

ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT

INTENTIONAL RADIATOR CERTIFICATION TO FCC PART 22 SUBPART H, PART 24 SUBPART E AND INDUSTRY CANADA RSS-132 and RSS-133 REQUIREMENT

OF

Product Name: Expedite L10-G , GSM0508-40

Brand Name: Expedite L10-G

Marketing Name: Expedite L10-G

Model No.: GSM0508-40

Model Difference: N/A

Report No.: ER/2014/10072

Issue Date: Feb. 17, 2014

FCC ID: PKRNVWGSM0508

IC: 3229A-GSM0508

FCC Rule Part: 2 , 22H & 24E

IC Rule Part: RSS 132, Issue 3 and RSS 133, Issue 6

Prepared for: Novatel Wireless Inc.
9645, Scranton Road, San Diego, USA, 92121

Prepared by: SGS Taiwan Ltd.
Electronics & Communication Laboratory
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VERIFICATION OF COMPLIANCE

Applicant: Novatel Wireless Inc.
9645, Scranton Road, San Diego, USA, 92121

Product Name: Expedite L10-G , GSM0508-40

Brand Name: Expedite L10-G

Marketing Name: Expedite L10-G

Model No.: GSM0508-40

Model Difference: N/A

File Number: ER/2014/10072

FCC ID: PKRNVWGS0508

IC: 3229A-GSM0508

Date of test: Jan. 24, 2014 ~ Feb. 14, 2014

Date of EUT Received: Jan. 24, 2014

We hereby certify that:

The above equipment was tested by SGS Taiwan Ltd. Electronics & Communication Laboratory The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in TIA/EIA-603-C-2004, Issue 3 of RSS-Gen and the energy emitted by the sample EUT tested as described in this report is in compliance with conducted and radiated emission limits of FCC Rule PART 22 subpart H, PART 24 subpart E and IC standards Issue 3 of RSS-132, Issue 6 of RSS-133.

The test results of this report relate only to the tested sample identified in this report.

Test By: Marcus Tseng **Date:** Feb. 14, 2014

Marcus Tseng / Engineer

Prepared By: Judy Hsu **Date:** Feb. 14, 2014

Judy Hsu / Clerk

Approved By: Jim Chang **Date:** Feb. 14, 2014

Jim Chang / Supervisor

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Version

Version No.	Date	Description
00	Feb. 14, 2014	Initial creation of document

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1. GENERAL PRODUCT INFORMATION

General:

Product Name:	Expedite L10-G , GSM0508-40
Brand Name:	Expedite L10-G
Marketing Name:	Expedite L10-G
Model No.:	GSM0508-40
Model difference:	N/A
Hardware Version:	SKINK V21
Software Version:	V3.02a
Power Supply:	3.8Vdc by DC Power Supply

GSM/GPRS:

Cellular Phone Standards Frequency Range and Power:	Operating Frequency		Rated Power
	GSM/GPRS 850, Class 12	824.2 MHz– 848.8 MHz	33 dBm
	GSM/GPRS 1900, Class 12	1850.2MHz – 1909.8MHz	30 dBm
Type of Emission	GSM 850: 245KGXW, GSM 1900: 242KGXW GPRS 850: 243KGXW, GPRS 1900: 250KGXW		
IMEI:	013807000001050		

This test report applies for 850 /1900 GSM / GPRS.

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Final Amplifier Voltage and Current Information:

Test Mode	DC voltage (V)	DC current (mA)
GSM 850	3.8	245
GSM 1900	3.8	170
GPRS 850	3.8	241
GPRS 1900	3.8	167

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1.1. Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for **FCC ID: PKRNVWGS0508** filing to comply with Section Part 22 subpart H, Part 24 subpart E of the FCC CFR 47 Rules and **IC: 3229A-GSM0508** filing to comply with Issue 3 of RSS-132, Issue 6 of RSS-133.

1.2. Test Methodology

Both conducted and radiated testing were performed according to the procedures document of TIA/EIA 603C and FCC CFR 47.1046, 2.1047, 2.1049, 2.1051, 2.1053, 2.1055, 2.1057, issue 3 of RSS-132 and issue 6 of RSS-133..

TS 151 010-1 is used to set, and measure the output power.

The Output power Procedure of KDB941225 (SAR Measurement Procedures for 3G devices, WCDMA / HSPA) was used for EUT and Base station setting.

KDB971168 D01 Power Meas license Digital System v01 as the supplemental guideline to conduct the measurement, including Peak to Power Average Ratio, Average Power over the fundamental signal BW (EIRP/ERP) and Signal Bandwidth..

1.3. Test Facility

The measurement facilities used to collect the 3m Radiated Emission and AC power line conducted data are located on the address of SGS Taiwan Ltd. Electronics & Communication Laboratory No. 134, Wu Kung Rd., Wuku Industrial Zone, Taipei Country, Taiwan which are constructed and calibrated to meet the FCC requirements in documents ANSI C63.4: 2003. FCC Registration Number are: 990257, Canada Registration Number: 4620A-4

The 10 m Open Area Test Sites located on the address of SGS Taiwan Ltd. Electronics & Communication Laboratory No. 29, Pau-Tou-Tsuo Valley Chia-Pau Tsuen, Linkou Hsiang, Taipei county, which is constructed and calibrated to meet the CISPR 22/EN 55022 requirements. SGS Site No. 1(3 & 10 meters) and FCC Registration Number: 94644.

All equipment is calibrated externally and traceable to SI (International System of Unit).

1.4. Special Accessories

Not available for this EUT intended for grant.

1.5. Equipment Modifications

Not available for this EUT intended for grant.

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2. SYSTEM TEST CONFIGURATION

2.1. EUT Configuration

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

2.2. EUT Exercise

The EUT (Transmitter) was operated in the continuous transmission mode employed with the simulator of the Base Station that fixates at test default channels to fix the Tx frequency which was for the purpose of the measurements.

2.3. Test Procedure

2.3.1 Conducted Measurement at Antenna Port:

According to measurement procured TIA/EIA 603C, the EUT is placed on a turn table which is 0.8 m above ground plane. A low loss of RF cable was used to connect the antenna port of EUT to measurement equipment.

2.3.2 Radiated Emissions (ERP/EIRP):

According to measurement procured TIA/EIA 603C and RSS-Gen Issue 3, The EUT is placed on a turn table which is 0.8 m above ground plane. The turn table shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both Horizontal and Vertical. In order to find out the max. emission, the relative positions of this hand-held transmitter (EUT) was rotated through three orthogonal axes and measurement procedures for electric field radiated emissions above 1 GHz the EUT measurement is to be made "while keeping the antenna in the 'cone of radiation' from that area and pointed at the area both in azimuth and elevation, with polarization oriented for maximum response." is still within the 3dB illumination BW of the measurement antenna according to the requirements in Section 8 and 13 of ANSI C63.4:2009.

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2.4. Measurement Equipment Used:

Conducted Emission (measured at antenna port) Test Site					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Spectrum Analyzer	Agilent	E4446A	MY51100003	05/30/2013	05/29/2014
Spectrum Analyzer	Agilent	E4440A	US41160416	03/15/2013	03/14/2014
Radio Communication Analyzer	R & S	CMU200	102189	06/17/2013	06/16/2014
Radio Communication Analyzer	Anritsu	MT8820C	6200995019	10/21/2013	10/20/2014
Temperature Chamber	TERCHY	MHG-120LF	911009	05/06/2013	05/05/2014
DC Block	Mini-Circuits	BLK-18-S+	1	02/28/2013	02/27/2014
Attenuator	Mini-Circuit	BW-S10W2+	002	02/28/2013	02/27/2014
Splitter	Agilent	11636B	N/A	02/28/2013	02/27/2014
DC Power Supply	Agilent	E3640A	KR93300208	07/24/2013	07/23/2014

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ERP, EIRP MEASUREMENT EQUIPMENT List 966 Chamber

EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Spectrum Analyzer	Agilent	E4446A	MY51100003	05/30/2013	05/29/2014
EXA Spectrum Analyzer	Agilent	N9010A	MY50420195	01/20/2014	01/19/2015
Spectrum Analyzer	R&S	FSV-30	101398	10/22/2013	10/21/2014
Bilog Antenna	SCHWAZBECK	VULB9168	378	01/02/2014	01/02/2015
Bilog Antenna	SCHWAZBECK	VULB9160	3158	11/27/2013	11/26/2014
Horn antenna	ETS.LINDGREN	3117	123995	05/31/2013	05/30/2014
Horn antenna	ETS.LINDGREN	3117	123991	01/20/2014	01/19/2015
Horn Antenna	Schwarzbeck	BBHA9170	184	01/23/2014	01/22/2015
Horn Antenna	Schwarzbeck	BBHA9170	185	07/19/2013	07/18/2014
Network Analyze	Anritsu	MS4644A	1216312	05/23/2013	05/22/2014
Signal Generator	Agilent	E4438C	MY45093613	07/30/2013	07/29/2014
Pre-Amplifier	Agilent	8447D	1937A02834	01/03/2014	01/02/2015
Pre-Amplifier	Agilent	8449B	3008A00578	01/03/2014	01/02/2015
Pre-Amplifier	EMC Instruments Corp.	EMC184045	980135	01/24/2014	01/23/2015
Attenuator	Mini-Circuit	BW-S10W2+	004	02/28/2013	02/27/2014
Radio Communication Analyzer	R & S	CMU200	102189	06/17/2013	06/16/2014
Radio Communication Analyzer	Anritsu	MT8820C	6200995019	10/21/2013	10/20/2014
Turn Table	HD	DT420	N/A	N.C.R	N.C.R
Antenna Tower	HD	MA240-N	240/657	N.C.R	N.C.R
Controller	HD	HD100	N/A	N.C.R	N.C.R
Low Loss Cable	HUBER+SUHNER	966_Tx	10m	01/03/2014	01/02/2015
Low Loss Cable	HUBER+SUHNER	966_Rx	3m	01/03/2014	01/02/2015
Filter 800-1000	Micro-Tronics	EWT	M2	02/28/2013	02/28/2014
Filter 1800-2000	Micro-Tronics	EWT	M2	02/28/2013	02/28/2014
Filter 1700-1800	Micro-Tronics	BRC15751	001	02/28/2013	02/28/2014
1GHz High Pass Filter	Micro-Tronics	HPM50108	32	02/28/2013	02/28/2014
2GHz High Pass Filter	Micro-Tronics	HPM50110	36	02/28/2013	02/28/2014
3m Site NSA	SGS	966 chamber	N/A	07/15/2013	07/14/2014

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2.5. Configuration of Tested System

Fig. 2-1 Configuration of Tested System (Fixed Channel-Conducted)

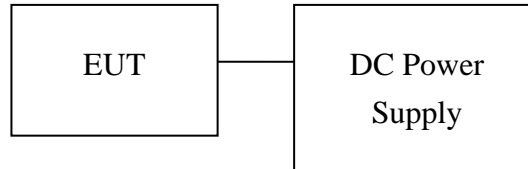


Fig. 2-2 Configuration of Tested System (Fixed Channel-Radiated)

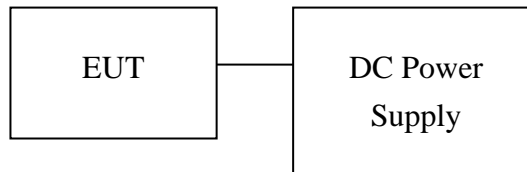


Table 2-1 Equipment Used in

Item	Equipment	Mfr/Brand	Model/ Type No.	Series No.	Data Cable	Power Cord
1.	DC Power Supply	HP	E3640A	KR93300208	shielded	Un-shielded

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3. SUMMARY OF TEST RESULTS

FCC Rules	IC Rules	Description Of Test	Result
§2.1046(a) §22.913(a)(2) §24.232(c)	N/A	RF Power Output	Compliant
§2.1046(a) §22.913(a)(2) §24.232(c)	§4.8 (RSS-Gen Issue 3) §5.4 (RSS-132) §6.4 (RSS-133)	ERP/ EIRP measurement	Compliant
§2.1049(h)	§4.6.1 (RSS-Gen Issue 3) §2.3 (RSS-133)	99% Occupied Bandwidth	Compliant
§2.1051 §22.917(a) §24.238(a)	§4.9 (RSS-Gen Issue 3) §5.5 (RSS-132) §6.5 (RSS-133)	Out of Band Emissions at Antenna Terminals and Band Edge	Compliant
§2.1053 §22.917(a) §24.238(a)	§4.9 (RSS-Gen Issue 3) §5.5 (RSS-132) §6.5 (RSS-133)	Field Strength of Spurious Radiation	Compliant
§24.232(d)	§6.4 (RSS-133) §5.4 (RSS-132)	Peak to Average Ratio	Compliant
§2.1055(a)(1) §22.355 §24.235	§4.7 (RSS-Gen Issue 3) §4.3 (RSS-132) §6.3 (RSS-133)	Frequency Stability vs. Temperature	Compliant
§2.1055(d)(2) §22.355 §24.235	§4.7 (RSS-Gen Issue 3) §5.3 (RSS-132) §6.3 (RSS-133)	Frequency Stability vs. Voltage	Compliant
N/A	§4.10 (RSS-Gen Issue 3) §5.6 (RSS-132) §6.5 (RSS-133)	Receiver Spurious Emissions	Compliant

Max ERP/EIRP measurement result:

	dBm		W
GSM 850 Band	23.84	ERP	0.242
GSM 1900 Band	25.94	EIRP	0.393
GPRS 850 Band	23.00	ERP	0.200
GPRS 1900 Band	25.92	EIRP	0.391

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4. DESCRIPTION OF TEST MODES

The EUT has been tested under operating condition.

EUT was staying in continuous transmitting mode. Channel Low, Mid and High for each type band with rated data rate were chosen for full testing.

The list of channel selected to conduct the measurements

GSM/GPRS 850:

Channel Low: AFRCN 128 at 824.2MHz, Channel Mid: AFRCN 190 at 836.6MHz, Channel High: AFRCN 251 at 848.8MHz.

GSM/GPRS 1900:

Channel Low: AFRCN 512 at 1850.2MHz, Channel Mid: AFRCN 661 at 1880.0MHz, Channel High AFRCN 810 at 1909.8MHz

The field strength of spurious radiation emission was measured as EUT stand-up position (H mode) and lie down position (E1, E2 mode) for GSM/GPRS. The worst-case of E2 position for GSM/GPRS 850/ 1900 were reported.

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5. MEASUREMENT UNCERTAINTY

Test Items	Uncertainty
RF Power Output	+/- 1.42 dB
ERP/ EIRP measurement	Vertical Polarization = +/- 4.74dB Horizontal Polarization = +/- 4.62dB
99% Occupied Bandwidth	+/- 123.36 Hz
Out of Band Emissions at Antenna Terminals and Band Edge	+/- 1.55 dB
Peak to Average Ratio	+/- 1.55 dB
Frequency Stability vs. Temperature	+/- 123.36 Hz
Frequency Stability vs. Voltage	+/- 123.36 Hz
Temperature	+/- 0.8 °C
Humidity	+/- 4.7 %
DC / AC Power Source	DC= +/- 1%, AC= +/- 0.2%

Radiated Spurious Emission:

Measurement uncertainty (Polarization : Vertical)	30MHz - 180MHz: +/- 3.37dB
	180MHz -417MHz: +/- 3.19dB
	0.417GHz-1GHz: +/- 3.19dB
	1GHz - 18GHz: +/- 4.04dB
	18GHz - 40GHz: +/- 4.04dB

Measurement uncertainty (Polarization : Horizontal)	30MHz - 167MHz: +/- 4.22dB
	167MHz -500MHz: +/- 3.44dB
	0.5GHz-1GHz: +/- 3.39dB
	1GHz - 18GHz: +/- 4.08dB
	18GHz - 40GHz: +/- 4.08dB

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

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6. RF POWER OUTPUT MEASUREMENT

6.1 Standard Applicable:

According to FCC §2.1046.

FCC 22.913(a) Mobile station are limited to 7W.

FCC 24.232(c) Peak Power Measurement limited to 2W

FCC 24.232(c) Equipment must employ means to limit the power to the minimum necessary for successful communication.

3GPP Power limitation for HSDPA and HSUPA

Maximum Output Powers for HSDPA

Sub-test in table C.10.1.4	Power Class 3		Power Class 4	
	Power (dBm)	Tol (dB)	Power (dBm)	Tol (dB)
1	+24	+1.7/-3.7	+21	+2.7/-2.7
2	+24	+1.7/-3.7	+21	+2.7/-2.7
3	+23.5	+2.2/-3.7	+20.5	+3.2/-2.7
4	+23.5	+2.2/-3.7	+20.5	+3.2/-2.7

Maximum Output Powers for HSUPA

Sub-test in table C.11.1.3	Power Class 3		Power Class 4	
	Power (dBm)	Tol (dB)	Power (dBm)	Tol (dB)
1	+24	+1.7/-6.7	+21	+2.7/-5.7
2	+22	+3.7/-5.2	+19	+4.7/-4.2
3	+23	+2.7/-5.2	+20	+3.7/-4.2
4	+22	+3.7/-5.2	+19	+4.7/-4.2
5	+24	+1.7/-6.7	+21	+2.7/-5.7

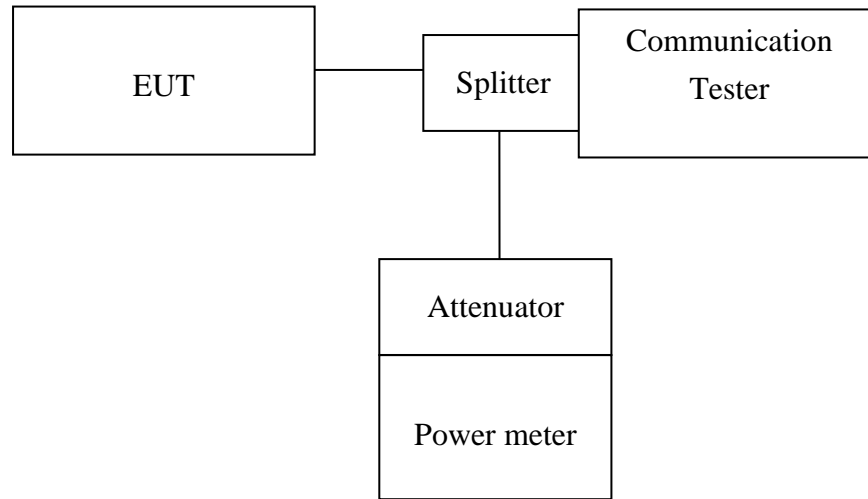
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6.2 Test Set-up:



Note: Measurement setup for testing on Antenna connector

6.3 Measurement Procedure:

The transmitter output was connected to a calibrated attenuator, the other end of which was connected to a power meter. Transmitter output was read off the power meter in dBm. The power output at the transmitter antenna port was determined by adding the value of the attenuator to the power meter reading. TS 151 010-1 is reference to conduct the test measurement of output power.

The Procedure of KDB941225 (SAR Measurement Procedures for 3G devices, (WCDMA/HSPA) was used for EUT and Base station setting. RMC 12.2kps is used for this testing, and KDB 971168 D01 Power Meas License Digital System as the supplemental test methodology to adjust the proper setting obtaining the measurement results

Necessary Communication complying with 24.232 (c) and 27.5(d)(4)

Set CMU200 (base-station simulator) MS Signal with packet data submenu; SLOT Configuration

Set appropriate level to verify if or not power on mobile station's link with simulator still exists.

6.4 Measurement Equipment Used:

Refer to section 2.4 in this report

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6.5 Measurement Result:

6.5.1 RF Conducted Output Power

6.5.1.1. GSM/GPRS/EDGE (GMSK; 8-PSK)

Result:

EUT Mode	Frequency (MHz)	CH	Peak Power (dBm)	Average Burst Power (dBm)
GSM 850	824.2	128	32.80	32.60
	836.6	190	32.80	32.60
	848.8	251	32.80	32.60

EUT Mode	Frequency (MHz)	CH	Peak Power (dBm)	Average Burst Power (dBm)
GSM 1900	1850.2	512	29.90	29.70
	1880.0	661	29.70	29.50
	1909.8	810	29.60	29.40

EUT Mode	Frequency (MHz)	CH	Peak Power (4DN 1UP) Class 8 (dBm)	Average Burst Power (4DN 1UP) Class 8 (dBm)	Peak Power (4DN 2UP) Class 10 (dBm)	Average Burst Power (4DN 2UP) Class 10 (dBm)
GPRS 850	824.2	128	32.80	32.60	32.10	31.90
	836.6	190	32.80	32.60	32.10	31.90
	848.8	251	32.90	32.60	32.00	31.90

EUT Mode	Frequency (MHz)	CH	Peak Power (4DN 3UP) Class 11 (dBm)	Average Burst Power (4DN 3UP) Class 11 (dBm)	Peak Power (4DN 4UP) Class 12 (dBm)	Average Burst Power (4DN 4UP) Class 12 (dBm)
GPRS 850	824.2	128	30.30	30.20	29.20	29.10
	836.6	190	30.30	30.20	29.30	29.10
	848.8	251	30.40	30.30	29.40	29.20

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EUT Mode	Frequency (MHz)	CH	Peak Power (4DN 1UP) Class 8 (dBm)	Average Burst Power (4DN 1UP) Class 8 (dBm)	Peak Power (4DN 2UP) Class 10 (dBm)	Average Burst Power (4DN 2UP) Class 10 (dBm)
GPRS 1900	1850.2	512	29.90	29.70	29.10	28.90
	1880.0	661	29.70	29.50	28.80	28.70
	1909.8	810	29.60	29.40	28.70	28.60

EUT Mode	Frequency (MHz)	CH	Peak Power (4DN 3UP) Class 11 (dBm)	Average Burst Power (4DN 3UP) Class 11 (dBm)	Peak Power (4DN 4UP) Class 12 (dBm)	Average Burst Power (4DN 4UP) Class 12 (dBm)
GPRS 1900	1850.2	512	27.20	27.10	26.20	26.00
	1880.0	661	27.00	26.80	25.90	25.80
	1909.8	810	26.90	26.80	25.80	25.70

Cable loss offset Low Band: 0.5dB

Cable loss offset High Band: 1dB

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6.5.2. Minimum Communications Power Measurement

PCS 1900 band

PCL	0	1	2	3	4	5	6	7	8
Output power (dBm)	29.7	28.5	26.5	24.5	22.6	20.6	18.7	16.7	14.7
PCL	9	10	11	12	13	14	15		
Output power (dBm)	12.7	11	9	7	5.1	3.1	1.2		

Note: The EUT output power was controlled by simulator. Set Communication Tester CMU200 PCL as above, and get the mobile phone output power reading.

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7. ERP, EIRP MEASUREMENT

7.1 Standard Applicable:

According to FCC §2.1046

FCC 22.913(a) Mobile station are limited to 7W ERP.

FCC 24.232(b) Mobile station are limited to 2W EIRP.

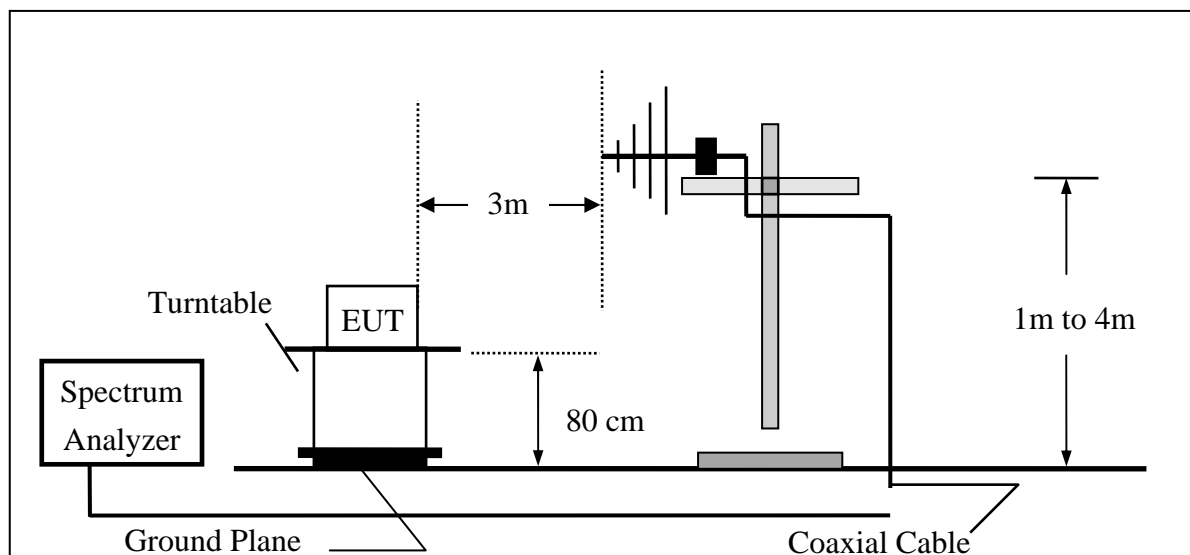
According to IC RSS-133 §6.4

The peak e.i.r.p. for transmitters operating in the band 1850-1910 MHz shall not exceed the limits 2W which given in SRSP-510.

According to issue 3 of RSS 132, section 5.4. The transmitter output power shall not exceed the limits 11.5W / 40.60 dBm given in SRSP-503.

