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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 : **SGH-T229**
FCC ID(Requested) : **A3LSGHT229**
Report No : **FE-245-R1**
Job No : **FE-245**
Date issued : **March 05, 2008**

- Abstract -

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

Prepared By

JH WOO - Test Engineer

Authorized By

WW JANG - Technical
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 : A3LSGHT229
- Quantity : Quantity production is planned
- Emission Designators : 254KGXW(GSM850)
251KGXW(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 : 0.929 W ERP GSM850 (29.68dBm)
1.059 W EIRP GSM1900 (30.25dBm)
- FCC Classification(s) : Licensed Portable Tx Held to Ear (PCE)
- Equipment (EUT) Type : Dual-Band GSM850/1900 Phone with Bluetooth
- Frequency Tolerance : $\pm 0.00025\%$ (2.5ppm)
- FCC Rule Part(s) : §24(E), §22(H), §2.
- Dates of Test : February 21-22, 2008
- Place of Test : SAMSUNG Lab,
- Test Report S/N : FE-245-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 it the same position and in vertical polarization. The frequency of the signal generator shall be set to the frequencies that were measured on the EUT. The test antenna shall be raised and lowered, if necessary, to ensure that the maximum signal is still being received. The signal generator, output level, shall be adjusted until an equal or a known related level to what was measured from the EUT is obtained in the spectrum analyzer. This level was recorded.

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

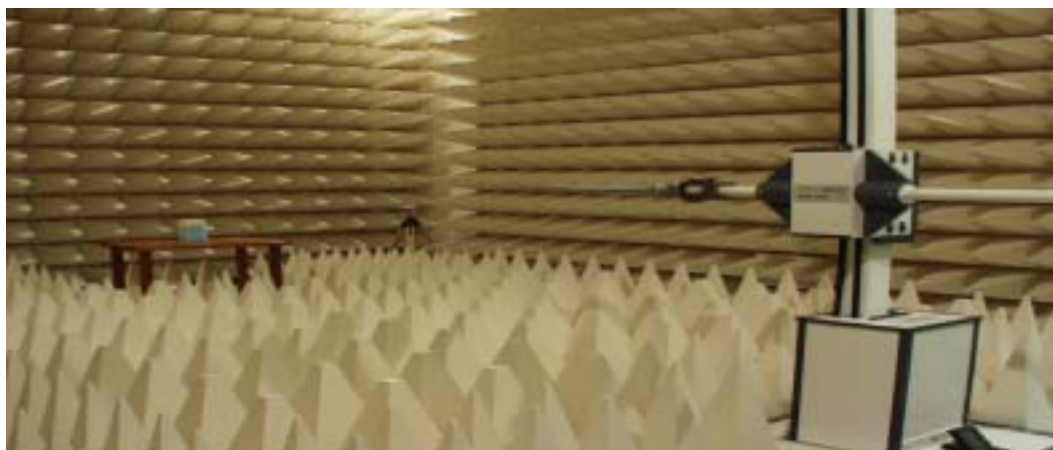


Figure2. Photograph of 3m Fully-Anechoic Chamber

3. MEASURING INSTRUMENT CALIBRATION

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

4. TEST EQUIPMENT LIST

Name Of Equipment	Model	Serial No.	Due Date
Spectrum Analyzer	ESI26	836119/010	2008-10-17
	E4440A(3Hz~26.5GHz)	MY41000236	2008-04-14
	E4440A(3Hz~26.5GHz)	MY41000233	2008-07-23
Signal Generator	SMR20	835197/030	2008-12-05
Network Analyzer	8753E	JP38160590	2008-06-26
Power Sensor	8485A	3318A19924	2008-10-01
Power Meter	E4419B	GB41293846	2008-09-06
Pre-Amplifier	8449B	3008A00691	2008-12-24
Communication test set	8960	GB42230535	2009-01-02
	8960	GB42360886	2008-07-03
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	2008-05-04
Dipole Antenna	3121C-DB4	9007-588	2008-05-29
Communication test set	CMU200	109162	2008-10-17
Receive Antenna	HL040	353255/019	2008-09-20
	HL040	353255/020	2008-04-25
Power Supply	E3640A	MY40003594	2008-06-25
Divider	11636B	51946	Not Required
	11636B	51942	Not Required
High Pass Filter	WHK1.0/15G-10SS	1	Not Required
	WHK/3.5/18G-10SS	4	Not Required
Environmental Chamber	SH-241	92000549	2008-11-15
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:

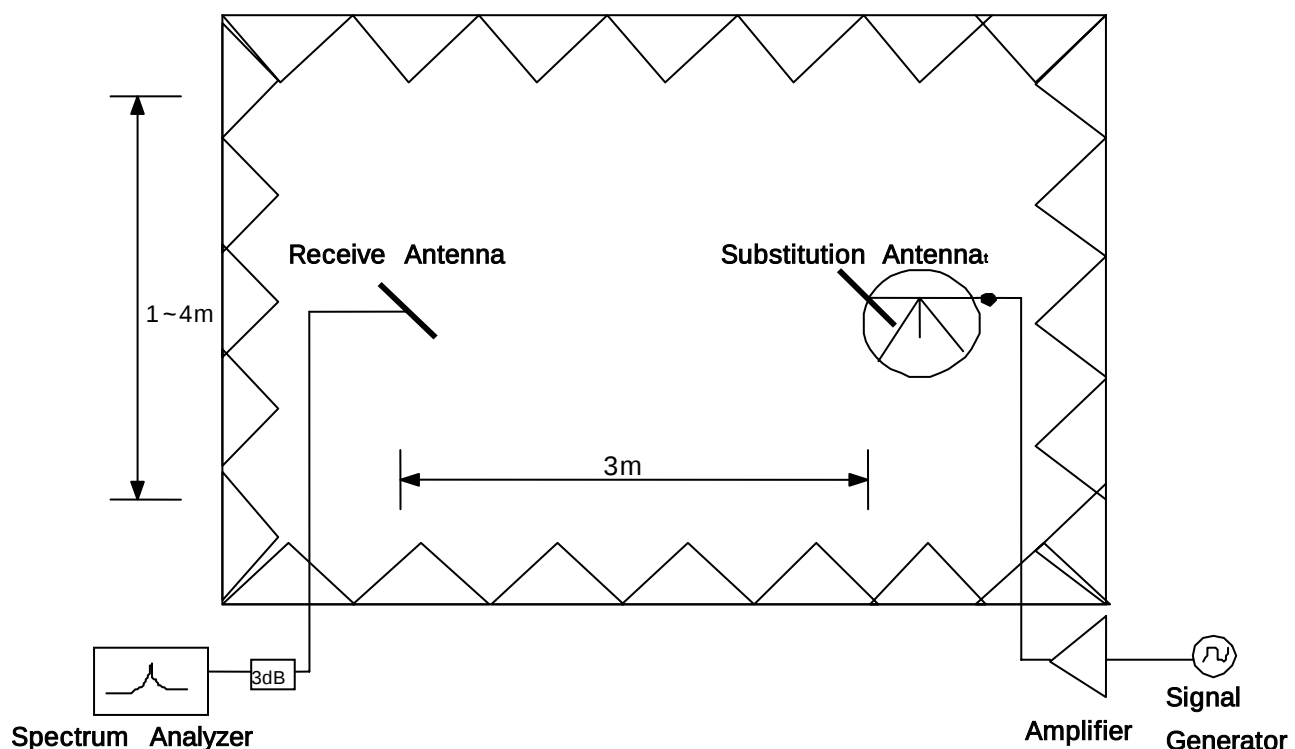


Figure 3. Diagram of ERP/EIRP test Set-up

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

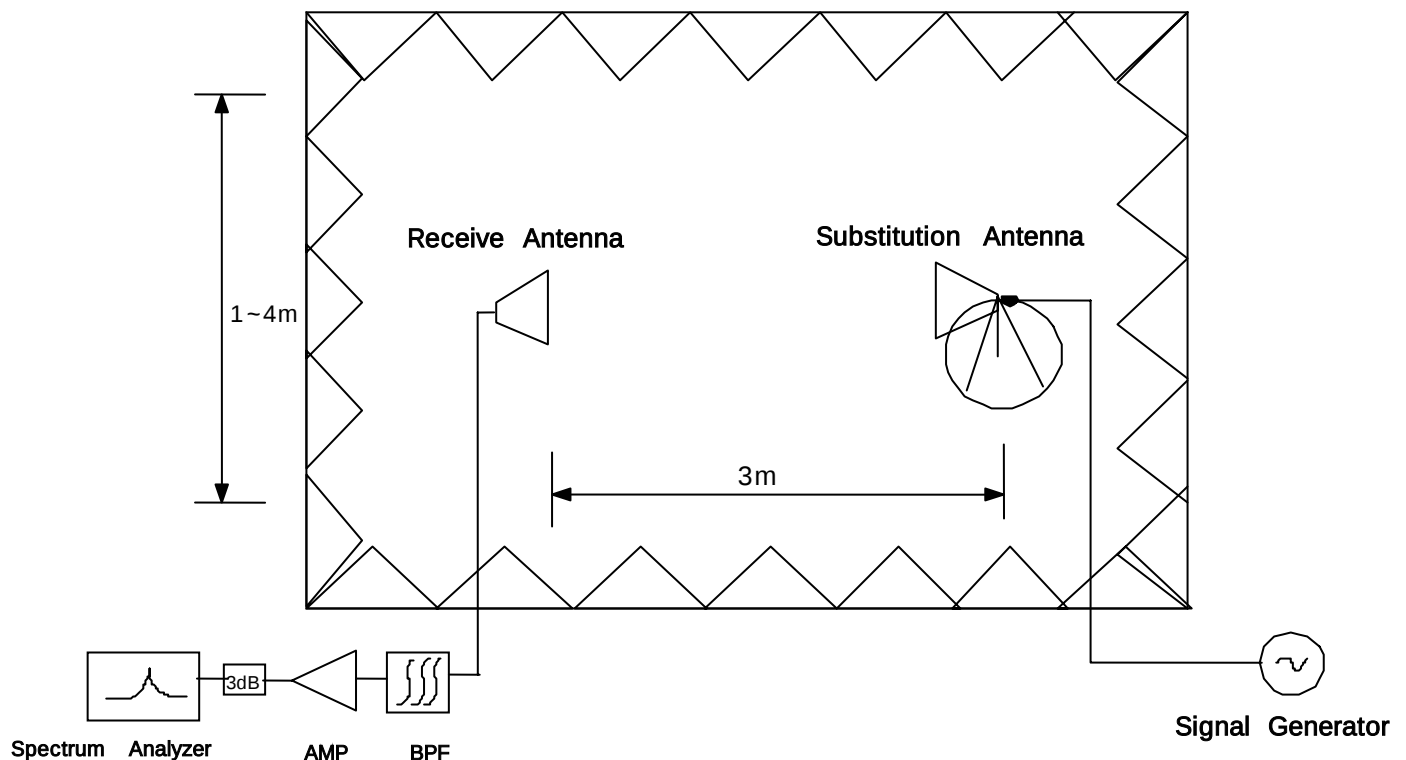


Figure 4. Diagram of Radiated Spurious & Harmonic test Set-up

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.

$$43 + 10\log(0.929 \text{ W}) = 42.68 \text{ dB}$$

$$29.68 \text{ dBm} - 42.68 \text{ dB} = -13 \text{ dBm}$$

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	28.00	H	-8.39	-0.67	-7.72
		V	-8.64	-0.67	-7.97
836.60	29.00	H	-9.59	-0.73	-8.86
		V	-8.33	-0.73	-7.60
848.80	30.00	H	-11.95	-0.79	-11.16
		V	-9.10	-0.79	-8.31

■ Result

Frequency (MHz)	Tested level (dBm)	Polarization (H/V)	Azimuth (angle)	ERP (dBm)	ERP (W)	Battery
824.20	-7.84	H	88/84	27.88	0.614	Standard
836.60	-9.13	H	80/84	28.73	0.746	Standard
848.80	-11.48	H	88/84	29.68	0.929	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	29.00	H	-9.45	9.70	-19.15
		V	-9.47	9.70	-19.13
1880.00	29.00	H	-9.71	9.70	-19.41
		V	-9.43	9.70	-19.13
1909.80	30.00	H	-8.80	9.70	-18.52
		V	-8.42	9.70	-18.12

■ Result

Frequency (MHz)	Tested level (dBm)	Polarization (H/V)	Azimuth (angle)	EIRP (dBm)	EIRP (W)	Battery
1850.20	-19.02	V	320/80	29.11	0.815	Standard
1880.00	-18.90	V	336/80	29.23	0.838	Standard
1909.80	-17.87	V	339/98	30.25	1.059	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 : 29.68 dBm = 0.929 W

Modulation Signal : GSM850

Limit : $43 + 10\log_{10}(P) = 42.68 \text{ dBc}$

■ Result

Channel	Harmonic	Frequency (MHz)	From EUT Tested level (dBm)	POL (H/V)	Result (dBc)
128	2	1648.40	-61.57	81.15	V
	3	2472.60	-67.59	81.45	V
	4	3296.80	-67.51	77.95	H
	5	4121.00	-68.07	75.73	V
	6	4945.20	-	-	-
	7	5769.40	-	-	-
190	2	1673.20	-62.76	81.43	V
	3	2509.80	-68.32	82.24	H
	4	3346.40	-67.57	78.03	V
	5	4183.00	-68.61	76.53	H
	6	5019.60	-	-	-
	7	5856.20	-	-	-
251	2	1697.60	-61.60	79.64	V
	3	2546.40	-67.85	81.86	V
	4	3395.20	-68.81	79.09	H
	5	4244.00	-69.20	76.76	V
	6	5092.80	-	-	-
	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 : 30.25 dBm = 1.059 W

Modulation Signal : GSM1900

Limit : $43 + 10\log_{10}(P) = 43.25 \text{ dBc}$

■ Result

Channel	Harmonic	Frequency (MHz)	From EUT Tested level (dBm)	POL (H/V)	Result (dBc)
512	2	3700.40	-53.48	59.43	V
	3	5550.60	-62.09	63.62	V
	4	7400.80	-66.55	64.77	V
	5	9251.00	-67.97	61.94	H
	6	11101.20	-	-	-
	7	12951.40	-	-	-
661	2	3760.00	-54.43	60.04	H
	3	5640.00	-65.16	66.78	H
	4	7520.00	-69.37	67.72	V
	5	9400.00	-69.42	63.05	V
	6	11280.00	-	-	-
	7	13160.00	-	-	-
810	2	3819.60	-55.33	61.35	H
	3	5729.40	-65.77	66.34	H
	4	7639.20	-67.01	65.18	H
	5	9549.00	-68.79	62.52	H
	6	11458.80	-	-	-
	7	13368.60	-	-	-

Radiated Spurious Emission measurements at 3 meters by Substitution Method

6.5. GSM850 Radiated Spurious & Harmonic Conversion Table

Date : 2008. 02. 22

Test Engineer : JH WOO

Tx Cable loss
 Tx Horn Ant Gain
 Rx Cable loss + HPF Insertion loss + Attenuator
 Pre-Amp gain
 Air loss
 Tested Level from EUT
 = + + -
 = ERP -

CH	Har	Frequency (MHz)	Tx C/L dB	Tx Horn Gain dBi	Tx Level dBm	ESI Level : H dBm	ESI Level : V dBm	Tested EUT Level : H dBm	Tested EUT Level : H dBm	Result EUT : H (dBc)	Result EUT : V (dBc)
128	2	1648.40	-7.44	9.50	-15.10	-25.78	-25.24	-62.55	-61.57	81.59	81.15
	3	2472.60	-9.40	10.70	-14.30	-30.65	-30.96	-68.10	-67.59	82.27	81.45
	4	3296.80	-10.62	12.30	-14.70	-34.30	-34.88	-67.51	-68.01	78.03	77.95
	5	4121.00	-12.18	12.50	-13.30	-37.37	-37.16	-68.95	-68.07	76.40	75.73
	6	4945.20	-13.25	12.70	-12.50	-39.95	-40.17	-	-	-	-
	7	5769.40	-14.88	12.90	-11.00	-42.25	-42.16	-	-	-	-
190	2	1673.20	-7.53	9.50	-15.00	-26.45	-26.15	-63.72	-62.76	82.09	81.43
	3	2509.80	-9.52	10.70	-14.20	-30.90	-30.96	-68.32	-68.42	82.24	82.28
	4	3346.40	-10.72	12.30	-14.60	-34.28	-34.36	-67.75	-67.57	78.29	78.03
	5	4183.00	-12.46	12.50	-13.00	-36.90	-37.13	-68.61	-69.07	76.53	76.76
	6	5019.60	-13.94	12.70	-11.80	-40.04	-40.64	-	-	-	-
	7	5856.20	-14.92	12.90	-11.00	-42.75	-42.94	-	-	-	-
251	2	1697.60	-7.61	9.50	-14.90	-26.64	-26.78	-62.79	-61.60	80.97	79.64
	3	2546.40	-9.56	10.70	-14.10	-30.32	-30.81	-68.41	-67.85	82.91	81.86
	4	3395.20	-10.77	12.30	-14.50	-34.25	-34.55	-68.81	-68.82	79.38	79.09
	5	4244.00	-12.36	12.50	-13.10	-37.07	-37.26	-69.31	-69.20	77.06	76.76
	6	5092.80	-14.20	12.70	-11.50	-40.12	-40.75	-	-	-	-
	7	5941.60	-15.12	12.90	-10.80	-43.10	-42.67	-	-	-	-

6.6. GSM1900 Radiated Spurious & Harmonic Conversion Table

Date : 2008. 02. 22

Test Engineer : JH WOO

Tx Cable loss
 Tx Horn Ant Gain
 Rx Cable loss + HPF Insertion loss + Attenuator
 Pre-Amp gain
 Air loss
 Tested Level from EUT
 = + + -
 = EIRP -

CH	Har	Frequency (MHz)	Tx C/L dB	Tx Horn Gain dBi	Tx Level dBm	ESI Level : H dBm	ESI Level : V dBm	Tested EUT Level : H dBm	Tested EUT Level : H dBm	Result EUT : H (dBc)	Result EUT : V (dBc)
512	2	3700.40	-11.22	12.40	-14.20	-37.48	12.40	-55.55	-53.48	61.32	59.43
	3	5550.60	-14.53	12.90	-11.40	-41.76	12.90	-65.05	-62.09	66.54	63.62
	4	7400.80	-17.53	10.50	-6.00	-45.31	10.50	-68.92	-66.55	66.86	64.77
	5	9251.00	-20.07	11.20	-4.10	-49.28	11.20	-67.97	-69.98	61.94	63.74
	6	11101.20	-22.36	11.60	-2.20	-53.59	11.60	-	-	-	-
	7	12951.40	-23.92	12.90	-2.00	-56.64	12.90	-	-	-	-
661	2	3760.00	-11.50	12.40	-13.90	-37.64	12.40	-54.43	-56.17	60.04	61.81
	3	5640.00	-14.83	12.90	-11.10	-41.41	12.90	-65.16	-65.29	67.00	66.78
	4	7520.00	-17.89	10.60	-5.70	-44.71	10.60	-69.58	-69.37	68.12	67.72
	5	9400.00	-20.33	11.60	-4.30	-49.48	11.60	-69.61	-69.42	63.38	63.05
	6	11280.00	-22.49	12.10	-2.60	-54.00	12.10	-	-	-	-
	7	13160.00	-24.50	12.80	-1.30	-56.48	12.80	-	-	-	-
810	2	3819.60	-11.73	12.40	-13.70	-37.23	12.40	-55.33	-59.91	61.35	65.31
	3	5729.40	-14.73	13.00	-11.30	-42.68	13.00	-65.77	-66.68	66.34	67.66
	4	7639.20	-18.21	11.20	-6.00	-45.08	11.20	-67.01	-69.09	65.18	67.23
	5	9549.00	-21.01	11.70	-3.70	-49.52	11.70	-68.79	-69.92	62.52	63.89
	6	11458.80	-22.20	11.70	-2.50	-54.59	11.70	-	-	-	-
	7	13368.60	-24.36	12.30	-0.90	-58.12	12.30	-	-	-	-

6.7. Frequency Stability

6.7.1. GSM850 Frequency Stability Table

Operating Frequency : 836,600,000 Hz

Channel : 190

Reference Voltage : 3.7VDC

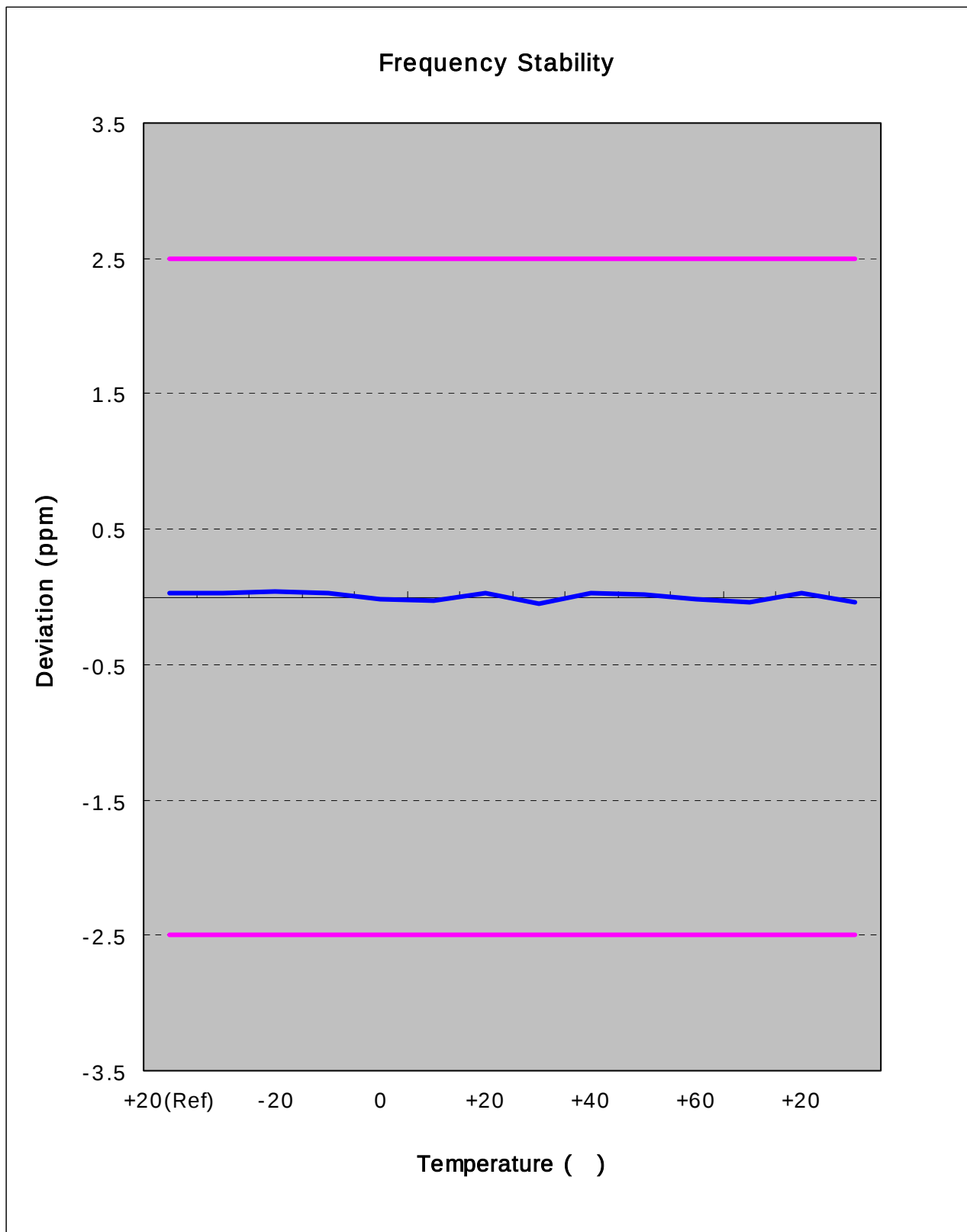
Deviation Limit : ± 0.00025 % or 2.5ppm

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency Error (Hz)	Frequency (Hz)	Deviation (%)	ppm
100%	3.70	+20(Ref)	27.90	836,600,028	0.000003	0.033
100%		-30	24.81	836,600,025	0.000003	0.030
100%		-20	29.00	836,600,029	0.000003	0.035
100%		-10	27.00	836,600,027	0.000003	0.032
100%		0	-17.97	836,599,982	-0.000002	-0.021
100%		+10	-19.75	836,599,980	-0.000002	-0.024
100%		+20	27.90	836,600,028	0.000003	0.033
100%		+30	-39.13	836,599,961	-0.000005	-0.047
100%		+40	19.22	836,600,019	0.000002	0.023
100%		+50	18.20	836,600,018	0.000002	0.022
100%		+60	-10.41	836,599,990	-0.000001	-0.012
85%	3.35	+20	-30.81	836,599,969	-0.000004	-0.037
115%	4.26	+20	23.02	836,600,023	0.000003	0.028
Batt.Endpoint	3.35	+20	-30.81	836,599,969	-0.000004	-0.037

