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Regulatory Compliance Group
IT R&D Center
416 Maetan3-Dong,
Yeongtong-gu, Suwon city,
Gyeonggi-Do, Korea 442-742

FCC CFR47 PART 22 & 24 SUBPART CERTIFICATION REPORT

Model Tested: SGH-X497
FCC ID (Requested): A3LSGHX497
Report No: FC-088-R1
Job No: FC-088
Date issued: July 09, 2005

- Abstract -

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




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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 442-742

- Attention: SungJoo KIM, Engineering Manager (QA Lab)

- FCC ID: A3LSGHX497

- Quantity: Quantity production is planned
- Emission Designators: 300KG7W

- Tx Freq. Range: 824.2 - 848.8MHz (GSM850)
1851.25 -1908.75MHz (GSM1900)

- Rx Freq. Range: 869.2 - 893.8 MHz (GSM850)
1931.25 -1988.75 MHz (GSM1900)

- Max. Power Rating: 2.685 W ERP GSM850 (34.29 dBm)
1.435 W EIRP GSM1900 (31.57 dBm)

- FCC Classification(s): Licensed Portable Tx Held to Ear (PCE)

- Equipment (EUT) Type: Dual-Band GSM850/1900 Phone
- Modulation(s): GSM850/ GSM1900
- Frequency Tolerance: $\pm 0.00025\%$ (2.5ppm)
- FCC Rule Part(s): §24(E), §22(H), §2.
- Dates of Test: June 29, July 2-5, 2005
- Place of Test: SAMSUNG Lab,
- Test Report S/N: FC-088-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 442-742. The site have 1 Fully-anechoic chamber and measurement facility.

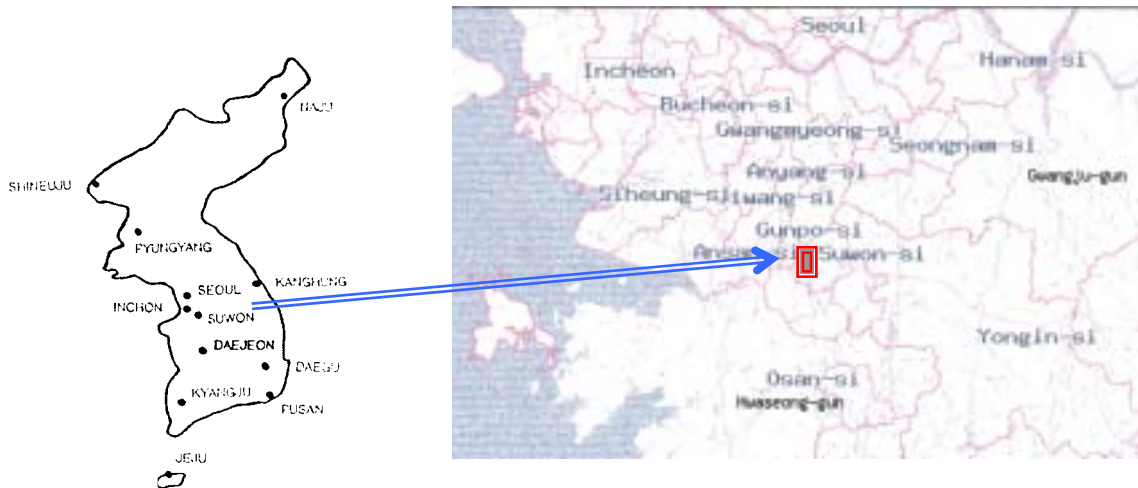


Figure1. Map of the Suwon City area.

Measurement Procedure

The radiated and spurious measurements were made Fully-anechoic chamber at a 3-meter test range (see Figure2). The equipment under testing was placed on a wooden turntable 3-meters from the receive antenna. The receive antenna height and turntable rotations were adjusted for the highest reading on the receive spectrum analyzer. The substitution antenna will replace the EUT antenna it the same position and in vertical polarization. The frequency of the signal generator shall be set to the frequencies that were measured on the EUT. The test antenna shall be raised and lowered, if necessary, to ensure that the maximum signal is still being received. The signal generator, output level, shall be adjusted until an equal or a known related level to what was measured from the EUT is obtained in the spectrum analyzer. This level was recorded.

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

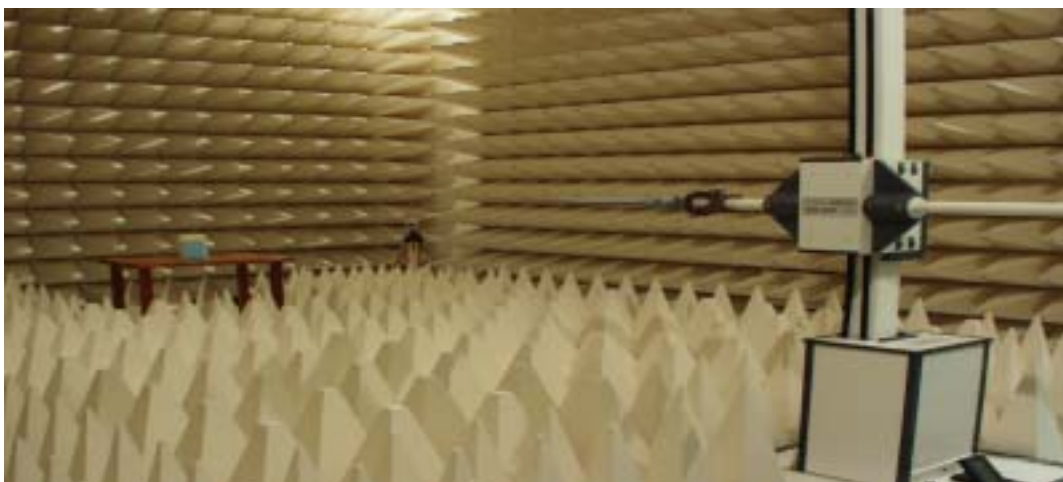


Figure2. Photograph of 3m Fully-Anechoic Chamber



3. MEASURING INSTRUMENT CALIBRATION

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

- End of page -



4.TEST EQUIPMENT LIST

Name of Equipment	Model	Serial No.	Due Date
Spectrum Analyzer	ESI26	836119/010	2005-09-20
	E4440A(3Hz~26.5GHz)	MY41000236	2005-10-27
	E4440A(3Hz~26.5GHz)	MY41000233	2005-11-04
Signal Generator	SMIQ03B	83824/021	2005-12-27
	SMR20	835197/030	2006-01-18
Power Meter	E4419B	GB41293846	2005-09-21
Power Sensor	8481B	3318A10325	2005-10-06
	8485A	3318A19924	2005-09-20
Amplifier	5S1G4	304866	2005-10-19
Pre-Amplifier	8449B	3008A00691	2006-01-11
Communication test set	8960	GB42230535	2005-11-04
	8960	GB42360886	2005-10-27
Antenna Master	MA0001	ANT0967	Not Required
Controller	HD100	100/756	Not Required
Environmental Chamber	PL-4S	13005454	2005-07-31
	SH-241	92000548	2005-11-22
	SH-241	92000549	2005-11-22
Horn Antenna	HF906	360306/011	2006-03-17
	HF906	100134	2006-04-25
Dipole Antenna	3121C-DB4	9007-587	2005-12-02
	3121C-DB4	9007-588	2006-06-04
Receive Antenna	HL040	353255/019	2005-08-13
Attenuator	8494A	3308A31997	2006-01-03
	8496A	3308A14426	2006-01-04
Divider	11636B	51941	Not Required
	11636B	51942	Not Required
	11636B	51946	Not Required
High Pass Filter	WHK1.0/15G-10SS	1	Not Required
	WHK1.0/15G-10SS	1	Not Required
	WHK/3.5/18G-10SS	3	Not Required
	WHK/3.5/18G-10SS	4	Not Required
Shielded Fully Anechoic Chamber	RF0002	ANT0001	Not Required

5. DESCRIPTION OF TESTS

5.1 Effective Radiated Power / Equivalent Isotropic Radiated Power

Test Set-up for the ERP/EIRP TEST

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

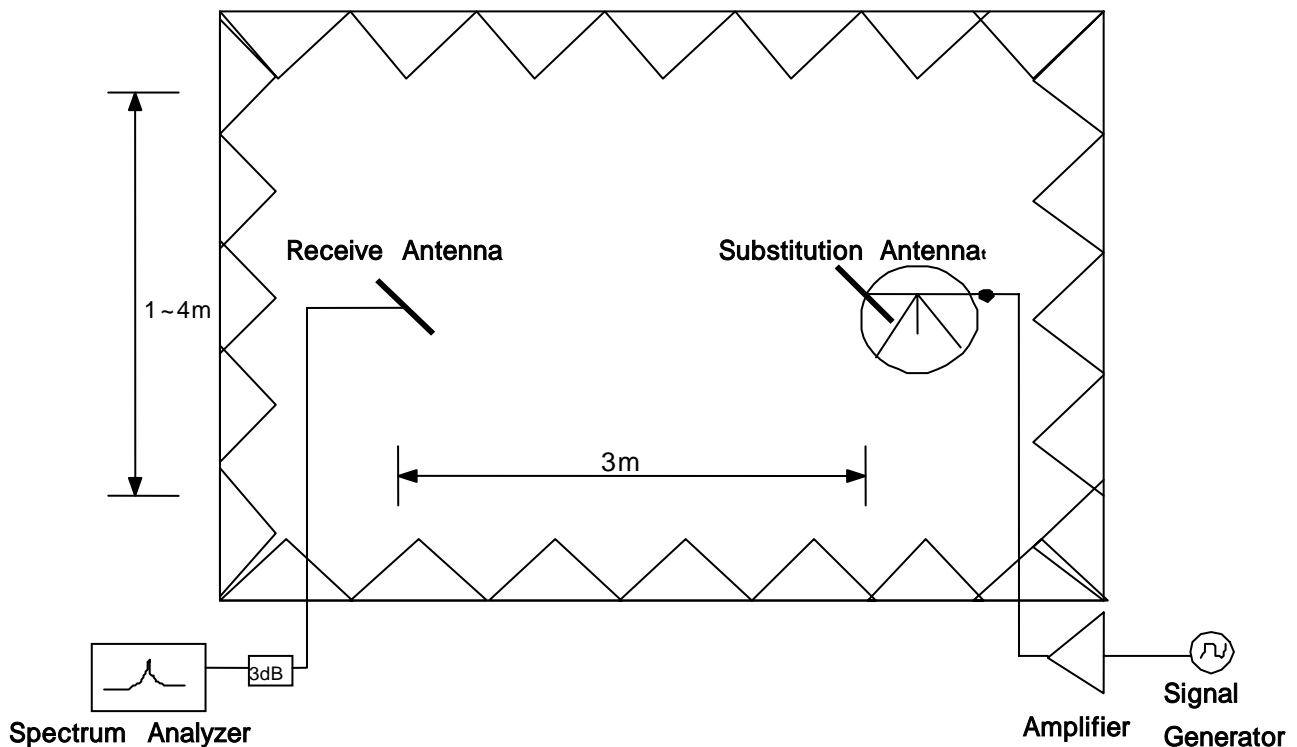


Figure 3. Diagram of ERP/EIRP test Set-up

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, 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.

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

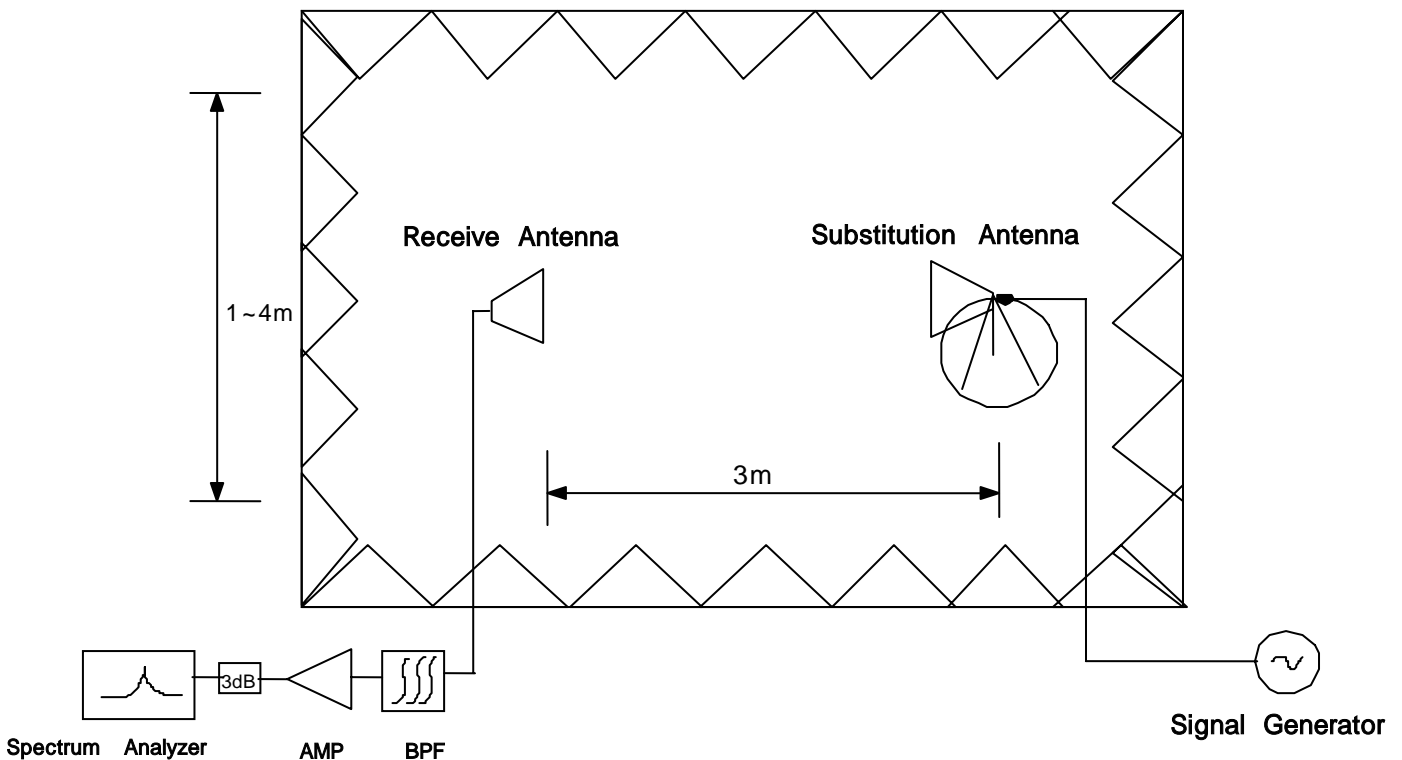


Figure 4. Diagram of Radiated Spurious & Harmonic test Set-up

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 GSM1900 Mode 2nd Harmonic(1880MHz)

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 **25.5dBm -(-24.8)= 50.3dBc** .

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5.3 Occupied Bandwidth

Test Procedure

The EUT was setup to maximum output power at its lowest channel. The occupied bandwidth was measured using a spectrum analyzer. The measurements are repeated for the highest and a middle channel. The EUT's occupied bandwidth is measured as the width of the signal between two points, one below the carrier center frequency and one above the carrier frequency, outside of which all emissions are attenuated at least 26Db below the transmitter power.

Plots of the EUT's occupied bandwidth are shown herein.

5.4 Spurious and Harmonic Emissions at Antenna Terminal

5.4.1 Occupied Bandwidth Emission Limits

- (a) On any frequency outside a licensee's frequency block, the power of any emission shall be attenuated below the transmitter power (P) by at least $43 + 10 \log(P)$ Db.
- (b) Compliance with these provisions is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or greater. However, in the 1MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emission are attenuated at least 26 dB below the transmitter power.
- (c) When measuring the emission limits, the nominal carrier frequency shall be adjusted as close to the licensee's frequency block edges, both upper and lower, as the design permits.
- (d) The measurement of emission power can be expressed in peak or average values, provided they are expressed in the same parameters as the transmitter power.

– End of page –

BLOCK	Freq. Range (MHz) Transmitter (Tx)	Freq. Range (MHz) Receiver (Rx)
A	1850 – 1865	1930 – 1945
B	1870 – 1885	1950 – 1965
C	1895 – 1910	1975 – 1990
D	1865 – 1870	1945 – 1950
E	1885 – 1890	1965 – 1970
F	1890 – 1895	1970 – 1975

Table 1. Broadband PCS Service Frequency Blocks

BLOCK	Freq. Range (MHz) Transmitter (Tx)	Freq. Range (MHz) Receiver (Rx)
A* Low + A	824 ~ 835	869 ~ 880
B	835 ~ 845	880 ~ 890
A* High	845 ~ 846.5	890 ~ 891.5
B*	846.5 ~ 849	891.5 ~ 894

Table 2. Cellular Service Frequency Blocks

5.4.2 Conducted Spurious Emission

Minimum standard:

On any frequency outside a license frequency block, the power of any emission shall be attenuated below the transmitter power(P) by at least $43+10\log(P)$ Db. Limit equivalent to -13 dBm, calculation shown below.

$$43 + 10\log (2.685 W) = 47.29 \text{ dB}$$

$$34.29 \text{ dBm} - 47.29 \text{ dB} = -13 \text{ dBm}$$

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 (± 2.5 ppm) of the center frequency.

Time Period and Procedure:

1. The carrier frequency of the transmitter and the individual oscillators is measured at room temperature (25°C to 27°C to provide a reference).
2. The equipment is subjected to an overnight "soak" at -30°C without any power applied.
3. After the overnight "soak" at -30°C (Usually 14~16 hours), the equipment is turned on in a "standby" condition for one minute before applying power to the transmitter. Measurement of the carrier frequency of the transmitter and the individual oscillators is made within a three minute interval after applying to the transmitter.
4. Frequency measurements are made at 10°C interval up to room temperature. At least a period of one and one half-hour is provided to allow stabilization of the equipment at each temperature level.
5. Again the transmitter carrier frequency and the individual oscillators is measured at room temperature to begin measurement of the upper temperature levels.
6. Frequency measurements are at 10 intervals starting at -30°C up to +60°C allowing at least two hours at each temperature for stabilization. In all measurements the frequency is measured within three minutes after re-applying power to the transmitter.
7. The artificial load is mounted external to the temperature chamber.

NOTE : The EUT is tested down to the battery endpoint.

