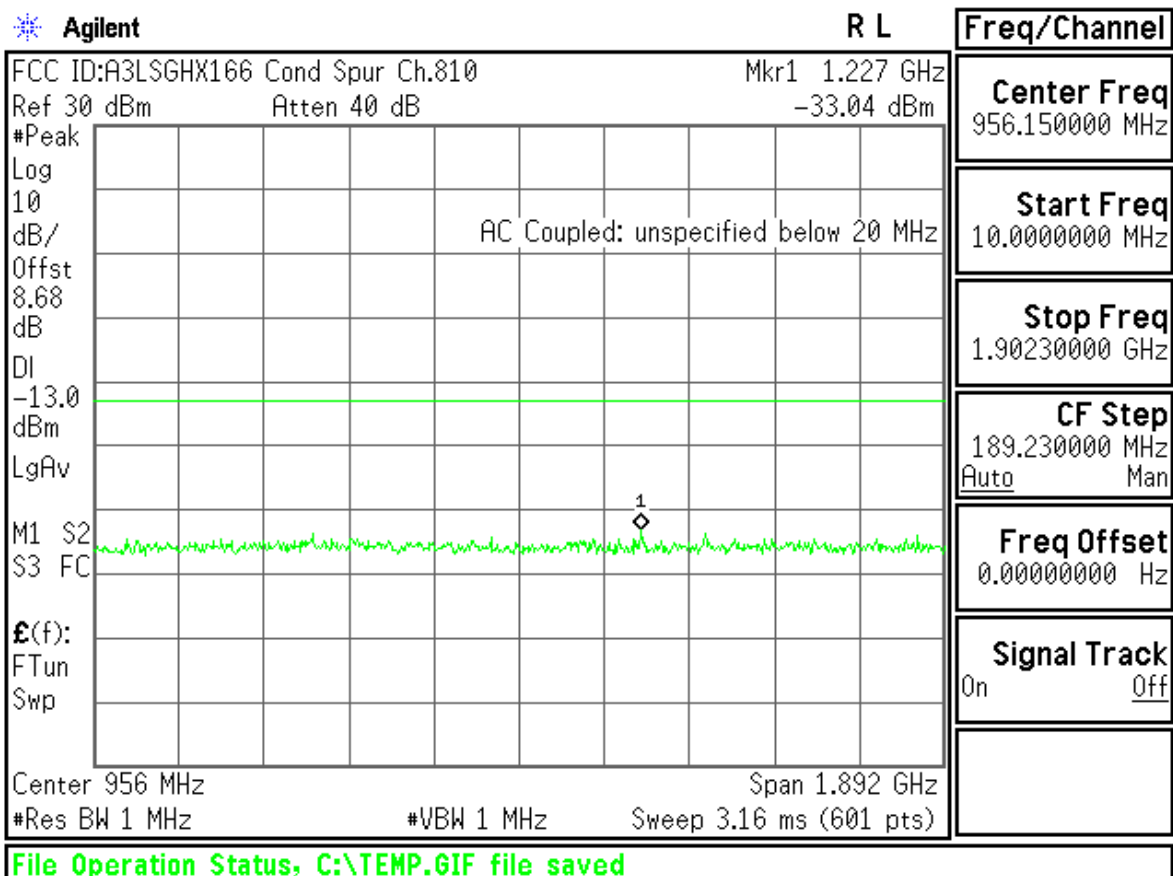