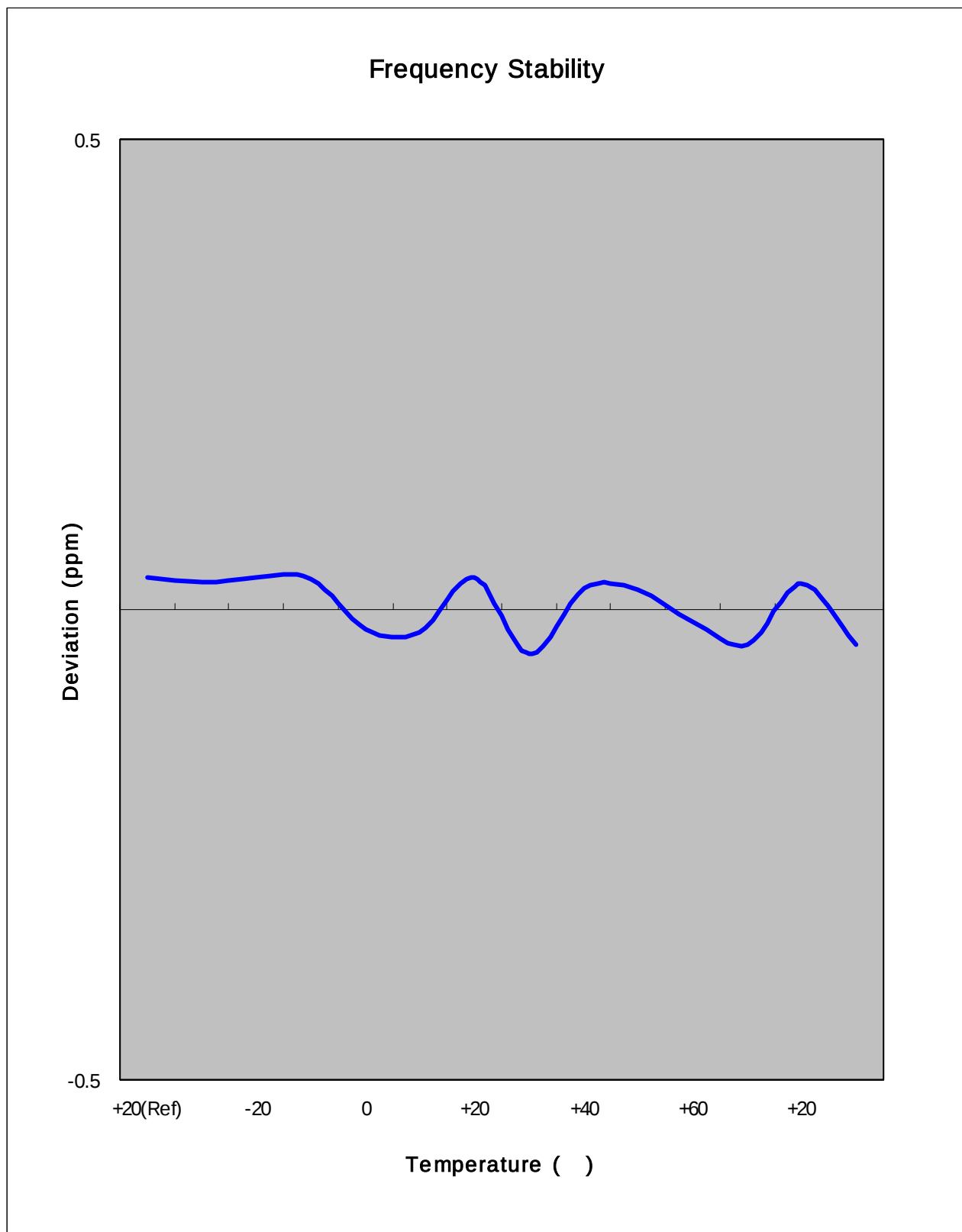
Note : The temperature is varied from -30 °C to +60 °C using an environmental chamber.

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

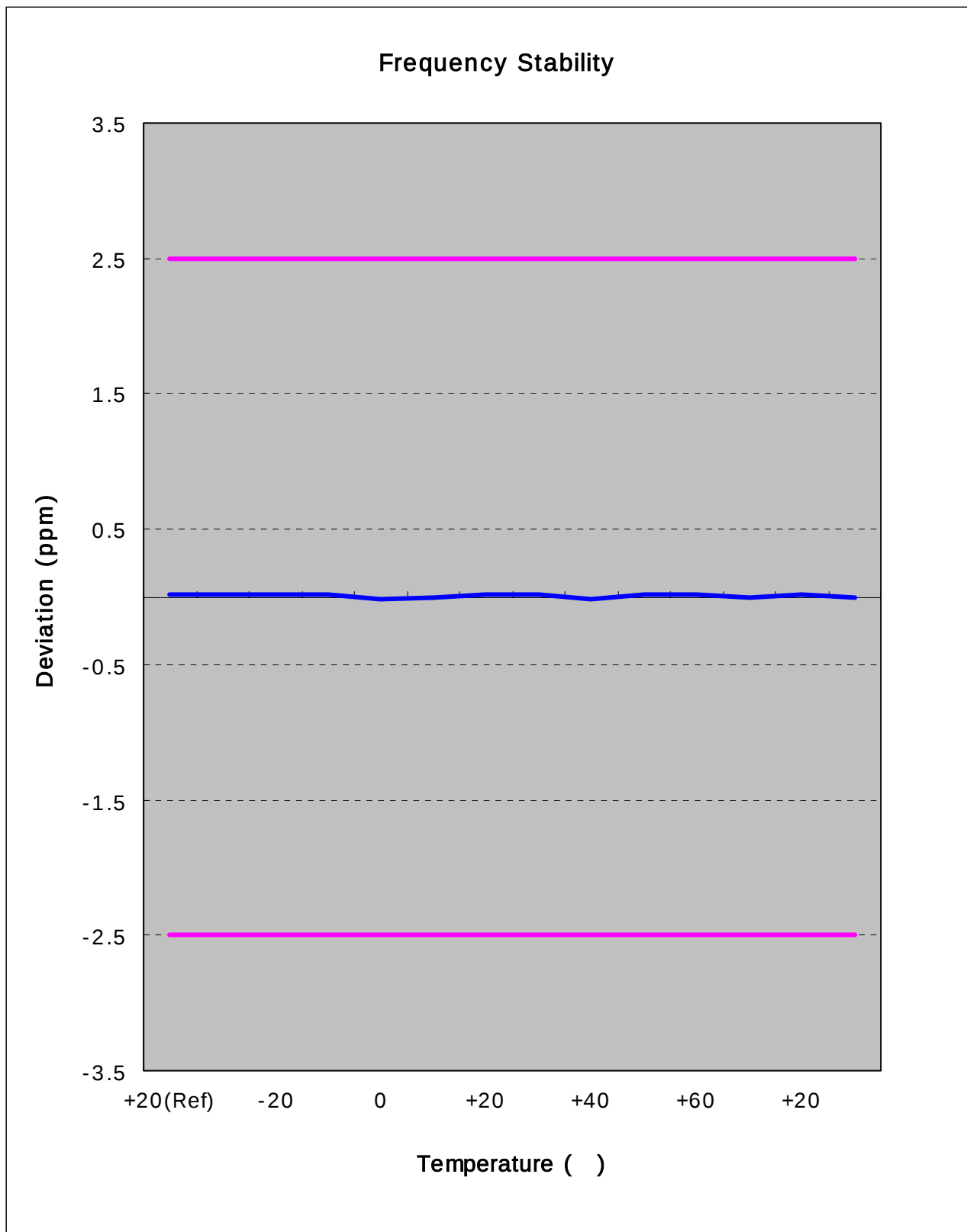
Deviation Limit : ± 0.00025 % or 2.5ppm

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency Error (Hz)	Frequency (Hz)	Deviation (%)	ppm
100%	3.70	+20(Ref)	26.71	1,880,000,027	0.000001	0.014
100%		-30	31.30	1,880,000,031	0.000002	0.017
100%		-20	27.83	1,880,000,028	0.000001	0.015
100%		-10	24.10	1,880,000,024	0.000001	0.013
100%		0	-29.82	1,879,999,970	-0.000002	-0.016
100%		+10	-14.98	1,879,999,985	-0.000001	-0.008
100%		+20	26.71	1,880,000,027	0.000001	0.014
100%		+30	23.38	1,880,000,023	0.000001	0.012
100%		+40	-23.87	1,879,999,976	-0.000001	-0.013
100%		+50	21.28	1,880,000,021	0.000001	0.011
100%		+60	31.44	1,880,000,031	0.000002	0.017
85%	3.35	+20	-19.50	1,879,999,981	-0.000001	-0.010
115%	4.26	+20	31.06	1,880,000,031	0.000002	0.017
Batt.Endpoint	3.35	+20	-19.50	1,879,999,981	-0.000001	-0.010

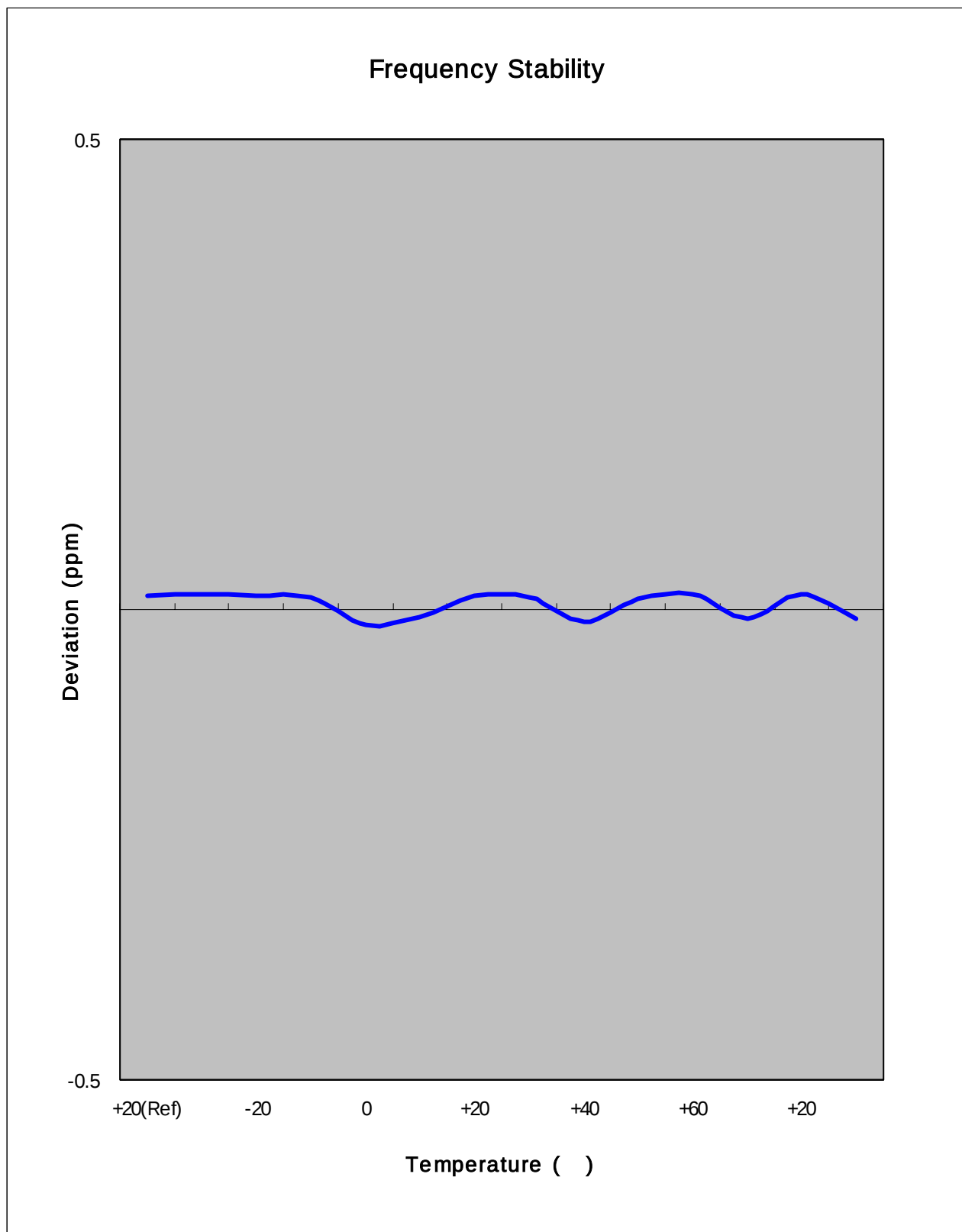
Note : The temperature is varied from -30 °C to +60 °C using an environmental chamber.

The EUT is tested down to the battery end point.

6.7.4. GSM1900 Frequency Stability Graph



Zoom IN





7. CONCLUSION

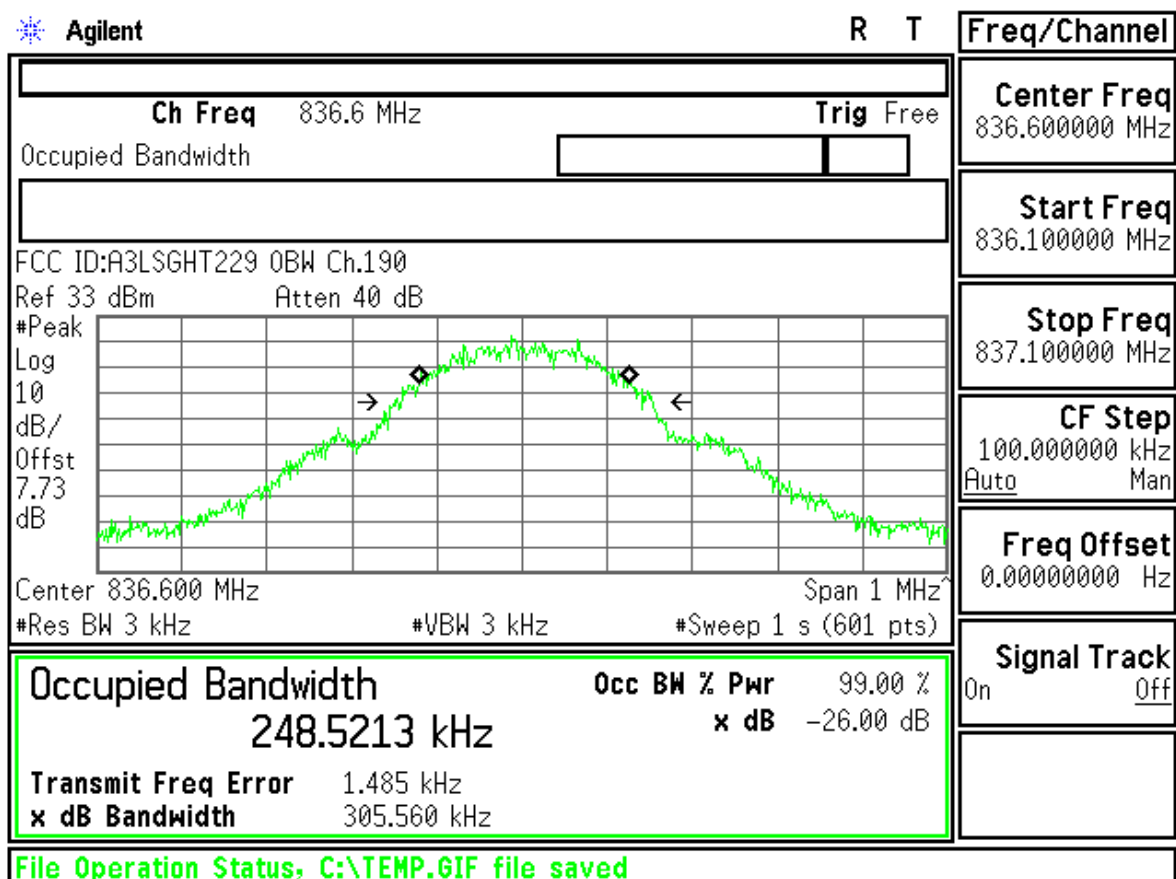
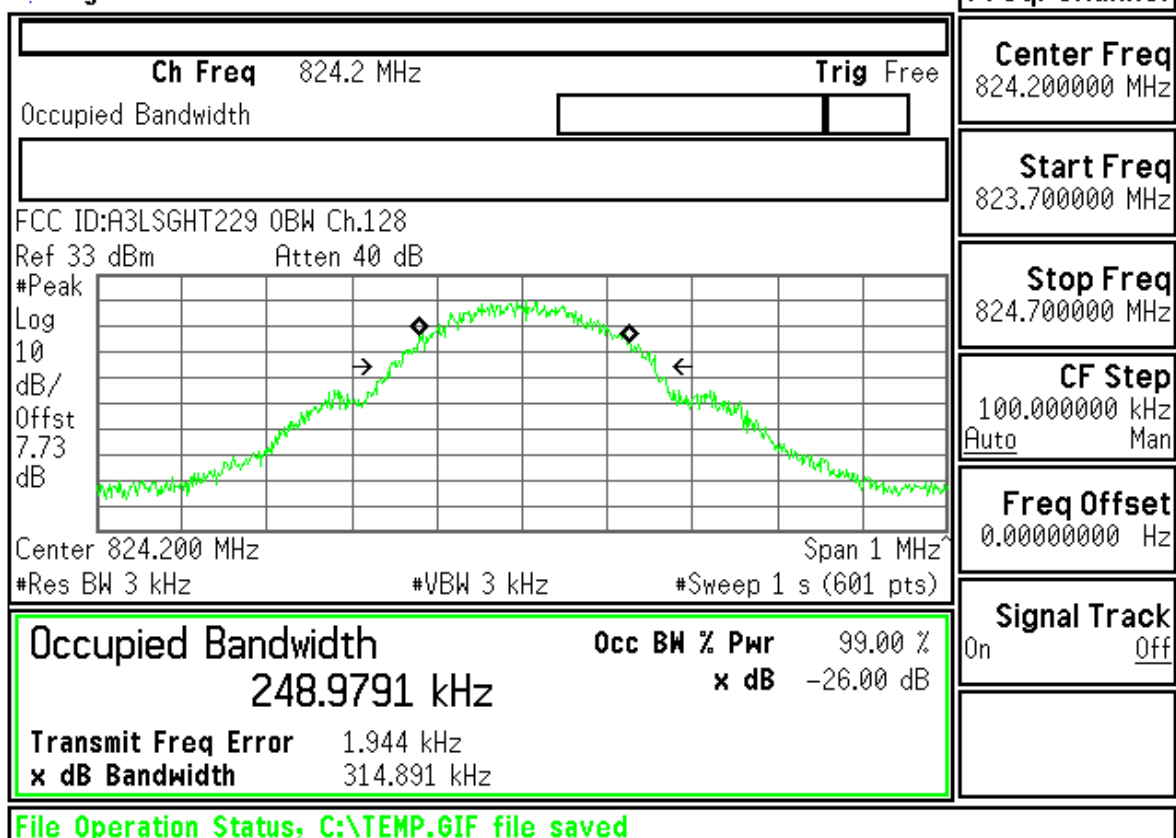
The data collected shows that the SAMSUNG Dual-Band GSM850/1900 Phone with Bluetooth.
FCC ID : A3LSGHT229 complies with all the requirements of Parts 2,22,24 of the FCC Rules.

