



SAMSUNG ELECTRONICS Co., Ltd.,
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-X156**
FCC ID (Requested): **A3LSGHX156**
Report No: **FC-132-R1**
Job No: **FC-132**
Date issued: **September 26, 2005**

- Abstract -

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

Prepared By		Date	2005.09.26
	_____ WW JANG – Test Engineer		_____
Checked By		Date	2005.09.27
	_____ SH PARK –Senior Manager		_____
Authorized By		Date	2005.09.27
	_____ JK CHOI – General 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: A3LSGHX156
- Quantity: Quantity production is planned
- Emission Designators: 249KGXW(GSM850), 252KGXW(GSM1900)
- 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: 1.191W ERP GSM850 (30.76dBm)
1.406W EIRP GSM1900 (31.48dBm)
- 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: September 22-24 2005
- Place of Test: SAMSUNG Lab,
- Test Report S/N: FC-132-R1

2. INTRODUCTION

2.1 General

These measurement test were conducted at **SAMSUNG ELECTRONICS CO., LTD(SUWON)**. The site address is 416 Maetan3-Dong, Yeongtong-gu, Suwon City, Gyeonggi-Do, Korea 443-742. The site have 1 Fully-anechoic chamber and measurement facility.

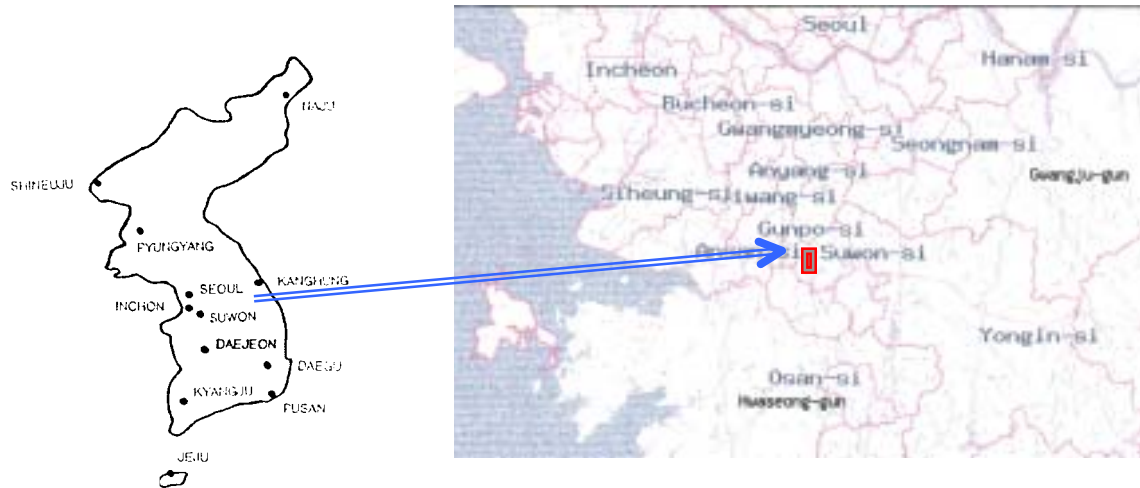


Figure1. Map of the Suwon City area.

Measurement Procedure

The radiated and spurious measurements were made Fully-anechoic chamber at a 3-meter test range (see Figure2). The equipment under testing was placed on 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.

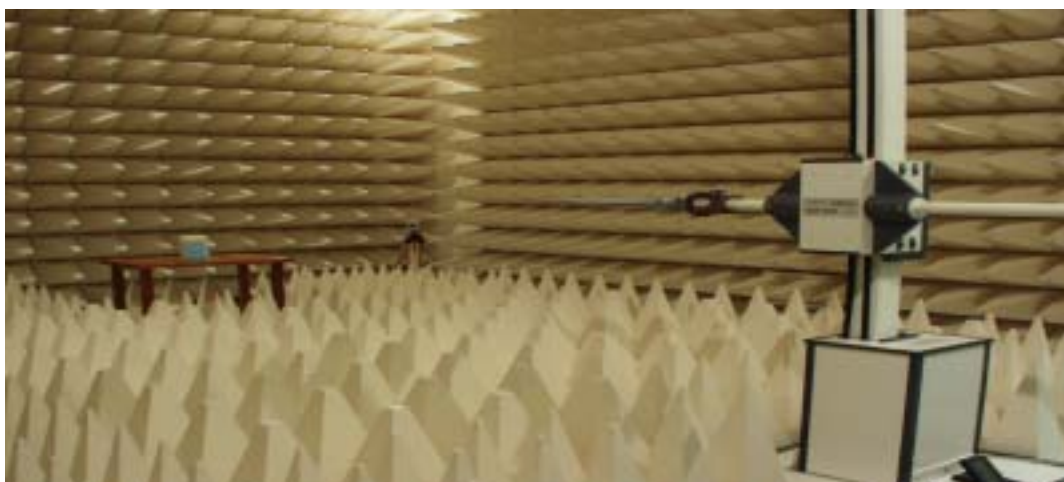


Figure2. Photograph of 3m Fully-Anechoic Chamber

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.

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4. TEST EQUIPMENT LIST

Name of Equipment	Model	Serial No.	Due Date
Spectrum Analyzer	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	2006-09-07
Power Sensor	8481B	3318A10325	2006-09-08
	8485A	3318A19924	2006-09-08
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	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
Receive Antenna	HL040	353255/020	2006-06-21
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:

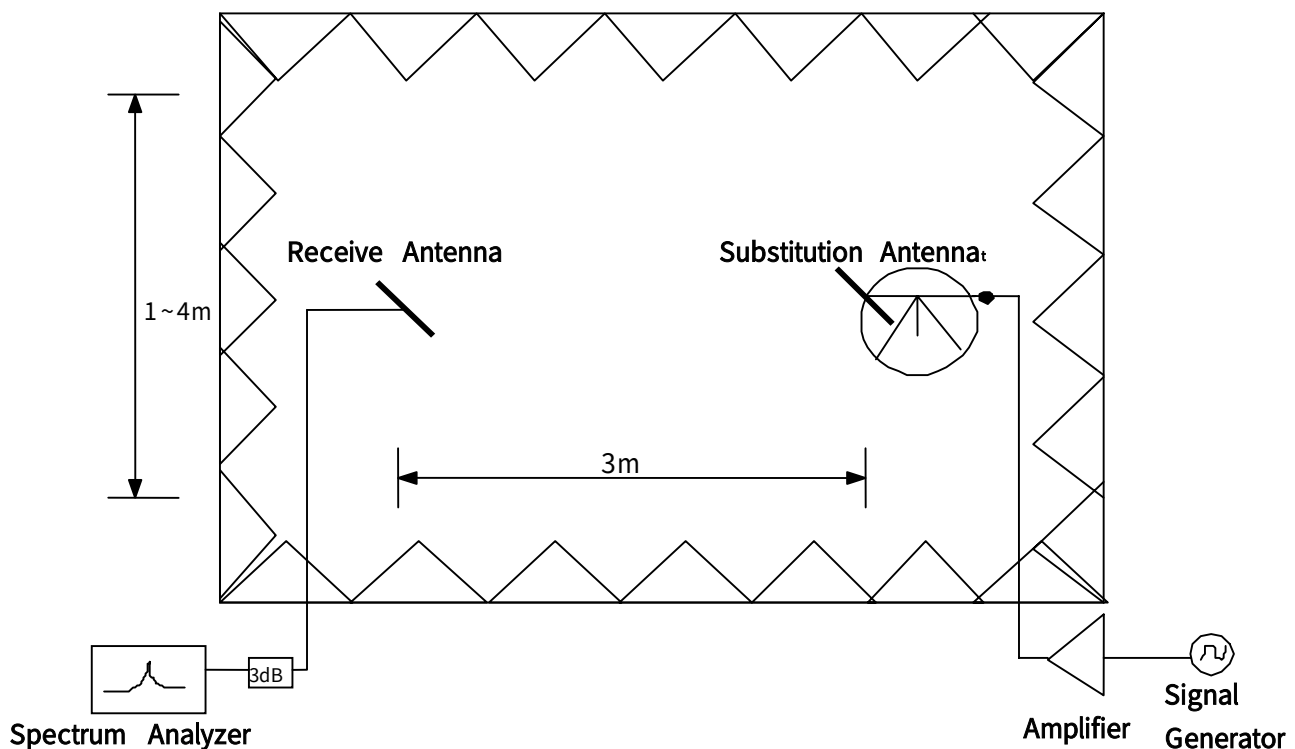


Figure 3. Diagram of ERP/EIRP test Set-up

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

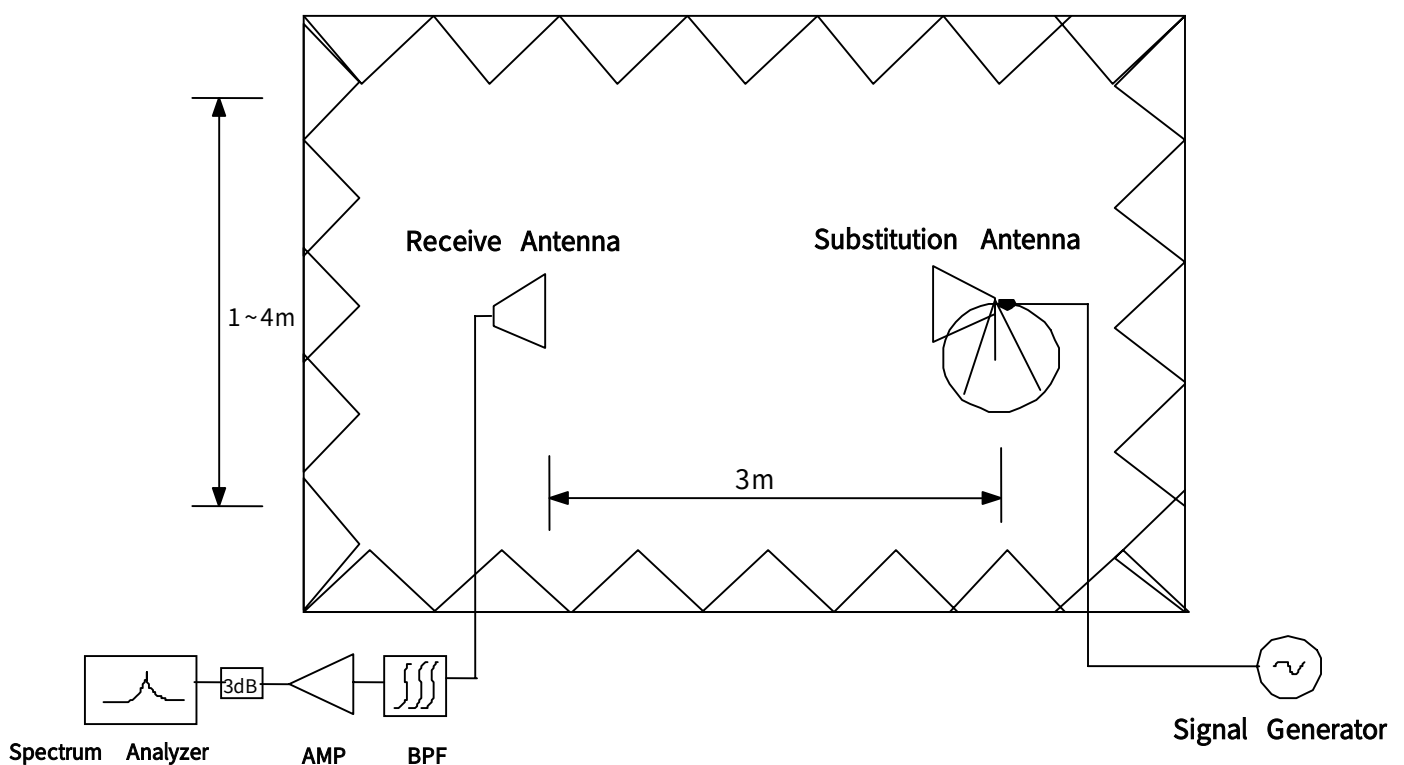


Figure 4. Diagram of Radiated Spurious & Harmonic test Set-up

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

– End of page –

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 -13dBm, calculation shown below.

$$43 + 10\log(1.191 \text{ W}) = 43.76\text{dB}$$

$$30.76\text{dBm} - 43.76 \text{ dB} = -13 \text{ dBm}$$

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 (dBi)	Ref level (dBm)
824.20	25.00	H	-13.47	0.00	-13.47
		V	-12.49	0.00	-12.49
836.60	25.00	H	-13.47	0.00	-13.47
		V	-12.49	0.00	-12.49
848.80	25.00	H	-13.47	0.00	-13.47
		V	-12.49	0.00	-12.49

■ Result

Frequency (MHz)	From EUT Tested level (dBm)	Polarization (H/V)	Azimuth (angle)	ERP (dBm)	ERP (W)	Battery
824.20	-10.26	H1	361	28.21	0.662	Standard
836.60	-8.71	H1	361	29.76	0.946	Standard
848.80	-7.71	H1	361	30.76	1.191	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	-14.04	8.42	-22.46
		V	-14.46	8.42	-22.88
1880.00	27.00	H	-13.92	8.25	-22.17
		V	-14.10	8.25	-22.35
1909.80	27.00	H	-13.67	8.40	-22.07
		V	-13.85	8.40	-22.25

■ Result

Frequency (MHz)	From EUT Tested level (dBm)	Polarization (H/V)	Azimuth (angle)	EIRP (dBm)	EIRP (W)	Battery
1850.20	-18.78	H1	149	30.68	1.169	Standard
1880.00	-17.69	H1	147	31.48	1.406	Standard
1909.80	-18.47	H1	144	30.60	1.148	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 : 30.76dBm = 1.191 W

Modulation Signal : GSM850

$$\text{Limit : } 43 + 10\log_{10}(P) = 43.76 \text{ dBc}$$

■ Result

Channel	Harmonic	Frequency (MHz)	From EUT Tested level (dBm)	POL (H/V)	Result (dBc)
128	2	1648.40	-49.03	H2	68.22
	3	2472.60	-55.37	H1	69.82
	4	3296.80	-66.53	V	76.31
	5	4121.00	-64.75	H1	72.16
	6	4945.20	-	-	-
	7	5769.40	-	-	-
190	2	1673.20	-54.65	H2	73.34
	3	2509.80	-57.73	H1	71.39
	4	3346.40	-66.16	V	76.28
	5	4183.00	-67.88	H1	74.66
	6	5019.60	-	-	-
	7	5856.20	-	-	-
251	2	1697.60	-56.32	H1	73.52
	3	2546.40	-58.78	H1	72.04
	4	3395.20	-66.49	V	77.19
	5	4244.00	-66.22	H1	73.95
	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 : 31.48 dBm = 1.406W

Modulation Signal : GSM1900

Limit : $43 + 10\log_{10}(P) = 44.48 \text{ dBc}$

■ Result

Channel	Harmonic	Frequency (MHz)	From EUT Tested level (dBm)	POL (H/V)	Result (dBc)
512	2	3700.40	-61.43	H1	67.09
	3	5550.60	-61.01	H2	62.39
	4	7400.80	-63.20	H2	59.89
	5	9251.00	-68.10	H2	59.84
	6	11101.20	-	-	-
	7	12951.40	-	-	-
661	2	3760.00	-60.66	H2	66.97
	3	5640.00	-59.63	H2	60.95
	4	7520.00	-63.98	H2	60.56
	5	9400.00	-68.54	H2	61.58
	6	11280.00	-	-	-
	7	13160.00	-	-	-
810	2	3819.60	-61.66	V	67.09
	3	5729.40	-55.75	H2	56.93
	4	7639.20	-66.98	H2	62.82
	5	9549.00	-68.06	H1	60.46
	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 : 2005. 09. 23.

Test Engineer : Y E 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 +2.14- ⑦

CH	Har	Frequency (MHz)	① Tx CL (dB)	② Horn Gain (dB)	Tx Level @ (S/G 0dBm)	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	7.19	8.03	0.84	-49.03	-49.66	-35.32	-35.76	68.22	68.66
	3	2472.60	9.32	9.55	0.23	-55.37	-59.12	-36.92	-39.68	69.82	72.58
	4	3296.80	11.75	9.64	-2.11	-66.46	-66.53	-45.18	-43.41	78.08	76.31
	5	4121.00	14.98	10.67	-4.31	-64.75	-65.95	-39.26	-40.26	72.16	73.16
	6	4945.20	15.41	11.05	-4.36	-	-	-	-	-	-
	7	5769.40	16.83	11.23	-5.60	-	-	-	-	-	-
190	2	1673.20	7.34	8.03	0.69	-54.65	-56.02	-40.44	-41.53	73.34	74.43
	3	2509.80	9.55	9.55	0.00	-57.73	-60.84	-38.49	-40.77	71.39	73.67
	4	3346.40	11.94	9.64	-2.30	-66.21	-66.16	-44.99	-43.38	77.89	76.28
	5	4183.00	14.39	10.67	-3.72	-67.88	-68.07	-41.76	-42.02	74.66	74.92
	6	5019.60	15.67	11.05	-4.62	-	-	-	-	-	-
	7	5856.20	17.20	11.23	-5.97	-	-	-	-	-	-
251	2	1697.60	7.45	8.03	0.58	-56.32	-60.17	-40.62	-44.19	73.52	77.09
	3	2546.40	9.65	9.55	-0.10	-58.78	-60.82	-39.14	-40.39	72.04	73.29
	4	3395.20	12.13	9.64	-2.49	-66.66	-66.49	-45.84	-44.29	78.74	77.19
	5	4244.00	14.17	10.67	-3.50	-66.22	-68.55	-41.05	-42.28	73.95	75.18
	6	5092.80	15.83	11.05	-4.78	-	-	-	-	-	-
	7	5941.60	17.88	11.23	-6.65	-	-	-	-	-	-

6.6 GSM1900 Radiated Spurious & Harmonic Conversion Table

Date : 2005. 09. 23.