7.2 Test SET-UP (Block Diagram of Configuration):

(A) Radiated Emission Test Set-Up, Frequency Below 1000MHz



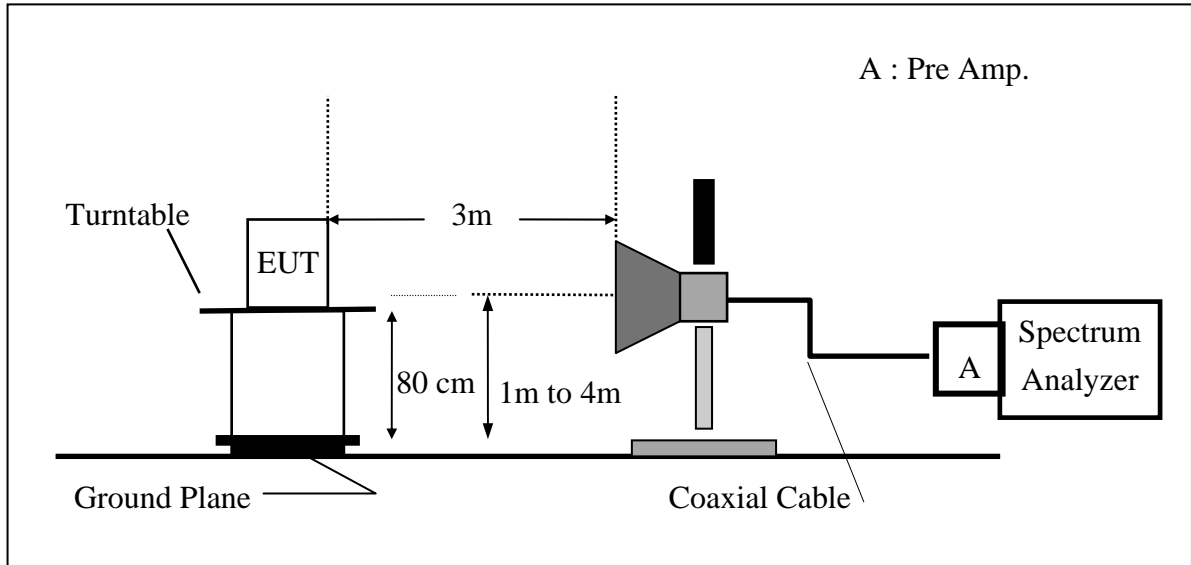
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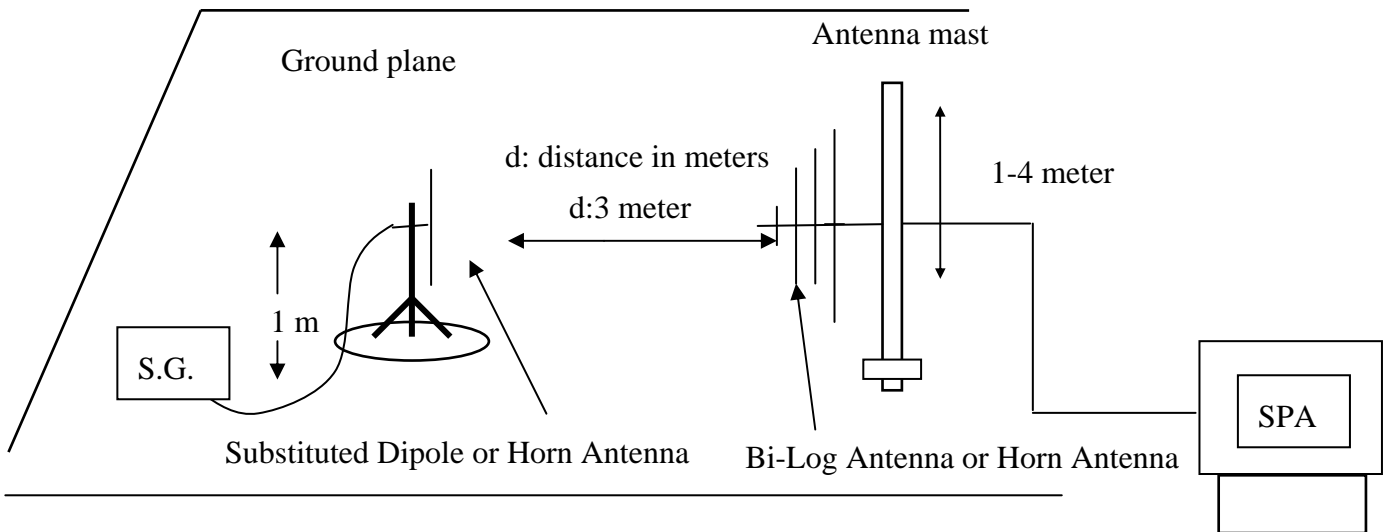
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(B) Radiated Emission Test Set-UP Frequency Over 1 GHz



(C) Substituted Method Test Set-UP



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7.3 Measurement Procedure:

The EUT was placed on an non-conductive turntable using a non-conductive support. The radiated emission at the fundamental frequency was measured at 3 m with a test antenna and EMI spectrum analyzer.

During the measurement, the EUT was communication with the station. The highest emission was recorded with the rotation of the turntable and the lowering of the test antenna from 4m to 1m. The reading was recorded and the field strength (E in dBuV/m) was calculated.

ERP in frequency band 824.2 –848.80MHz were measured using a substitution method. The EUT was replaced by dipole antenna connected, the S.G. output was recorded and ERP was calculated as follows:

EIRP in frequency band 1850.2 –1909.8MHz were measured using a substitution method. The EUT was replaced by a horn antenna connected, the S.G. output was recorded and EIRP was calculated as follows:

$$\text{ERP} = \text{S.G. output (dBm)} + \text{Antenna Gain (dBd)} - \text{Cable Loss (dB)}$$

$$\text{EIRP} = \text{S.G. output (dBm)} + \text{Antenna Gain (dBi)} - \text{Cable Loss (dB)}$$

Spectrum setting:

1. Detector = Peak, marker the highest value of the detector by maximum hold, set RBW wide enough to capture the entire signal of emission, and VBW $\geq 3 \times \text{RBW}$.

Or,

2. KDB 971168 D01 Power Meas License Digital Systems v01 is adopted, and the procedure as lists under item 4, Measurement of the Average Power over the Fundamental Signal Bandwidth, is followed to set correspondingly for the acquisition of proper measurement data.

Set frequency = nominal signal center frequency;

Set span = 2 X occupied BW;

Set RBW $\approx 1 \sim 5\%$ of the span, not to exceed 1 MHz

Set VBW = 3 x RBW;

Select average power (RMS) detector

Set sweep time and number of measurement points to achieve a minimum of 1 millisecond/pt integration time (ex. Point = 601points, then sweep time = $601 * 10^{-3} = 6\text{s}$).

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Activate trace averaging routine over a minimum of 10 sweeps;
Activate marker/span pair and set span = signal or channel bandwidth;
Activate the band/interval power marker function;
Record the band power level;

Record adjusted value as the average signal power level. Then activate the occupied bandwidth measurement function.

7.4 Measurement Equipment Used:

Refer to section 2.4 in this report

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7.5 Measurement Result: (Peak) –using option of peak measurement

EUT				Measurement					
Operation Band	Pol.	Fundamental Frequency	CH	Antenna Pol.	S.G. Output	Antenna Gain	Cable Loss	ERP	Limit
		MHz		V/H	dBm	dBd	dB	dBm	dBm
GSM850	E2	824.2	128	V	22.96	3.91	-3.03	23.84	38.45
				H	21.11	3.91	-3.03	21.99	38.45
		836.6	190	V	22.57	3.89	-3.07	23.40	38.45
				H	21.56	3.89	-3.07	22.38	38.45
		848.8	251	V	20.56	3.87	-3.11	21.32	38.45
				H	19.91	3.87	-3.11	20.68	38.45

Remark :

- (1) The RBW,VBW of SPA for measurement RBW=300 KHz, VBW=1MHz

EUT				Measurement					
Operation Band	Pol.	Fundamental Frequency	CH	Antenna Pol.	S.G. Output	Antenna Gain	Cable Loss	EIRP	Limit
		MHz		V/H	dBm	dB	dB	dBm	dBm
GSM 1900	E2	1850.2	512	V	25.53	5.08	-4.67	25.94	33.01
				H	23.09	5.08	-4.67	23.50	33.01
		1880.0	661	V	25.52	5.00	-4.70	25.81	33.01
				H	22.84	5.00	-4.70	23.13	33.01
		1909.8	810	V	25.46	4.92	-4.74	25.64	33.01
				H	21.80	4.92	-4.74	21.98	33.01

Remark :

- (1) The RBW,VBW of SPA for measurement RBW=300K, VBW=1MHz

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EUT				Measurement					
Operation Band	Pol.	Fundamental Frequency	CH	Antenna Pol.	S.G. Output	Antenna Gain	Cable Loss	ERP	Limit
		MHz		V/H	dBm	dBd	dB	dBm	dBm
GPRS 850	E2	824.20	128	V	22.12	3.91	-3.03	23.00	38.45
				H	19.58	3.91	-3.03	20.46	38.45
		836.60	190	V	21.89	3.89	-3.07	22.71	38.45
				H	20.90	3.89	-3.07	21.72	38.45
		848.80	251	V	19.52	3.87	-3.11	20.28	38.45
				H	19.50	3.87	-3.11	20.27	38.45

Remark :

- (1) The RBW,VBW of SPA for measurement RBW=300 KHz, VBW=1MHz

EUT				Measurement					
Operation Band	Pol.	Fundamental Frequency	CH	Antenna Pol.	S.G. Output	Antenna Gain	Cable Loss	EIRP	Limit
		MHz		V/H	dBm	dBd	dB	dBm	dBm
GPRS 1900	E2	1850.20	512	V	25.51	5.08	-4.67	25.92	33.01
				H	22.25	5.08	-4.67	22.66	33.01
		1880.00	661	V	25.35	5.00	-4.70	25.65	33.01
				H	22.18	5.00	-4.70	22.48	33.01
		1909.80	810	V	23.13	4.92	-4.74	23.32	33.01
				H	21.33	4.92	-4.74	21.51	33.01

Remark :

- (1) The RBW,VBW of SPA for measurement RBW=300 KHz, VBW=1MHz

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9.5.1 Measurement Result: (Average) – using option of RMS measurement

EUT				Measurement					
Operation Band	Pol.	Fundamental Frequency	CH	Antenna Pol.	S.G. Output	Antenna Gain	Cable Loss	ERP	Limit
		MHz		V/H	dBm	dBd	dB	dBm	dBm
GSM 850	E2	824.20	128	V	17.62	3.91	-3.03	18.5	40.60
				H	15.13	3.91	-3.03	16.01	40.60
		836.60	190	V	16.65	3.89	-3.07	17.47	40.60
				H	15.85	3.89	-3.07	16.67	40.60
		848.80	251	V	14.83	3.87	-3.11	15.59	40.60
				H	14.16	3.87	-3.11	14.92	40.60

Remark :

- (1) The RBW,VBW of SPA for frequency RBW=6 kHz, VBW=20 kHz

EUT				Measurement					
Operation Band	Pol.	Fundamental Frequency	CH	Antenna Pol.	S.G. Output	Antenna Gain	Cable Loss	EIRP	Limit
		MHz		V/H	dBm	dB	dB	dBm	dBm
GSM 1900	E2	1850.20	512	V	19.94	5.08	-4.67	20.35	33.01
				H	17.77	5.08	-4.67	18.18	33.01
		1880.00	661	V	20.38	5.00	-4.70	20.68	33.01
				H	17.66	5.00	-4.70	17.96	33.01
		1909.80	810	V	20.30	4.92	-4.74	20.48	33.01
				H	16.60	4.92	-4.74	16.78	33.01

Remark :

- (1) The RBW,VBW of SPA for frequency RBW=6 kHz, VBW=20 kHz

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EUT				Measurement					
Operation Band	Pol.	Fundamental Frequency	CH	Antenna Pol.	S.G. Output	Antenna Gain	Cable Loss	ERP	Limit
		MHz		V/H	dBm	dBd	dB	dBm	dBm
GPRS 850	E2	824.20	128	V	16.90	3.91	-3.03	17.78	40.60
				H	13.71	3.91	-3.03	14.59	40.60
		836.60	190	V	16.70	3.89	-3.07	17.52	40.60
				H	15.38	3.89	-3.07	16.20	40.60
		848.80	251	V	13.84	3.87	-3.11	14.60	40.60
				H	14.12	3.87	-3.11	14.88	40.60

Remark :

- (1) The RBW,VBW of SPA for frequency RBW=6 kHz, VBW=20 kHz

EUT				Measurement					
Operation Band	Pol.	Fundamental Frequency	CH	Antenna Pol.	S.G. Output	Antenna Gain	Cable Loss	EIRP	Limit
		MHz		V/H	dBm	dB	dB	dBm	dBm
GPRS 1900	E2	1850.20	512	V	19.83	5.08	-4.67	20.24	33.01
				H	16.94	5.08	-4.67	17.35	33.01
		1880.00	661	V	19.66	5.00	-4.70	19.96	33.01
				H	17.17	5.00	-4.70	17.47	33.01
		1909.80	810	V	18.11	4.92	-4.74	18.29	33.01
				H	15.50	4.92	-4.74	15.68	33.01

Remark :

- (1) The RBW,VBW of SPA for frequency RBW=6 kHz, VBW=20 kHz

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8 OCCUPIED BANDWIDTH MEASUREMENT

8.1 Standard Applicable:

According to §FCC 2.1049 (99%)

According to IC RSS-Gen Issue 3 §4.6.1 (99%)

According to IC RSS-133 §2.3 (20dB)

8.2 Test Set-up:

Refer to section 6.2 in this report

8.3 Measurement Procedure:

The EUT's output RF connector was connected with a short cable to the spectrum analyzer, RBW was set to about 1% of emission BW, VBW= 3 times RBW, -20dBc display line was placed on the screen (or 20dB bandwidth), the occupied bandwidth is the delta frequency between the two points where the display line intersects the signal trace. Then set RBW to 99% bandwidth, RBW= 1%, VBW= 3 RBW, with span > 2 * Signal BW, set % Power = 99%.

NOTE: For the plot of bandwidth measurement, the marker of the 99% bandwidth is diamond-shape while the marker of the 20dB BW is arrow-mark

8.4 Measurement Equipment Used:

Refer to section 2.4 in this report

8.5 Measurement Result:

Refer to next pages.

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99% Bandwidth

EUT Mode	Frequency (MHz)	CH	99% Bandwidth (kHz)
GSM 850	824.20	128	244.5839
	836.60	190	244.0232
	848.80	251	245.6674

EUT Mode	Frequency (MHz)	CH	99% Bandwidth (kHz)
GSM 1900	1850.20	512	242.1437
	1880.00	661	240.9058
	1909.80	810	237.3721

EUT Mode	Frequency (MHz)	CH	99% Bandwidth (kHz)
GPRS 850	824.20	128	236.4027
	836.60	190	241.7741
	848.80	251	242.7294

EUT Mode	Frequency (MHz)	CH	99% Bandwidth (kHz)
GPRS 1900	1850.20	512	248.1158
	1880.00	661	246.8894
	1909.80	810	250.0483

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20dB Bandwidth

EUT Mode	Frequency (MHz)	CH	20dB Bandwidth (MHz)
GSM 850	824.20	128	0.277
	836.60	190	0.280
	848.80	251	0.284

EUT Mode	Frequency (MHz)	CH	20dB Bandwidth (MHz)
GSM 1900	1850.20	512	0.280
	1880.00	661	0.273
	1909.80	810	0.267

EUT Mode	Frequency (MHz)	CH	20dB Bandwidth (MHz)
GPRS 850	824.20	128	0.275
	836.60	190	0.286
	848.80	251	0.284

EUT Mode	Frequency (MHz)	CH	20dB Bandwidth (MHz)
GPRS 1900	1850.20	512	0.288
	1880.00	661	0.279
	1909.80	810	0.293

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99% & 20dB Bandwidth Test Data

Figure 8-1: GSM 850 Channel Low

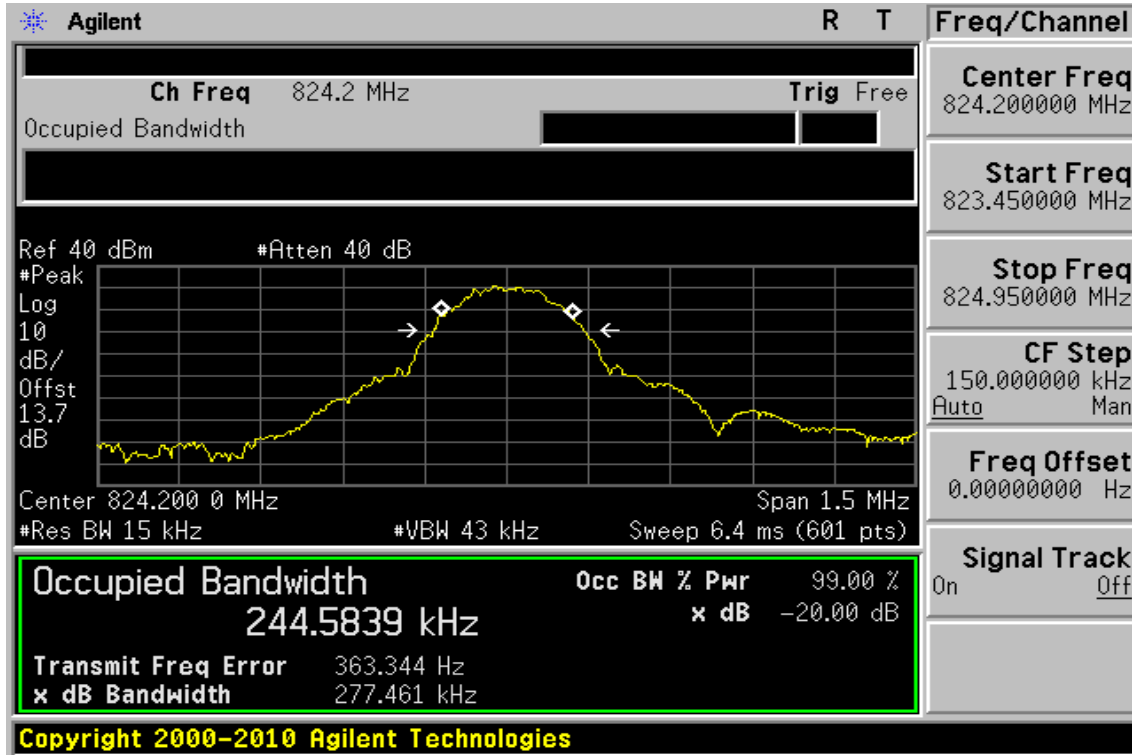
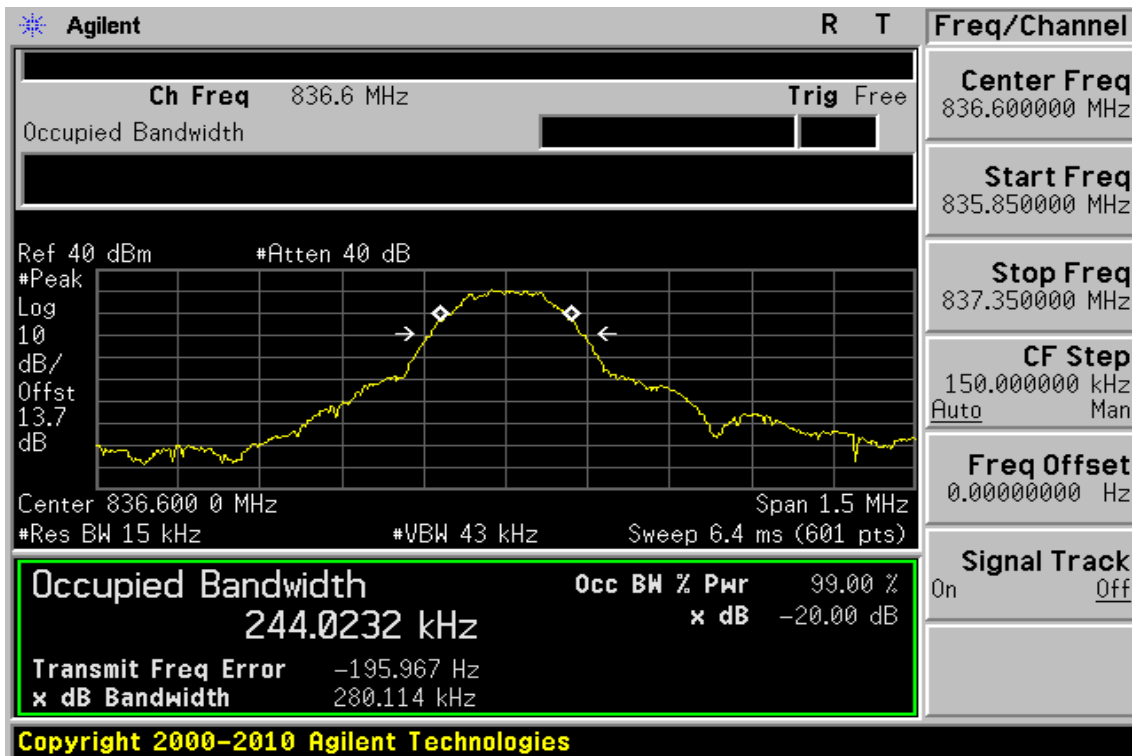


Figure 8-2: GSM 850 Channel Mid



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Figure 8-3: GSM 850 Channel High

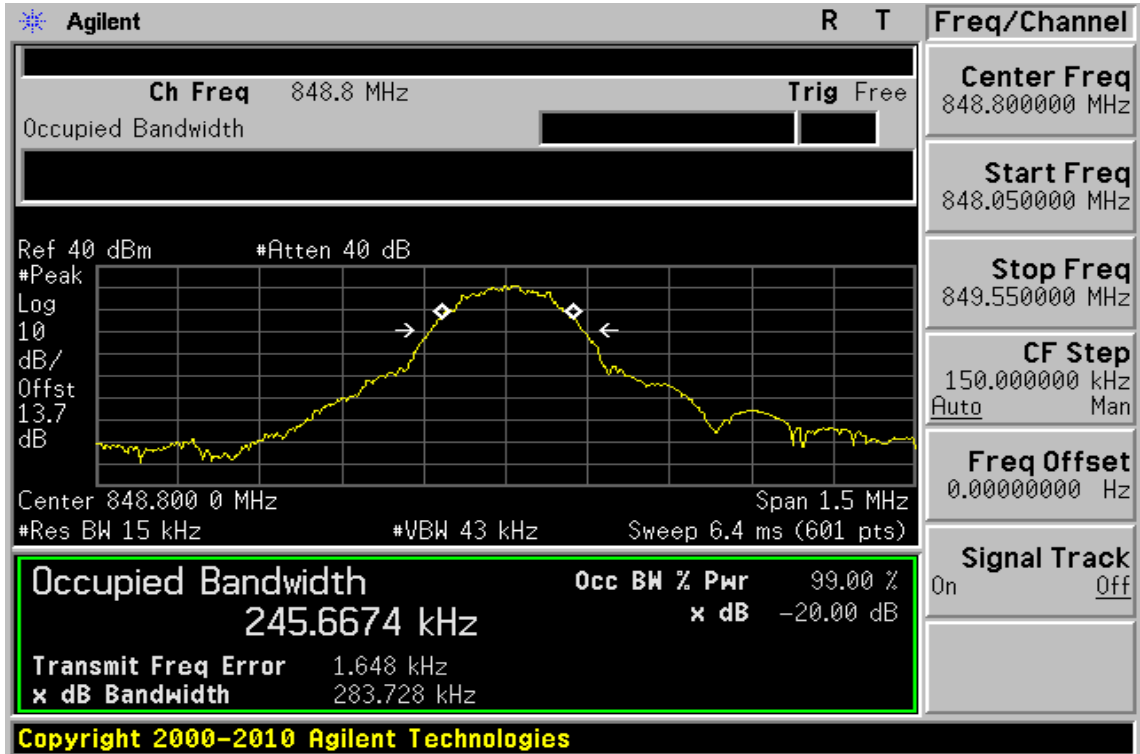
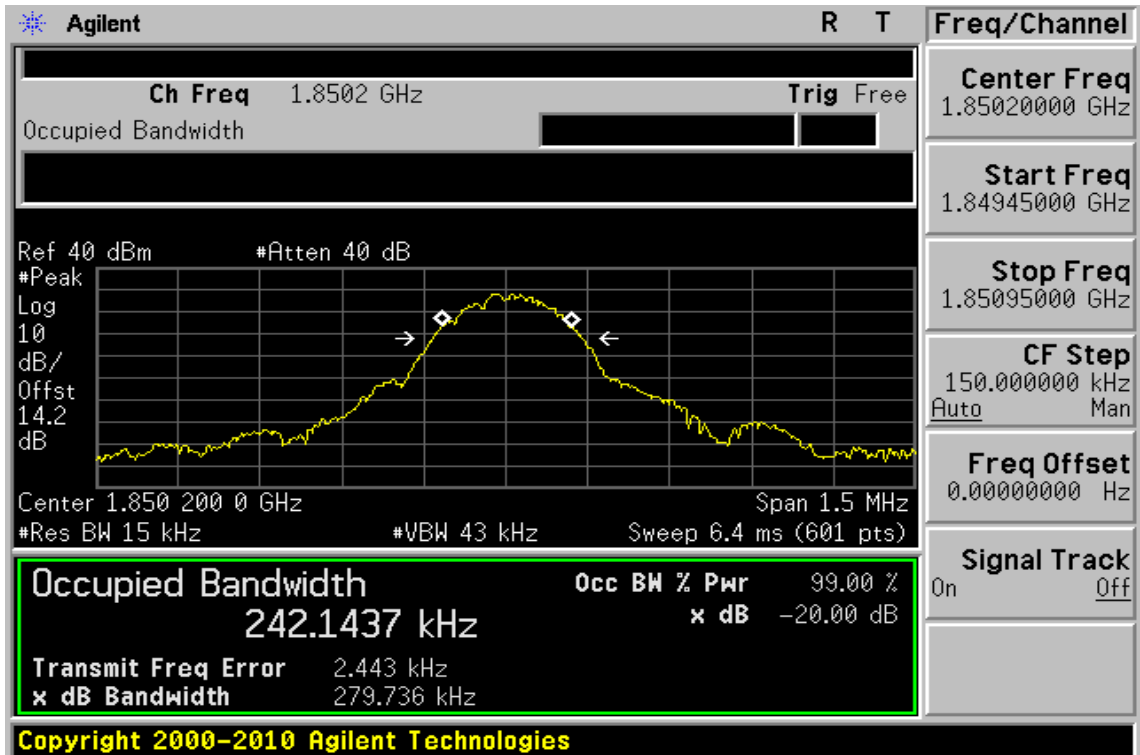


