HCT CO., LTD.

SAN 136-1, AMI-RI , BUBAL-EUP, ICHEON-SI, KYOUNGKI-DO, 467-701, KOREA
TEL: +82 31 639 8565 FAX : +82 31 639 8525 www.hct.co.kr

CERTIFICATE OF COMPLIANCE

FCC Part 24 & 22 Certification

Avantis Co., Ltd.

Room #502, Seoil building, 1543-8, Seocho-dong, Seocho-gu, Seoul, Korea 137-872

Date of Issue: December 2, 2008
Test Report No.: HCT-SAR08-0101
Test Site: HCT CO., LTD.

FCC ID : **VXMSTANDALONETCD**

APPLICANT : Avantis Co., Ltd.

EUT Type:	TCD
Tx Frequency:	824.20 – 848.80 MHz (GSM850) / 1 850.20 – 1 909.80 MHz (GSM1900)
Rx Frequency:	869.20 – 893.80 MHz (GSM850) / 1 930.20 – 1 989.80 MHz (GSM1900)
Max. RF Output Power:	1.393 W ERP GSM850 (31.44 dBm) / 0.760 W EIRP GSM1900 (28.81 dBm)
Trade Name/Model(s):	Avantis / Stand Alone TCD
FCC Classification:	PCS Licensed Transmitter worn on body (PCT)
Application Type:	Certification
FCC Rule Part(s):	§22, §24, §2
Antenna Specifications:	Manufacturer: Auden Techno Corp.
	MODEL: CP-1210DS-200, Gain: CDMA: - 0.76 dBi / PCS: -1.25 dBi
	(Length= 105 mm)
Emission Designator(s):	300KGXW (GSM)

This equipment has been shown to be capable of compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in ∮ 2.947.

I attest to the accuracy of data. All measurements reported herein were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

HCT CO., LTD. Certifies that no party to this application has been denied FCC benefits pursuant to section 5301 of the Anti- Drug Abuse Act of 1998, 21 U.S. C. 853(a)

Report prepared by
: Young-Kwan Kim
Test Engineer of RF Part

Approved by
: Sang- Jun Lee
Manager of RF Part

Table of Contents

MEASUREMENT REPORT

1. SCOPE

Measurement and determination of electromagnetic emissions (EME) of radio frequency devices including intentional and/or unintentional radiators for compliance with the technical rules and regulations of the Federal Communications Commission.

General Information

Company Name:	**Avantis Co., Ltd.**
Address:	**Room #502, Seoil building, 1543-8, Seocho-dong, Seocho-gu, Seoul, Korea 137-872**
Tel. / Fax :	**82-2-3474-7205 / 82-2-3474-720**

• EUT Type:	TCD
• Trade Name:	Avantis
• Model(s):	Stand Alone TCD
• Serial Number(s):	#1
• Tx Frequency:	824.20 – 848.80 MHz (GSM850) 1 850.20 – 1 909.80 MHz (GSM1900)
• Rx Frequency:	869.20 – 893.80 MHz (GSM850) 1 930.20 – 1 989.80 MHz (GSM1900)
• Application Type:	Certification
• FCC Classification:	PCS Licensed Transmitter worn on body (PCT)
• FCC Rule Part(s):	§22, §24, §2
• Modulation(s):	GSM
• Antenna Type:	Intenna
• Date(s) of Tests:	December 27, 2007 ~ December 28, 2007
• Place of Tests:	HCT CO., LTD. Icheon, Kyounki-Do, KOREA
• Report Serial No.:	HCT-SAR08-0101

2. INTRODUCTION

EUT DESCRIPTION

The Avantis Co., Ltd. TCD. Its basic purpose is used for communications. It transmits from 824.20 – 848.80 MHz (GSM850), 1 850.20 – 1 909.80 MHz (GSM1900) and receives from 869.20 – 893.80MHz (GSM850), 1 930.20 – 1 989.80 MHz (GSM1900)). The RF power is rated at GSM850 (1.393 W), GSM1900 (0.760 W).

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.

Test Facility

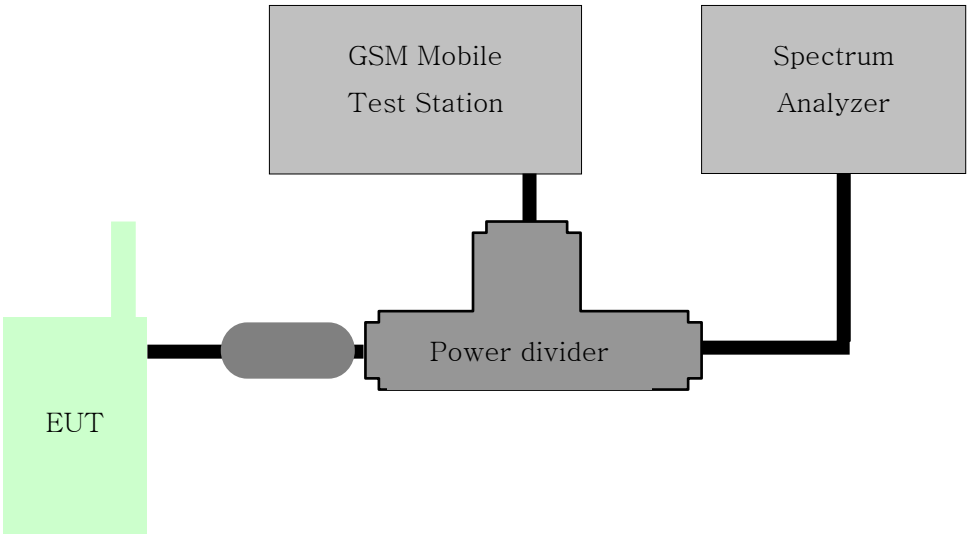
The open area test site and conducted measurement facility used to collect the radiated data are located at the 254-1, Maekok-Ri, Hobup-Myun, Ichon-Si, Kyoungki-Do, 467-701, KOREA. The site is constructed in conformance with the requirements of ANSI C63.4 and CISPR Publication 22. Detailed description of test facility was submitted to the Commission and accepted dated July 6, 2006(Registration Number: 90661)

3. DESCRIPTION OF TESTS

3.1 Conducted RF Power TEST

According to FCC §2.1046 (A), for transmitters other than single sideband, independent sideband and controlled carrier radiotelephone, power output shall be measured at the RF output terminals when the transmitter is adjusted in accordance with the tune-up procedure to give the values of current and voltage on the circuit elements specified in § 2.1033(c)(8). The electrical characteristics of the radio frequency load attached to the output terminals when this test is made shall be stated.

Test Set-up

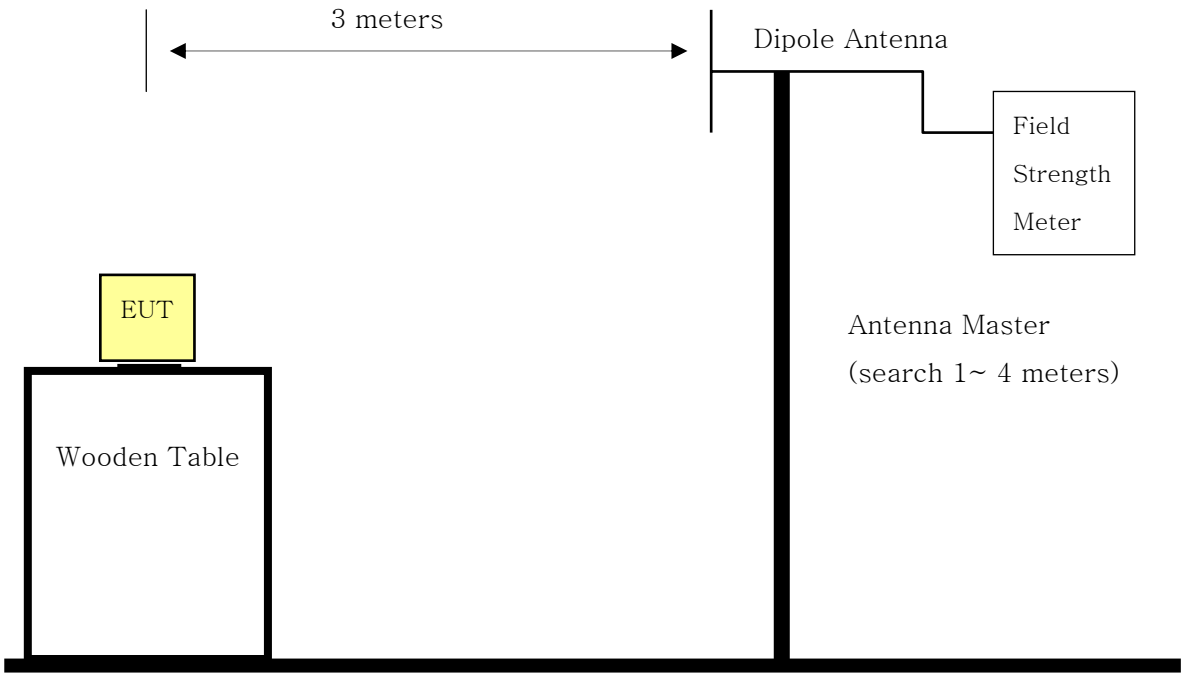


Test Procedure

1) The EUT was coupled to the spectrum analyzer and the base station simulator through a power divider. The radio frequency load attached to the EUT antenna terminal was 50 Ohm. The lost of the cables the test system is calibrated to correct the reading.
2) The spectrum analyzer was set to Maxpeak Detector function and Maximum hold mode.
3) The resolution banswidth of the spectrum analyzer was comparable to the emission bandwidth.

3.2 Effective Radiated Power.

Test Set-up



[Open Field Test Site]

Test Procedure

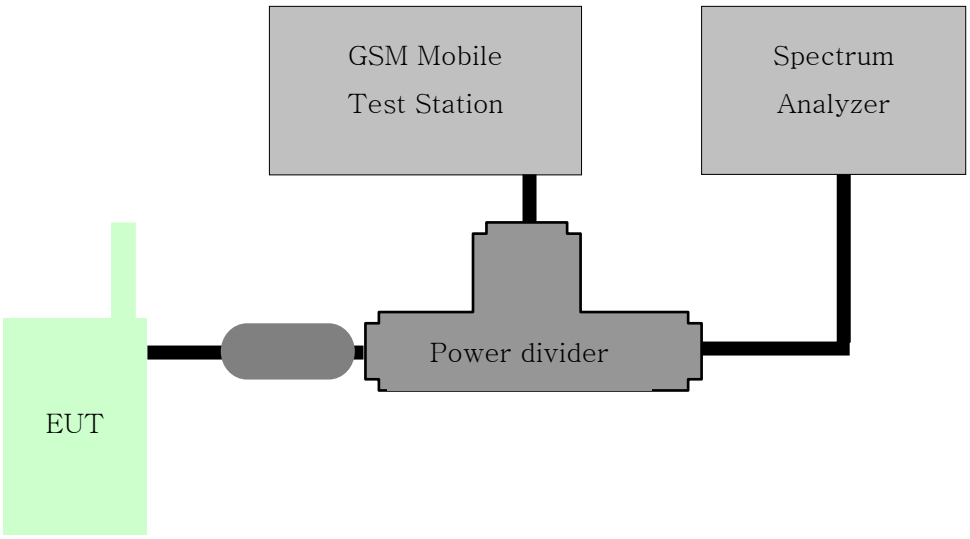
The measurement facilities used for this test have been documented in previous filings with the commission pursuant to section 2.948.

The open field test site is situated in open field with ground screen whose site attenuation characteristics meet ANSI C63.4 –2003. A mast capable of lifting the receiving antenna from a height of one to four meters is used together with a turn-able wooden platform mounted at three from the antenna mast.

1) The EUT mounted on a wooden tripod is 0.8 meter above test site ground level.
2) During the test, the turn table is rotated and the antenna height is also varied from 1 to 4 meters until the maximum signal is found.
3) Record the field strength meter's level.
4) Replace the EUT with λ/ 2 dipole antenna that is connected to a calibrated signal generator.
5) Increase the signal generator output till the field strength meter's level is equal to the item (4). (47 dBm Amp is used for ERP/EIRP.)
6) The signal generator output level is the rating of effective radiated power (ERP).
7) The instrument settings used (RBW/ VBW) during ERP/ EIRP output power measurement are as Below;
   -. Below 1 GHz : RBW 3 MHz, VBW 3 MHz
   -. Above 1 GHz : RBW 3 MHz, VBW 3 MHz

3.3 Occupied bandwidth.

Test Set-up

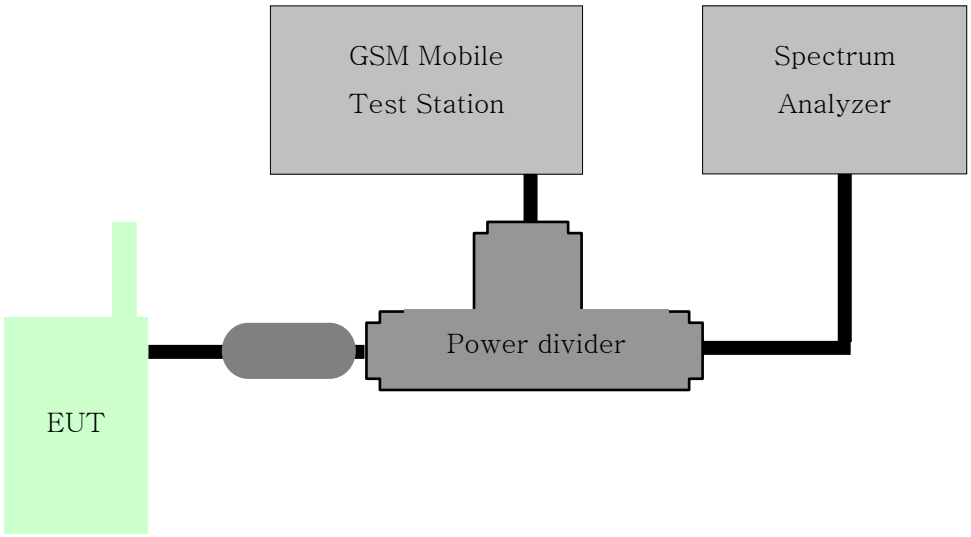


Test Procedure

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 26 dB below the transmitter power. Plots of the EUT's occupied bandwidth are shown herein.

3.4 Spurious and Harmonic Emissions at Antenna Terminal.

Test Set-up

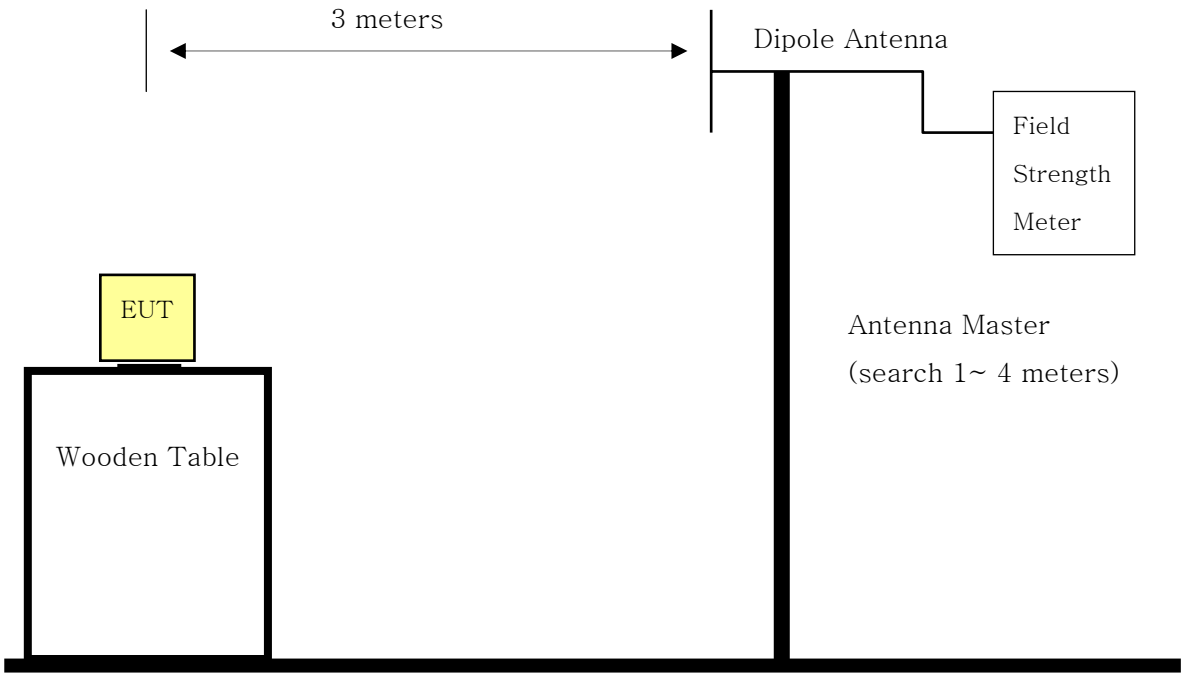


Test Procedure

The EUT was setup to maximum output power at its lowest channel. The Resolution BW of the analyzer is set to 1 % of the emission bandwidth to show compliance with the – 13 dBm limit, in the 1 MHz bands immediately outside and adjacent to the edge of the frequency block. The 1 MHz RBW was used to scan from 10 MHz to 10 GHz. (PCS Mode: 10 MHz to 20 GHz). A display line was placed at – 13 dBm to show compliance. The high, lowest and a middle channel were tested for out of band measurements.

3.5 Field strength of spurious radiation .

Test Set-up



[Open Field Test Site]

Test Procedure

The measurement facilities used for this test have been documented in previous filings with the commission pursuant to section 2.948.
The open field test site is situated in open field with ground screen whose site attenuation characteristics meet ANSI C63.4 –2003. A mast capable of lifting the receiving antenna from a height of one to four meters is used together with a turn-able wooden platform mounted at three from the antenna mast.