Test Engineer : Y E 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	12.59	9.73	7.14	-61.43	-64.30	-35.61	-37.65	67.09	69.13
	3	5550.60	16.77	11.55	4.78	-61.01	-62.13	-30.91	-32.61	62.39	64.09
	4	7400.80	20.15	11.44	1.29	-63.20	-63.24	-28.41	-29.85	59.89	61.33
	5	9251.00	23.62	12.17	-1.45	-68.10	-68.83	-28.36	-29.97	59.84	61.45
	6	11101.20	27.20	13.66	-3.54	-	-	-	-	-	-
	7	12951.40	32.49	13.27	-9.22	-	-	-	-	-	-
661	2	3760.00	12.83	9.73	6.90	-60.66	-62.13	-35.49	-35.57	66.97	67.05
	3	5640.00	16.75	11.55	4.80	-59.63	-63.45	-29.47	-33.23	60.95	64.71
	4	7520.00	20.19	11.44	1.25	-63.98	-64.21	-29.08	-30.66	60.56	62.14
	5	9400.00	23.90	12.17	-1.73	-68.54	-69.59	-30.10	-31.53	61.58	63.01
	6	11280.00	27.30	13.66	-3.64	-	-	-	-	-	-
	7	13160.00	33.13	13.27	-9.86	-	-	-	-	-	-
810	2	3819.60	13.19	9.73	6.54	-61.63	-61.66	-36.55	-35.61	68.03	67.09
	3	5729.40	16.79	11.55	4.76	-55.75	-63.10	-25.45	-32.86	56.93	64.34
	4	7639.20	20.65	11.44	0.79	-66.98	-68.12	-31.34	-33.36	62.82	64.84
	5	9549.00	24.50	12.17	-2.33	-68.06	-69.03	-28.98	-30.38	60.46	61.86
	6	11458.80	27.63	13.66	-3.97	-	-	-	-	-	-
	7	13368.60	33.48	13.27	-10.21	-	-	-	-	-	-

6.7 Frequency Stability

6.7.1 GSM850 Frequency Stability Table

Operating Frequency : 836,600,000 Hz

Channel : 190

Reference Voltage : 3.7VDC

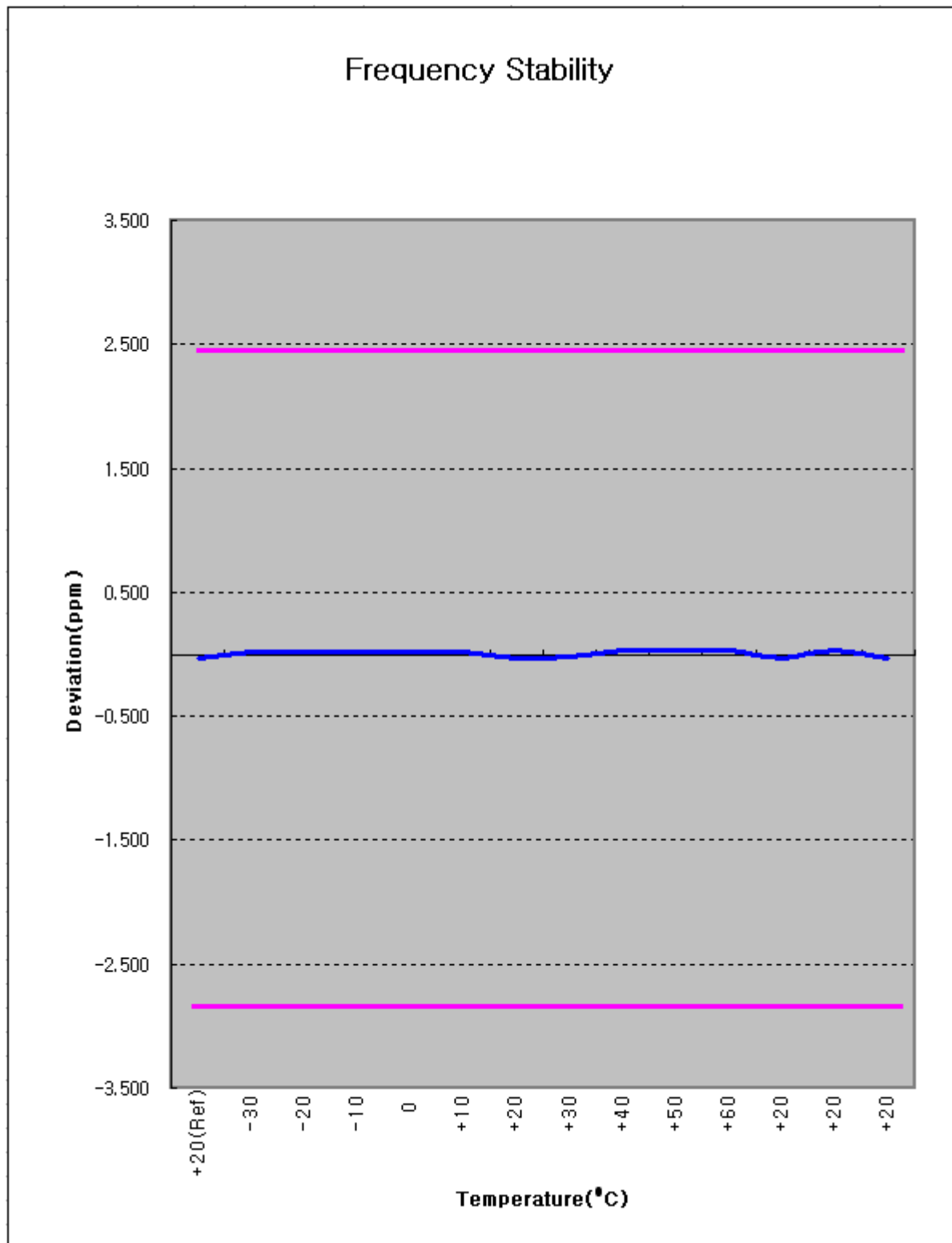
Deviation Limit : ± 0.00025 % or 2.5ppm

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency Error (Hz)	Frequency (Hz)	Deviation (%)	ppm
100%	3.70	+20(Ref)	-23.12	836,599,977	-0.000003	-0.028
100%		-30	18.35	836,600,018	0.000002	0.022
100%		-20	20.42	836,600,020	0.000002	0.024
100%		-10	19.63	836,600,020	0.000002	0.023
100%		0	21.44	836,600,021	0.000003	0.026
100%		+10	18.16	836,600,018	0.000002	0.022
100%		+20	-23.12	836,599,977	-0.000003	-0.028
100%		+30	-19.82	836,599,980	-0.000002	-0.024
100%		+40	25.46	836,600,025	0.000003	0.030
100%		+50	26.17	836,600,026	0.000003	0.031
100%		+60	26.04	836,600,026	0.000003	0.031
85%	3.35	+20	-29.22	836,599,971	-0.000003	-0.035
115%	4.26	+20	22.34	836,600,022	0.000003	0.027
Batt.Endpoint	3.35	+20	-29.220	836,599,971	-0.000003	-0.035

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

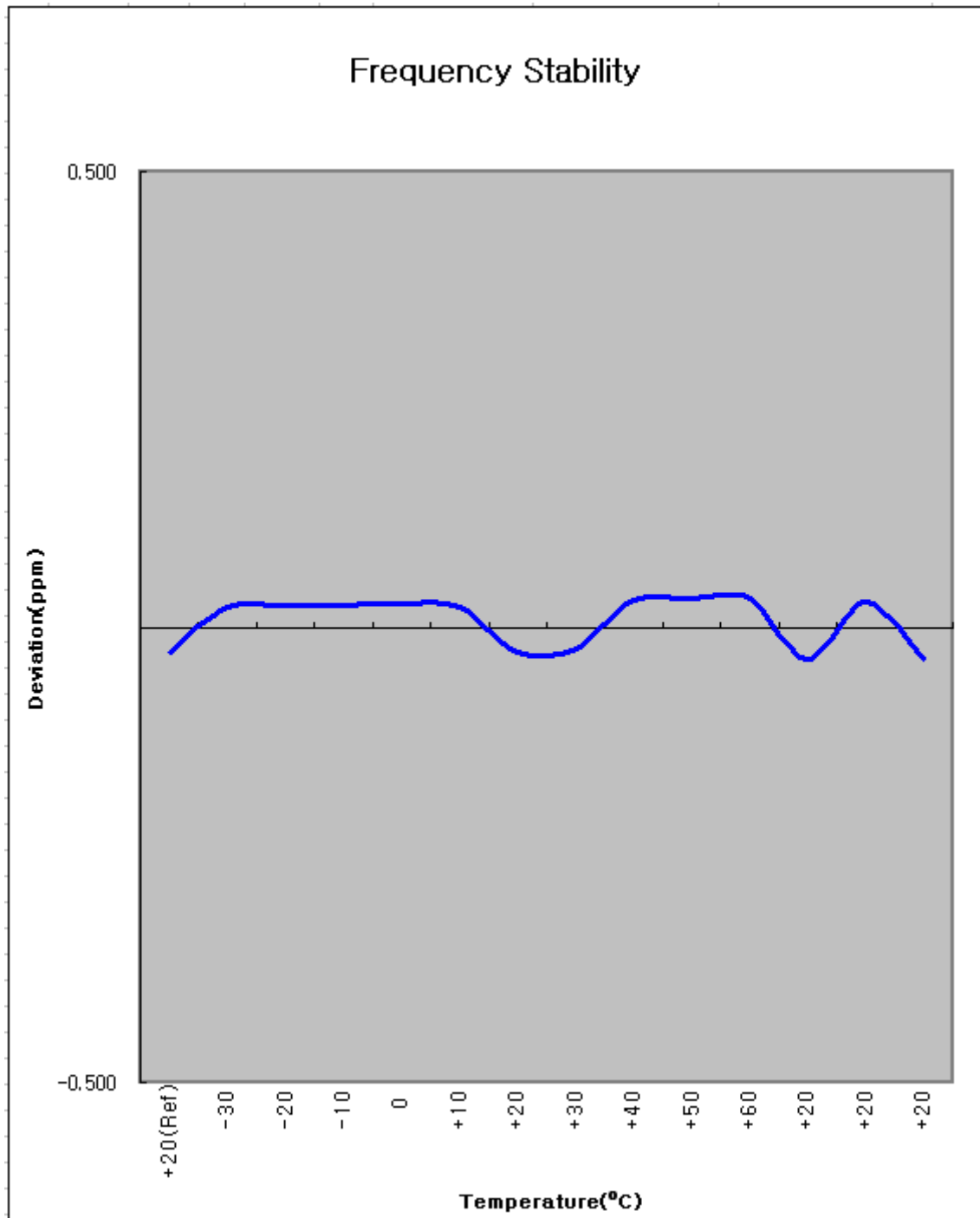
The EUT is tested down to the battery end point

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

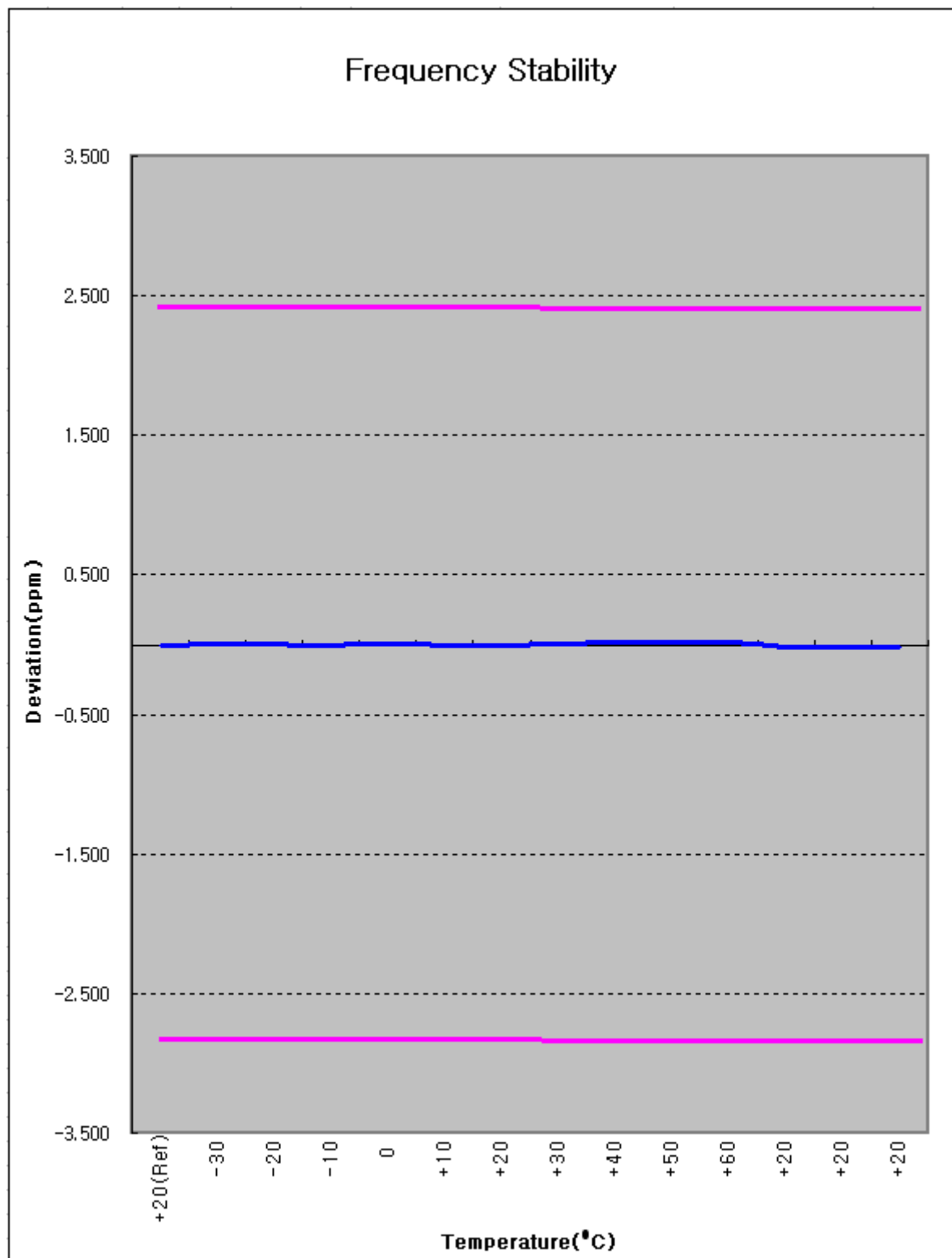
Deviation Limit : ± 0.00025 % or 2.5ppm

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency Error (Hz)	Frequency (Hz)	Deviation (%)	ppm
100%	3.70	+20(Ref)	-21.20	1,879,999,979	-0.000001	-0.011
100%		-30	19.63	1,880,000,020	0.000001	0.010
100%		-20	21.71	1,880,000,022	0.000001	0.012
100%		-10	-15.34	1,879,999,985	-0.000001	-0.008
100%		0	17.22	1,880,000,017	0.000001	0.009
100%		+10	-20.00	1,879,999,980	-0.000001	-0.011
100%		+20	-21.20	1,879,999,979	-0.000001	-0.011
100%		+30	21.33	1,880,000,021	0.000001	0.011
100%		+40	31.65	1,880,000,032	0.000002	0.017
100%		+50	30.17	1,880,000,030	0.000002	0.016
100%		+60	29.37	1,880,000,029	0.000002	0.016
85%	3.35	+20	-35.44	1,879,999,965	-0.000002	-0.019
115%	4.26	+20	-22.20	1,879,999,978	-0.000001	-0.012
Batt.Endpoint	3.35	+20	-35.44	1,879,999,965	-0.000002	-0.019

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

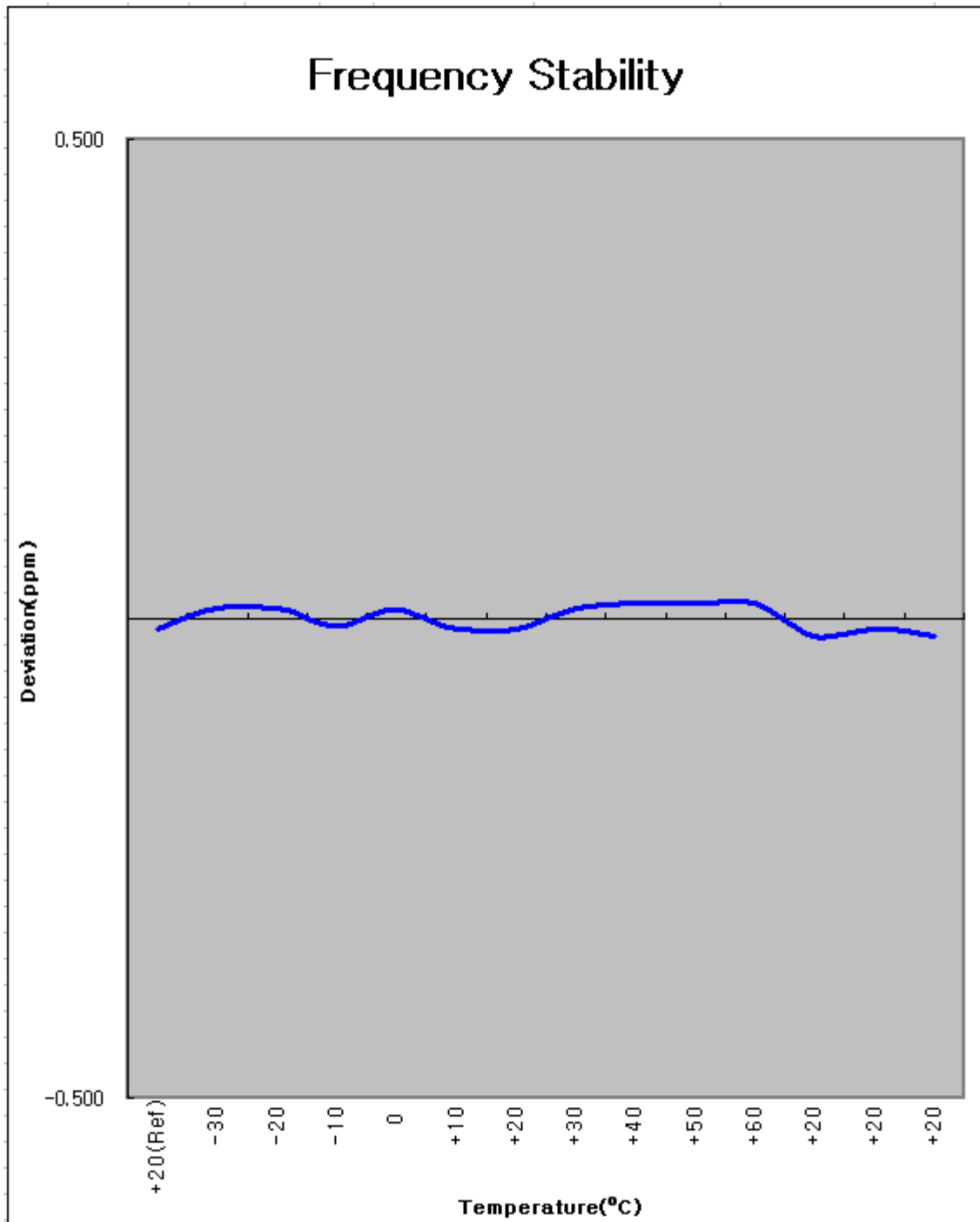
The EUT is tested down to the battery end point

6.7.4 GSM1900 Frequency Stability Graph



- End of page -

Zoom In



- End of page -

7. SAMPLE CALCULATION

7.1 Emission Designator

Emission Designator = 300KGXW

GSM Bandwidth = 300KHz

G = Phase Modulation

X = Two or more channels containing quantized or digital information

W = Combination(Audio/Data)