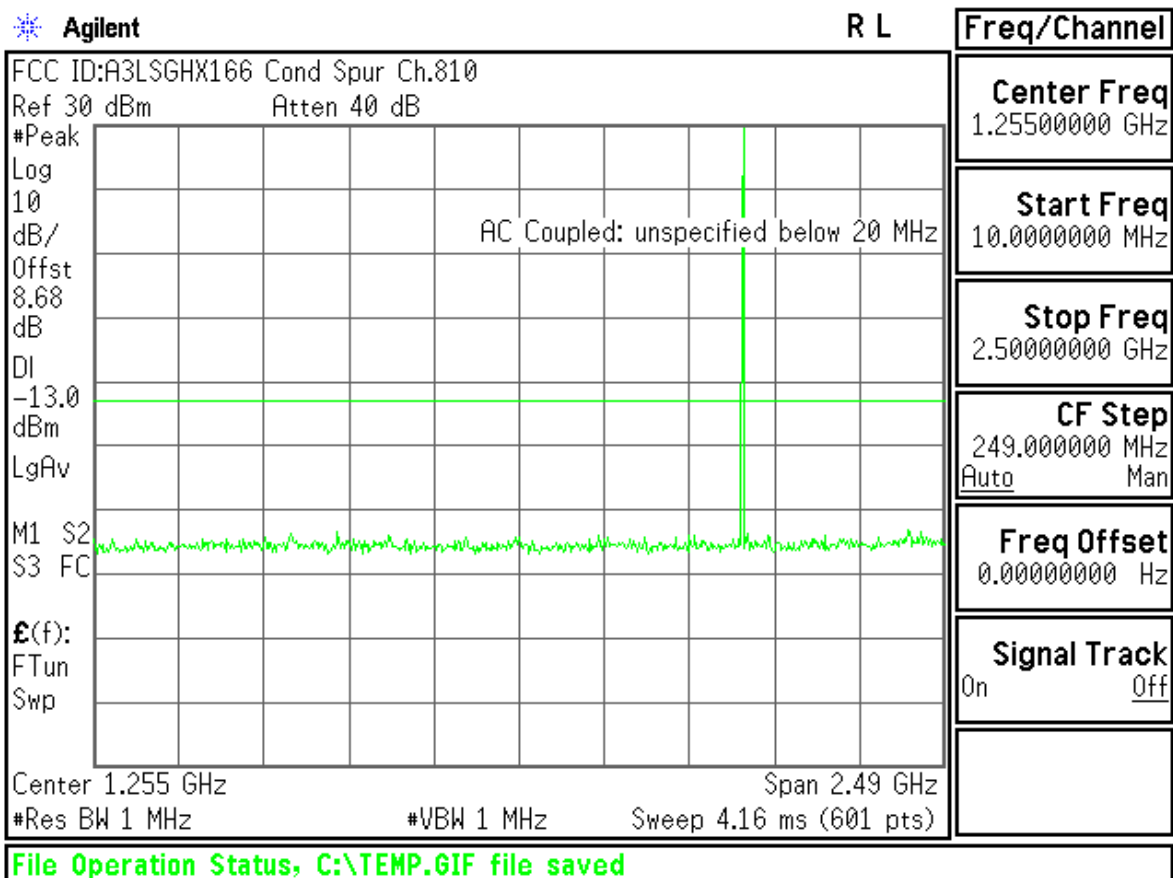
CF Step
186.250000 MHz
Auto Man