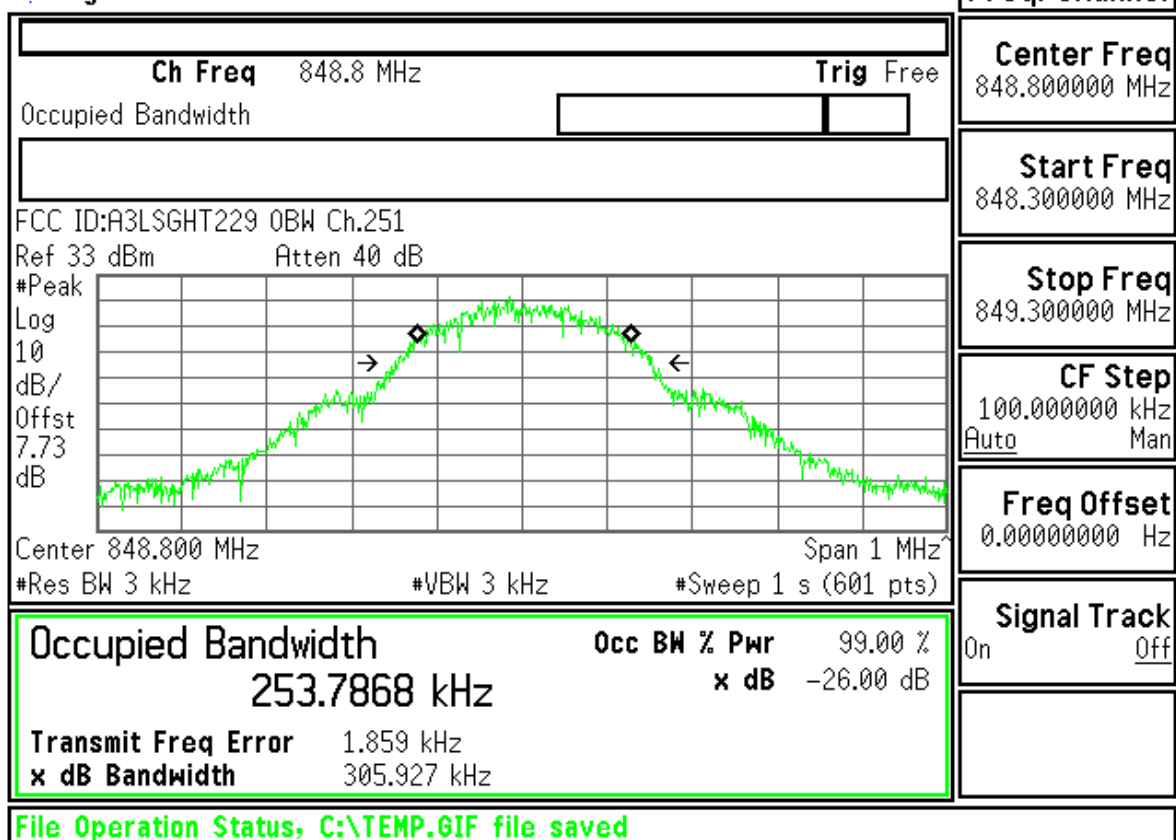
8. TEST PLOTS

GSM850

Agilent

R T



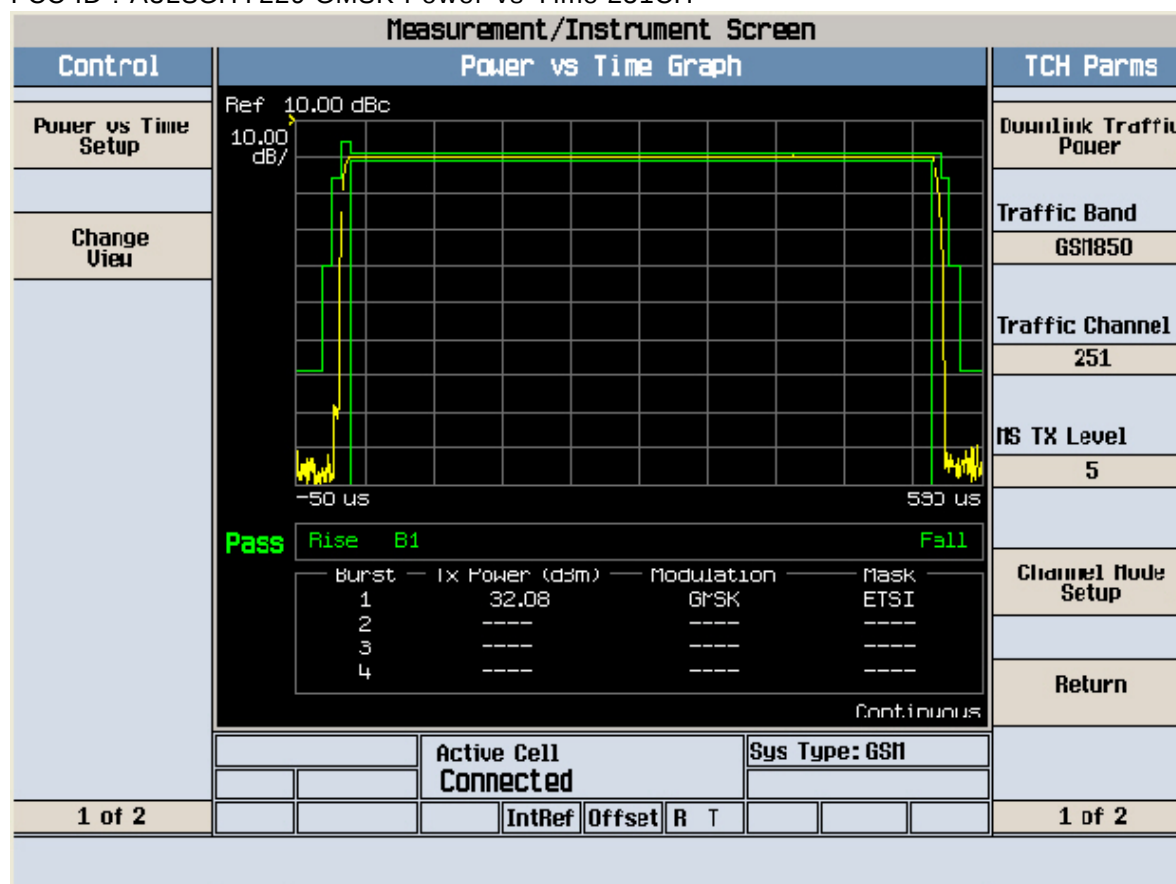
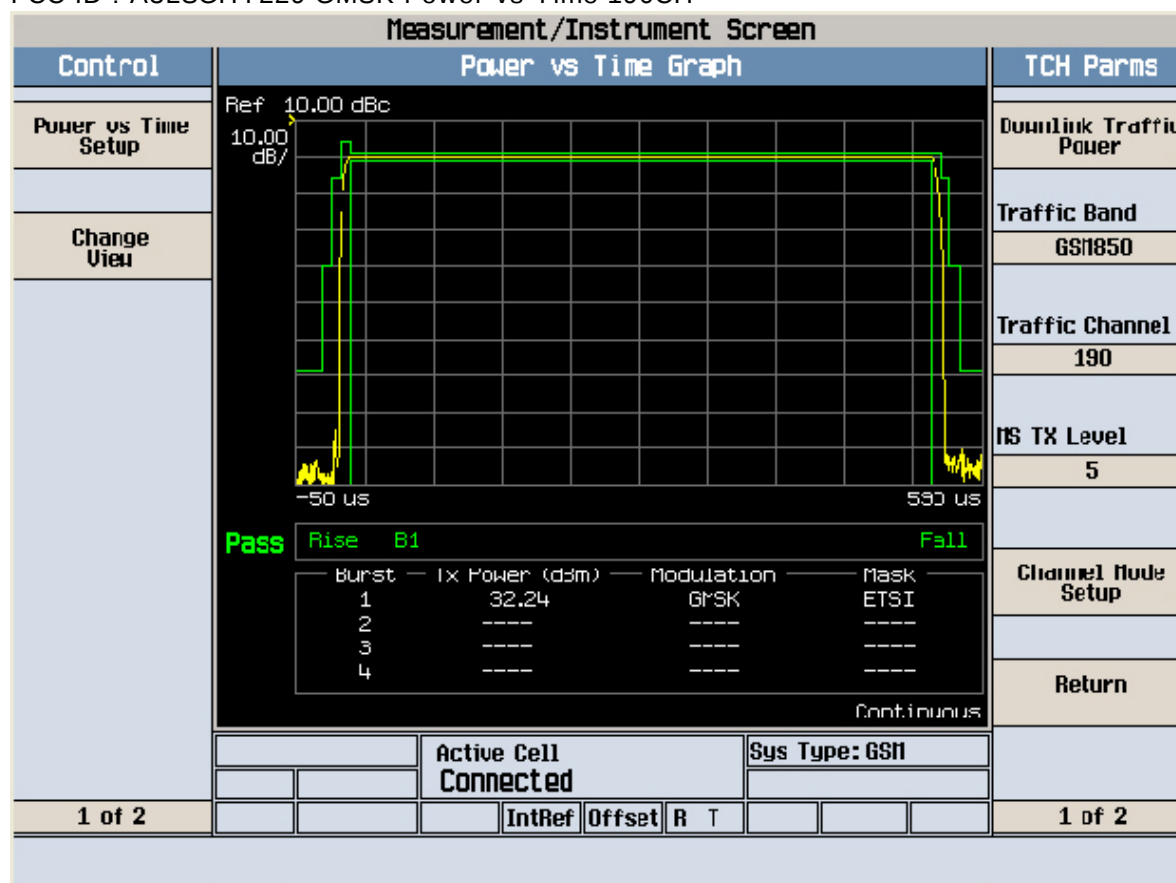


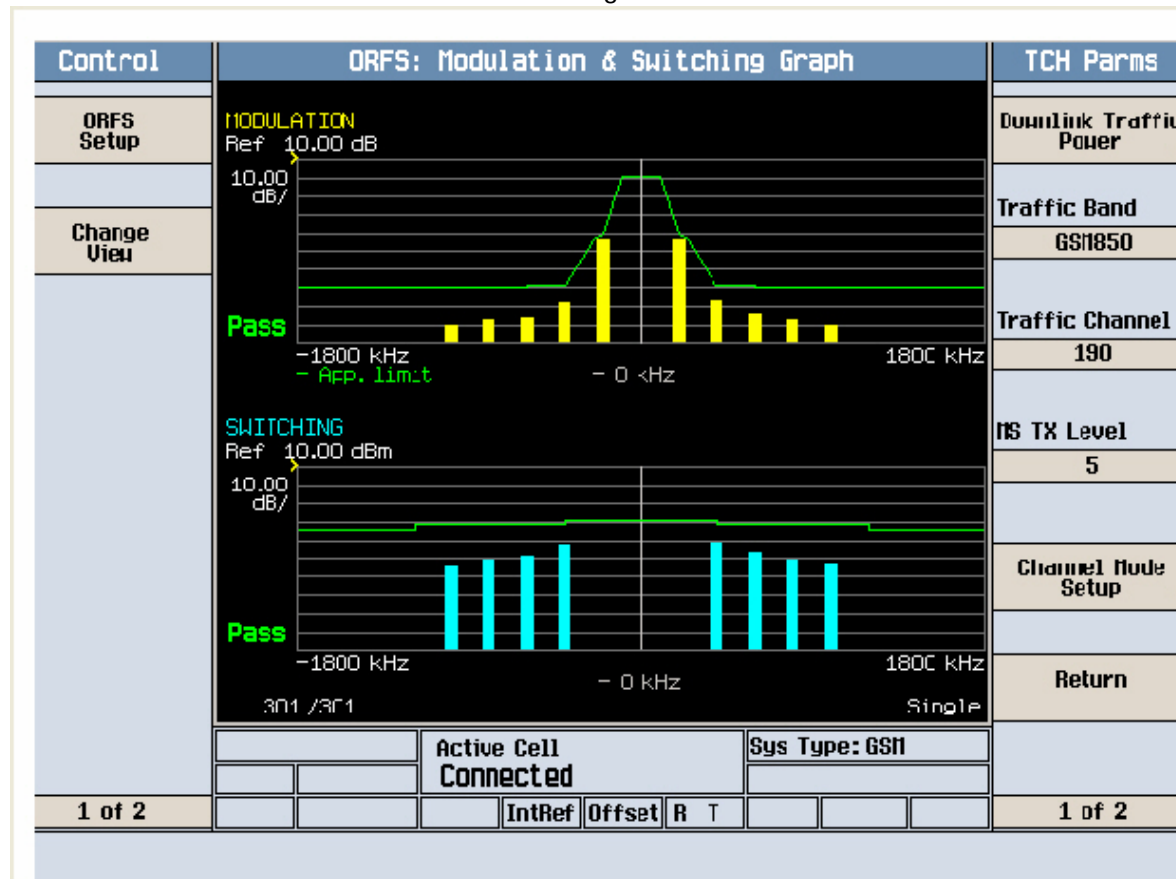
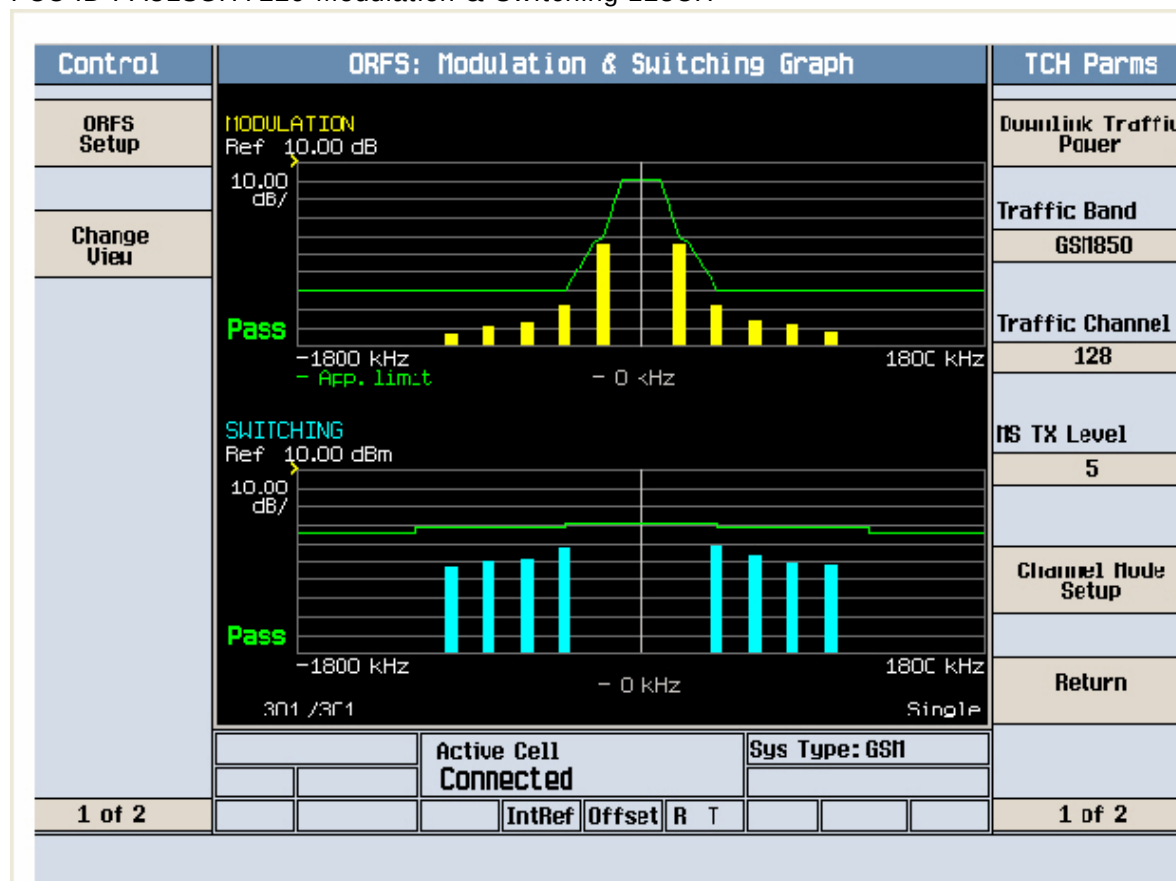
Control	Transmit Power								TCH Parms																						
Transmit Power Setup ▾	<table><tr><td></td><td>Burst 1</td><td>Burst 2</td><td>Burst 3</td><td>Burst 4</td></tr><tr><td>Burst Power</td><td>32.15</td><td>----</td><td>----</td><td>----</td></tr><tr><td>Estimated Carrier Power</td><td>32.15</td><td>----</td><td>----</td><td>----</td></tr></table>									Burst 1	Burst 2	Burst 3	Burst 4	Burst Power	32.15	----	----	----	Estimated Carrier Power	32.15	----	----	----	Downlink Traffic Power							
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	Estimated Carrier Power	32.15	----	----	----																										
	Single								Traffic Band																						
								GSM850																							
Swap Window Positions	<table><tr><td></td><td>Peak Phase °</td><td>RMS Phase °</td><td>Frequency Hz</td></tr><tr><td>Minimum</td><td>3.48</td><td>1.60</td><td>-3.44</td></tr><tr><td>Maximum</td><td>4.85</td><td>1.82</td><td>14.58</td></tr><tr><td>Average</td><td>4.15</td><td>1.69</td><td>3.98</td></tr><tr><td>Pass/Fail</td><td>Pass</td><td>Pass</td><td>Pass</td></tr></table>									Peak Phase °	RMS Phase °	Frequency Hz	Minimum	3.48	1.60	-3.44	Maximum	4.85	1.82	14.58	Average	4.15	1.69	3.98	Pass/Fail	Pass	Pass	Pass	Traffic Channel		
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			IntRef	Offset	R	T																									

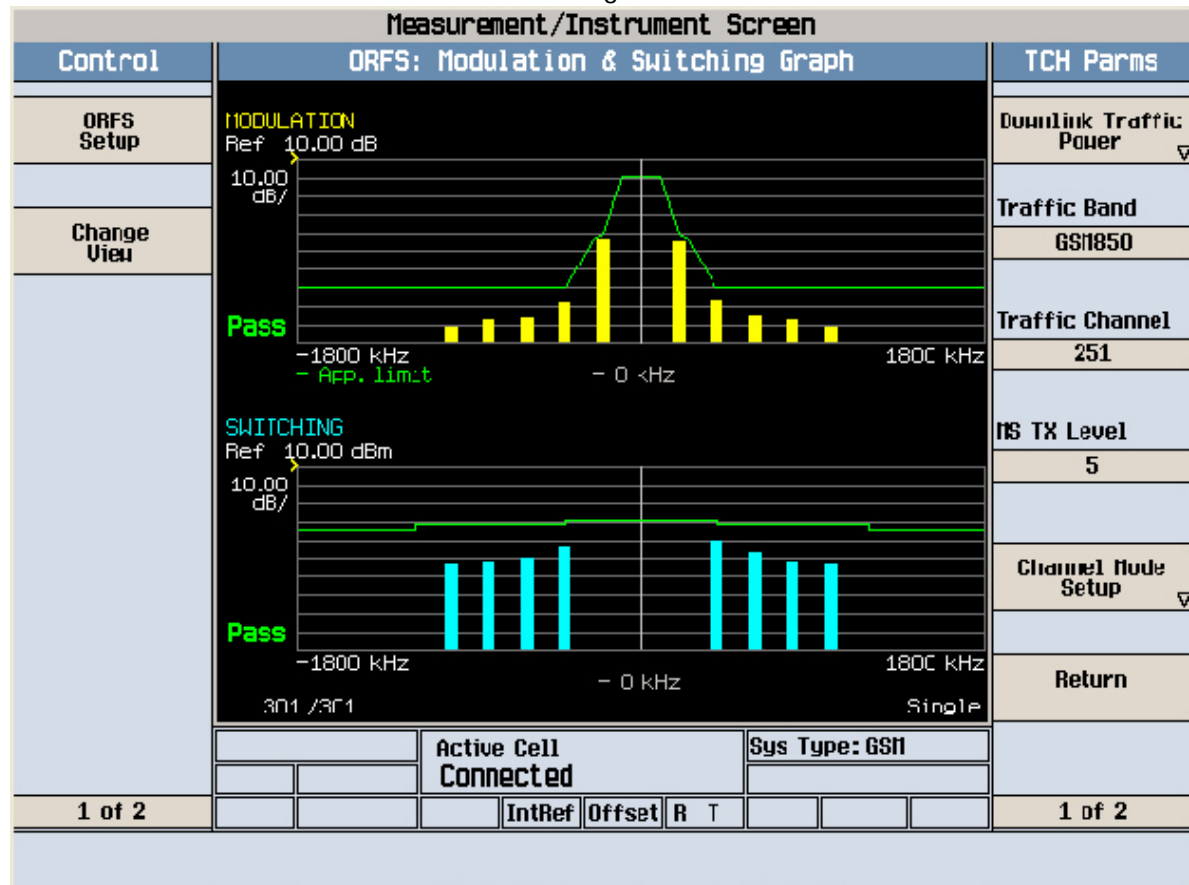
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1 of 2				IntRef	Offset	R T				1 of 2																

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1 of 2									1 of 2																									

Control	Measurement/Instrument Screen								TCH Parms																																					
Power vs Time Setup	<table border="1"> <thead> <tr> <th colspan="4">Power vs Time Graph</th> </tr> </thead> <tbody> <tr> <td colspan="4"> </td> </tr> <tr> <td colspan="4"> <table border="1"> <thead> <tr> <th>Burst</th> <th>Px Power (dbm)</th> <th>Modulation</th> <th>Mask</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>32.10</td> <td>GMSK</td> <td>ETSI</td> </tr> <tr> <td>2</td> <td>----</td> <td>----</td> <td>----</td> </tr> <tr> <td>3</td> <td>----</td> <td>----</td> <td>----</td> </tr> <tr> <td>4</td> <td>----</td> <td>----</td> <td>----</td> </tr> </tbody> </table> </td> </tr> <tr> <td colspan="4">Continuous</td> </tr> </tbody> </table>								Power vs Time Graph								<table border="1"> <thead> <tr> <th>Burst</th> <th>Px Power (dbm)</th> <th>Modulation</th> <th>Mask</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>32.10</td> <td>GMSK</td> <td>ETSI</td> </tr> <tr> <td>2</td> <td>----</td> <td>----</td> <td>----</td> </tr> <tr> <td>3</td> <td>----</td> <td>----</td> <td>----</td> </tr> <tr> <td>4</td> <td>----</td> <td>----</td> <td>----</td> </tr> </tbody> </table>				Burst	Px Power (dbm)	Modulation	Mask	1	32.10	GMSK	ETSI	2	----	----	----	3	----	----	----	4	----	----	----	Continuous				Downlink Traffic Power	
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1 of 2									1 of 2																																					







Agilent

R T

Freq/Channel

FCC ID:A3LSGHT229 Cond Spur Ch.128

Ref 33 dBm

Atten 40 dB

#Peak

Log

10

dB/

Offst

7.73

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
10.0000000 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:A3LSGHT229 Cond Spur Ch.128

Mkr1 816.5 MHz

Ref 33 dBm

Atten 40 dB

-33.46 dBm

#Peak

Log

10

dB/

Offst

7.73

dB

DI

-13.0

dBm

LgAv

M1 S2

S3 FC

$\mathcal{E}(f)$:

FTun

Swp

AC Coupled: unspecified below 20 MHz

Center 414.6 MHz

Span 809.2 MHz

#Res BW 1 MHz

#VBW 1 MHz

Sweep 1.36 ms (601 pts)