- End of page -



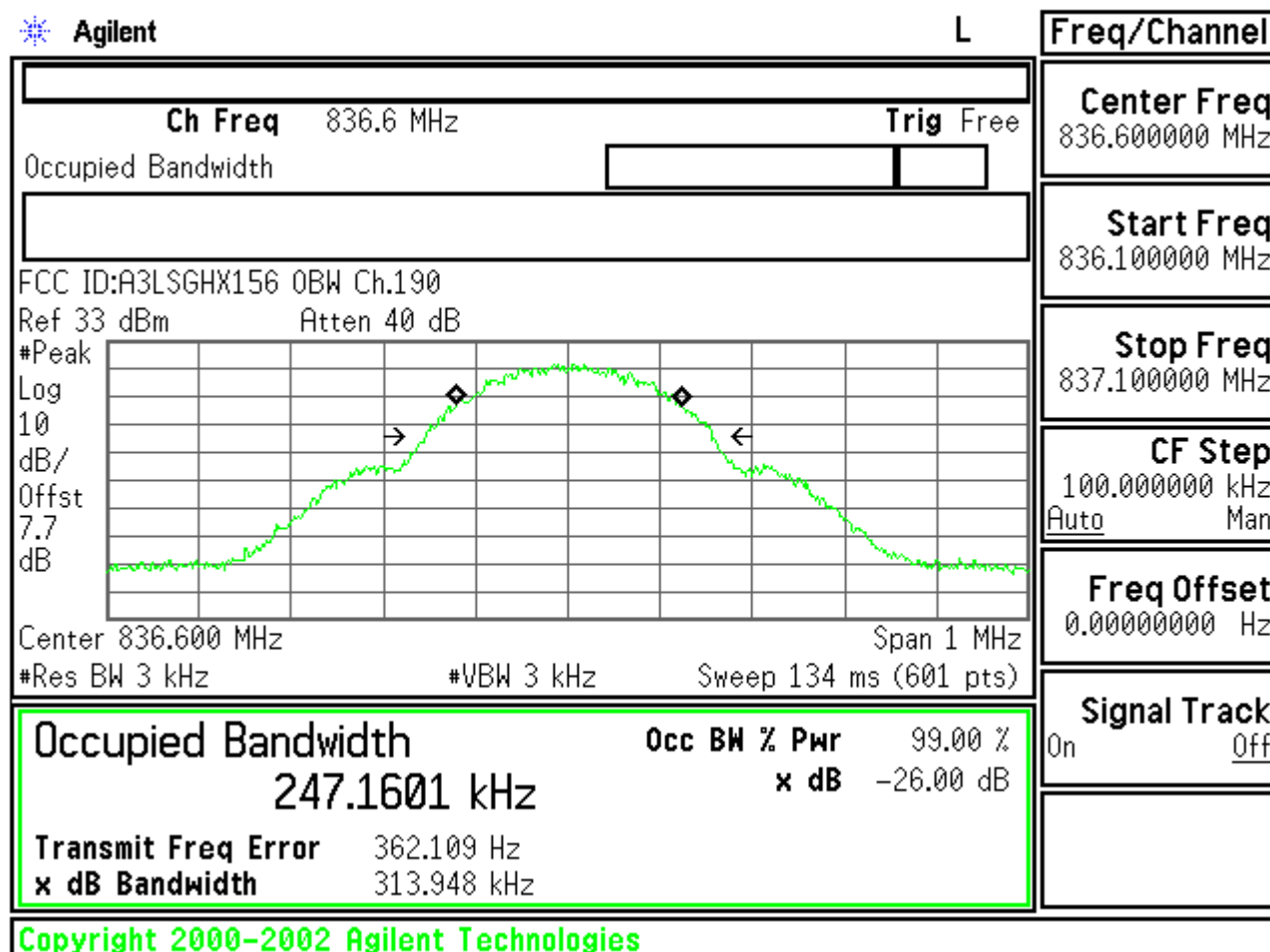
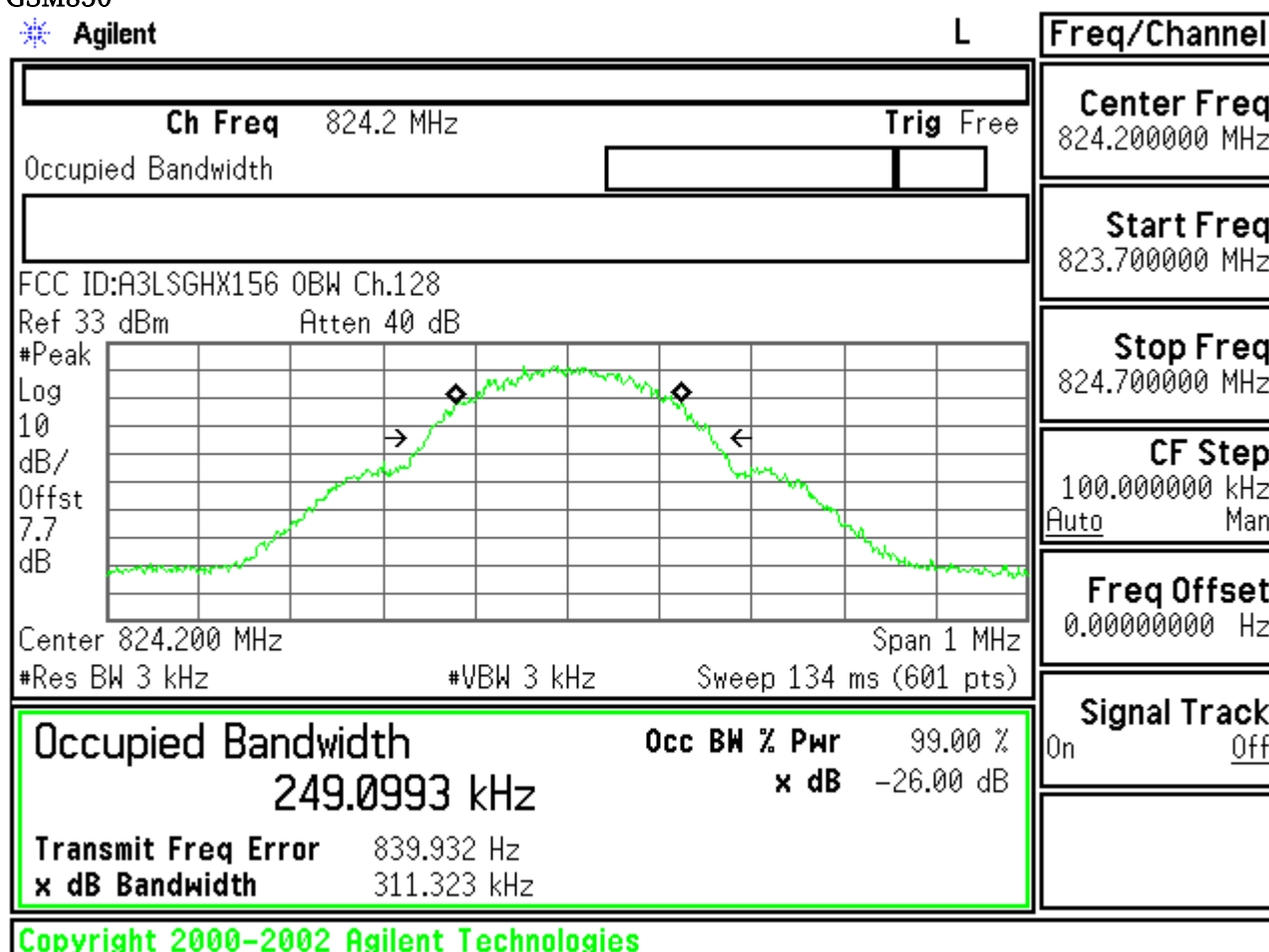
8. CONCLUSION

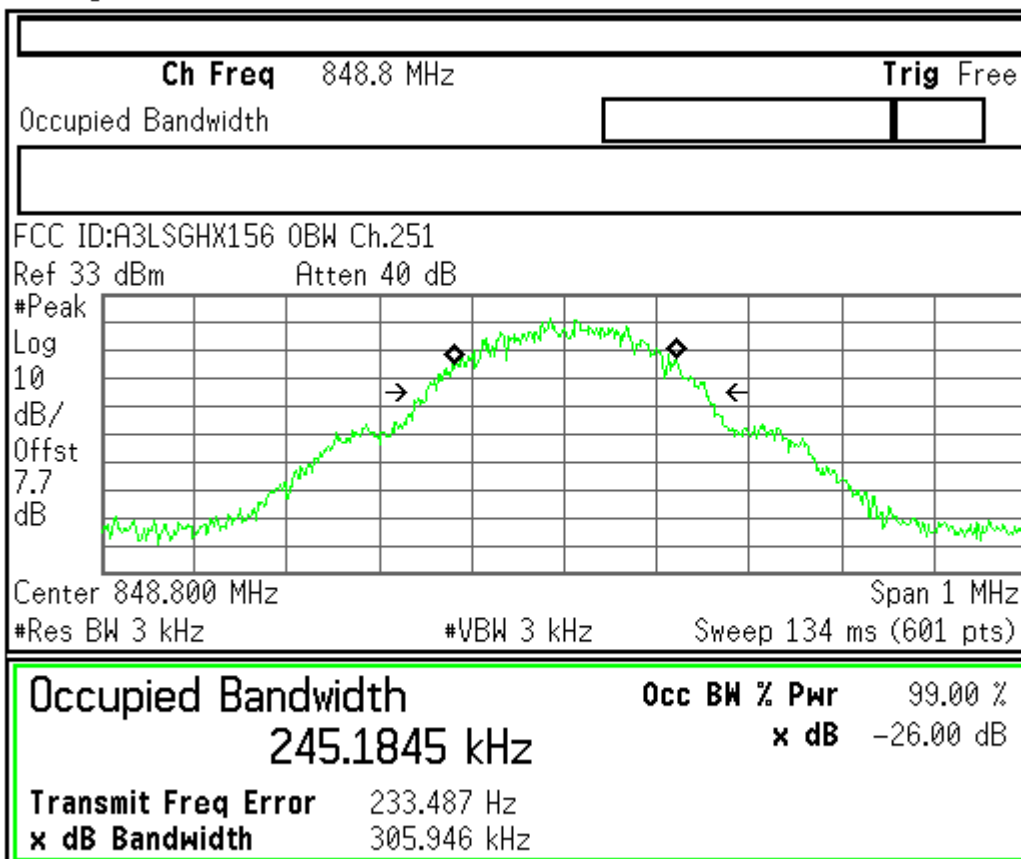
The data collected shows that the SAMSUNG Dual-Band GSM850/1900 Phone .
FCC ID : A3LSGHX156 complies with all the requirements of Parts 2,22,24 of the FCC Rules.

- End of page -

9. TEST PLOTS

- End of page -





Center Freq
848.800000 MHz

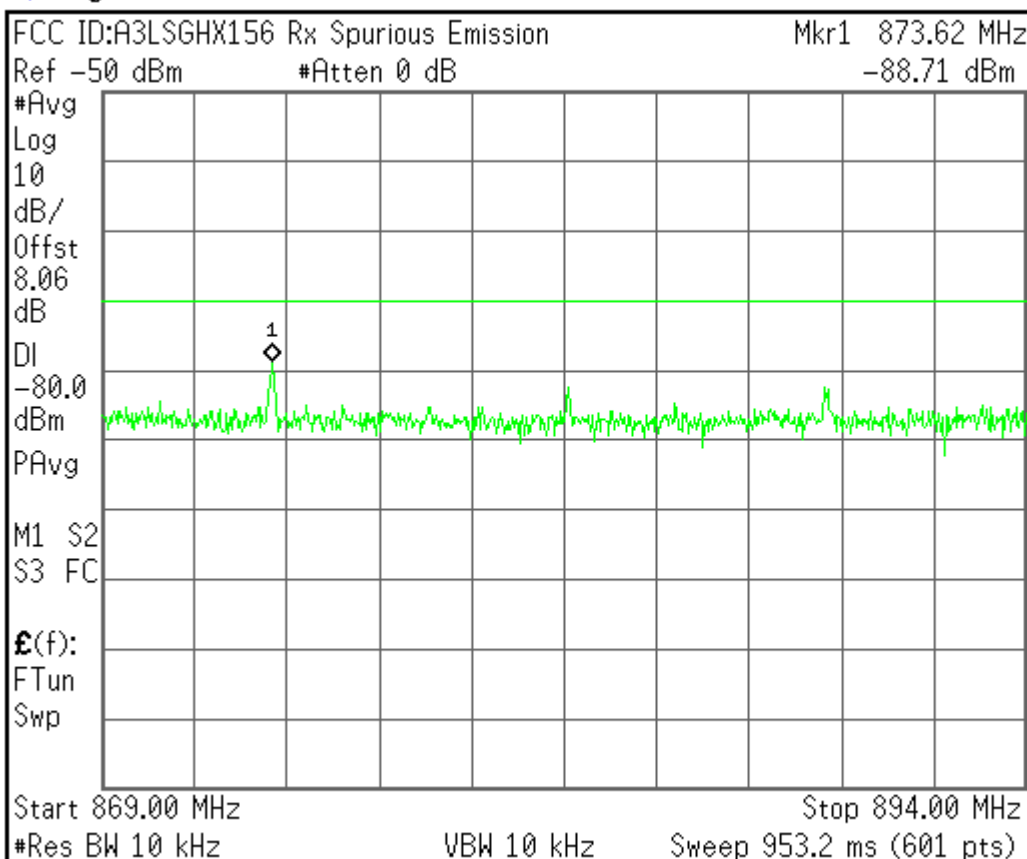
Start Freq
848.300000 MHz

Stop Freq
849.300000 MHz

CF Step
100.000000 kHz
Auto Man

Freq Offset
0.00000000 Hz

Signal Track
On Off



Center Freq
881.500000 MHz

Start Freq
869.000000 MHz

Stop Freq
894.000000 MHz

CF Step
2.50000000 MHz
Auto Man

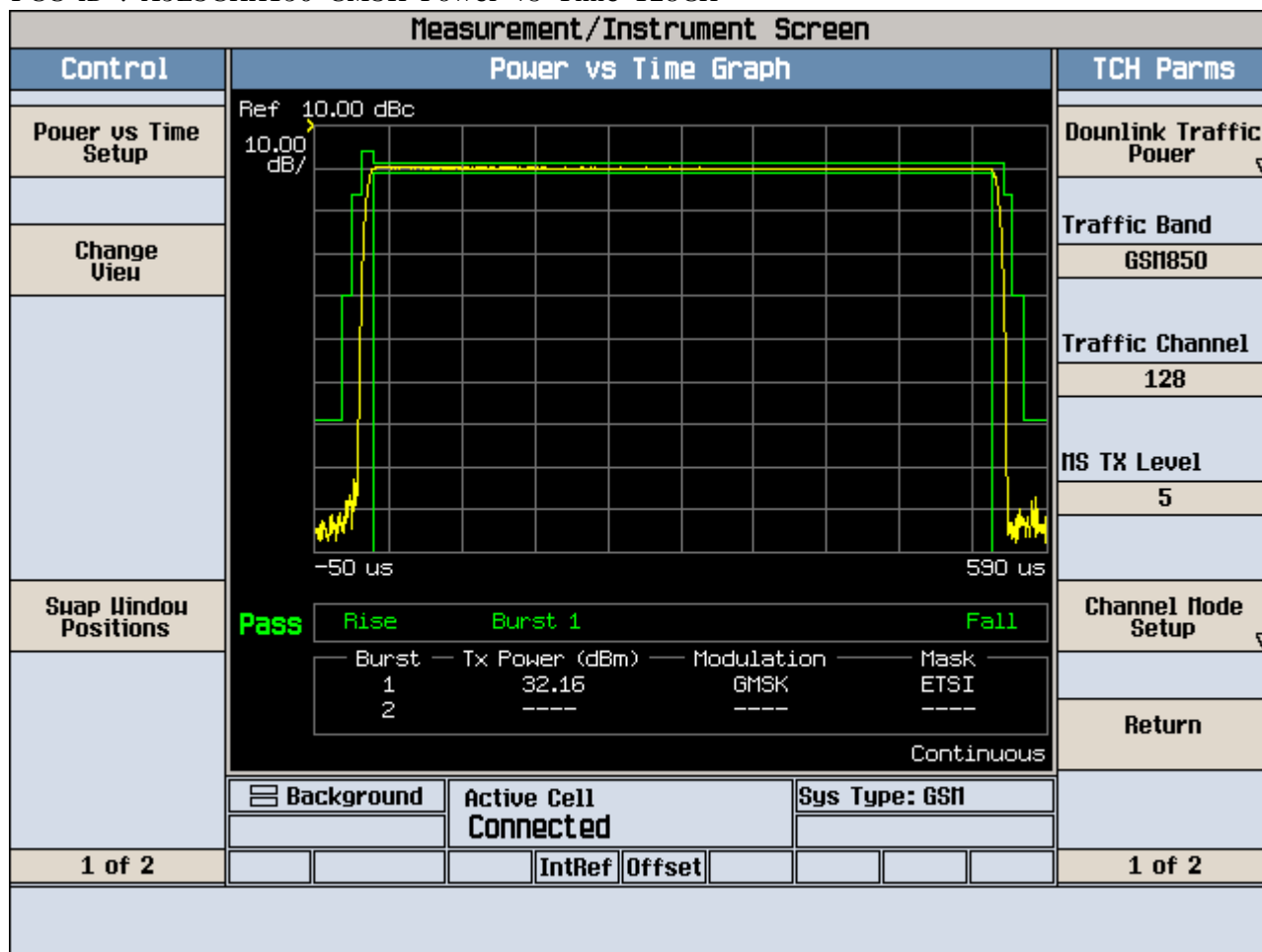
Freq Offset
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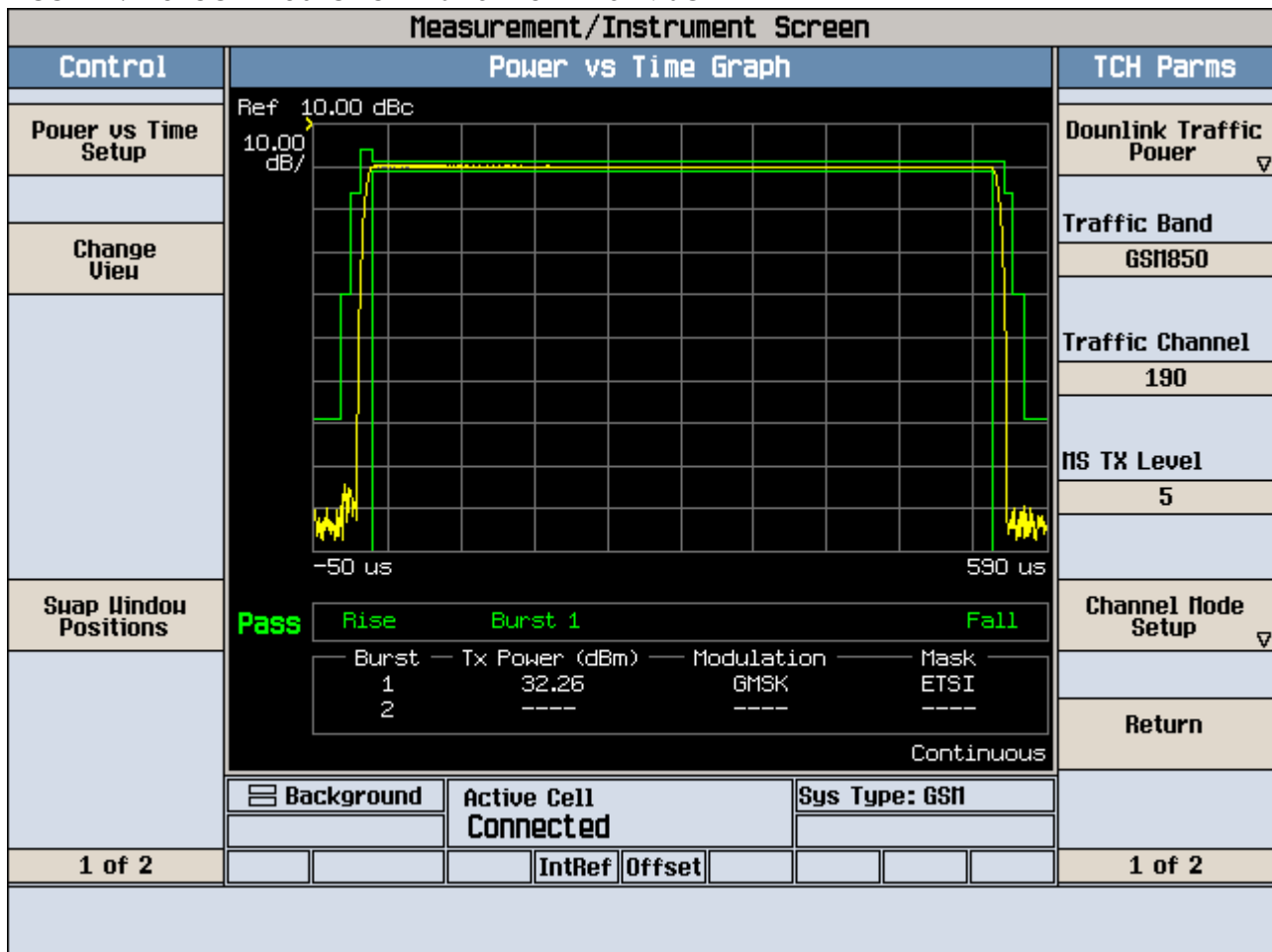
Signal Track
On Off