1) The unit mounted on a wooden table 1.5 m × 1.0 m × 0.80 m is 0.8 meter above test site ground level.
2) During the emission test, the turn table is rotated and the EUT is manipulated to find the configuration resulting in maximum emission under normal condition of installation and operation.
3) The antenna height and polarization are also varied from 1 to 4 meters until the maximum signal is found.
4) The spectrum shall be scanned up to the 10^{th} harmonic of the fundamental frequency.
5) The instrument settings used (RBW/ VBW) during ERP/ EIRP output power measurement are as below ;

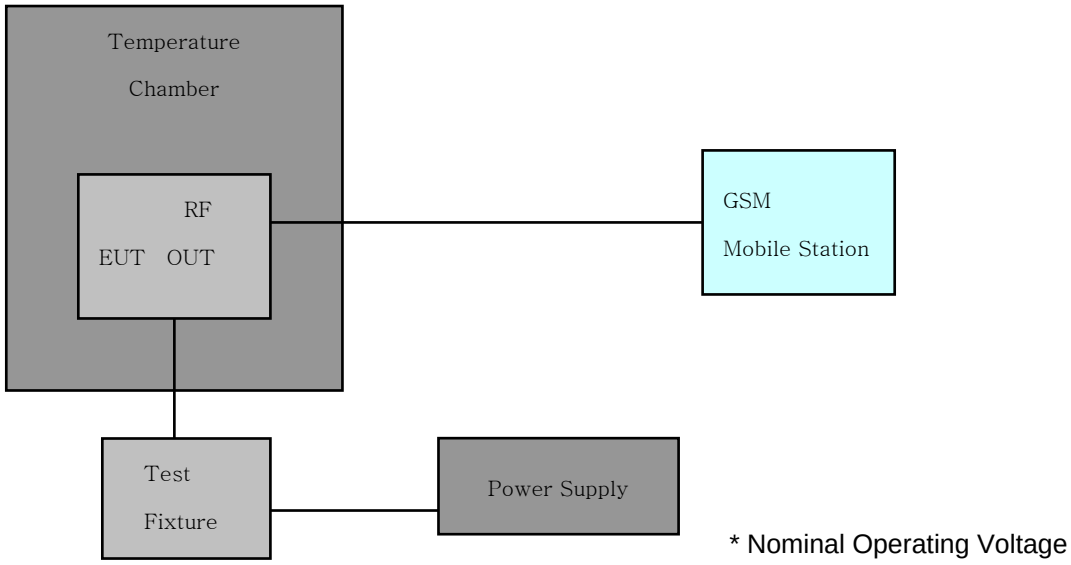
   -. Below 1 GHz : RBW 3 MHz, VBW 3 MHz

   -. Above 1 GHz : RBW 3 MHz, VBW 3 MHz

3.6 Frequency stability .

3.6.1 Frequency stability with variation of ambient temperature.

Test Set-up



* Nominal Operating Voltage

Test Procedure

The frequency stability of the transmitter is measured by:

a.) **Temperature:** The temperature is varied from - 30 °C to + 50 °C using an environmental chamber.

b.) **Primary Supply Voltage:** The primary supply voltage is varied from battery end point 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 ± 0.000 25 %(± 2.5 ppm) of the center frequency.

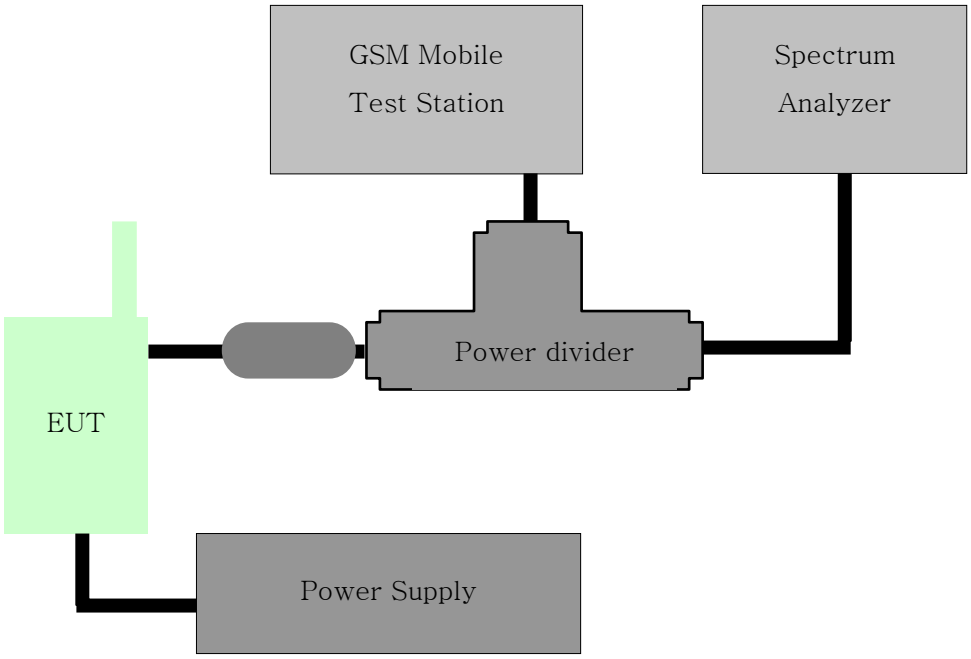
Time Period and Procedure:

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 power 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 were made at 10 °C intervals starting at - 30 °C up to + 50 °C allowing at least two hours at each temperature for stabilization. In all measurements the frequency is measured within three minutes after 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.

3.6.2 Frequency stability with variation of primary supply voltage.

Test Set-up

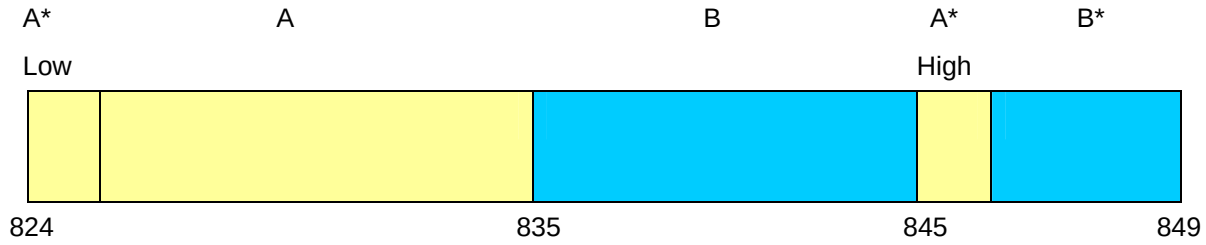


Test Procedure

1) The primary supply is varied in steps of from battery end point to 115 % of the nominal supply voltage, or reduce primary supply voltage to the battery operating end point.
4) The frequency is recorded each 10 °C step.

3.7 Frequency Block Edge

3.7.1 Cellular - Mobile Frequency Blocks



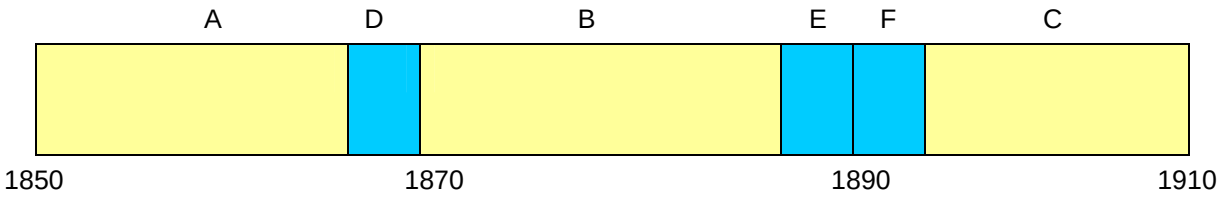
BLOCK 1: 824 – 835 MHz (A* Low + A)

BLOCK 2: 835 – 845 MHz (B)

BLOCK 3: 845 – 846.5 MHz (A* High)

BLOCK 4: 846.5 – 849 MHz (B*)

3.7.2 Cellular - Mobile Frequency Blocks



BLOCK 1: 1 850 – 1 865 MHz (A)

BLOCK 2: 1 865 – 1870 MHz (D)

BLOCK 3: 1 870 – 1 885 MHz (B)

BLOCK 4: 1 885 – 1 890 MHz (E)

BLOCK 5: 1 890 – 1 895 MHz (F)

BLOCK 6: 1 895 – 1 910 MHz (C)

4. Effective Radiated Power Output (CDMA)

Radiated measurements at 3 meters

Modulation: GSM850

Freq. (MHz)	REF. LEVEL (dBm)	POL (H/V)	ERP (W)	ERP (dBm)	BATTERY
824.20	- 15.71	V	1.393	31.44	Standard
836.60	- 16.12	V	1.268	31.03	Standard
848.80	- 16.16	V	1.256	30.99	Standard

Note: Standard batteries are the only options for this phone

NOTES:

Effective Radiated Power Output Measurements by Substitution Method
According to ANSI/TIA/EIA-603-C-2004, Aug. 17, 2004:

The EUT was placed on a wooden turn table 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 CDMA signals, a peak detector is used, with RBW = VBW = 3 MHz. For AMPS, GSM, and NADC TDMA signals, a peak detector is used, with RBW = VBW = 1 MHz. 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 the dipole is measured. The ERP is recorded.

5. Equivalent Isotropic Radiated Power (E.I.R.P.) PCS CDMA

Radiated measurements at 3 meters

Modulation: GSM1900

Freq. (MHz)	REF. LEVEL (dBm)	POL (H/V)	EIRP (W)	EIRP (dBm)	BATTERY
1 850.20	- 25.25	V	0.760	28.81	Standard
1 880.00	- 25.82	V	0.667	28.24	Standard
1 909.80	- 25.70	V	0.685	28.36	Standard

Note: Standard batteries are the only options for this phone

NOTES:

Equivalent Isotropic Radiated Power Measurements by Substitution Method According to ANSI/TIA/EIA-603-C-2004, Aug. 17, 2004:

The EUT was placed on a wooden turn table 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 CDMA signals, a peak detector is used, with RBW = VBW = 3 MHz. For AMPS, GSM, and NADC TDMA signals, a peak detector is used, with RBW = VBW = 1 MHz. A Horn antenna was substituted in place of the EUT. This Horn 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 the Horn antenna is measured. The difference between the gain of the horn and an isotropic antenna is taken into consideration and the EIRP is recorded.

6. Radiated Measurements

6.1 GSM850 Radiated Measurements

Field Strength of SPURIOUS Radiation

- ▣ OPERATING FREQUENCY: 824.20 MHz
- ▣ CHANNEL: 128 (Low)
- ▣ MEASURED OUTPUT POWER: 31.44 dBm = 1.393 W
- ▣ MODULATION SIGNAL: GSM (Internal)
- ▣ DISTANCE: 3 meters
- ▣ LIMIT: - (43 + 10 lo_{g10} (W)) = - 44.44 dBc

Freq. (MHz)	LEVEL@ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBd)	CORRECT GENERATOR LEVEL (dBm)	POL (H/V)	(dBc)
1 648.40	- 44.48	7.3	- 37.18	V	- 64.3
2 472.60	- 42.32	8.3	- 34.02	V	- 60.4
3 296.80	- 55.01	9.7	- 45.31	V	- 70.5

NOTES:

Radiated Spurious Emission Measurements by Substitution Method

According to ANSI/TIA/EIA-603-C-2004, Aug. 17, 2004:

The EUT was placed on a wooden turn table 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 CDMA signals, a peak detector is used, with RBW = VBW = 3 MHz. For AMPS, GSM, and NADC TDMA signals, a peak detector is used, with RBW = VBW = 1 MHz. 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 1 GHz, 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.

6. Radiated Measurements

6.2 GSM850 Radiated Measurements

Field Strength of SPURIOUS Radiation

- ▣ OPERATING FREQUENCY: 836.60 MHz
- ▣ CHANNEL: 190 (Mid)
- ▣ MEASURED OUTPUT POWER: 31.44 dBm = 1.393 W
- ▣ MODULATION SIGNAL: GSM (Internal)
- ▣ DISTANCE: 3 meters
- ▣ LIMIT: - (43 + 10 lo_{g10} (W)) = - 44.44 dBc

Freq. (MHz)	LEVEL@ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBd)	CORRECT GENERATOR LEVEL (dBm)	POL (H/V)	(dBc)
1 673.20	- 49.74	7.3	- 42.44	V	- 69.6
2 509.80	- 39.88	8.3	- 31.58	V	- 57.9
3 346.40	- 57.13	9.7	- 47.43	V	- 72.6

NOTES:

Radiated Spurious Emission Measurements by Substitution Method

According to ANSI/TIA/EIA-603-C-2004, Aug. 17, 2004:

The EUT was placed on a wooden turn table 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 CDMA signals, a peak detector is used, with RBW = VBW = 3 MHz. For AMPS, GSM, and NADC TDMA signals, a peak detector is used, with RBW = VBW = 1 MHz. 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 1 GHz, 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.

6. Radiated Measurements

6.3 GSM850 Radiated Measurements

Field Strength of SPURIOUS Radiation

- ▣ OPERATING FREQUENCY: 848.80 MHz
- ▣ CHANNEL: 251 (High)
- ▣ MEASURED OUTPUT POWER: 31.44 dBm = 1.393 W
- ▣ MODULATION SIGNAL: GSM (Internal)
- ▣ DISTANCE: 3 meters
- ▣ LIMIT: - (43 + 10 lo_{g10} (W)) = - 44.44 dBc

Freq. (MHz)	LEVEL@ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBd)	CORRECT GENERATOR LEVEL (dBm)	POL (H/V)	(dBc)
1 699.60	- 51.02	7.3	- 43.72	V	- 70.9
2 549.40	- 40.59	8.3	- 32.29	V	- 58.6
3 390.20	- 53.23	9.7	- 43.53	V	- 68.7

NOTES:

Radiated Spurious Emission Measurements by Substitution Method

According to ANSI/TIA/EIA-603-C-2004, Aug. 17, 2004:

The EUT was placed on a wooden turn table 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 CDMA signals, a peak detector is used, with RBW = VBW = 3 MHz. For AMPS, GSM, and NADC TDMA signals, a peak detector is used, with RBW = VBW = 1 MHz. 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 1 GHz, 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.

6. Radiated Measurements

6.4 GSM1900 Radiated Measurements

Field Strength of SPURIOUS Radiation

- ▣ OPERATING FREQUENCY: 1 850.20 MHz
- ▣ CHANNEL: 512 (Low)
- ▣ MEASURED OUTPUT POWER: 28.81 dBm = 0.760 W
- ▣ MODULATION SIGNAL: GSM (Internal)
- ▣ DISTANCE: 3 meters
- ▣ LIMIT: - (43 + 10 lo_{g10} (W)) = - 41.81 dBc

Freq. (MHz)	LEVEL@ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBd)	CORRECT GENERATOR LEVEL (dBm)	POL (H/V)	(dBc)
3 700.40	- 73.82	12.4	- 61.42	V	- 81.2
5 550.60	- 65.69	11.7	- 53.99	V	- 74.7
7 400.80	- 67.89	11.5	- 56.39	V	- 77.5

NOTES:

Radiated Spurious Emission Measurements by Substitution Method

According to ANSI/TIA/EIA-603-C-2004, Aug. 17, 2004:

The EUT was placed on a wooden turn table 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 CDMA signals, a peak detector is used, with RBW = VBW = 3 MHz. For AMPS, GSM, and NADC TDMA signals, a peak detector is used, with RBW = VBW = 1 MHz. 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 1 GHz, 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.

6. Radiated Measurements

6.5 GSM1900 Radiated Measurements

Field Strength of SPURIOUS Radiation

- ▣ OPERATING FREQUENCY: 1 880.00 MHz
- ▣ CHANNEL: 661 (Mid)
- ▣ MEASURED OUTPUT POWER: 28.81 dBm = 0.760 W
- ▣ MODULATION SIGNAL: GSM (Internal)
- ▣ DISTANCE: 3 meters
- ▣ LIMIT: - (43 + 10 lo_{g10} (W)) = - 41.81 dBc

Freq. (MHz)	LEVEL@ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBd)	CORRECT GENERATOR LEVEL (dBm)	POL (H/V)	(dBc)
3 760.00	- 73.41	12.4	- 61.01	V	- 80.8
5 460.00	- 72.01	11.7	- 60.31	V	- 81.0
7 520.00	- 67.91	11.5	- 56.41	V	- 77.5

NOTES:

Radiated Spurious Emission Measurements by Substitution Method

According to ANSI/TIA/EIA-603-C-2004, Aug. 17, 2004:

The EUT was placed on a wooden turn table 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 CDMA signals, a peak detector is used, with RBW = VBW = 3 MHz. For AMPS, GSM, and NADC TDMA signals, a peak detector is used, with RBW = VBW = 1 MHz. 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 1 GHz, 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.

6. Radiated Measurements

6.6 GSM1900 Radiated Measurements

Field Strength of SPURIOUS Radiation

▣ OPERATING FREQUENCY: 1 909.80 MHz

▣ CHANNEL: 810 (High)

▣ MEASURED OUTPUT POWER: 28.81 dBm = 0.760 W

▣ MODULATION SIGNAL: GSM (Internal)

▣ DISTANCE: 3 meters

▣ LIMIT: - (43 + 10 lo_{g10} (W)) = - 41.81 dBc

Freq. (MHz)	LEVEL@ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBd)	CORRECT GENERATOR LEVEL (dBm)	POL (H/V)	(dBc)
3 819.60	- 67.14	12.4	- 54.74	V	- 74.6
5 729.40	- 69.63	11.7	- 57.93	V	- 78.6
7 639.20	- 67.74	11.5	- 56.24	V	- 77.4

NOTES:

Radiated Spurious Emission Measurements by Substitution Method

According to ANSI/TIA/EIA-603-C-2004, Aug. 17, 2004:

The EUT was placed on a wooden turn table 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 CDMA signals, a peak detector is used, with RBW = VBW = 3 MHz. For AMPS, GSM, and NADC TDMA signals, a peak detector is used, with RBW = VBW = 1 MHz. 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 1 GHz, 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.