Figure 8-4: GSM 1900 Channel Low



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Figure 8-5: GSM 1900 Channel Mid

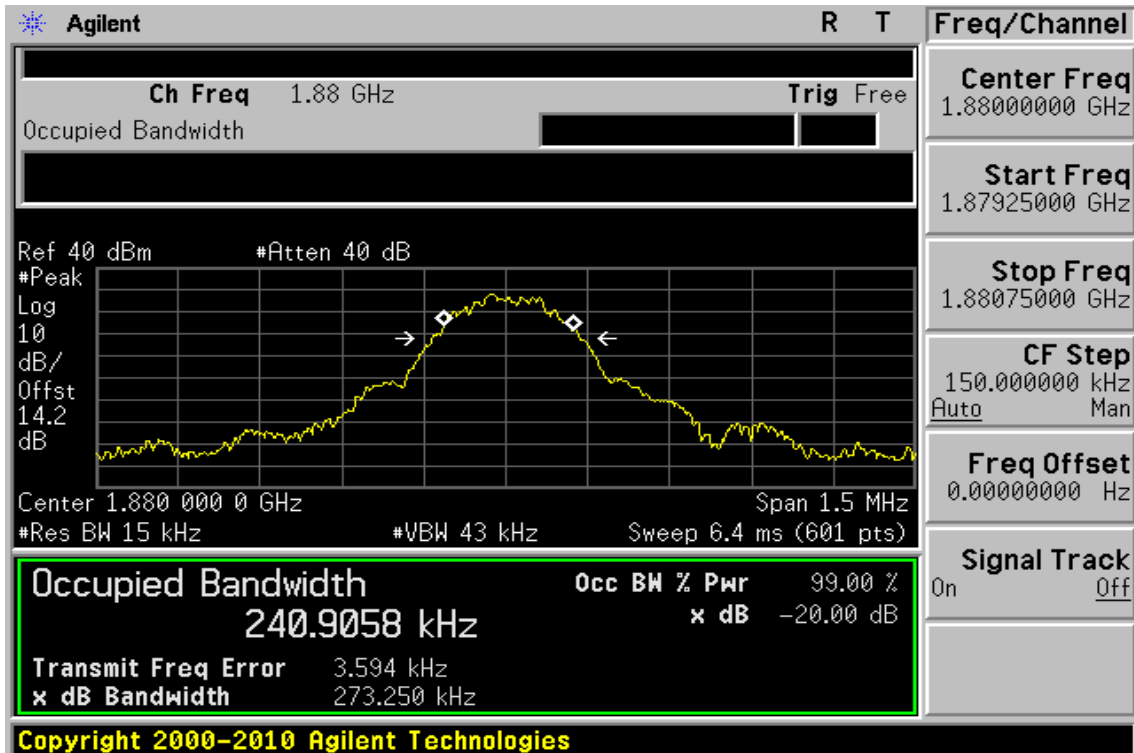
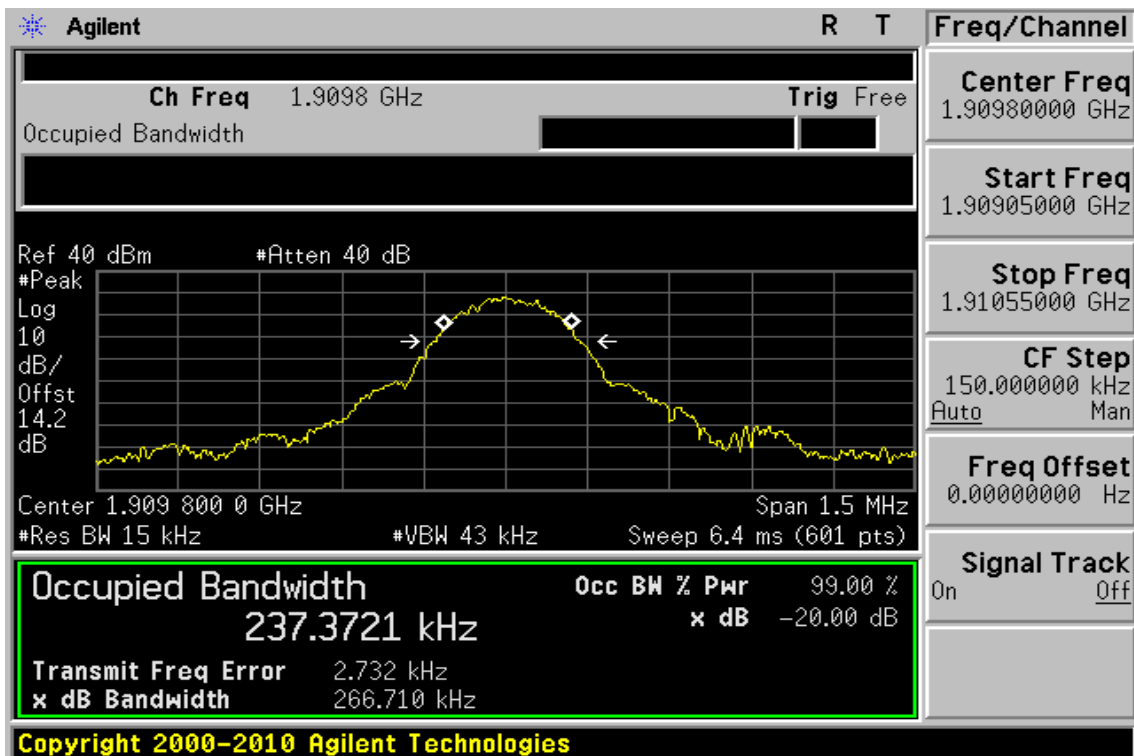


Figure 8-6: GSM 1900 Channel High



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Figure 8-9: GPRS 850 Channel High

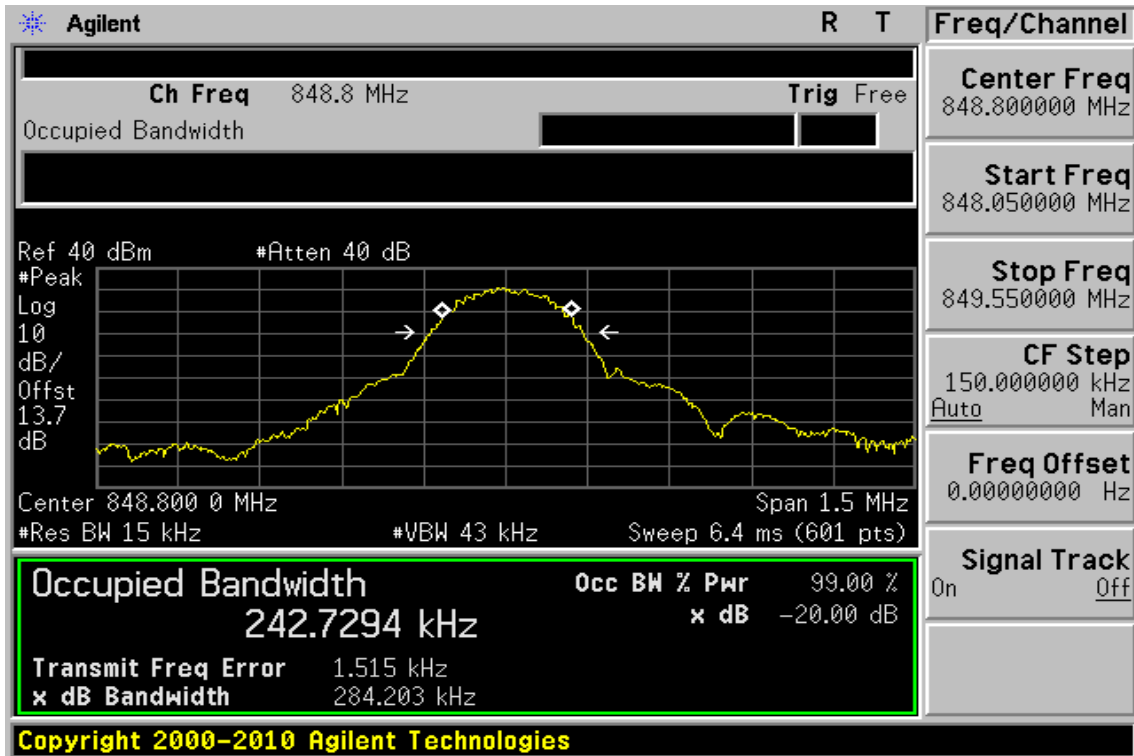
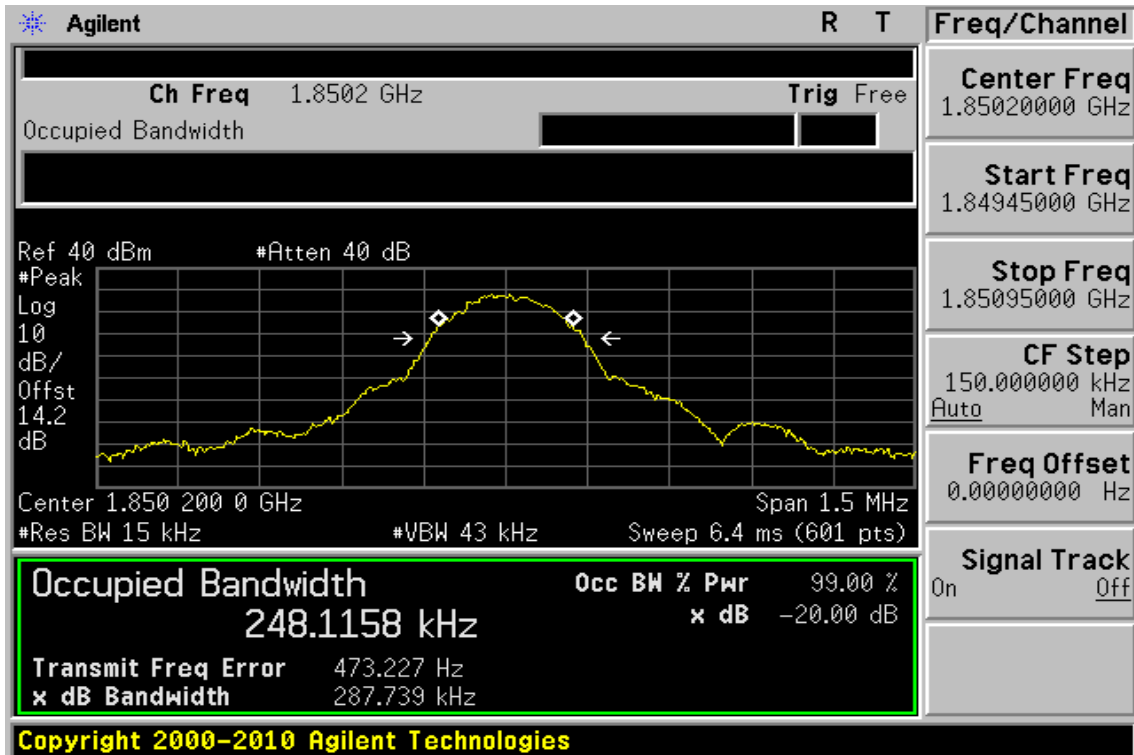


Figure 8-10: GPRS 1900 Channel Low



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Figure 8-11: GPRS 1900 Channel Mid

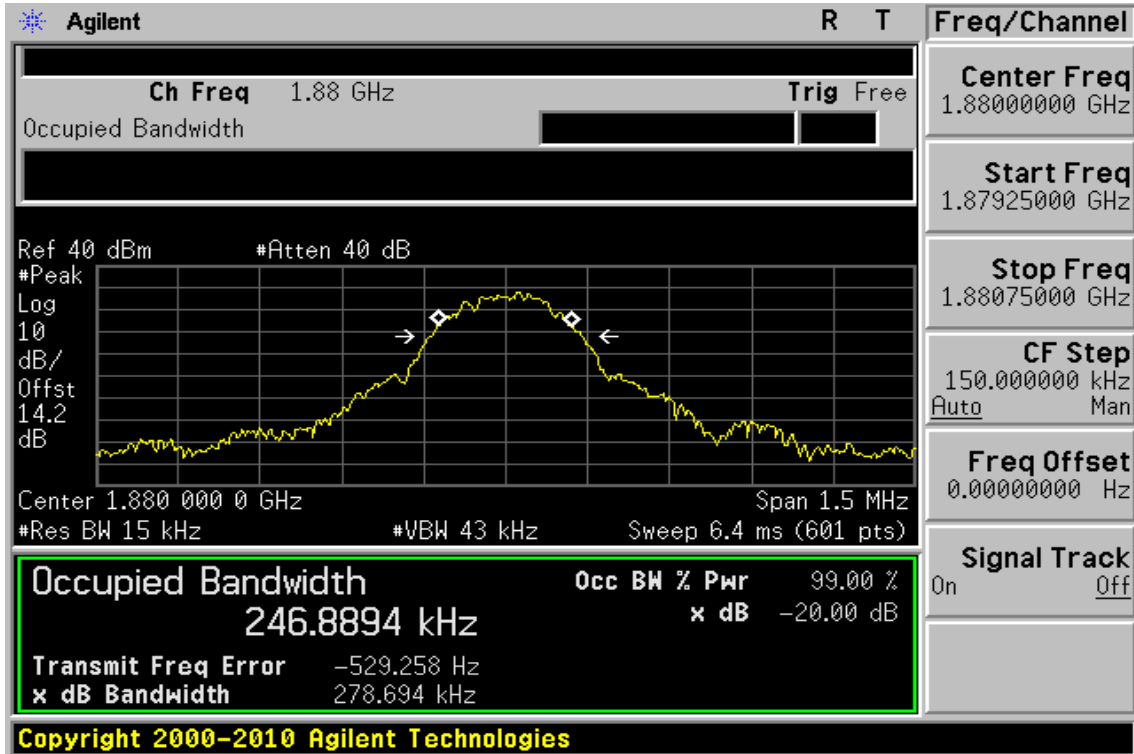
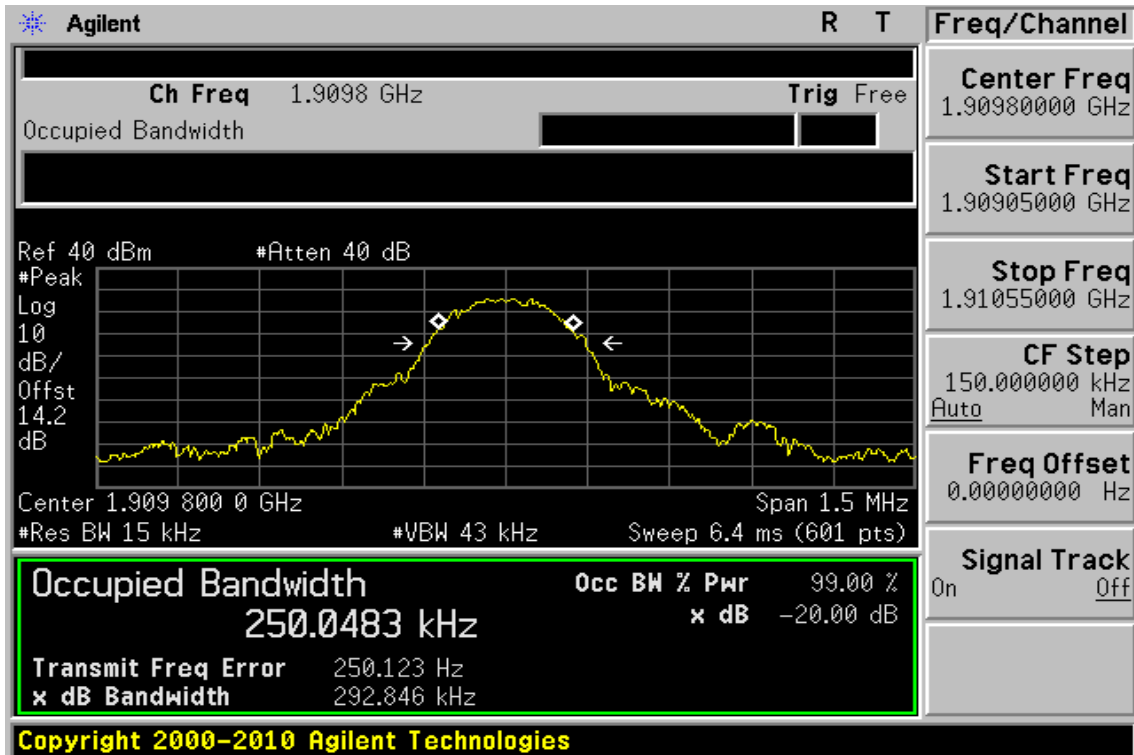


Figure 8-12: GPRS 1900 Channel High



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9 OUT OF BAND EMISSION AT ANTENNA TERMINALS

9.1 Standard Applicable:

According to FCC §2.1051.

FCC §22.917(a), §24.238(a), the magnitude of each spurious and harmonic emission that can be detected when the equipment is operated under the conditions specified in the instruction manual and/or alignment procedure, shall not be less than $43 + 10 \log$ (mean output power in watts) dBc below the mean power output outside a license's frequency block (-13dBm)

According to RSS-132 §5.5

Mobile and base station equipment shall comply with the limits in (i) and (ii) below.

- (i) In the first 1.0 MHz band immediately outside and adjacent to each of the sub-bands specified in Section 5.1, the power of emissions per any 1% of the occupied bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least $43 + 10 \log_{10} p$ (watts).
- (ii) After the first 1.0 MHz immediately outside and adjacent to each of the sub-bands, the power of emissions in any 100 kHz bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least $43 + 10 \log_{10} p$ (watts). If the measurement is performed using 1% of the occupied bandwidth, power integration over 100 kHz is required.

According to RSS-133 §6.5

6.5.1 Out-of-Block Emissions

Equipment shall comply with the limits in (i) and (ii) below.

- (i) In the 1.0 MHz bands immediately outside and adjacent to the equipment's operating frequency block, the emission power per any 1% of the emission bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least $43 + 10 \log_{10} p$ (watts).
- (ii) After the first 1.0 MHz, the emission power in any 1 MHz bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least $43 + 10 \log_{10} p$ (watts). If the measurement is performed using 1% of the emission bandwidth, power integration over 1.0 MHz is required.

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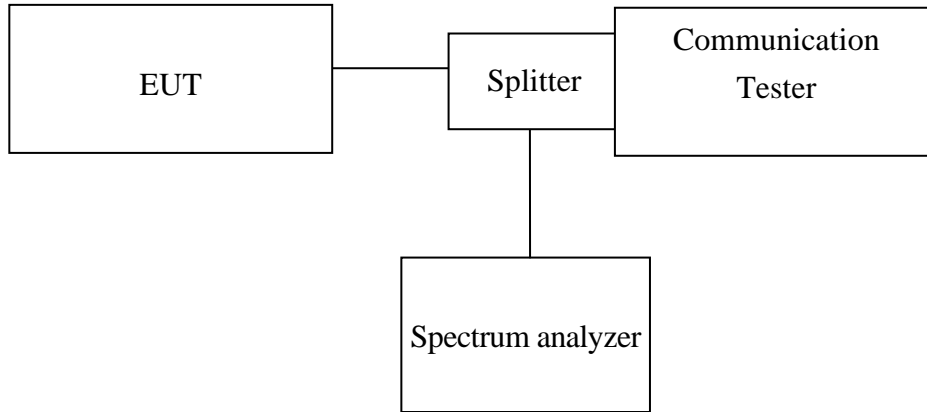
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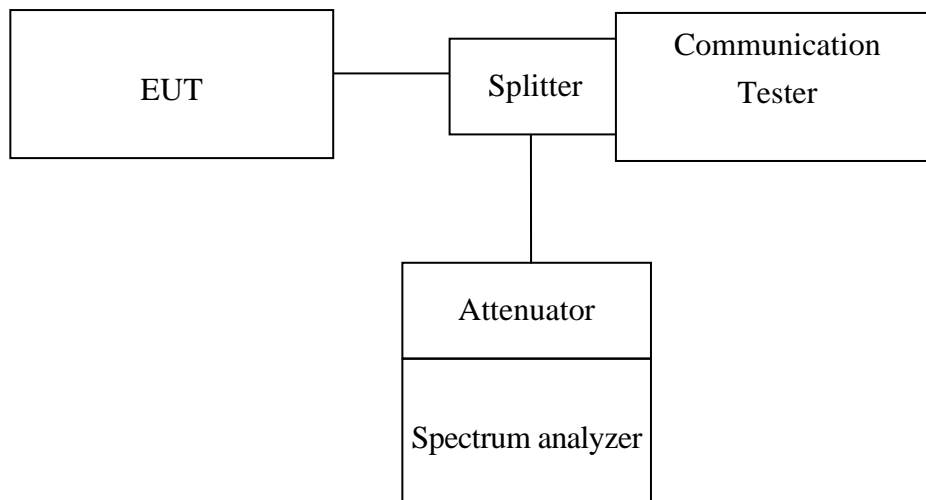
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9.2 Test SET-UP:

Out of band emission



Band Edge



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9.3 Measurement Procedure:

The RF output of the transceiver was connected to a spectrum analyzer through appropriate attenuation. The resolution bandwidth of the spectrum analyzer was set at 1MHz, sufficient scans were taken to show the out of band Emissions if any up to 10th harmonic.

For the out of band: Set the RBW, VBW = 1MHz, Start=30MHz, Stop= 10 th harmonic. Limit = -13dBm

Band Edge Requirements: In the 1 MHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of at least 1 percent of the emission bandwidth of the fundamental emission of the transmitter may be employed to measure the out of band Emissions. Limit, -13dBm.

Conducted Emission:

- 1、 To connect Antenna Port of EUT to Spectrum.
- 2、 Set RBW = 1MHz & VBW = 1MHz on Spectrum.
- 3、 Sweep the frequency to determine spurious emission as seen on spectrum from span of 30 to 1G, 1G to 2.5G, 2.5G to 7.5G, 7.5G to 10G ,10G to 15G and 15G to 20GHz
- 4、 Via Software, combine 6 spans of frequency range into one plot

9.4 Measurement Equipment Used:

Refer to section 2.4 in this report

9.5 Measurement Result:

Refer to next pages.

NOTE: the occurrence of the spike on the conducted emission is the signal of the fundamental emission.