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6. TEST DATA

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

Supply Voltage : 3.7VDC

Modulation : GSM850

Reference level

Frequency (MHz)	Output (dBm)	Polarization	S/A (dBm)	Ant gain (dBd)	Ref level (dBm)
824.20	23.50	H	-15.14	0.00	-15.14
		V	-15.05	0.00	-15.05
836.60	24.50	H	-14.14	0.00	-14.14
		V	-15.05	0.00	-15.05
848.80	23.50	H	-15.14	0.00	-15.14
		V	-15.59	0.00	-15.59

Result

Frequency (MHz)	From EUT Tested level (dBm)	Polarization (H/V)	Azimuth (angle)	ERP (dBm)	ERP (W)	Battery
824.20	-4.97	H1	180	33.67	2.328	Standard
836.60	-4.35	H1	176	34.29	2.685	Standard
848.80	-4.93	H2	178	33.71	2.349	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 : GSM1900

Reference level

Frequency (MHz)	Output (dBm)	Polarization	S/A (dBm)	Ant gain (dBi)	Ref level (dBm)
1850.20	27.00	H	-13.79	8.42	-22.21
		V	-14.23	8.42	-22.65
1880.00	27.00	H	-13.74	8.25	-21.99
		V	-13.82	8.25	-22.07
1909.80	27.00	H	-13.83	8.40	-22.23
		V	-13.84	8.40	-22.24

Result

Frequency (MHz)	From EUT Tested level (dBm)	Polarization (H/V)	Azimuth (angle)	EIRP (dBm)	EIRP (W)	Battery
1850.20	-19.57	H2	19	29.64	0.920	Standard
1880.00	-18.59	H2	23	30.40	1.096	Standard
1909.80	-17.66	H2	18	31.57	1.435	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 Field Strength of SPURIOUS Radiation

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

Measured Output Power : 34.29 dBm = 2.685 W

Modulation Signal : GSM850

$$\text{Limit : } 43 + 10\log_{10}(P) = 47.29 \text{ dBc}$$

Result

Channel	Harmonic	Frequency (MHz)	From EUT Tested level (dBm)	POL (H/V)	Result (dBc)
128	2	1648.40	-39.92	H2	62.97
	3	2472.60	-48.35	H2	66.37
	4	3296.80	-67.25	V	81.41
	5	4121.00	-68.54	V	79.55
	6	4945.20	-	-	-
	7	5769.40	-	-	-
190	2	1673.20	-41.68	H2	63.98
	3	2509.80	-49.79	H2	67.12
	4	3346.40	-67.01	H1	82.18
	5	4183.00	-68.63	V	79.54
	6	5019.60	-	-	-
	7	5856.20	-	-	-
251	2	1697.60	-46.83	H2	67.47
	3	2546.40	-51.25	H2	68.05
	4	3395.20	-68.18	V	83.22
	5	4244.00	-69.13	H1	80.46
	6	5092.80	-	-	-
	7	5941.60	-	-	-

Radiated Spurious Emission measurements at 3 meters by Substitution Method



6.4 GSM1900 Radiated Spurious & Harmonic measurement Field Strength of SPURIOUS Radiation

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

Measured Output Power : 31.57 dBm = 1.435 W

Modulation Signal : GSM1900

$$\text{Limit : } 43 + 10\log_{10}(P) = 44.57 \text{ dBc}$$

Result

Channel	Harmonic	Frequency (MHz)	From EUT Tested level (dBm)	POL (H/V)	Result (dBc)
512	2	3700.40	-58.36	H1	64.77
	3	5550.60	-61.06	H2	62.82
	4	7400.80	-60.38	H1	57.73
	5	9251.00	-69.00	H2	60.78
	6	11101.20	-	-	-
	7	12951.40	-	-	-
	8	14801.60	-	-	-
661	2	3760.00	-60.82	H1	67.54
	3	5640.00	-58.09	H1	59.90
	4	7520.00	-60.16	V	58.56
	5	9400.00	-68.19	V	62.02
	6	11280.00	-	-	-
	7	13160.00	-	-	-
	8	15040.00	-	-	-
810	2	3819.60	-57.36	H1	64.52
	3	5729.40	-60.45	H1	62.20
	4	7639.20	-63.81	V	61.50
	5	9549.00	-69.28	H2	62.36
	6	11458.80	-	-	-
	7	13368.60	-	-	-
	8	15278.40	-	-	-

Radiated Spurious Emission measurements at 3 meters by Substitution Method



6.5 GSM850 Radiated Spurious & Harmonic Conversion Table

Date : 2005 . 07 . 04 .

Test Engineer : WW JANG

Tx Cable loss
 Tx Horn Ant Gain
 Rx Cable loss + HPF Insertion loss + Attenuator
 Pre-Amp gain
 Air loss
 Tested Level from EUT
 = + + -
 = ERP +2.14-

CH	Har	Frequency (MHz)	Tx CL (dB)	Horn Gain (dB)	Tx Level @ (S/G 0dBm)	Tested Level EUT : H (dBm)	Tested Level EUT : V (dBm)	Amplitude of Emission EUT : H (dBm)	Amplitude of Emission EUT : V (dBm)	Result EUT : H (dBc)	Result EUT : V (dBc)
128	2	1648.40	7.08	7.68	0.60	-39.92	-43.35	-26.54	-30.52	62.97	66.95
	3	2472.60	9.22	9.19	-0.03	-48.35	-51.47	-29.94	-33.37	66.37	69.80
	4	3296.80	11.59	9.00	-2.59	-67.03	-67.25	-45.41	-44.98	81.84	81.41
	5	4121.00	13.25	10.19	-3.06	-68.71	-68.54	-43.77	-43.12	80.20	79.55
	6	4945.20	15.04	10.16	-4.88	-	-	-	-	-	-
	7	5769.40	16.65	10.54	-6.11	-	-	-	-	-	-
190	2	1673.20	7.22	7.68	0.46	-41.68	-42.77	-27.55	-29.34	63.98	65.77
	3	2509.80	9.46	9.19	-0.27	-49.79	-52.70	-30.69	-33.77	67.12	70.20
	4	3346.40	11.74	9.00	-2.74	-67.01	-68.36	-45.75	-46.23	82.18	82.66
	5	4183.00	13.33	10.19	-3.14	-68.85	-68.63	-43.96	-43.11	80.39	79.54
	6	5019.60	15.29	10.16	-5.13	-	-	-	-	-	-
	7	5856.20	17.05	10.54	-6.51	-	-	-	-	-	-
251	2	1697.60	7.31	7.68	0.37	-46.83	-46.92	-31.04	-31.96	67.47	68.39
	3	2546.40	9.54	9.19	-0.35	-51.25	-52.86	-31.62	-33.44	68.05	69.87
	4	3395.20	11.96	9.00	-2.96	-68.37	-68.18	-47.59	-46.79	84.02	83.22
	5	4244.00	13.47	10.19	-3.28	-69.13	-69.40	-44.96	-44.03	81.39	80.46
	6	5092.80	15.54	10.16	-5.38	-	-	-	-	-	-
	7	5941.60	17.71	10.54	-7.17	-	-	-	-	-	-



6.6 GSM1900 Radiated Spurious & Harmonic Conversion Table

Date : 2005 . 07 . 04 .

Test Engineer : WW JANG

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 CL (dB)	Horn Gain (dB)	Tx Level @ (S/G 10dBm)	Tested Level EUT : H (dBm)	Tested Level EUT : V (dBm)	Amplitude of Emission EUT : H (dBm)	Amplitude of Emission EUT : V (dBm)	Result EUT : H (dBc)	Result EUT : V (dBc)
512	2	3700.40	12.43	9.73	7.30	-58.36	-60.38	-33.20	-34.44	64.77	66.01
	3	5550.60	16.77	11.55	4.78	-61.06	-63.15	-31.25	-33.23	62.82	64.80
	4	7400.80	20.09	11.44	1.35	-60.38	-61.82	-26.16	-28.96	57.73	60.53
	5	9251.00	23.81	12.17	-1.64	-69.00	-69.80	-29.21	-30.90	60.78	62.47
	6	11101.20	27.57	13.66	-3.91	-	-	-	-	-	-
	7	12951.40	33.20	13.27	-9.93	-	-	-	-	-	-
661	2	3760.00	12.73	9.73	7.00	-60.82	-62.17	-35.97	-36.32	67.54	67.89
	3	5640.00	16.76	11.55	4.79	-58.09	-63.36	-28.33	-33.42	59.90	64.99
	4	7520.00	20.17	11.44	1.27	-62.24	-60.16	-27.87	-26.99	59.44	58.56
	5	9400.00	24.14	12.17	-1.97	-68.86	-68.19	-30.83	-30.45	62.40	62.02
	6	11280.00	27.69	13.66	-4.03	-	-	-	-	-	-
	7	13160.00	33.72	13.27	-10.45	-	-	-	-	-	-
810	2	3819.60	13.03	9.73	6.70	-57.36	-59.54	-32.95	-33.64	64.52	65.21
	3	5729.40	16.85	11.55	4.70	-60.45	-62.69	-30.63	-32.77	62.20	64.34
	4	7639.20	20.60	11.44	0.84	-64.87	-63.81	-30.60	-29.93	62.17	61.50
	5	9549.00	24.78	12.17	-2.61	-69.28	-69.09	-30.79	-31.19	62.36	62.76
	6	11458.80	28.26	13.66	-4.60	-	-	-	-	-	-
	7	13368.60	34.11	13.27	-10.84	-	-	-	-	-	-



6.7 Frequency Stability

6.7.1 GSM850 Frequency Stability Table

Operating Frequency : 836,600,000 Hz

Channel : 190

Reference Voltage : 3.7VDC

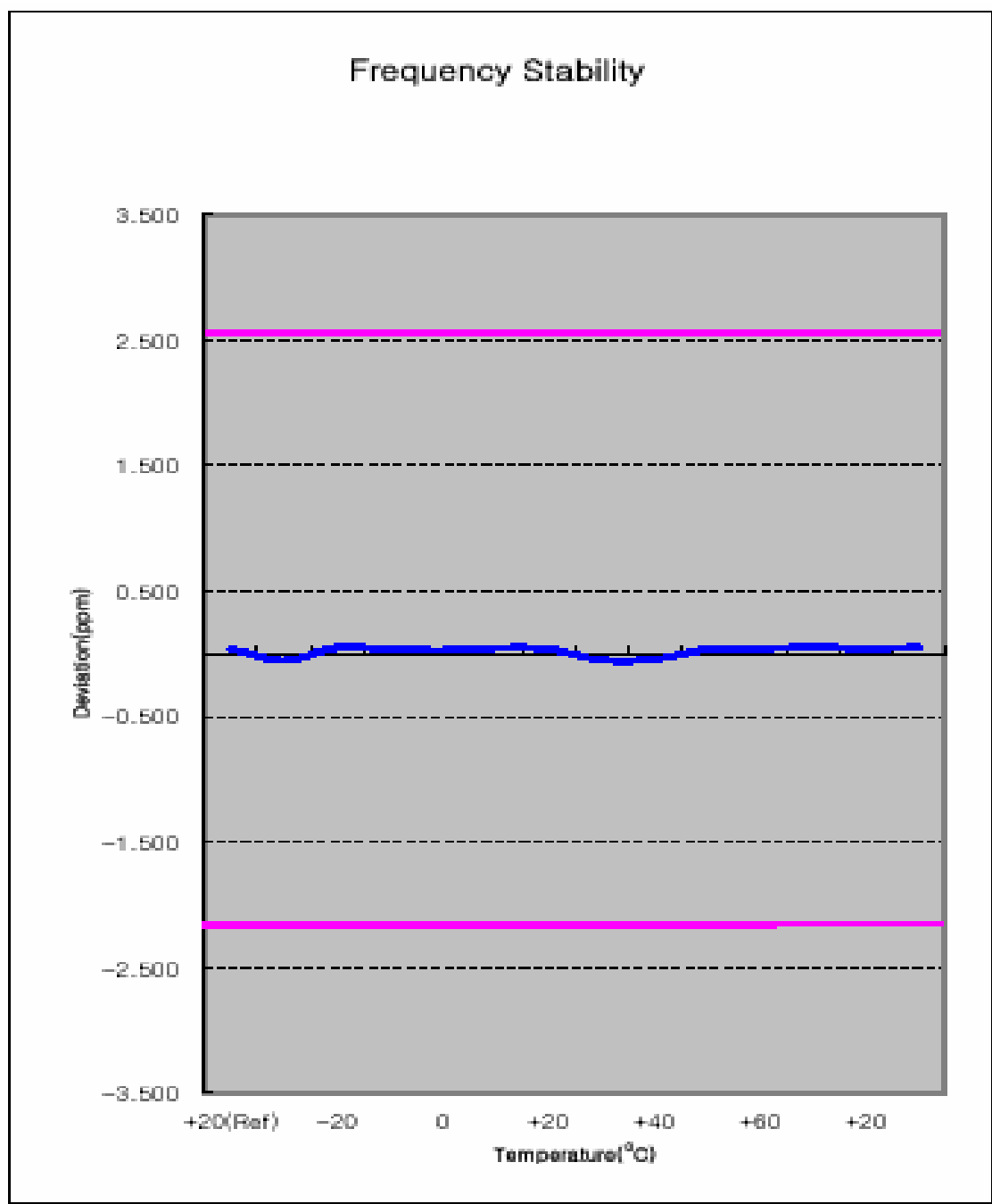
Deviation Limit : ± 0.00025 % or 2.5ppm

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency Error (Hz)	Frequency (Hz)	Deviation (%)	ppm
100%	3.70	+20(Ref)	32.63	836,600,033	0.000004	0.039
100%		-30	-45.76	836,599,954	-0.000005	-0.055
100%		-20	40.85	836,600,041	0.000005	0.049
100%		-10	30.71	836,600,031	0.000004	0.037
100%		0	23.35	836,600,023	0.000003	0.028
100%		+10	38.26	836,600,038	0.000005	0.046
100%		+20	32.63	836,600,033	0.000004	0.039
100%		+30	-40.87	836,599,959	-0.000005	-0.049
100%		+40	-36.31	836,599,964	-0.000004	-0.043
100%		+50	29.01	836,600,029	0.000003	0.035
100%		+60	36.93	836,600,037	0.000004	0.044
85%	3.20	+20	40.38	836,600,040	0.000005	0.048
115%	4.26	+20	36.22	836,600,036	0.000004	0.043
Batt.Endpoint	3.20	+20	40.38	836,600,040	0.000005	0.048

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

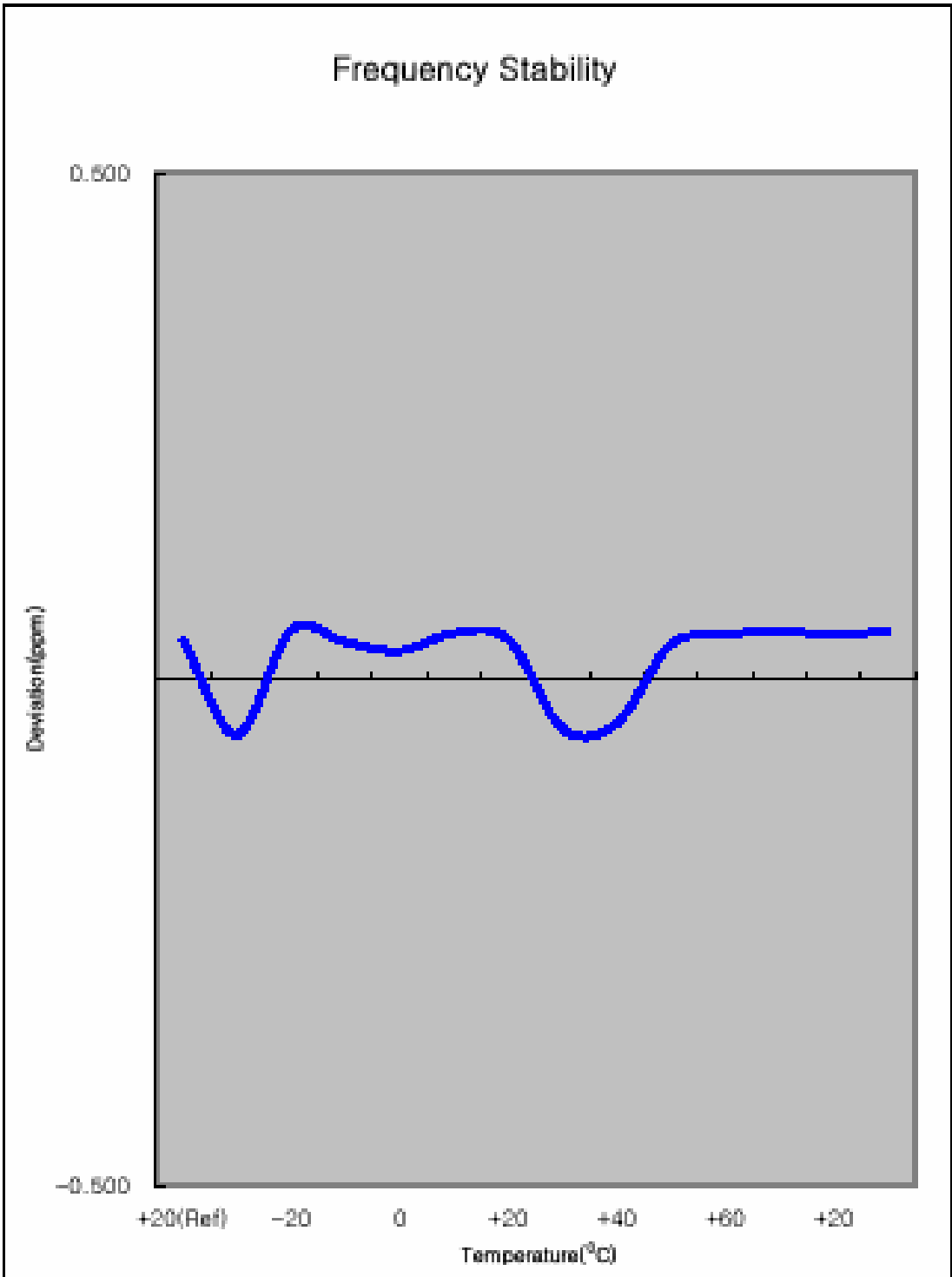
The EUT is tested down to the battery end point

6.7.3 GSM850 Frequency Stability Graph



- End of page -

Zoom In



- End of page -



6.7.2 GSM1900 Frequency Stability Table

Operating Frequency : 1,880,000,000 Hz

Channel : 661

Reference Voltage : 3.7VDC

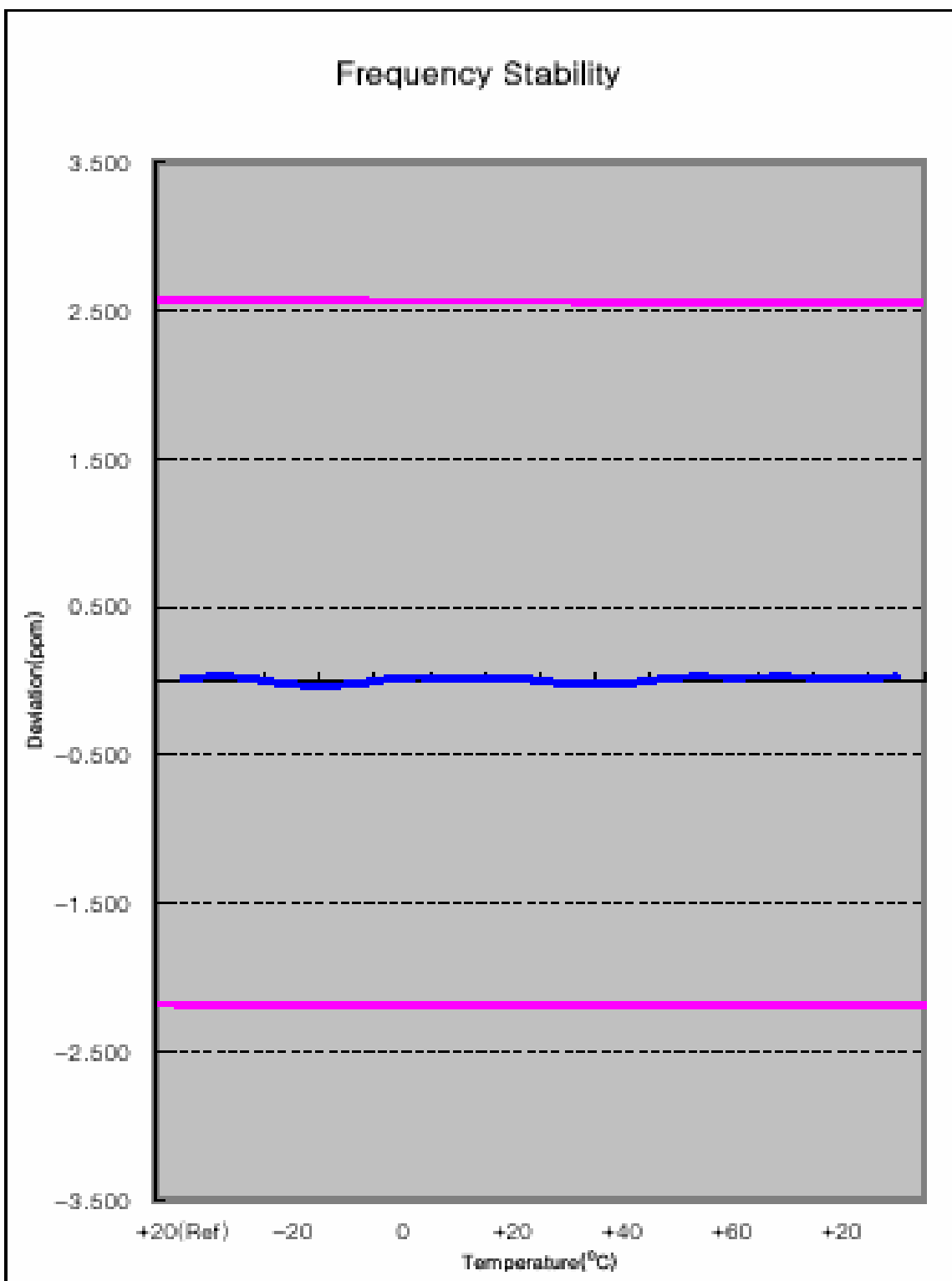
Deviation Limit : ± 0.00025 % or 2.5ppm

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency Error (Hz)	Frequency (Hz)	Deviation (%)	ppm
100%	3.70	+20(Ref)	40.63	1,880,000,041	0.000002	0.022
100%		-30	51.82	1,880,000,052	0.000003	0.028
100%		-20	-48.71	1,879,999,951	-0.000003	-0.026
100%		-10	-46.33	1,879,999,954	-0.000002	-0.025
100%		0	45.03	1,880,000,045	0.000002	0.024
100%		+10	40.12	1,880,000,040	0.000002	0.021
100%		+20	40.63	1,880,000,041	0.000002	0.022
100%		+30	-32.75	1,879,999,967	-0.000002	-0.017
100%		+40	-35.46	1,879,999,965	-0.000002	-0.019
100%		+50	48.38	1,880,000,048	0.000003	0.026
100%		+60	48.83	1,880,000,049	0.000003	0.026
85%		3.20	+20	53.81	1,880,000,054	0.000003
115%	4.26	+20	40.54	1,880,000,041	0.000002	0.022
Batt.Endpoint	3.20	+20	53.81	1,880,000,054	0.000003	0.029