7. FREQUENCY STABILITY

7.1 FREQUENCY STABILITY (GSM850)

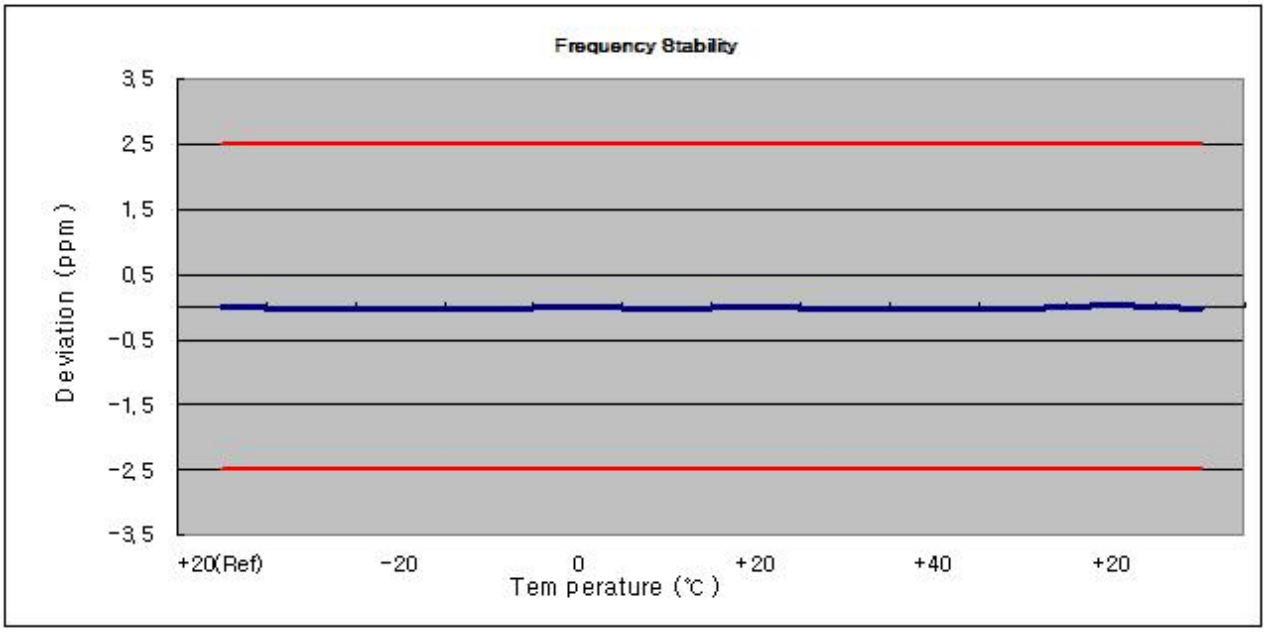
OPERATING FREQUENCY: 836,600,000 Hz

CHANNEL: 190

REFERENCE VOLTAGE: 3.7 VDC

DEVIATION LIM IT: ± 0.000 25 % or 2.5 ppm

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100%	12.00	+20(Ref)	836 600 035	35	0.000 004	0.019
100%		-30	836 519 939	-61	-0.000 007	-0.032
100%		-20	836 519 957	-43	-0.000 005	-0.023
100%		-10	836 519 949	-51	-0.000 006	-0.027
100%		0	836 520 027	27	0.000 003	0.014
100%		+10	836 519 968	-32	-0.000 004	-0.017
100%		+20	836 520 035	35	0.000 004	0.019
100%		+30	836 519 961	-39	-0.000 005	-0.021
100%		+40	836 519 952	-48	-0.000 006	-0.026
100%		+50	836 519 947	-53	-0.000 006	-0.028
115%	13.80	+20	836 520 038	38	0.000 005	0.020
Batt. Endpoint	10.20	+20	836 519 959	-41	-0.000 005	-0.022



7. FREQUENCY STABILITY

7.2 FREQUENCY STABILITY (GSM1900)

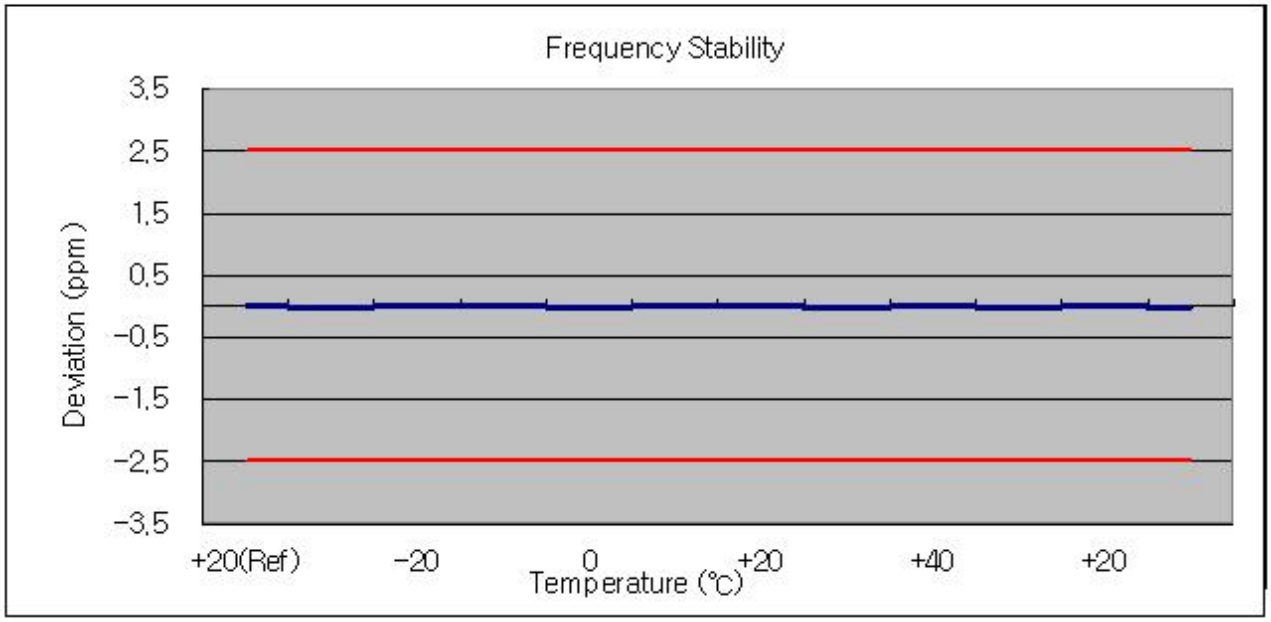
OPERATING FREQUENCY: 1,880,000,000 Hz

CHANNEL: 661

REFERENCE VOLTAGE: 3.7 VDC

DEVIATION LIM IT: ± 0.000 25 % or 2.5 ppm

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100%	12.00	+20(Ref)	1880 000 028	28	0.000 003	0.015
100%		-30	1879 999 949	-51	-0.000 006	-0.027
100%		-20	1880 000 047	47	0.000 006	0.025
100%		-10	1880 000 037	37	0.000 004	0.020
100%		0	1879 999 966	-34	-0.000 004	-0.018
100%		+10	1880 000 037	37	0.000 004	0.020
100%		+20	1880 000 028	28	0.000 003	0.015
100%		+30	1879 999 969	-31	-0.000 004	-0.016
100%		+40	1880 000 042	42	0.000 005	0.022
100%		+50	1879 999 946	-54	-0.000 006	-0.029
115%	13.80	+20	1880 000 030	30	0.000 004	0.016
Batt. Endpoint	10.20	+20	1879 999 967	-33	-0.000 004	-0.018



8. LIST OF TEST EQUIPMENT

Manufacture	Model/ Equipment	Serial Number	Calibration Date	Calibration Interval	Calibration Due
R&S	ESI40/ Spectrum Analyzer	831564/003	11/06/2007	Annual	11/06/2008
Advantest	R3273/ Spectrum Analyzer	J04821	03/15/2007	Annual	03/15/2008
HP	8664A/ Signal Generator	3744A02069	04/10/2007	Annual	04/10/2008
Agilent	E4416A/ Power Meter	GB41291412	01/22/2007	Annual	01/22/2008
Agilent	E9327A/ Power Sensor	US40440910	01/24/2007	Annual	01/24/2008
Agilent	HP8901B/ Modulation Analyzer	3438A05231	08/04/2007	Annual	08/04/2008
Agilent	8903A/ Audio Analyzer	2433A04322	08/04/2007	Annual	08/04/2008
R&S	CMU200/ Base Station	839117/011	01/28/2007	Annual	01/28/2008
Agilent	8960 (E5515C)/ Base Station	GB44400269	02/11/2007	Annual	02/11/2008
Tescom	TC-3000/ Bluetooth Simulator	3000A4900112	01/22/2007	Annual	01/22/2008
MITEQ	AMF-6D-01180-35-20P/ AMP	990893	02/24/2007	Annual	02/24/2008
Wainwright	WHK1.2/15G-10EF/H.P.F	2	06/28/2007	Annual	06/28/2008
Wainwright	WHK3.3/18G-10EF/H.P.F	1	06/28/2007	Annual	06/28/2008
Agilent	778D/ Dual Directional Coupler	16072	11/09/2007	Annual	11/09/2008
Agilent	1506A/ Power Divider	99441	11/10/2007	Annual	11/10/2008
Digital	EP-3010/ Power Supply	3110117	12/29/2007	Annual	12/29/2008
Schwarzbeck	UHAP/ Dipole Antenna	630	11/13/2007	Annual	11/13/2008
Schwarzbeck	UHAP/ Dipole Antenna	605	11/13/2007	Annual	11/13/2008
R&S	HFH2-Z2/ Loop Antenna	881056/070	12/11/2007	Annual	12/11/2008
Schwarzbeck	VULB9160/ TRILOG Antenna	3150	03/19/2007	Annual	03/19/2008
Schwarzbeck	VULB9160/ TRILOG Antenna	4150	01/23/2007	Annual	01/23/2008
Korea Engineering	KR-1005L / Chamber	KRAB07063-2CH	01/08/2007	Annual	01/08/2008
Schwarzbeck	BBHA 9120D/ Horn Antenna	147	03/31/2007	Biennial	03/31/2008
Schwarzbeck	BBHA 9120D/ Horn Antenna	1201	05/02/2007	Biennial	05/02/2008

9. SAMPLE CALCULATIONS

A. ERP Sample Calculation

Freq. Tuned (MHz)	LEVEL(1) (dBm)	POL (H/V)	ERP (W)	ERP(2) (dBm)	BATTERY
824.20	- 15.71	V	1.393	31.44	Standard

1) The EUT mounted on a wooden tripod is 0.8 meter above test site ground level.

2) During the test , the turn table is rotated and the antenna height is also varied from 1 to 4 meters until the maximum signal is found.

3) Record the field strength meter's level. (**LEVEL**)

4) Replace the EUT with dipole antenna that is connected to a calibrated signal generator.

5) Increase the signal generator output till the field strength meter's level is equal to the item (3).

6) The signal generator output level with cable loss is the rating of effective radiated power (**ERP**).
(Cable loss means the factor between Signal Generator and Transmitting Antenna.)

For more details, please refer to the test set-up procedure.

B. Emission Designator

Emission Designator = 300KGXW

GSM BW = 300 KHz

G = Phase Modulation

X = Cases not otherwise covered

W = Combination (Audio/Data)

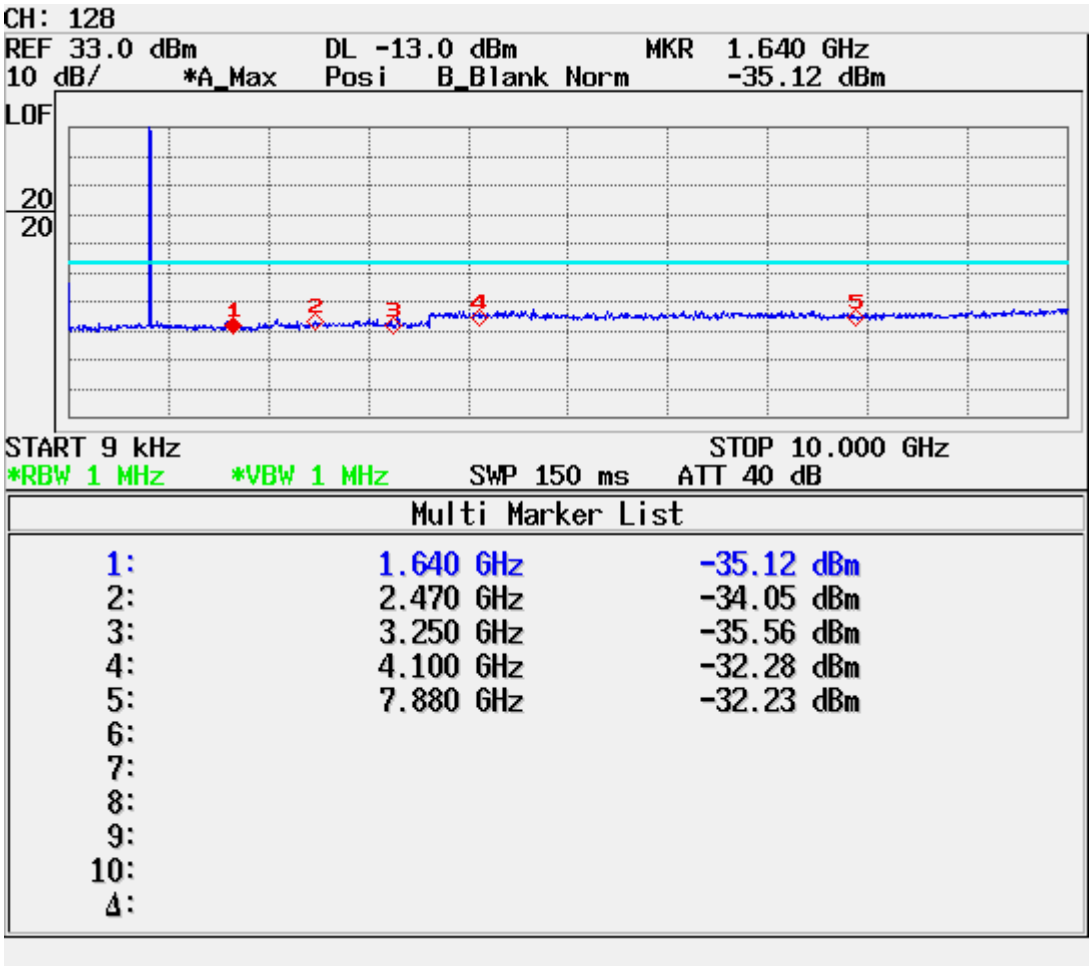
Emission Designator = 300KGXW

10. CONCLUSION

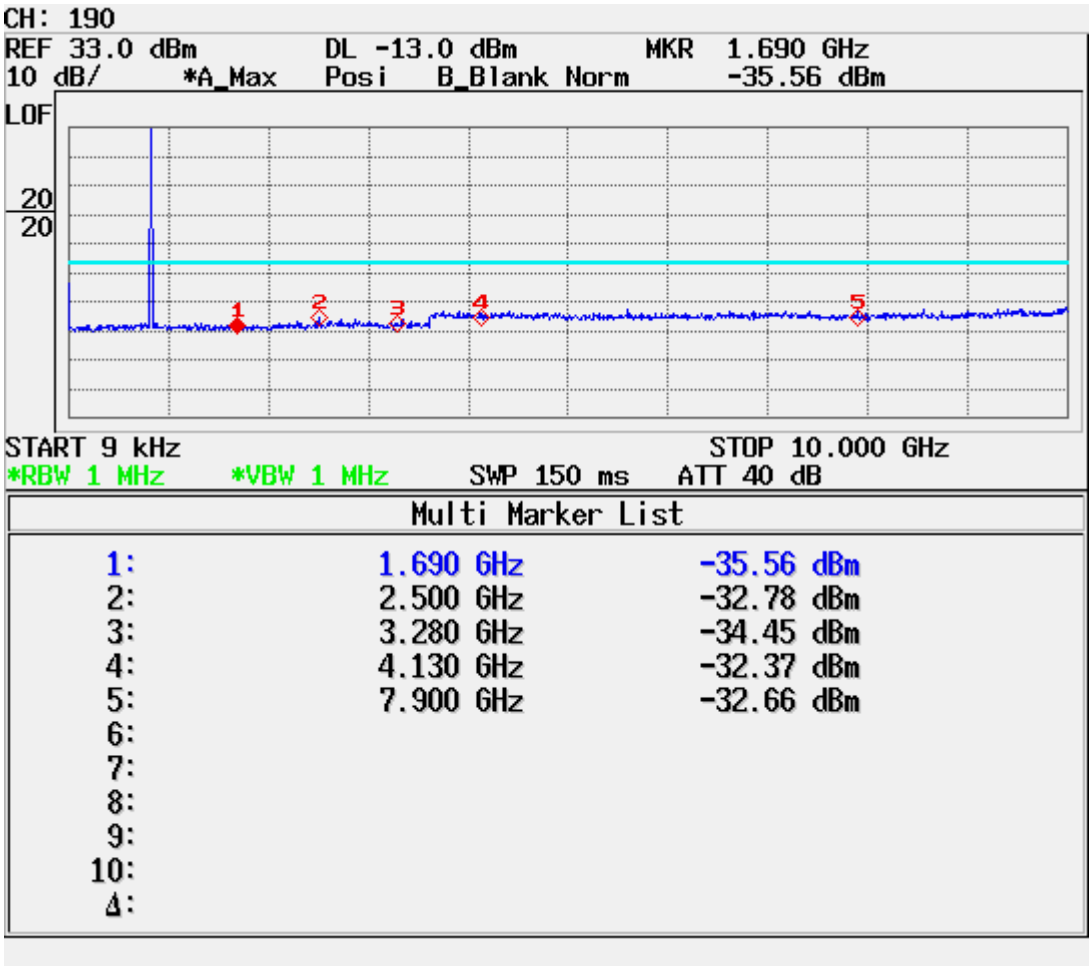
The data collected shows that the TCD **FCC ID: VXMSTANDALONETCD** complies with all the requirements of Parts 2, 22 and 24 of the FCC rules.