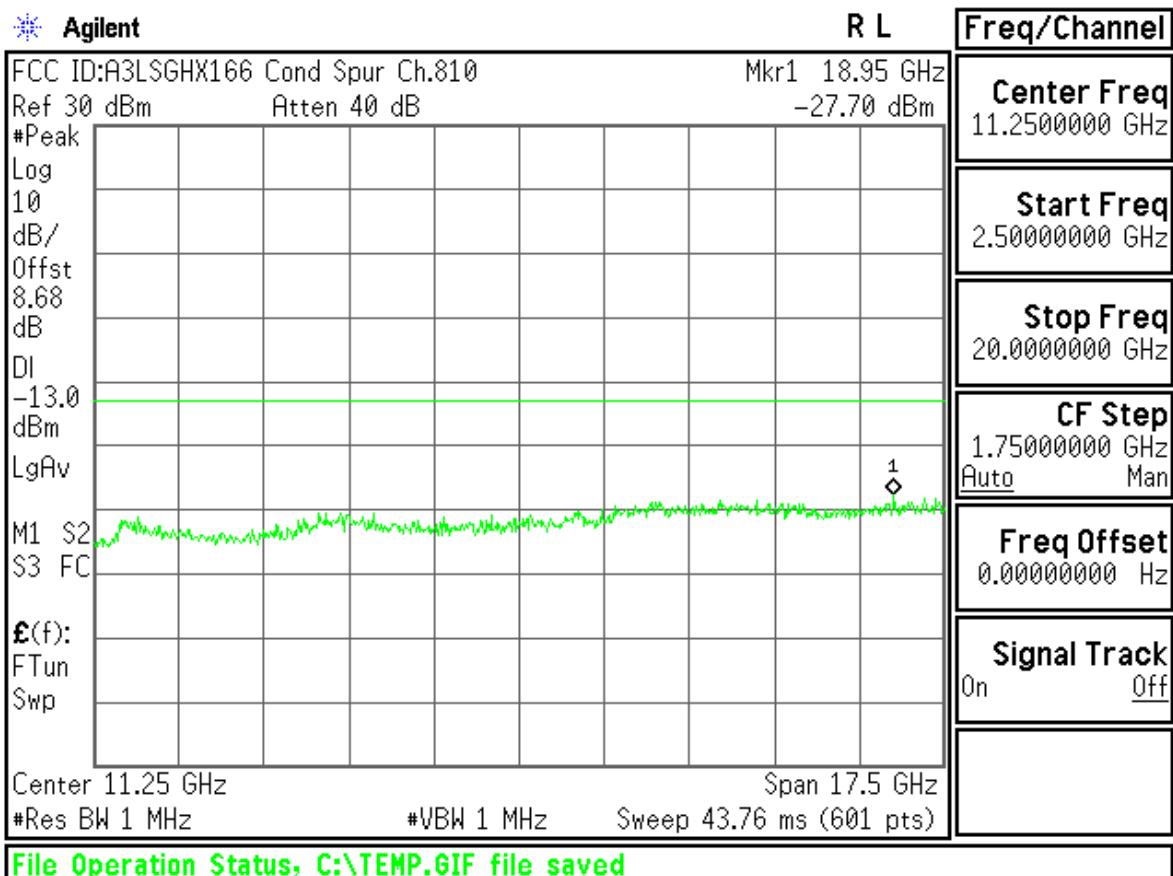
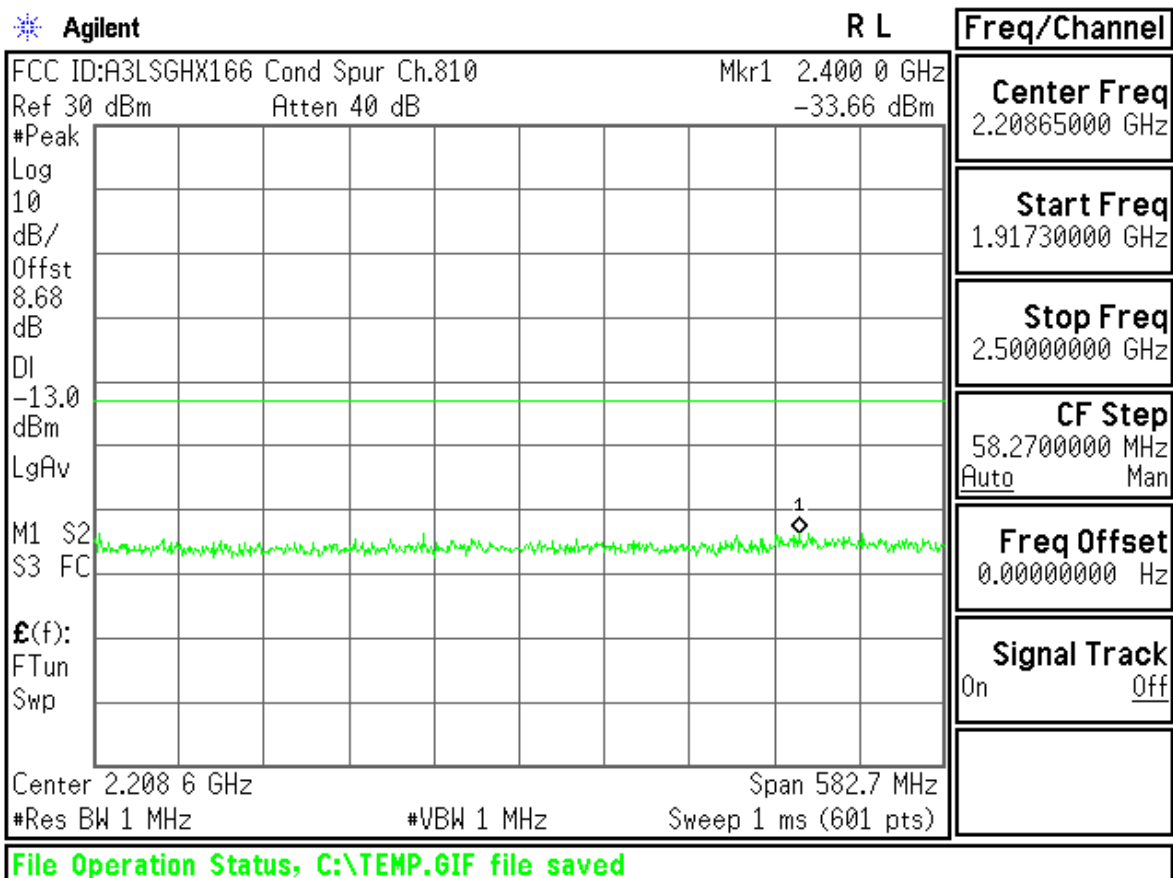
Freq Offset
0.00000000 Hz