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

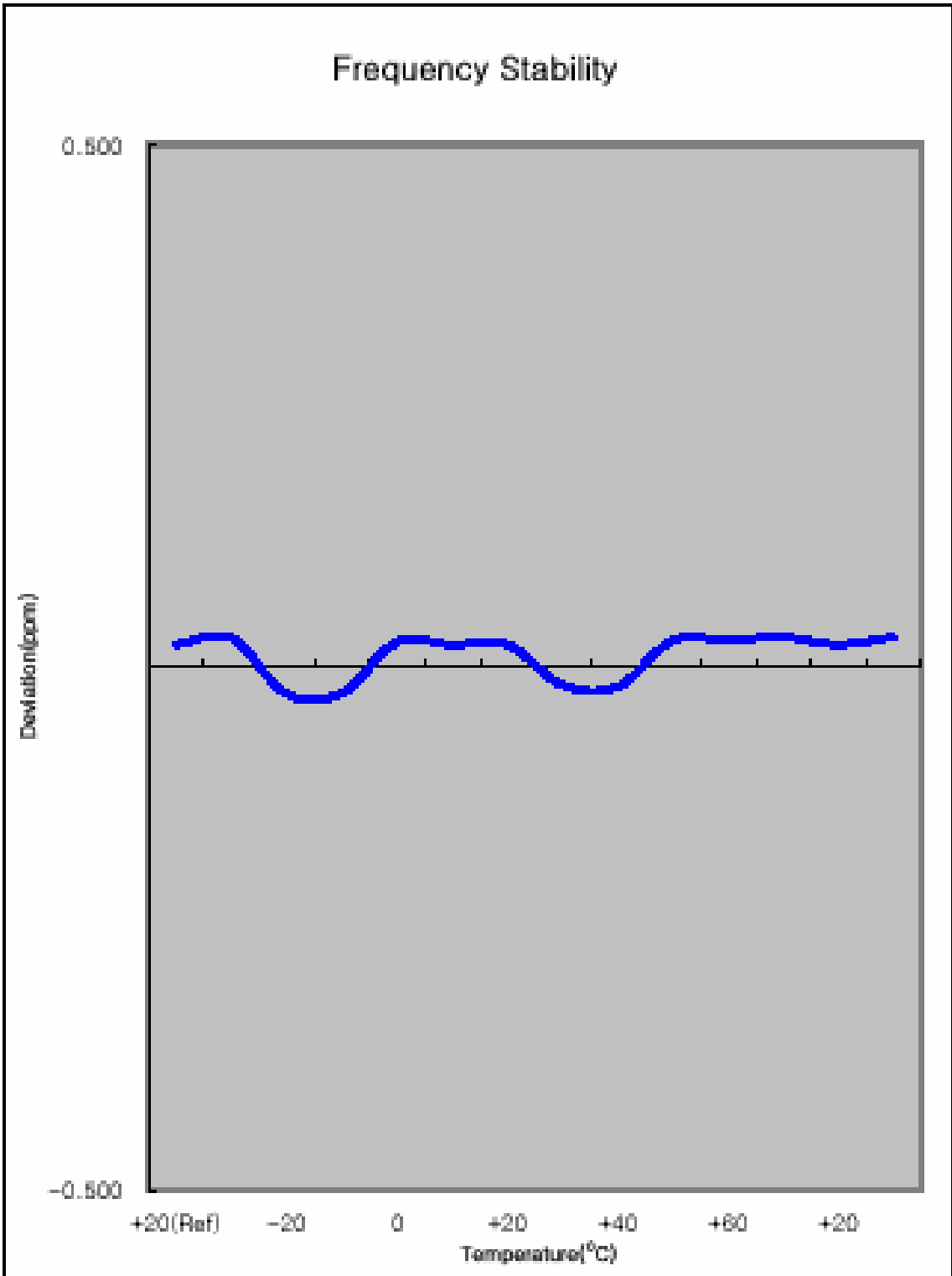
The EUT is tested down to the battery end point

6.7.4 GSM1900 Frequency Stability Graph



- End of page -

Zoom In



- End of page -



7. SAMPLE CALCULATION

7.1 Emission Designator

Emission Designator = 300KG7W

GSM Bandwidth = 300KHz

G = Phase Modulation

7 = Two or more channels containing quantized or digital information

W = Combination (Audio/Data)

- End of page -



8. CONCLUSION

The data collected shows that the SAMSUNG Dual-Band GSM850/1900 Phone.
FCC ID : A3LSGHX497 complies with all the requirements of Parts 2,22,24 of the FCC Rules.

- End of page -



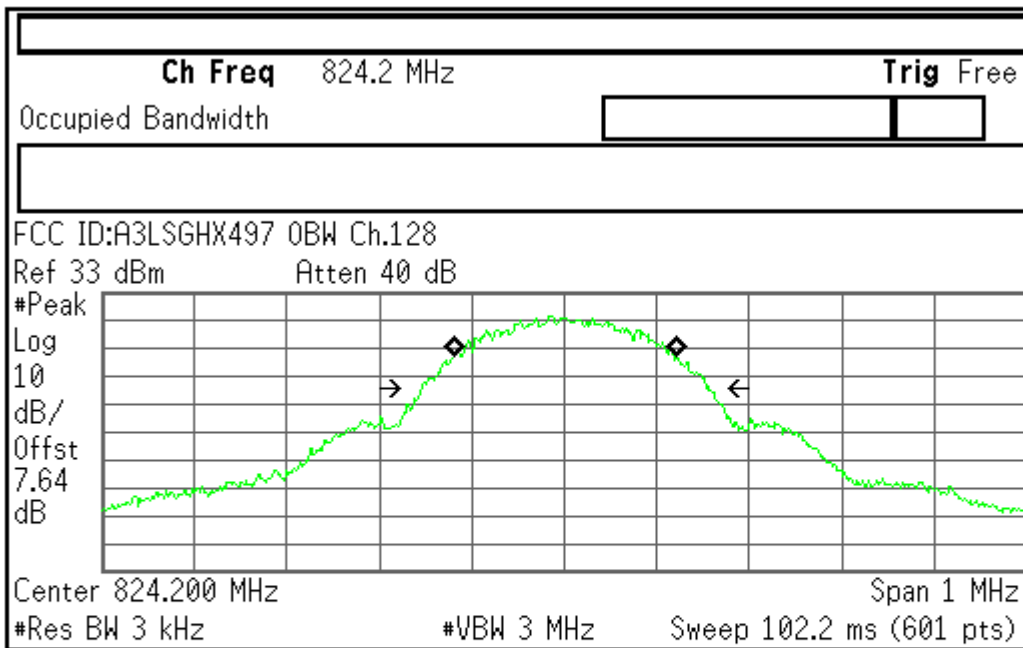
9. TEST PLOTS

- End of page -

GSM850

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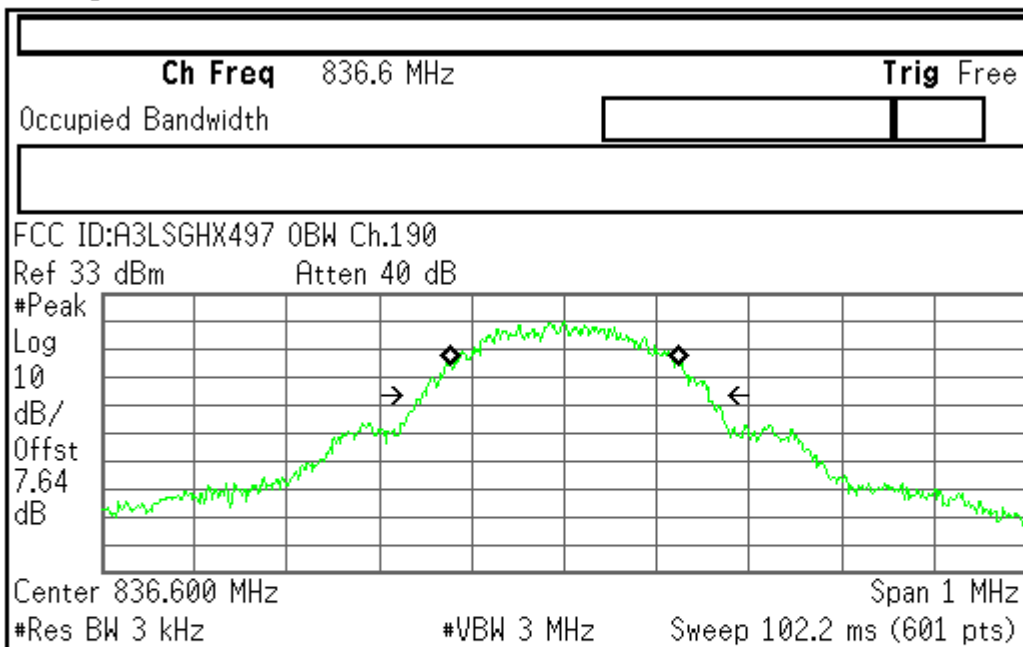
Freq/Channel
Center Freq 824.200000 MHz
Start Freq 823.700000 MHz
Stop Freq 824.700000 MHz
CF Step 100.000000 kHz Auto Man
Freq Offset 0.00000000 Hz
Signal Track On Off

Occupied Bandwidth 245.5489 kHz	Occ BW % Pwr 99.00 %
Transmit Freq Error 729.543 Hz	x dB -26.00 dB
x dB Bandwidth 314.185 kHz	

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Freq/Channel
Center Freq 836.600000 MHz
Start Freq 836.100000 MHz
Stop Freq 837.100000 MHz
CF Step 100.000000 kHz Auto Man
Freq Offset 0.00000000 Hz
Signal Track On Off

Occupied Bandwidth 250.1584 kHz	Occ BW % Pwr 99.00 %
Transmit Freq Error -340.090 Hz	x dB -26.00 dB
x dB Bandwidth 313.453 kHz	

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Ch Freq 848.8 MHz Trig Free

Occupied Bandwidth

Center Freq
848.800000 MHz

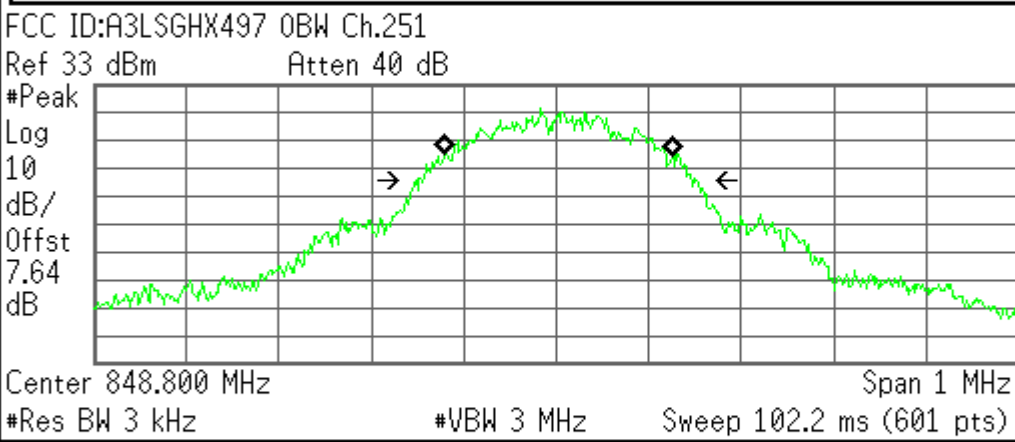
Start Freq
848.300000 MHz

Stop Freq
849.300000 MHz

CF Step
100.000000 kHz
Auto Man

Freq Offset
0.00000000 Hz

Signal Track
On Off

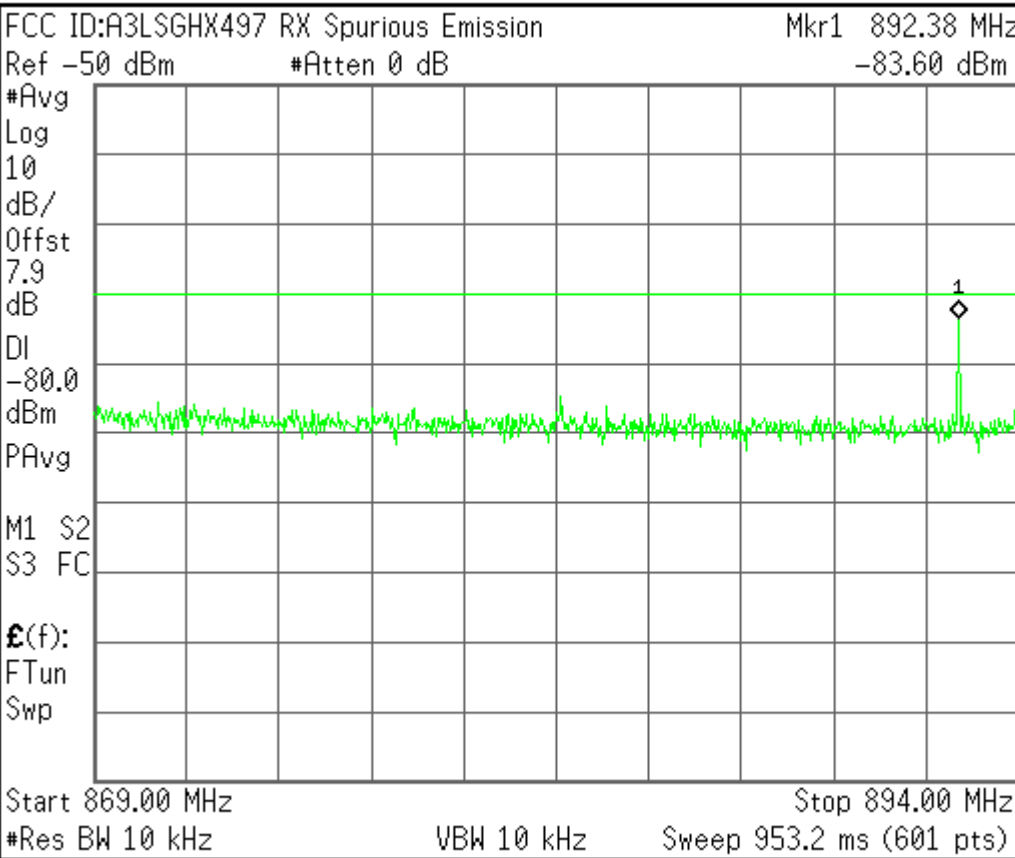


Occupied Bandwidth 250.2827 kHz

Occ BW % Pwr 99.00 %
x dB -26.00 dB

Transmit Freq Error 1.573 kHz
x dB Bandwidth 304.939 kHz

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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

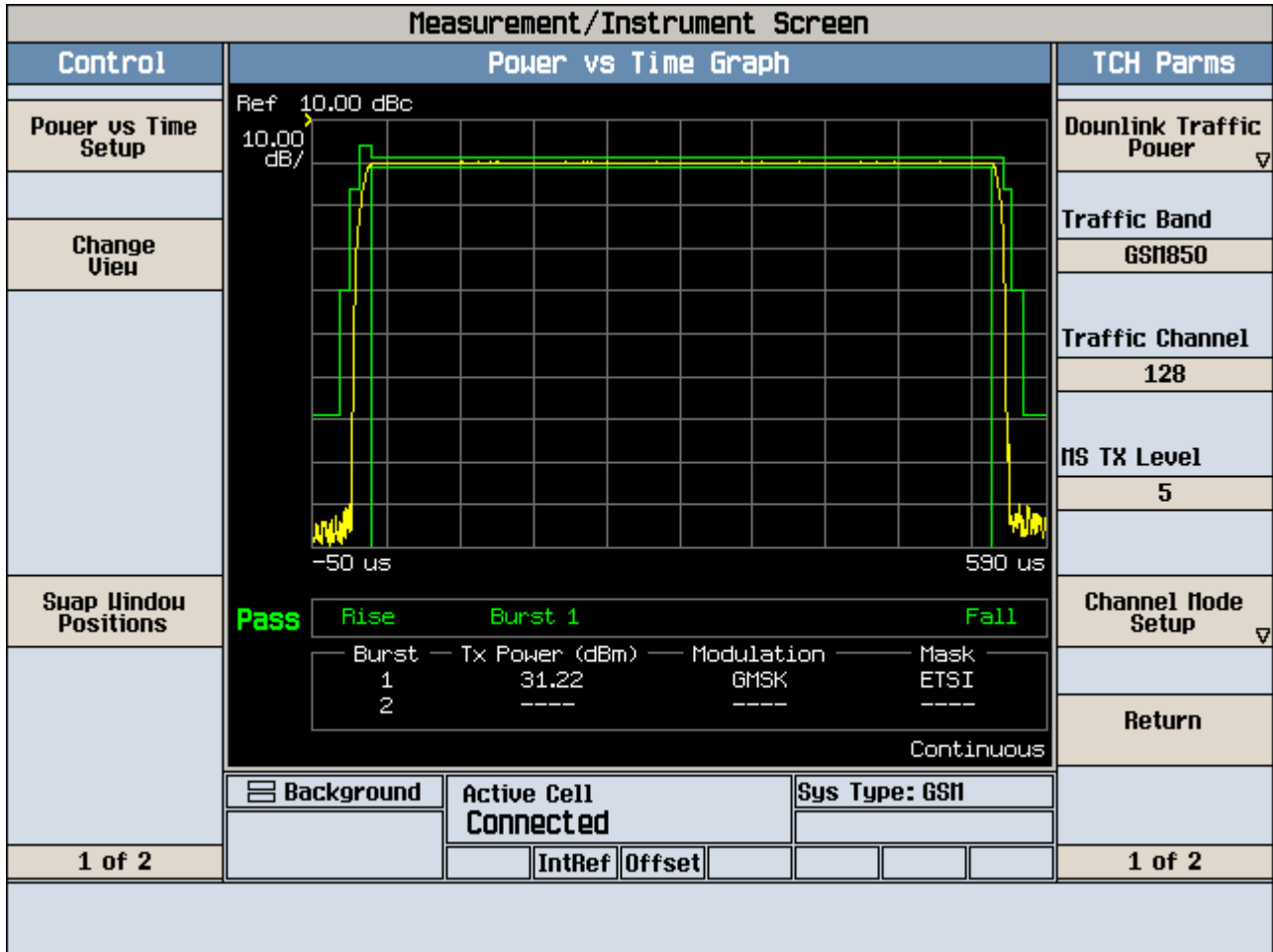
Signal Track
On Off

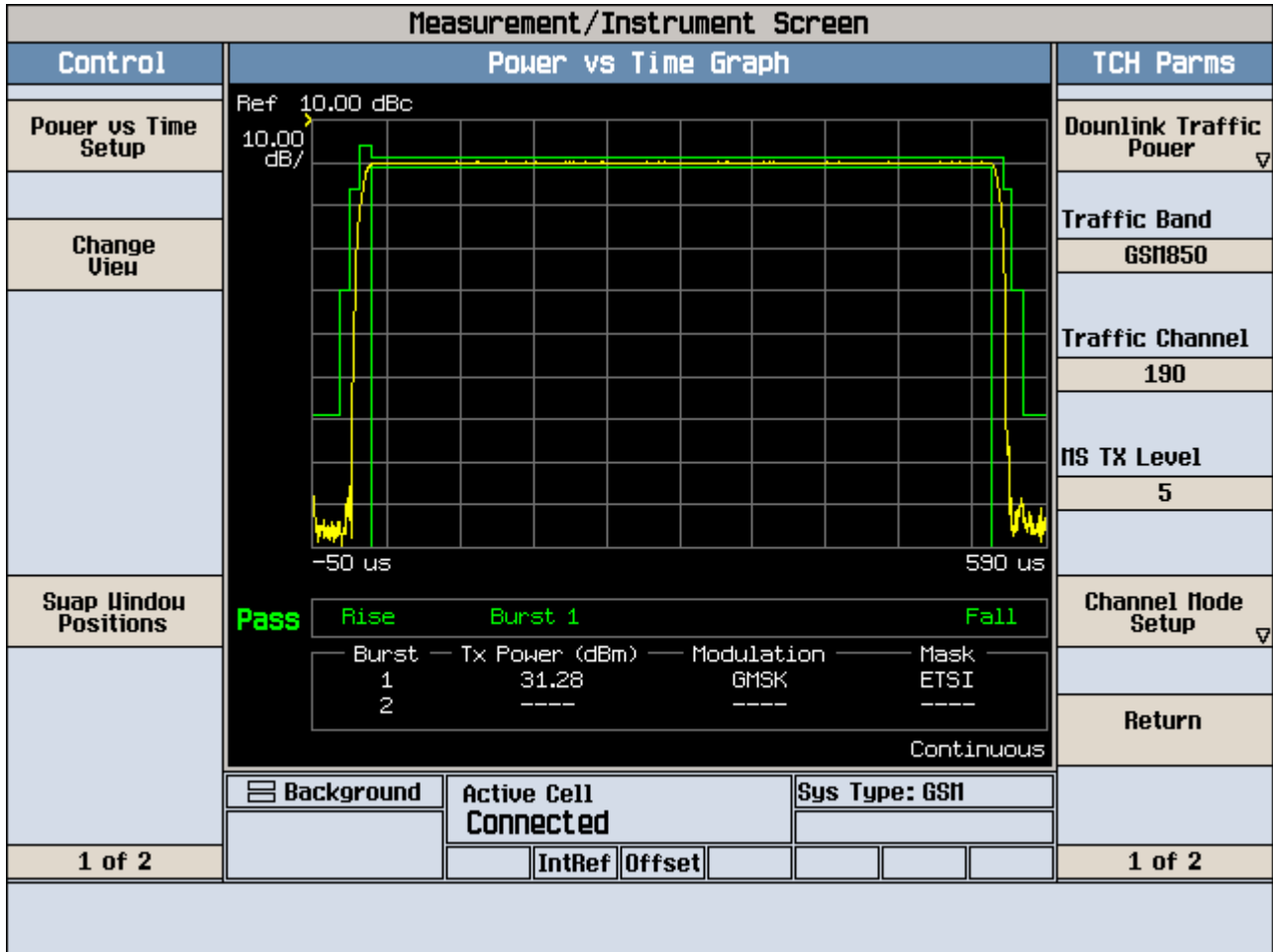
Copyright 2000-2002 Agilent Technologies