11.TEST PLOTS

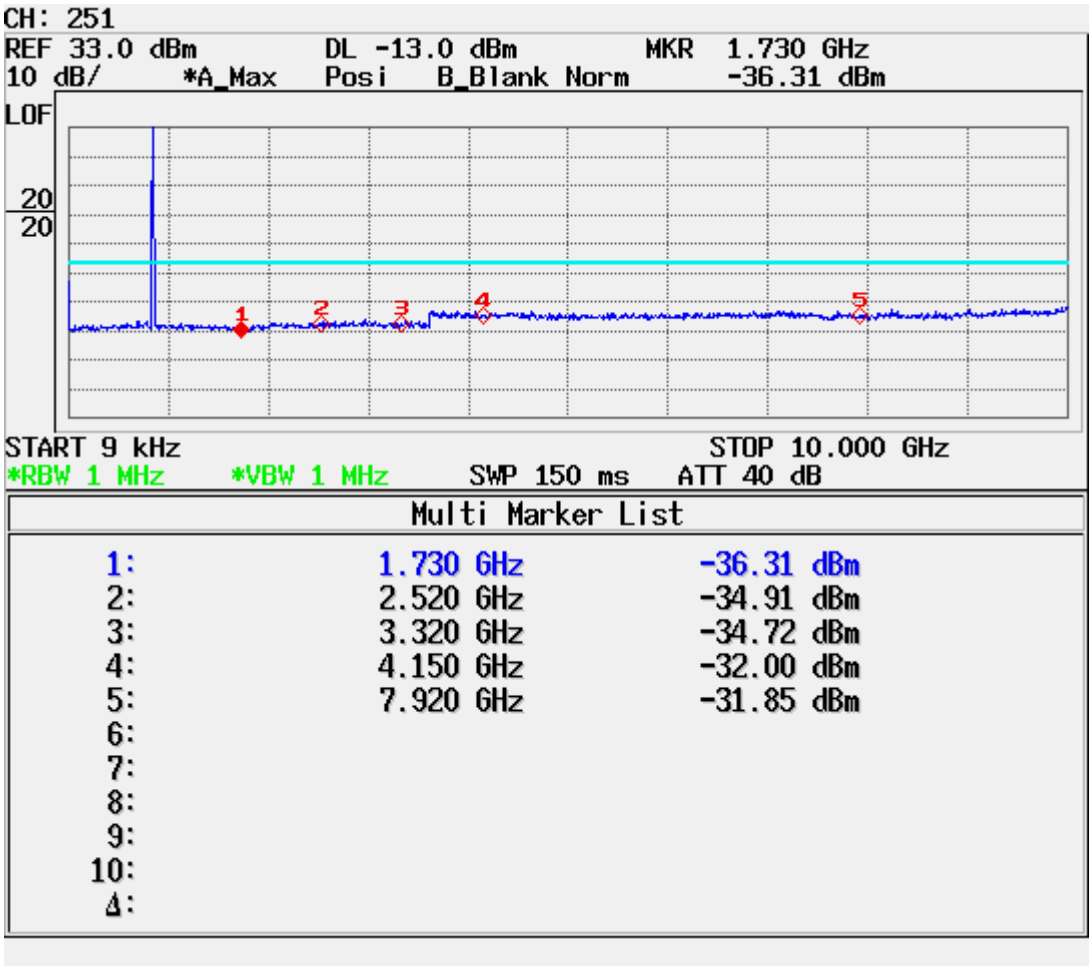
■ GSM850 MODE (128 CH.) Conducted Spurious



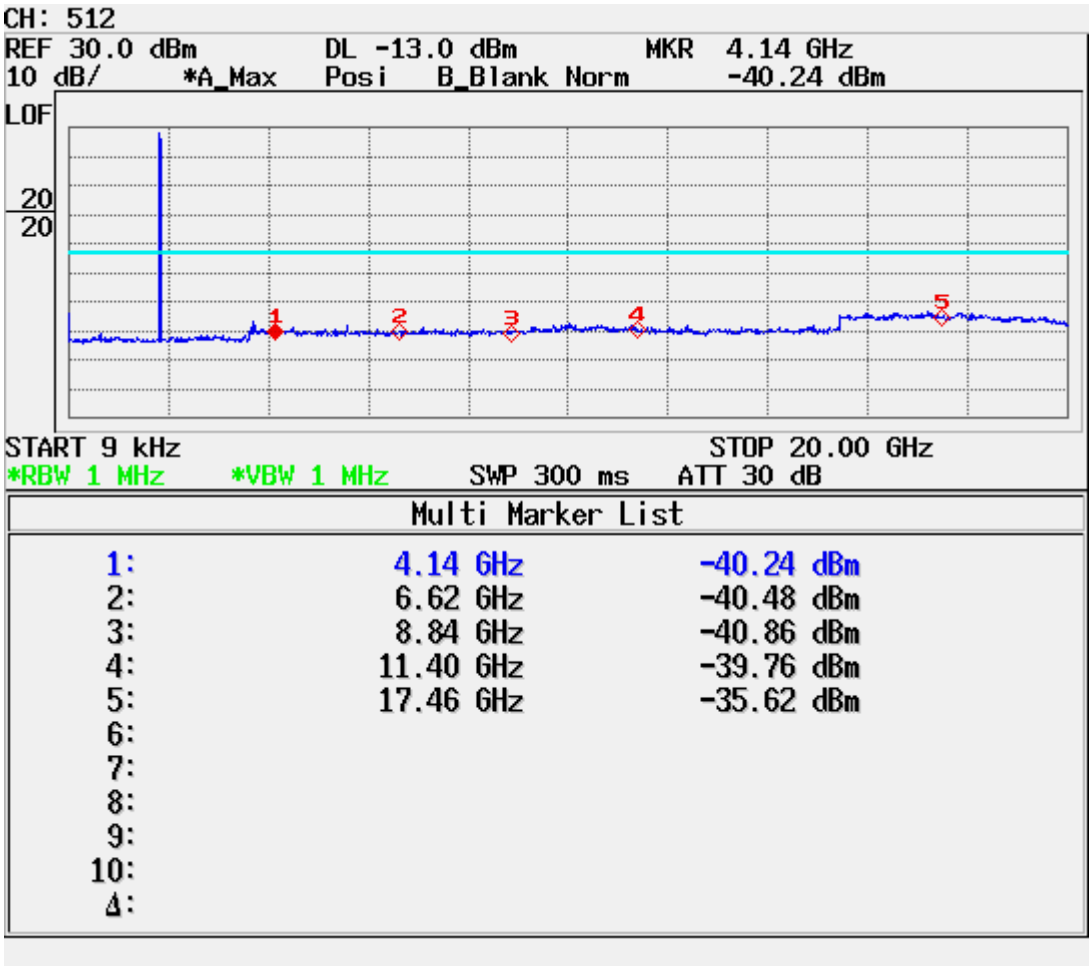
■ GSM850 MODE (190 CH.) Conducted Spurious



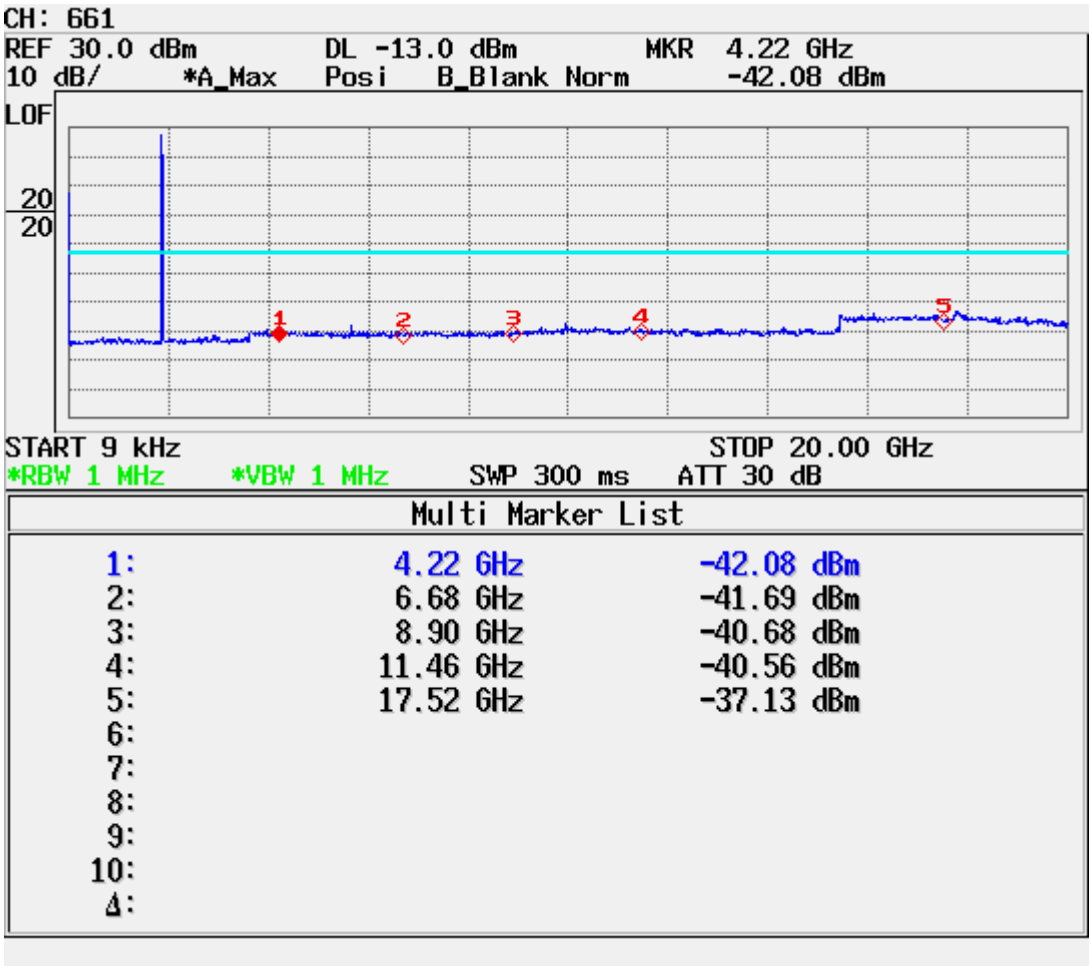
■ GSM850 MODE (251 CH.) Conducted Spurious



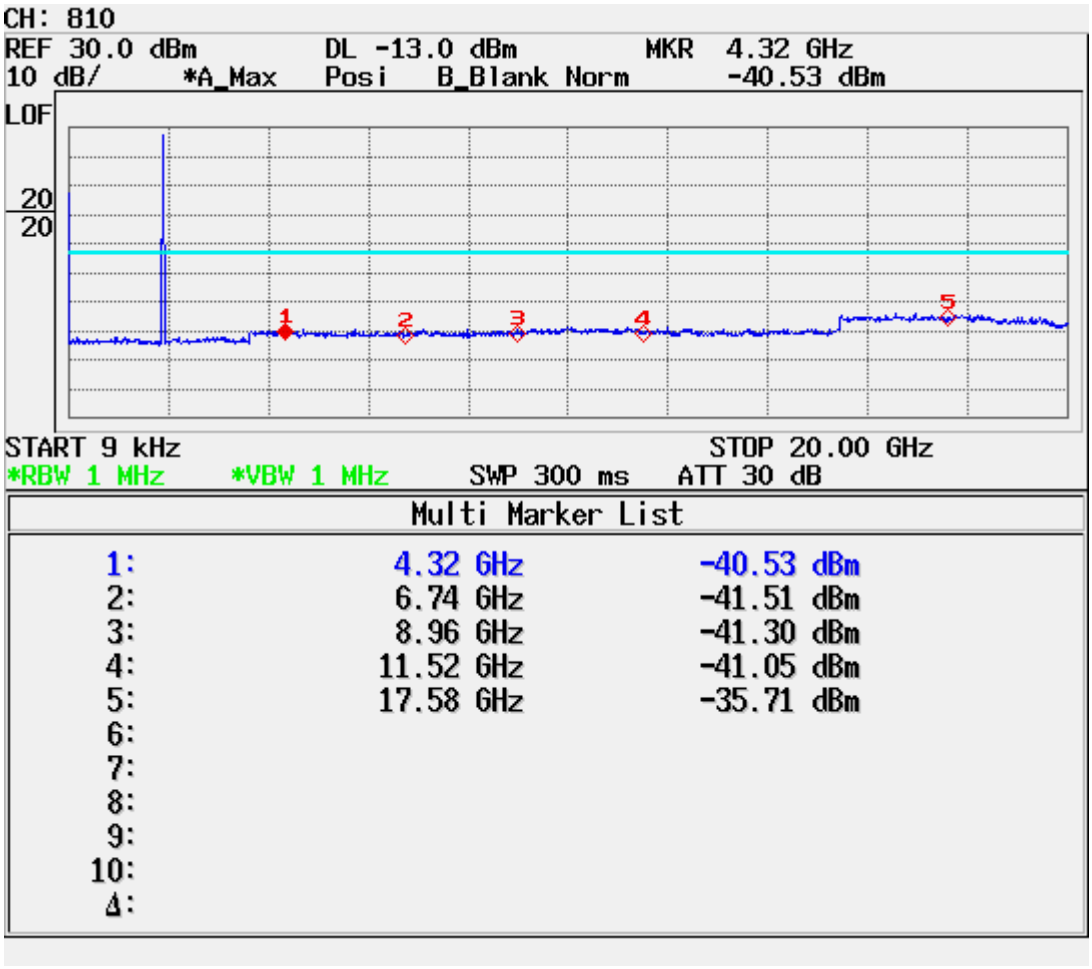
■ GSM1900 MODE (512 CH.) Conducted Spurious



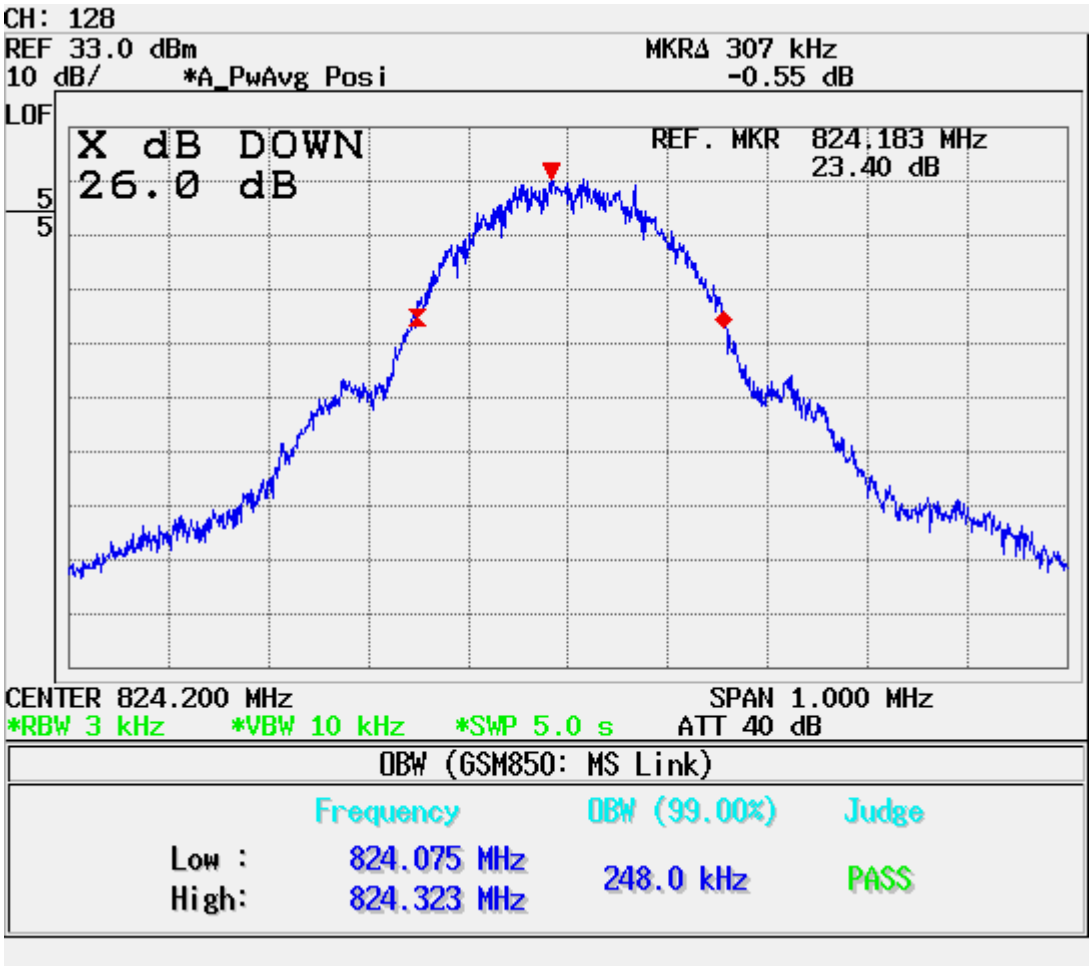
■ GSM1900 MODE (661 CH.) Conducted Spurious