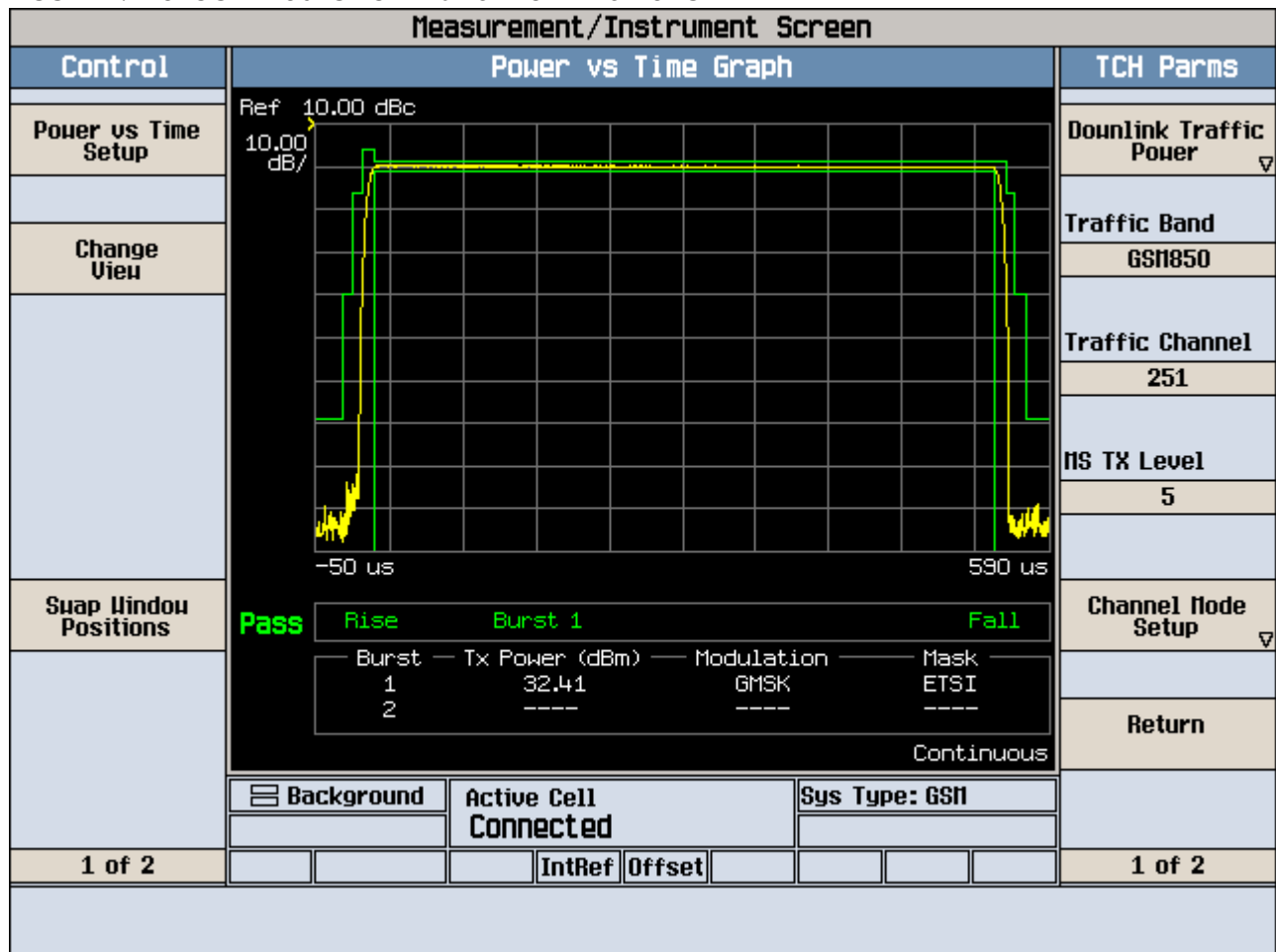
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Control		GSM/GPRS Transmit Power						TCH Parms																						
GSM/GPRS TX Power Setup ▾		GSMK Transmit Power 32.16 dBm Continuous						Downlink Traffic Power ▾																						
Swap Window Positions								Traffic Band			GSM850																			
		Traffic Channel			128																									
		RMS TX Level			5																									
		Channel Mode Setup ▾																												
		Return																												
1 of 2		Phase & Frequency Error 50 / 50 Continuous <table border="1"> <thead> <tr> <th></th> <th>Peak Phase °</th> <th>RMS Phase °</th> <th>Frequency Hz</th> </tr> </thead> <tbody> <tr> <td>Minimum</td> <td>2.72</td> <td>1.21</td> <td>-5.15</td> </tr> <tr> <td>Maximum</td> <td>4.30</td> <td>1.53</td> <td>11.79</td> </tr> <tr> <td>Average</td> <td>3.49</td> <td>1.36</td> <td>1.54</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	2.72	1.21	-5.15	Maximum	4.30	1.53	11.79	Average	3.49	1.36	1.54	Pass/Fail	Pass	Pass	Pass			
	Peak Phase °	RMS Phase °	Frequency Hz																											
Minimum	2.72	1.21	-5.15																											
Maximum	4.30	1.53	11.79																											
Average	3.49	1.36	1.54																											
Pass/Fail	Pass	Pass	Pass																											
		Active Cell Connected			Sys Type: GSM																									
		IntRef			Offset																									
1 of 2								1 of 2																						

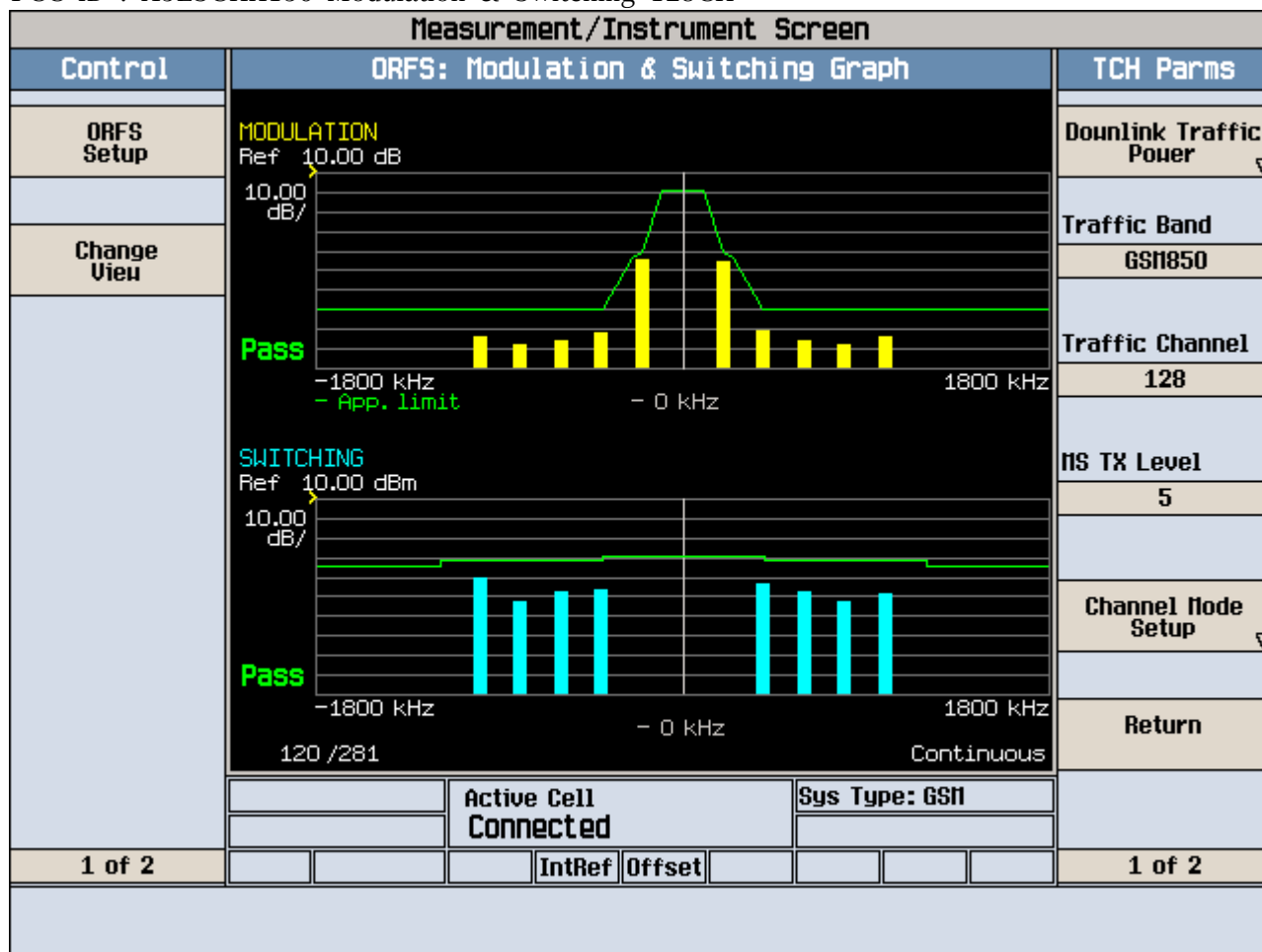
Measurement/Instrument Screen																														
Control		GSM/GPRS Transmit Power						TCH Parms																						
GSM/GPRS TX Power Setup ▾		GMSK Transmit Power 32.26 dBm Continuous						Downlink Traffic Power ▾																						
								Traffic Band																						
								GSM850																						
								Traffic Channel																						
								190																						
								RIS 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>2.81</td><td>1.20</td><td>2.33</td></tr><tr><td>Maximum</td><td>4.32</td><td>1.46</td><td>16.75</td></tr><tr><td>Average</td><td>3.50</td><td>1.32</td><td>8.82</td></tr><tr><td>Pass/Fail</td><td>Pass</td><td>Pass</td><td>Pass</td></tr></tbody></table> 30 / 50 Continuous							Peak Phase °	RMS Phase °	Frequency Hz	Minimum	2.81	1.20	2.33	Maximum	4.32	1.46	16.75	Average	3.50	1.32	8.82	Pass/Fail	Pass	Pass	Pass	Channel Mode Setup ▾		
	Peak Phase °							RMS Phase °	Frequency Hz																					
Minimum	2.81							1.20	2.33																					
Maximum	4.32							1.46	16.75																					
Average	3.50	1.32	8.82																											
Pass/Fail	Pass	Pass	Pass																											
								Return																						
1 of 2				Active Cell Connected		Sys Type: GSM																								
				IntRef		Offset																								
1 of 2																														

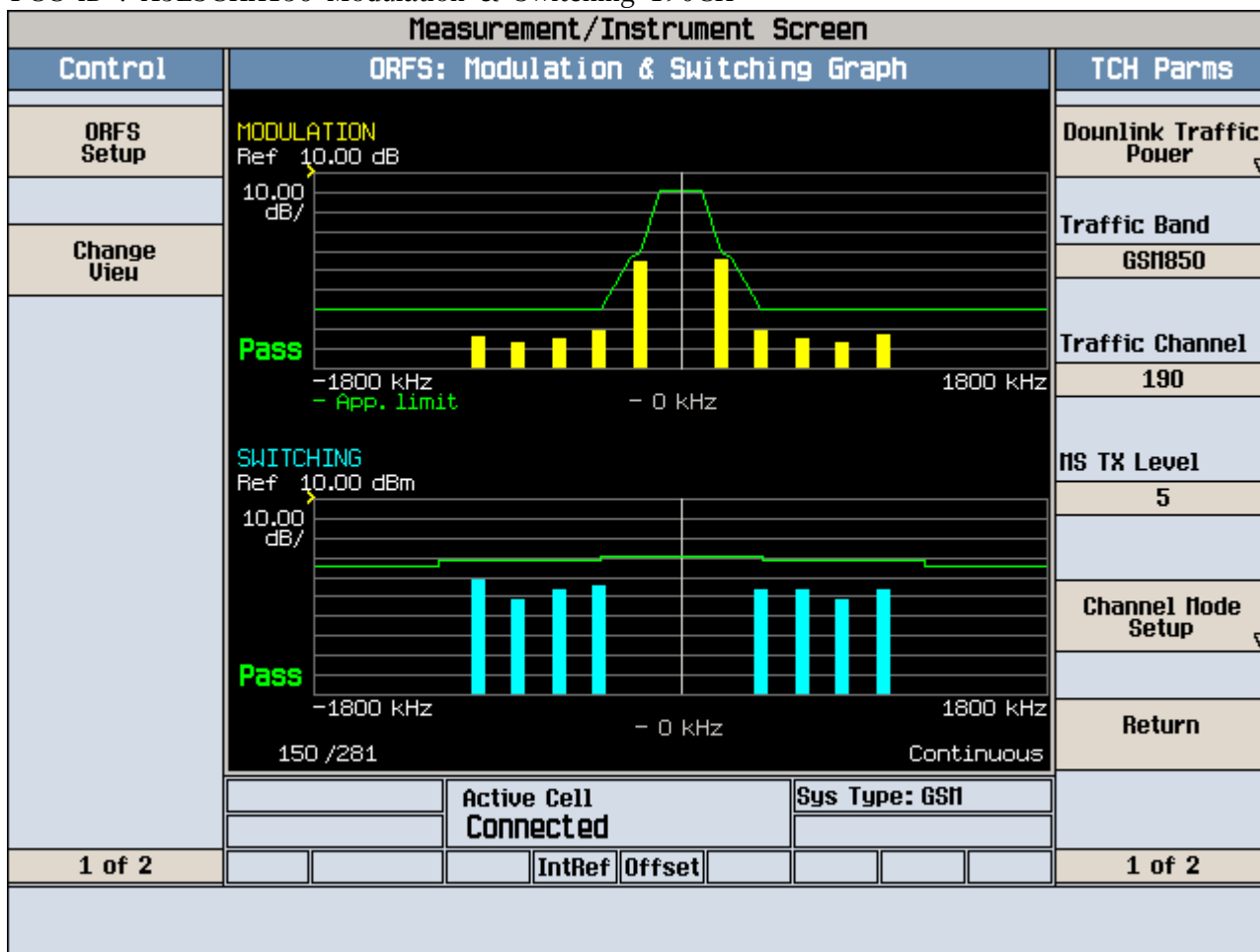
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Swap Window Positions								Traffic Band			GSM850																			
		Traffic Channel			251																									
		RMS TX Level			5																									
		Channel Mode Setup ▾																												
		Return																												
1 of 2		Phase & Frequency Error <table border="1"> <thead> <tr> <th></th> <th>Peak Phase °</th> <th>RMS Phase °</th> <th>Frequency Hz</th> </tr> </thead> <tbody> <tr> <td>Minimum</td> <td>2.86</td> <td>1.18</td> <td>-4.40</td> </tr> <tr> <td>Maximum</td> <td>4.68</td> <td>1.44</td> <td>13.78</td> </tr> <tr> <td>Average</td> <td>3.67</td> <td>1.29</td> <td>5.31</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	2.86	1.18	-4.40	Maximum	4.68	1.44	13.78	Average	3.67	1.29	5.31	Pass/Fail	Pass	Pass	Pass	1 of 2		
	Peak Phase °	RMS Phase °	Frequency Hz																											
Minimum	2.86	1.18	-4.40																											
Maximum	4.68	1.44	13.78																											
Average	3.67	1.29	5.31																											
Pass/Fail	Pass	Pass	Pass																											
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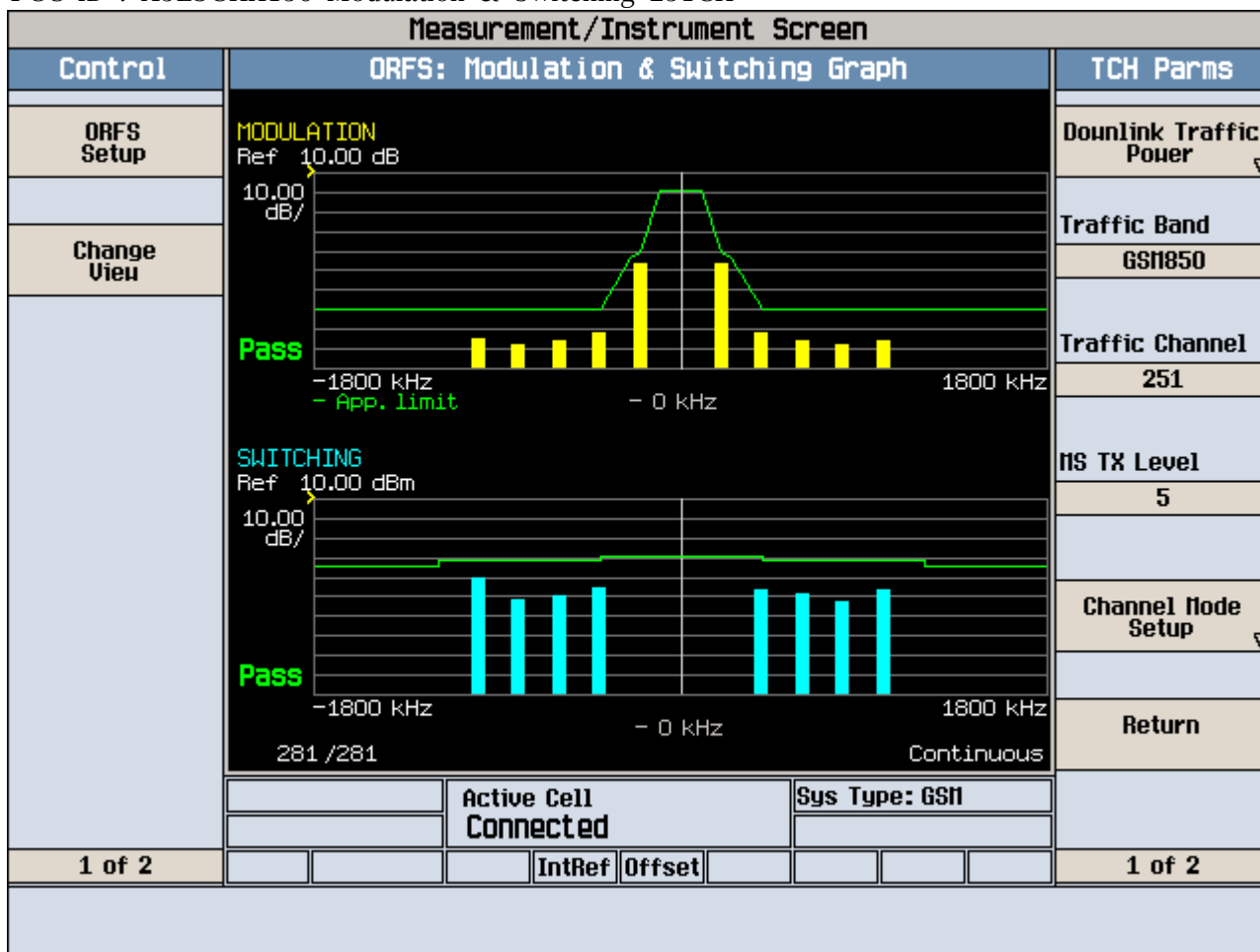