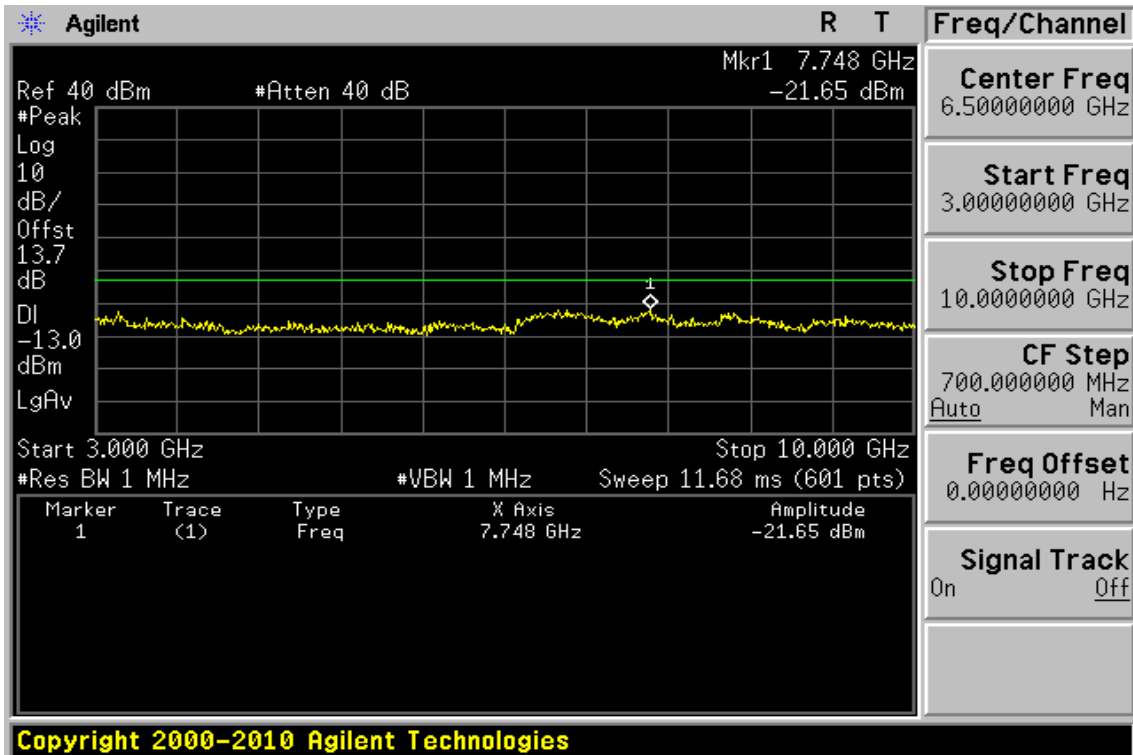
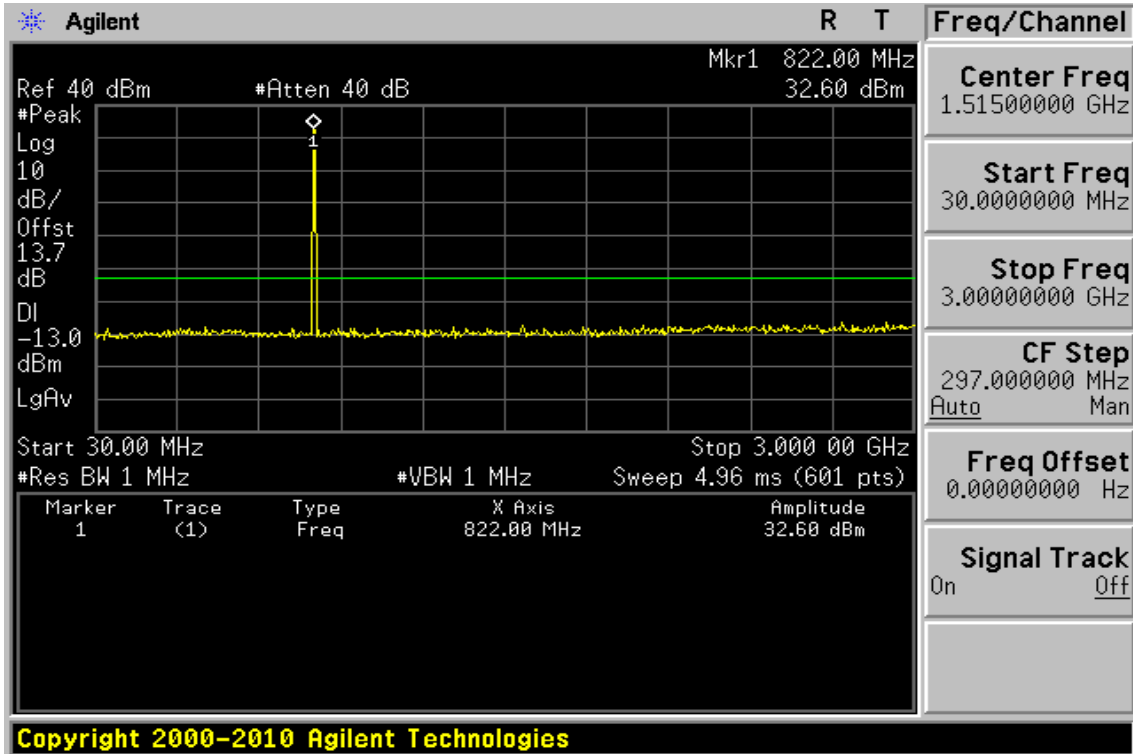
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Figure 9-1: Out of Band emission at antenna terminals – GSM 850 Channel Lowest



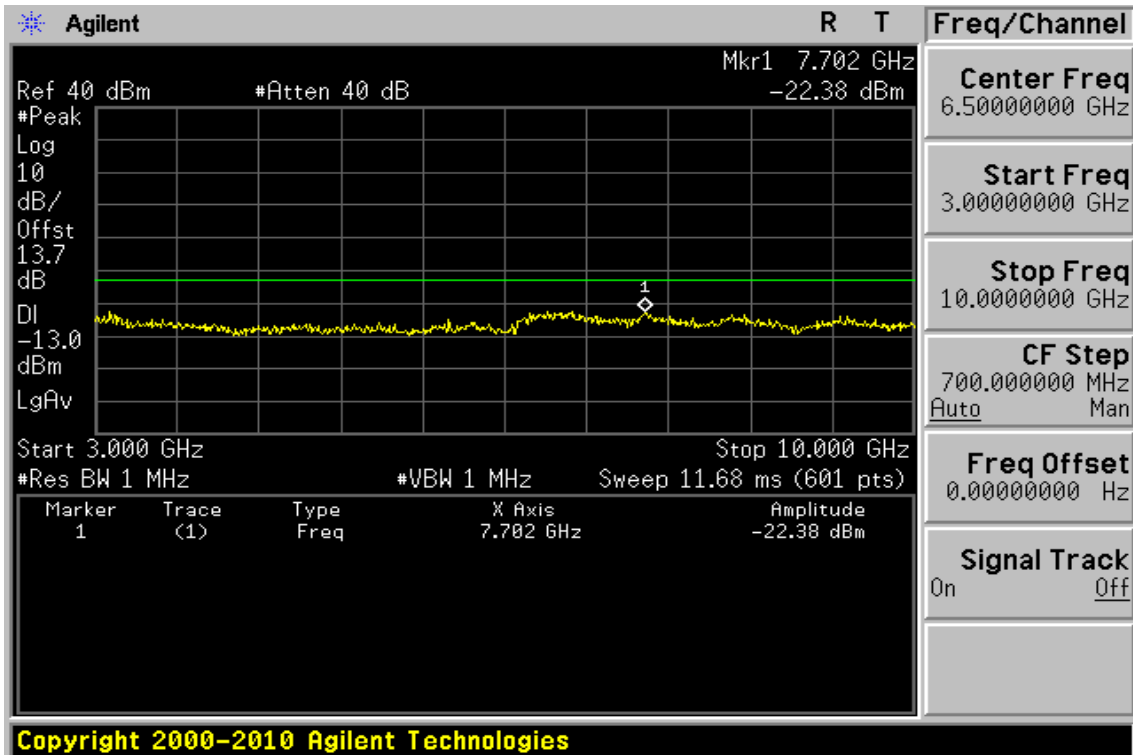
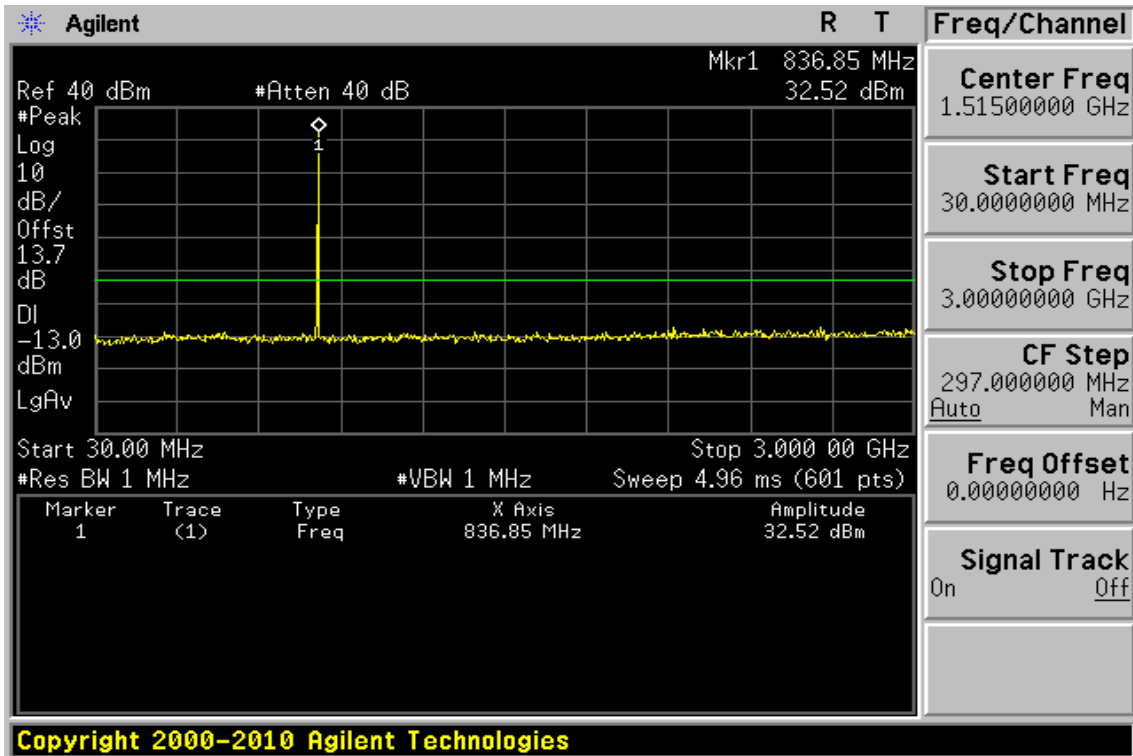
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Figure 9-2: Out of Band emission at antenna terminals –GSM 850 Channel Mid



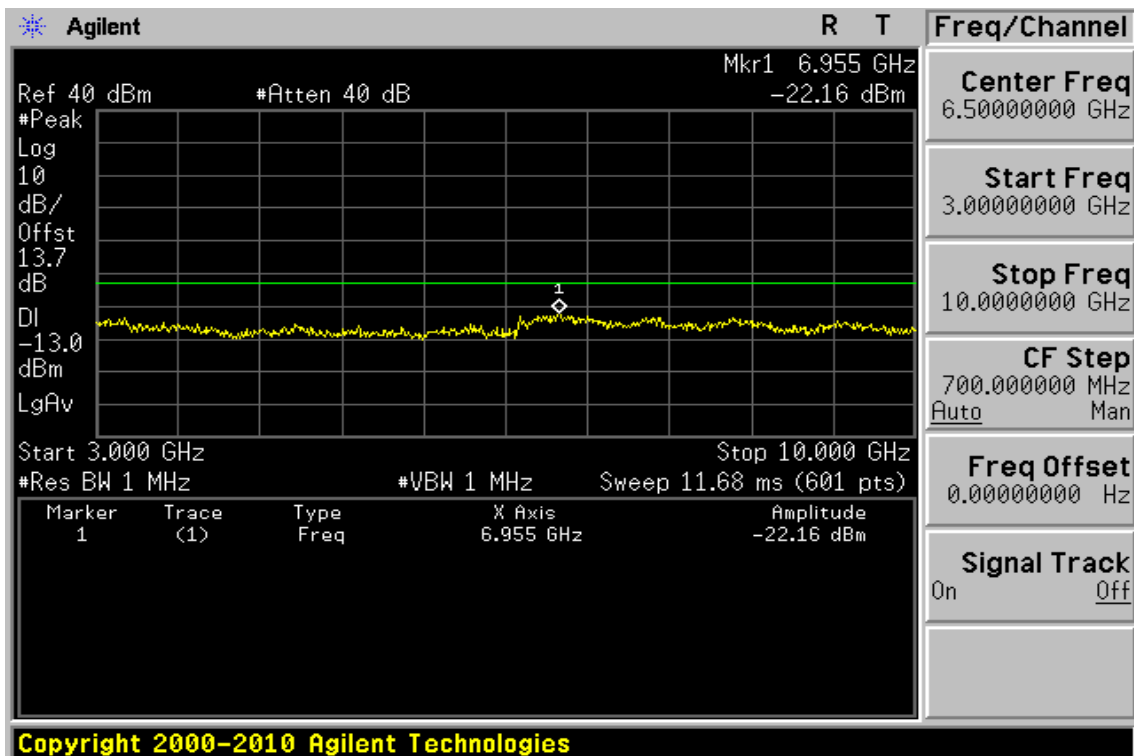
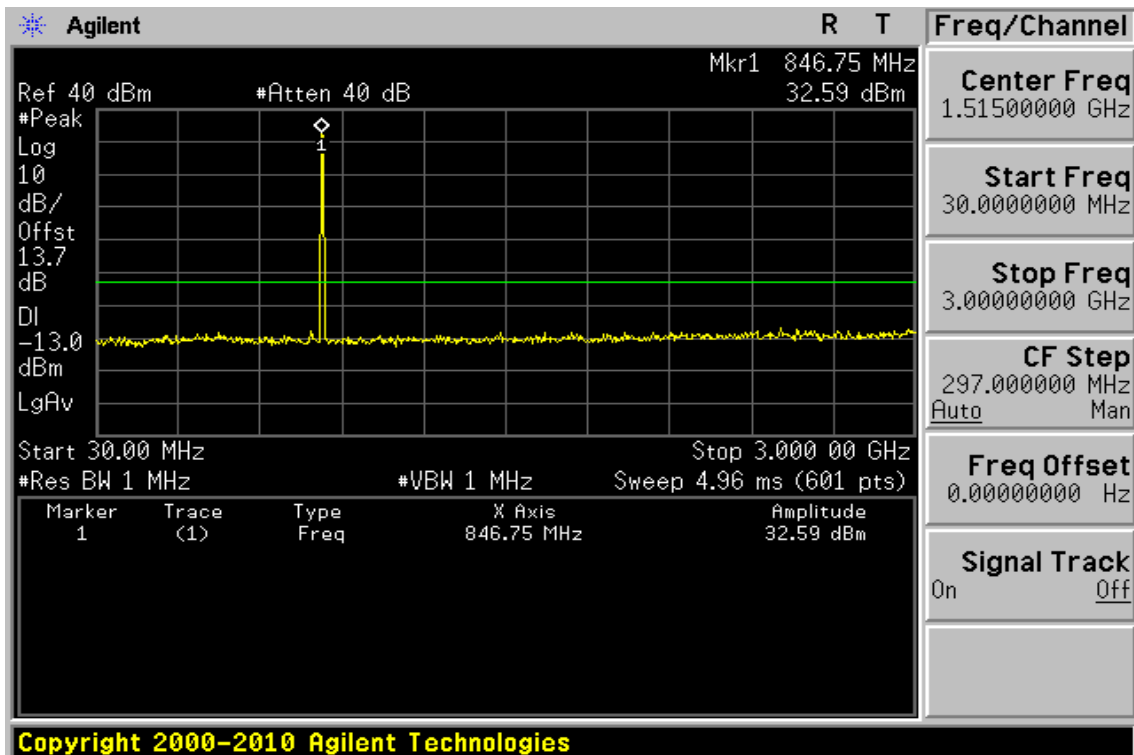
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Figure 9-3: Out of Band emission at antenna terminals –GSM 850 Channel Highest



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Figure 9-4: Band edge emission at antenna terminals –GSM 850 Channel Lowest

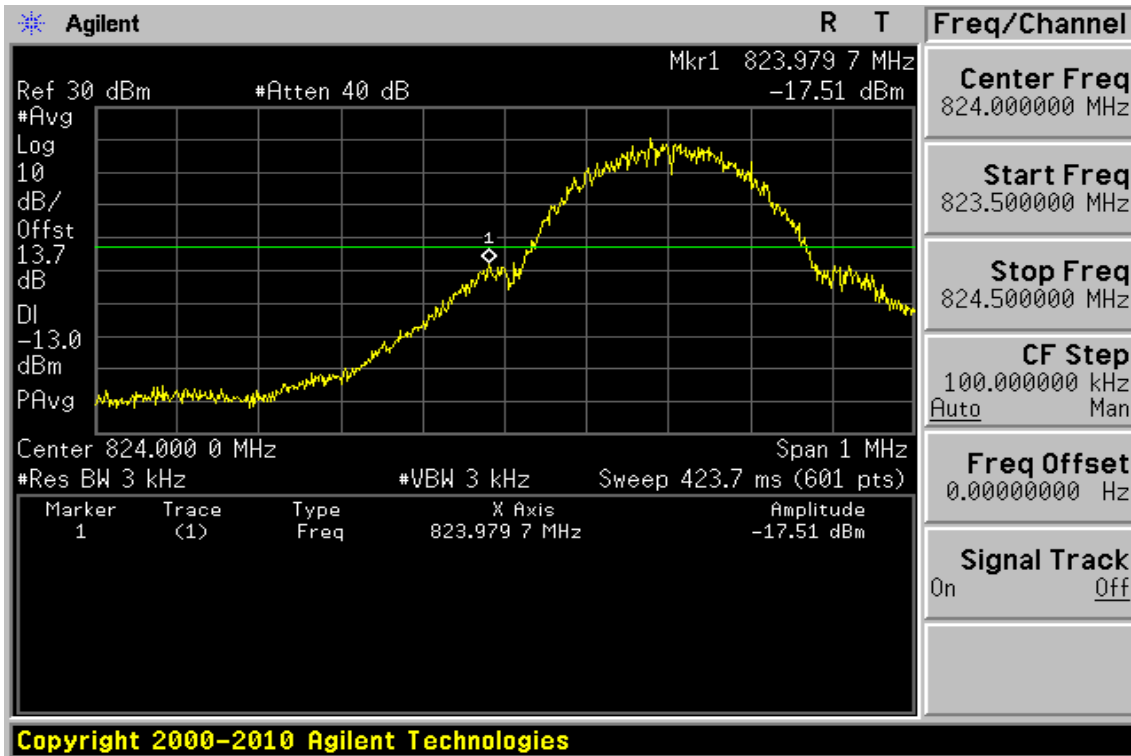
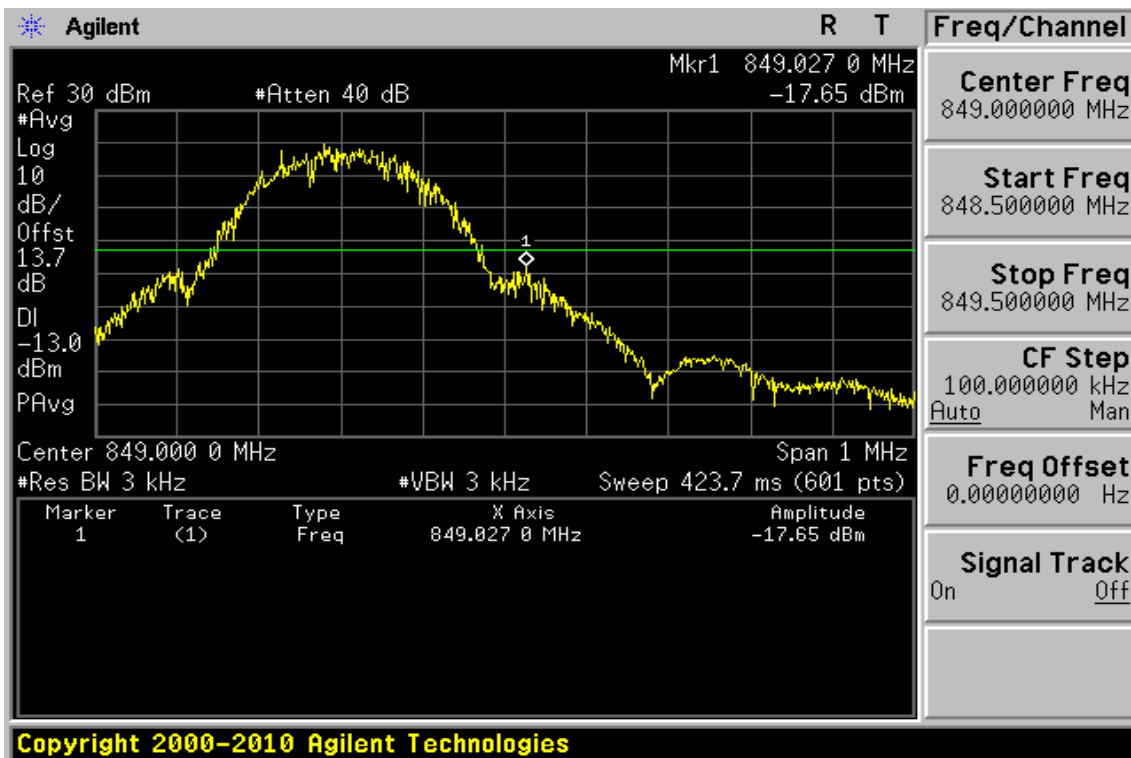


Figure 9-5: Band edge emission at antenna terminals –GSM 850 Channel Highest



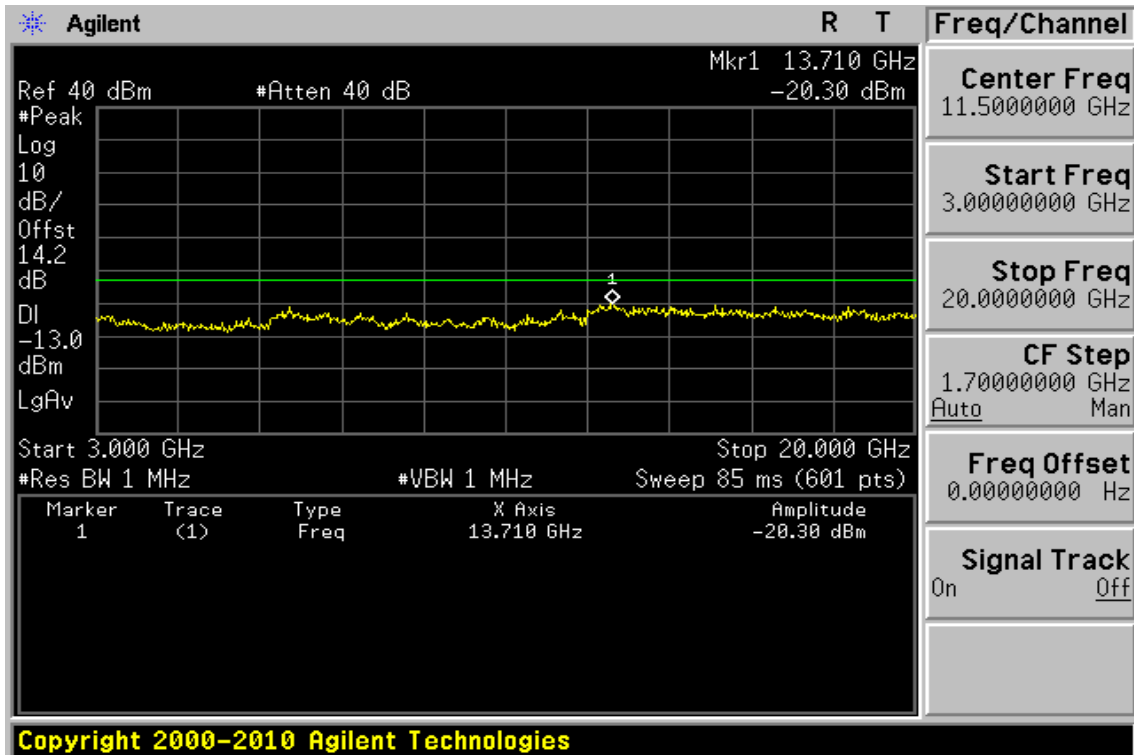
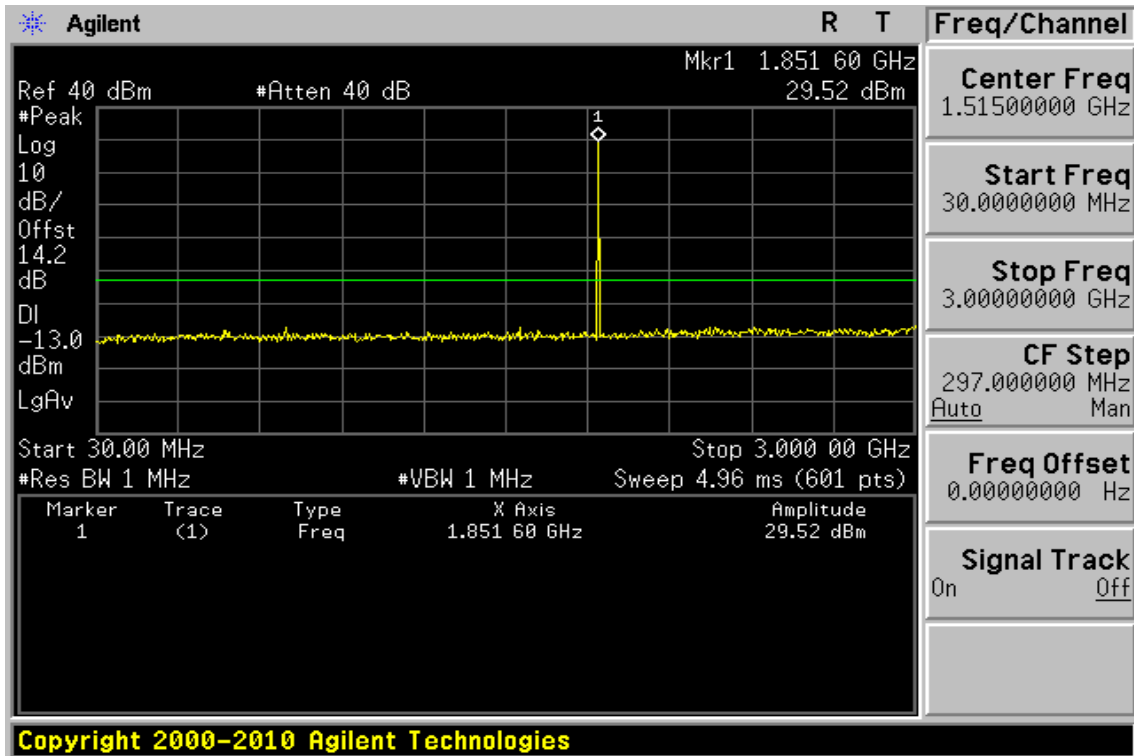
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Figure 9-6: Out of Band emission at antenna terminals – GSM 1900 Channel Lowest