Center Freq
414.600000 MHz

Start Freq
10.0000000 MHz

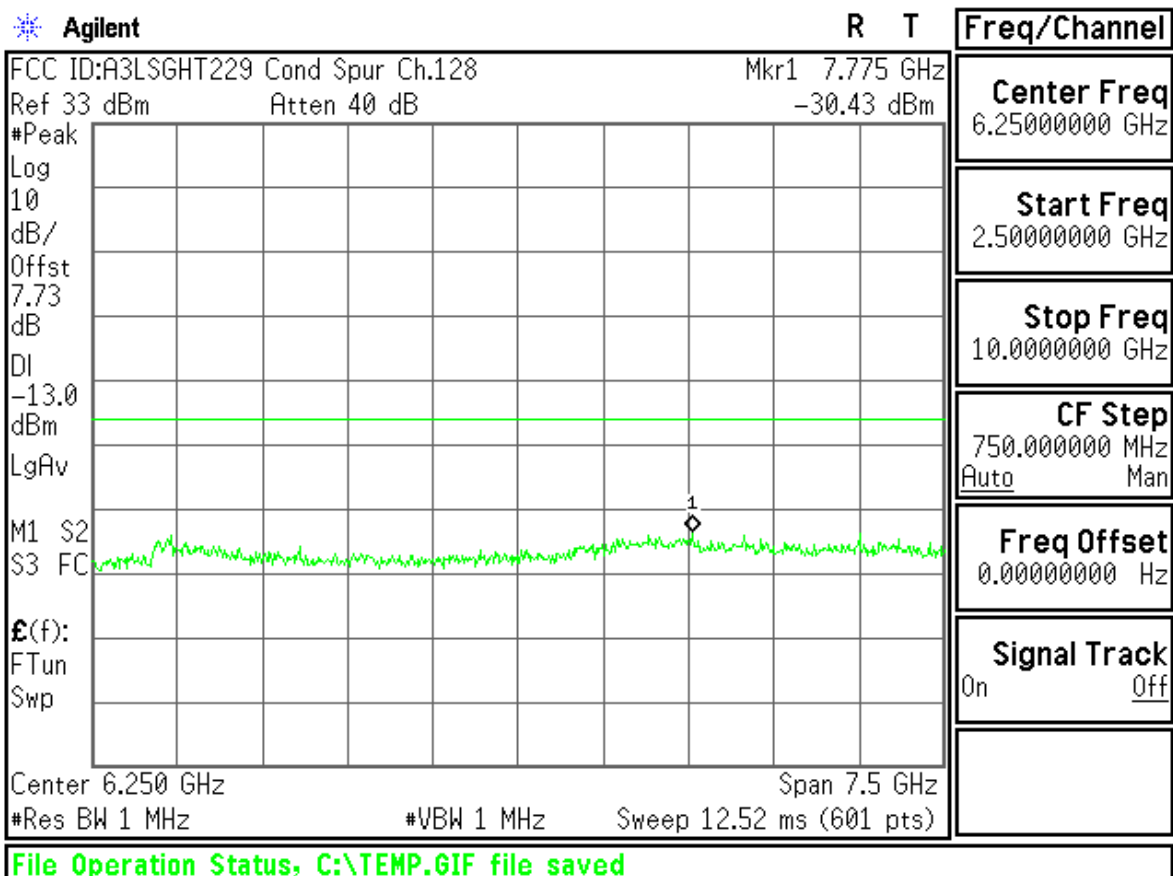
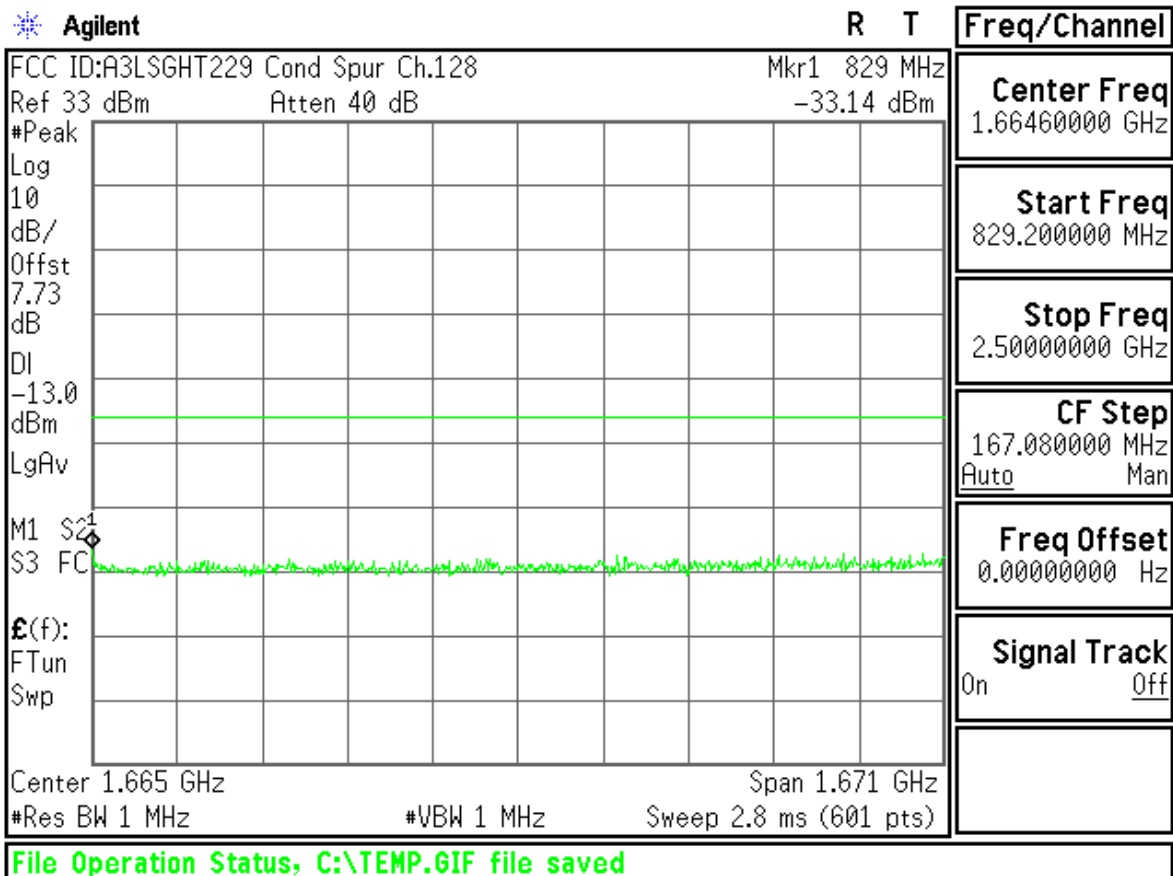
Stop Freq
819.200000 MHz

CF Step
80.9200000 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:A3LSGHT229 Cond Spur Ch.190

Ref 33 dBm

Atten 40 dB

#Peak

Log

10

dB/

Offst

7.73

dB

DI

-13.0

dBm

LgAv

M1 S2

S3 FC

$\mathcal{E}(f)$:

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:A3LSGHT229 Cond Spur Ch.190

Mkr1 831.6 MHz

Ref 33 dBm

Atten 40 dB

-29.58 dBm

#Peak

Log

10

dB/

Offst

7.73

dB

DI

-13.0

dBm

LgAv

M1 S2

S3 FC

$\mathcal{E}(f)$:

FTun

Swp

AC Coupled: unspecified below 20 MHz

Center Freq
420.800000 MHz

Start Freq
10.0000000 MHz

Stop Freq
831.600000 MHz

CF Step
82.1600000 MHz
Auto Man

Freq Offset
0.00000000 Hz

Signal Track
On Off

Center 420.8 MHz

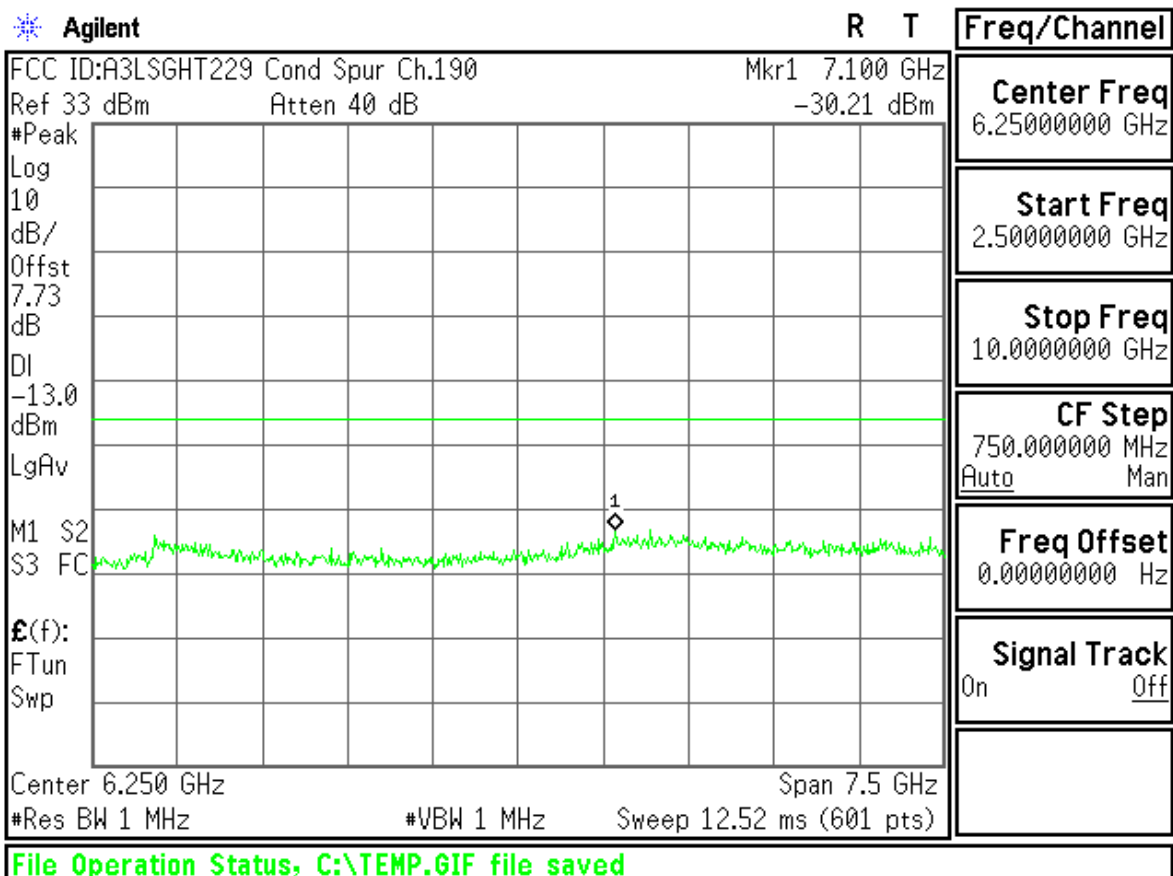
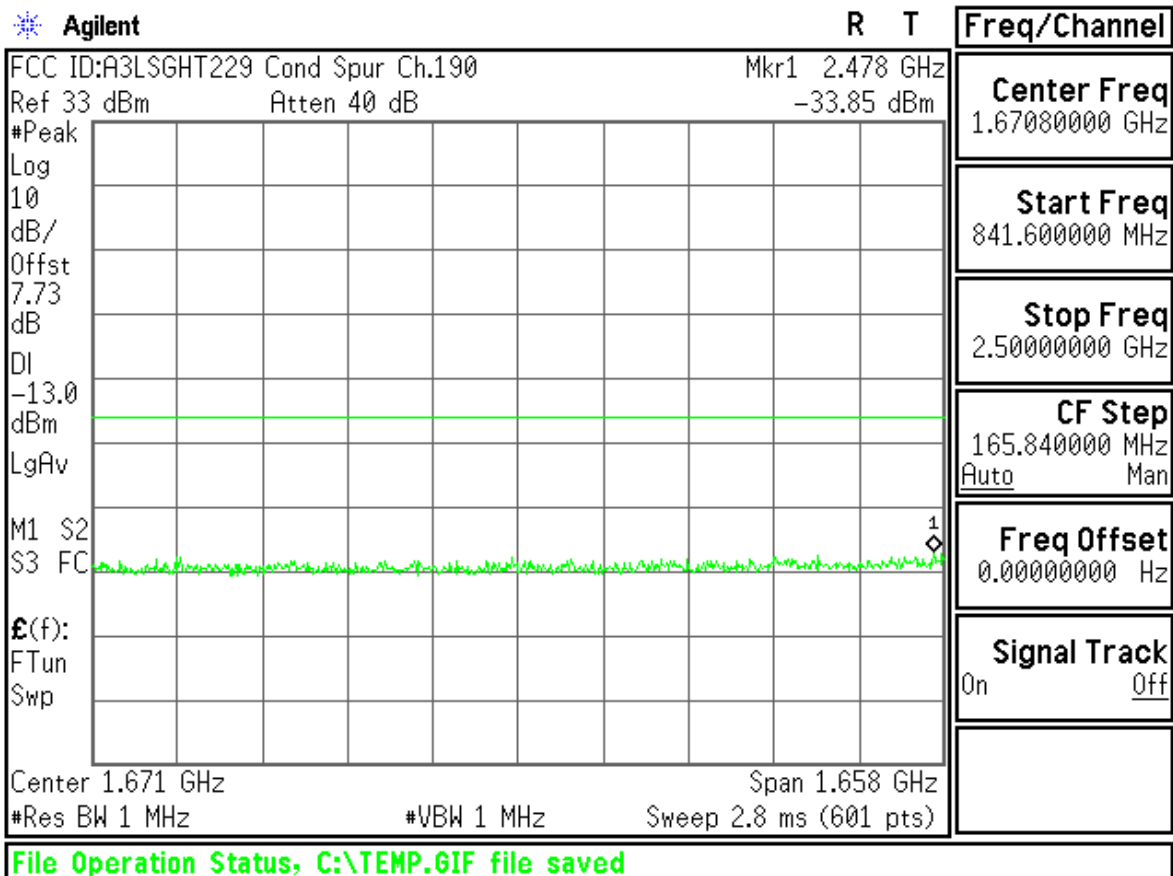
Span 821.6 MHz

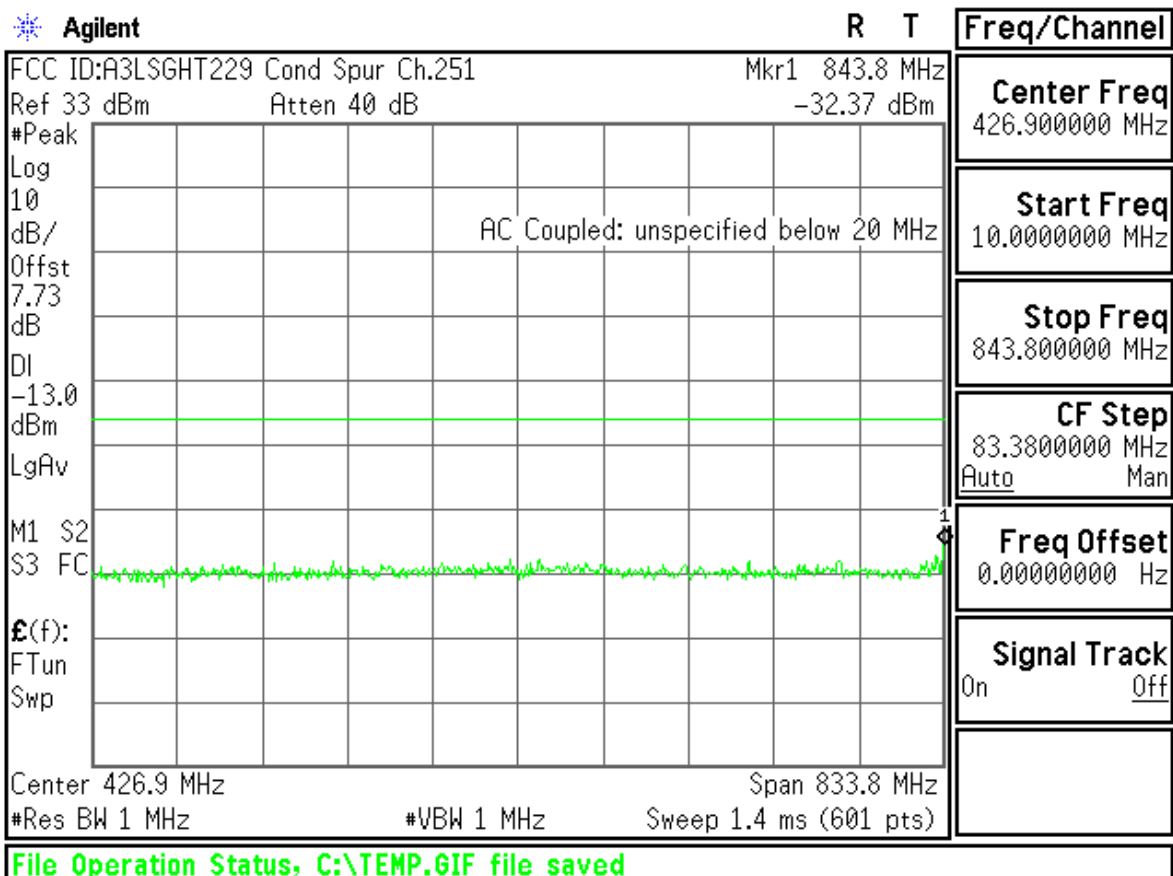
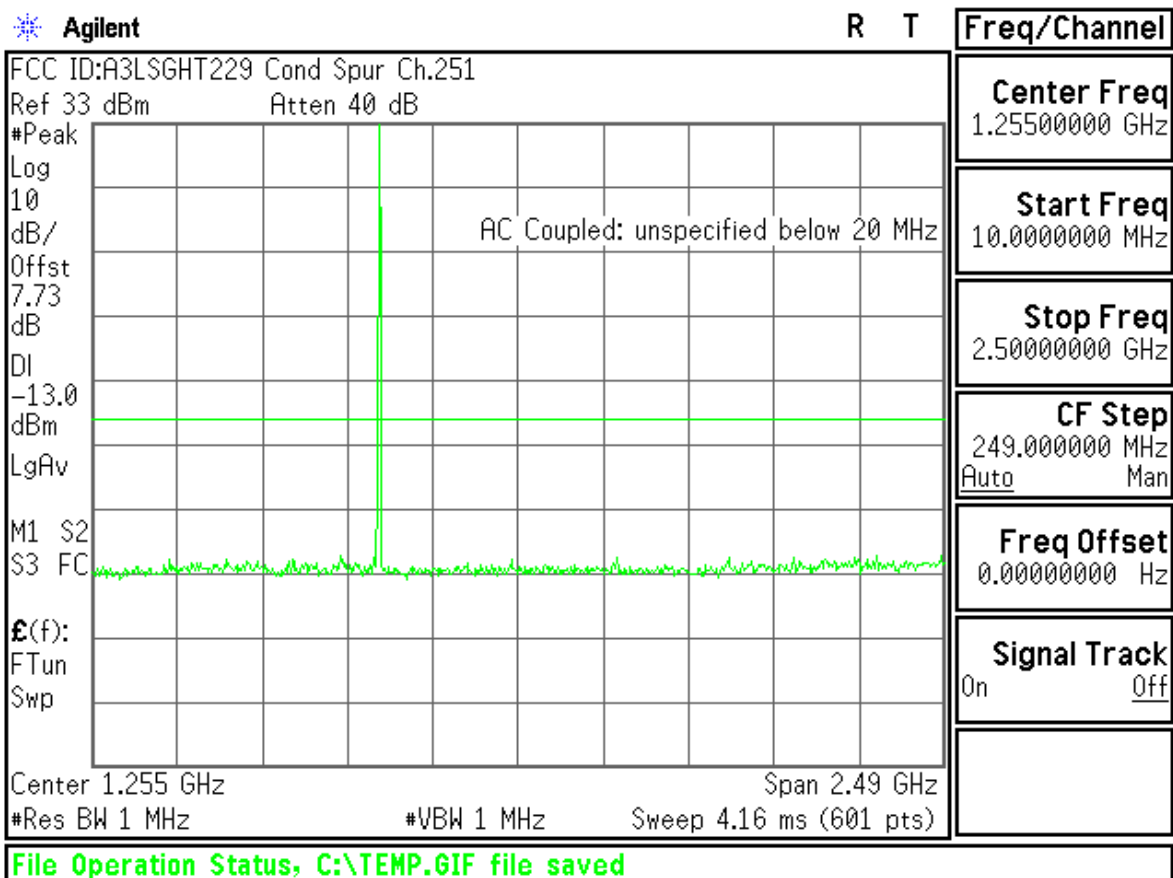
#Res BW 1 MHz