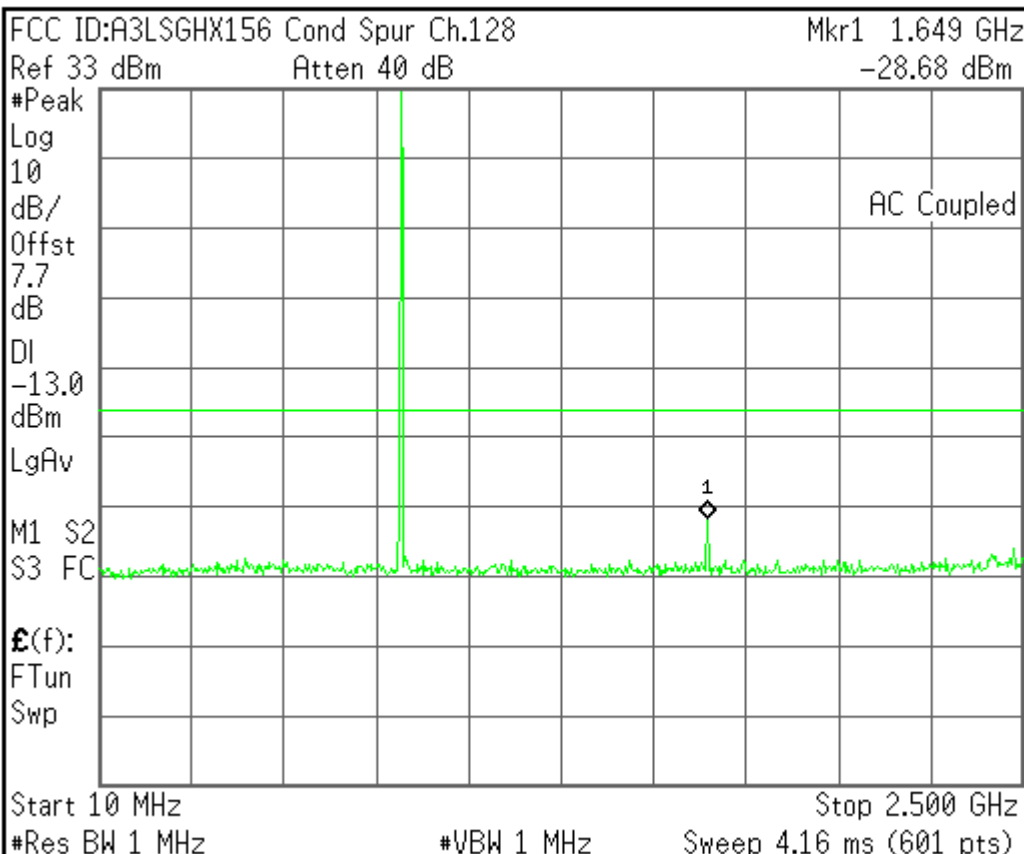












Center Freq
1.25500000 GHz

Start Freq
10.0000000 MHz

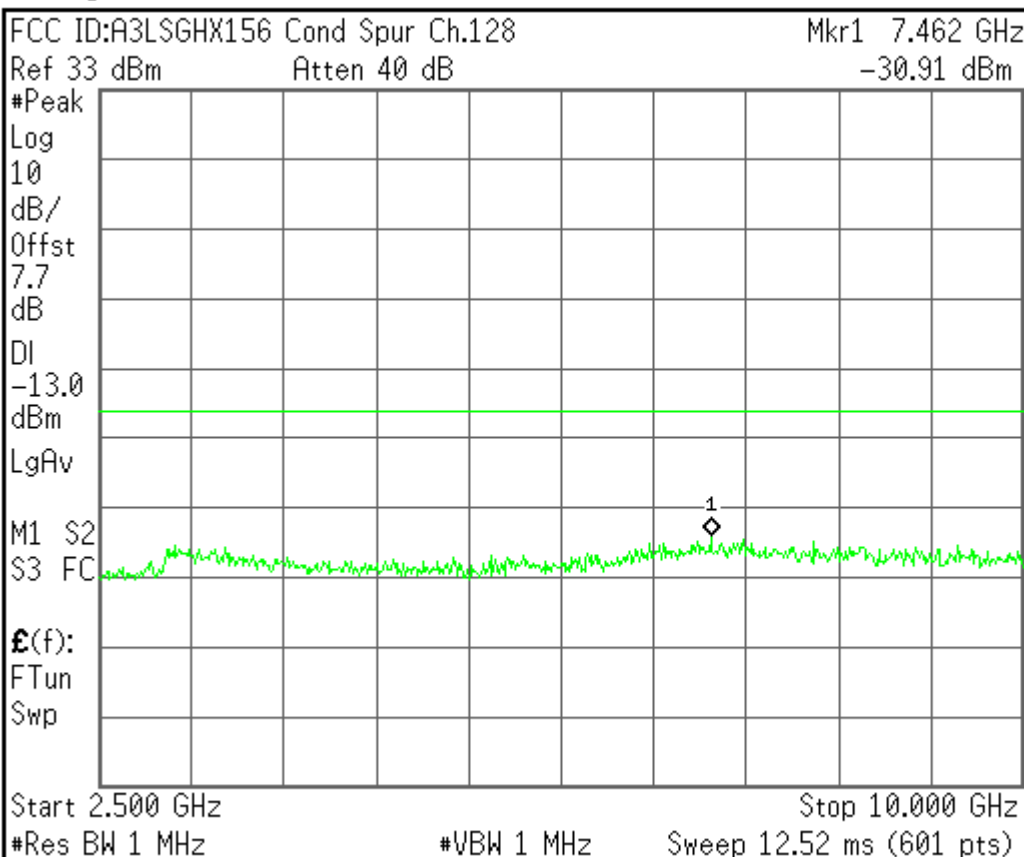
Stop Freq
2.50000000 GHz

CF Step
249.000000 MHz
Auto Man

Freq Offset
0.00000000 Hz

Signal Track
On Off

Copyright 2000-2002 Agilent Technologies



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

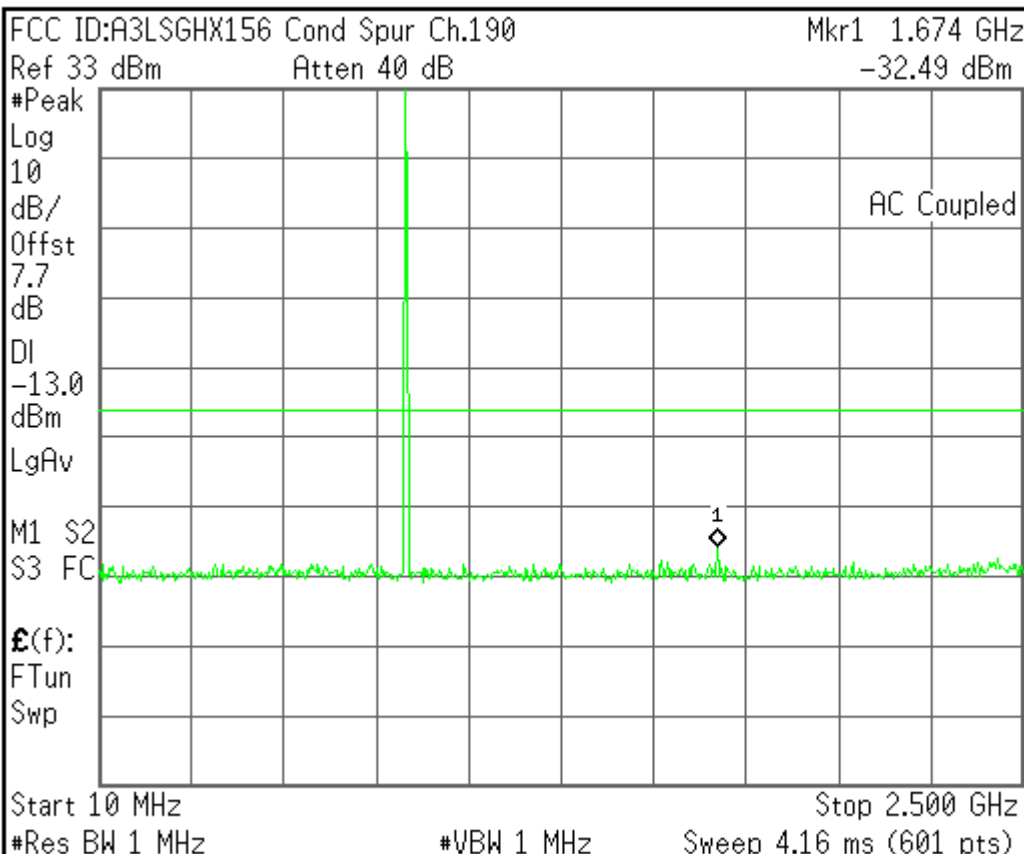
Signal Track
On Off

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Agilent

L

Freq/Channel



Center Freq
1.25500000 GHz

Start Freq
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Stop Freq
2.50000000 GHz

CF Step
249.000000 MHz
Auto Man

Freq Offset
0.00000000 Hz

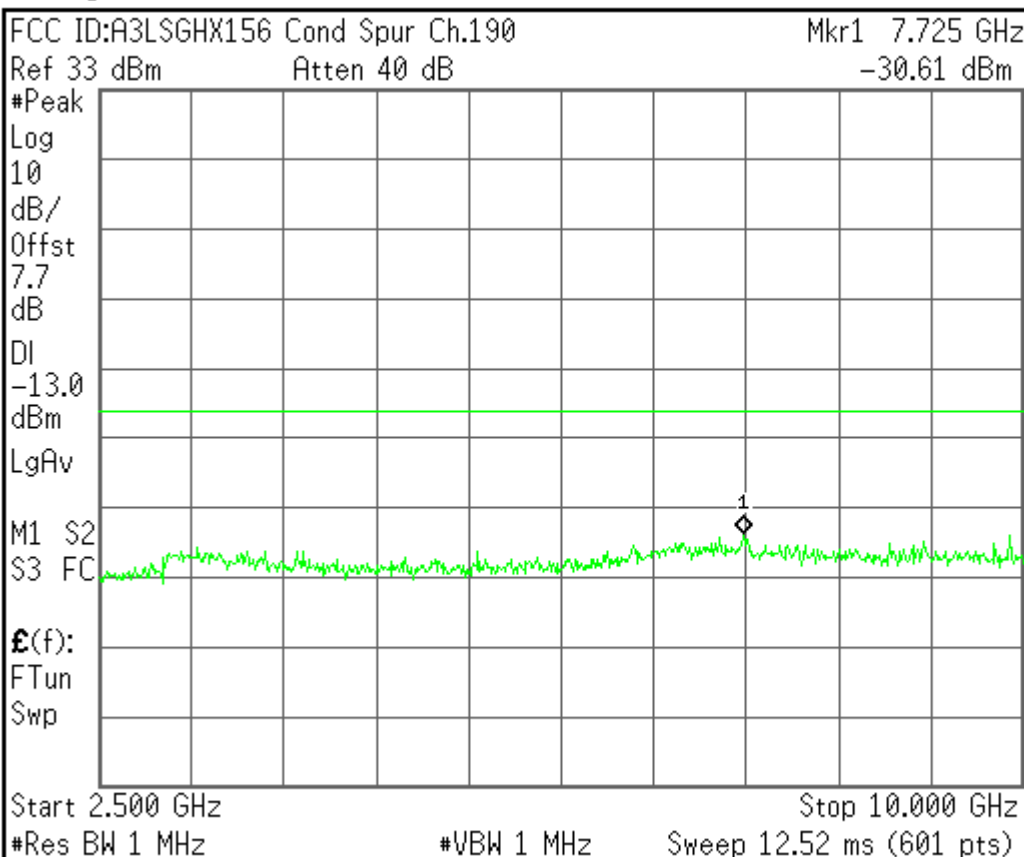
Signal Track
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Agilent

L

Freq/Channel



Center Freq
6.25000000 GHz

Start Freq
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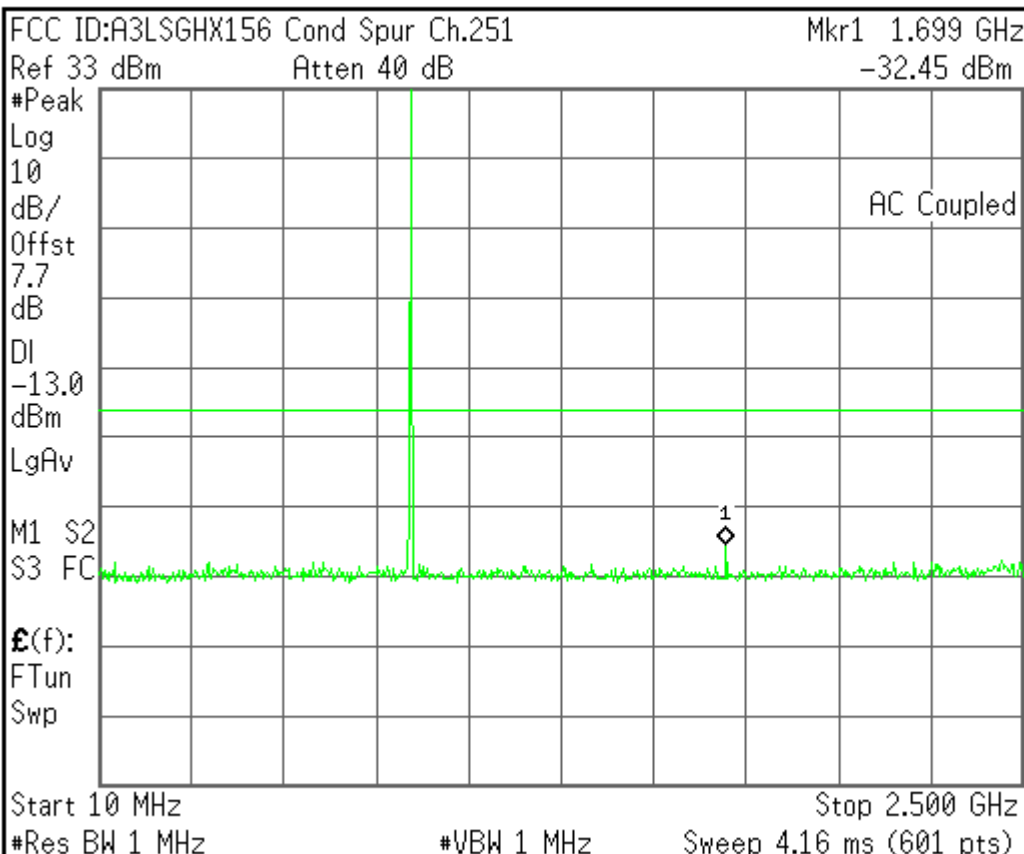
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CF Step
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Freq Offset
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Signal Track
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Center Freq
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Start Freq
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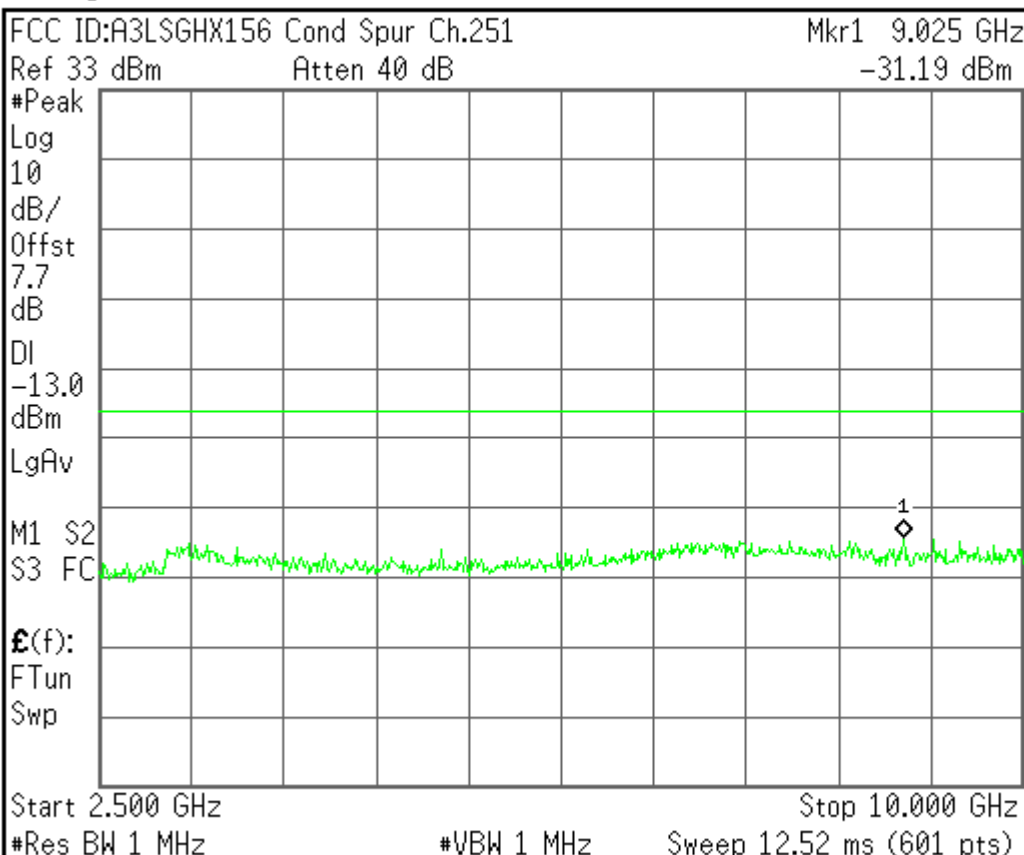
Stop Freq
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CF Step
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Auto Man

Freq Offset
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Signal Track
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Center Freq
6.25000000 GHz

Start Freq
2.50000000 GHz

Stop Freq
10.0000000 GHz

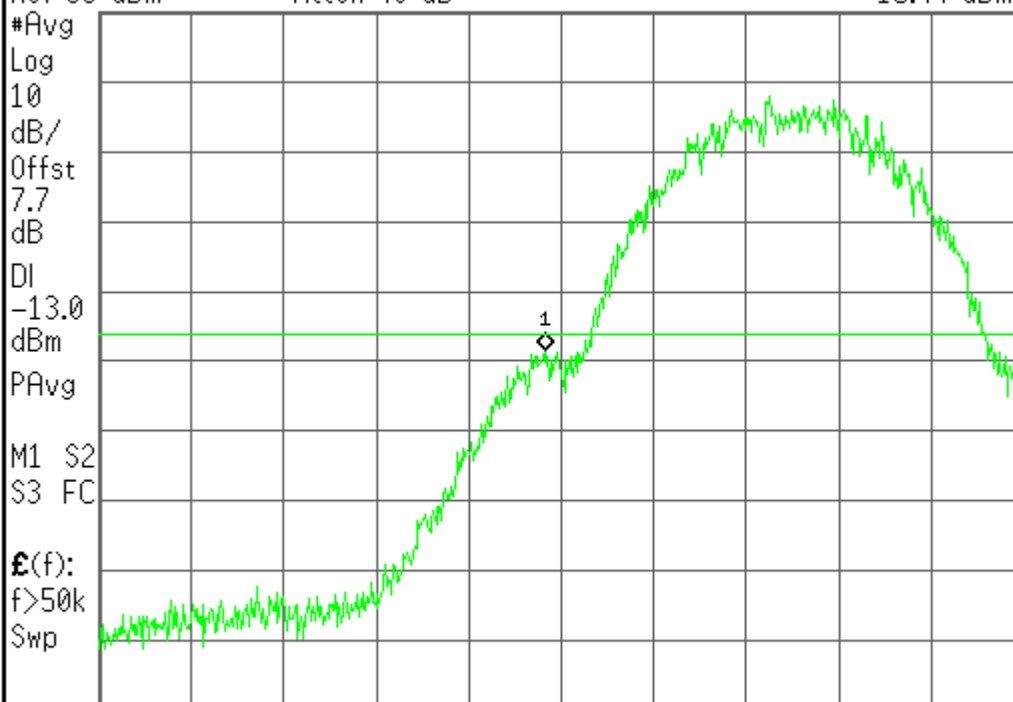
CF Step
750.000000 MHz
Auto Man

Freq Offset
0.00000000 Hz

Signal Track
On Off

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FCC ID:A3LSGHX156 Band Edge Ch.128 Mkr1 823.985 0 MHz
Ref 33 dBm Atten 40 dB -15.44 dBm



Center Freq
824.000000 MHz

Start Freq
823.595000 MHz

Stop Freq
824.405000 MHz

CF Step
81.0000000 kHz
Auto Man

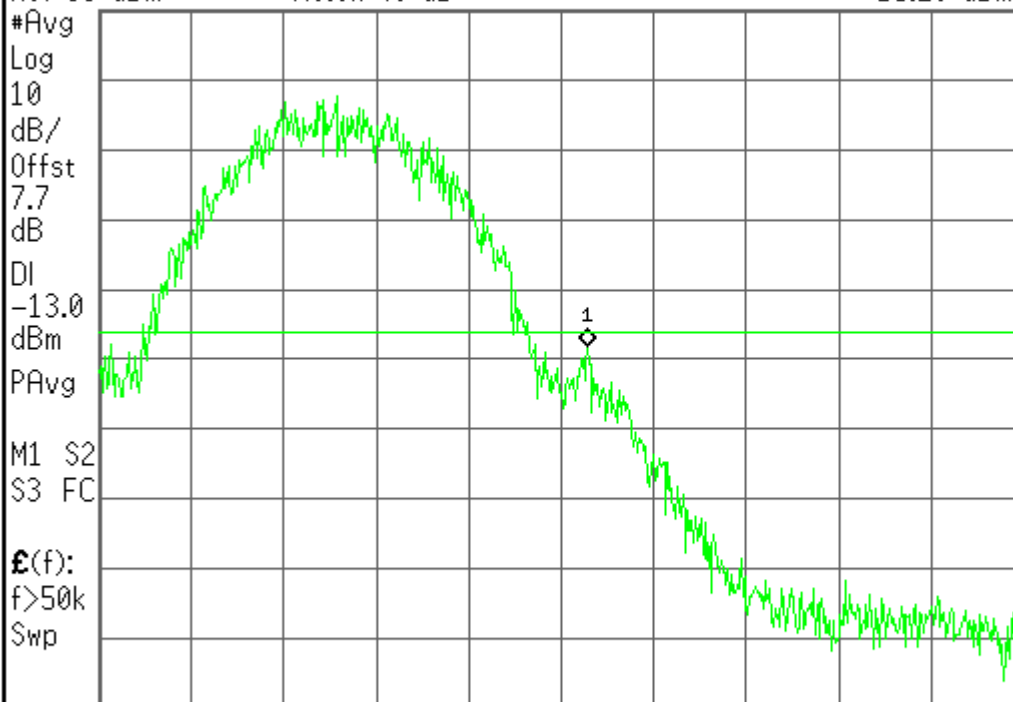
Freq Offset
0.00000000 Hz

Signal Track
On Off

Center 824.000 0 MHz Span 810 kHz
#Res BW 3 kHz #VBW 3 kHz Sweep 343.2 ms (601 pts)