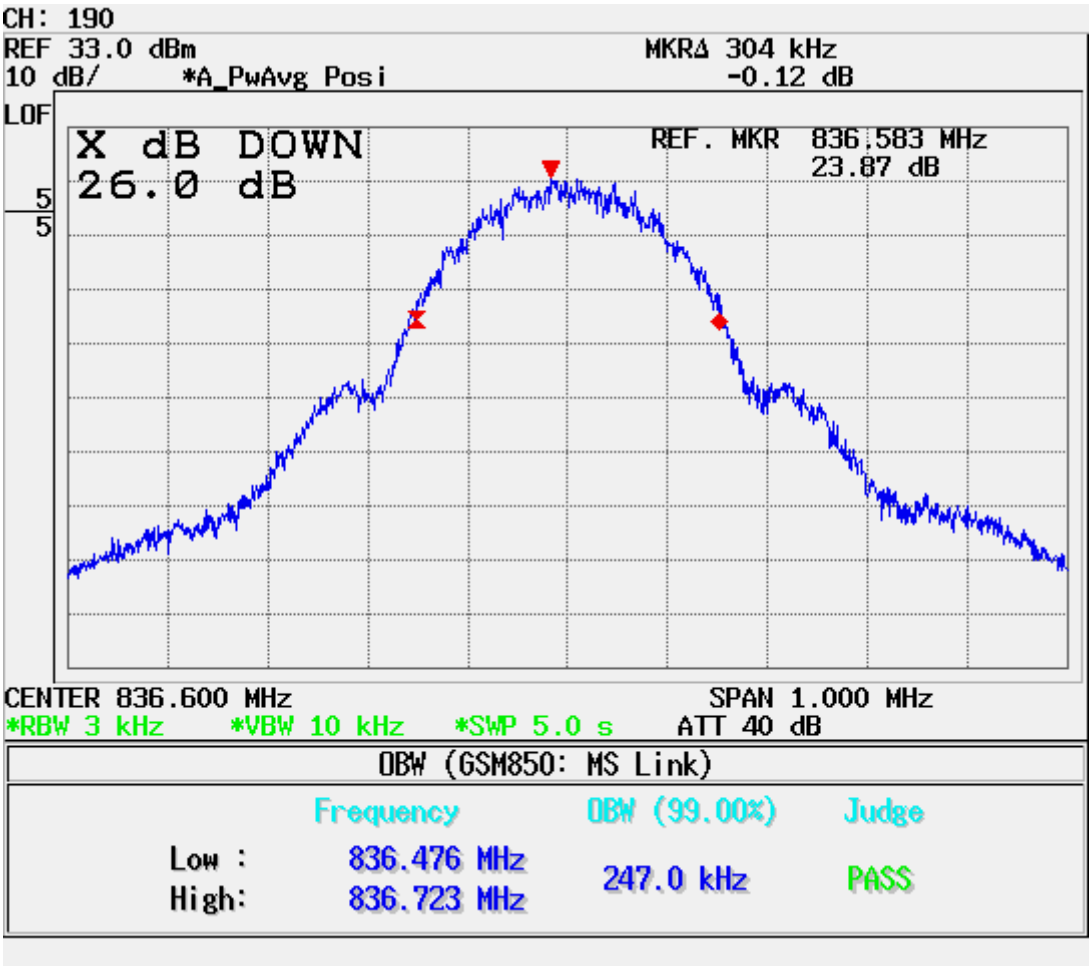
■ GSM1900 MODE (810 CH.) Conducted Spurious



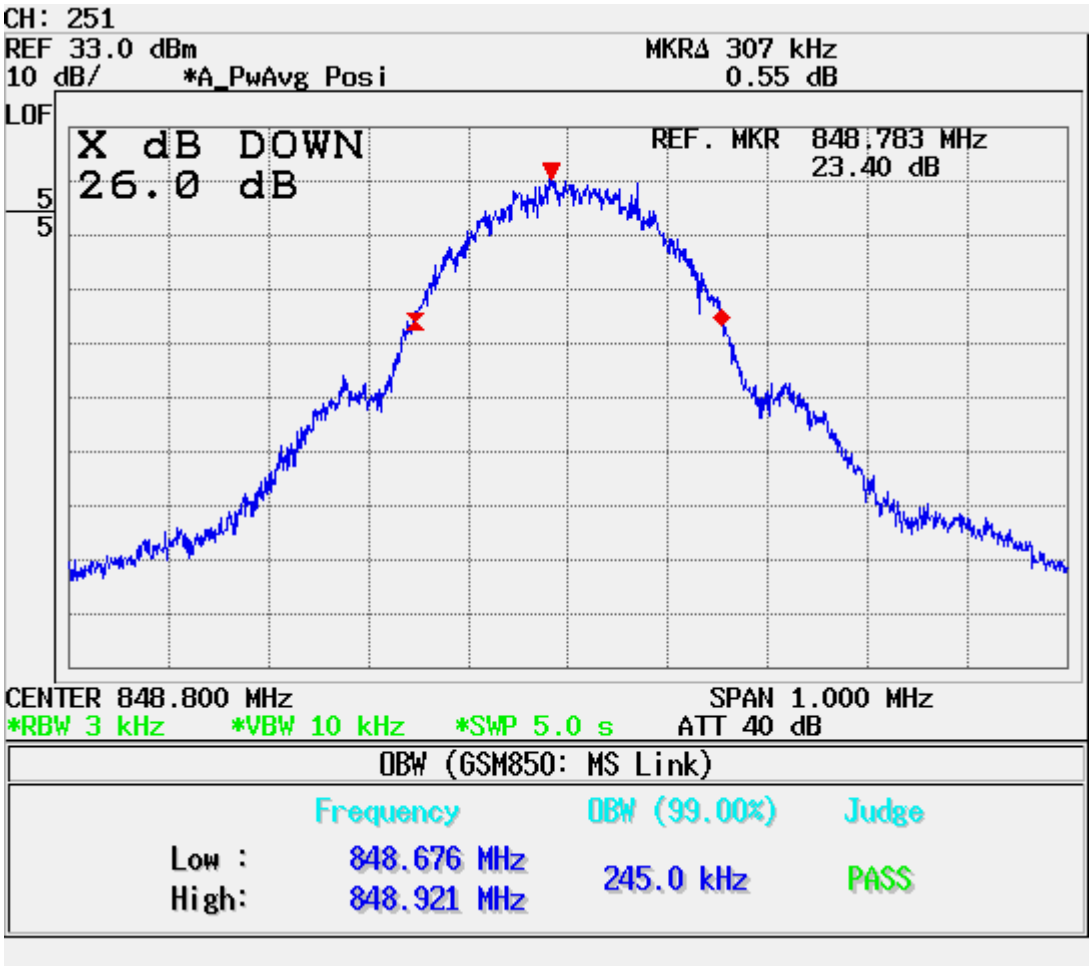
■ Occupied Bandwidth - 26 dBc BW (KHz) (GSM850 128 CH)



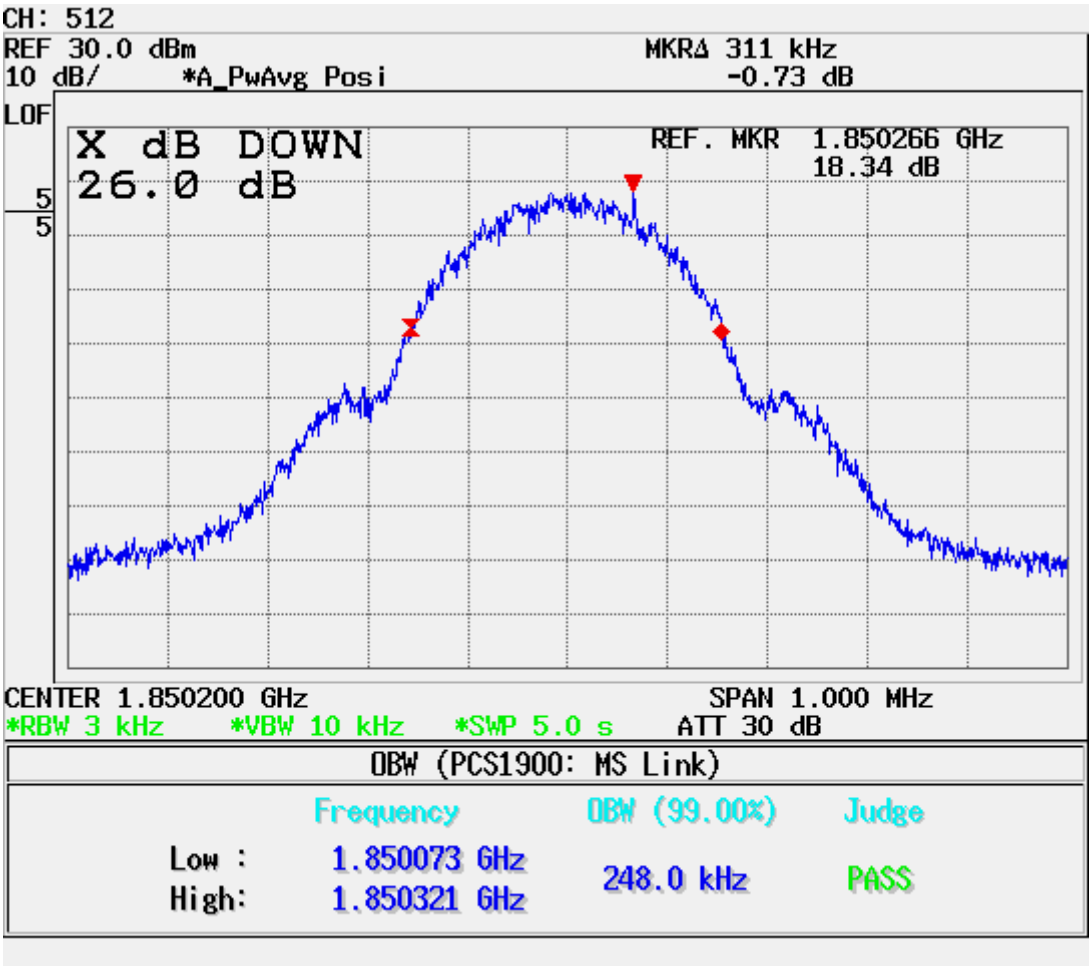
■ Occupied Bandwidth – 26 dBc BW (KHz) (GSM850 190 CH)



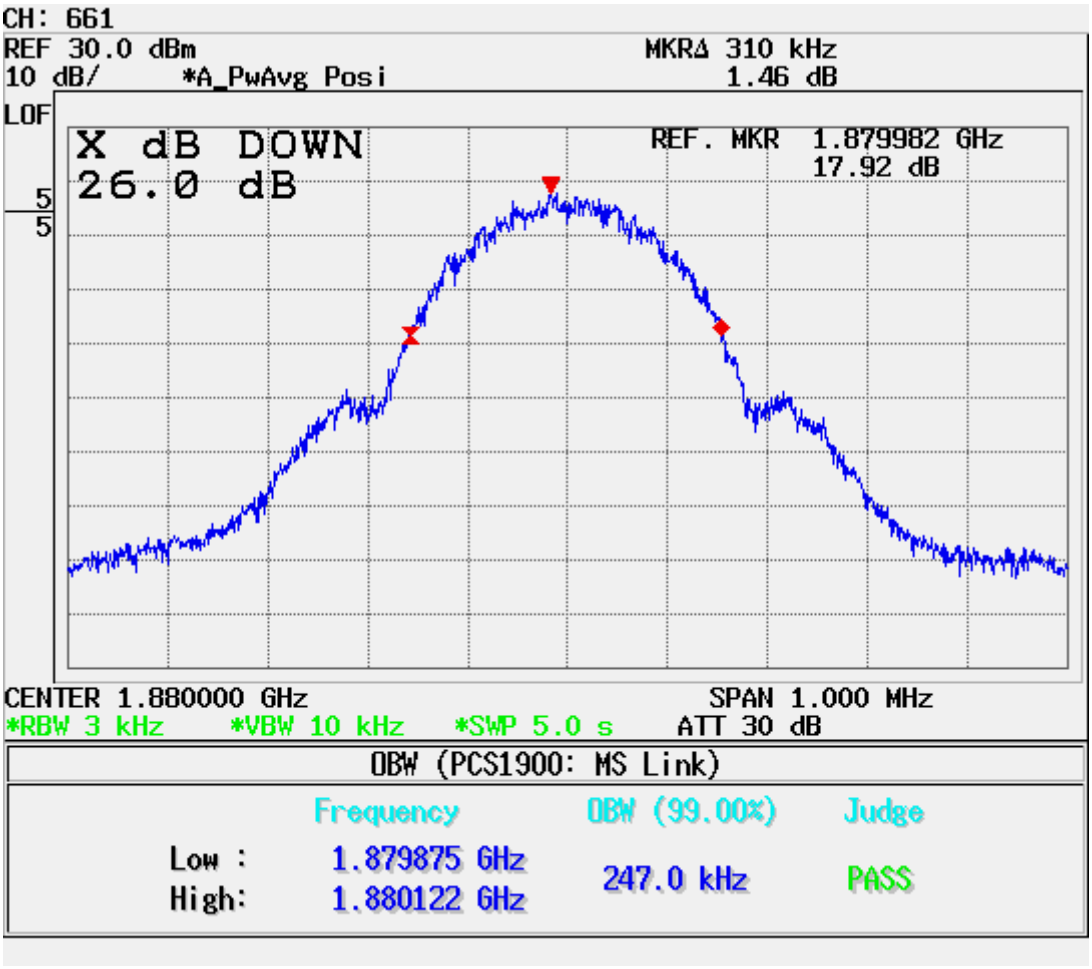
■ Occupied Bandwidth – 26 dBc BW (KHz) (GSM850 251 CH)



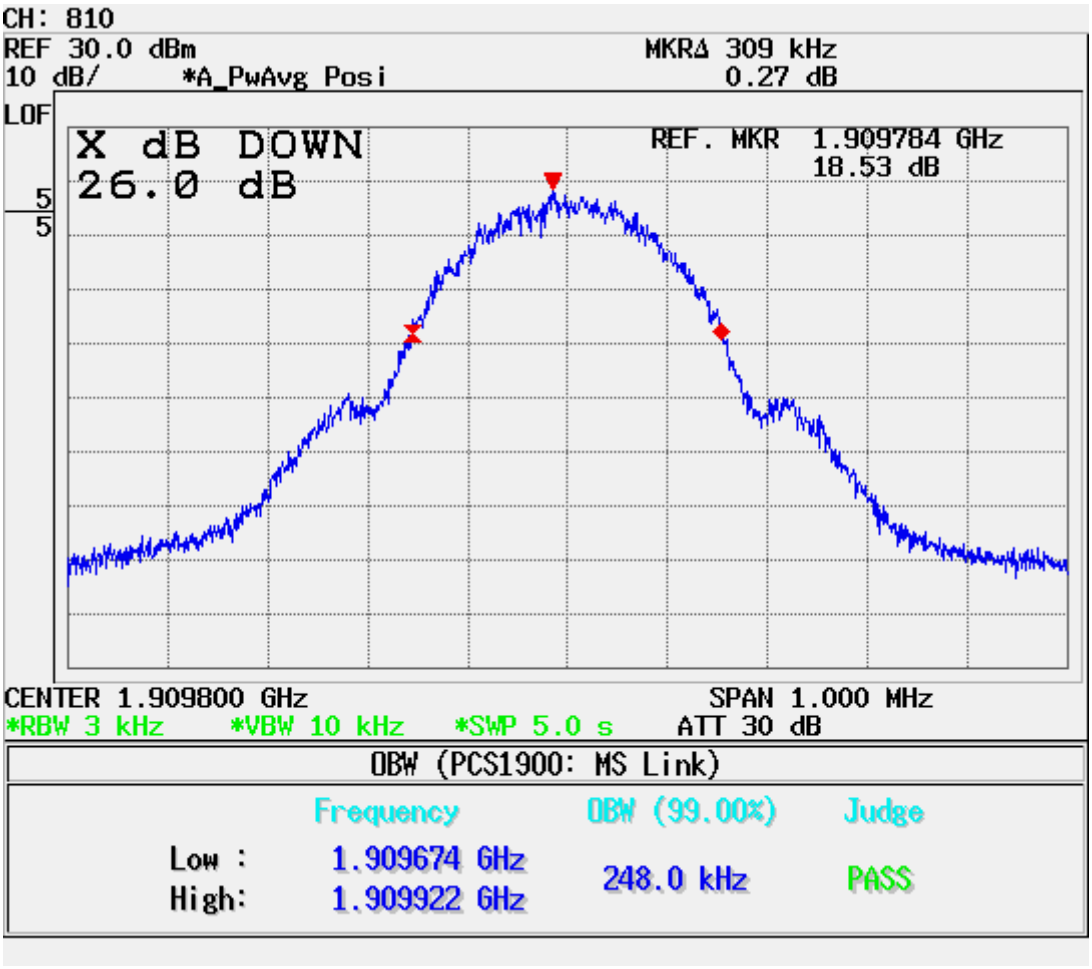
■ Occupied Bandwidth – 26 dBc BW (KHz) (GSM1900 512 CH)



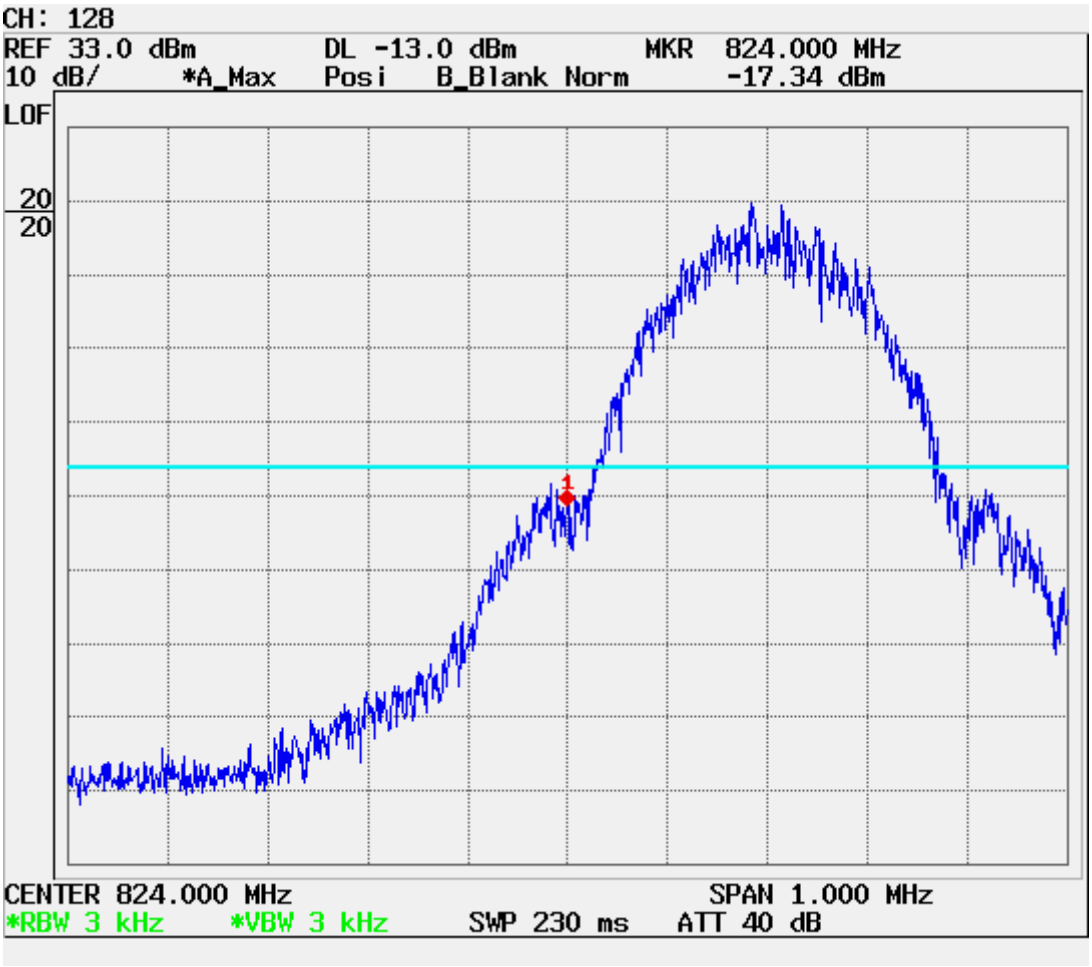
■ Occupied Bandwidth – 26 dBc BW (KHz) (GSM1900 661 CH)