Signal Track
On Off

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







Agilent

R L

Freq/Channel

FCC ID:A3LSGHX166 Band Edge Ch.512

Ref 30 dBm

Atten 40 dB

#Avg

Log

10

dB/

Offst

8.68

dB

DI

-13.0

dBm

PAvg

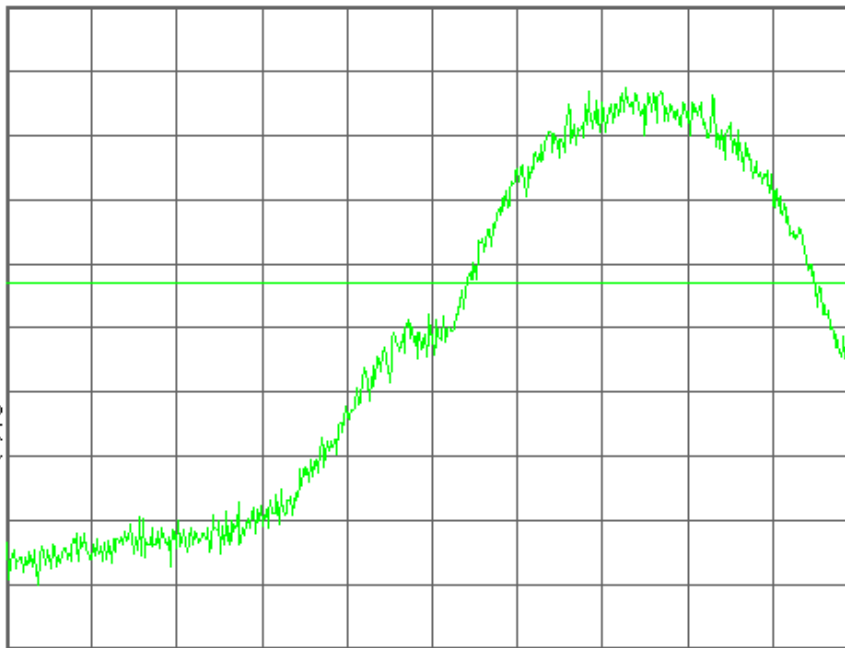
M1 S2

S3 FC

$E(f)$:

f>50k

Swp



Center 1.850 000 0 GHz

Span 810 kHz

#Res BW 3 kHz

#VBW 3 kHz

Sweep 343.2 ms (601 pts)