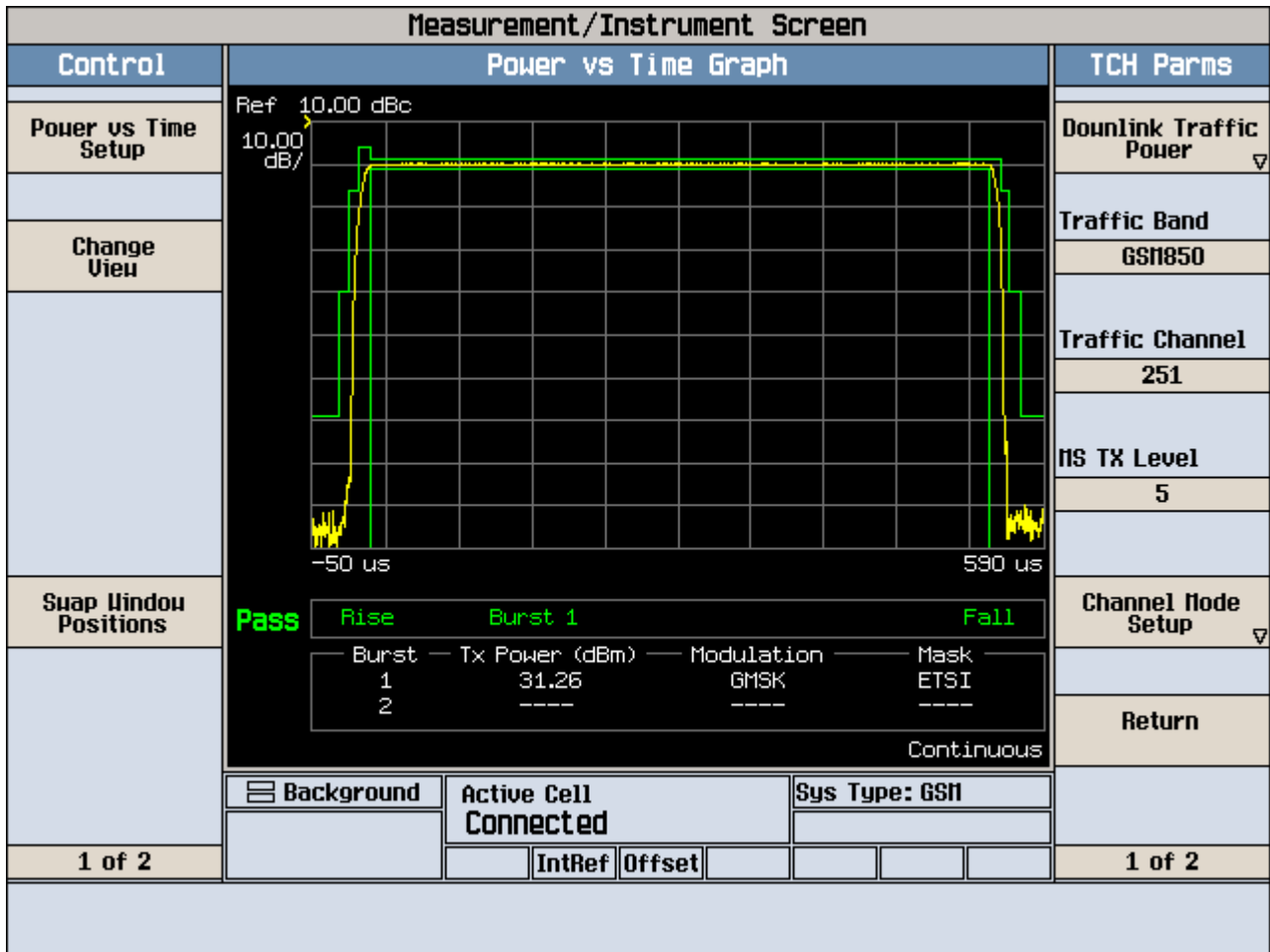
Measurement/Instrument Screen						
Control	GSM/GPRS Transmit Power				TCH Parms	
GSM/GPRS TX Power Setup ▾	GSM Transmit Power 31.22 dBm				Downlink Traffic Power ▾	
	Continuous				Traffic Band GSM850	
					Traffic Channel 128	
	Phase & Frequency Error				RIS TX Level 5	
		Peak Phase °	RMS Phase °	Frequency Hz		
	Minimum	1.00	0.38	-16.54		
	Maximum	1.82	0.52	-10.78		
	Average	1.32	0.46	-13.59		
	Pass/Fail	Pass	Pass	Pass		
	10 / 50 Continuous				Channel Mode Setup ▾	
Swap Window Positions					Return	
	Background	Active Cell Connected		Sys Type: GSM		
1 of 2		IntRef	Offset			1 of 2

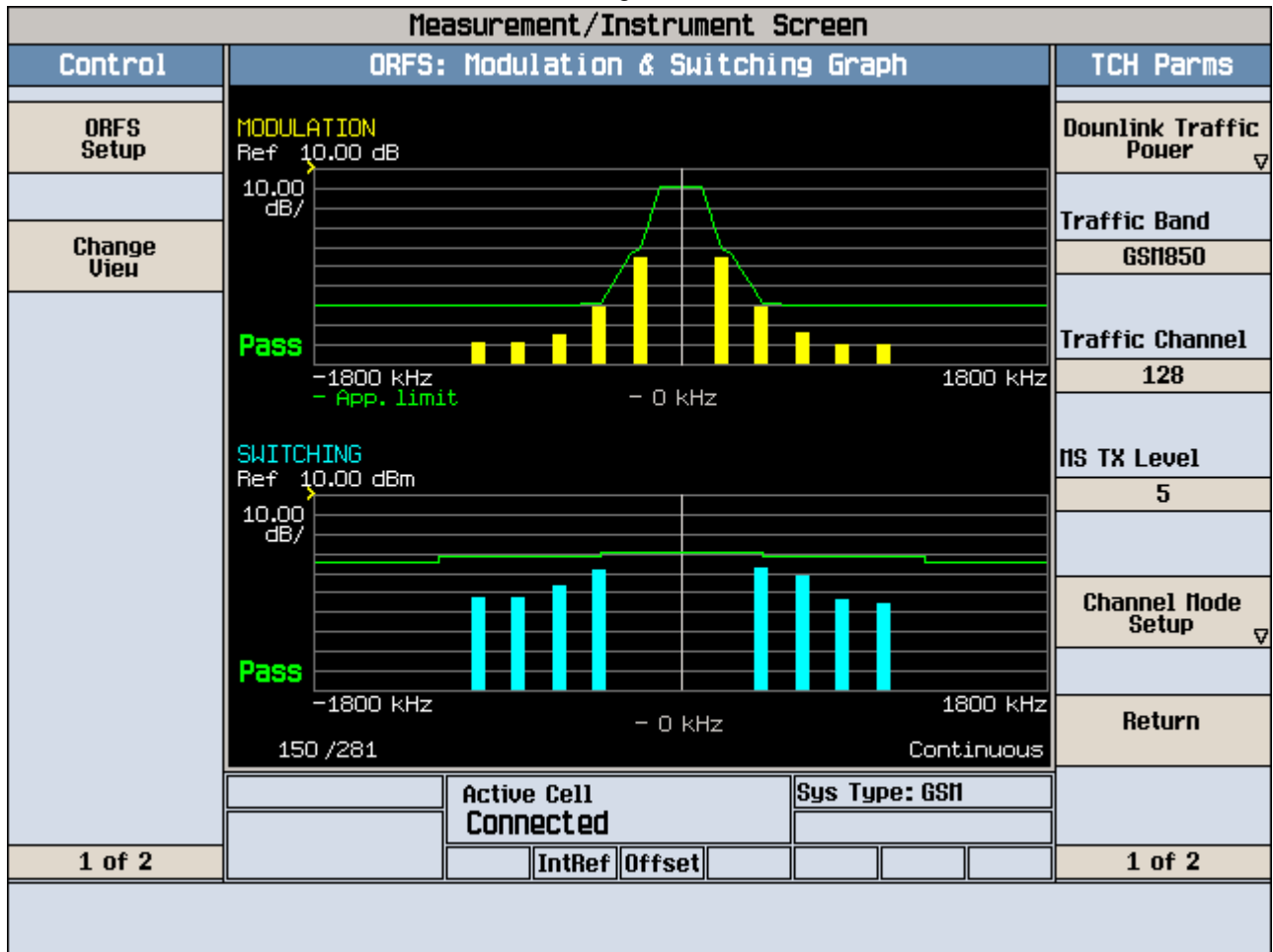
Measurement/Instrument Screen						
Control	GSM/GPRS Transmit Power				TCH Parms	
GSM/GPRS TX Power Setup ▾	GSM Transmit Power 31.28 dBm Continuous				Downlink Traffic Power ▾	
Swap Window Positions	Phase & Frequency Error				Traffic Band	
					GSM850	
					Traffic Channel	
					190	
					RIS TX Level	
				5		
				Channel Mode Setup ▾		
				Return		
0 / 50				Continuous		
Background		Active Cell Connected		Sys Type: GSM		
1 of 2		IntRef Offset		1 of 2		

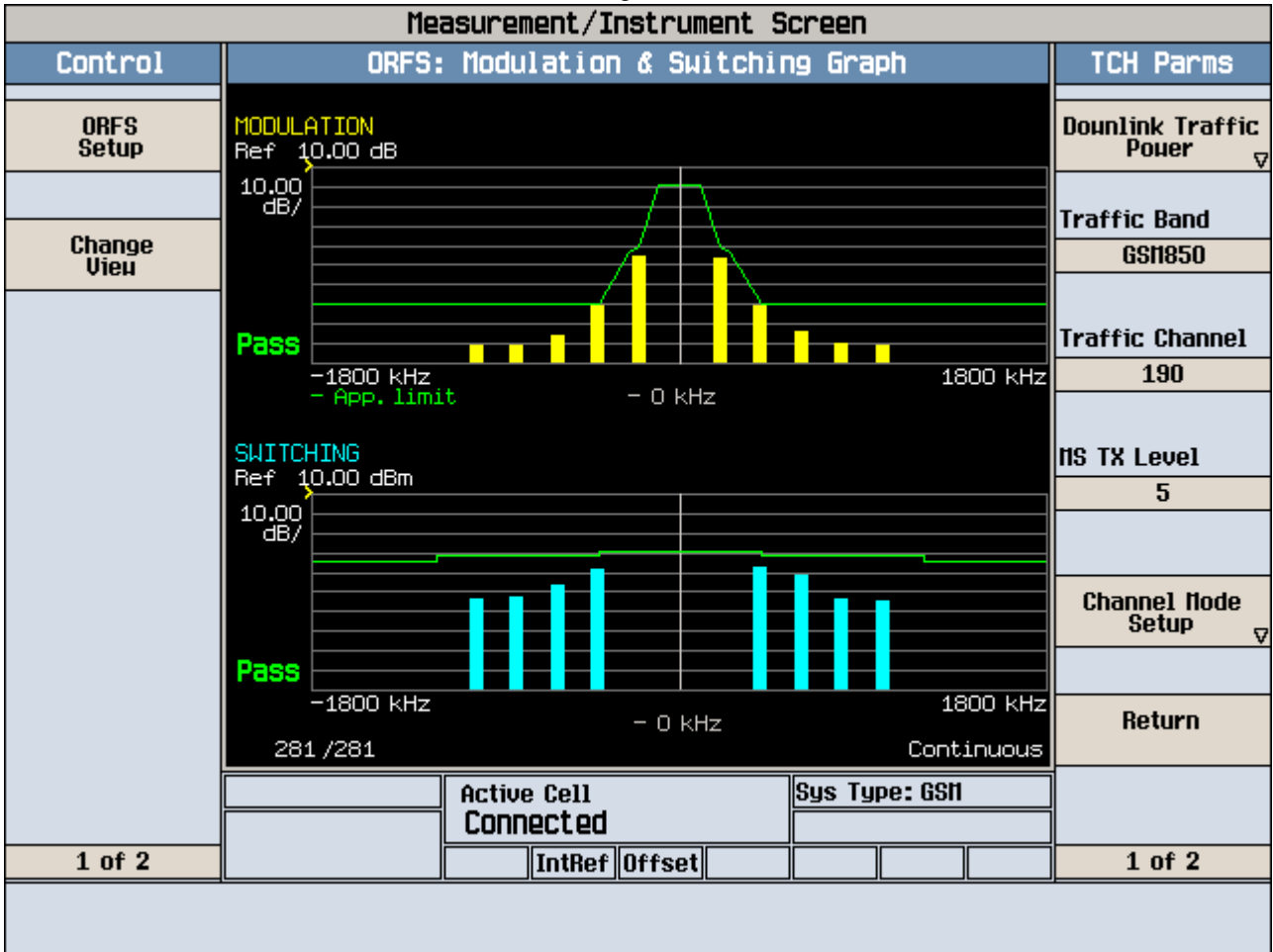
Measurement/Instrument Screen																													
Control		GSM/GPRS Transmit Power					TCH Parms																						
GSM/GPRS TX Power Setup ▾		<p style="text-align: center;">GMSK Transmit Power 31.26 dBm</p> <p style="text-align: right;">Continuous</p>					Downlink Traffic Power ▾																						
Swap Window Positions							Traffic Band			GSM850																			
		Traffic Channel			251																								
		RMS TX Level			5																								
		Channel Mode Setup ▾			Return																								
1 of 2		<p style="text-align: center;">Phase & Frequency Error</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th></th> <th>Peak Phase °</th> <th>RMS Phase °</th> <th>Frequency Hz</th> </tr> </thead> <tbody> <tr> <td>Minimum</td> <td style="text-align: center;">1.11</td> <td style="text-align: center;">0.40</td> <td style="text-align: center;">-18.66</td> </tr> <tr> <td>Maximum</td> <td style="text-align: center;">1.76</td> <td style="text-align: center;">0.55</td> <td style="text-align: center;">-12.52</td> </tr> <tr> <td>Average</td> <td style="text-align: center;">1.43</td> <td style="text-align: center;">0.49</td> <td style="text-align: center;">-15.82</td> </tr> <tr> <td>Pass/Fail</td> <td style="text-align: center;">Pass</td> <td style="text-align: center;">Pass</td> <td style="text-align: center;">Pass</td> </tr> </tbody> </table> <p style="text-align: right;">Continuous</p>						Peak Phase °	RMS Phase °	Frequency Hz	Minimum	1.11	0.40	-18.66	Maximum	1.76	0.55	-12.52	Average	1.43	0.49	-15.82	Pass/Fail	Pass	Pass	Pass	50 / 50		
	Peak Phase °	RMS Phase °	Frequency Hz																										
Minimum	1.11	0.40	-18.66																										
Maximum	1.76	0.55	-12.52																										
Average	1.43	0.49	-15.82																										
Pass/Fail	Pass	Pass	Pass																										
		<input type="checkbox"/> Background		Active Cell Connected			Sys Type: GSM																						
				IntRef	Offset																								
									1 of 2																				