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FCC ID:A3LSGHX156 Band Edge Ch.251 Mkr1 849.023 2 MHz
Ref 33 dBm Atten 40 dB -15.20 dBm



Center Freq
849.000000 MHz

Start Freq
848.595000 MHz

Stop Freq
849.405000 MHz

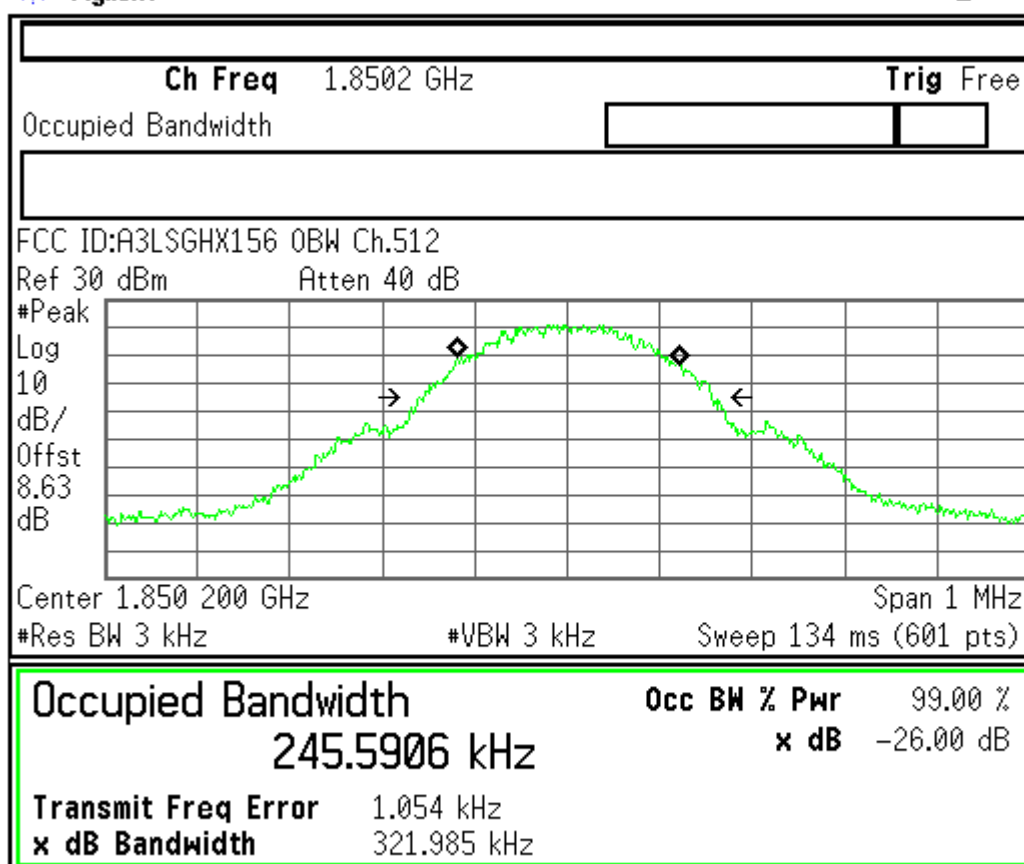
CF Step
81.0000000 kHz
Auto Man

Freq Offset
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Signal Track
On Off

Center 849.000 0 MHz Span 810 kHz
#Res BW 3 kHz #VBW 3 kHz Sweep 343.2 ms (601 pts)

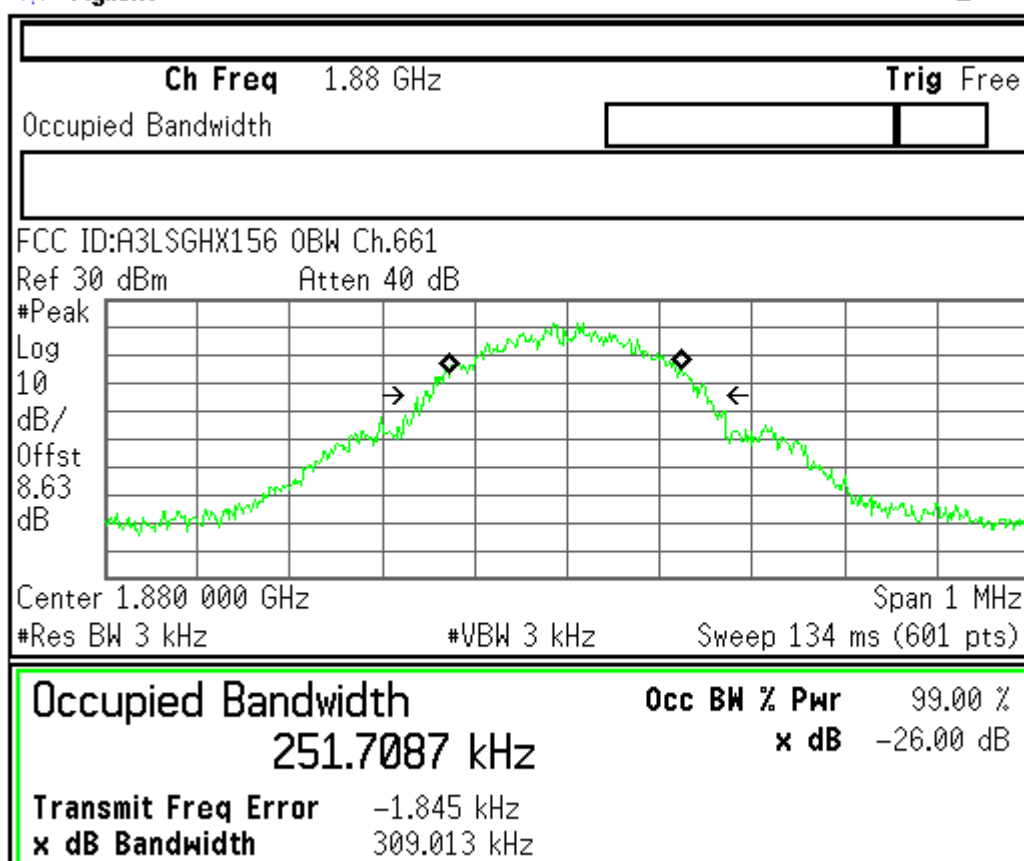
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Freq/Channel

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

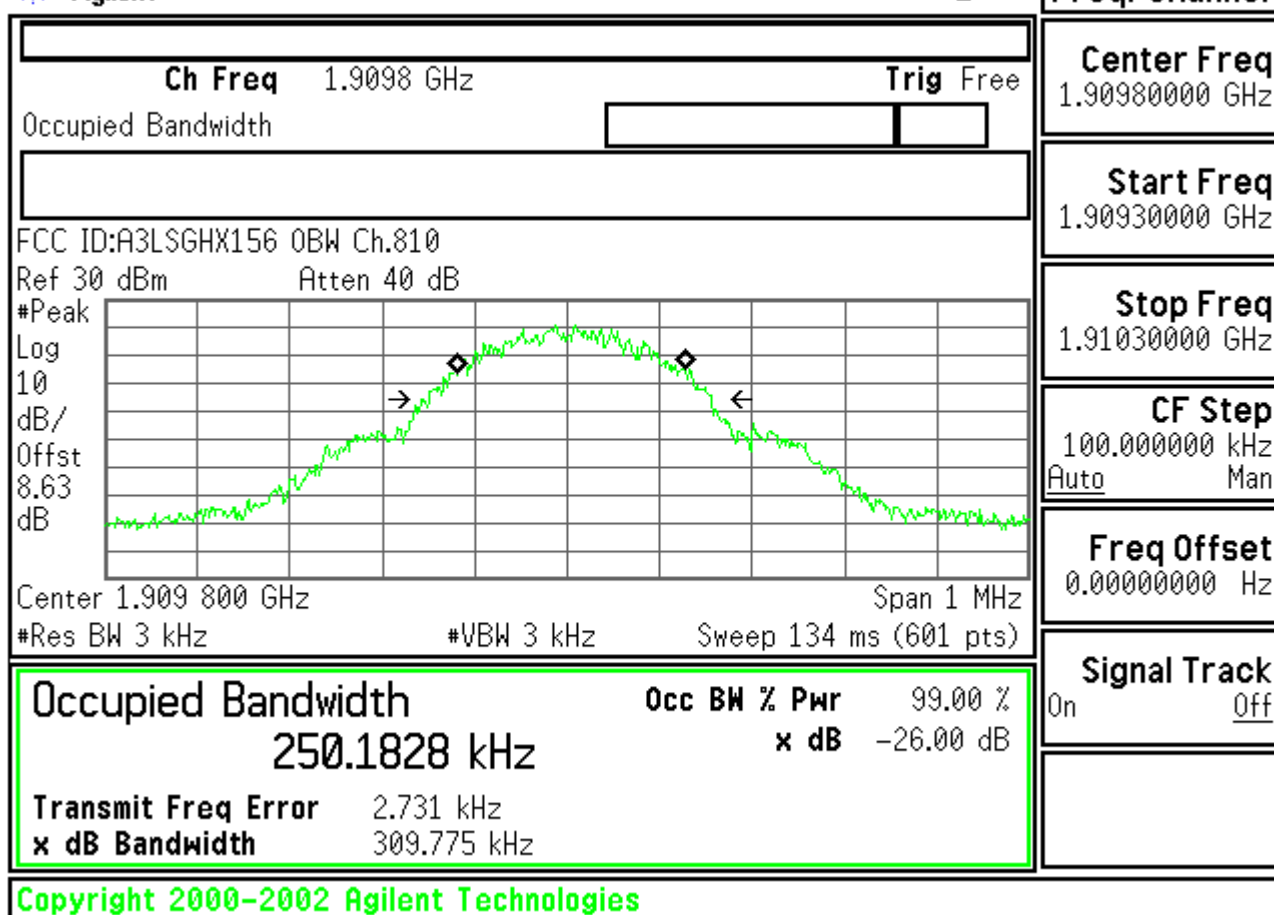
Copyright 2000-2002 Agilent Technologies



Freq/Channel

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

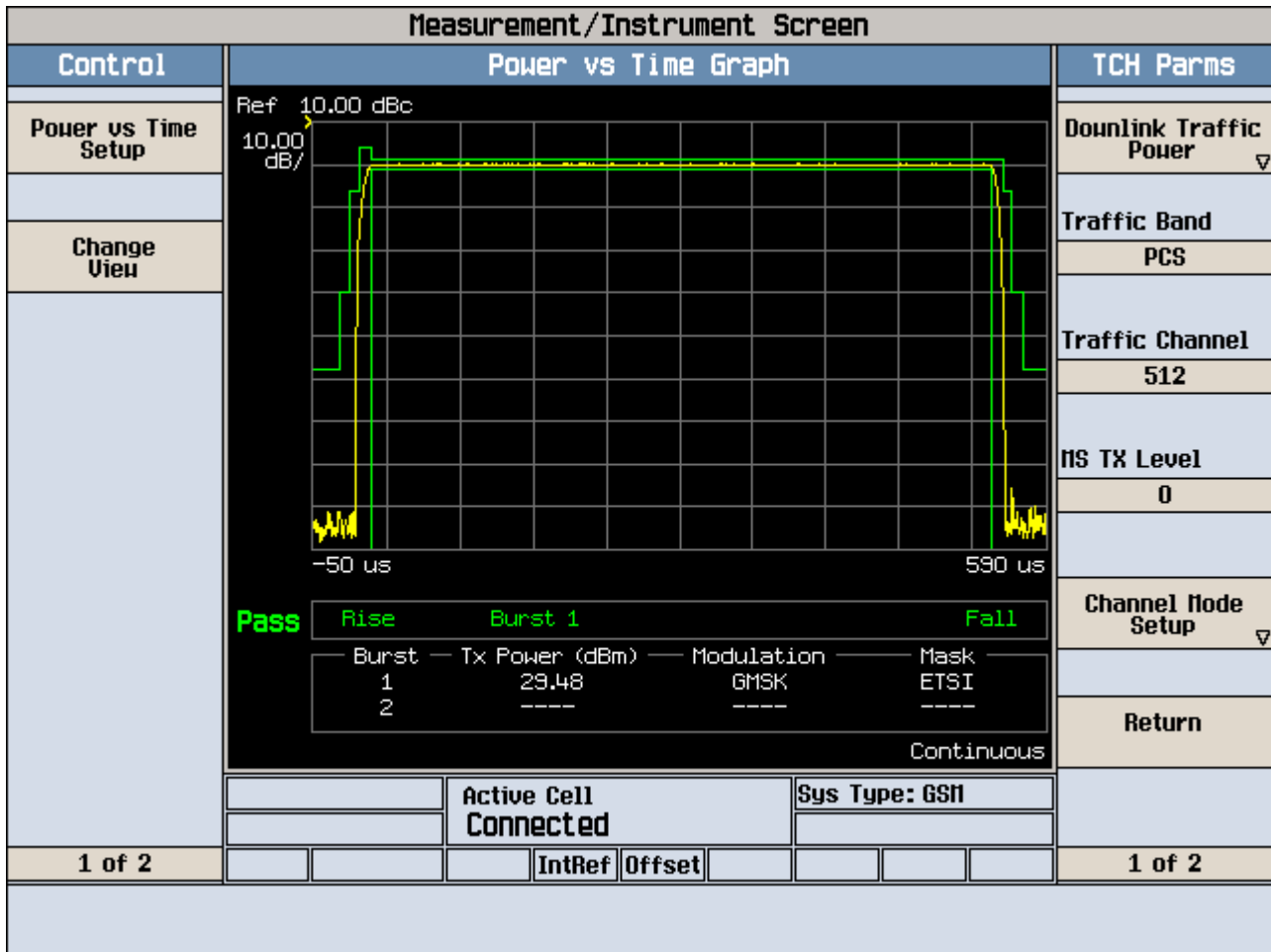
Copyright 2000-2002 Agilent Technologies

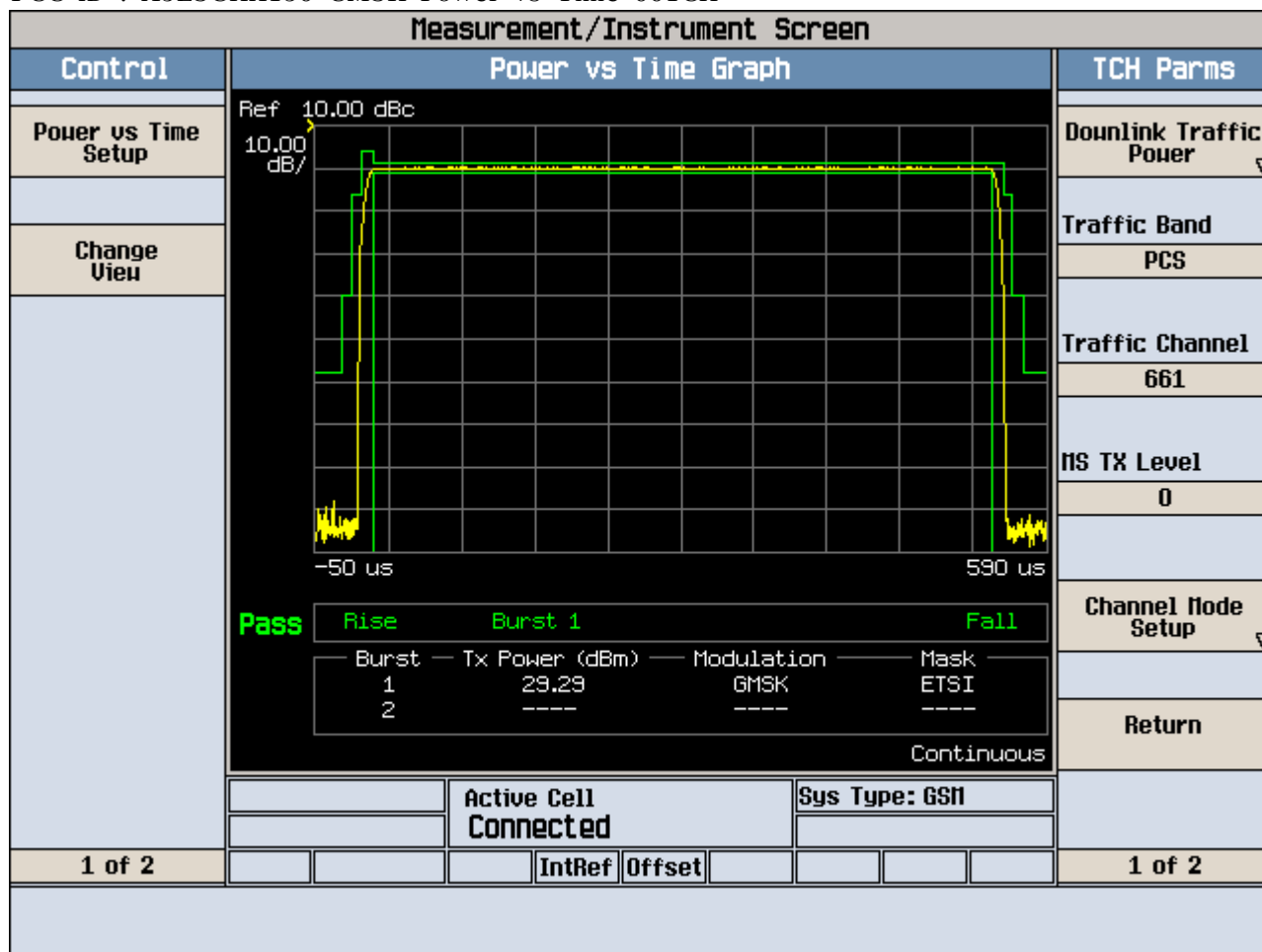


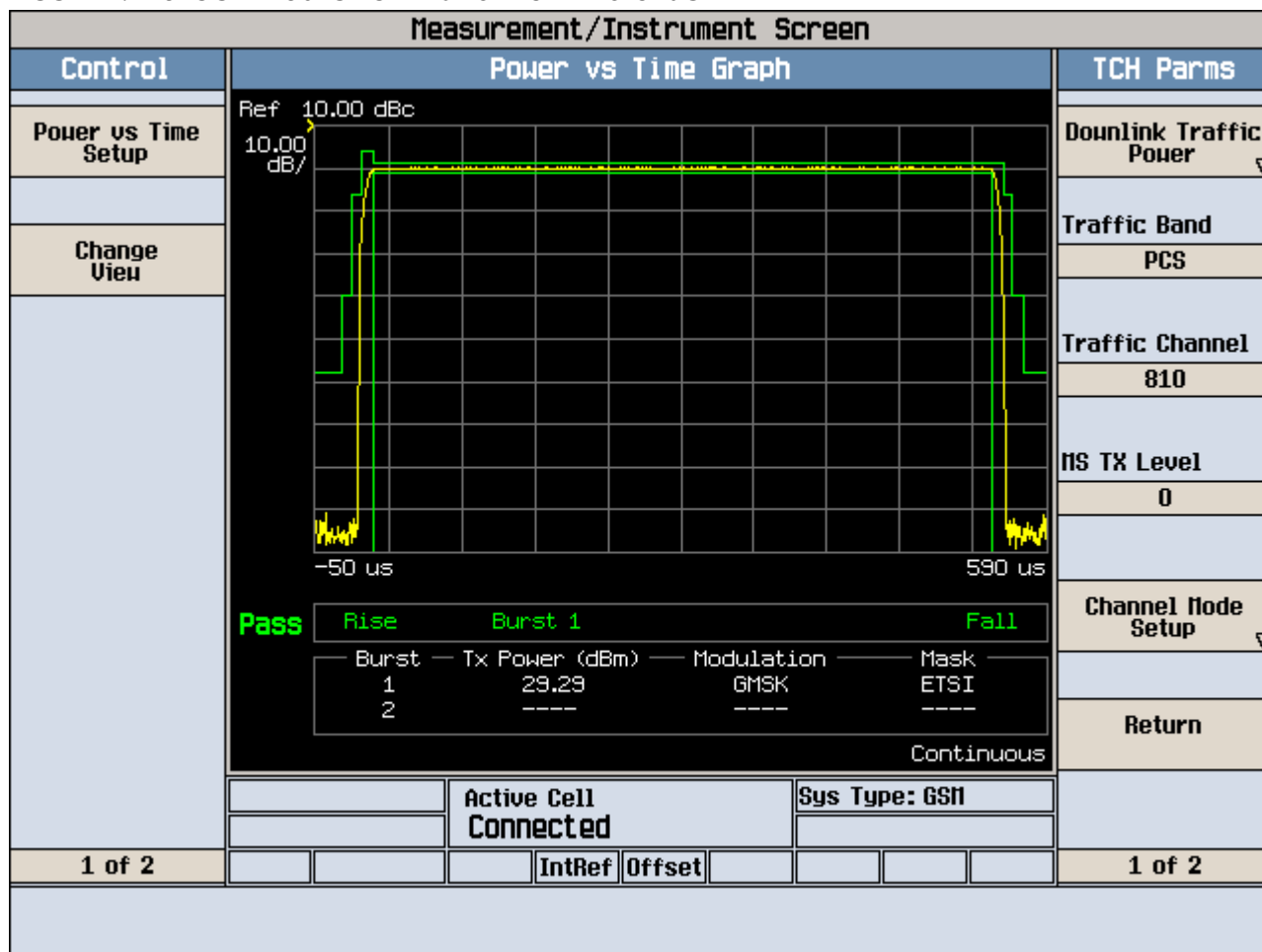
Measurement/Instrument Screen																														
Control		GSM/GPRS Transmit Power						TCH Params																						
GSM/GPRS TX Power Setup ▾		GSMK Transmit Power 29.47 dBm Continuous						Downlink Traffic Power ▾																						
Swap Window Positions								Traffic Band			PCS																			
		Traffic Channel			512																									
		RIS TX Level			0																									
		Channel Mode Setup ▾																												
		Return																												
1 of 2		Phase & Frequency Error Continuous 20 / 50 <table border="1"> <thead> <tr> <th></th> <th>Peak Phase °</th> <th>RMS Phase °</th> <th>Frequency Hz</th> </tr> </thead> <tbody> <tr> <td>Minimum</td> <td>3.93</td> <td>1.57</td> <td>-17.07</td> </tr> <tr> <td>Maximum</td> <td>6.62</td> <td>1.95</td> <td>4.04</td> </tr> <tr> <td>Average</td> <td>5.07</td> <td>1.75</td> <td>-6.73</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	3.93	1.57	-17.07	Maximum	6.62	1.95	4.04	Average	5.07	1.75	-6.73	Pass/Fail	Pass	Pass	Pass			
	Peak Phase °	RMS Phase °	Frequency Hz																											
Minimum	3.93	1.57	-17.07																											
Maximum	6.62	1.95	4.04																											
Average	5.07	1.75	-6.73																											
Pass/Fail	Pass	Pass	Pass																											
		Active Cell Connected			Sys Type: GSM																									
		IntRef			Offset																									
1 of 2								1 of 2																						