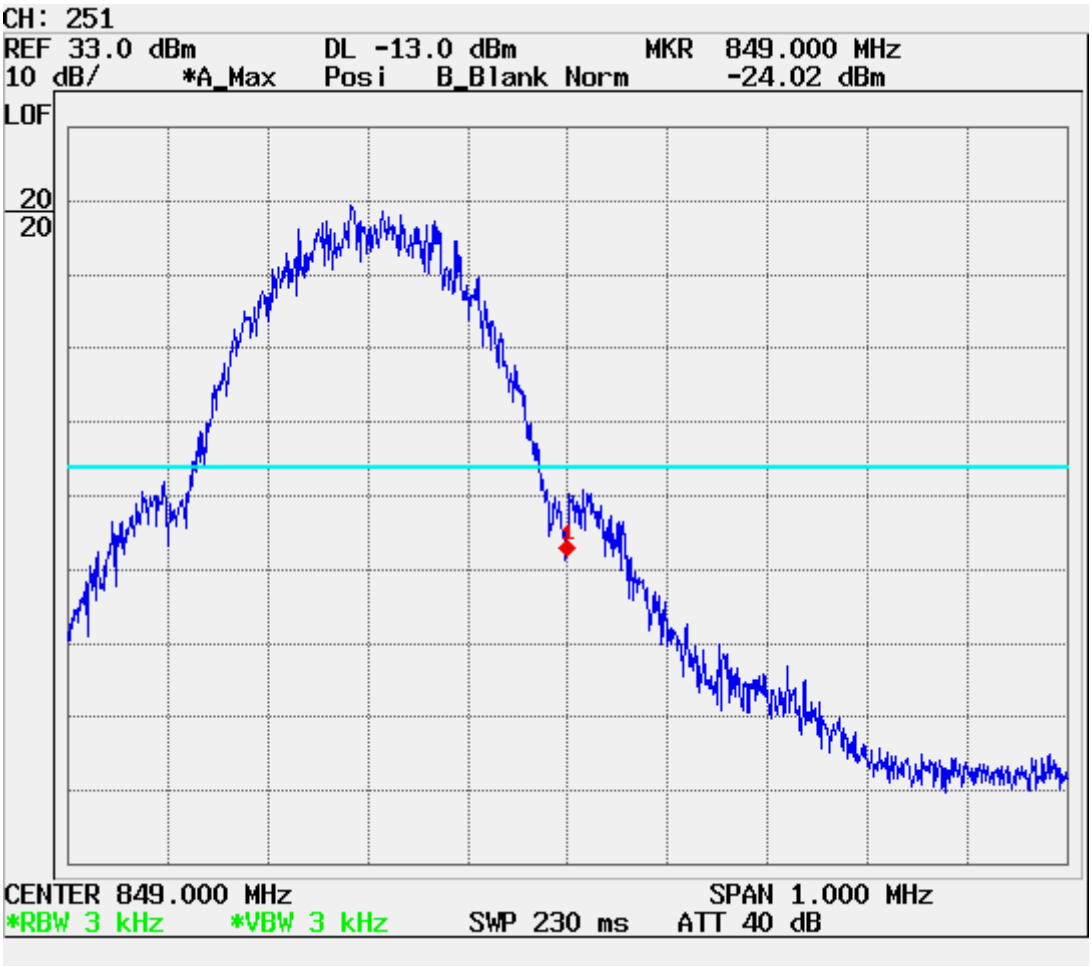
■ Occupied Bandwidth – 26 dBc BW (KHz) (GSM1900 810 CH)



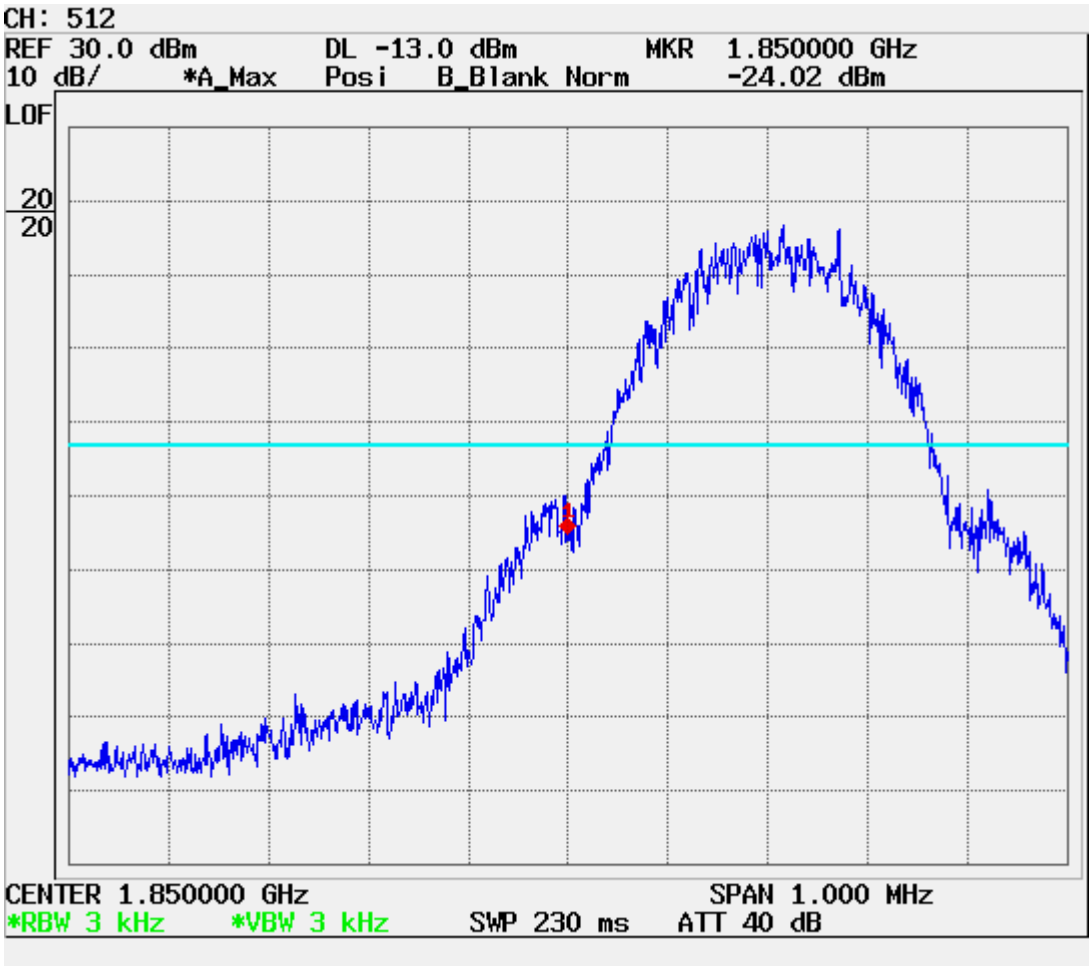
■ GSM Block Edge GSM850 (128 CH.)



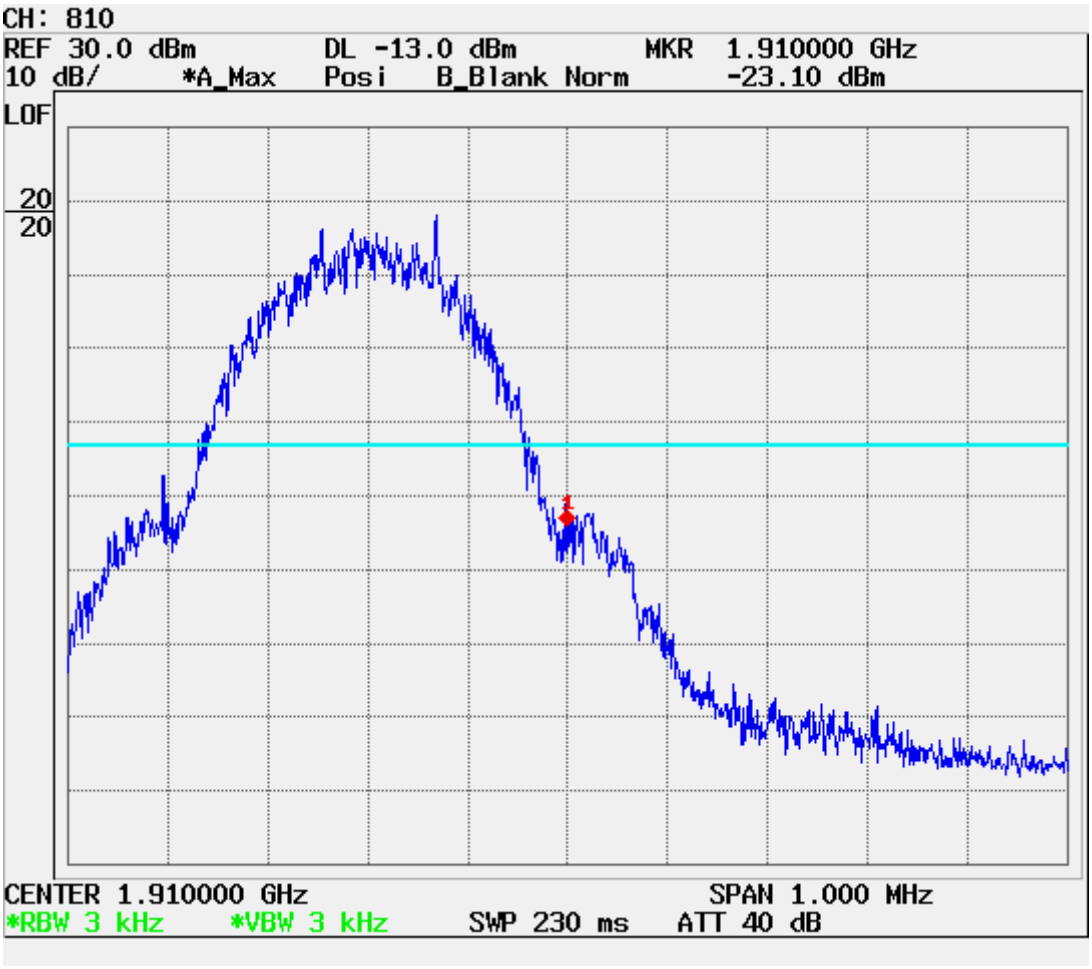
■ GSM Block Edge GSM850 (251 CH.)



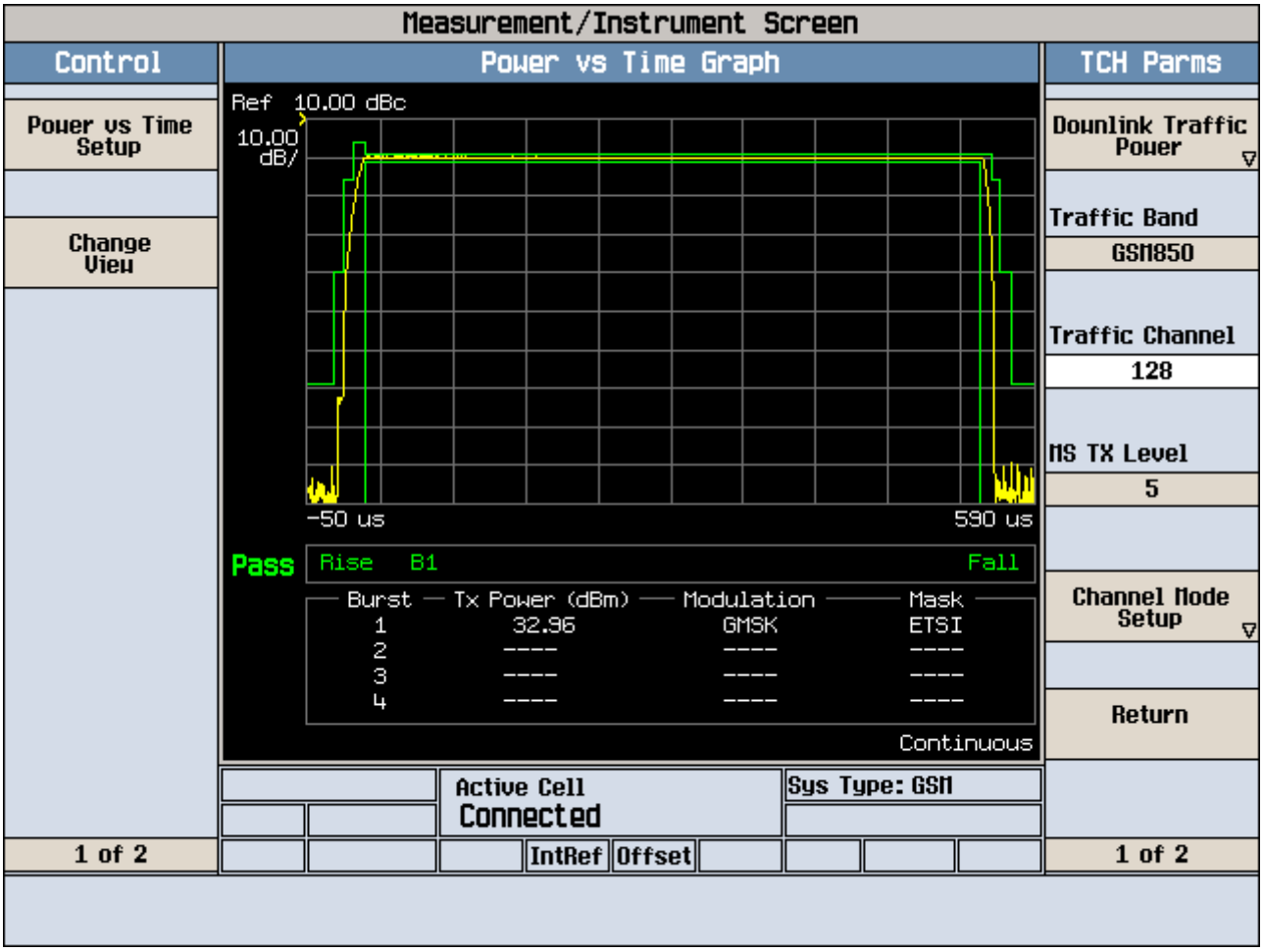
■ GSM Block Edge GSM1900 (512 CH.)



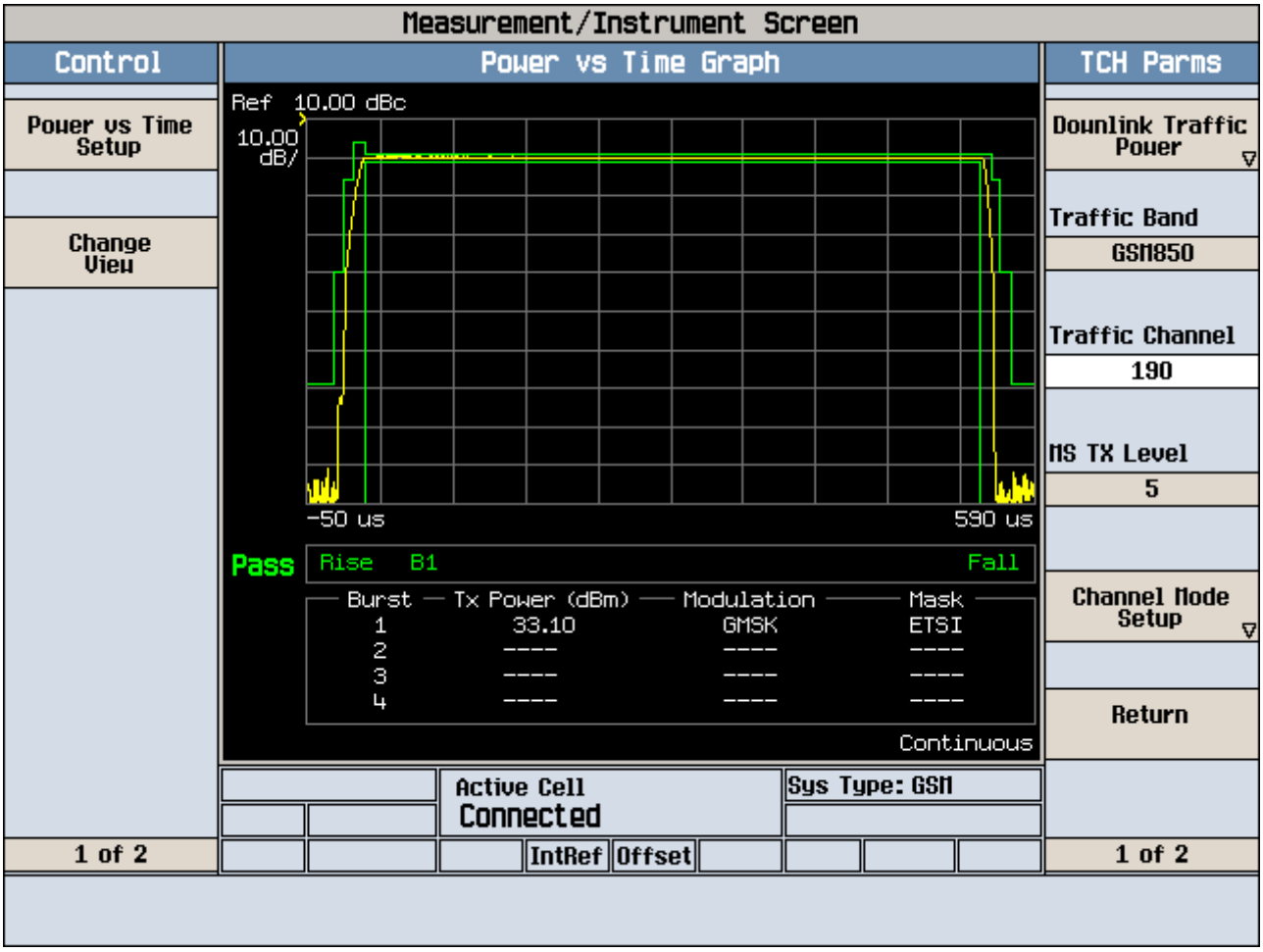
■ GSM Block Edge GSM1900 (810 CH.)