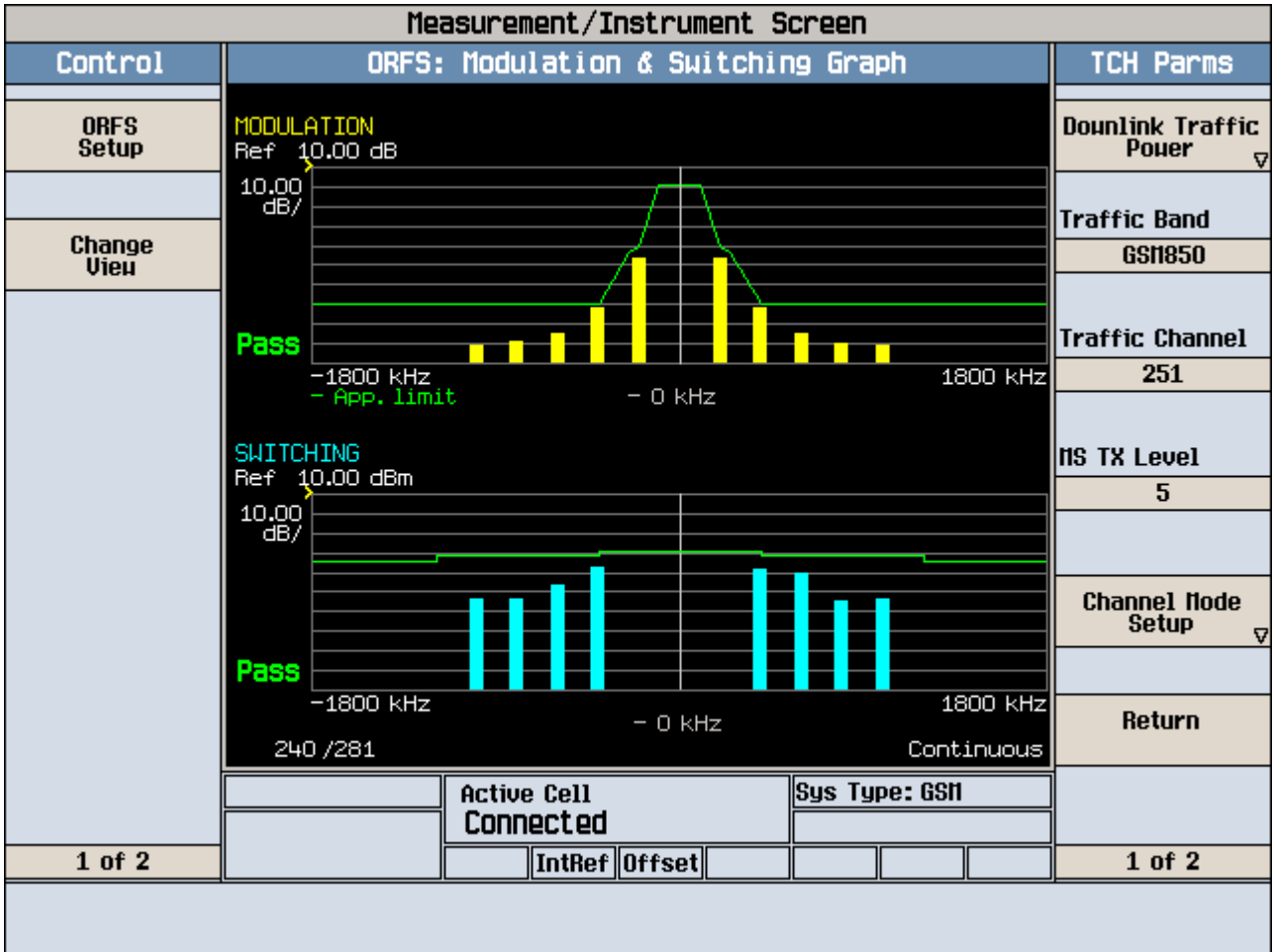








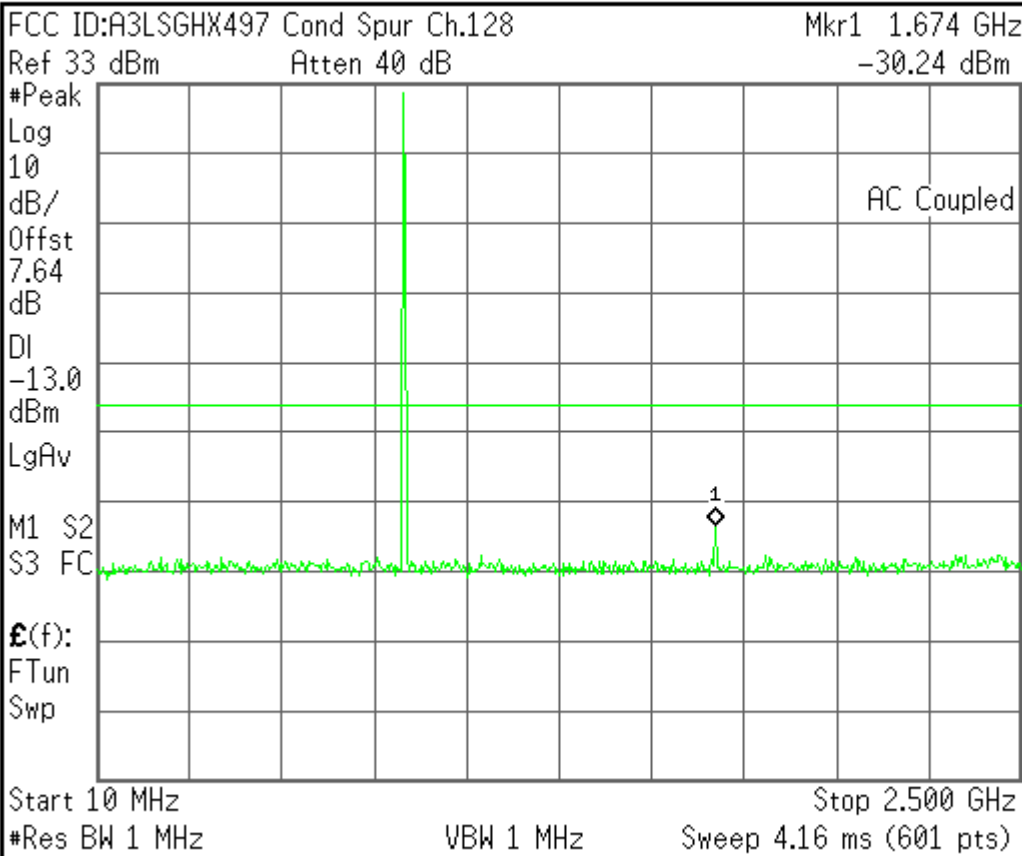




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Freq/Channel



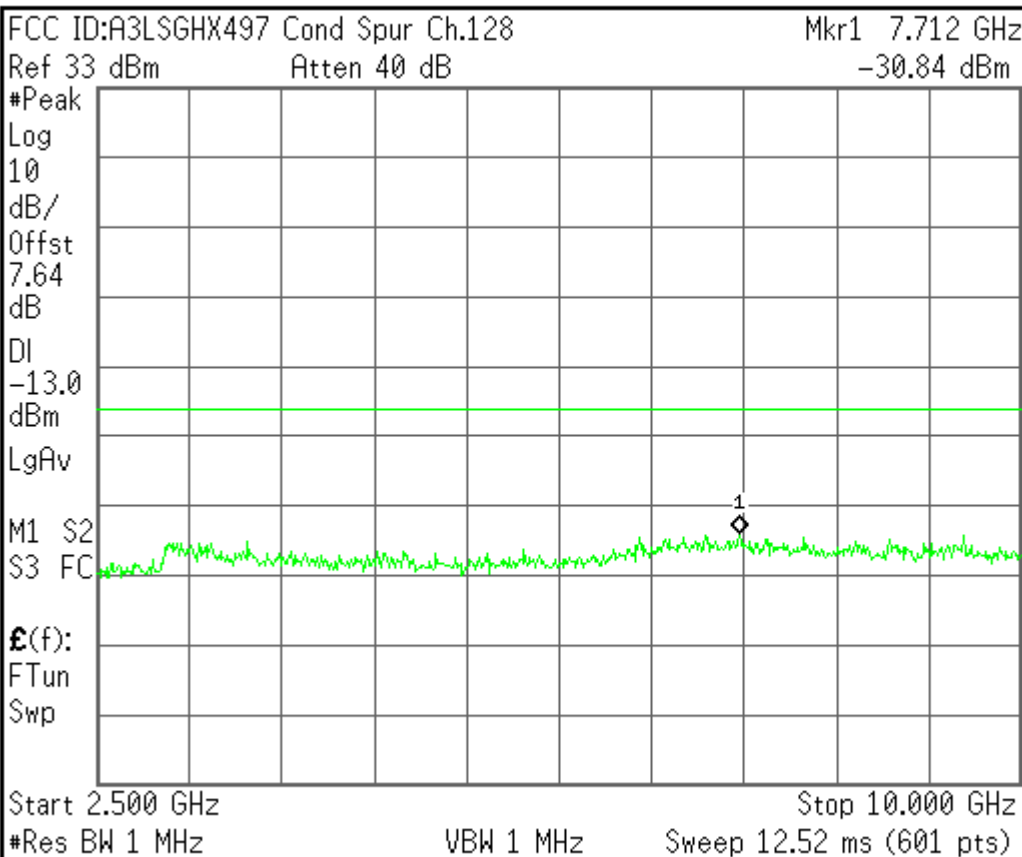
Center Freq 1.25500000 GHz
Start Freq 10.0000000 MHz
Stop Freq 2.50000000 GHz
CF Step 249.000000 MHz Auto Man
Freq Offset 0.00000000 Hz
Signal Track On Off

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Freq/Channel



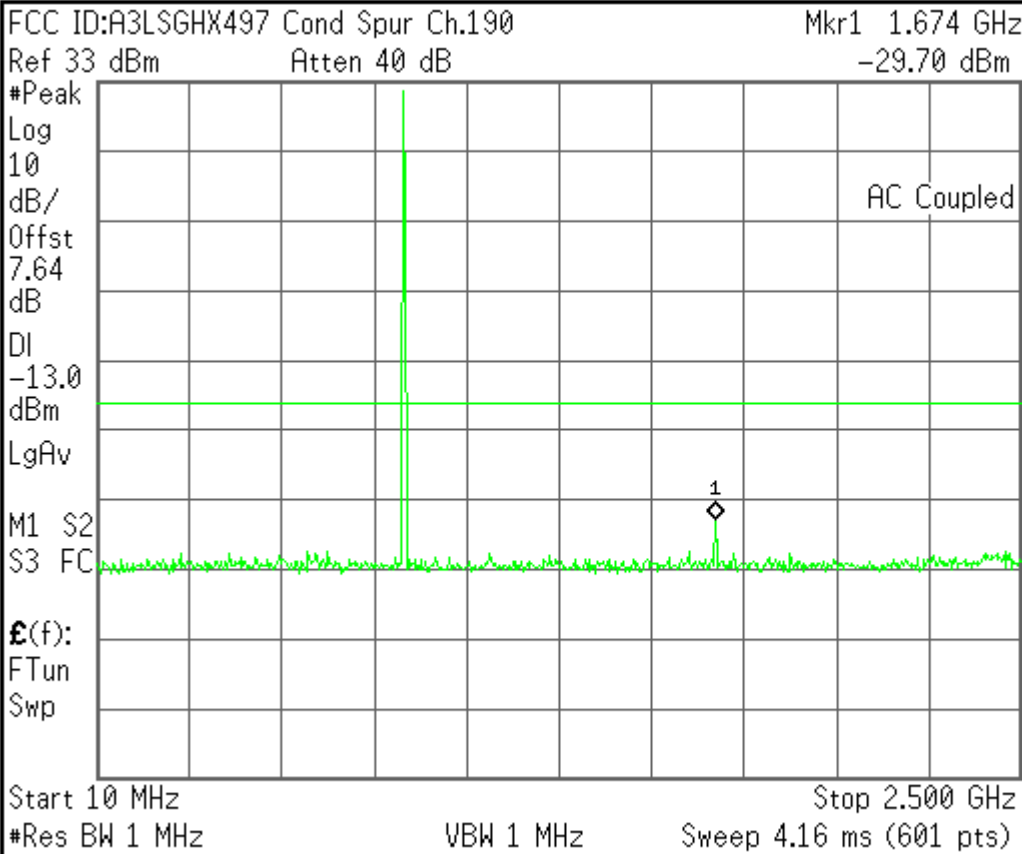
Center Freq 6.25000000 GHz
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Stop Freq 10.0000000 GHz
CF Step 750.000000 MHz Auto Man
Freq Offset 0.00000000 Hz
Signal Track On Off

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Freq/Channel



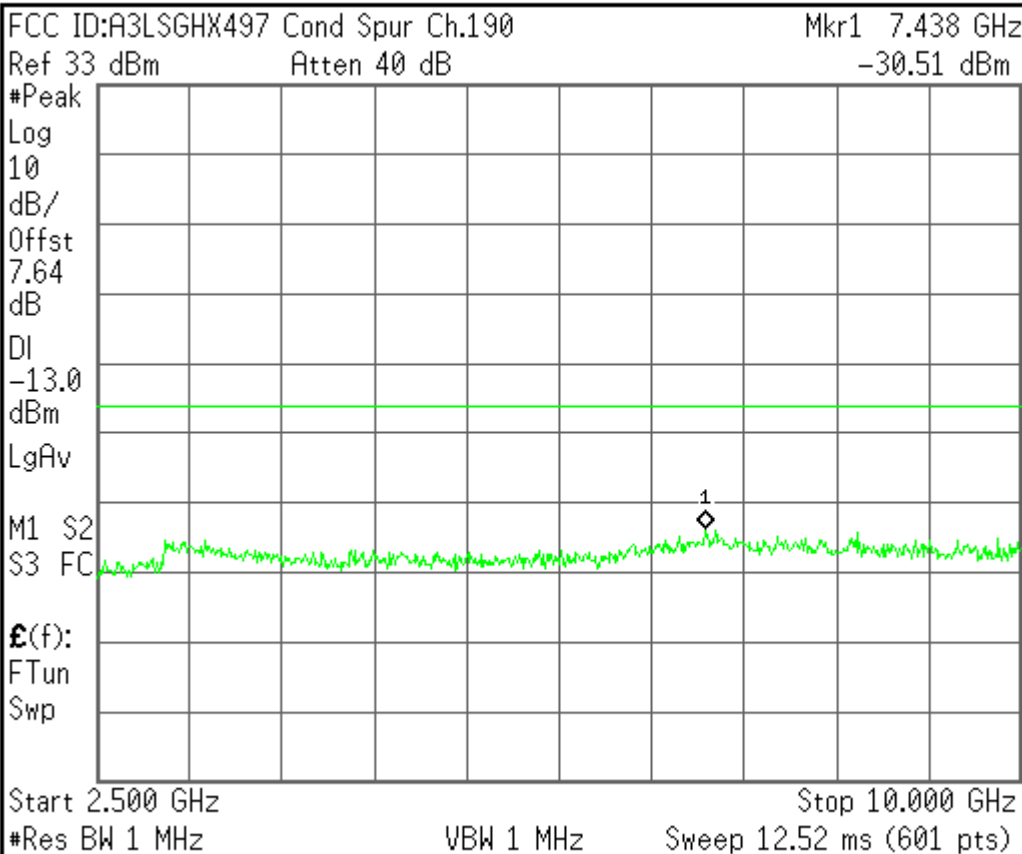
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Stop Freq 2.50000000 GHz
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Freq Offset 0.00000000 Hz
Signal Track On Off

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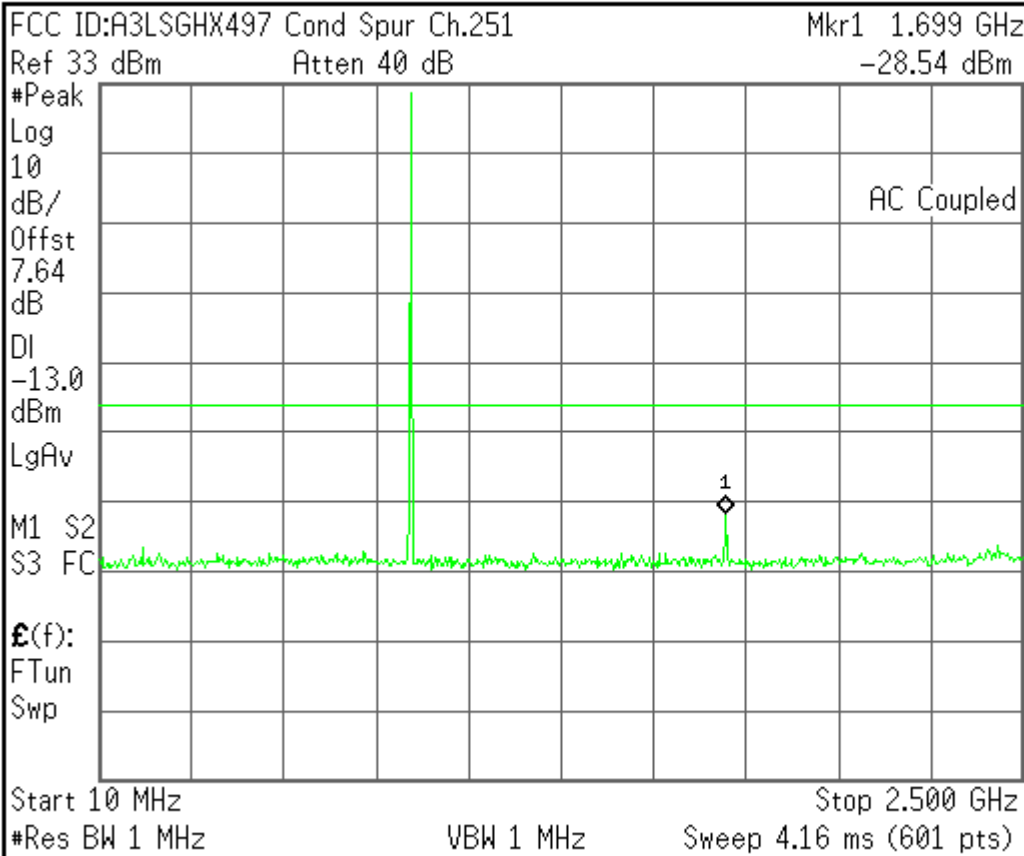
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Freq/Channel



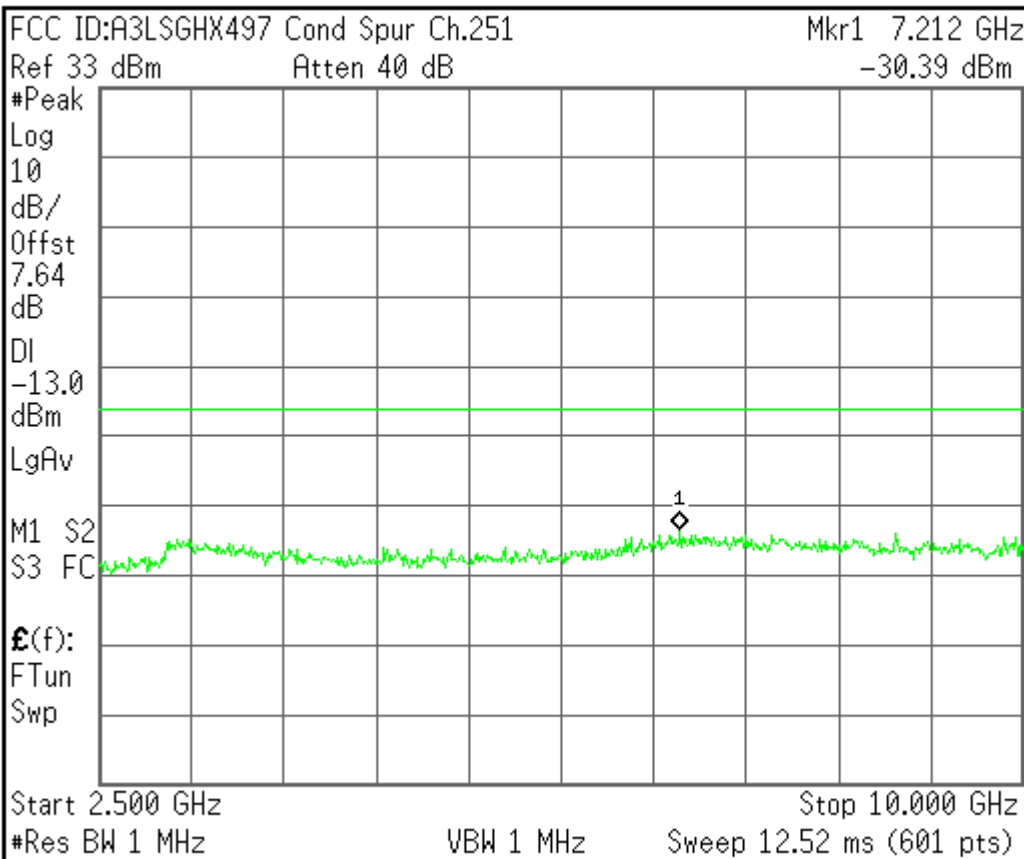
Center Freq 6.25000000 GHz
Start Freq 2.50000000 GHz
Stop Freq 10.0000000 GHz
CF Step 750.000000 MHz Auto Man
Freq Offset 0.00000000 Hz
Signal Track On Off

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Center Freq 1.25500000 GHz
Start Freq 10.0000000 MHz
Stop Freq 2.50000000 GHz
CF Step 249.000000 MHz Auto Man
Freq Offset 0.00000000 Hz
Signal Track On Off

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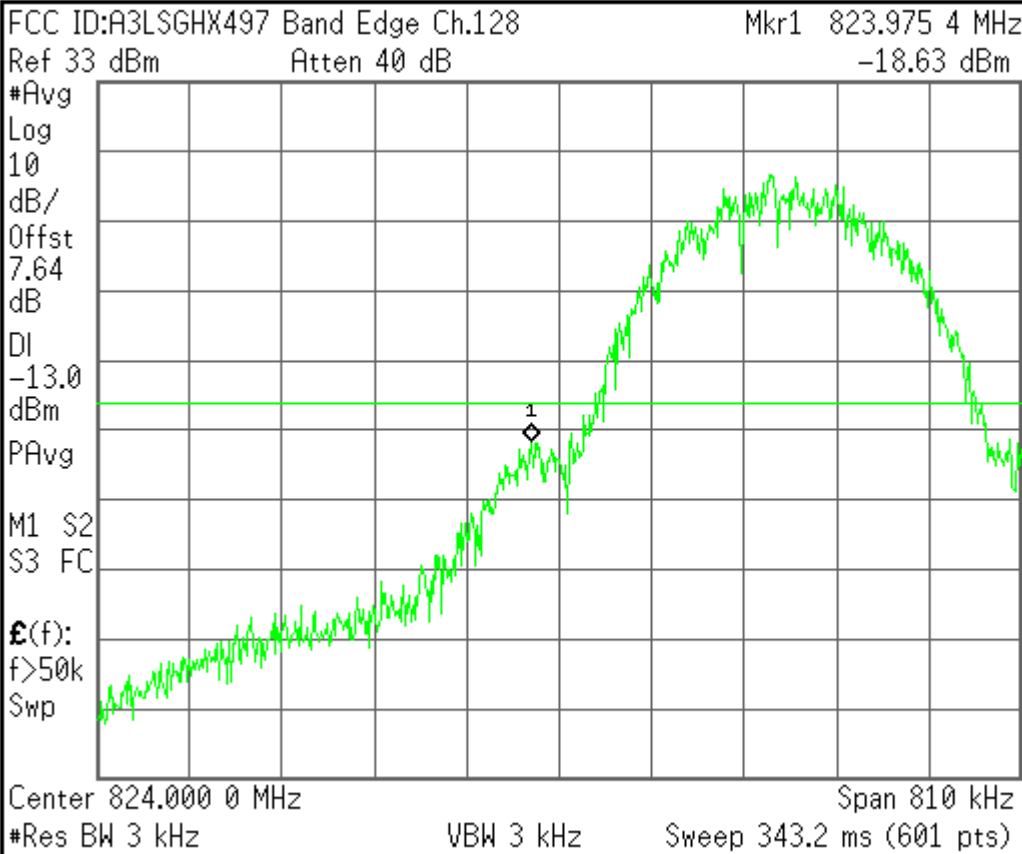
Center Freq 6.25000000 GHz
Start Freq 2.50000000 GHz
Stop Freq 10.0000000 GHz
CF Step 750.000000 MHz Auto Man
Freq Offset 0.00000000 Hz
Signal Track On Off