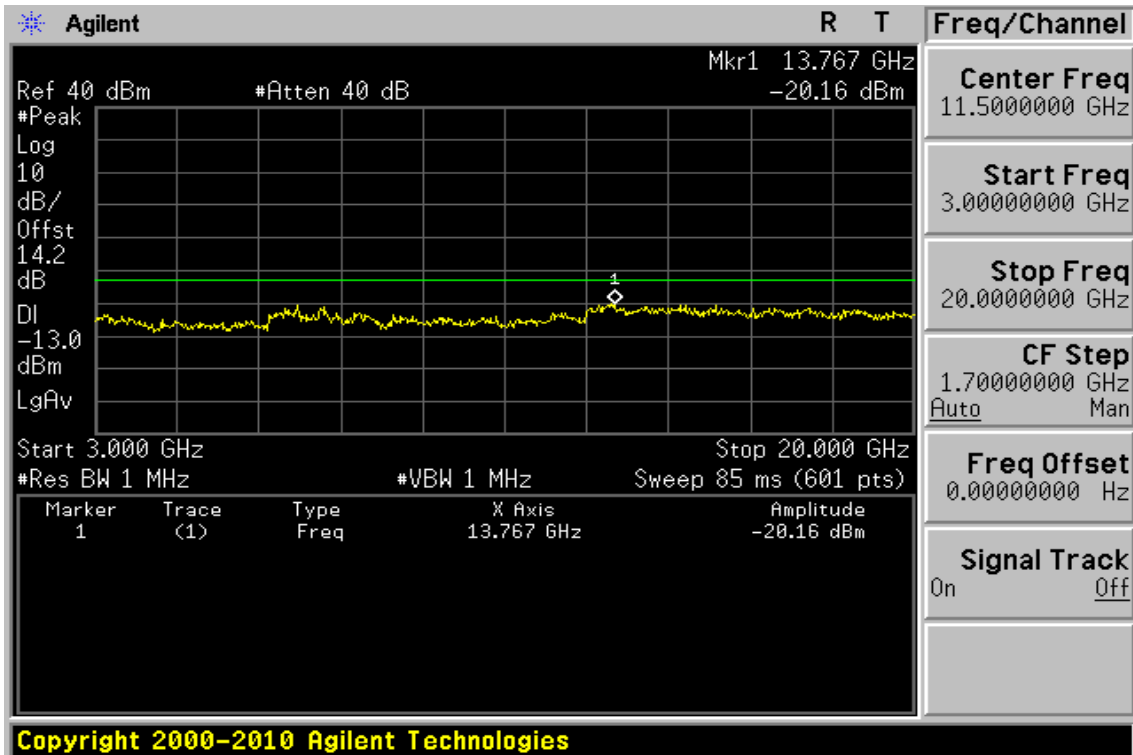
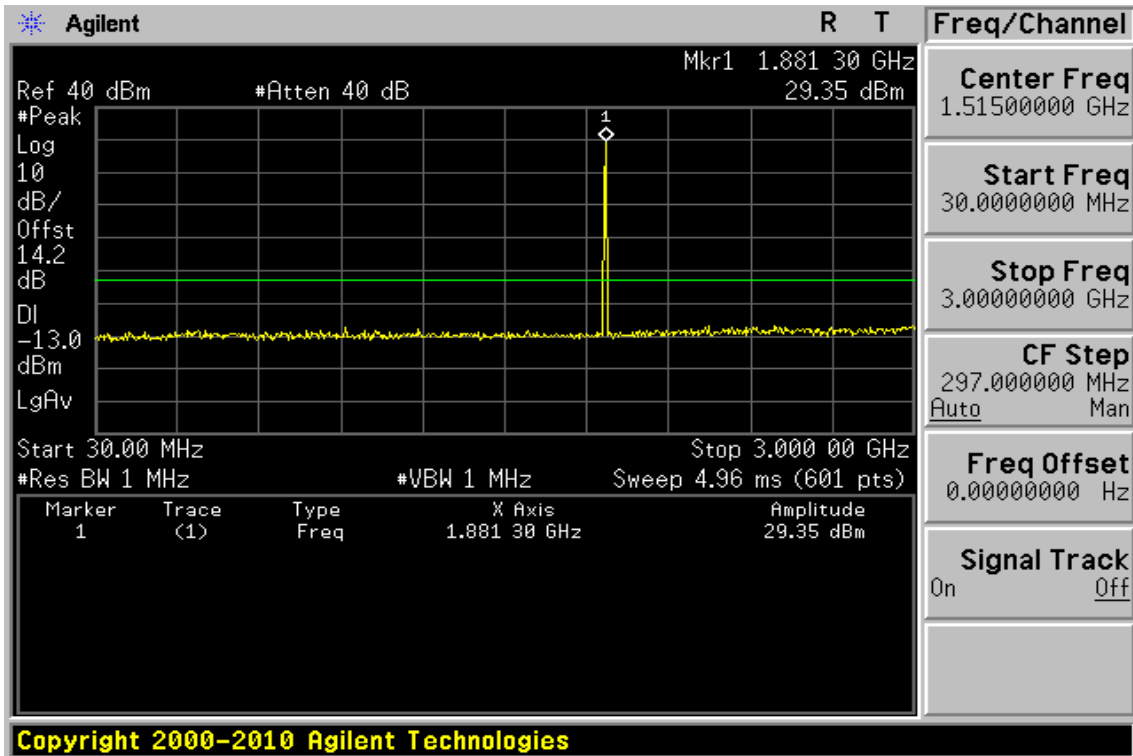
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Figure 9-7: Out of Band emission at antenna terminals – GSM 1900 Channel Mid



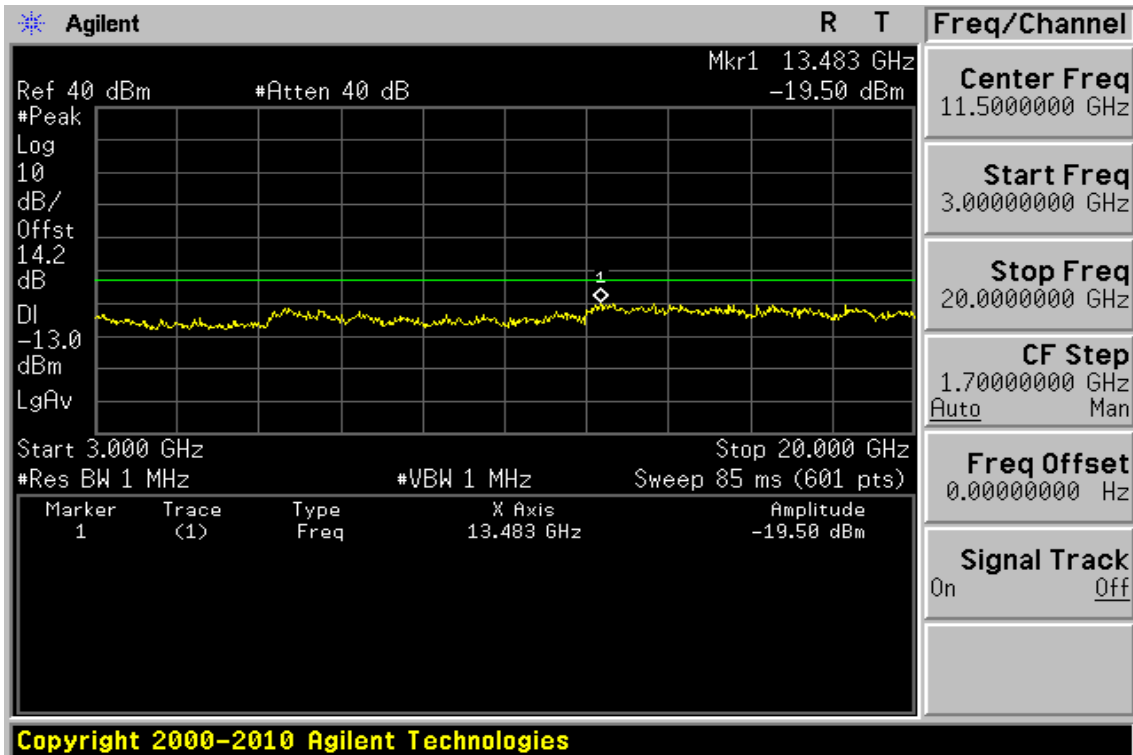
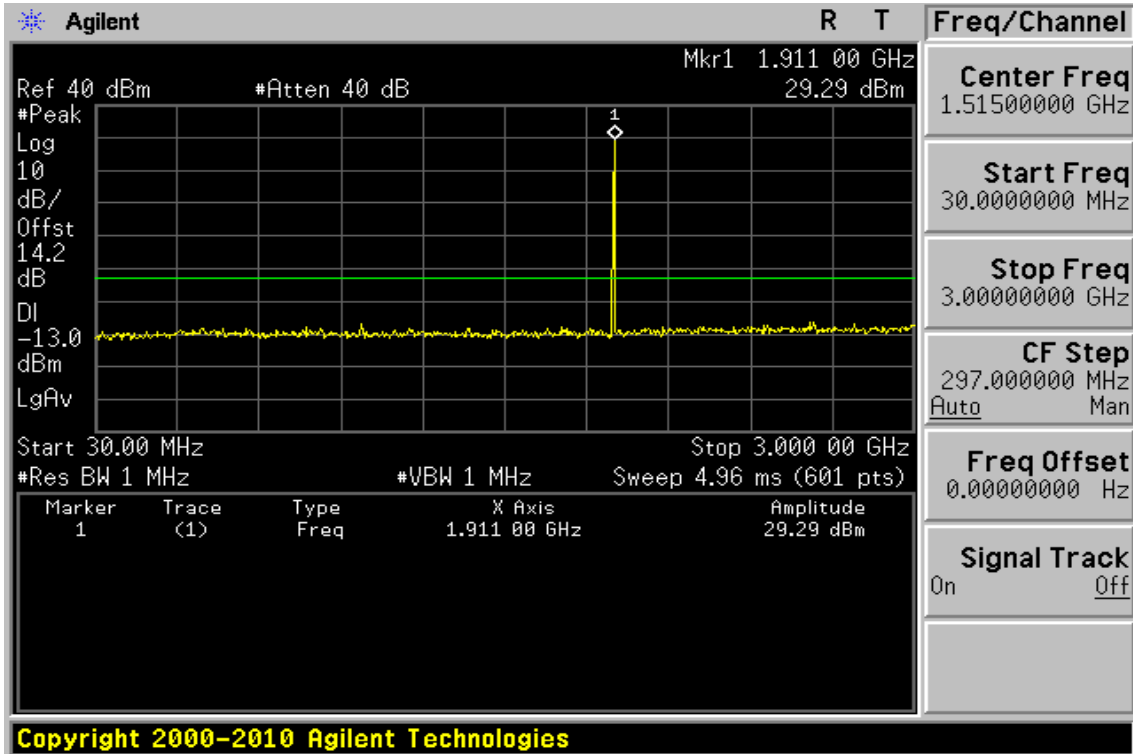
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Figure 9-8: Out of Band emission at antenna terminals –GSM 1900 Channel Highest



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Figure 9-9: Band edge emission at antenna terminals –GSM 1900 Channel Lowest

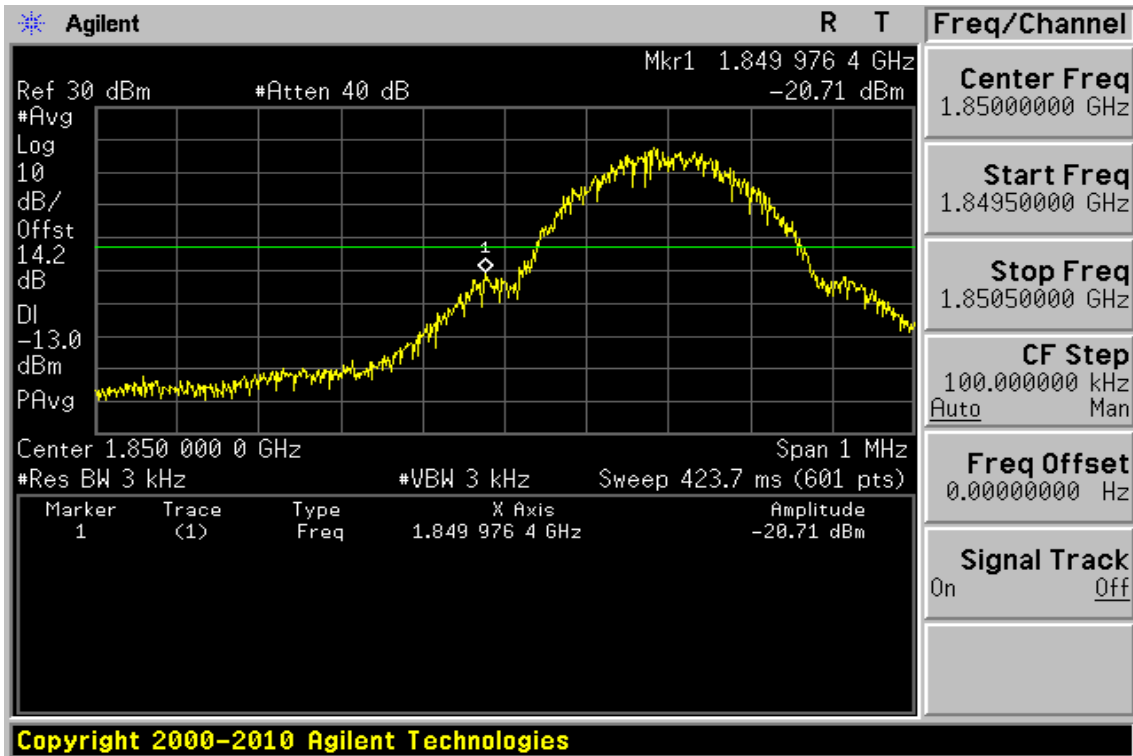
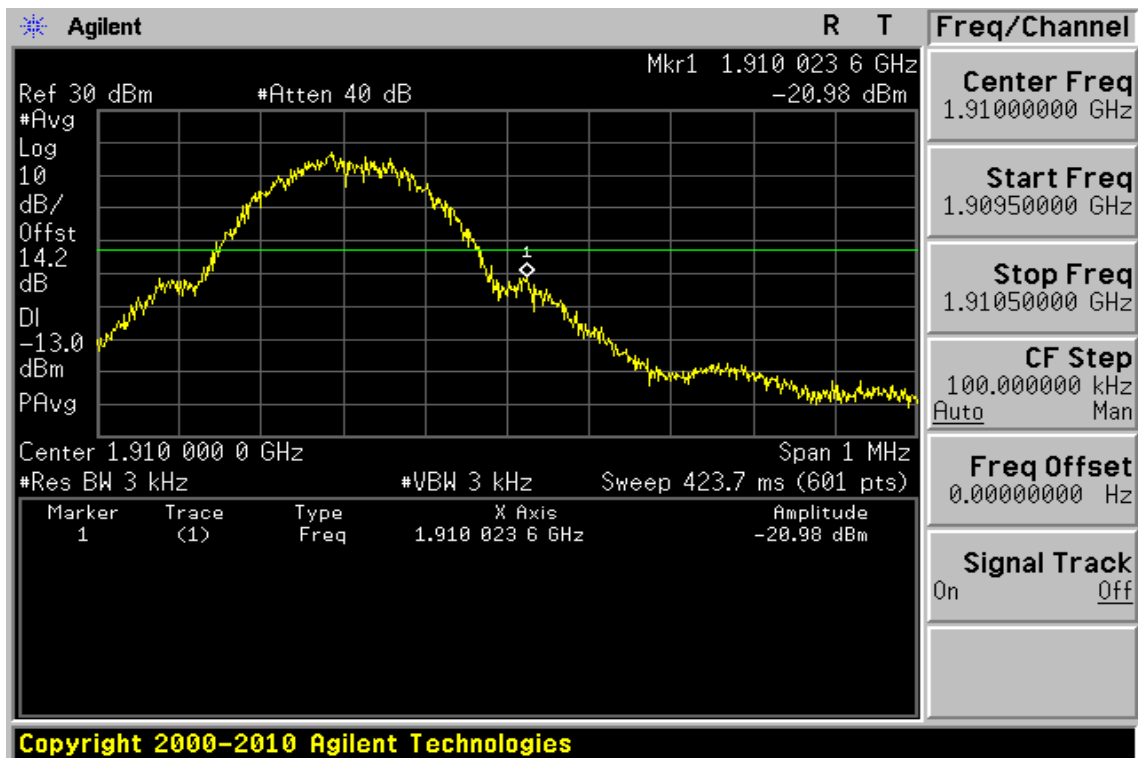


Figure 9-10: Band edge emission at antenna terminals –GSM 1900 Channel Highest



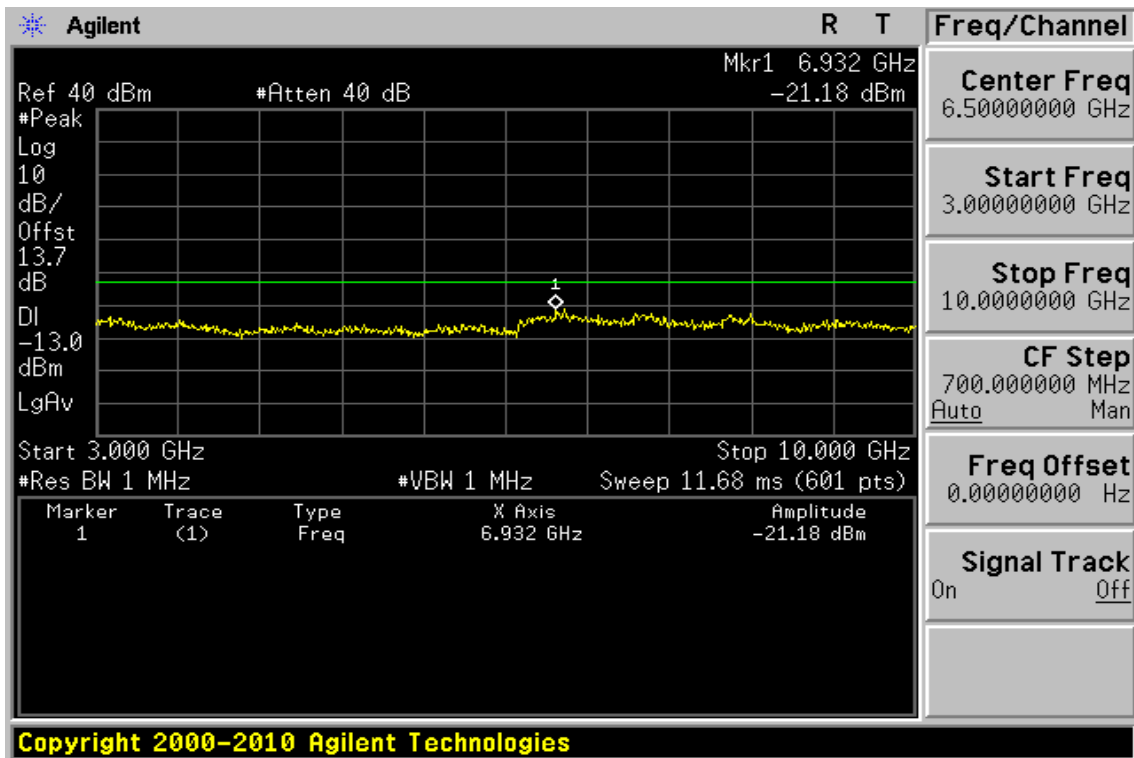
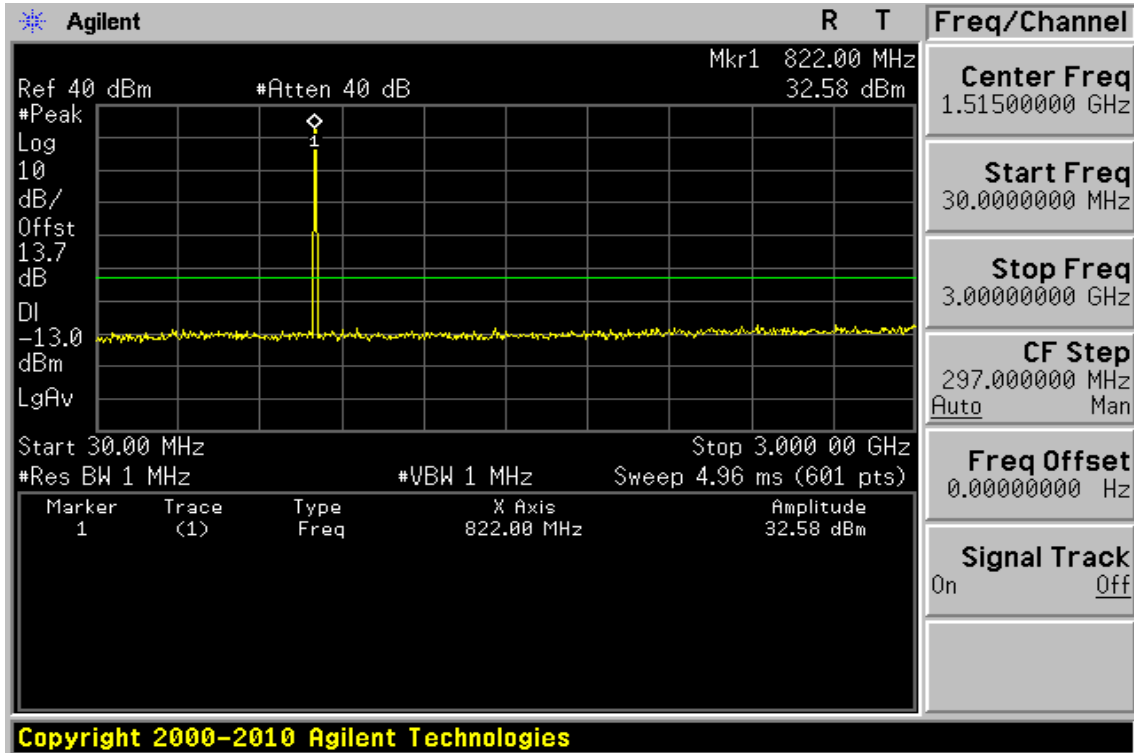
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Figure 9-11: Out of Band emission at antenna terminals – GPRS 850 Channel Lowest