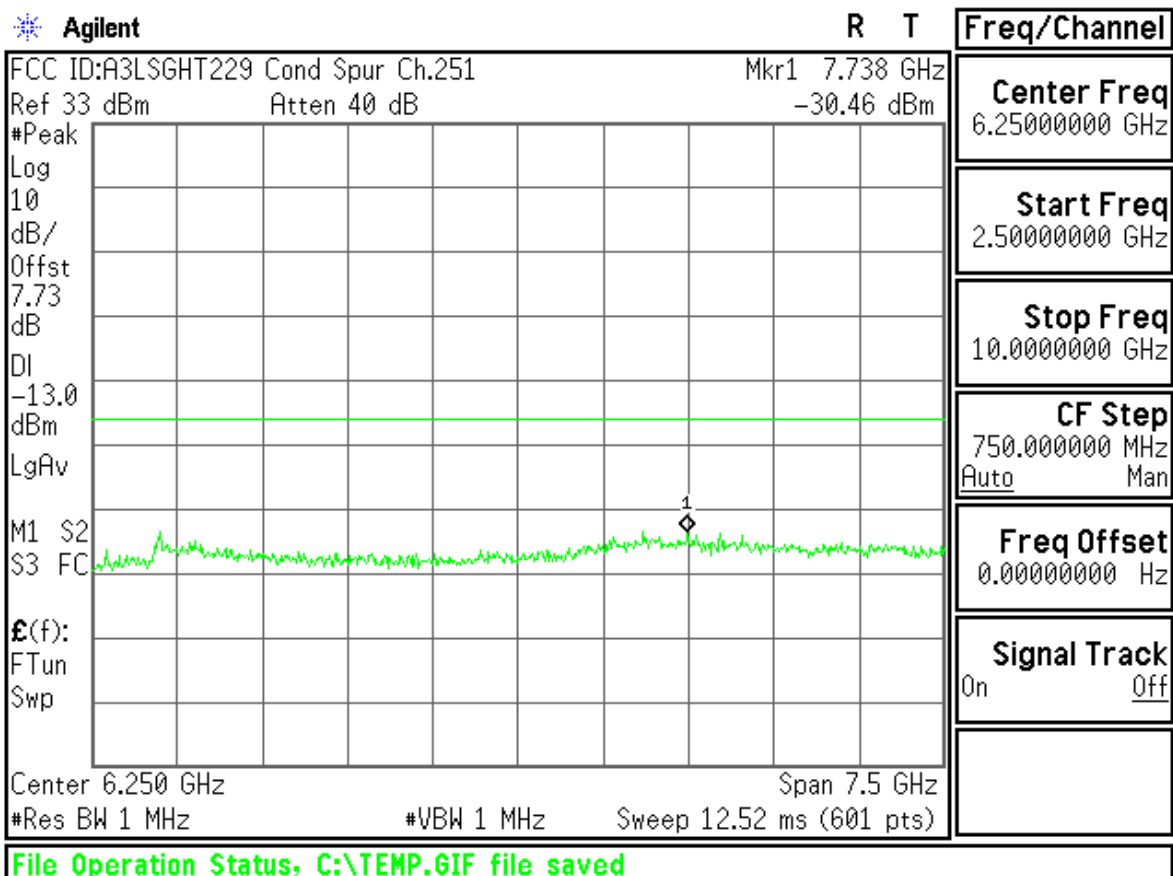
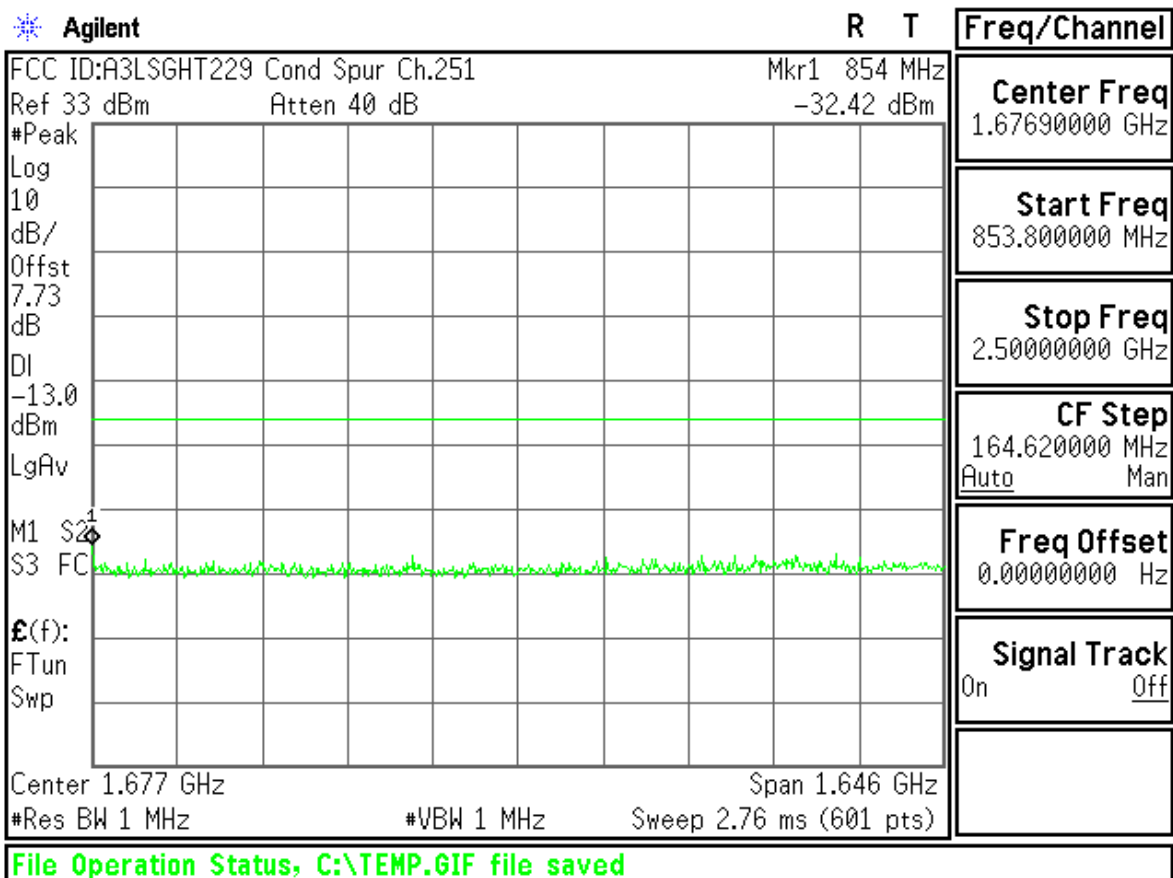
#VBW 1 MHz

Sweep 1.4 ms (601 pts)

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







Agilent

R T

Freq/Channel

FCC ID:A3LSGHT229 Band Edge Ch.128

Ref 33 dBm

Atten 40 dB

#Avg

Log

10

dB/

Offst

7.73

dB

DI

-13.0

dBm

PAvg

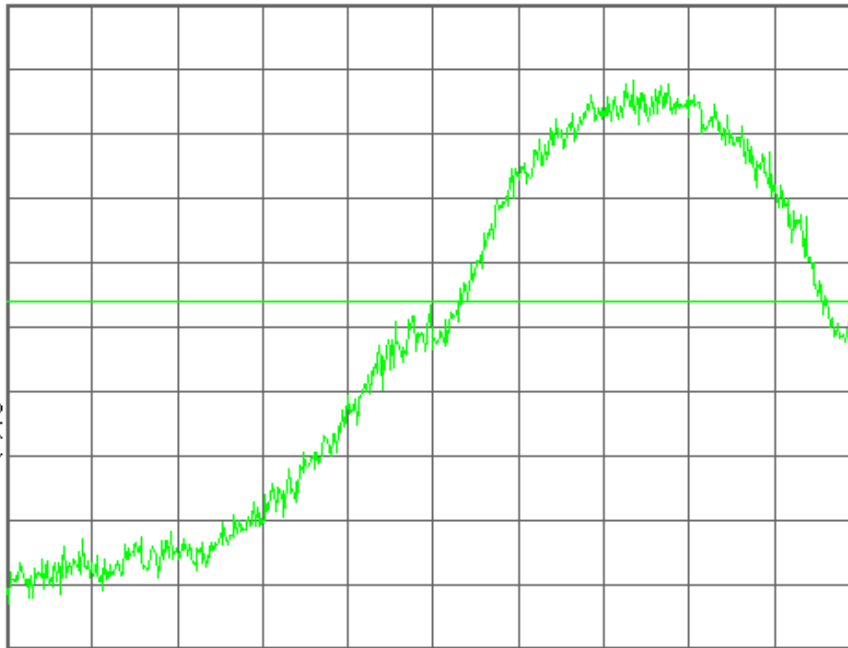
M1 S2

S3 FC

£(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 T

Freq/Channel

FCC ID:A3LSGHT229 Band Edge Ch.128

Mkr1 823.994 7 MHz

Ref 33 dBm

Atten 40 dB

-14.90 dBm

#Avg

Log

10

dB/

Offst

7.73

dB

DI

-13.0

dBm

PAvg

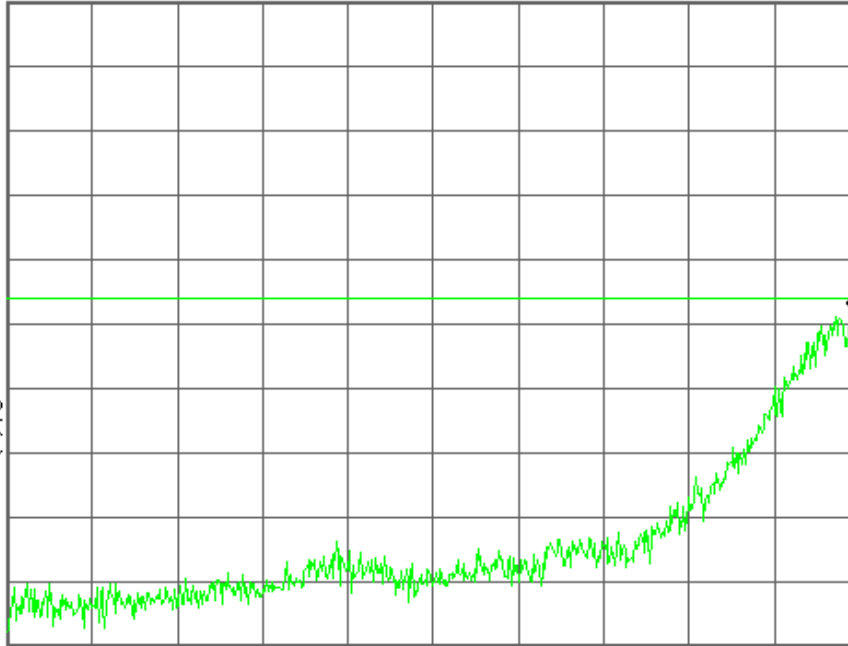
M1 S2

S3 FC

£(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 T

Freq/Channel

FCC ID:A3LSGHT229 Band Edge Ch.251

Ref 33 dBm

Atten 40 dB

#Avg

Log

10

dB/

Offst

7.73

dB

DI

-13.0

dBm

PAvg

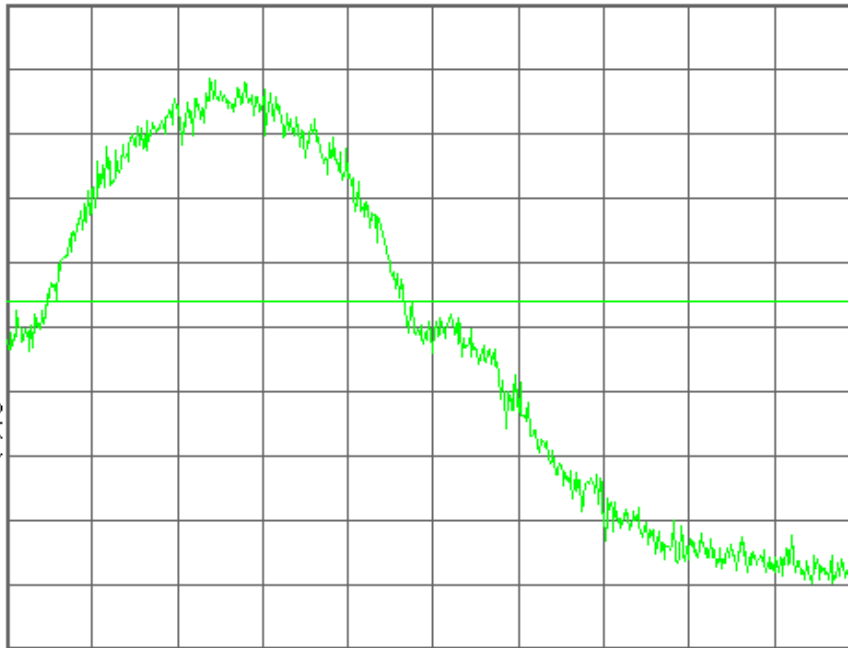
M1 S2

S3 FC

$\mathcal{E}(f)$:

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 T

Freq/Channel

FCC ID:A3LSGHT229 Band Edge Ch.251

Mkr1 849.024 1 MHz

Ref 33 dBm

Atten 40 dB

-15.60 dBm

#Avg

Log

10

dB/

Offst

7.73

dB

DI

-13.0

dBm

PAvg

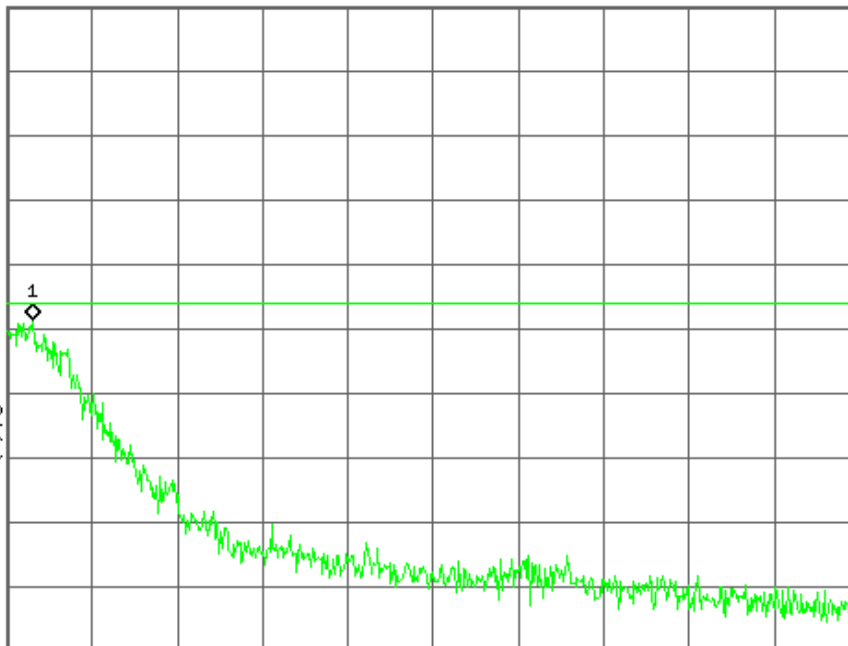
M1 S2

S3 FC

$\mathcal{E}(f)$:

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

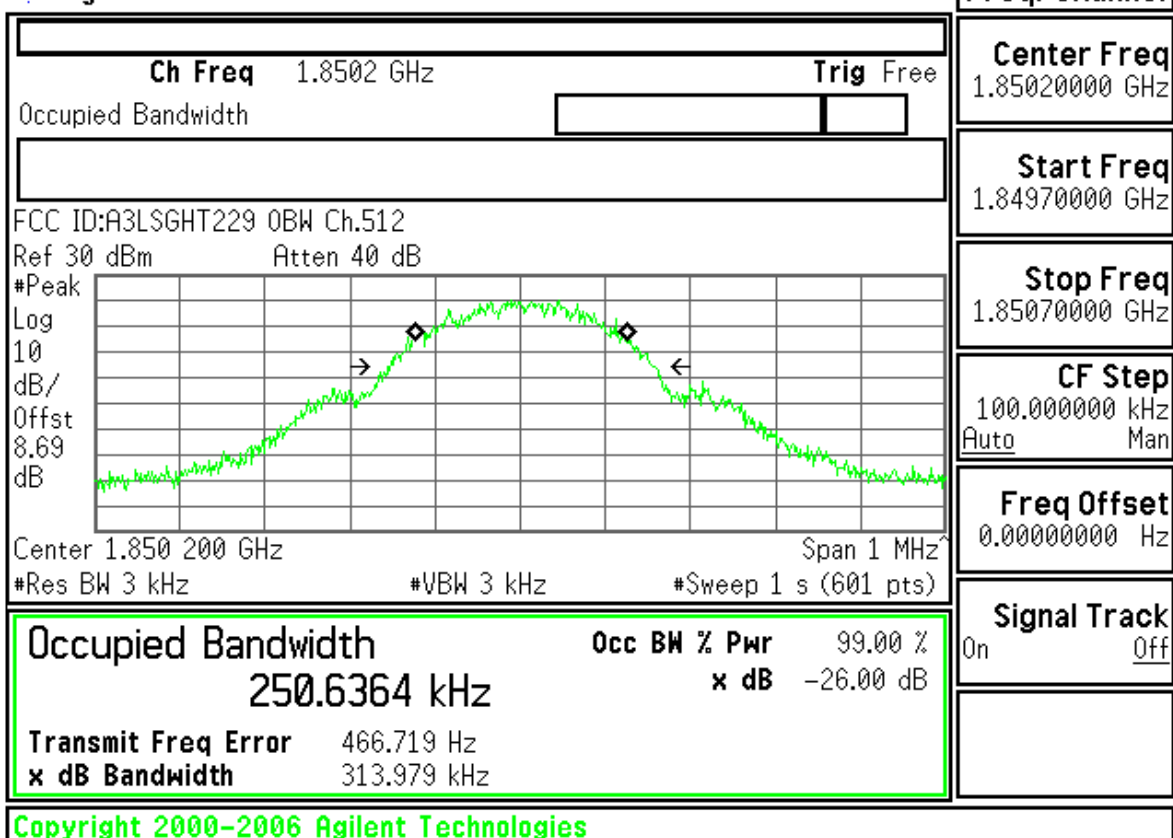
GSM1900



Agilent

R T

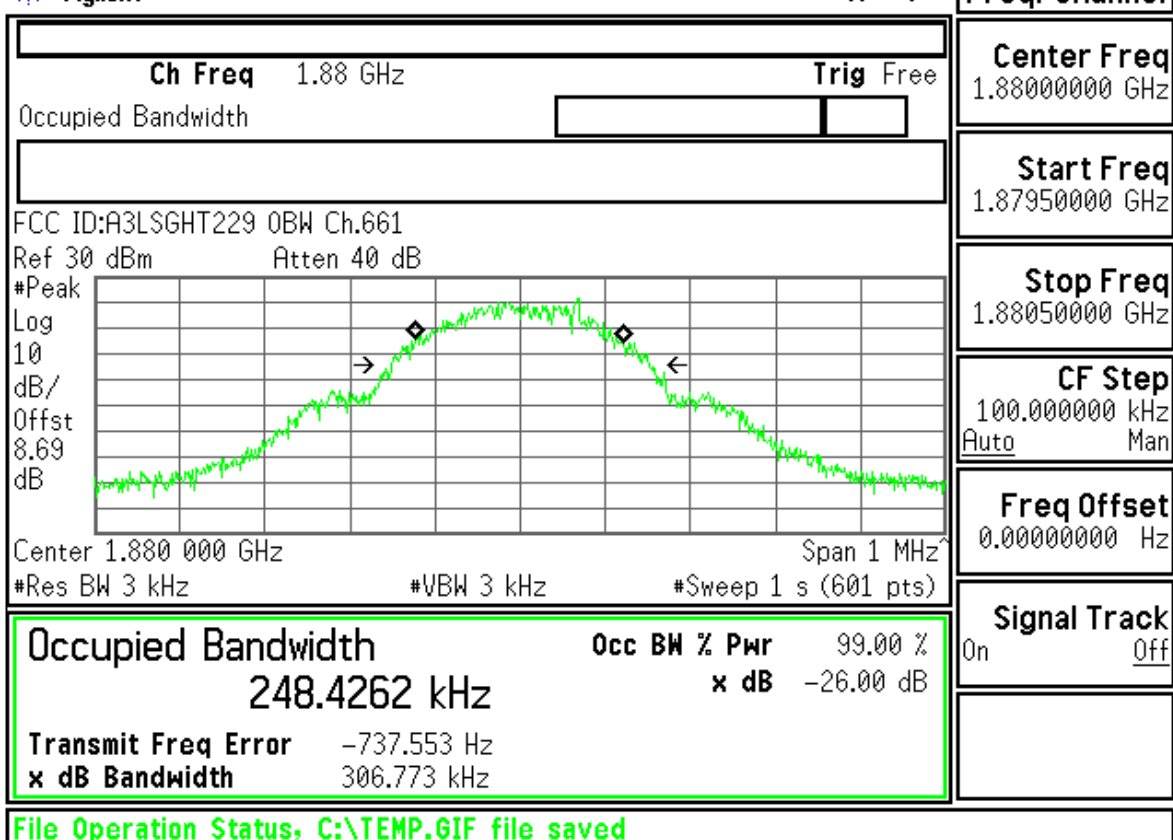
Freq/Channel

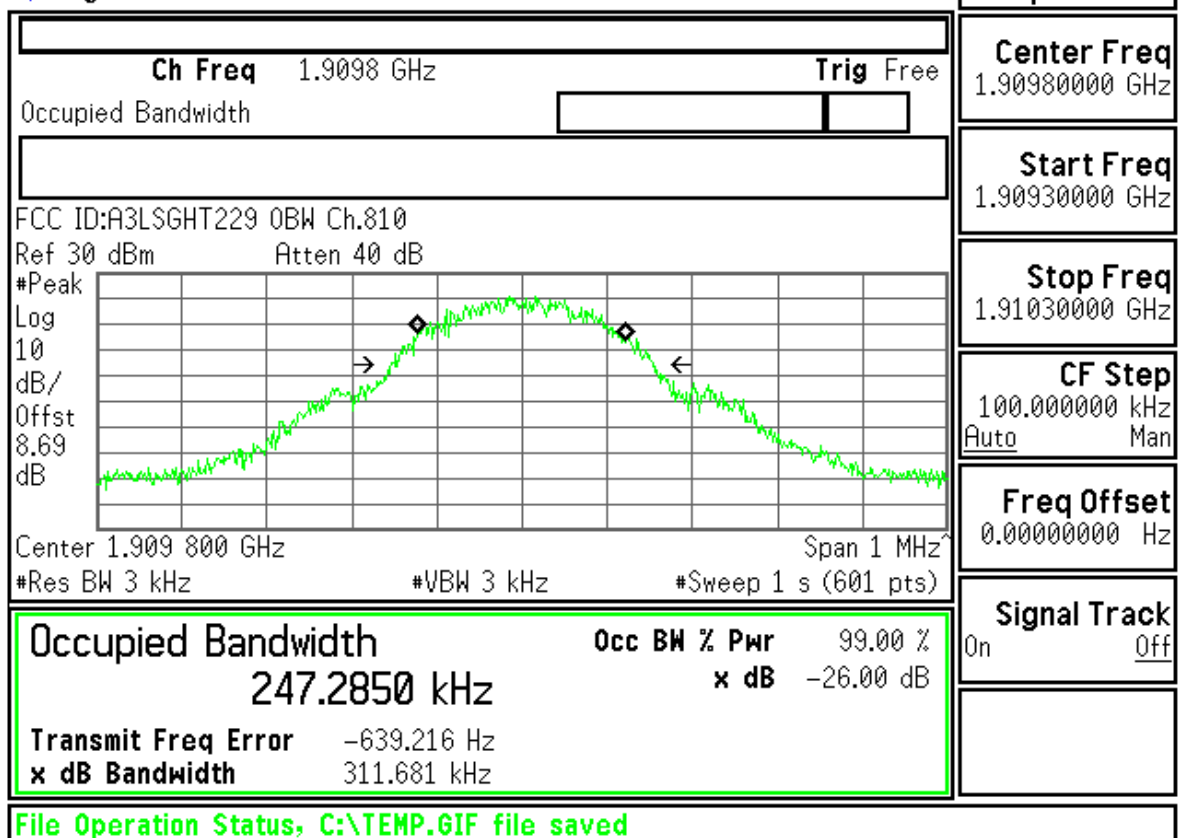
Center Freq
1.85020000 GHzStart Freq
1.84970000 GHzStop Freq
1.85070000 GHzCF Step
100.000000 kHz
Auto ManFreq Offset
0.00000000 HzSignal Track
On Off

Agilent

R T

Freq/Channel

Center Freq
1.88000000 GHzStart Freq
1.87950000 GHzStop Freq
1.88050000 GHzCF Step
100.000000 kHz
Auto ManFreq Offset
0.00000000 HzSignal Track
On Off



FCC ID : A3LSGHT229 Transmit Power 512CH

Measurement/Instrument Screen									
Control	Transmit Power						TCH Parms		
Transmit Power Setup							Downlink Traffic Power		
		Burst 1	Burst 2	Burst 3	Burst 4		Traffic Band		
	Burst Power	29.81	----	----	----		PCS		
	Estimated Carrier Power	29.81	----	----	----		Traffic Channel		
						Single	512		
	Phase & Frequency Error						MS TX Level		
		Peak Phase °	RMS Phase °	Frequency Hz			0		
	Minimum	7.80	1.86	-42.00					
	Maximum	12.46	2.35	-15.45			Channel Mode Setup		
	Average	9.91	2.11	-28.20					
	Pass/Fail	Pass	Pass	Pass			Return		
						Single			
		Active Cell Connected			Sys Type: GSM				
1 of 2		IntRef	Offset	R T			1 of 2		