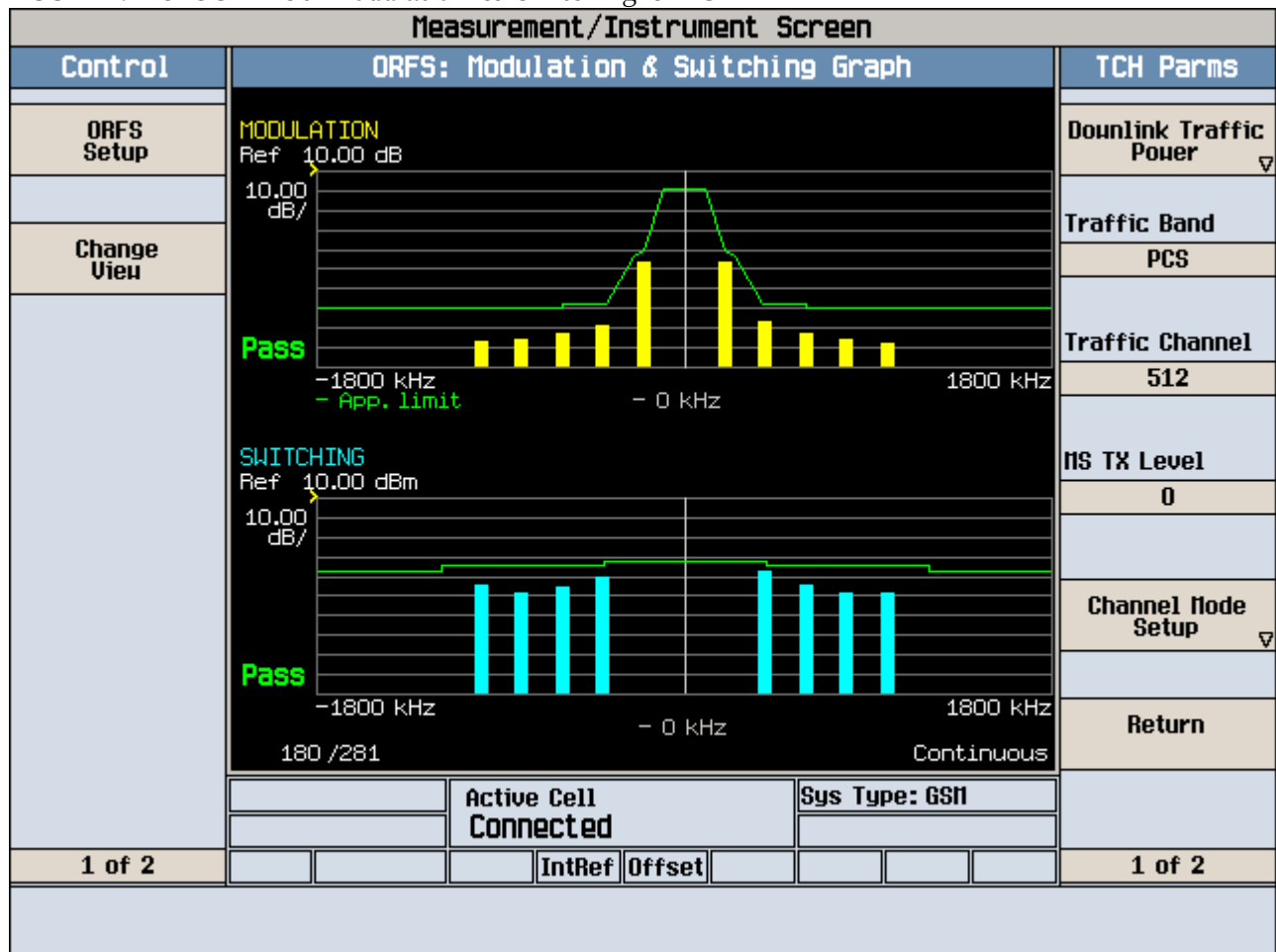
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Swap Window Positions								Traffic Band			PCS																			
		Traffic Channel			661																									
		RIS TX Level			0																									
		Channel Mode Setup ▾																												
		Return																												
1 of 2		Phase & Frequency Error <table border="1"> <thead> <tr> <th></th> <th>Peak Phase °</th> <th>RMS Phase °</th> <th>Frequency Hz</th> </tr> </thead> <tbody> <tr> <td>Minimum</td> <td>3.51</td> <td>1.31</td> <td>-2.09</td> </tr> <tr> <td>Maximum</td> <td>6.02</td> <td>1.82</td> <td>20.15</td> </tr> <tr> <td>Average</td> <td>4.48</td> <td>1.56</td> <td>10.72</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	3.51	1.31	-2.09	Maximum	6.02	1.82	20.15	Average	4.48	1.56	10.72	Pass/Fail	Pass	Pass	Pass	1 of 2		
	Peak Phase °	RMS Phase °	Frequency Hz																											
Minimum	3.51	1.31	-2.09																											
Maximum	6.02	1.82	20.15																											
Average	4.48	1.56	10.72																											
Pass/Fail	Pass	Pass	Pass																											
		Active Cell Connected			Sys Type: GSM																									
		IntRef			Offset																									

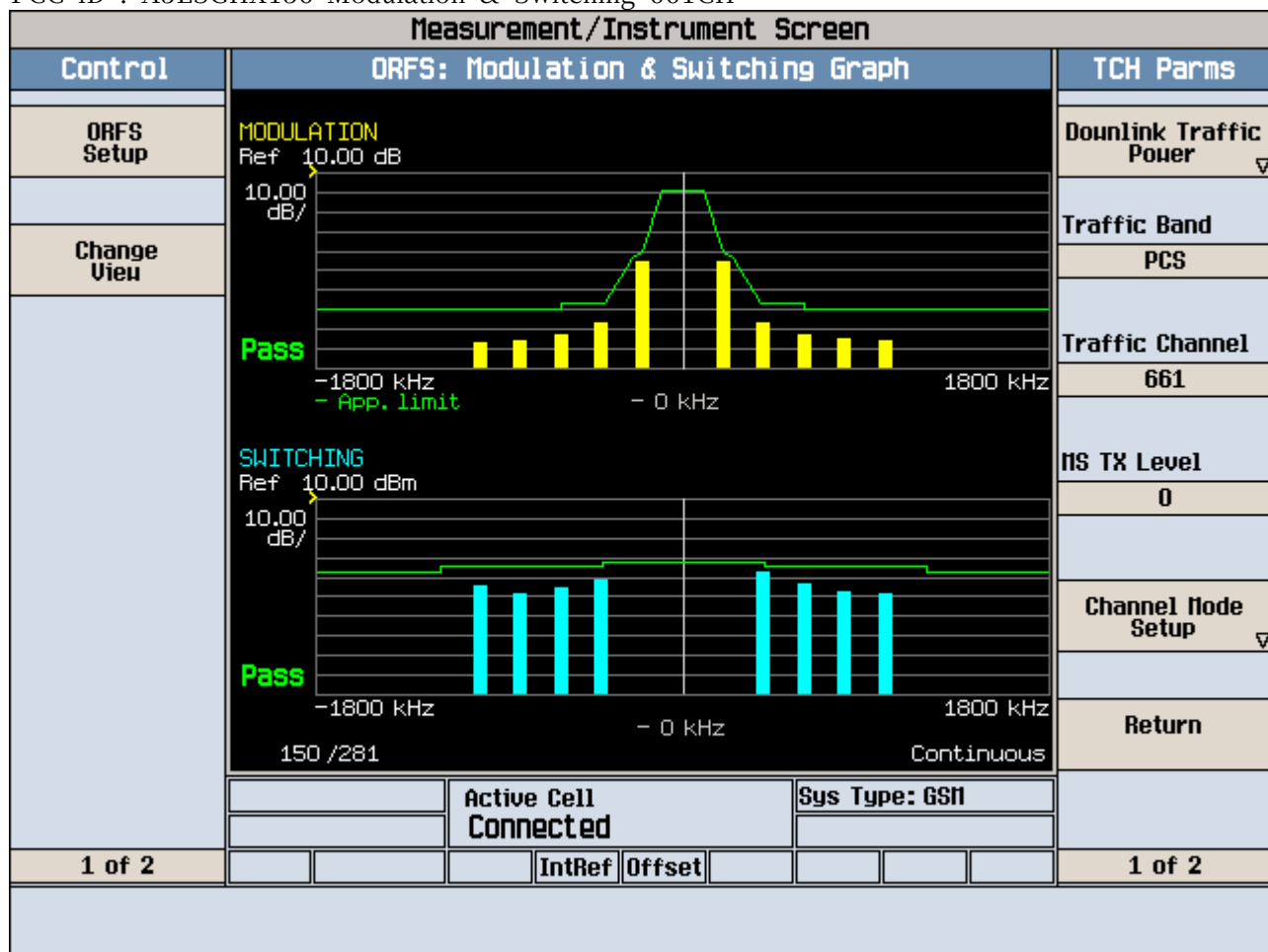
Measurement/Instrument Screen																														
Control		GSM/GPRS Transmit Power						TCH Params																						
GSM/GPRS TX Power Setup ▾		GSMK Transmit Power 29.30 dBm Continuous						Downlink Traffic Power ▾																						
Swap Window Positions								Traffic Band			PCS																			
		Traffic Channel			810																									
		RIS TX Level			0																									
		Channel Mode Setup ▾																												
		Return																												
1 of 2		Phase & Frequency Error Continuous 20 / 50 <table border="1"> <thead> <tr> <th></th> <th>Peak Phase °</th> <th>RMS Phase °</th> <th>Frequency Hz</th> </tr> </thead> <tbody> <tr> <td>Minimum</td> <td>3.60</td> <td>1.32</td> <td>-3.90</td> </tr> <tr> <td>Maximum</td> <td>6.22</td> <td>1.74</td> <td>19.14</td> </tr> <tr> <td>Average</td> <td>4.53</td> <td>1.55</td> <td>9.56</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	3.60	1.32	-3.90	Maximum	6.22	1.74	19.14	Average	4.53	1.55	9.56	Pass/Fail	Pass	Pass	Pass			
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		Active Cell Connected			Sys Type: GSM																									
		IntRef			Offset																									
1 of 2								1 of 2																						