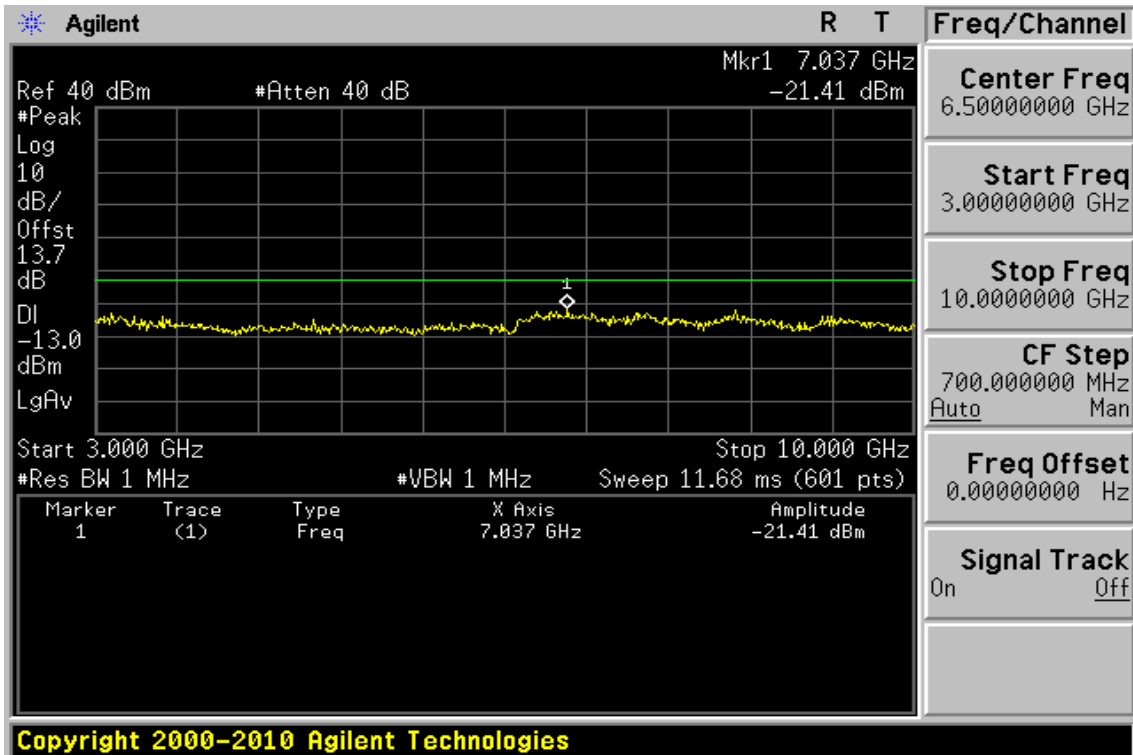
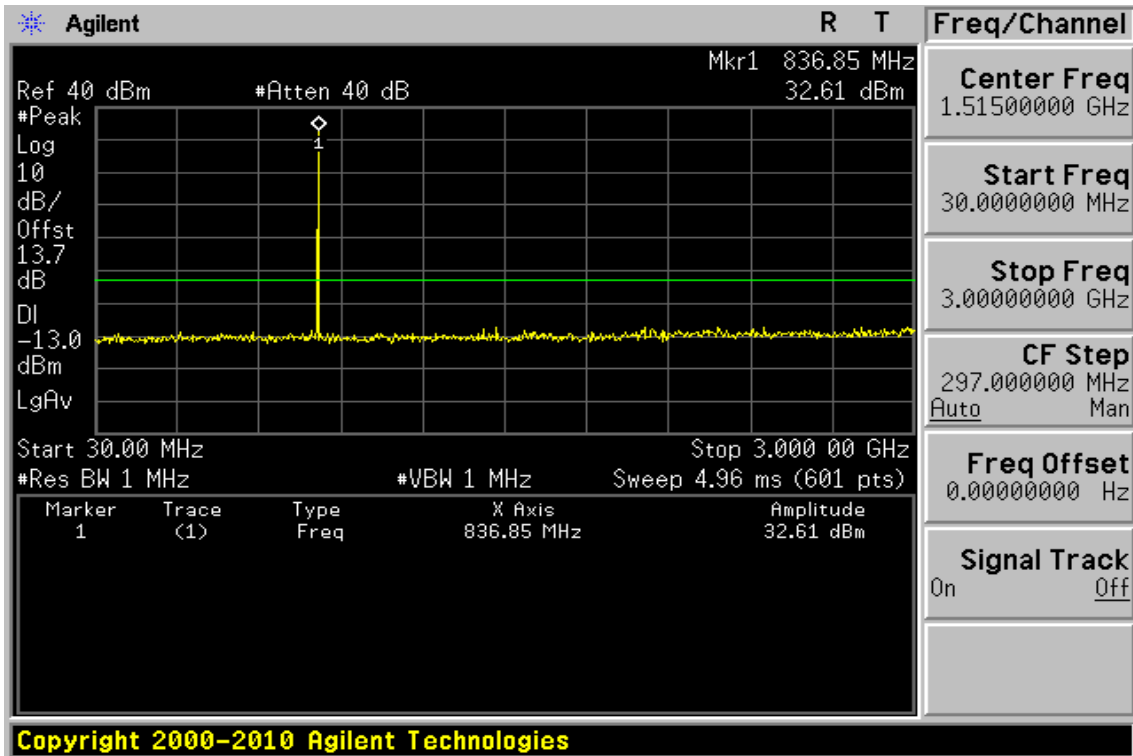
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Figure 9-12: Out of Band emission at antenna terminals – GPRS 850 Channel Mid



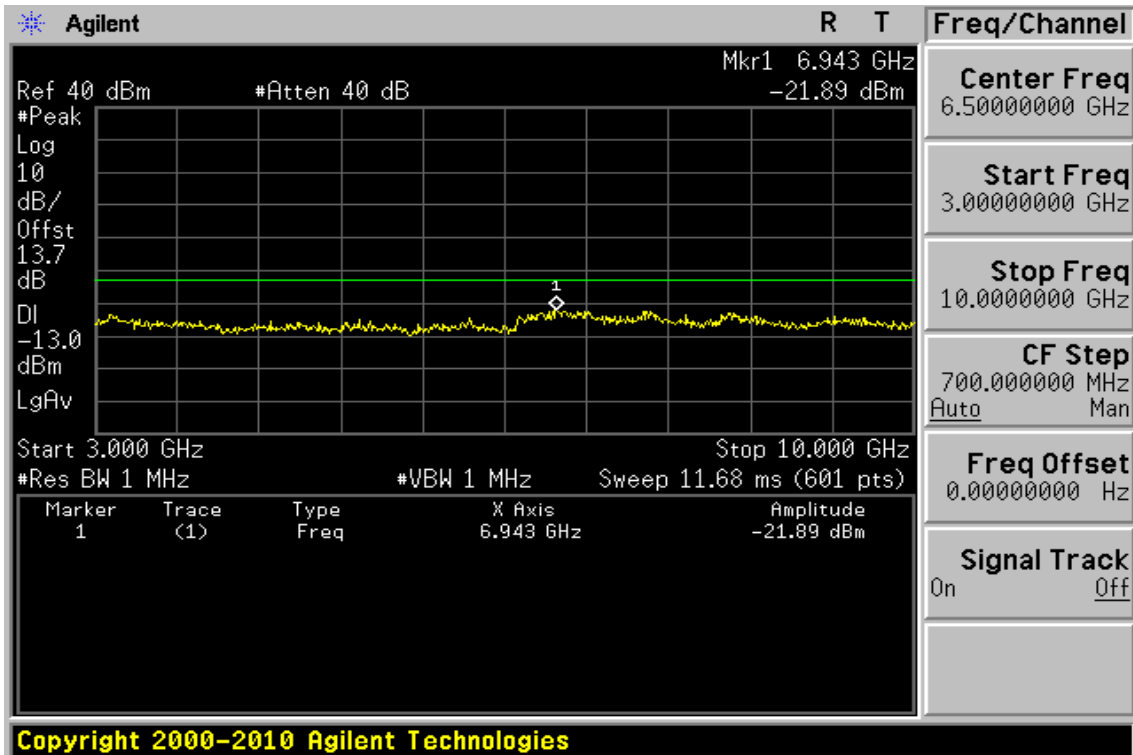
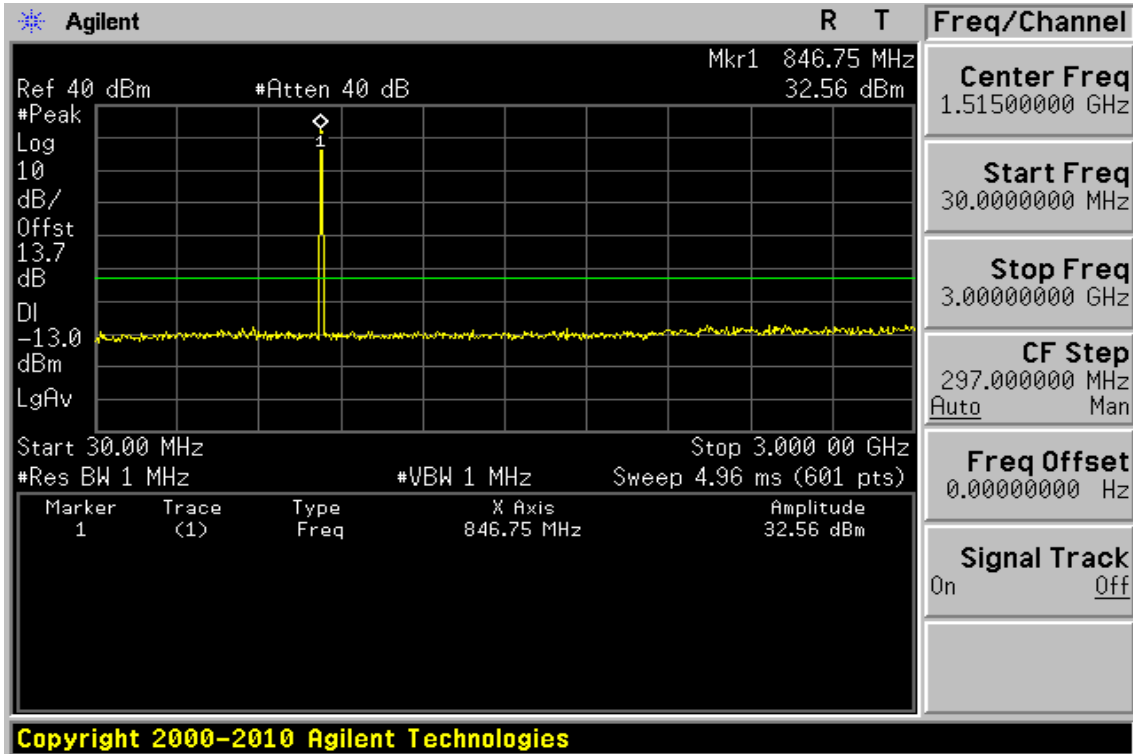
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Figure 9-13: Out of Band emission at antenna terminals – GPRS 850 Channel Highest



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Figure 9-14: Band edge emission at antenna terminals – GPRS 850 Channel Lowest

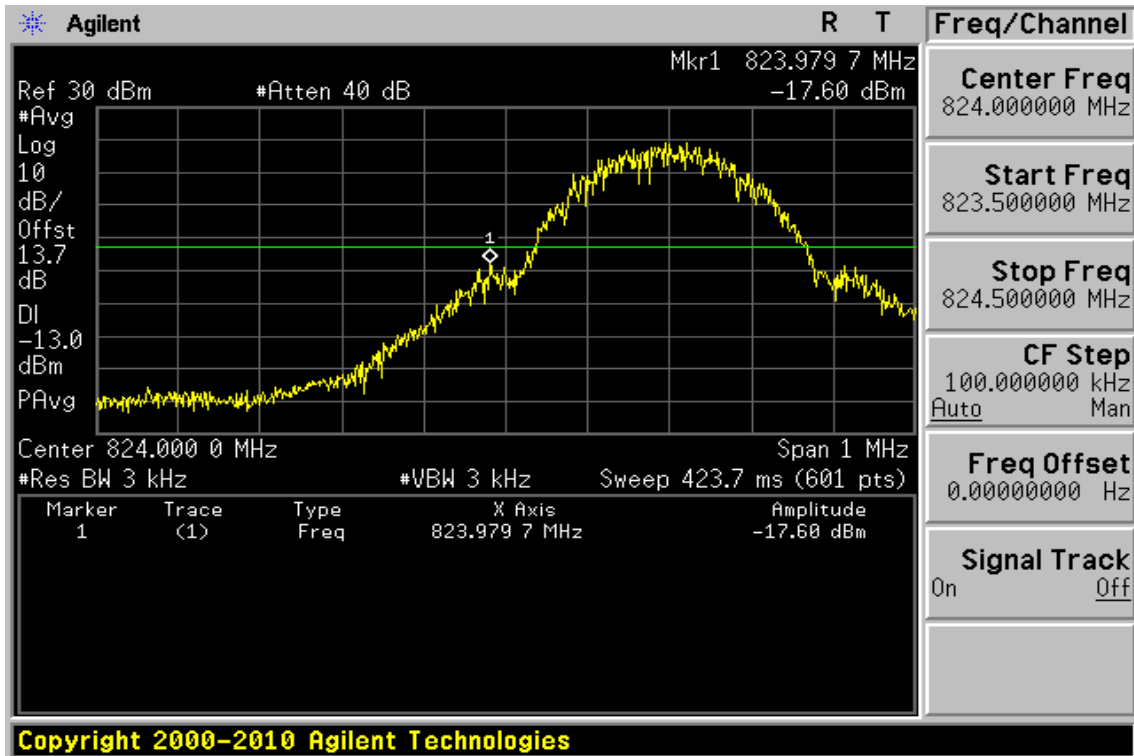
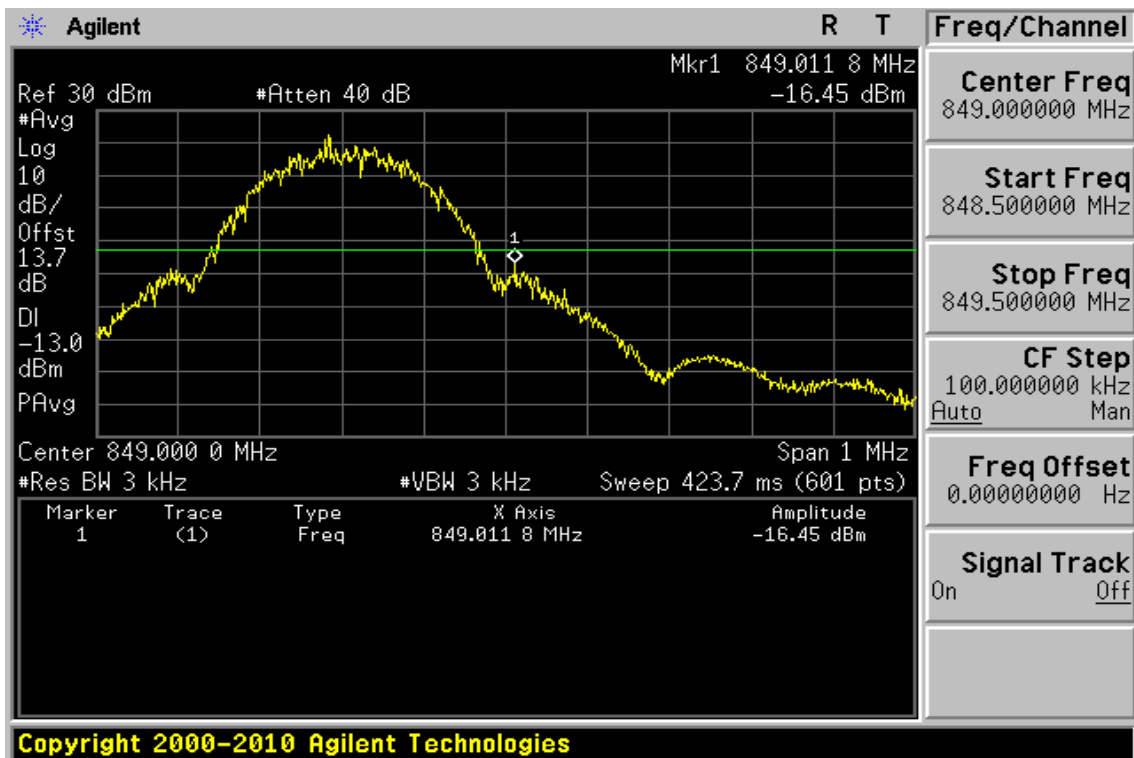


Figure 9-15: Band edge emission at antenna terminals – GPRS 850 Channel Highest



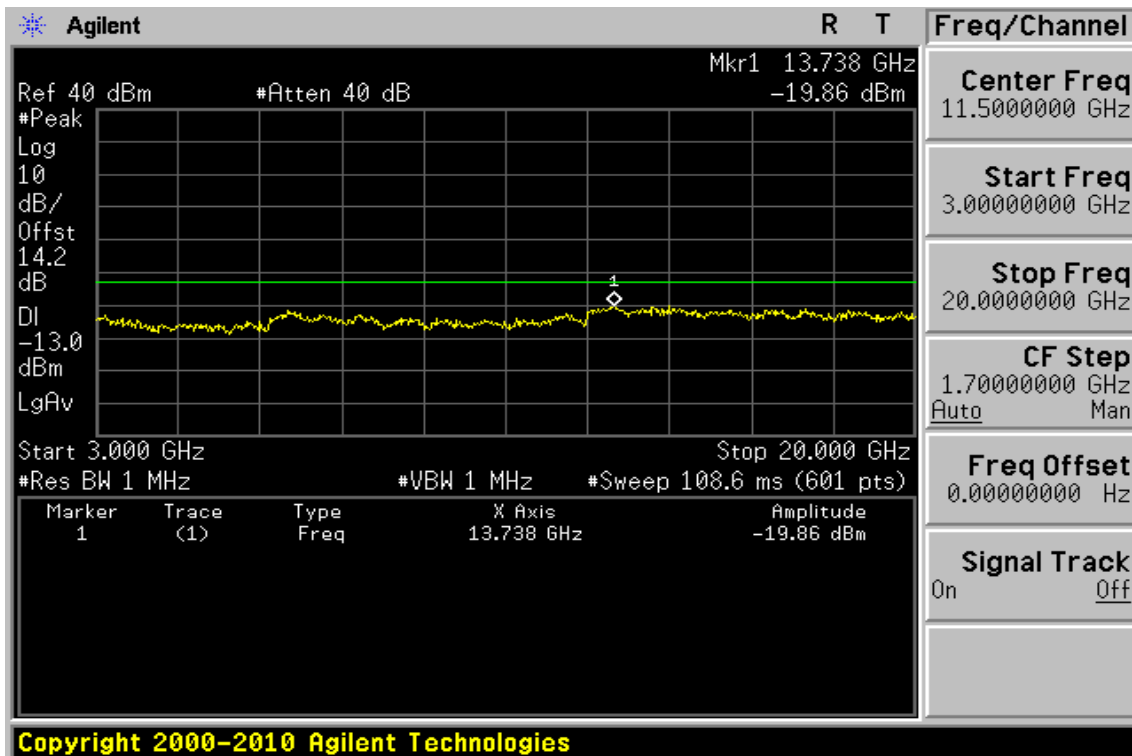
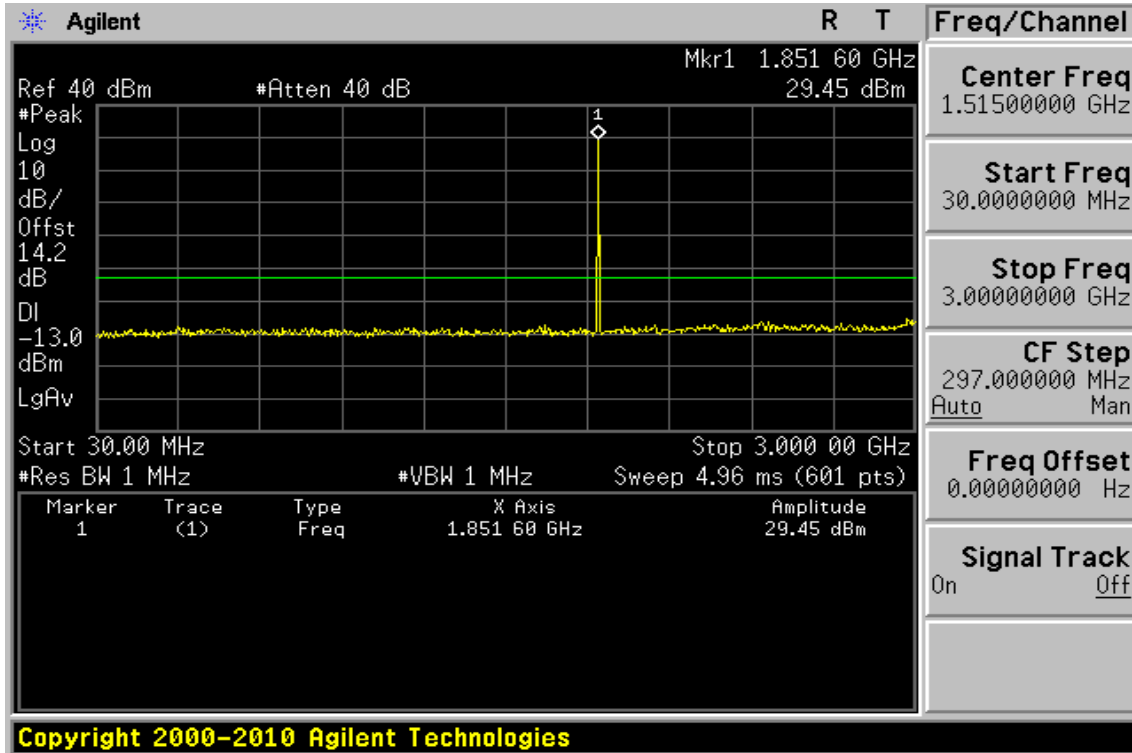
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Figure 9-16: Out of Band emission at antenna terminals – GPRS 1900 Channel Lowest



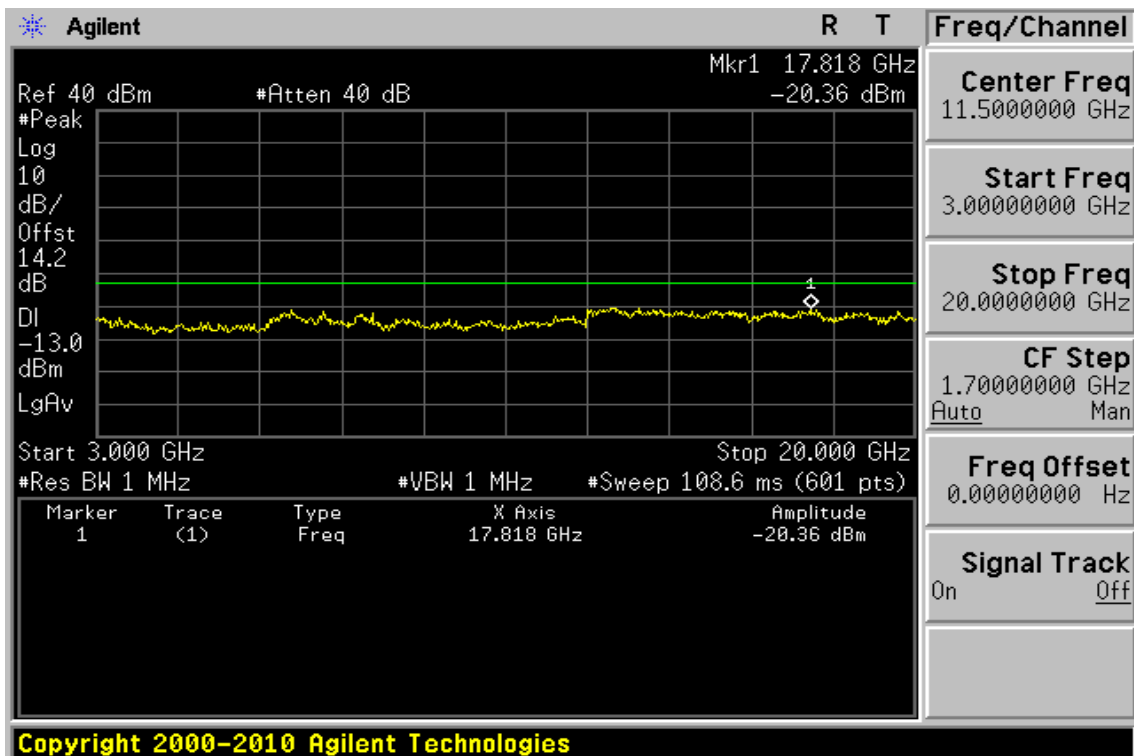
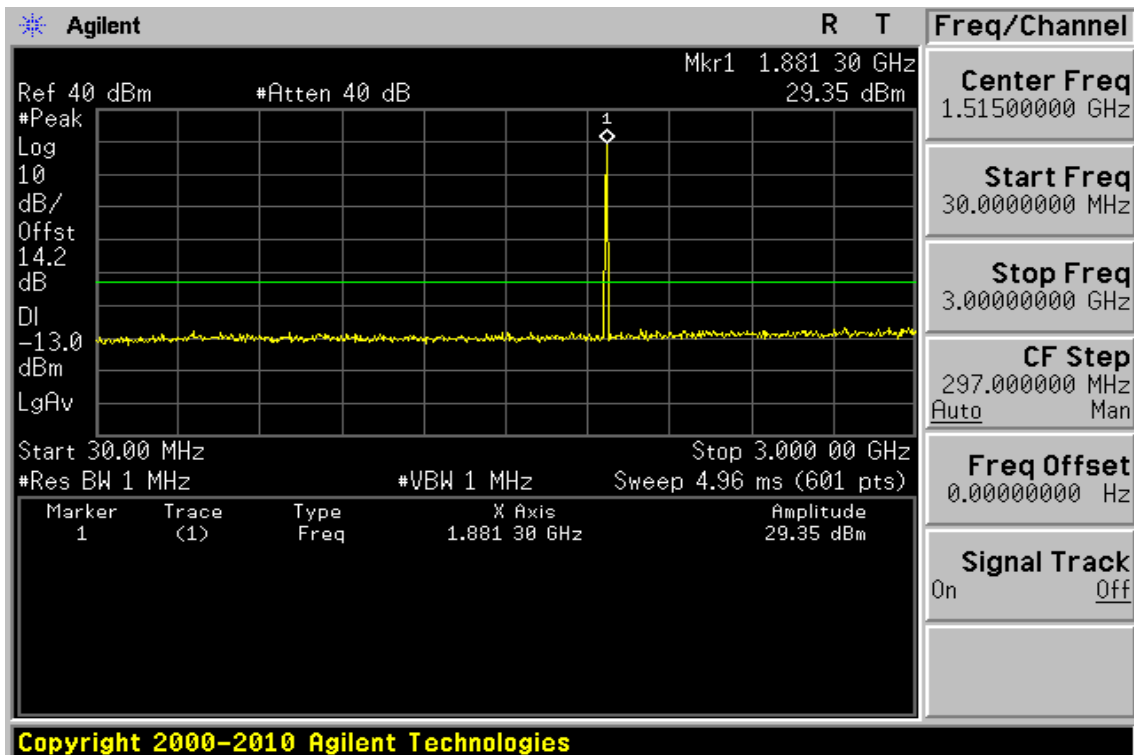
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Figure 9-17: Out of Band emission at antenna terminals – GPRS 1900 Channel Mid