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Freq/Channel



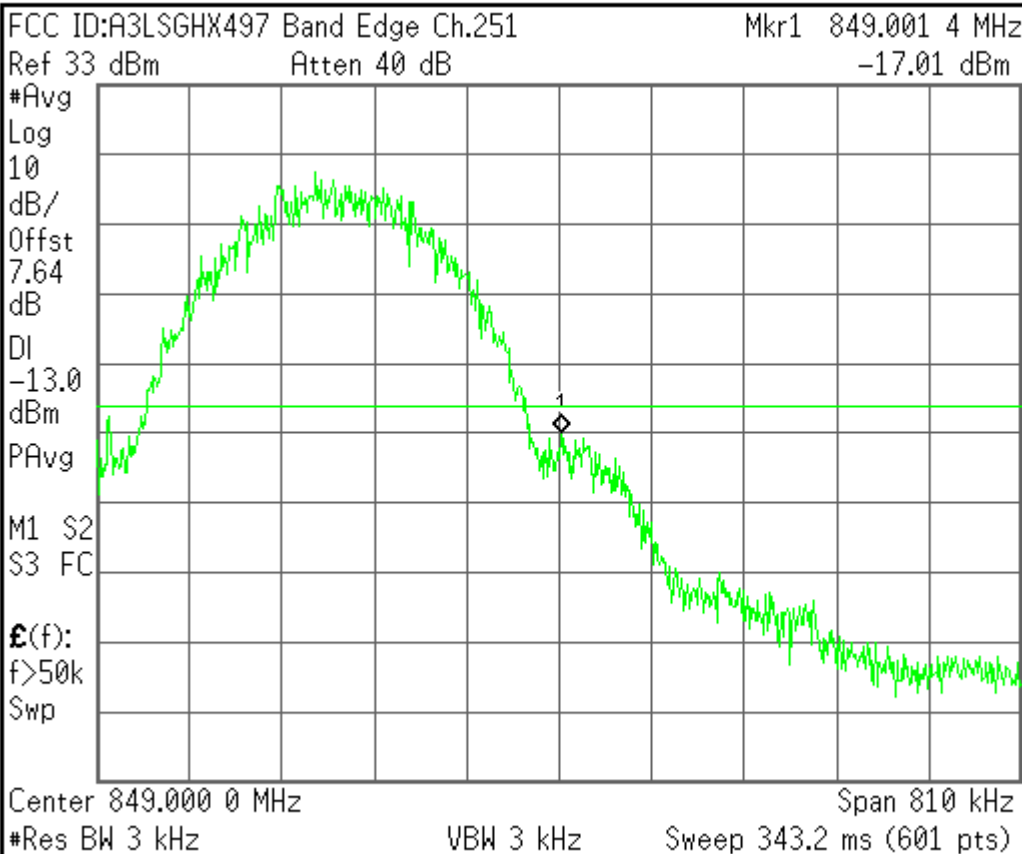
Center Freq 824.000000 MHz
Start Freq 823.595000 MHz
Stop Freq 824.405000 MHz
CF Step 81.0000000 kHz Auto Man
Freq Offset 0.00000000 Hz
Signal Track On Off

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Freq/Channel



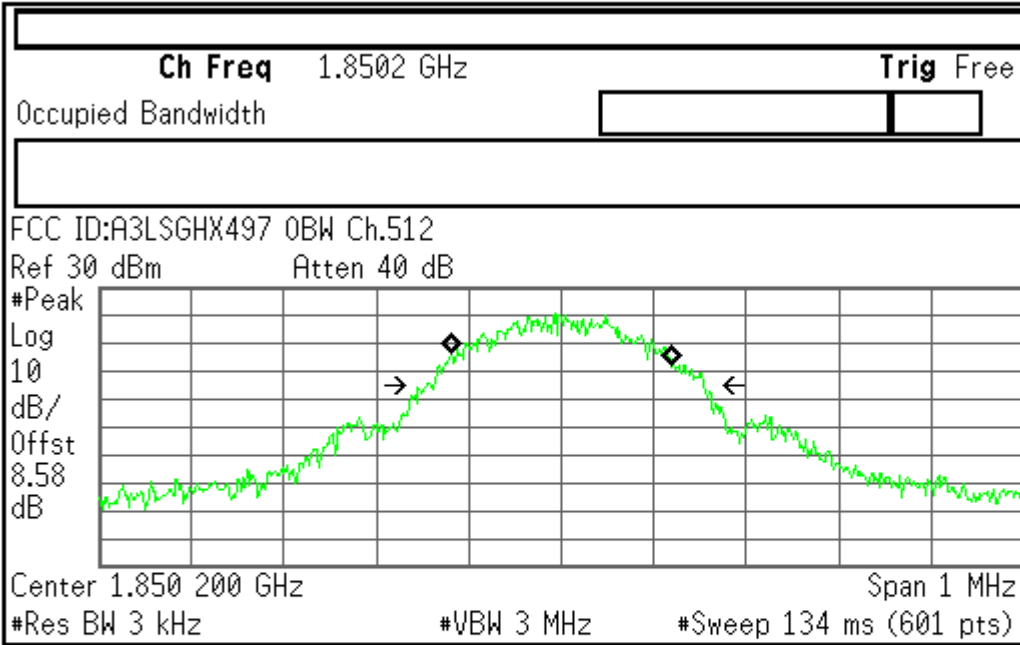
Center Freq 849.000000 MHz
Start Freq 848.595000 MHz
Stop Freq 849.405000 MHz
CF Step 81.0000000 kHz Auto Man
Freq Offset 0.00000000 Hz
Signal Track On Off

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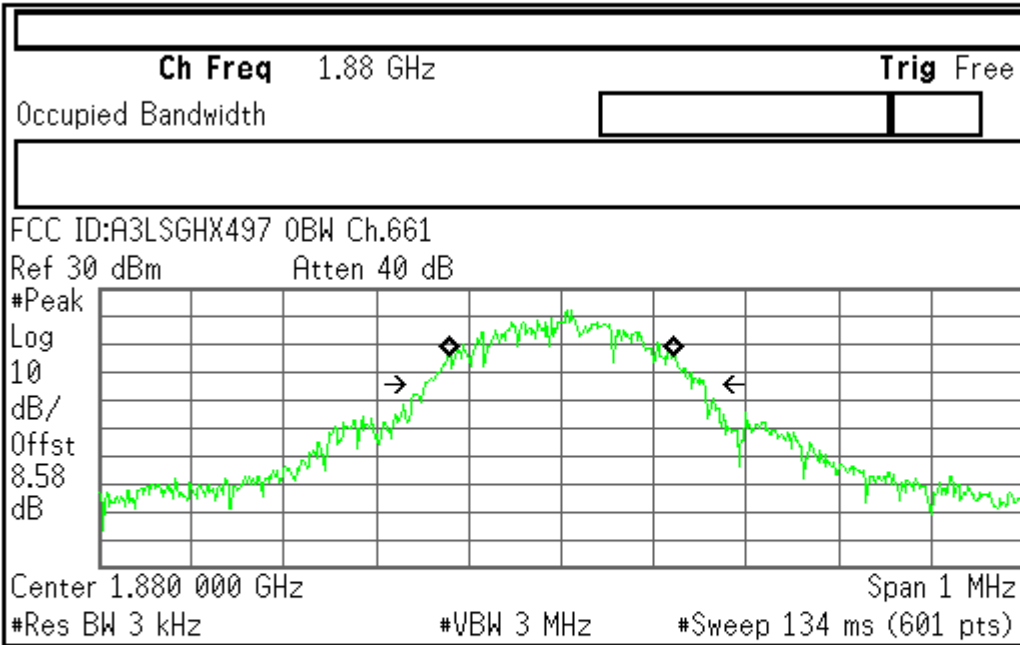
Freq/Channel
Center Freq 1.85020000 GHz
Start Freq 1.84970000 GHz
Stop Freq 1.85070000 GHz
CF Step 100.000000 kHz Auto Man
Freq Offset 0.00000000 Hz
Signal Track On Off

Occupied Bandwidth 242.0556 kHz	Occ BW % Pwr 99.00 %
Transmit Freq Error 252.480 Hz	x dB -26.00 dB
x dB Bandwidth 303.182 kHz	

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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

Occupied Bandwidth 246.9574 kHz	Occ BW % Pwr 99.00 %
Transmit Freq Error 72.323 Hz	x dB -26.00 dB
x dB Bandwidth 304.465 kHz	

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Ch Freq 1.9098 GHz Trig Free
 Occupied Bandwidth

Center Freq
1.90980000 GHz

Start Freq
1.90930000 GHz

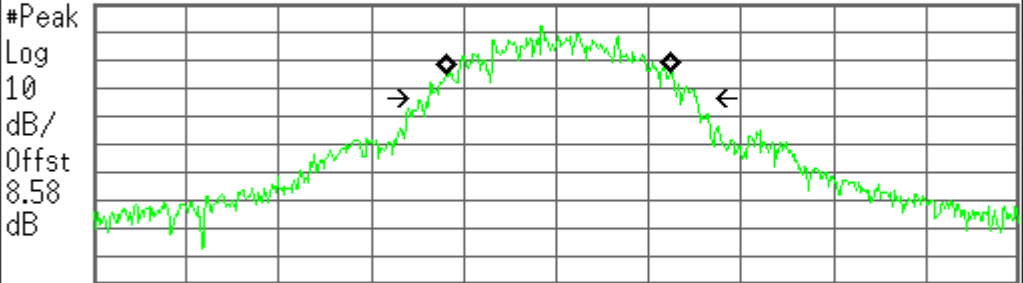
Stop Freq
1.91030000 GHz

CF Step
100.000000 kHz
Auto Man

Freq Offset
0.00000000 Hz

Signal Track
On Off

FCC ID:A3LSGHX497 0BW Ch.810
 Ref 30 dBm Atten 40 dB

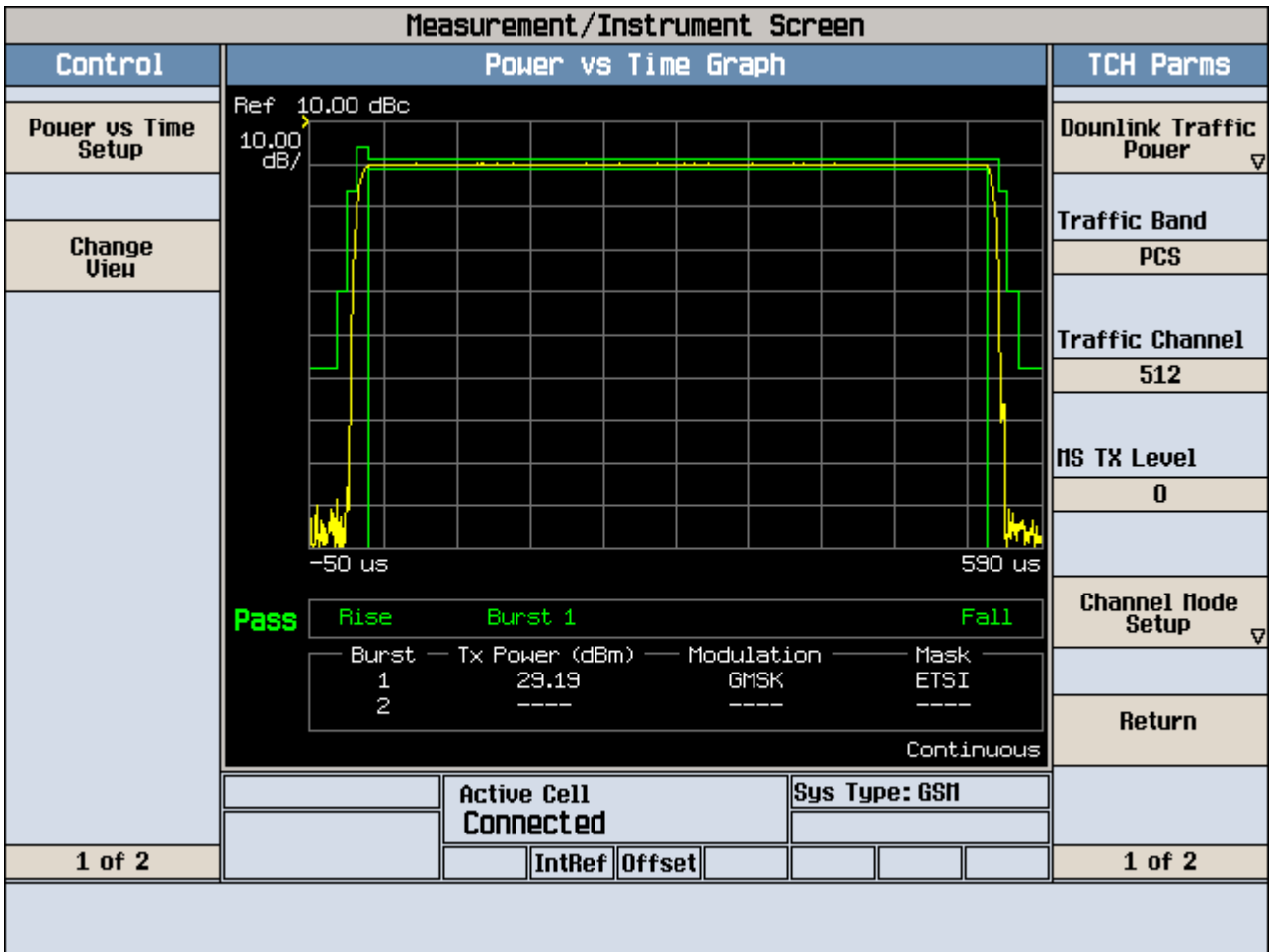


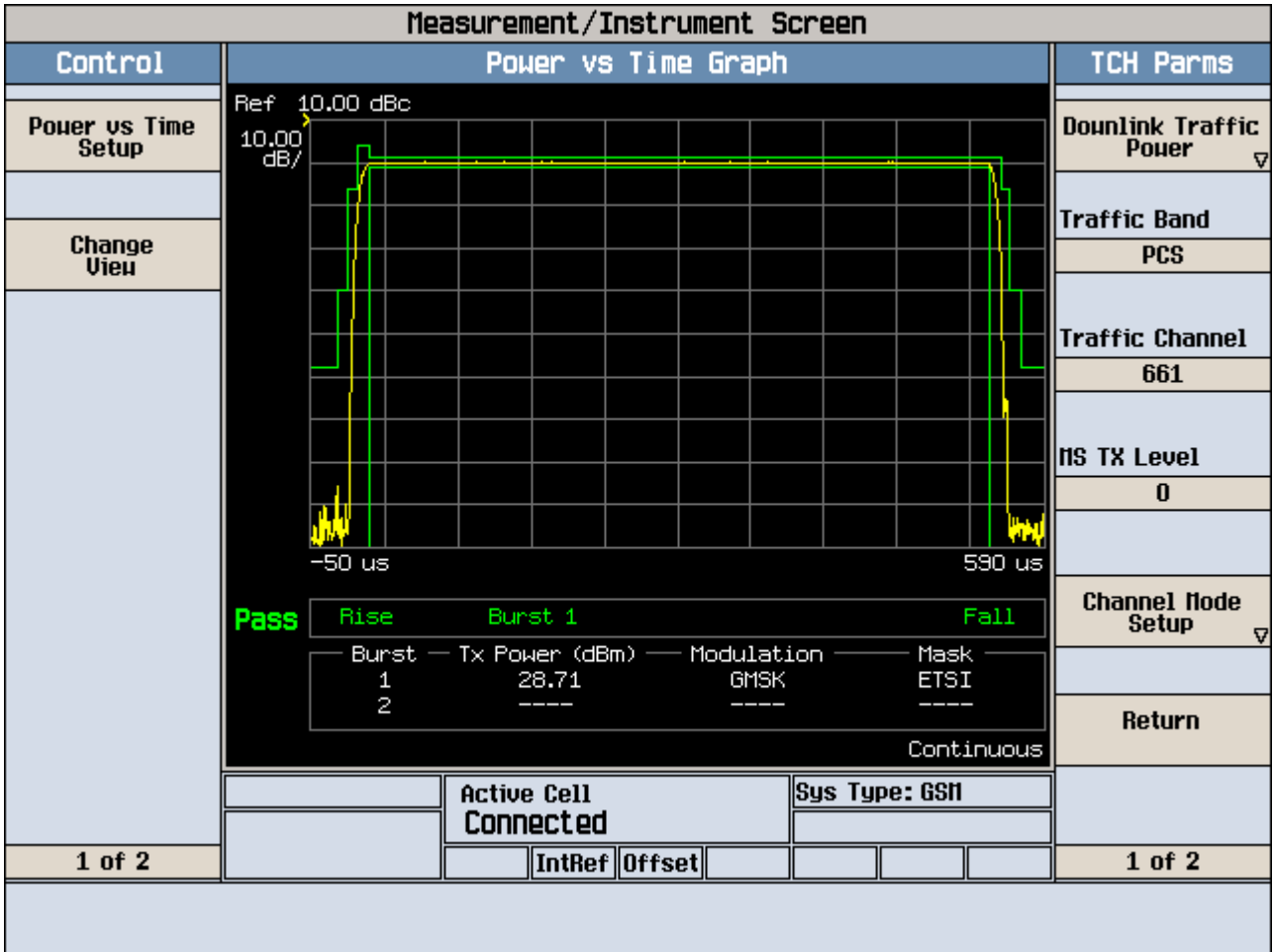
Center 1.909 800 GHz Span 1 MHz
 #Res BW 3 kHz #VBW 3 MHz #Sweep 134 ms (601 pts)