Measurement/Instrument Screen										
Control		Transmit Power							TCH Parms	
Transmit Power Setup ▾									Downlink Traffic Power ▾	
									Traffic Band	
									PCS	
									Traffic Channel	
Swap Window Positions									MS TX Level	
									0	
									Channel Mode Setup ▾	
									Return	
1 of 2									1 of 2	

Burst 1				Burst 2				Burst 3				Burst 4			
Burst Power				29.60				----				----			
Estimated Carrier Power				29.60				----				----			

Single

Phase & Frequency Error			
	Peak Phase °	RMS Phase °	Frequency Hz
Minimum	8.26	1.88	-43.18
Maximum	14.05	2.31	-15.32
Average	10.62	2.06	-26.39
Pass/Fail	Pass	Pass	Pass

50 / 50 Single

Active Cell Connected				Sys Type: GSM			

Measurement/Instrument Screen										
Control		Transmit Power							TCH Parms	
Transmit Power Setup ▾									Downlink Traffic Power ▾	
									Traffic Band	
									PCS	
									Traffic Channel	
Swap Window Positions									MS TX Level	
									0	
									Channel Mode Setup ▾	
									Return	
1 of 2									1 of 2	

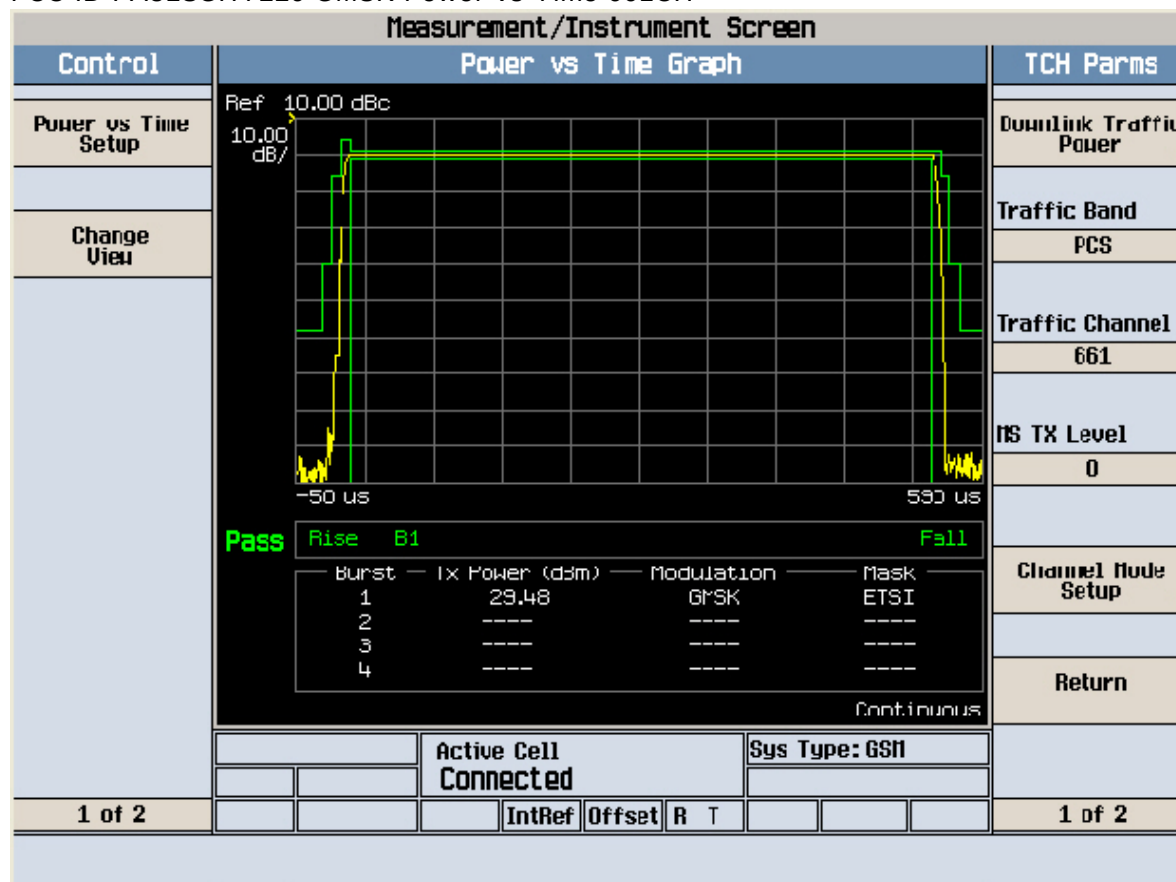
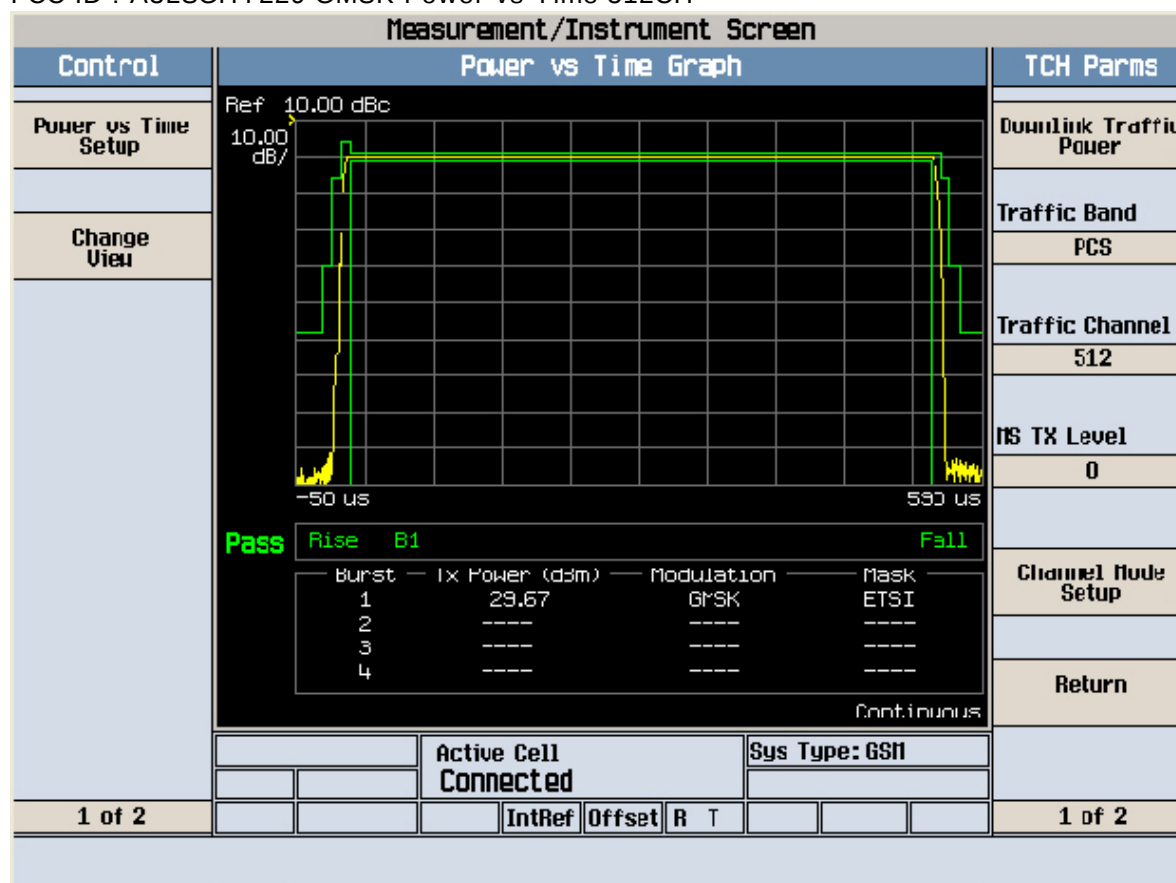
Burst 1				Burst 2				Burst 3				Burst 4			
Burst Power				29.77				----				----			
Estimated Carrier Power				29.77				----				----			

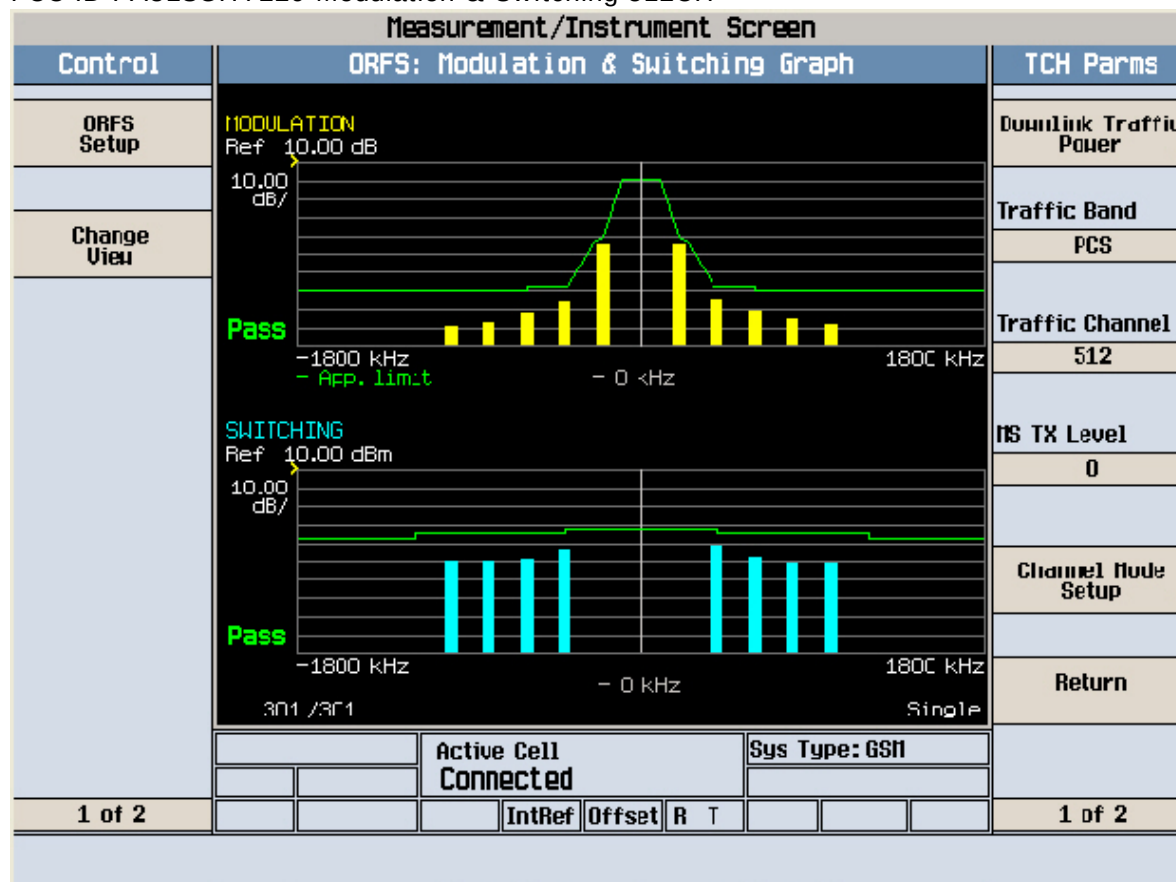
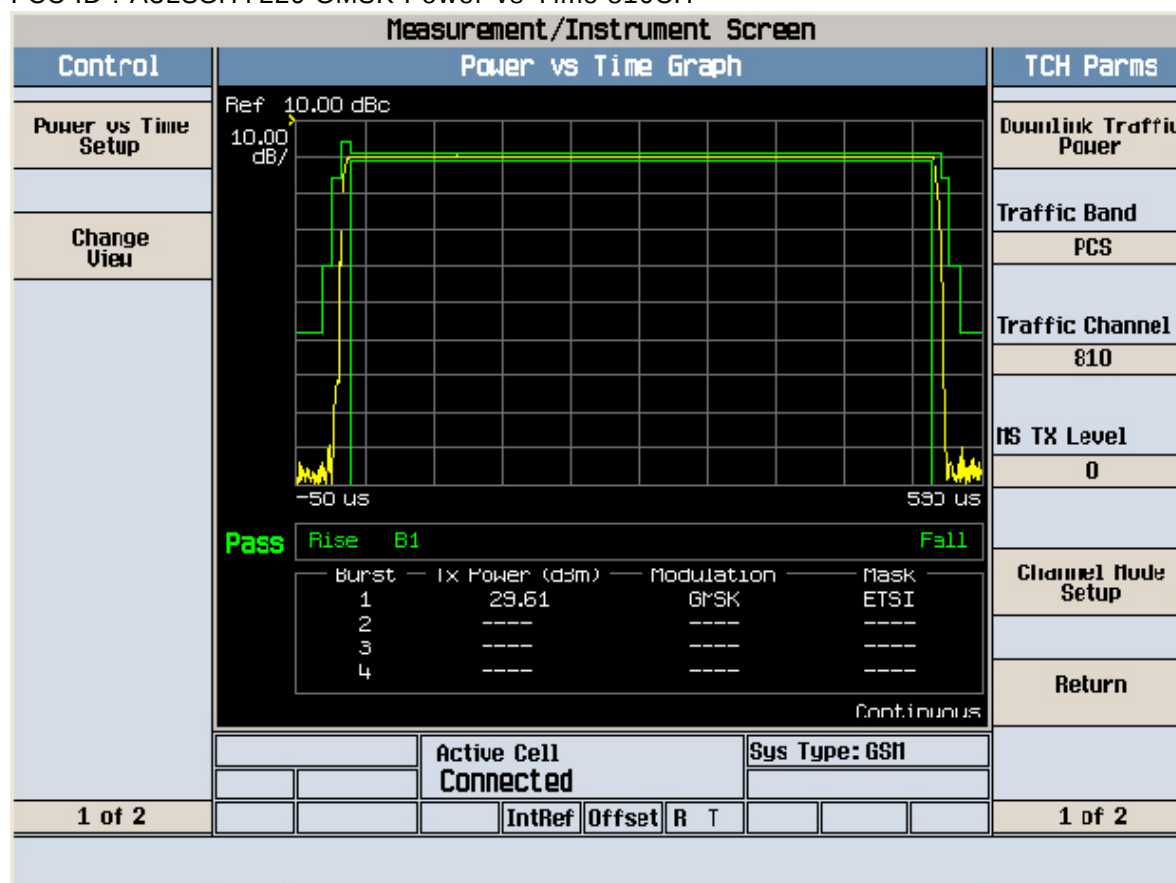
Single

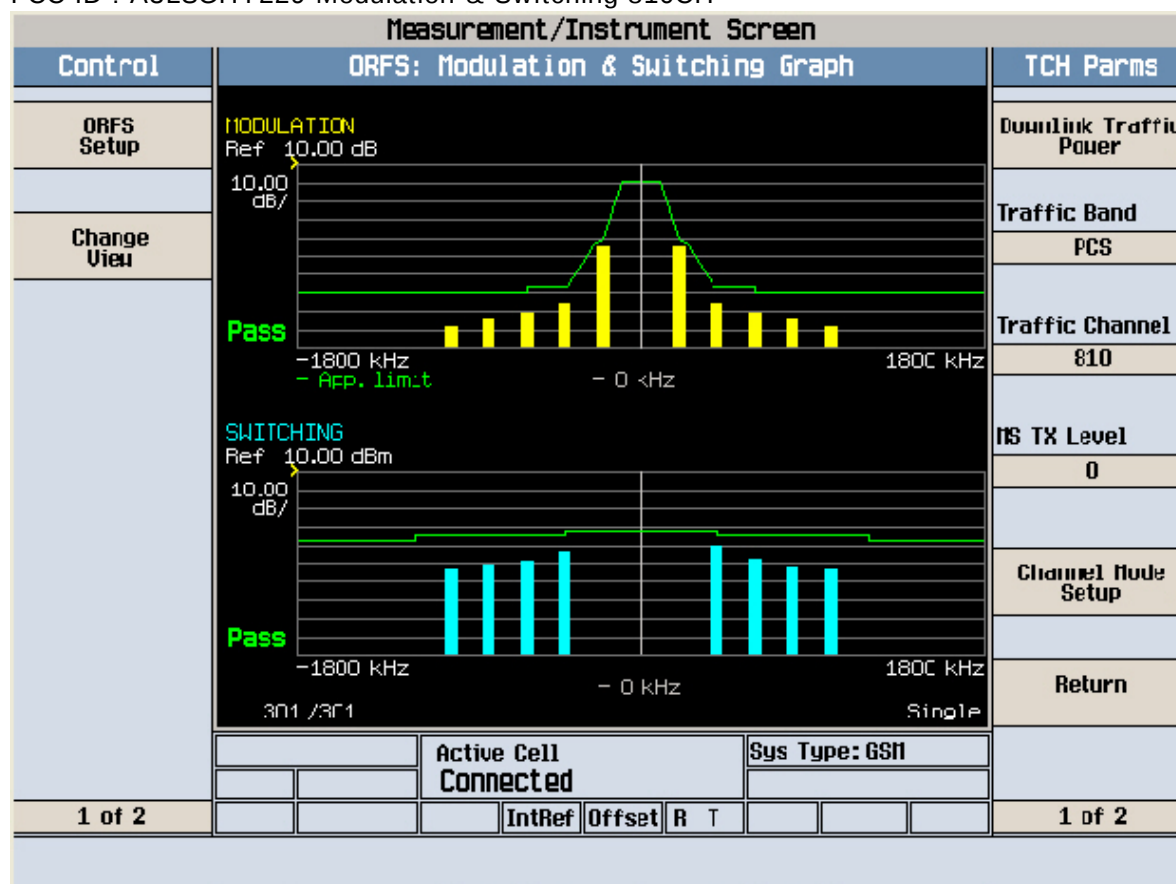
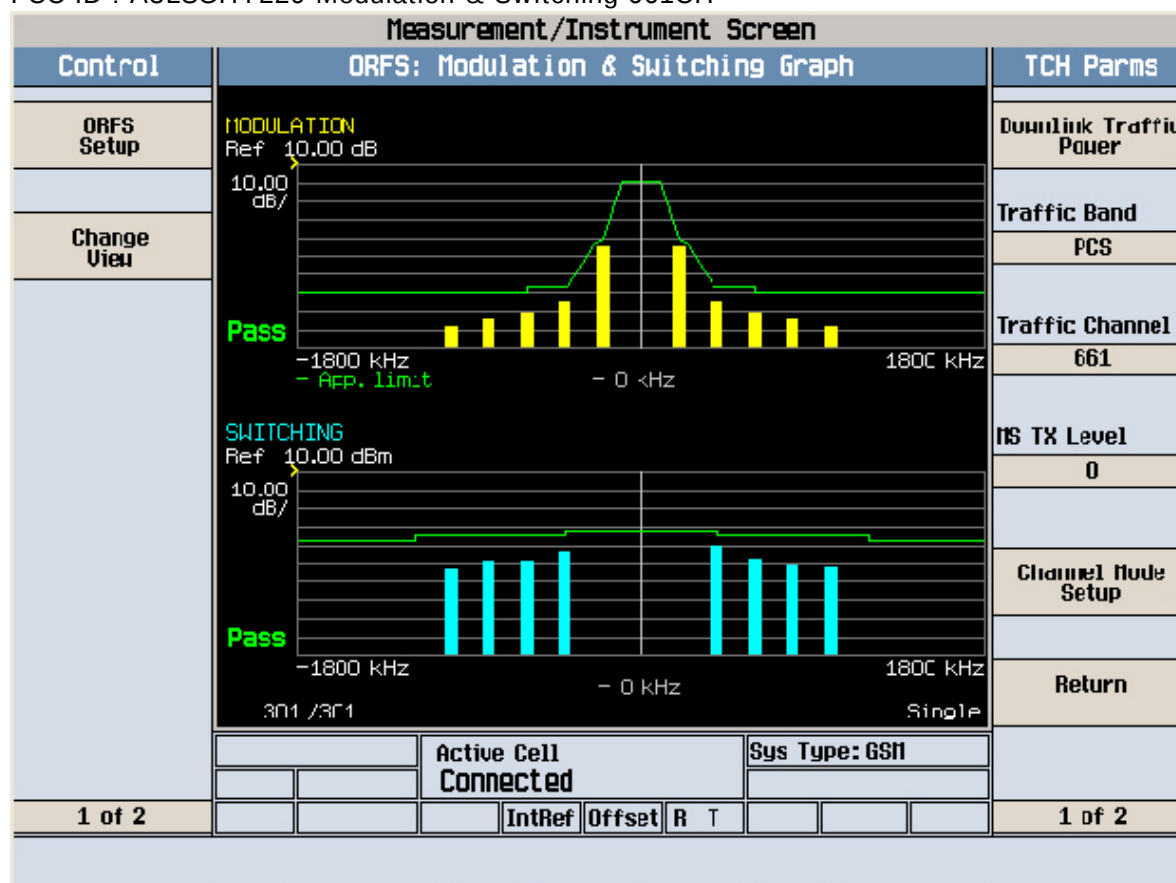
Phase & Frequency Error			
	Peak Phase °	RMS Phase °	Frequency Hz
Minimum	5.82	1.76	-41.83
Maximum	11.82	2.23	-7.57
Average	9.45	2.01	-27.90
Pass/Fail	Pass	Pass	Pass