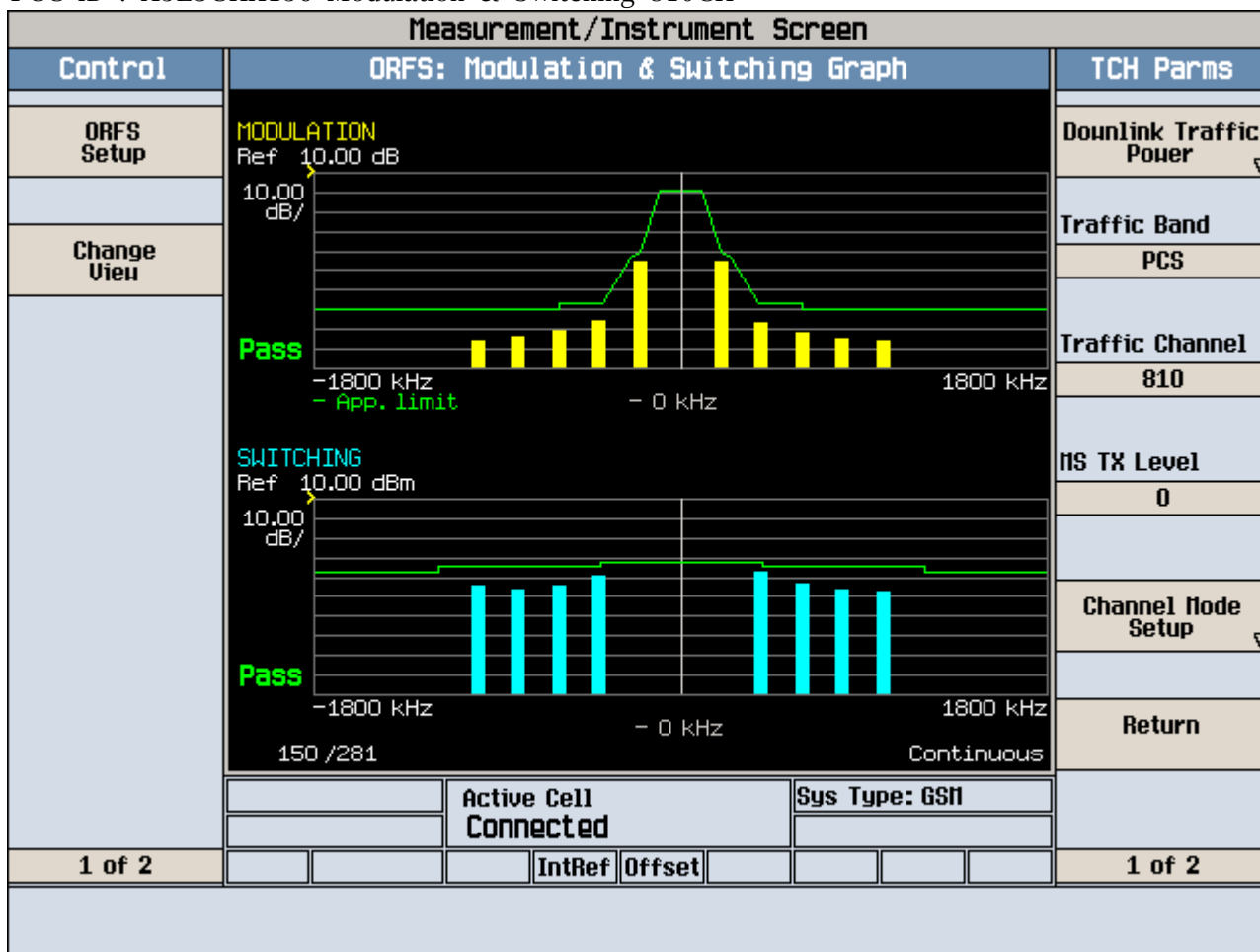


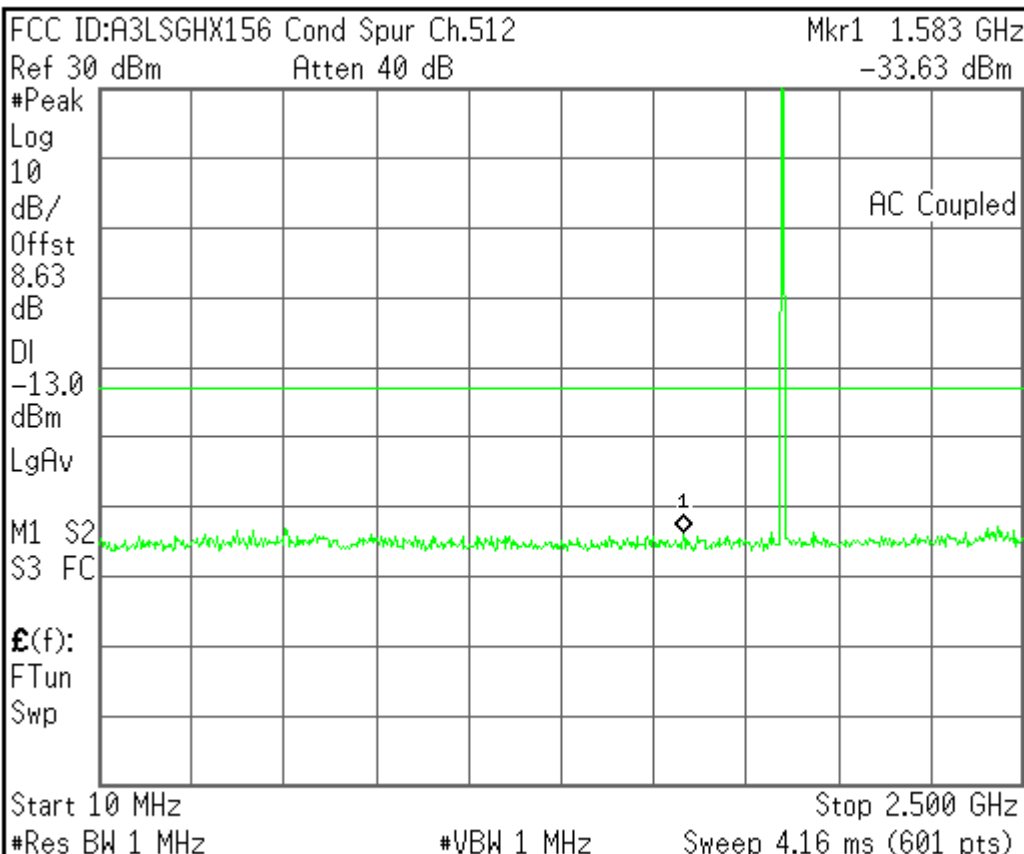












Center Freq
 1.25500000 GHz

Start Freq
 10.0000000 MHz

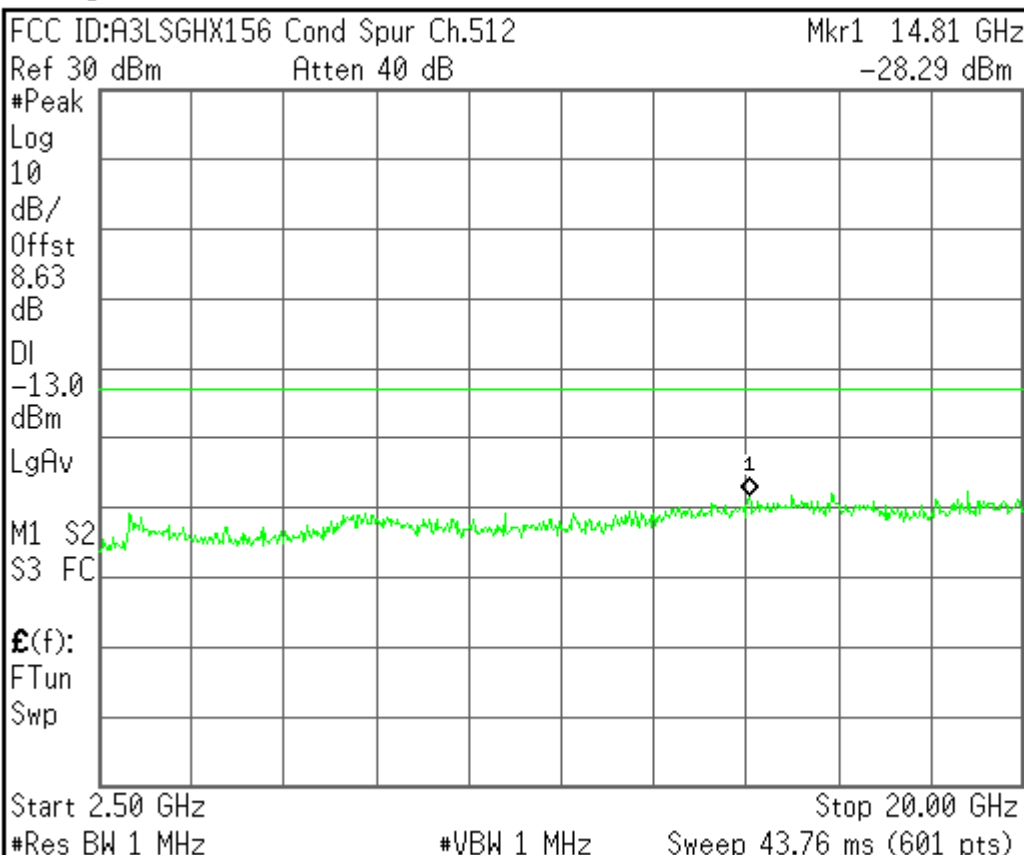
Stop Freq
 2.50000000 GHz

CF Step
 249.000000 MHz
 Auto Man

Freq Offset
 0.00000000 Hz

Signal Track
 On Off

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Center Freq
 11.2500000 GHz

Start Freq
 2.50000000 GHz

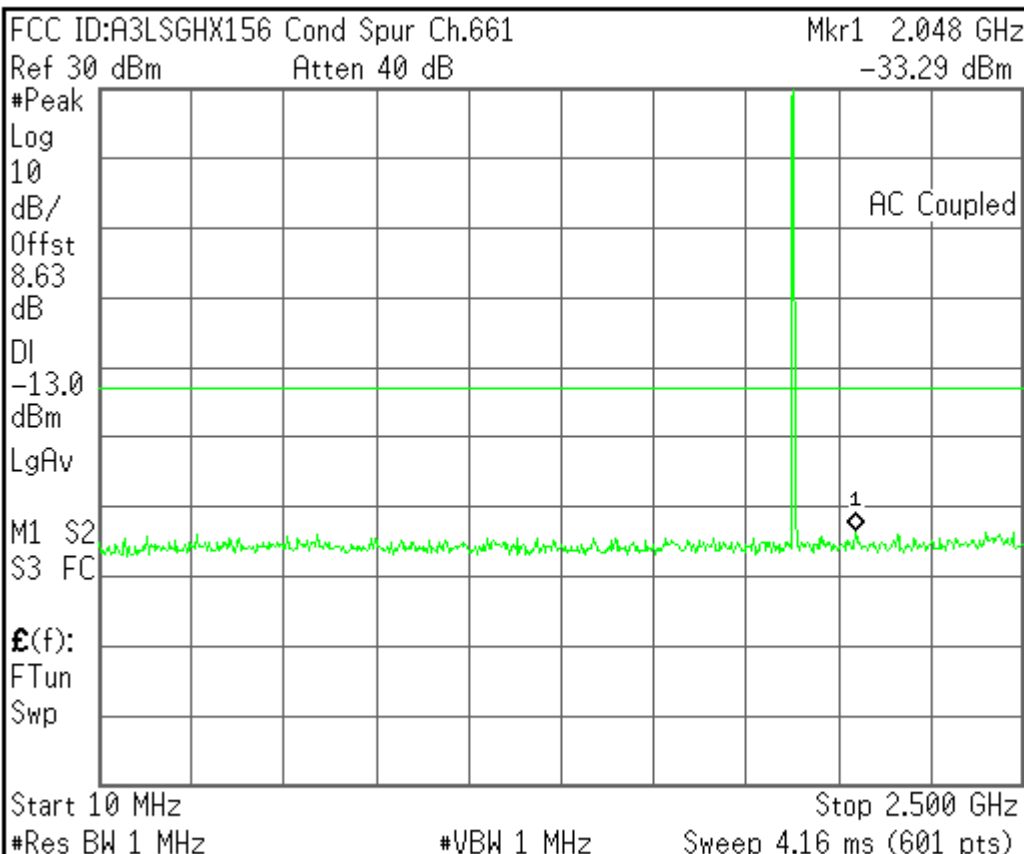
Stop Freq
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CF Step
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 Auto Man

Freq Offset
 0.00000000 Hz

Signal Track
 On Off

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Center Freq
1.25500000 GHz

Start Freq
10.0000000 MHz

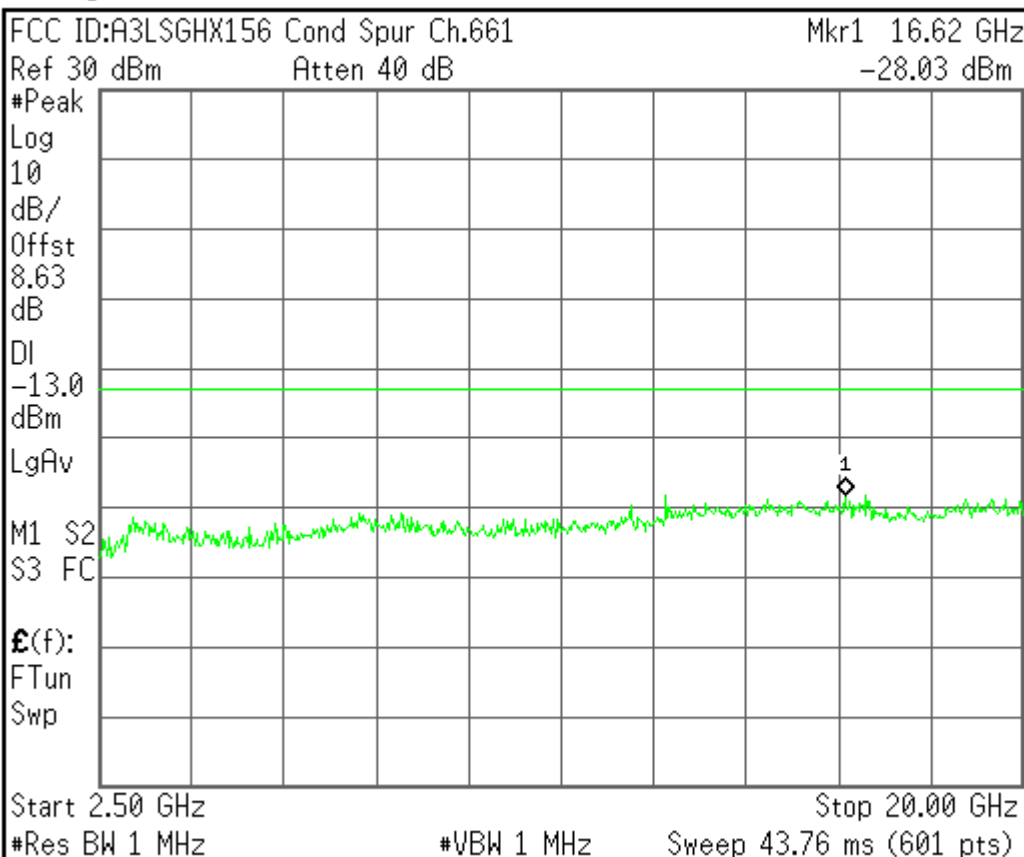
Stop Freq
2.50000000 GHz

CF Step
249.000000 MHz
Auto Man

Freq Offset
0.00000000 Hz

Signal Track
On Off

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Center Freq
11.2500000 GHz

Start Freq
2.50000000 GHz

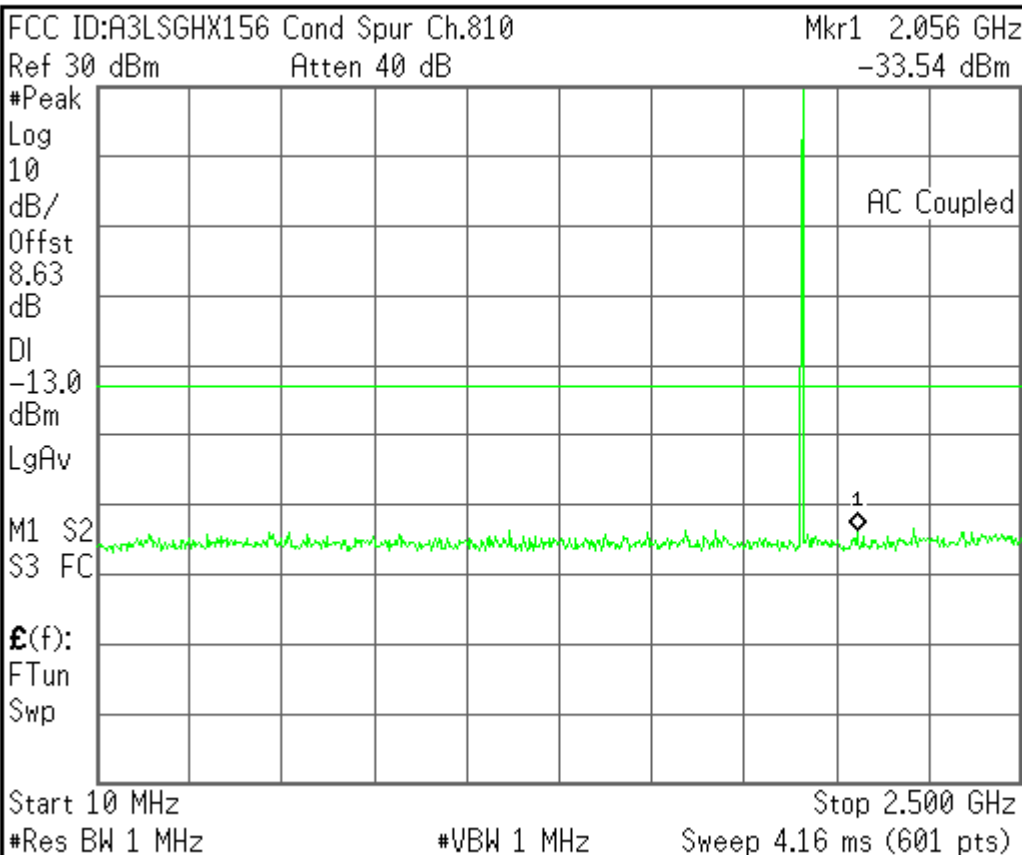
Stop Freq
20.0000000 GHz

CF Step
1.75000000 GHz
Auto Man

Freq Offset
0.00000000 Hz

Signal Track
On Off

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Center Freq
1.25500000 GHz

Start Freq
10.0000000 MHz

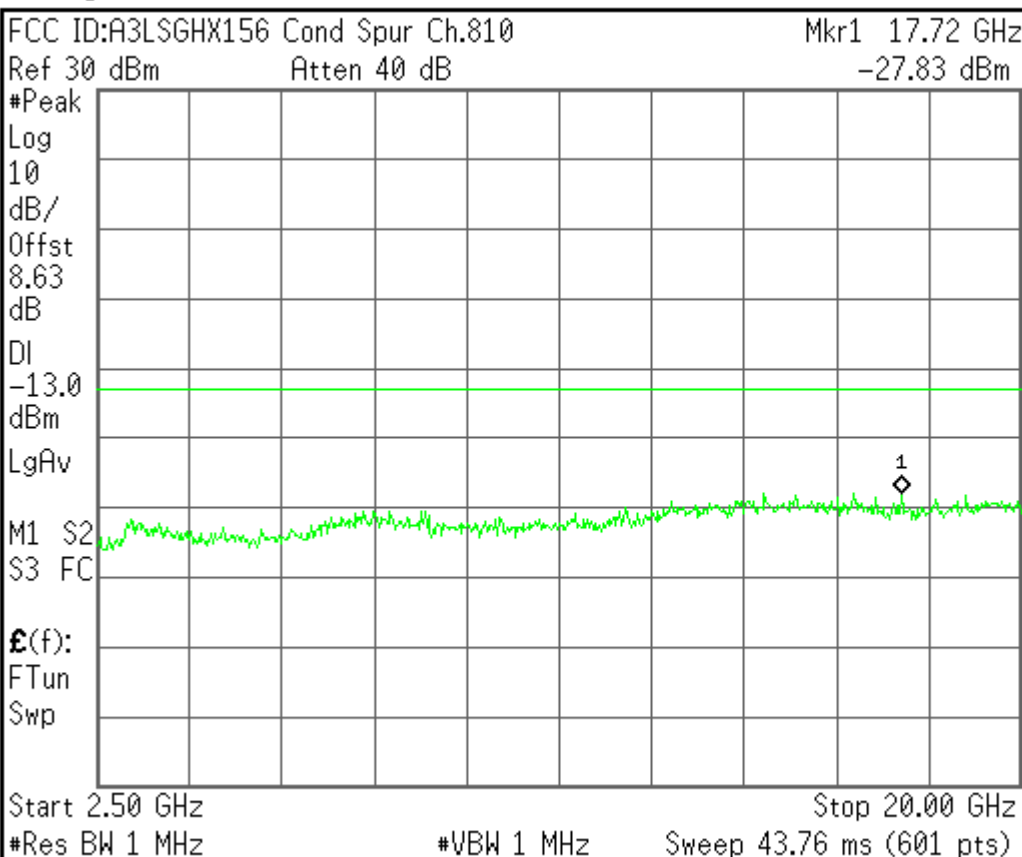
Stop Freq
2.50000000 GHz

CF Step
249.000000 MHz
Auto Man

Freq Offset
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Signal Track
On Off

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Center Freq
11.2500000 GHz

Start Freq
2.50000000 GHz

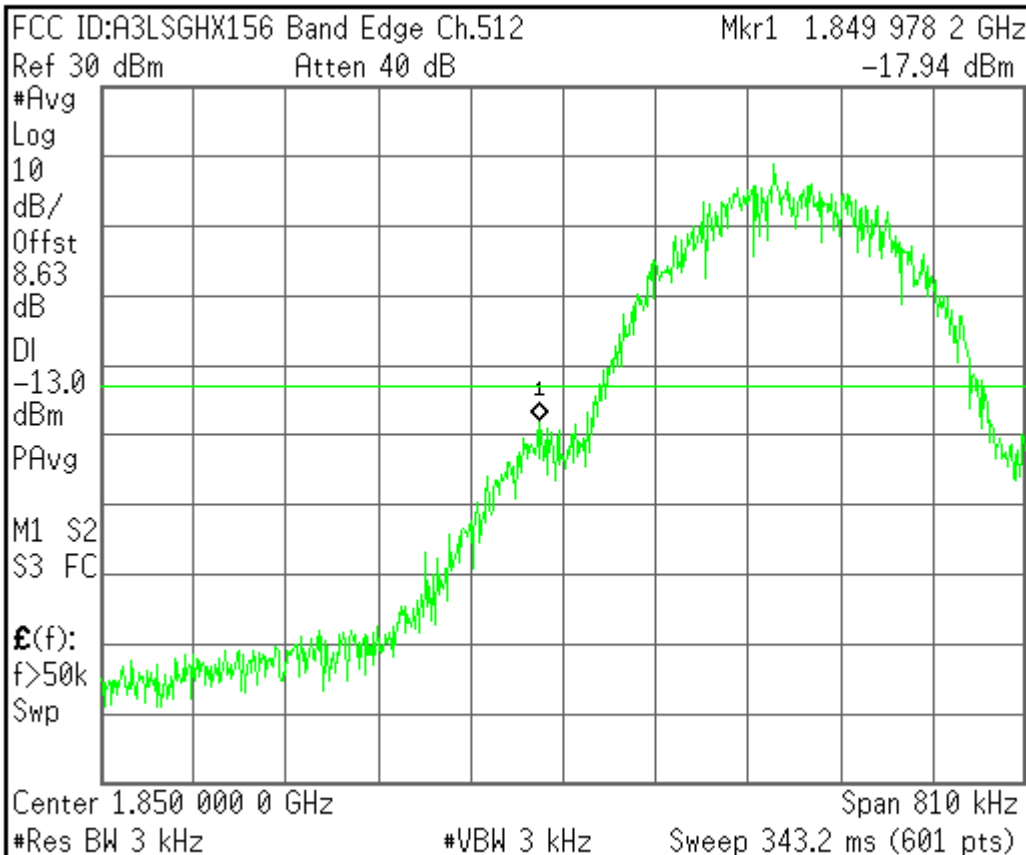
Stop Freq
20.0000000 GHz

CF Step
1.75000000 GHz
Auto Man

Freq Offset
0.00000000 Hz

Signal Track
On Off

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Center Freq
 1.85000000 GHz

Start Freq
 1.84959500 GHz

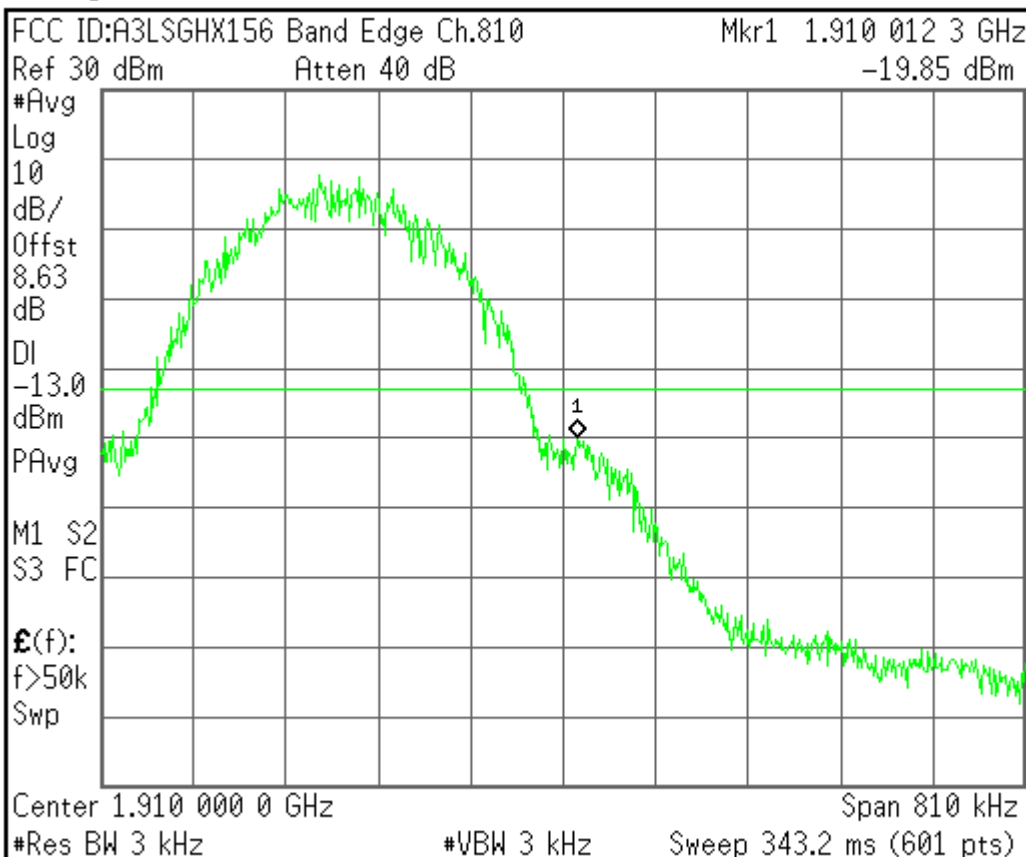
Stop Freq
 1.85040500 GHz

CF Step
 81.00000000 kHz
 Auto Man

Freq Offset
 0.00000000 Hz

Signal Track
 On Off

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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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