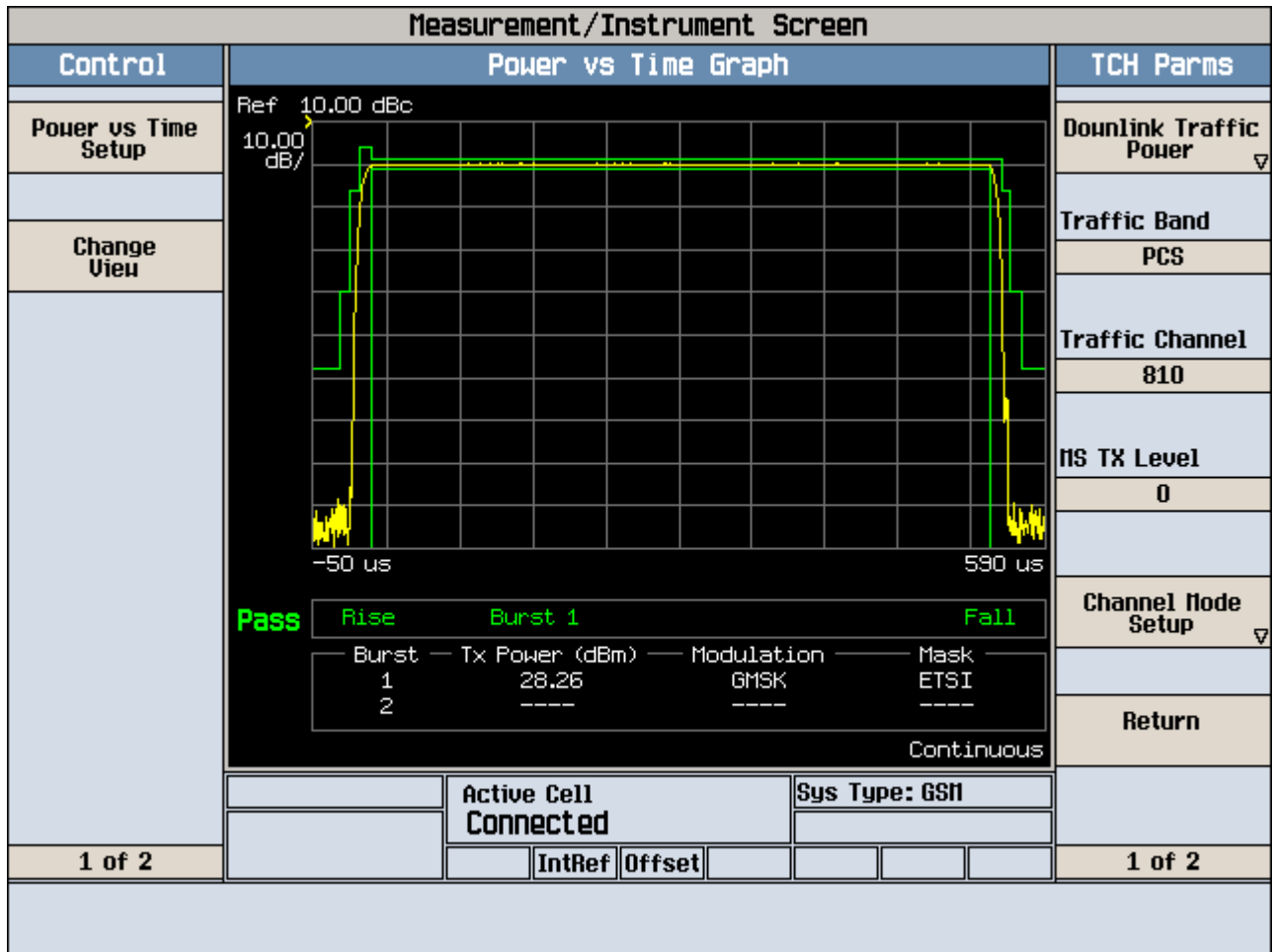
Occupied Bandwidth	Occ BW % Pwr	99.00 %
246.5765 kHz	x dB	-26.00 dB
Transmit Freq Error		2.192 kHz
x dB Bandwidth		293.897 kHz

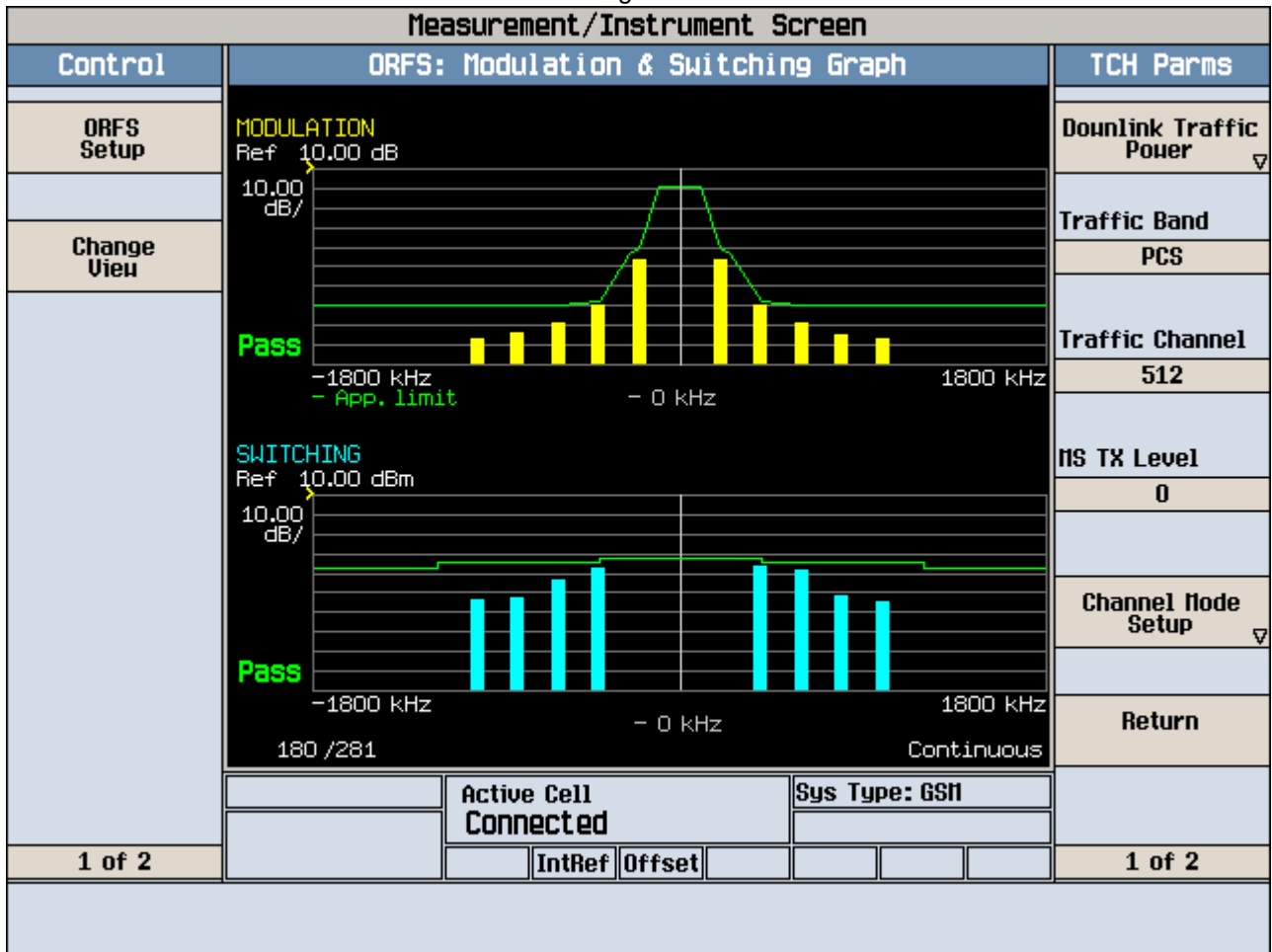
Measurement/Instrument Screen																													
Control		GSM/GPRS Transmit Power					TCH Parms																						
GSM/GPRS TX Power Setup ▾		<p style="text-align: center;">GMSK Transmit Power 28.84 dBm</p> <p style="text-align: right;">Continuous</p>					Downlink Traffic Power ▾																						
Swap Window Positions							Traffic Band			PCS																			
		Traffic Channel			661																								
		RIS TX Level			0																								
		Channel Mode Setup ▾			Return																								
1 of 2		<p style="text-align: center;">Phase & Frequency Error</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th></th> <th>Peak Phase °</th> <th>RMS Phase °</th> <th>Frequency Hz</th> </tr> </thead> <tbody> <tr> <td>Minimum</td> <td style="text-align: center;">1.86</td> <td style="text-align: center;">0.73</td> <td style="text-align: center;">3.90</td> </tr> <tr> <td>Maximum</td> <td style="text-align: center;">4.41</td> <td style="text-align: center;">1.13</td> <td style="text-align: center;">13.19</td> </tr> <tr> <td>Average</td> <td style="text-align: center;">2.66</td> <td style="text-align: center;">0.91</td> <td style="text-align: center;">9.67</td> </tr> <tr> <td>Pass/Fail</td> <td style="text-align: center;">Pass</td> <td style="text-align: center;">Pass</td> <td style="text-align: center;">Pass</td> </tr> </tbody> </table> <p style="text-align: right;">Continuous</p>						Peak Phase °	RMS Phase °	Frequency Hz	Minimum	1.86	0.73	3.90	Maximum	4.41	1.13	13.19	Average	2.66	0.91	9.67	Pass/Fail	Pass	Pass	Pass	10 / 50		
	Peak Phase °	RMS Phase °	Frequency Hz																										
Minimum	1.86	0.73	3.90																										
Maximum	4.41	1.13	13.19																										
Average	2.66	0.91	9.67																										
Pass/Fail	Pass	Pass	Pass																										
		Active Cell Connected			Sys Type: GSM																								
		IntRef			Offset																								
1 of 2										1 of 2																			

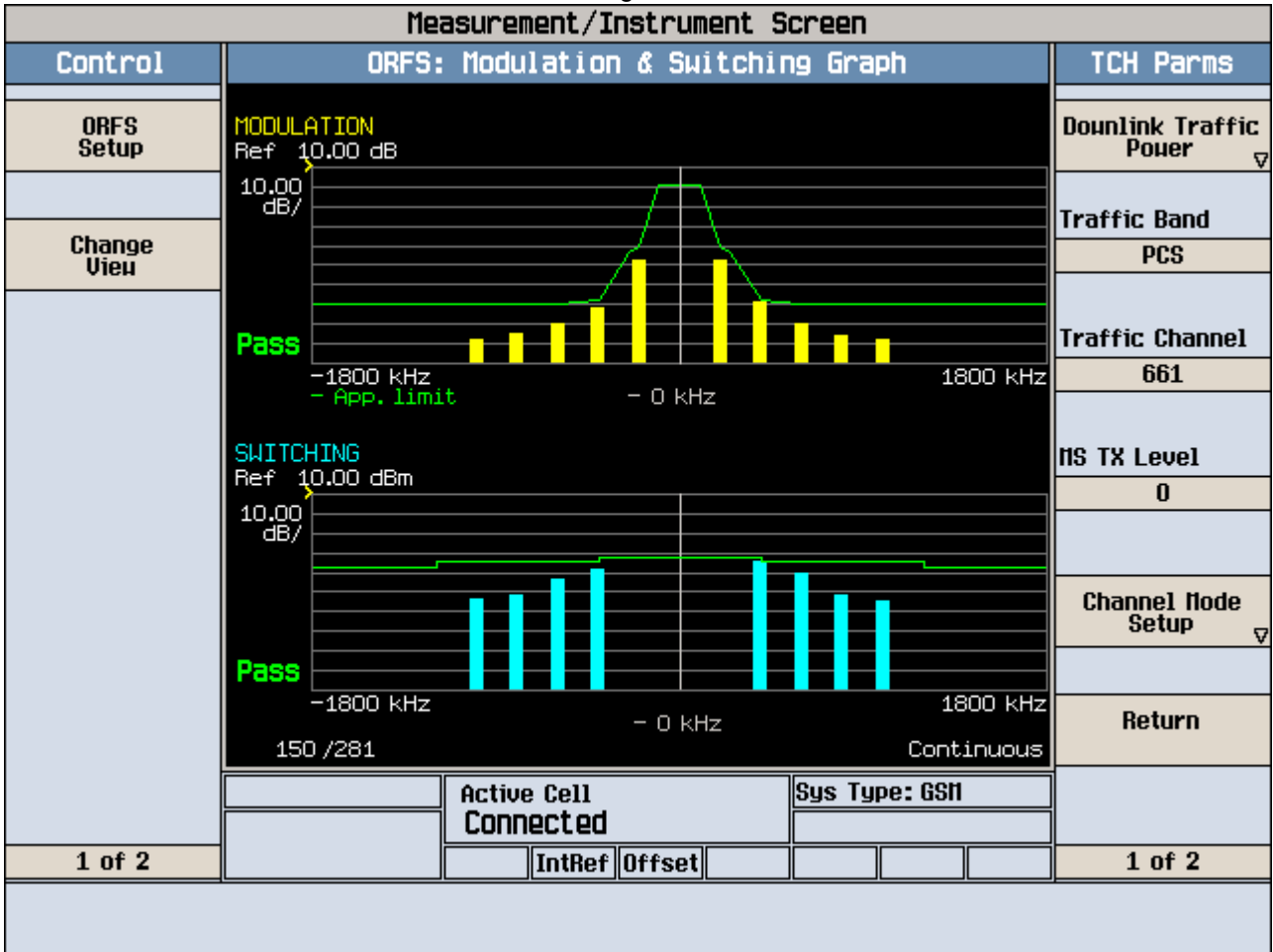
Measurement/Instrument Screen						
Control	GSM/GPRS Transmit Power				TCH Parms	
GSM/GPRS TX Power Setup ▾	GSM Transmit Power 28.83 dBm Continuous				Downlink Traffic Power ▾	
Swap Window Positions	Phase & Frequency Error				Traffic Band	
					PCS	
					Traffic Channel	
					810	
					RIS TX Level	
				0		
				Channel Mode Setup ▾		
				Return		
				50 / 50 Continuous		
Background		Active Cell Connected		Sys Type: GSM		
1 of 2		IntRef	Offset			1 of 2

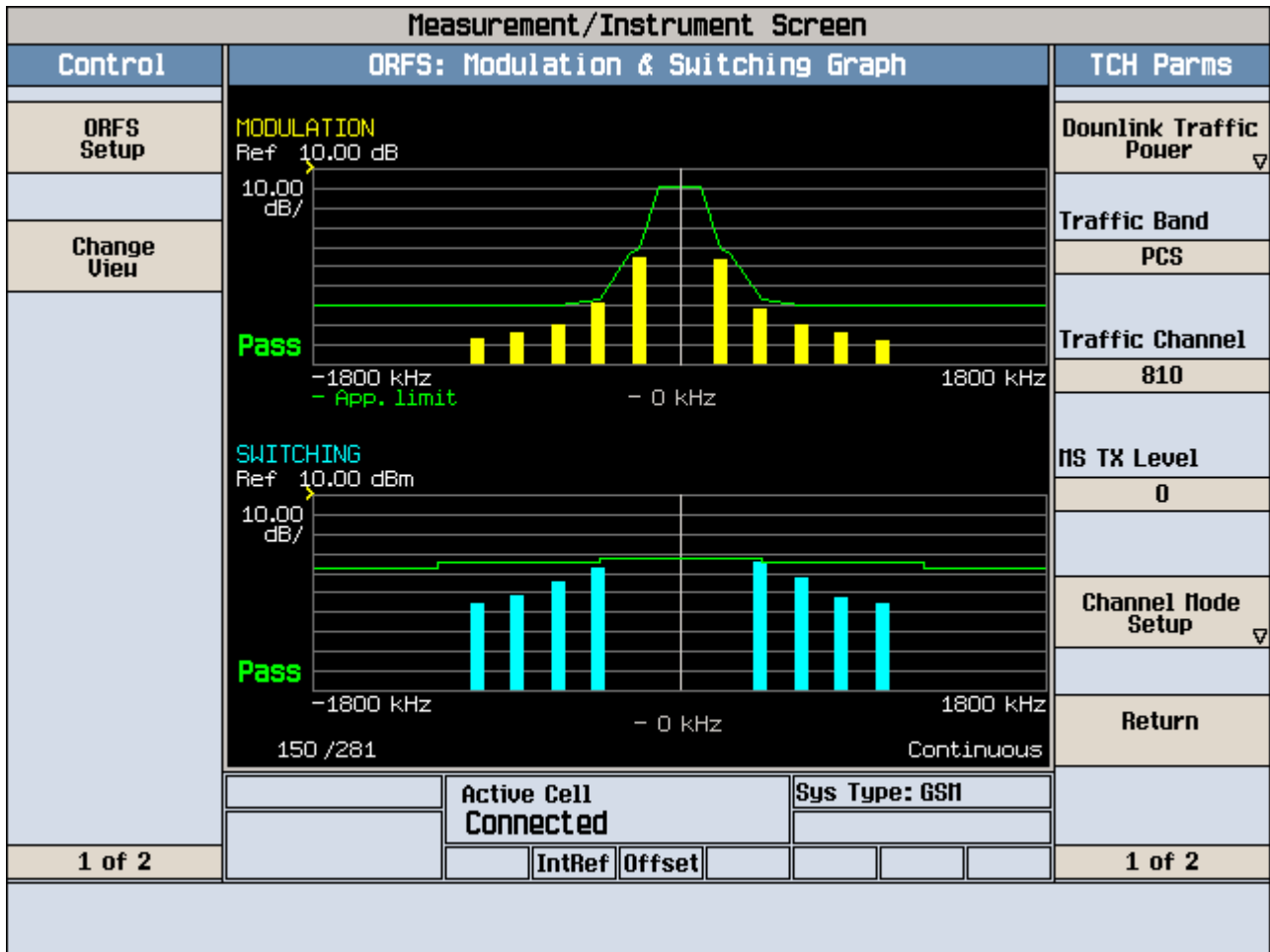


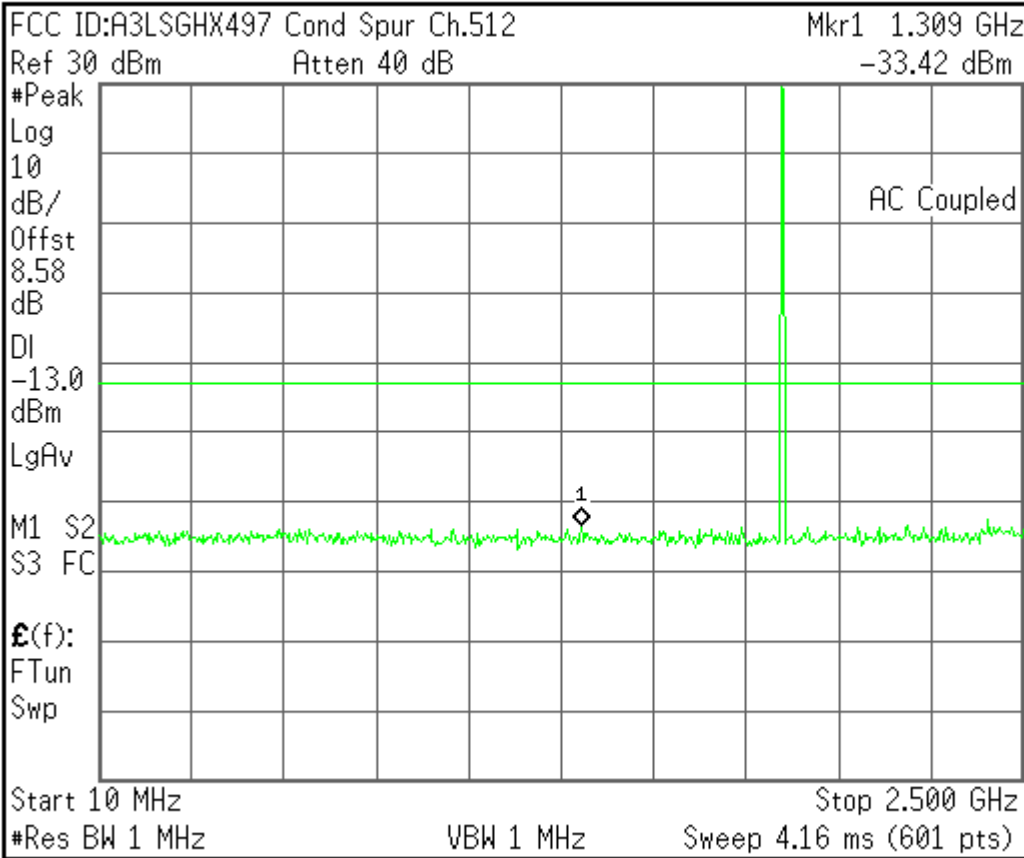






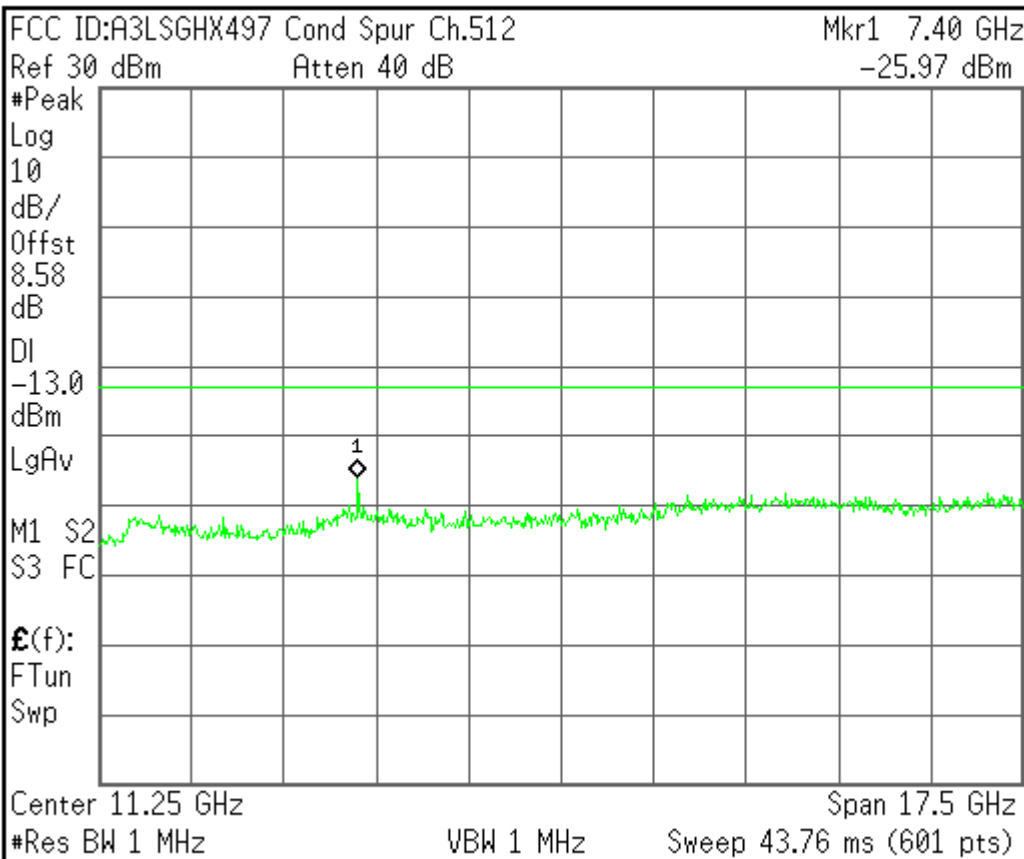






Freq/Channel	
Center Freq	1.25500000 GHz
Start Freq	10.0000000 MHz
Stop Freq	2.50000000 GHz
CF Step	249.000000 MHz Auto Man
Freq Offset	0.00000000 Hz
Signal Track	On Off