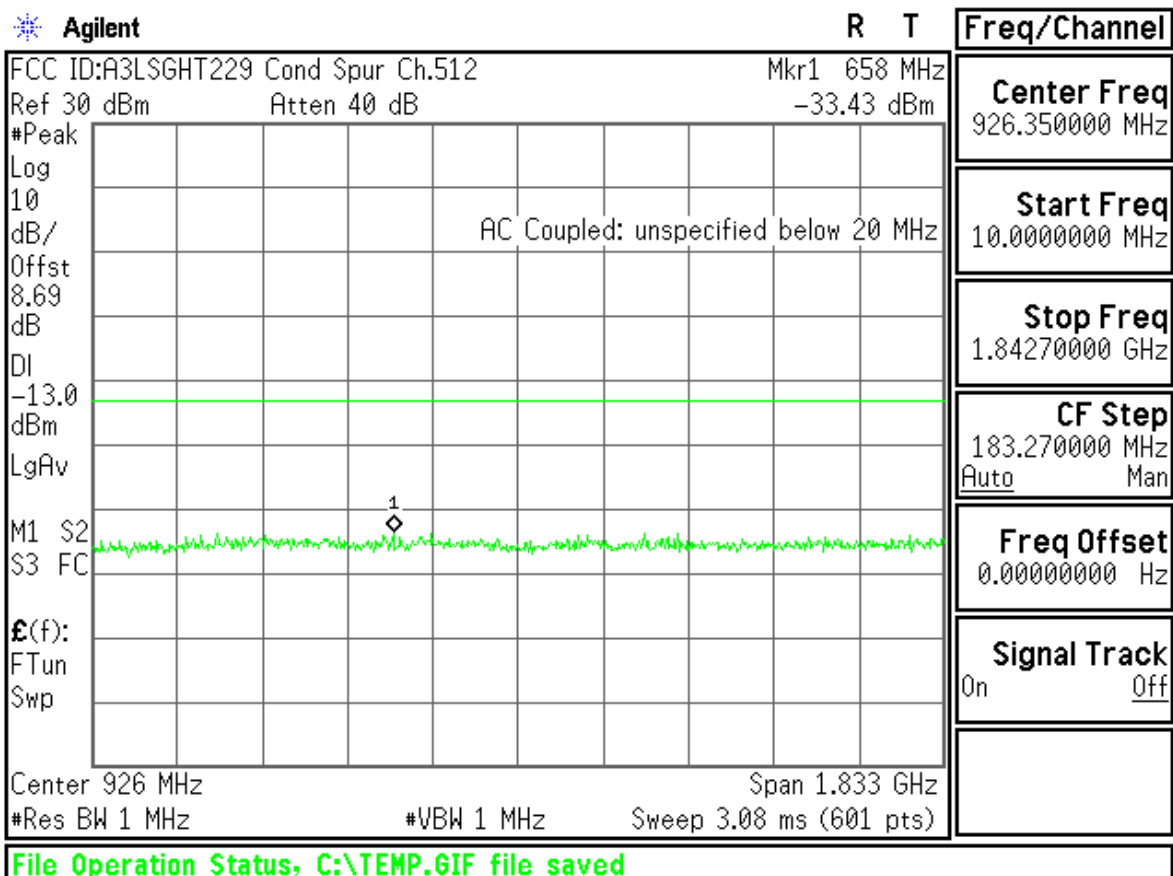
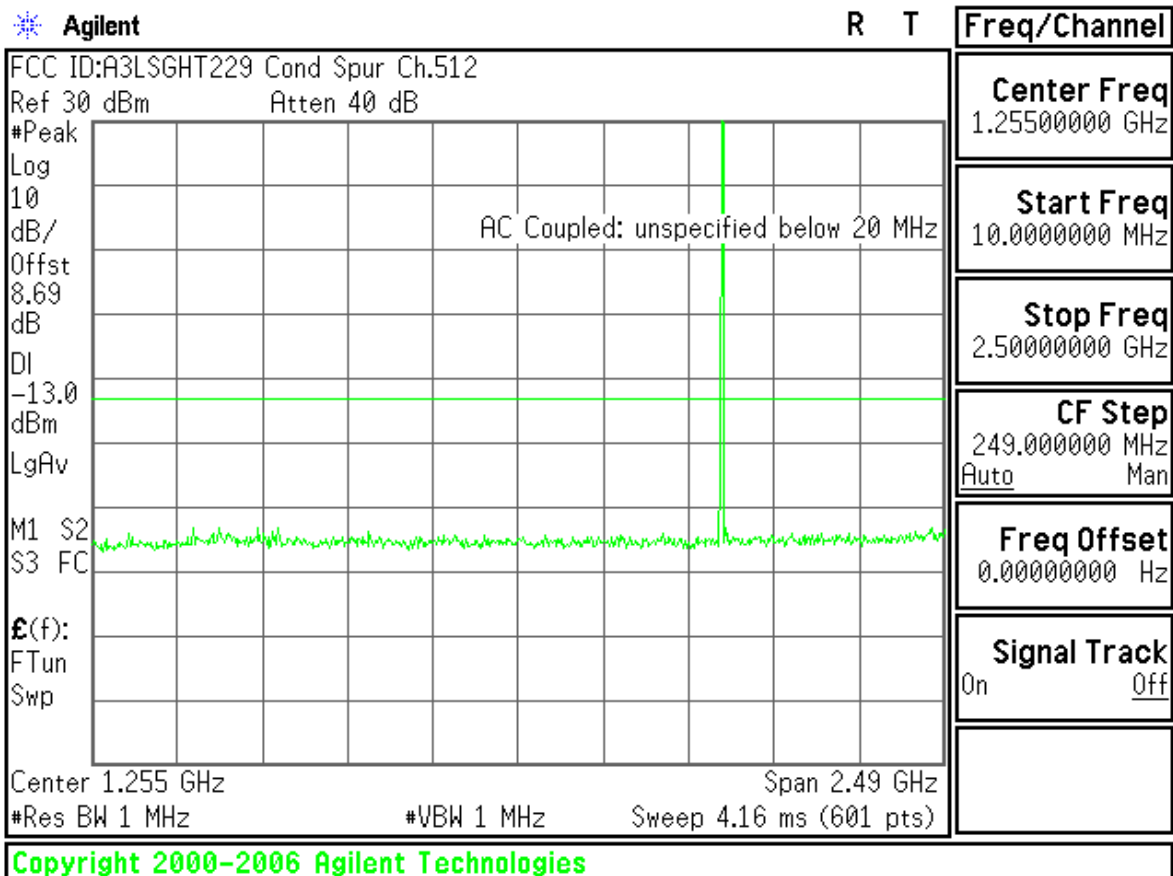
50 / 50 Single

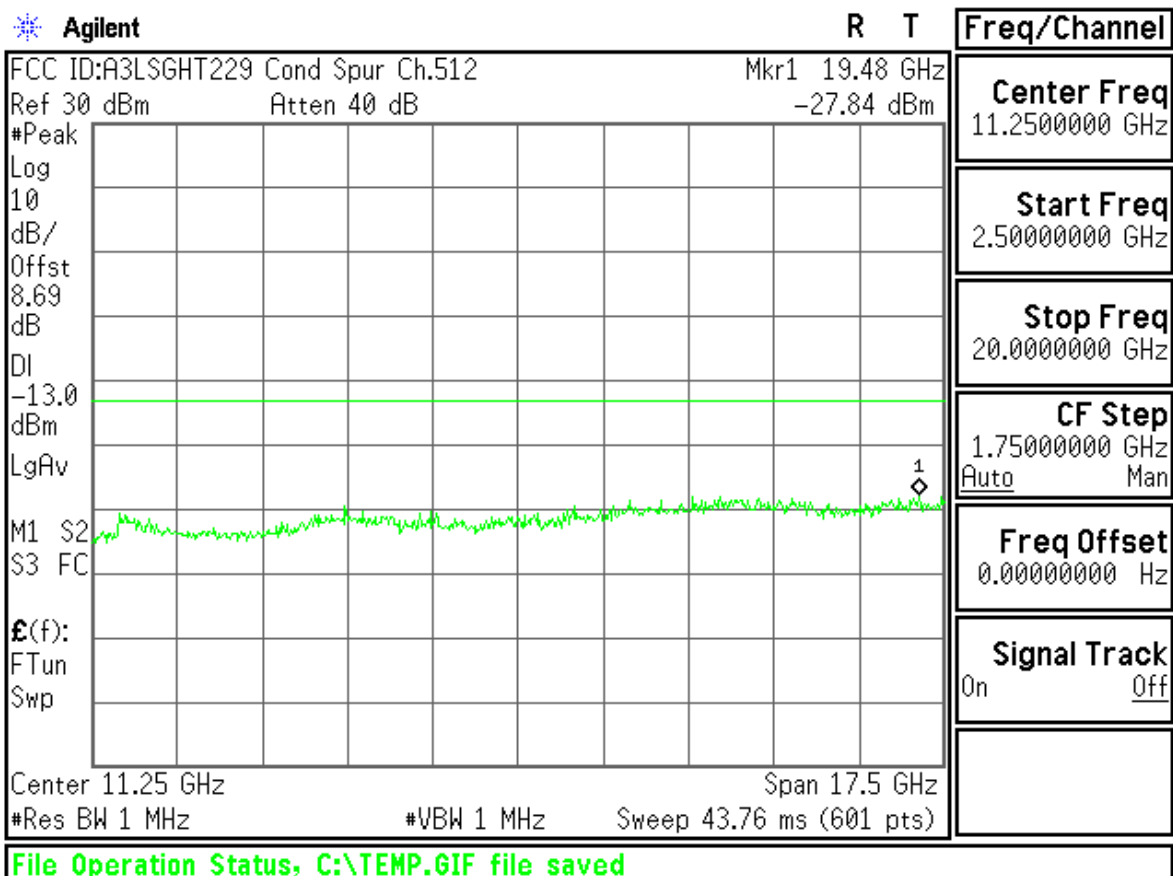
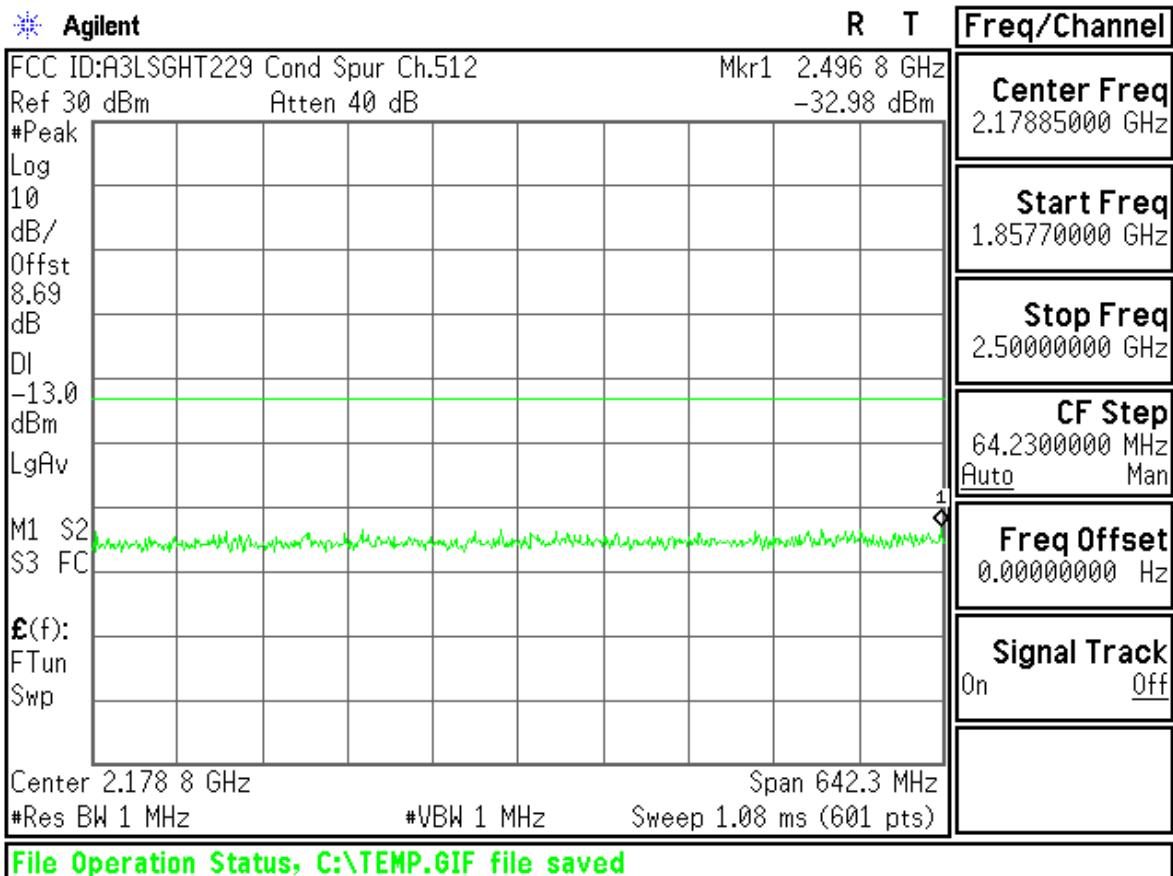
Active Cell Connected				Sys Type: GSM			

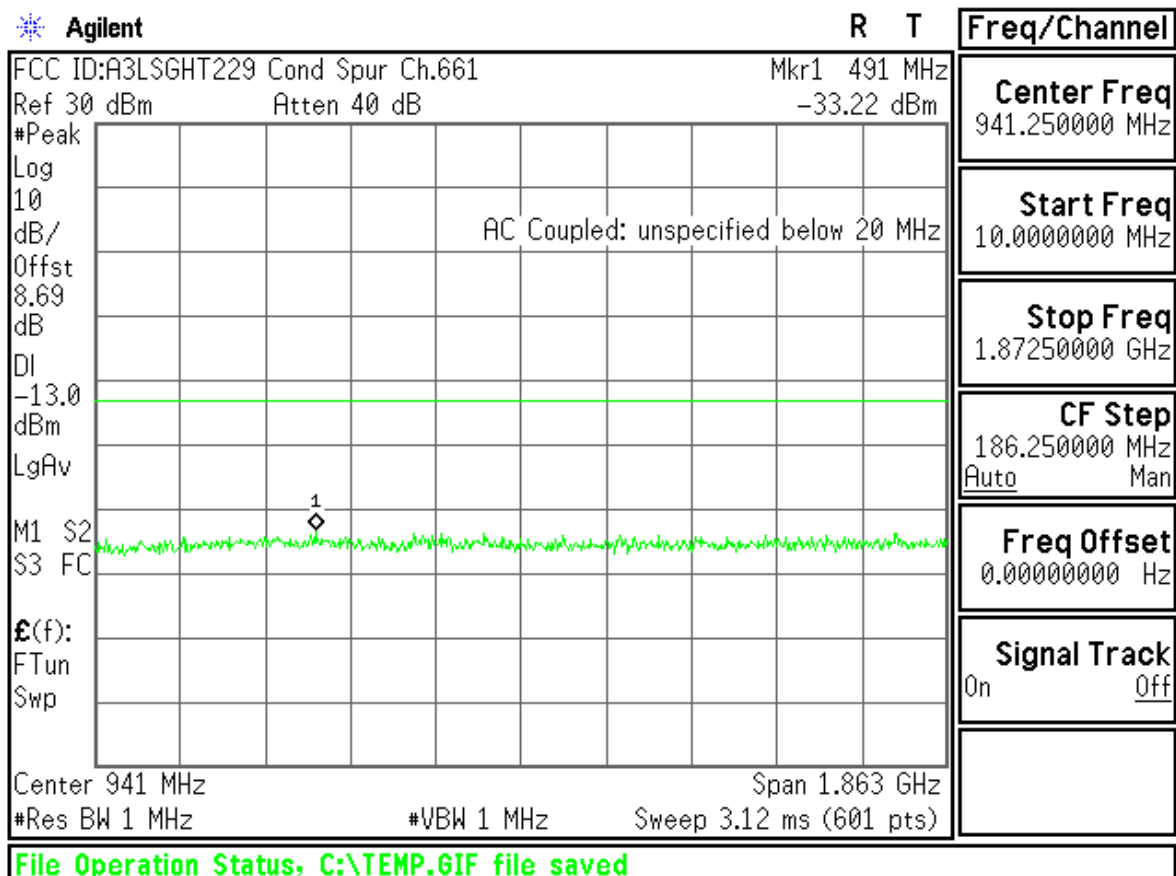
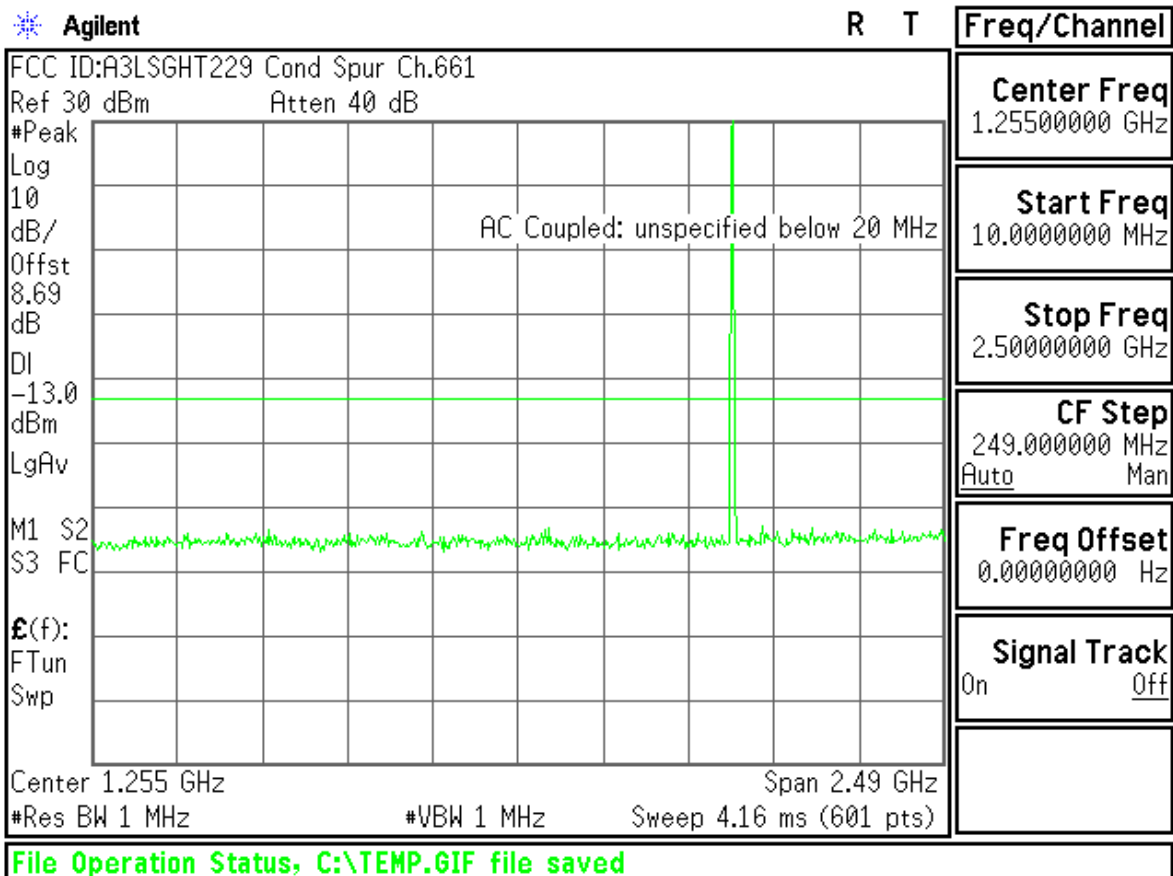


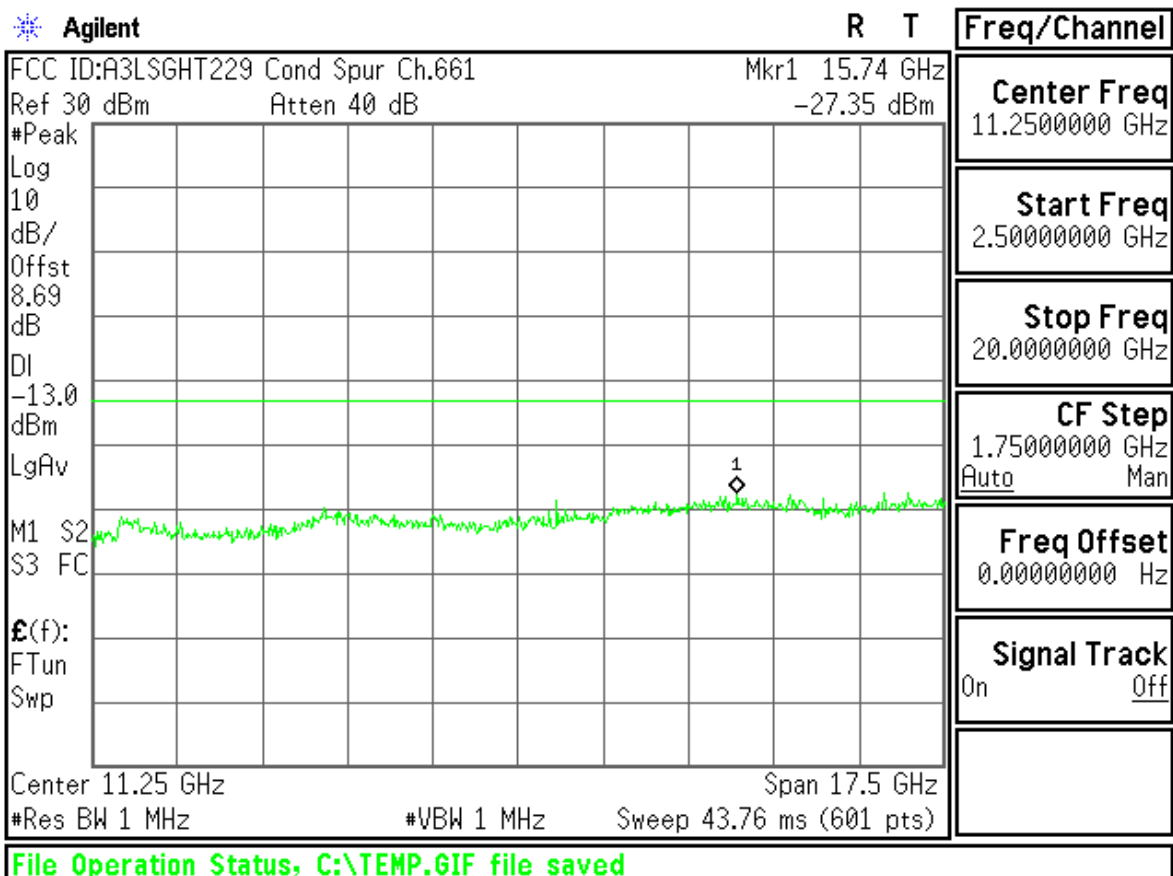
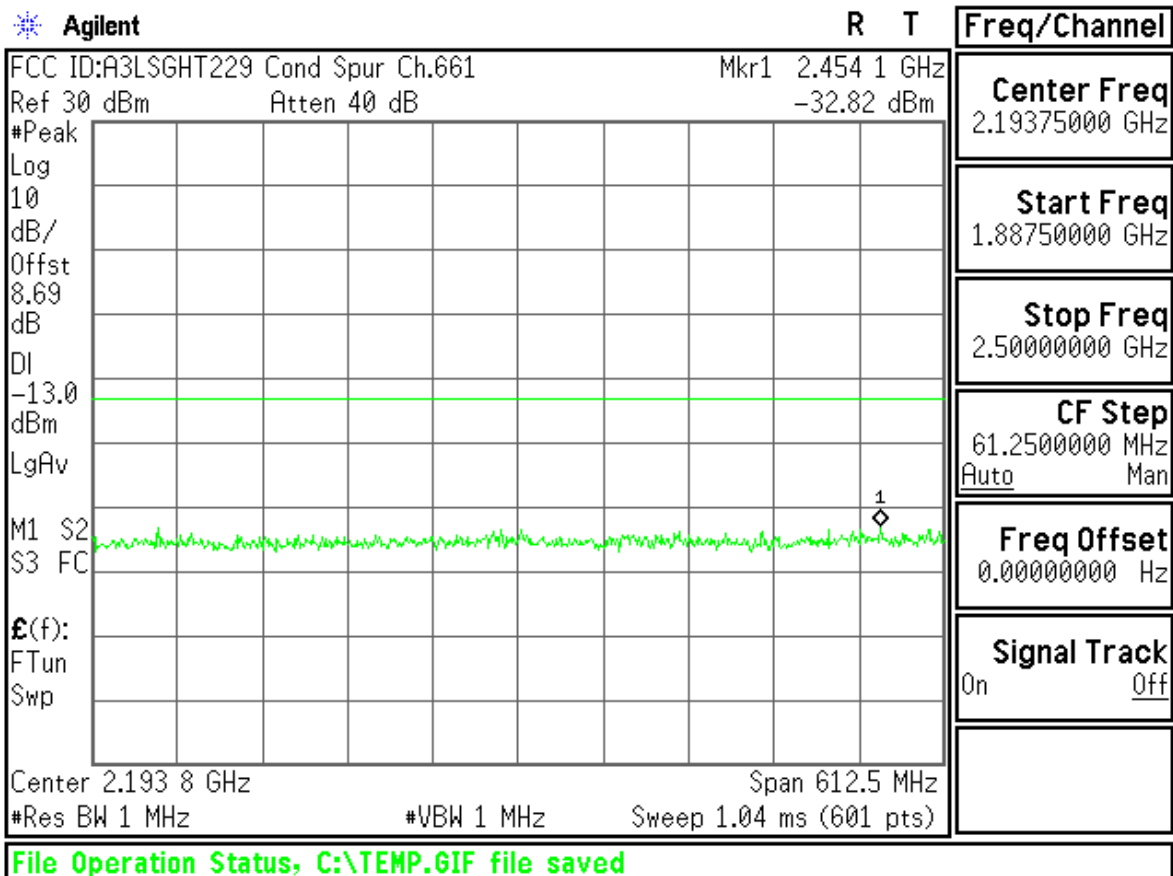