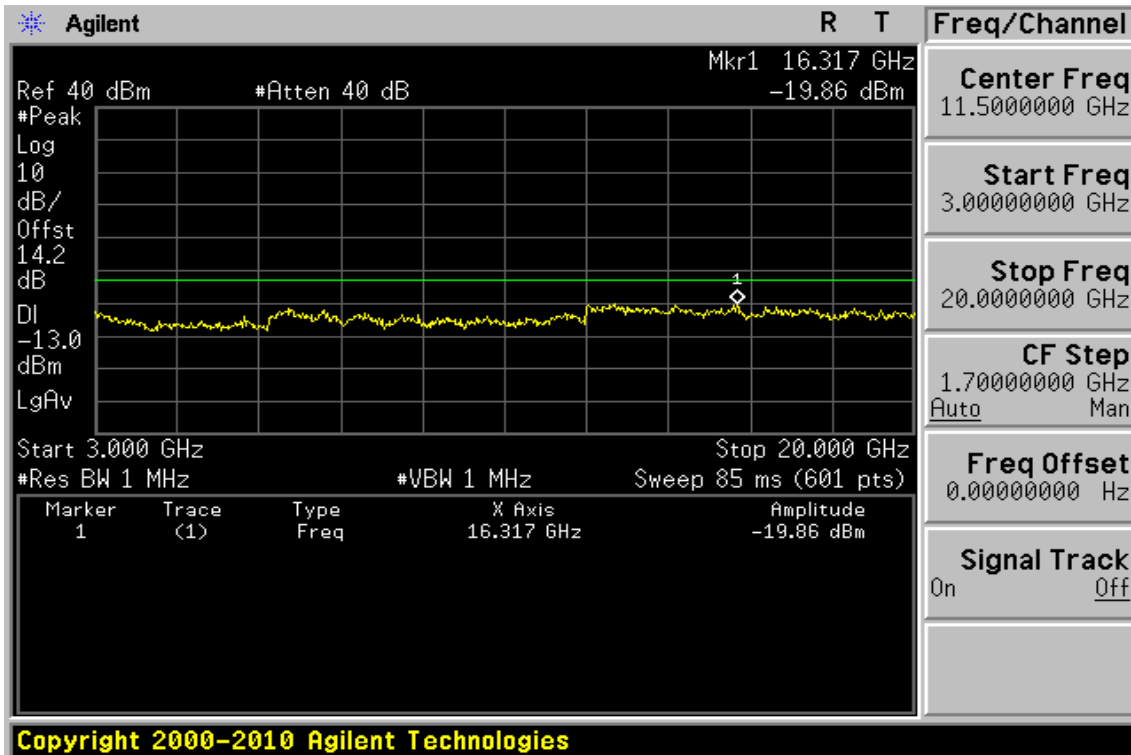
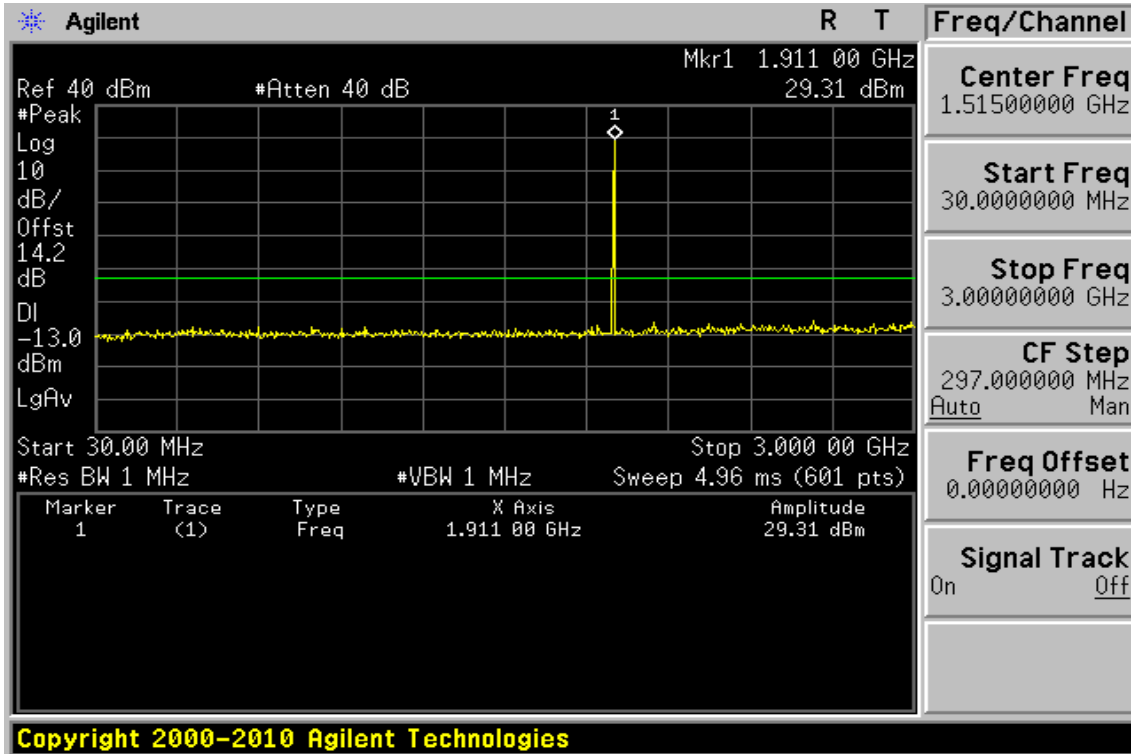
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Figure 9-18: Out of Band emission at antenna terminals – GPRS 1900 Channel Highest



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Figure 9-19: Band edge emission at antenna terminals – GPRS 1900 Channel Lowest

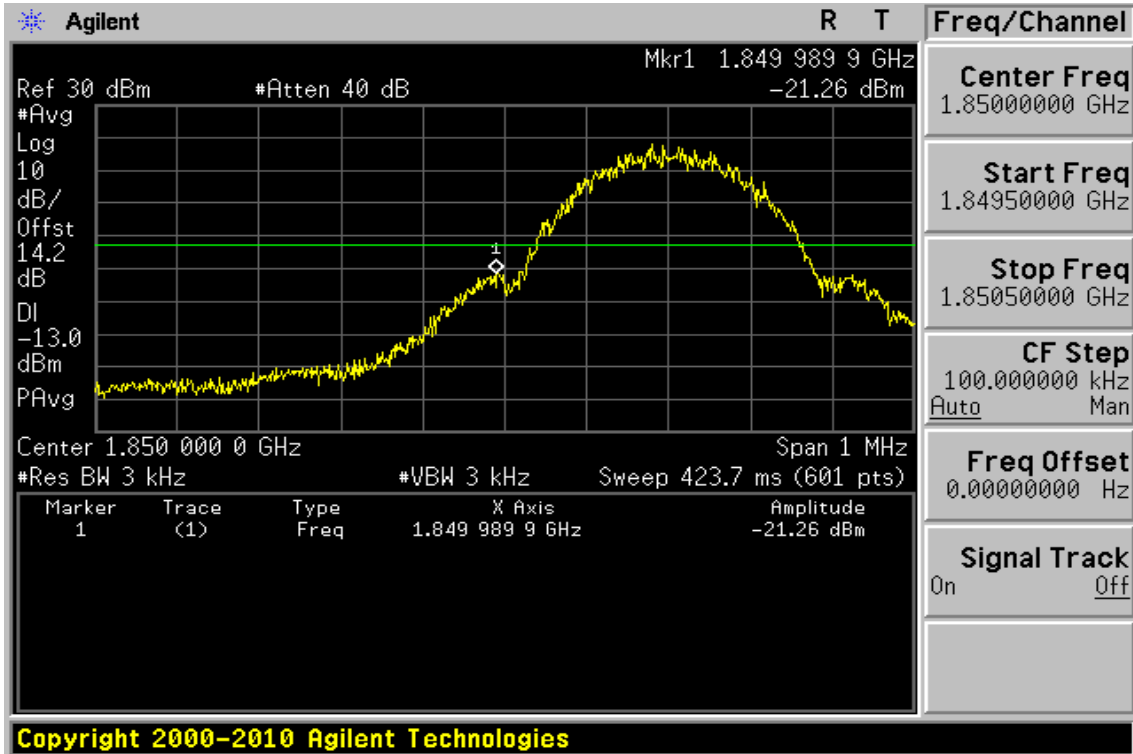
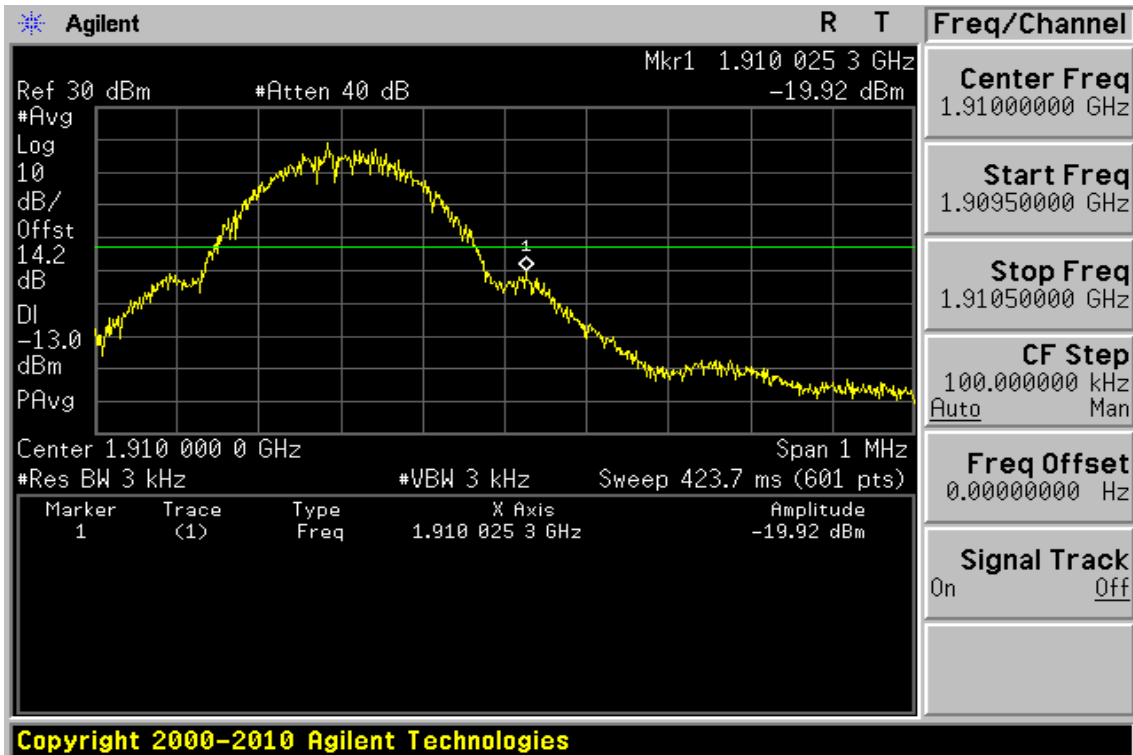


Figure 9-20: Band edge emission at antenna terminals – GPRS 1900 Channel Highest



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10 FIELD STRENGTH OF SPURIOUS RADIATION MEASUREMENT

10.1 Standard Applicable:

According to FCC §2.1053

FCC §22.917(a), §24.238(a), the magnitude of each spurious and harmonic emission that can be detected when the equipment is operated under the conditions specified in the instruction manual and/ or alignment procedure, shall not be less than $43 + 10 \log$ (mean output power in watts) dBc below the mean power output outside a license's frequency block (-13dBm)

According to RSS-132 §5.5

Mobile and base station equipment shall comply with the limits in (i) and (ii) below.

(i) In the first 1.0 MHz band immediately outside and adjacent to each of the sub-bands specified in Section 5.1, the power of emissions per any 1% of the occupied bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least $43 + 10 \log_{10} p$ (watts).

(ii) After the first 1.0 MHz immediately outside and adjacent to each of the sub-bands, the power of emissions in any 100 kHz bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least $43 + 10 \log_{10} p$ (watts). If the measurement is performed using 1% of the occupied bandwidth, power integration over 100 kHz is required.

According to RSS-133 §6.5

6.5.1 Out-of-Block Emissions

Equipment shall comply with the limits in (i) and (ii) below.

(i) In the 1.0 MHz bands immediately outside and adjacent to the equipment's operating frequency block, the emission power per any 1% of the emission bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least $43 + 10 \log_{10} p$ (watts).

(ii) After the first 1.0 MHz, the emission power in any 1 MHz bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least $43 + 10 \log_{10} p$ (watts). If the measurement is performed using 1% of the emission bandwidth, power integration over 1.0 MHz is required.

6.5.2 Out-of-Sub-band Emissions

Outside the sub-bands 1850-1910 MHz and 1930-1990 MHz, the attenuation shall be equal to or greater than the out-of-block emission limits in Section 6.5.1.

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Receiver Spurious Emissions

Receiver spurious emissions shall comply with the limits specified in RSS-Gen.

Spurious emissions from receivers shall not exceed the radiated limits shown in the table below:

Radiated Limits of Receiver Spurious Emissions

Frequency (MHz)	Field Strength (microvolts/m at 3 metres)*
30-88	100
88-216	150
216-960	200
Above 960	500

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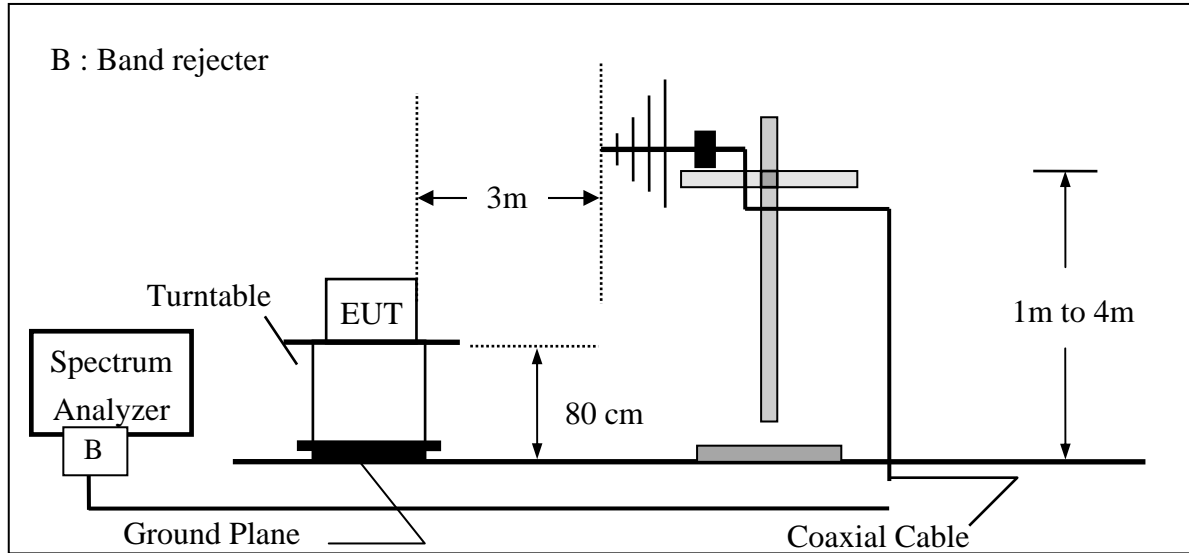
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10.2 EUT Setup (Block Diagram of Configuration):

Radiated Emission Test Set-Up, Frequency Below 1000MHz



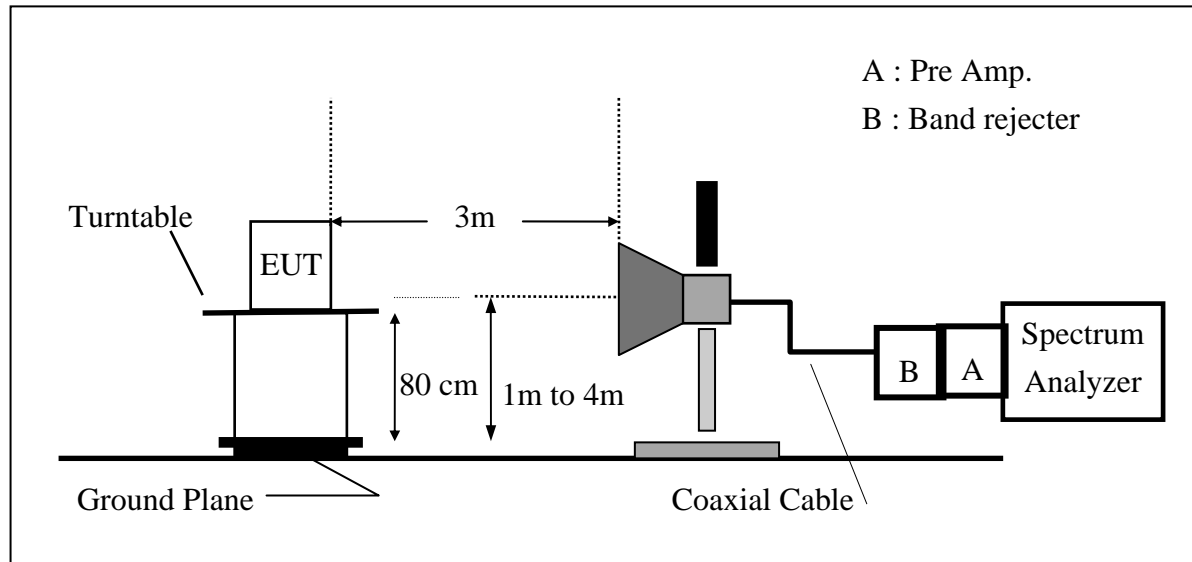
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Radiated Emission Test Set-UP Frequency Over 1 GHz



10.3 Measurement Procedure:

The EUT was placed on a non-conductive; The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and the EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. This maximization process was repeated with the EUT positioned in each of its three orthogonal orientations.

The frequency range up to tenth harmonic was investigated for each of three fundamental frequency (low, middle and high channels). Once spurious emission was identified, the power of the emission was determined using the substitution method.

The spurious emissions attenuation was calculated as the difference between radiated power at the fundamental frequency and the spurious emissions frequency.

$$ERP = S.G. \text{ output (dBm)} + \text{Antenna Gain (dBd)} - \text{Cable Loss (dB)}$$

$$EIRP = S.G. \text{ output (dBm)} + \text{Antenna Gain (dBi)} - \text{Cable Loss (dB)}$$

10.4 Measurement Equipment Used:

Refer to section 2.4 in this report

10.5 Measurement Result:

Refer to attach tabular data sheets.

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Radiated Spurious Emission Measurement Result: GSM 850 Mode

Operation Band	:GSM 850	Test Date	:2014-01-29
ARFCN	:CH 128	Temp./Humi.	:24 deg_C / 59 RH
Fundamental Frequency	:824.2 MHz	Engineer	:Curry
Operation Mode	:TX LOW		
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:VERTICAL

Freq. MHz	Note F/H/E/S	ERP dBm	SG Output Level dBm	Antenna Gain dBd	Cable Loss dB	Limit dBm	Margin dB
51.34	S	-66.73	-53.57	-12.17	-1.00	-13.00	-53.73
103.72	S	-63.67	-60.92	-1.53	-1.22	-13.00	-50.67
251.16	S	-71.98	-73.72	3.46	-1.71	-13.00	-58.98
438.37	S	-71.13	-72.55	3.60	-2.18	-13.00	-58.13
604.24	S	-59.35	-60.21	3.48	-2.63	-13.00	-46.35
712.88	S	-61.18	-62.23	3.83	-2.77	-13.00	-48.18
1648.40	H	-44.47	-43.59	3.54	-4.42	-13.00	-31.47
2472.60	H	-53.35	-51.55	3.65	-5.45	-13.00	-40.35
3296.80	H	-57.54	-56.64	5.52	-6.42	-13.00	-44.54
4121.00	H	-53.07	-53.01	7.10	-7.16	-13.00	-40.07
4945.20	H	-45.57	-45.43	7.73	-7.87	-13.00	-32.57
5769.40	H	---					
6593.60	H	---					
7417.80	H	---					
8242.00	H	---					

$$\text{ERP(dBm)} = \text{SG Level(dBm)} + \text{Antenna Gain(dBd)} + \text{Cable Loss(dB)}$$

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.
 “E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.
 “---” : denotes Noise Floor.

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Operation Band	:GSM 850	Test Date	:2014-01-29
ARFCN	:CH 128	Temp./Humi.	:24 deg_C / 59 RH
Fundamental Frequency	:824.2 MHz	Engineer	:Curry
Operation Mode	:TX LOW		
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:HORIZONTAL

Freq.	Note	ERP	SG	Antenna	Cable	Limit	Margin
MHz	F/H/E/S	dBm	Output Level dBm	Gain dBd	Loss dB	dBm	dB
30.00	S	-57.79	-41.11	-15.88	-0.80	-13.00	-44.79
51.34	S	-60.31	-47.14	-12.17	-1.00	-13.00	-47.31
103.72	S	-64.79	-62.05	-1.53	-1.22	-13.00	-51.79
480.08	S	-69.92	-71.29	3.68	-2.30	-13.00	-56.92
604.24	S	-57.47	-58.33	3.48	-2.63	-13.00	-44.47
712.88	S	-59.03	-60.09	3.83	-2.77	-13.00	-46.03
1648.40	H	-44.26	-43.38	3.54	-4.42	-13.00	-31.26
2472.60	H	-58.26	-56.46	3.65	-5.45	-13.00	-45.26
3296.80	H	---					
4121.00	H	---					
4945.20	H	---					
5769.40	H	---					
6593.60	H	---					
7417.80	H	---					
8242.00	H	---					

ERP(dBm) = SG Level(dBm) + Antenna Gain(dBd) + Cable Loss(dB)

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.
 “E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.
 “---” : denotes Noise Floor.

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Operation Band	:GSM 850	Test Date	:2014-01-29
ARFCN	:CH 190	Temp./Humi.	:24 deg_C / 59 RH
Fundamental Frequency	:836.6 MHz	Engineer	:Curry
Operation Mode	:TX MID		
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:VERTICAL

Freq.	Note	ERP	SG	Antenna	Cable	Limit	Margin
MHz	F/H/E/S	dBm	Output Level dBm	Gain dBd	Loss dB	dBm	dB
30.00	S	-72.16	-55.48	-15.88	-0.80	-13.00	-59.16
51.34	S	-68.54	-55.37	-12.17	-1.00	-13.00	-55.54
103.72	S	-63.66	-60.91	-1.53	-1.22	-13.00	-50.66
445.16	S	-70.67	-72.03	3.57	-2.20	-13.00	-57.67
603.27	S	-58.51	-59.36	3.47	-2.62	-13.00	-45.51
686.69	S	-64.95	-66.12	3.90	-2.73	-13.00	-51.95
1673.20	H	-43.39	-42.41	3.47	-4.45	-13.00	-30.39
2509.80	H	-58.01	-56.23	3.72	-5.49	-13.00	-45.01
3346.40	H	-57.07	-56.26	5.66	-6.47	-13.00	-44.07
4183.00	H	-39.27	-39.15	7.10	-7.22	-13.00	-26.27
5019.60	H	-44.25	-44.14	7.82	-7.93	-13.00	-31.25
5856.20	H	---					
6692.80	H	---					
7529.40	H	---					
8366.00	H	---					

ERP(dBm) = SG Level(dBm) + Antenna Gain(dBd) + Cable Loss(dB)

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.
 “E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.
 “---” : denotes Noise Floor.

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Operation Band	:GSM 850	Test Date	:2014-01-29
ARFCN	:CH 190	Temp./Humi.	:24 deg_C / 59 RH
Fundamental Frequency	:836.6 MHz	Engineer	:Curry
Operation Mode	:TX MID		
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:HORIZONTAL

Freq.	Note	ERP	SG	Antenna	Cable	Limit	Margin
MHz	F/H/E/S	dBm	Output Level dBm	Gain dBd	Loss dB	dBm	dB
30.00	S	-56.48	-39.80	-15.88	-0.80	-13.00	-43.48
52.31	S	-57.59	-44.69	-11.90	-1.00	-13.00	-44.59
103.72	S	-64.47	-61.72	-1.53	-1.22	-13.00	-51.47
466.50	S	-69.49	-70.84	3.62	-2.26	-13.00	-56.49
604.24	S	-58.54	-59.40	3.48	-2.63	-13.00	-45.54
773.02	S	-66.31	-67.21	3.80	-2.90	-13.00	-53.31
1673.20	H	-43.19	-42.21	3.47	-4.45	-13.00	-30.19
2509.80	H						
3346.40	H						
4183.00	H	-51.53	-51.41	7.10	-7.22	-13.00	-38.53
5019.60	H	-52.88	-52.77	7.82	-7.93	-13.00	-39.88
5856.20	H	---					
6692.80	H	---					
7529.40	H	---					
8366.00	H	---					

ERP(dBm) = SG Level(dBm) + Antenna Gain(dBd) + Cable Loss(dB)

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.
 “E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.
 “---” : denotes Noise Floor.