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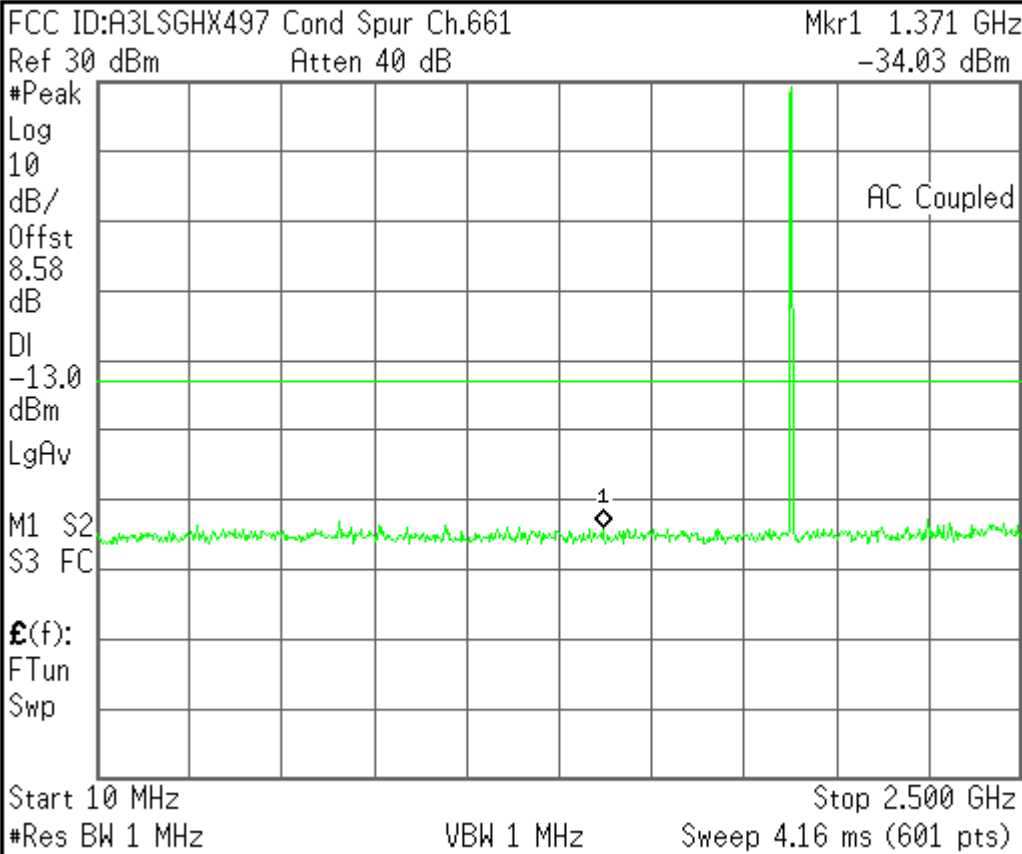
Freq/Channel	
Center Freq	11.2500000 GHz
Start Freq	2.50000000 GHz
Stop Freq	20.0000000 GHz
CF Step	1.75000000 GHz Auto Man
Freq Offset	0.00000000 Hz
Signal Track	On Off

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L

Freq/Channel



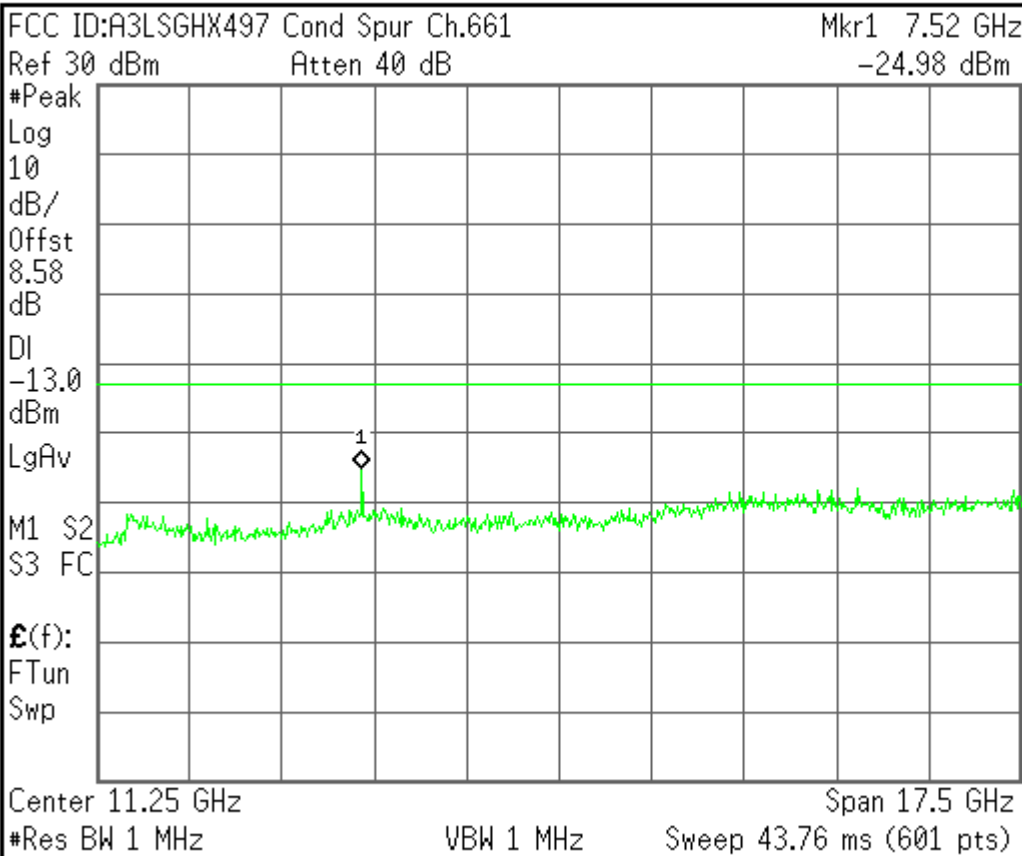
Center Freq 1.25500000 GHz
Start Freq 10.0000000 MHz
Stop Freq 2.50000000 GHz
CF Step 249.000000 MHz Auto Man
Freq Offset 0.00000000 Hz
Signal Track On Off

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L

Freq/Channel



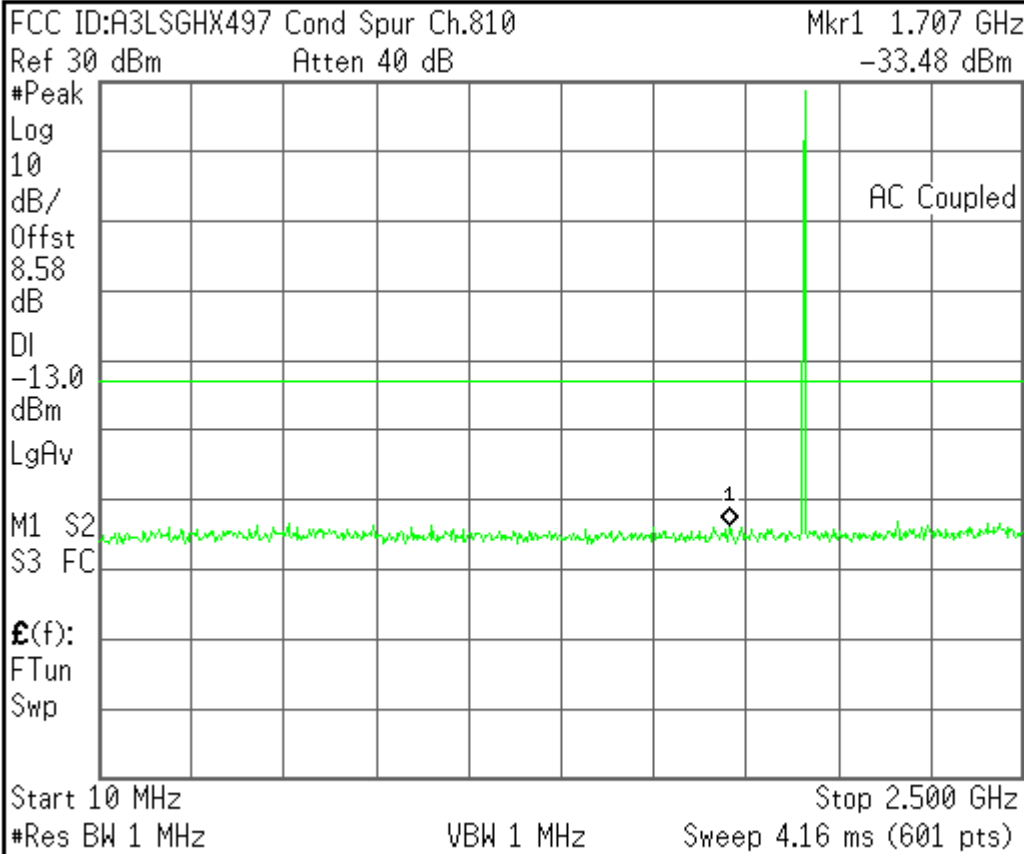
Center Freq 11.2500000 GHz
Start Freq 2.50000000 GHz
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CF Step 1.75000000 GHz Auto Man
Freq Offset 0.00000000 Hz
Signal Track On Off

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L

Freq/Channel



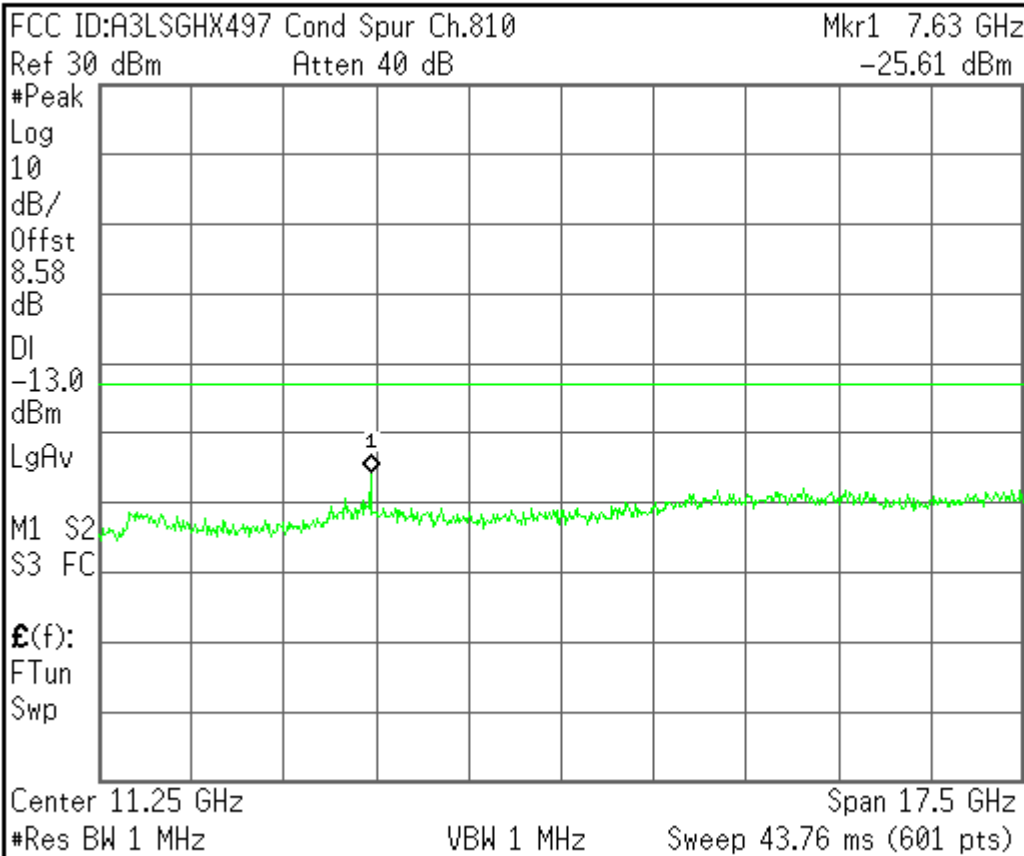
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CF Step 249.000000 MHz Auto Man
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Signal Track On Off

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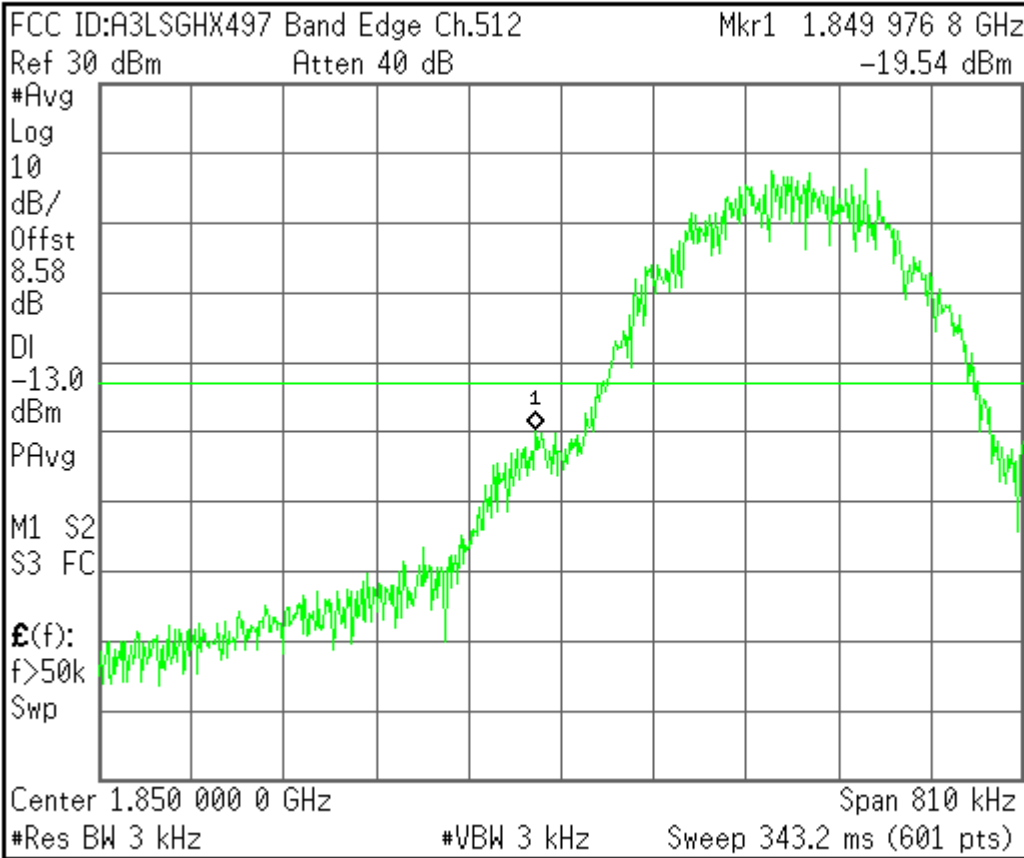
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Freq/Channel



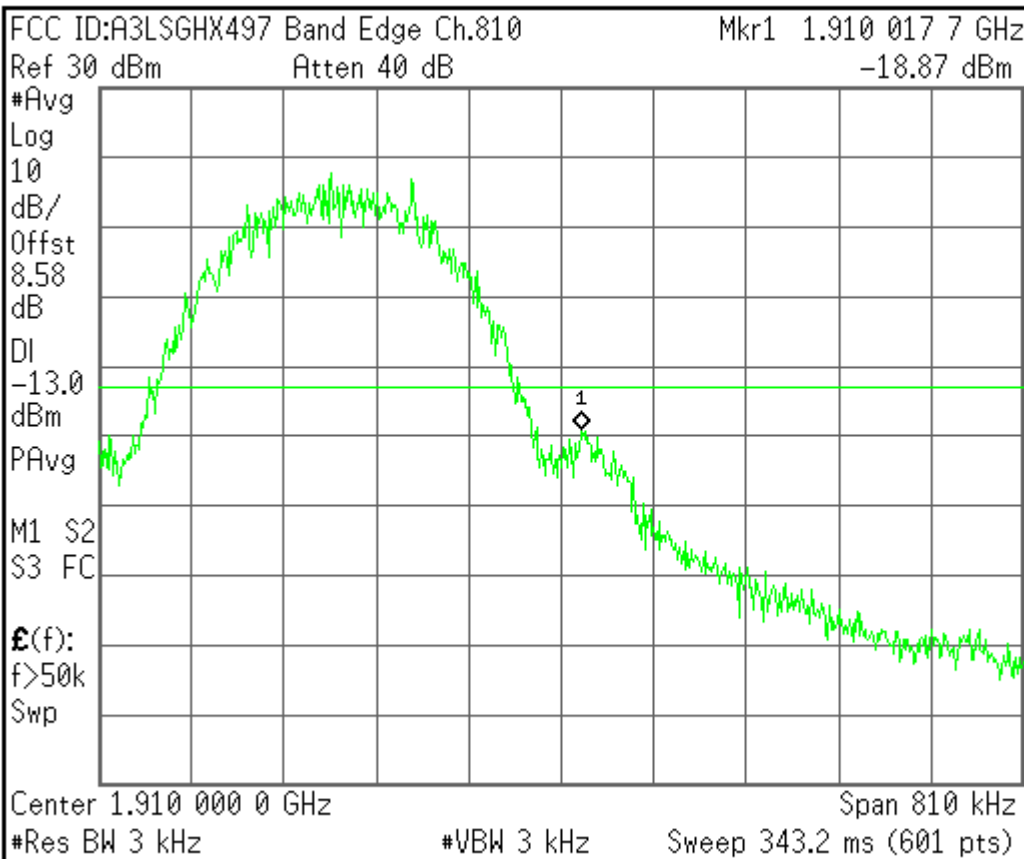
Center Freq 11.2500000 GHz
Start Freq 2.50000000 GHz
Stop Freq 20.0000000 GHz
CF Step 1.75000000 GHz Auto Man
Freq Offset 0.00000000 Hz
Signal Track On Off

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Freq/Channel
Center Freq 1.85000000 GHz
Start Freq 1.84959500 GHz
Stop Freq 1.85040500 GHz
CF Step 81.00000000 kHz Auto Man
Freq Offset 0.00000000 Hz
Signal Track On Off

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Freq/Channel
Center Freq 1.91000000 GHz
Start Freq 1.90959500 GHz
Stop Freq 1.91040500 GHz
CF Step 81.00000000 kHz Auto Man
Freq Offset 0.00000000 Hz
Signal Track On Off

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