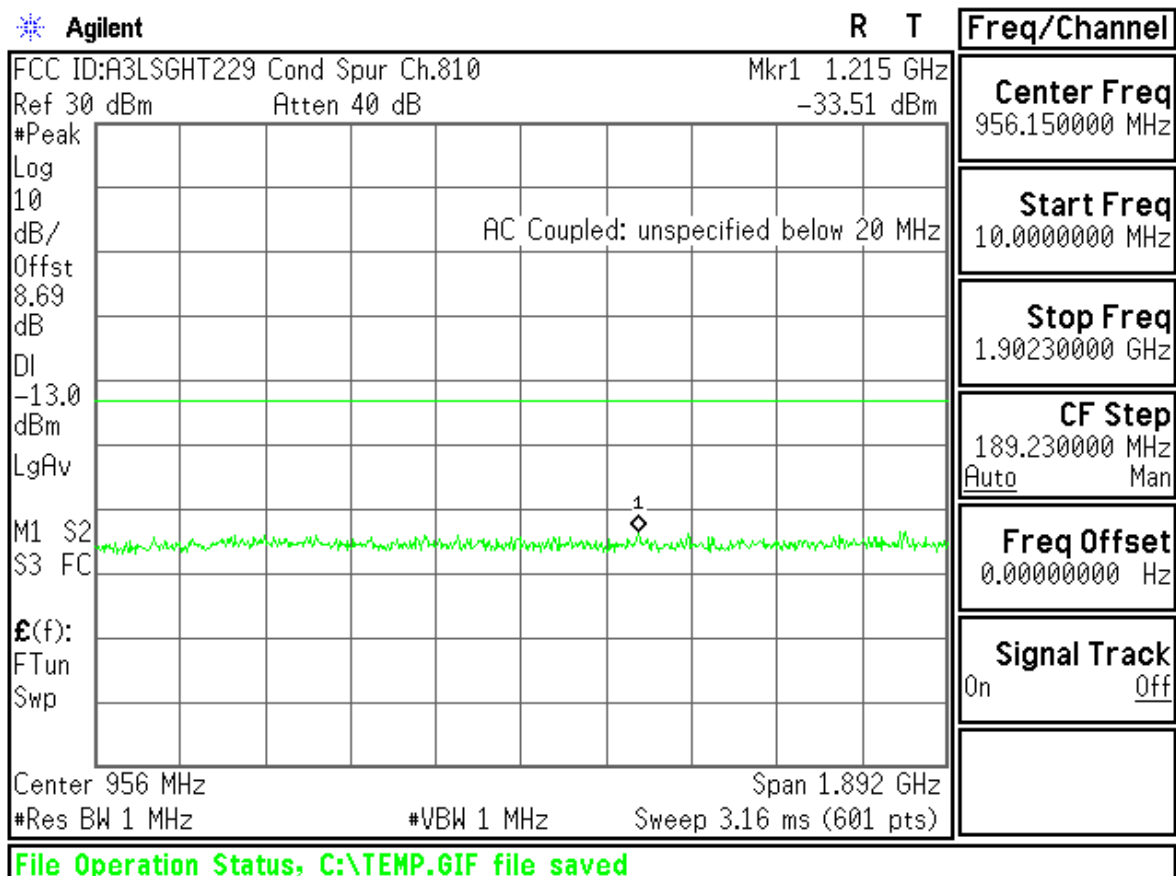
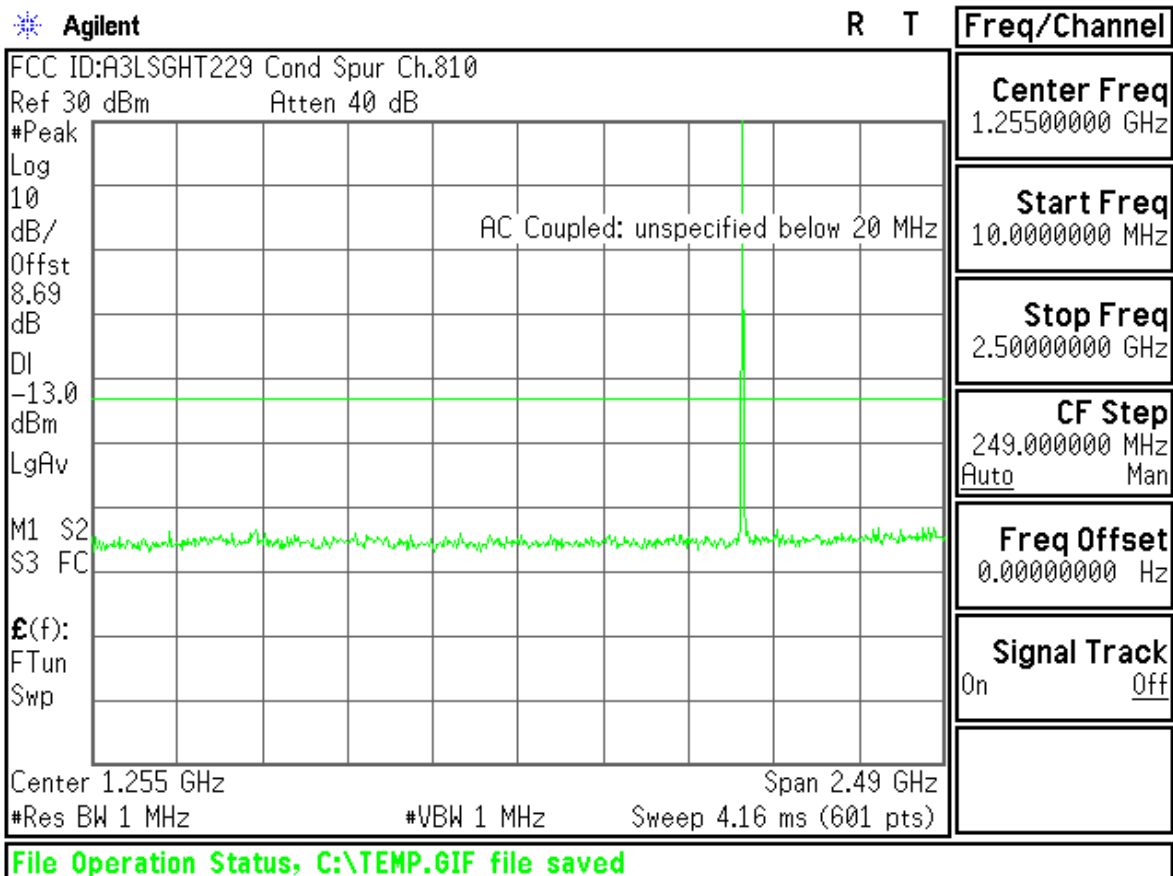


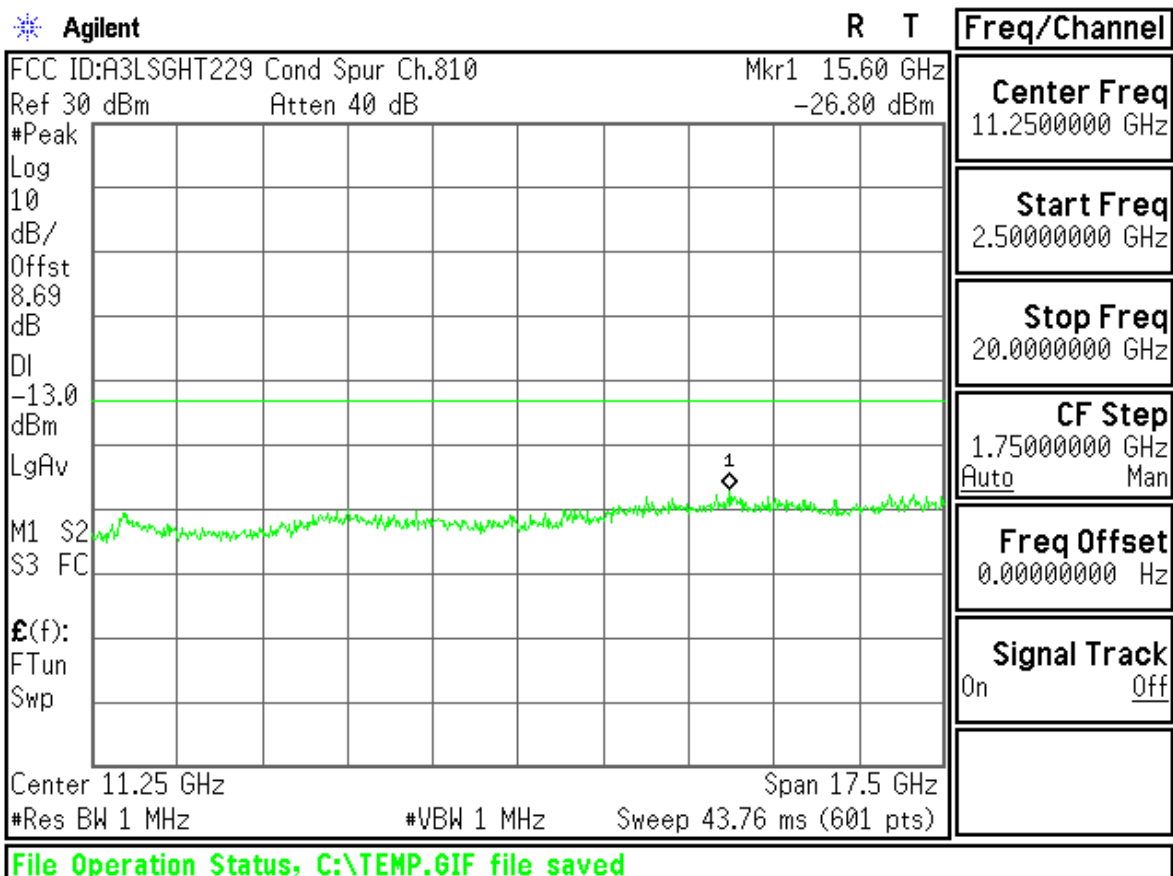
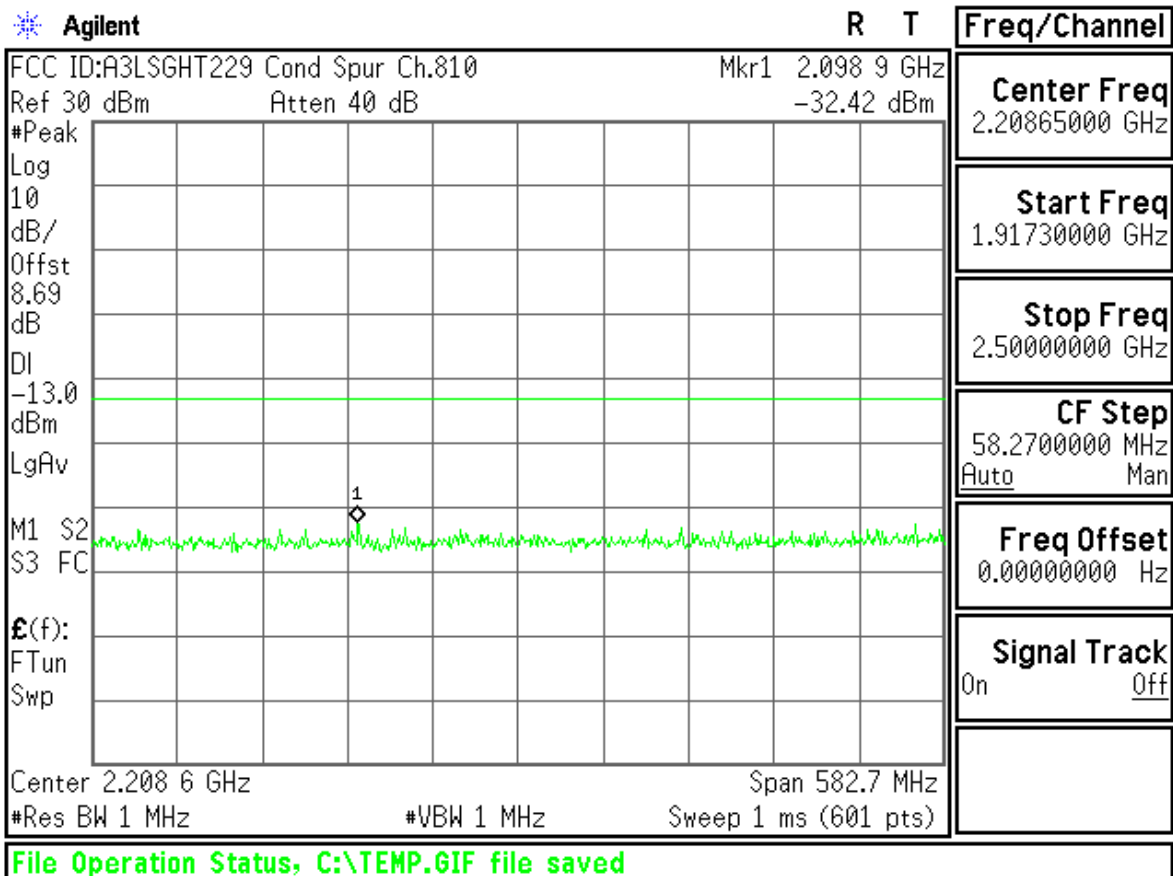












Agilent

R T

Freq/Channel

FCC ID:A3LSGHT229 Band Edge Ch.512

Ref 30 dBm

Atten 40 dB

#Avg

Log

10

dB/

Offst

8.69

dB

DI

-13.0

dBm

PAvg

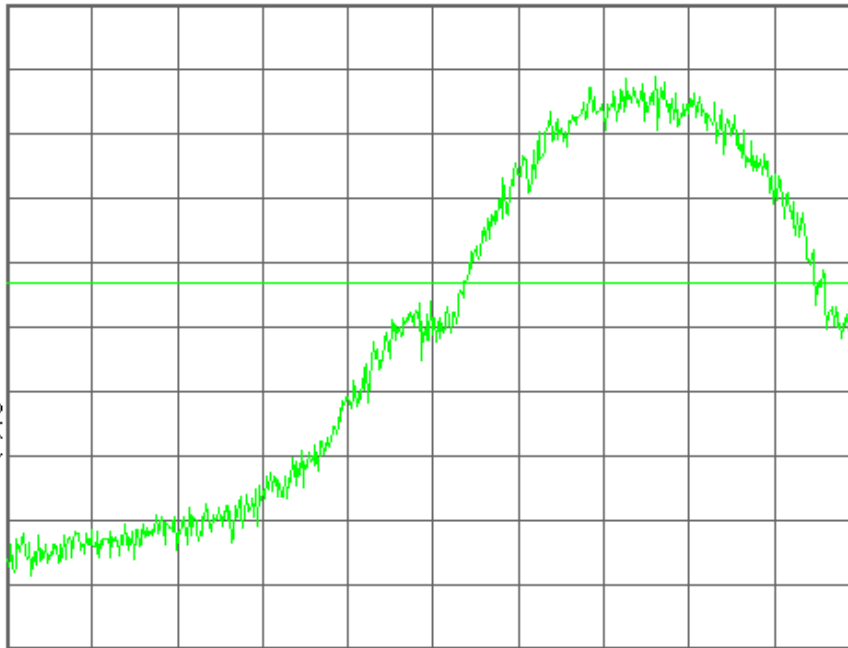
M1 S2

S3 FC

£(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 T

Freq/Channel

FCC ID:A3LSGHT229 Band Edge Ch.512

Mkr1 1.849 994 7 GHz

Ref 30 dBm

Atten 40 dB

-16.10 dBm

#Avg

Log

10

dB/

Offst

8.69

dB

DI

-13.0

dBm

PAvg

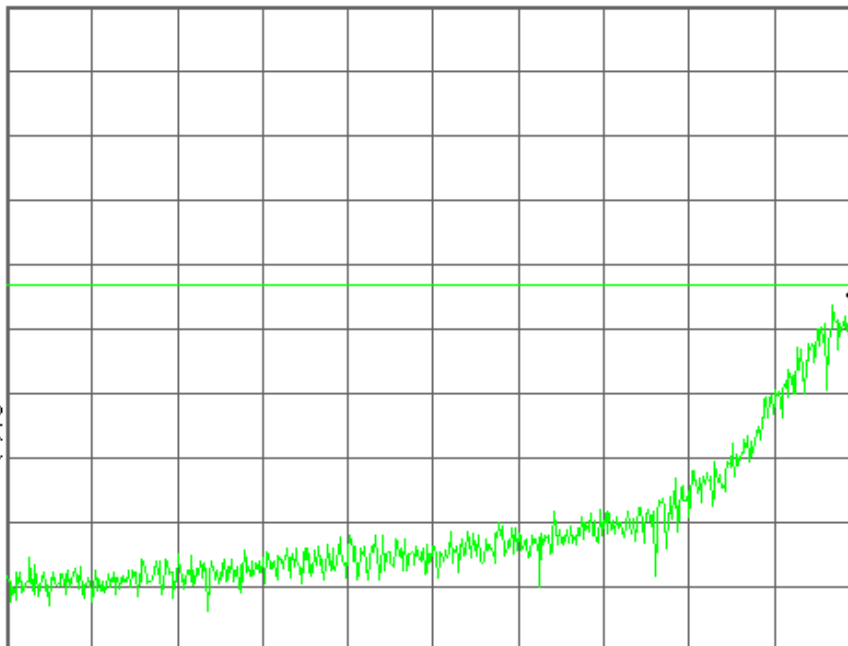
M1 S2

S3 FC

£(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 T

Freq/Channel

FCC ID:A3LSGHT229 Band Edge Ch.810

Ref 30 dBm

Atten 40 dB

#Avg

Log

10

dB/

Offst

8.69

dB

DI

-13.0

dBm

PAvg

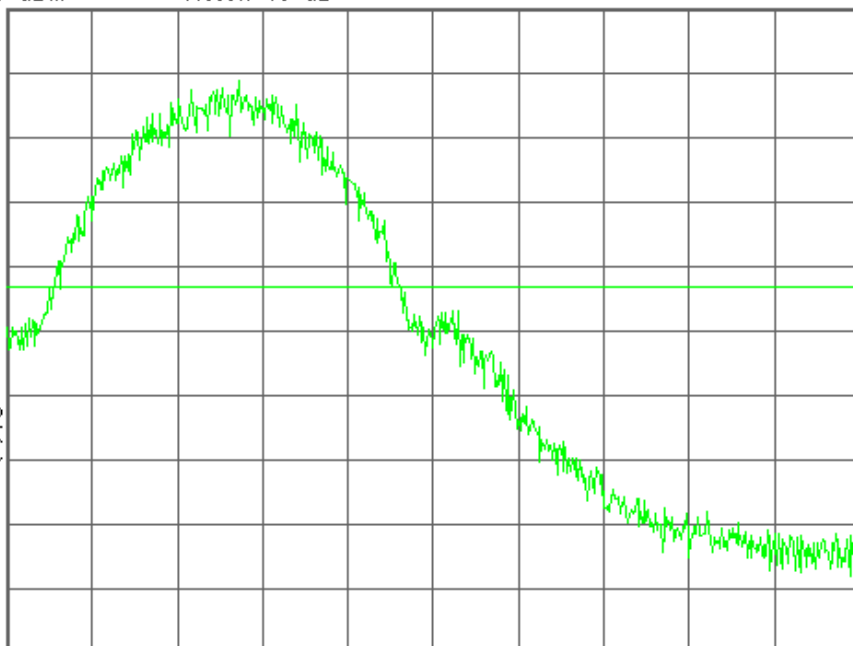
M1 S2

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 T

Freq/Channel

FCC ID:A3LSGHT229 Band Edge Ch.810

Mkr1 1.910 023 2 GHz

Ref 30 dBm

Atten 40 dB

-16.92 dBm

#Avg

Log

10

dB/

Offst

8.69

dB

DI

-13.0

dBm

PAvg

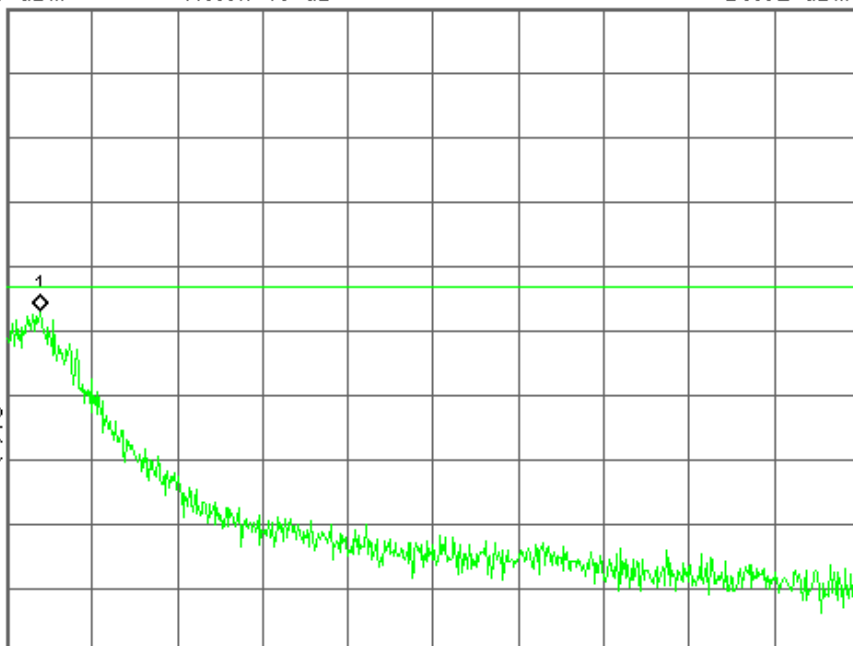
M1 S2

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