Center Freq
1.85000000 GHz

Start Freq
1.84959500 GHz

Stop Freq
1.85040500 GHz

CF Step
81.0000000 kHz
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:A3LSGHX166 Band Edge Ch.512

Mkr1 1.849 993 3 GHz

Ref 30 dBm

Atten 40 dB

-19.18 dBm

#Avg

Log

10

dB/

Offst

8.68

dB

DI

-13.0

dBm

PAvg

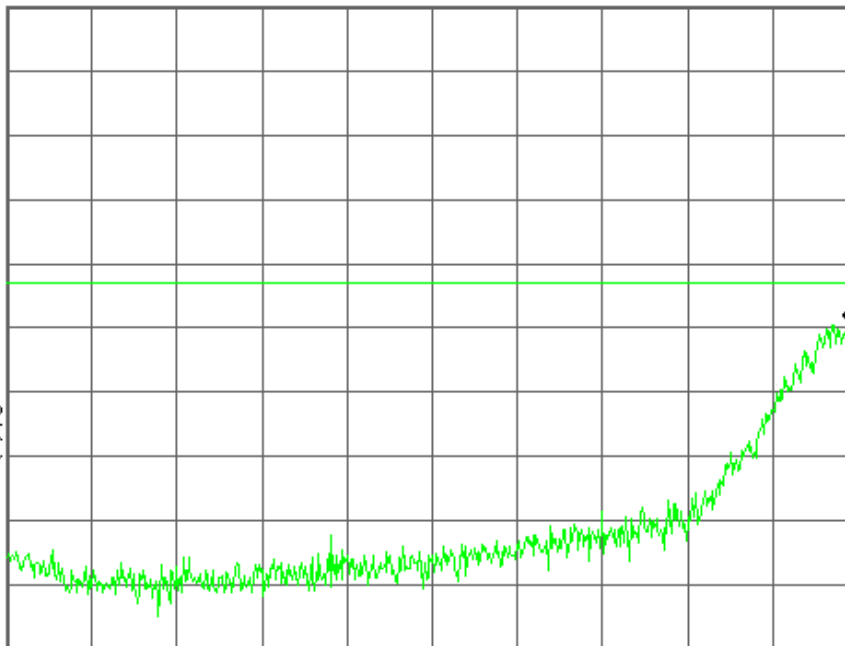
M1 S2

S3 FC

$E(f)$:

f>50k

Swp



Center 1.849 595 0 GHz

Span 810 kHz

#Res BW 3 kHz

#VBW 3 kHz

Sweep 343.2 ms (601 pts)

Center Freq
1.84959500 GHz

Start Freq
1.84919000 GHz

Stop Freq
1.85000000 GHz

CF Step
81.0000000 kHz
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:A3LSGHX166 Band Edge Ch.810