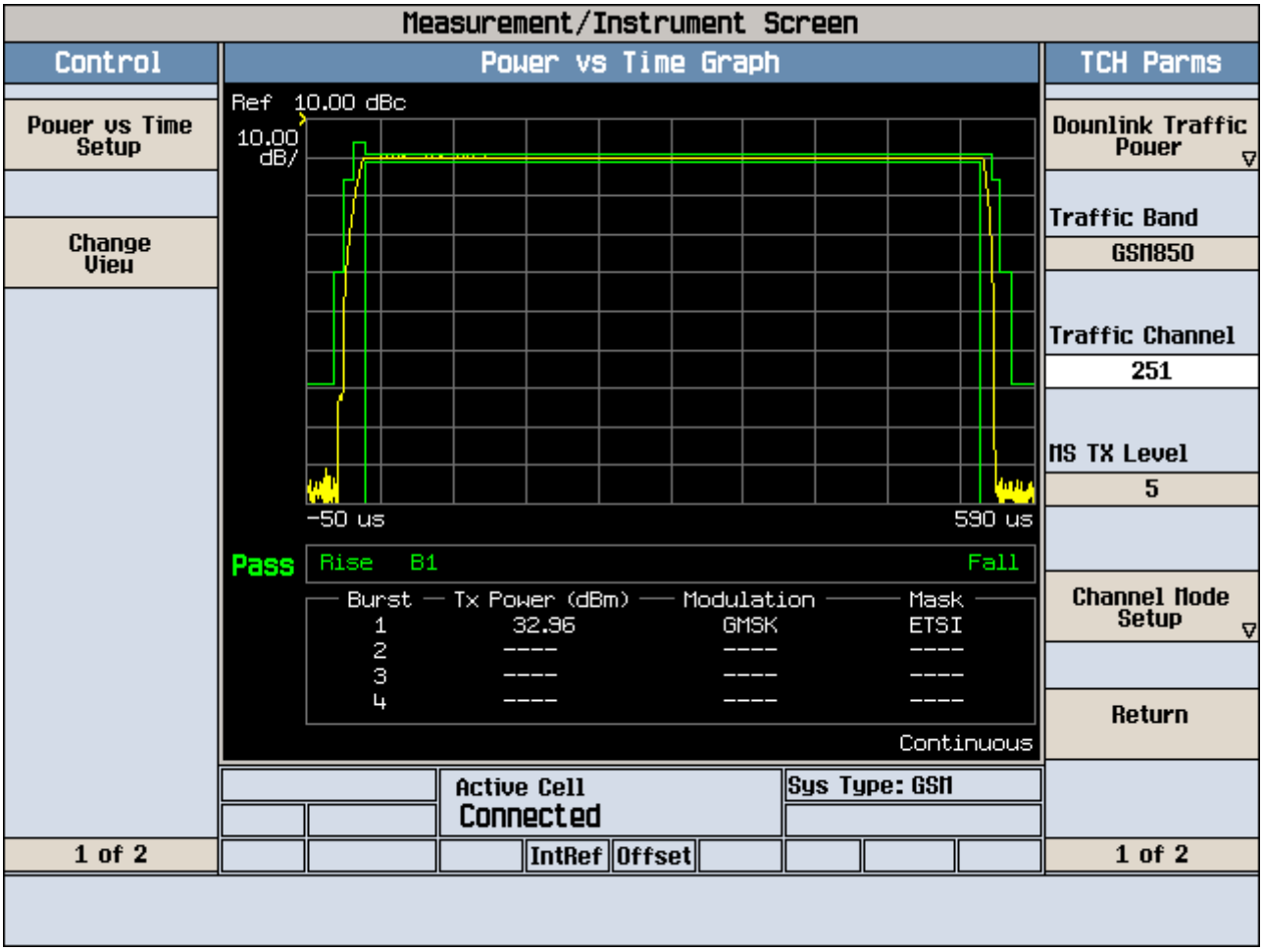
■ Power output conducted (GSM850 128 CH)



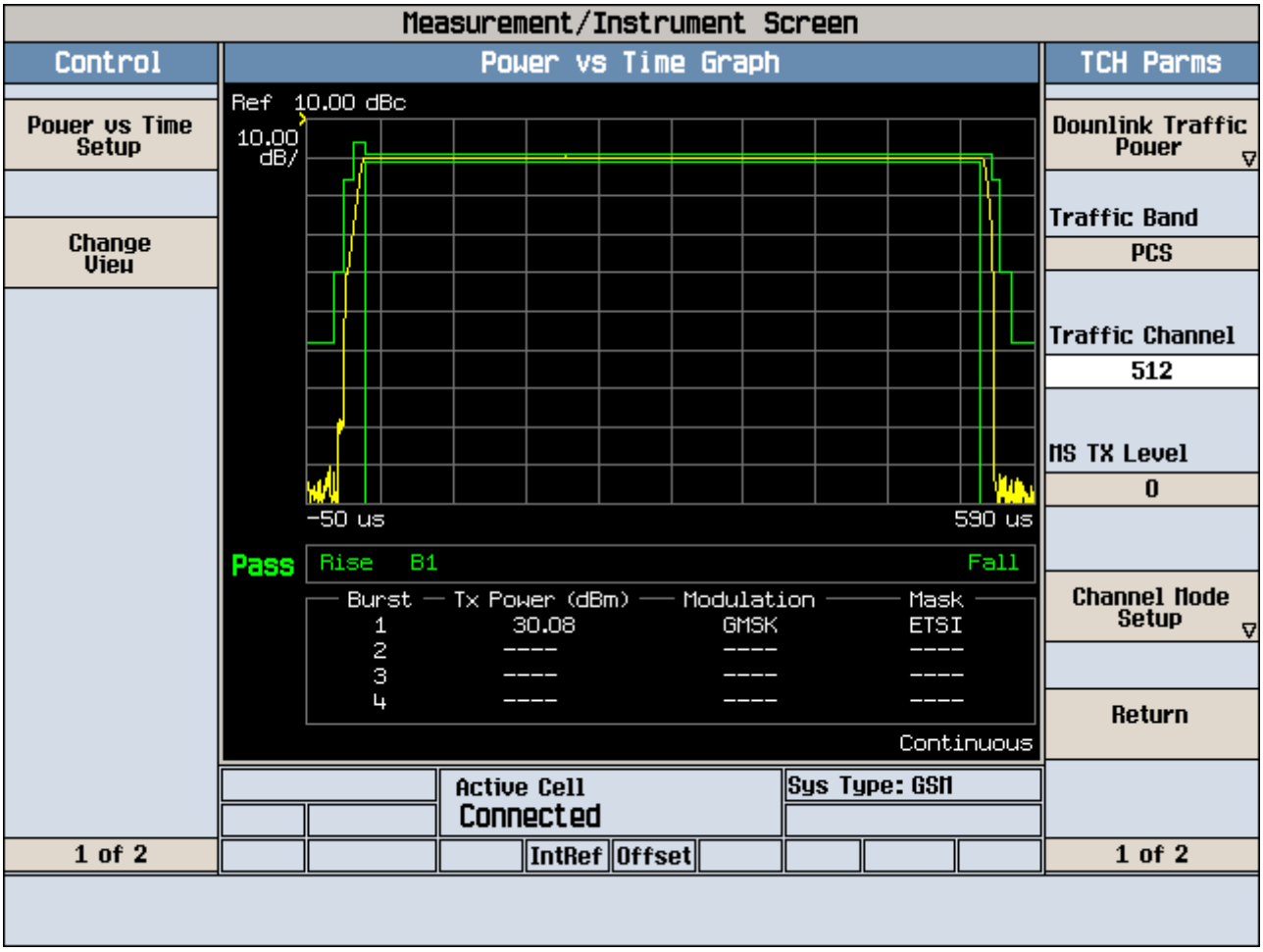
■ Power output conducted (GSM850 190 CH)



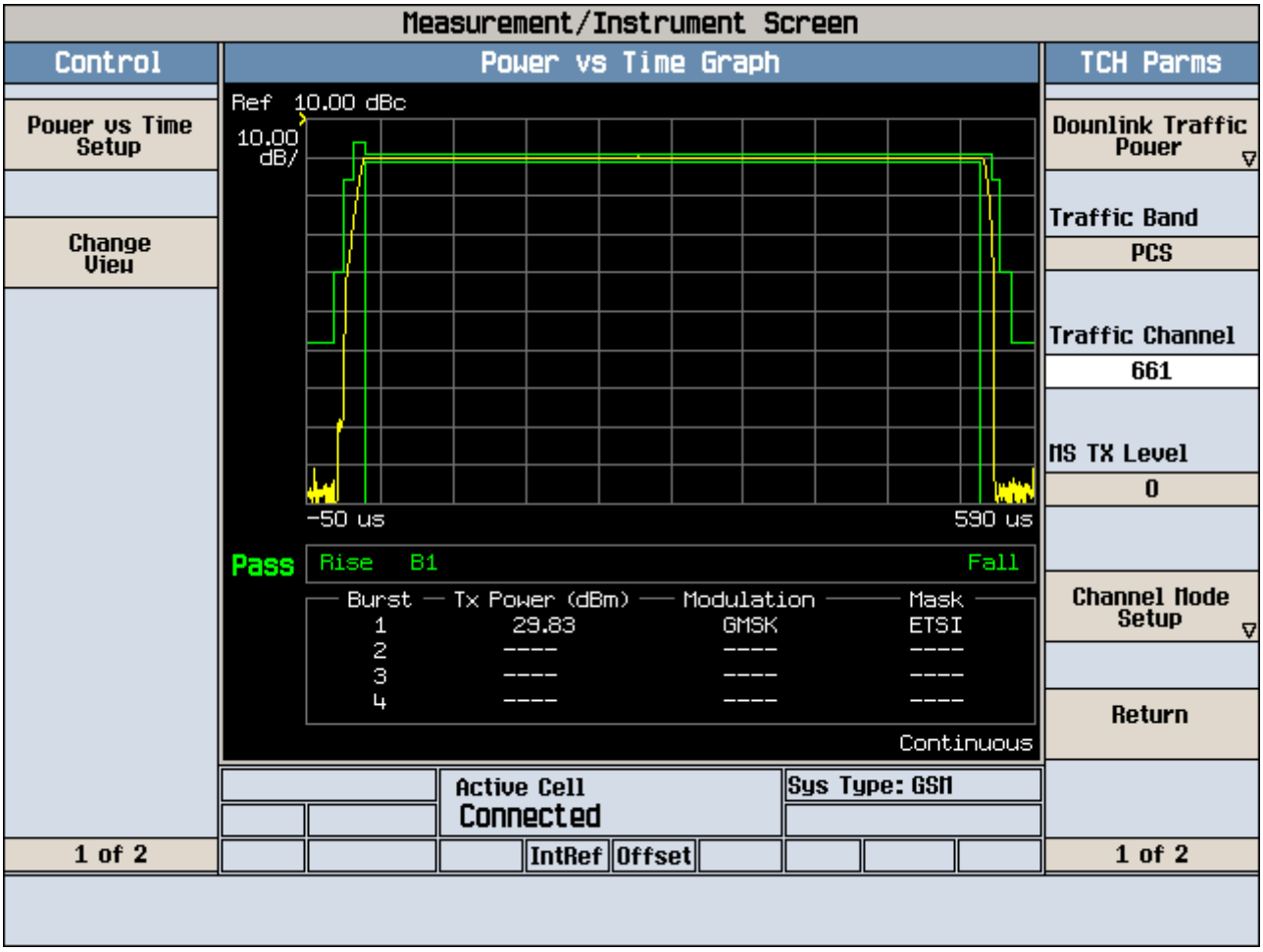
■ Power output conducted (GSM850 251 CH)



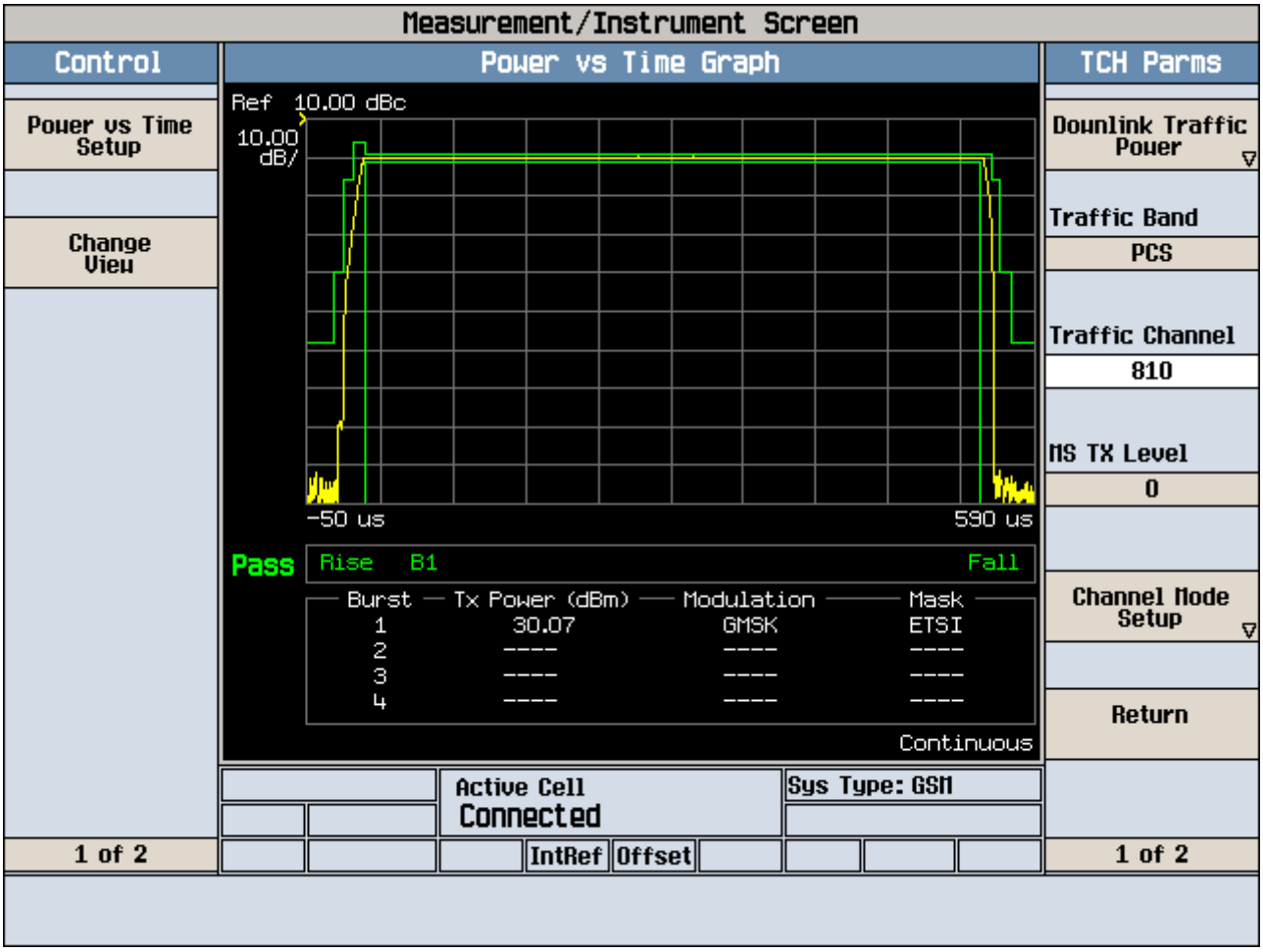
■ Power output conducted (GSM1900 512 CH)