Ref 30 dBm

Atten 40 dB

#Avg

Log

10

dB/

Offst

8.68

dB

DI

-13.0

dBm

PAvg

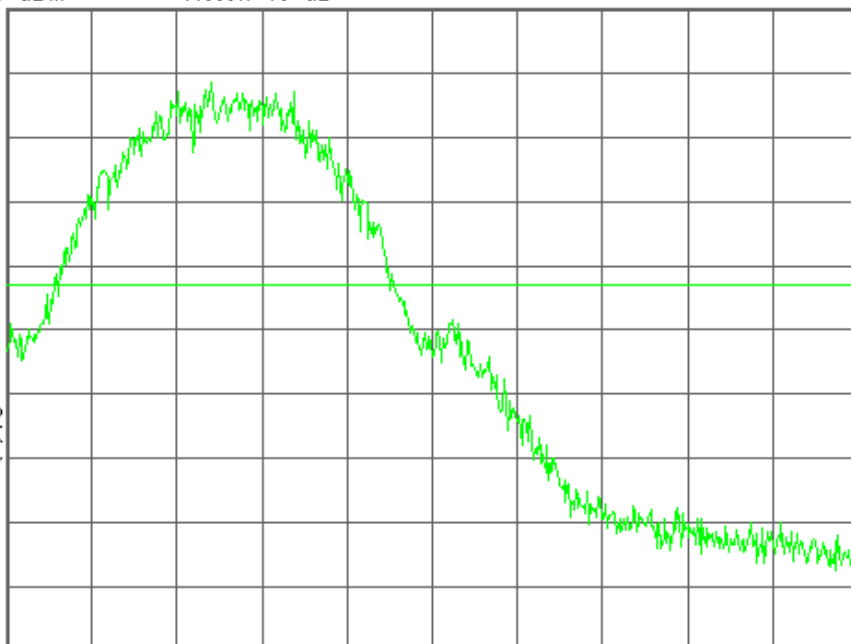
M1 S2

S3 FC

$\mathcal{E}(f)$:

f>50k

Swp



Center 1.910 000 0 GHz

Span 810 kHz

#Res BW 3 kHz

#VBW 3 kHz

Sweep 343.2 ms (601 pts)

Center Freq
1.91000000 GHz

Start Freq
1.90959500 GHz

Stop Freq
1.91040500 GHz

CF Step
81.0000000 kHz
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:A3LSGHX166 Band Edge Ch.810

Mkr1 1.910 019 0 GHz

Ref 30 dBm

Atten 40 dB

-19.47 dBm

#Avg

Log

10

dB/

Offst

8.68

dB

DI

-13.0

dBm

PAvg

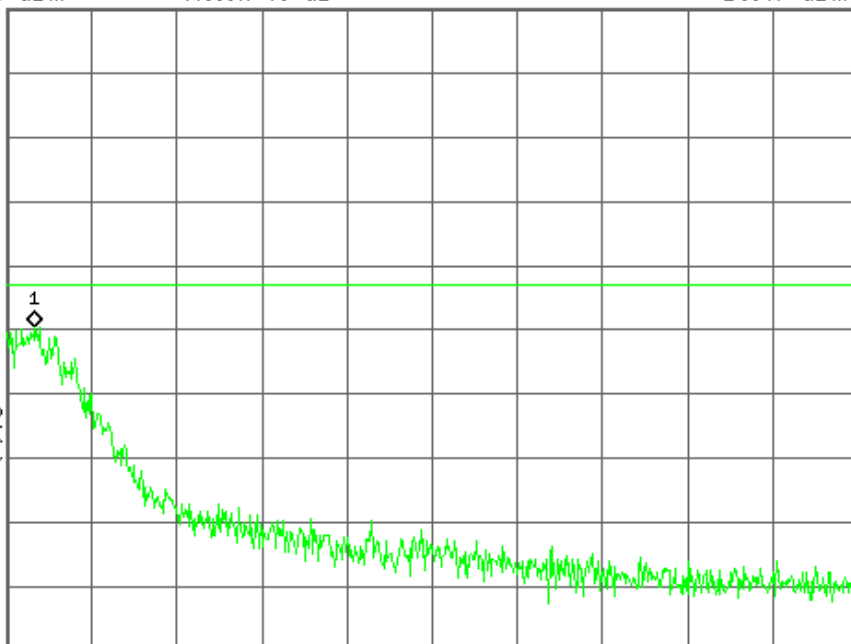
M1 S2

S3 FC

$\mathcal{E}(f)$:

f>50k

Swp



Center 1.910 405 0 GHz

Span 810 kHz

#Res BW 3 kHz

#VBW 3 kHz

Sweep 343.2 ms (601 pts)

Center Freq
1.91040500 GHz

Start Freq
1.91000000 GHz

Stop Freq
1.91081000 GHz

CF Step
81.0000000 kHz
Auto Man

Freq Offset
0.00000000 Hz

Signal Track
On Off

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