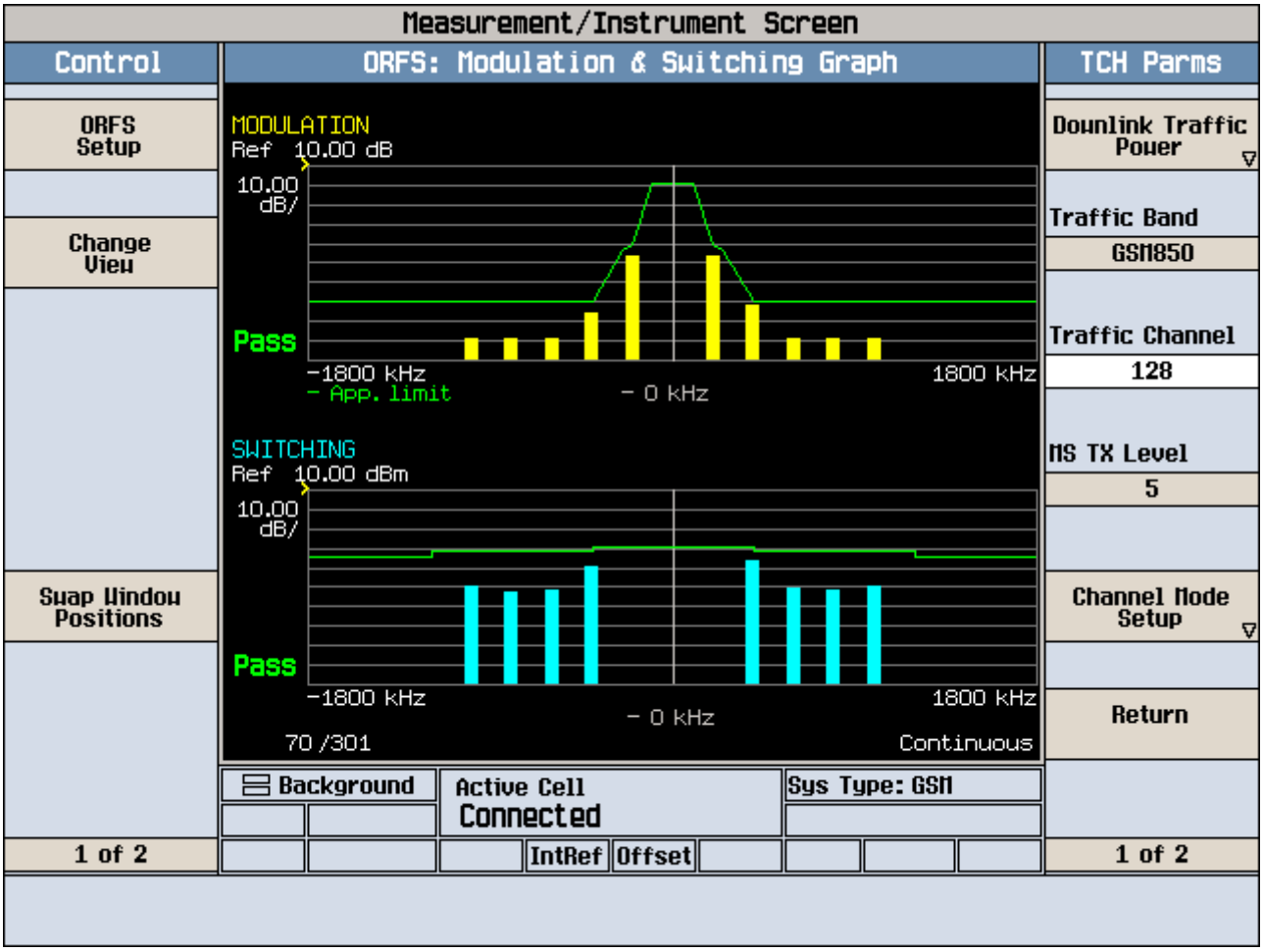
■ Power output conducted (GSM1900 661 CH)



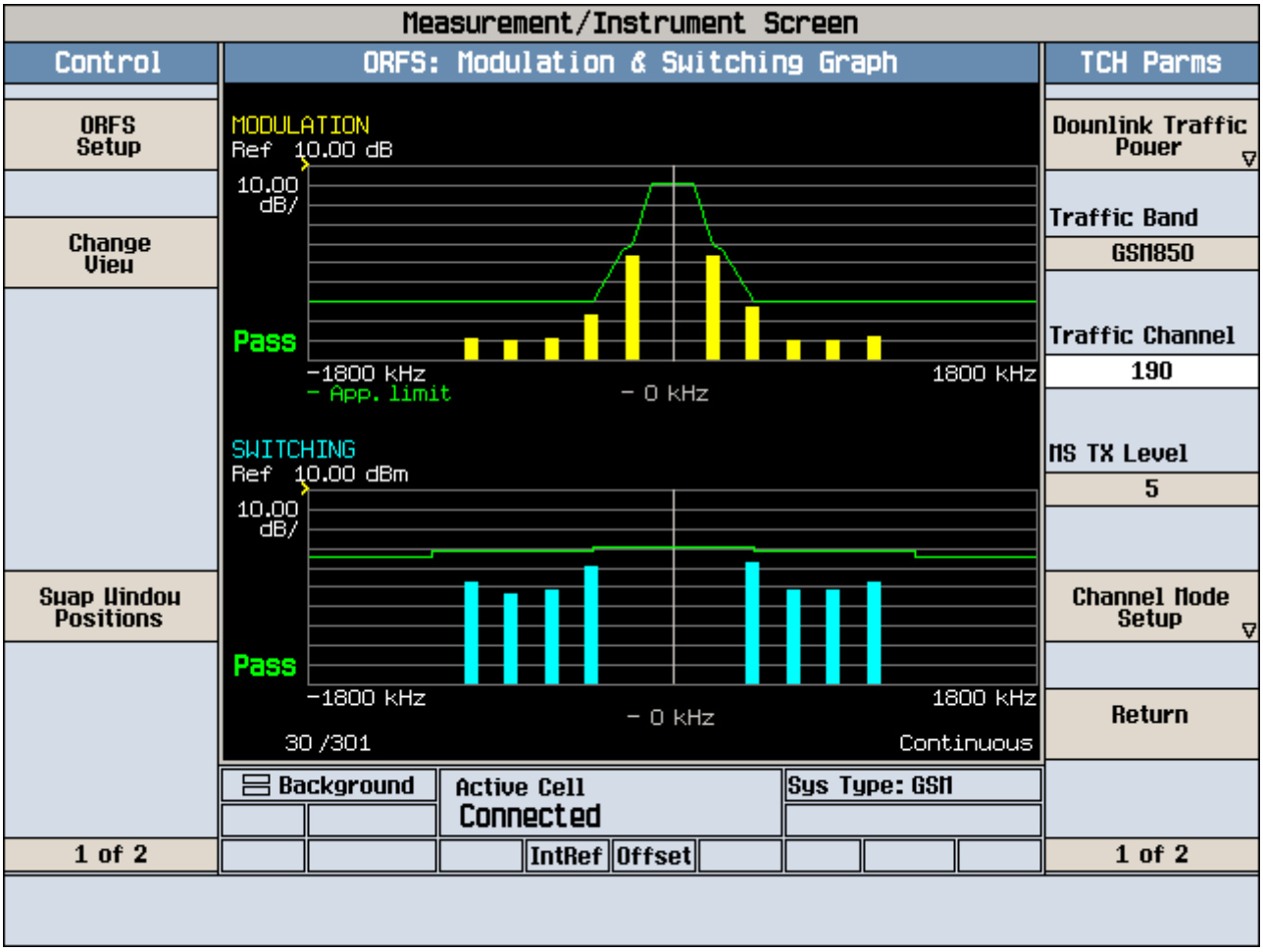
■ Power output conducted (GSM1900 810 CH)



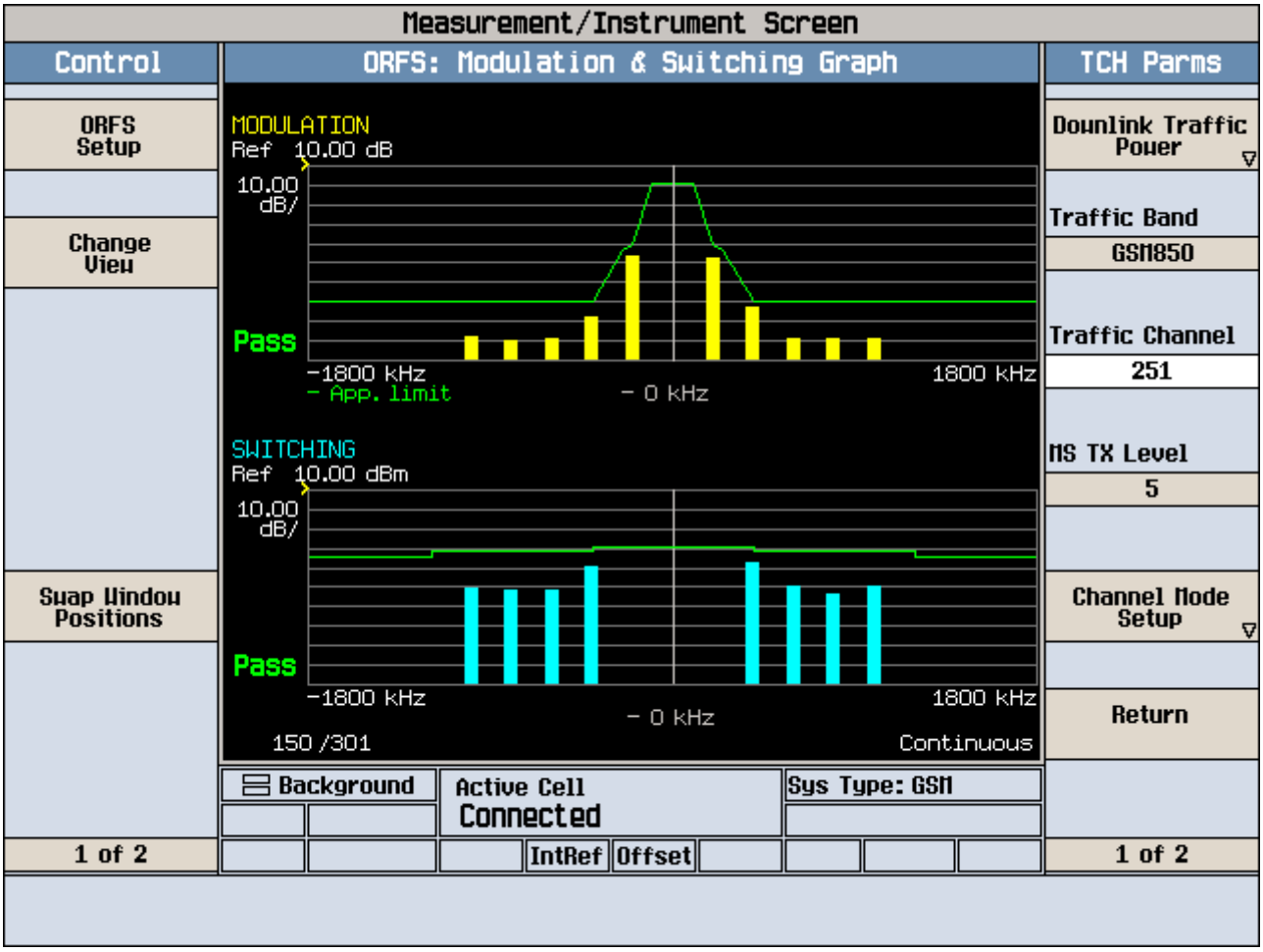
■ Modulation & Switching Graph (GSM850 128 CH)



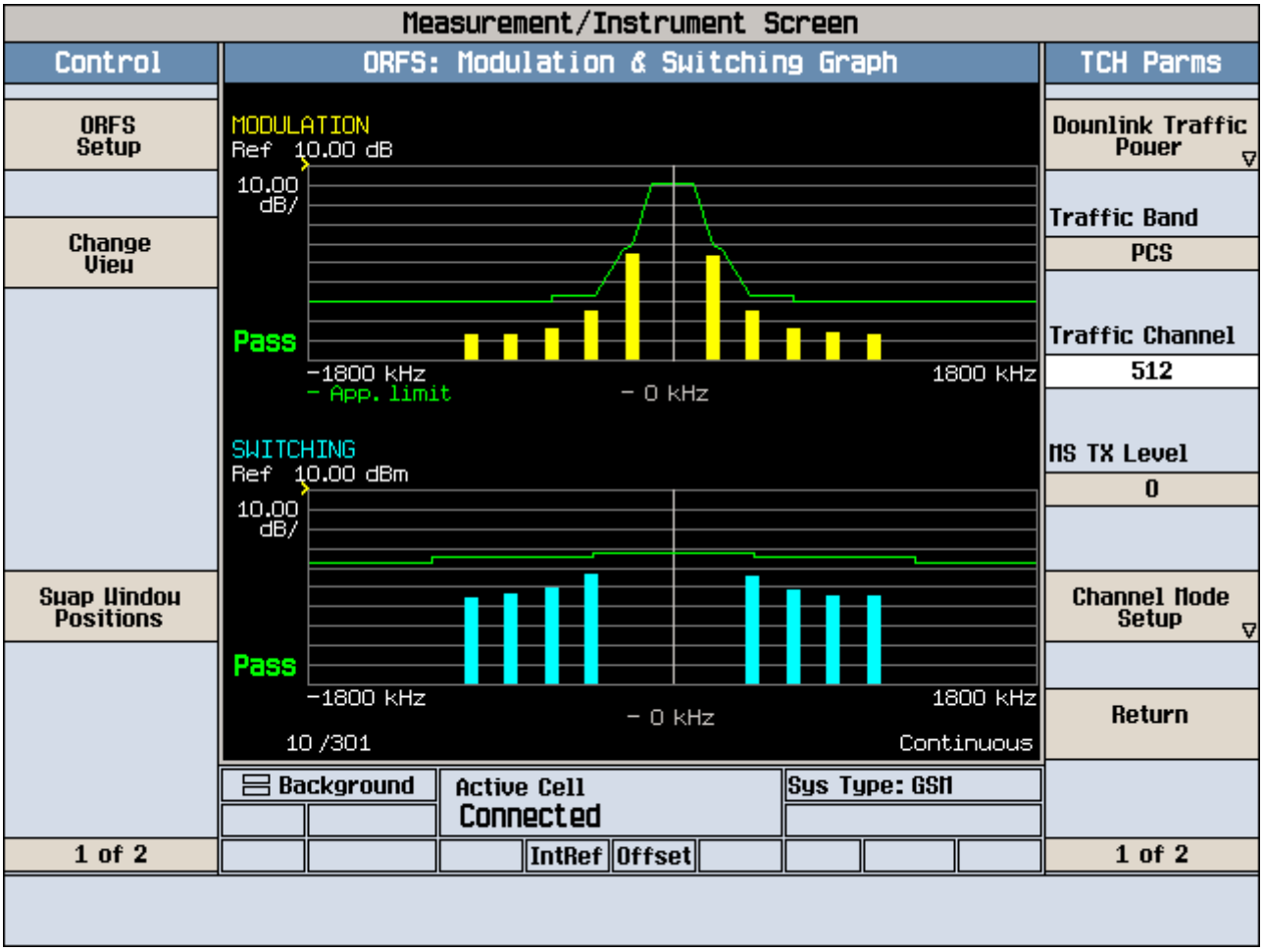
■ Modulation & Switching Graph (GSM850 190 CH)



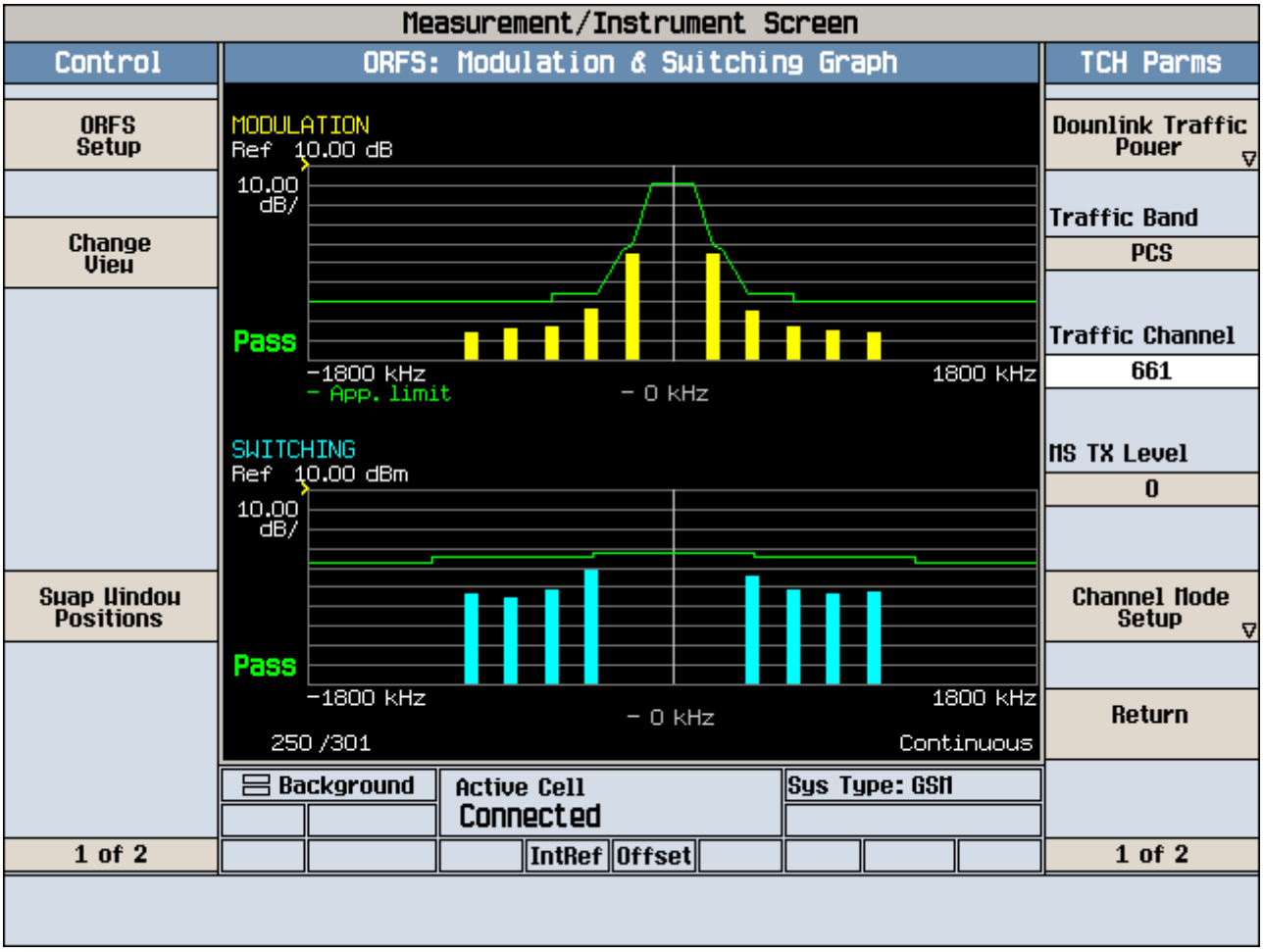
■ Modulation & Switching Graph (GSM850 251 CH)



■ Modulation & Switching Graph (GSM1900 512 CH)



■ Modulation & Switching Graph (GSM1900 661 CH)



■ Modulation & Switching Graph (GSM1900 810 CH)