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Operation Band	:GSM 850	Test Date	:2014-01-29
ARFCN	:CH 251	Temp./Humi.	:24 deg_C / 59 RH
Fundamental Frequency	:848.8 MHz	Engineer	:Curry
Operation Mode	:TX HIGH		
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:VERTICAL

Freq.	Note	ERP	SG	Antenna	Cable	Limit	Margin
MHz	F/H/E/S	dBm	Output Level dBm	Gain dBd	Loss dB	dBm	dB
30.00	S	-72.39	-55.71	-15.88	-0.80	-13.00	-59.39
51.34	S	-68.22	-55.06	-12.17	-1.00	-13.00	-55.22
103.72	S	-64.10	-61.35	-1.53	-1.22	-13.00	-51.10
468.44	S	-71.36	-72.71	3.62	-2.27	-13.00	-58.36
604.24	S	-59.98	-60.84	3.48	-2.63	-13.00	-46.98
770.11	S	-64.78	-65.67	3.79	-2.89	-13.00	-51.78
1697.60	H	-41.52	-40.43	3.40	-4.48	-13.00	-28.52
2546.40	H	-49.86	-48.10	3.79	-5.54	-13.00	-36.86
3395.20	H	-54.63	-53.92	5.80	-6.52	-13.00	-41.63
4244.00	H	-36.61	-36.44	7.10	-7.27	-13.00	-23.61
5092.80	H	-43.59	-43.47	7.88	-8.00	-13.00	-30.59
5941.60	H	---					
6790.40	H	---					
7639.20	H	---					
8488.00	H	---					

ERP(dBm) = SG Level(dBm) + Antenna Gain(dBd) + Cable Loss(dB)

Note : "F" : denotes Fundamental Frequency. ; "H" : denotes Harmonic Frequency.
 "E" : denotes Band Edge Frequency. ; "S" : denotes Spurious Frequency.
 "---" : denotes Noise Floor.

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Operation Band	:GSM 850	Test Date	:2014-01-29
ARFCN	:CH 251	Temp./Humi.	:24 deg_C / 59 RH
Fundamental Frequency	:848.8 MHz	Engineer	:Curry
Operation Mode	:TX HIGH		
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:HORIZONTAL

Freq.	Note	ERP	SG	Antenna	Cable	Limit	Margin
MHz	F/H/E/S	dBm	Output Level dBm	Gain dBd	Loss dB	dBm	dB
30.00	S	-54.60	-37.92	-15.88	-0.80	-13.00	-41.60
44.55	S	-60.67	-46.25	-13.53	-0.90	-13.00	-47.67
51.34	S	-59.75	-46.59	-12.17	-1.00	-13.00	-46.75
103.72	S	-65.08	-62.34	-1.53	-1.22	-13.00	-52.08
470.38	S	-70.87	-72.23	3.63	-2.27	-13.00	-57.87
603.27	S	-57.39	-58.24	3.47	-2.62	-13.00	-44.39
1697.60	H	-42.95	-41.87	3.40	-4.48	-13.00	-29.95
2546.40	H	-59.68	-57.93	3.79	-5.54	-13.00	-46.68
3395.20	H						
4244.00	H	-46.74	-46.57	7.10	-7.27	-13.00	-33.74
5092.80	H	-52.02	-51.90	7.88	-8.00	-13.00	-39.02
5941.60	H	---					
6790.40	H	---					
7639.20	H	---					
8488.00	H	---					

ERP(dBm) = SG Level(dBm) + Antenna Gain(dBd) + Cable Loss(dB)

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.
 “E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.
 “---” : denotes Noise Floor.

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Radiated Spurious Emission Measurement Result: GSM 1900 Mode

Operation Band	:GSM 1900	Test Date	:2014-01-29
ARFCN	:CH 512	Temp./Humi.	:24 deg_C / 59 RH
Fundamental Frequency	:1850.2 MHz	Engineer	:Curry
Operation Mode	:TX LOW		
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:VERTICAL

Freq.	Note	EIRP	SG	Antenna	Cable	Limit	Margin
MHz	F/H/E/S	dBm	Output Level dBm	Gain dBi	Loss dB	dBm	dB
30.00	S	-72.39	-57.86	-13.73	-0.80	-13.00	-59.39
53.28	S	-69.60	-59.11	-9.49	-1.00	-13.00	-56.60
104.69	S	-65.22	-64.52	0.52	-1.22	-13.00	-52.22
396.66	S	-72.07	-76.00	5.99	-2.06	-13.00	-59.07
468.44	S	-71.36	-74.86	5.77	-2.27	-13.00	-58.36
604.24	S	-59.98	-62.99	5.63	-2.63	-13.00	-46.98
3700.40	H	-53.34	-55.16	8.62	-6.80	-13.00	-40.34
5550.60	H	-50.40	-52.30	10.30	-8.40	-13.00	-37.40
7400.80	H	---					
9251.00	H	-45.07	-47.40	13.35	-11.02	-13.00	-32.07
11101.20	H	---					
12951.40	H	---					
14801.60	H	---					
16651.80	H	---					
18502.00	H	---					

$$\text{EIRP(dBm)} = \text{SG Level(dBm)} + \text{Antenna Gain(dBi)} + \text{Cable Loss(dB)}$$

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.
 “E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.
 “---” : denotes Noise Floor.

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Operation Band	:GSM 1900	Test Date	:2014-01-29
ARFCN	:CH 512	Temp./Humi.	:24 deg_C / 59 RH
Fundamental Frequency	:1850.2 MHz	Engineer	:Curry
Operation Mode	:TX LOW		
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:HORIZONTAL

Freq.	Note	EIRP	SG	Antenna	Cable	Limit	Margin
MHz	F/H/E/S	dBm	Output Level dBm	Gain dBi	Loss dB	dBm	dB
30.00	S	-52.45	-37.92	-13.73	-0.80	-13.00	-39.45
53.28	S	-58.39	-47.90	-9.49	-1.00	-13.00	-45.39
104.69	S	-63.83	-63.12	0.52	-1.22	-13.00	-50.83
240.49	S	-74.88	-78.74	5.53	-1.67	-13.00	-61.88
470.38	S	-68.72	-72.23	5.78	-2.27	-13.00	-55.72
603.27	S	-57.24	-60.24	5.62	-2.62	-13.00	-44.24
3700.40	H	-58.02	-59.84	8.62	-6.80	-13.00	-45.02
5550.60	H	---					
7400.80	H	---					
9251.00	H	---					
11101.20	H	---					
12951.40	H	---					
14801.60	H	---					
16651.80	H	---					
18502.00	H	---					

EIRP(dBm) = SG Level(dBm) + Antenna Gain(dBi) + Cable Loss(dB)

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.
 “E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.
 “---” : denotes Noise Floor.

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Operation Band	:GSM 1900	Test Date	:2014-01-29
ARFCN	:CH 661	Temp./Humi.	:24 deg_C / 59 RH
Fundamental Frequency	:1880 MHz	Engineer	:Curry
Operation Mode	:TX MID		
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:VERTICAL

Freq.	Note	EIRP	SG	Antenna	Cable	Limit	Margin
MHz	F/H/E/S	dBm	Output Level dBm	Gain dBi	Loss dB	dBm	dB
52.31	S	-70.43	-59.68	-9.75	-1.00	-13.00	-57.43
104.69	S	-64.85	-64.15	0.52	-1.22	-13.00	-51.85
248.25	S	-71.79	-75.67	5.58	-1.70	-13.00	-58.79
445.16	S	-70.67	-74.18	5.72	-2.20	-13.00	-57.67
603.27	S	-58.51	-61.51	5.62	-2.62	-13.00	-45.51
686.69	S	-64.95	-68.27	6.05	-2.73	-13.00	-51.95
3760.00	H	-54.09	-55.98	8.74	-6.85	-13.00	-41.09
5640.00	H	---					
7520.00	H	---					
9400.00	H	---					
11280.00	H	---					
13160.00	H	---					
15040.00	H	---					
16920.00	H	---					
18800.00	H	---					

EIRP(dBm) = SG Level(dBm) + Antenna Gain(dBi) + Cable Loss(dB)

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.
 “E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.
 “---” : denotes Noise Floor.

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Operation Band	:GSM 1900	Test Date	:2014-01-29
ARFCN	:CH 661	Temp./Humi.	:24 deg_C / 59 RH
Fundamental Frequency	:1880 MHz	Engineer	:Curry
Operation Mode	:TX MID		
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:HORIZONTAL

Freq.	Note	EIRP	SG	Antenna	Cable	Limit	Margin
MHz	F/H/E/S	dBm	Output Level dBm	Gain dBi	Loss dB	dBm	dB
30.00	S	-56.48	-41.95	-13.73	-0.80	-13.00	-43.48
52.31	S	-57.59	-46.84	-9.75	-1.00	-13.00	-44.59
104.69	S	-65.17	-64.46	0.52	-1.22	-13.00	-52.17
159.98	S	-76.31	-75.41	0.51	-1.41	-13.00	-63.31
466.50	S	-69.49	-72.99	5.77	-2.26	-13.00	-56.49
603.27	S	-58.57	-61.57	5.62	-2.62	-13.00	-45.57
3760.00	H	-55.60	-57.48	8.74	-6.85	-13.00	-42.60
5640.00	H	---					
7520.00	H	---					
9400.00	H	---					
11280.00	H	---					
13160.00	H	---					
15040.00	H	---					
16920.00	H	---					
18800.00	H	---					

EIRP(dBm) = SG Level(dBm) + Antenna Gain(dBi) + Cable Loss(dB)

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.
 “E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.
 “---” : denotes Noise Floor.

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Operation Band	:GSM 1900	Test Date	:2014-01-29
ARFCN	:CH 810	Temp./Humi.	:24 deg_C / 59 RH
Fundamental Frequency	:1909.8 MHz	Engineer	:Curry
Operation Mode	:TX HIGH		
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:VERTICAL

Freq.	Note	EIRP	SG	Antenna	Cable	Limit	Margin
MHz	F/H/E/S	dBm	Output Level dBm	Gain dBi	Loss dB	dBm	dB
51.34	S	-66.73	-55.72	-10.02	-1.00	-13.00	-53.73
104.69	S	-64.88	-64.18	0.52	-1.22	-13.00	-51.88
251.16	S	-71.98	-75.87	5.61	-1.71	-13.00	-58.98
438.37	S	-71.13	-74.70	5.75	-2.18	-13.00	-58.13
603.27	S	-58.73	-61.73	5.62	-2.62	-13.00	-45.73
712.88	S	-59.18	-62.38	5.98	-2.77	-13.00	-46.18
3819.60	H	-53.81	-55.77	8.85	-6.90	-13.00	-40.81
5729.40	H	---					
7639.20	H	---					
9549.00	H	---					
11458.80	H	---					
13368.60	H	---					
15278.40	H	---					
17188.20	H	---					
19098.00	H	---					

EIRP(dBm) = SG Level(dBm) + Antenna Gain(dBi) + Cable Loss(dB)

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.
 “E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.
 “---” : denotes Noise Floor.

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Operation Band	:GSM 1900	Test Date	:2014-01-29
ARFCN	:CH 810	Temp./Humi.	:24 deg_C / 59 RH
Fundamental Frequency	:1909.8 MHz	Engineer	:Curry
Operation Mode	:TX HIGH		
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:HORIZONTAL

Freq.	Note	EIRP	SG	Antenna	Cable	Limit	Margin
MHz	F/H/E/S	dBm	Output Level dBm	Gain dBi	Loss dB	dBm	dB
30.00	S	-57.79	-43.26	-13.73	-0.80	-13.00	-44.79
52.31	S	-61.06	-50.31	-9.75	-1.00	-13.00	-48.06
104.69	S	-65.72	-65.02	0.52	-1.22	-13.00	-52.72
480.08	S	-69.92	-73.44	5.83	-2.30	-13.00	-56.92
604.24	S	-57.47	-60.48	5.63	-2.63	-13.00	-44.47
711.91	S	-59.20	-62.42	5.98	-2.77	-13.00	-46.20
3819.60	H	-56.02	-57.97	8.85	-6.90	-13.00	-43.02
5729.40	H	---					
7639.20	H	---					
9549.00	H	---					
11458.80	H	---					
13368.60	H	---					
15278.40	H	---					
17188.20	H	---					
19098.00	H	---					

EIRP(dBm) = SG Level(dBm) + Antenna Gain(dBi) + Cable Loss(dB)

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.
 “E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.
 “---” : denotes Noise Floor.

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Radiated Spurious Emission Measurement Result: GSM 850 Mode

Operation Band	:GSM 850	Test Date	:2014-02-05
Fundamental Frequency	:824.2 MHz	Temp./Humi.	:24 deg_C / 59 RH
Operation Mode	:RX LOW	Engineer	:Curry
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:VERTICAL

Actual FS(dBμV/m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV/m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.

“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.

“---” : denotes Noise Floor.

The trace on RE(radiation emission) plot is as colored blue, and the detection manner we’ve employed is peak detector.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
MHz	F/H/E/S	Mode	Reading Level	dB	FS	@3m	dB
		PK/QP/AV	dBμV		dBμV/m	dBμV/m	
47.46	S	Peak	48.61	-13.00	35.61	40.00	-4.39
90.14	S	Peak	47.23	-18.98	28.25	43.50	-15.25
138.64	S	Peak	41.54	-13.29	28.25	43.50	-15.25
299.66	S	Peak	45.22	-11.24	33.98	46.00	-12.02
372.41	S	Peak	43.73	-9.74	33.99	46.00	-12.01
600.36	S	Peak	36.62	-5.51	31.11	46.00	-14.89
1648.40	H	Peak	42.41	-1.58	40.83	54.00	-13.17
2472.60	H	---					
3296.80	H	---					
4121.00	H	---					
4945.20	H	---					
5769.40	H	---					
6593.60	H	---					
7417.80	H	---					
8242.00	H	---					

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Operation Band	:GSM 850	Test Date	:2014-02-05
Fundamental Frequency	:824.2 MHz	Temp./Humi.	:24 deg_C / 59 RH
Operation Mode	:RX LOW	Engineer	:Curry
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:HORIZONTAL

Actual FS(dBμV/m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV/m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.

“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.

“---” : denotes Noise Floor.

The trace on RE(radiation emission) plot is as colored blue, and the detection manner we’ve employed is peak detector.

Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
61.04	S	Peak	44.95	-13.77	31.18	40.00	-8.82
138.64	S	Peak	50.17	-13.29	36.88	43.50	-6.62
222.06	S	Peak	37.14	-14.49	22.65	46.00	-23.35
299.66	S	Peak	44.91	-11.24	33.67	46.00	-12.33
372.41	S	Peak	43.40	-9.74	33.66	46.00	-12.34
600.36	S	Peak	37.12	-5.51	31.61	46.00	-14.39
1648.40	H	Peak	43.52	-1.58	41.94	54.00	-12.06
2472.60	H	---					
3296.80	H	---					
4121.00	H	---					
4945.20	H	---					
5769.40	H	---					
6593.60	H	---					
7417.80	H	---					
8242.00	H	---					

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Operation Band	:GSM 850	Test Date	:2014-02-05
Fundamental Frequency	:836.6 MHz	Temp./Humi.	:24 deg_C / 59 RH
Operation Mode	:RX MID	Engineer	:Curry
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:VERTICAL

Actual FS(dBμV/m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV/m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.

“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.

“---” : denotes Noise Floor.

The trace on RE(radiation emission) plot is as colored blue, and the detection manner we've employed is peak detector.

Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
47.46	S	Peak	48.59	-13.00	35.59	40.00	-4.41
90.14	S	Peak	47.57	-18.98	28.59	43.50	-14.91
138.64	S	Peak	40.86	-13.29	27.57	43.50	-15.93
299.66	S	Peak	44.70	-11.24	33.46	46.00	-12.54
372.41	S	Peak	44.00	-9.74	34.26	46.00	-11.74
600.36	S	Peak	36.78	-5.51	31.27	46.00	-14.73
1673.20	H	Peak	43.76	-1.38	42.38	54.00	-11.62
2509.80	H	---					
3346.40	H	---					
4183.00	H	---					
5019.60	H	---					
5856.20	H	---					
6692.80	H	---					
7529.40	H	---					
8366.00	H	---					

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Operation Band	:GSM 850	Test Date	:2014-02-05
Fundamental Frequency	:836.6 MHz	Temp./Humi.	:24 deg_C / 59 RH
Operation Mode	:RX MID	Engineer	:Curry
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:HORIZONTAL

Actual FS(dBμV/m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV/m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.

“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.

“---” : denotes Noise Floor.

The trace on RE(radiation emission) plot is as colored blue, and the detection manner we’ve employed is peak detector.

Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
61.04	S	Peak	44.86	-13.77	31.09	40.00	-8.91
138.64	S	Peak	50.32	-13.29	37.03	43.50	-6.47
222.06	S	Peak	35.00	-14.49	20.51	46.00	-25.49
299.66	S	Peak	43.89	-11.24	32.65	46.00	-13.35
372.41	S	Peak	43.05	-9.74	33.31	46.00	-12.69
600.36	S	Peak	36.82	-5.51	31.31	46.00	-14.69
1673.20	S	Peak	42.86	-1.38	41.48	54.00	-12.52
2509.80	H	---					
3346.40	H	---					
4183.00	H	---					
5019.60	H	---					
5856.20	H	---					
6692.80	H	---					
7529.40	H	---					
8366.00	H	---					

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Operation Band	:GSM 850	Test Date	:2014-02-05
Fundamental Frequency	:848.8 MHz	Temp./Humi.	:24 deg_C / 59 RH
Operation Mode	:RX HIGH	Engineer	:Curry
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:VERTICAL

Actual FS(dBμV/m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV/m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.

“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.

“---” : denotes Noise Floor.

The trace on RE(radiation emission) plot is as colored blue, and the detection manner we’ve employed is peak detector.

Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
47.46	S	Peak	48.84	-13.00	35.84	40.00	-4.16
90.14	S	Peak	48.04	-18.98	29.06	43.50	-14.44
138.64	S	Peak	41.68	-13.29	28.39	43.50	-15.11
299.66	S	Peak	44.82	-11.24	33.58	46.00	-12.42
372.41	S	Peak	43.80	-9.74	34.06	46.00	-11.94
600.36	S	Peak	36.42	-5.51	30.91	46.00	-15.09
1697.60	H	Peak	41.73	-1.18	40.55	54.00	-13.45
2546.40	H	---					
3395.20	H	---					
4244.00	H	---					
5092.80	H	---					
5941.60	H	---					
6790.40	H	---					
7639.20	H	---					
8488.00	H	---					

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Operation Band	:GSM 850	Test Date	:2014-02-05
Fundamental Frequency	:848.8 MHz	Temp./Humi.	:24 deg_C / 59 RH
Operation Mode	:RX HIGH	Engineer	:Curry
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:HORIZONTAL

Actual FS(dBμV/m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV/m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.

“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.

“---” : denotes Noise Floor.

The trace on RE(radiation emission) plot is as colored blue, and the detection manner we’ve employed is peak detector.

Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
61.04	S	Peak	44.90	-13.77	31.13	40.00	-8.87
138.64	S	Peak	50.38	-13.29	37.09	43.50	-6.41
299.66	S	Peak	44.85	-11.24	33.61	46.00	-12.39
366.59	S	Peak	42.81	-9.86	32.95	46.00	-13.05
534.40	S	Peak	34.27	-7.58	26.69	46.00	-19.31
600.36	S	Peak	36.61	-5.51	31.10	46.00	-14.90
1697.60	H	Peak	42.41	-1.18	41.23	54.00	-12.77
2546.40	H	---					
3395.20	H	---					
4244.00	H	---					
5092.80	H	---					
5941.60	H	---					
6790.40	H	---					
7639.20	H	---					
8488.00	H	---					

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Radiated Spurious Emission Measurement Result: GSM 1900 Mode

Operation Band	:GSM 1900	Test Date	:2014-02-05
Fundamental Frequency	:1850.2 MHz	Temp./Humi.	:24 deg_C / 59 RH
Operation Mode	:RX LOW	Engineer	:Curry
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:VERTICAL

Actual FS(dBμV/m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV/m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.

“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.

“---” : denotes Noise Floor.

The trace on RE(radiation emission) plot is as colored blue, and the detection manner we’ve employed is peak detector.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
MHz	F/H/E/S	Mode	Reading Level	dB	FS	@3m	dB
		PK/QP/AV	dBμV		dBμV/m	dBμV/m	
47.46	S	Peak	48.43	-13.00	35.43	40.00	-4.57
90.14	S	Peak	48.08	-18.98	29.10	43.50	-14.40
162.89	S	Peak	40.01	-12.72	27.29	43.50	-16.21
299.66	S	Peak	43.30	-11.24	32.06	46.00	-13.94
372.41	S	Peak	43.89	-9.74	34.15	46.00	-11.85
600.36	S	Peak	35.87	-5.51	30.36	46.00	-15.64
3700.40	H	Peak	40.95	5.10	46.05	54.00	-7.95
5550.60	H	---					
7400.80	H	---					
9251.00	H	---					
11101.20	H	---					
12951.40	H	---					
14801.60	H	---					
16651.80	H	---					
18502.00	H	---					

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Operation Band	:GSM 1900	Test Date	:2014-02-05
Fundamental Frequency	:1850.2 MHz	Temp./Humi.	:24 deg_C / 59 RH
Operation Mode	:RX LOW	Engineer	:Curry
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:HORIZONTAL

Actual FS(dBμV/m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV/m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.

“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.

“---” : denotes Noise Floor.

The trace on RE(radiation emission) plot is as colored blue, and the detection manner we’ve employed is peak detector.

Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
61.04	S	Peak	45.29	-13.77	31.52	40.00	-8.48
138.64	S	Peak	50.16	-13.29	36.87	43.50	-6.63
240.49	S	Peak	34.94	-13.24	21.70	46.00	-24.30
299.66	S	Peak	42.11	-11.24	30.87	46.00	-15.13
372.41	S	Peak	43.46	-9.74	33.72	46.00	-12.28
600.36	S	Peak	36.61	-5.51	31.10	46.00	-14.90
3700.40	H	Peak	40.21	5.10	45.31	54.00	-8.69
5550.60	H	---					
7400.80	H	---					
9251.00	H	---					
11101.20	H	---					
12951.40	H	---					
14801.60	H	---					
16651.80	H	---					
18502.00	H	---					

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Operation Band	:GSM 1900	Test Date	:2014-02-05
Fundamental Frequency	:1880 MHz	Temp./Humi.	:24 deg_C / 59 RH
Operation Mode	:RX MID	Engineer	:Curry
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:VERTICAL

Actual FS(dBμV/m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV/m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.

“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.

“---” : denotes Noise Floor.

The trace on RE(radiation emission) plot is as colored blue, and the detection manner we’ve employed is peak detector.

Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
47.46	S	Peak	48.68	-13.00	35.68	40.00	-4.32
61.04	S	Peak	45.24	-13.77	31.47	40.00	-8.53
90.14	S	Peak	47.64	-18.98	28.66	43.50	-14.84
138.64	S	Peak	41.52	-13.29	28.23	43.50	-15.27
299.66	S	Peak	42.94	-11.24	31.70	46.00	-14.30
372.41	S	Peak	43.86	-9.74	34.12	46.00	-11.88
3760.00	H	Peak	40.38	4.84	45.22	54.00	-8.78
5640.00	H	---					
7520.00	H	---					
9400.00	H	---					
11280.00	H	---					
13160.00	H	---					
15040.00	H	---					
16920.00	H	---					
18800.00	H	---					

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Operation Band	:GSM 1900	Test Date	:2014-02-05
Fundamental Frequency	:1880 MHz	Temp./Humi.	:24 deg_C / 59 RH
Operation Mode	:RX MID	Engineer	:Curry
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:HORIZONTAL

Actual FS(dBμV/m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV/m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.

“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.

“---” : denotes Noise Floor.

The trace on RE(radiation emission) plot is as colored blue, and the detection manner we've employed is peak detector.

Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
61.04	S	Peak	44.81	-13.77	31.04	40.00	-8.96
138.64	S	Peak	50.03	-13.29	36.74	43.50	-6.76
246.31	S	Peak	36.34	-13.06	23.28	46.00	-22.72
299.66	S	Peak	42.94	-11.24	31.70	46.00	-14.30
354.95	S	Peak	43.37	-10.11	33.26	46.00	-12.74
600.36	S	Peak	35.83	-5.51	30.32	46.00	-15.68
3760.00	H	Peak	39.72	4.84	44.56	54.00	-9.44
5640.00	H	---					
7520.00	H	---					
9400.00	H	---					
11280.00	H	---					
13160.00	H	---					
15040.00	H	---					
16920.00	H	---					
18800.00	H	---					

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Operation Band	:GSM 1900	Test Date	:2014-02-05
Fundamental Frequency	:1909.8 MHz	Temp./Humi.	:24 deg_C / 59 RH
Operation Mode	:RX HIGH	Engineer	:Curry
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:VERTICAL

Actual FS(dBμV/m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV/m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.

“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.

“---” : denotes Noise Floor.

The trace on RE(radiation emission) plot is as colored blue, and the detection manner we’ve employed is peak detector.

Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
47.46	S	Peak	48.67	-13.00	35.67	40.00	-4.33
61.04	S	Peak	45.30	-13.77	31.53	40.00	-8.47
138.64	S	Peak	41.05	-13.29	27.76	43.50	-15.74
299.66	S	Peak	45.18	-11.24	33.94	46.00	-12.06
372.41	S	Peak	43.68	-9.74	33.94	46.00	-12.06
600.36	S	Peak	35.35	-5.51	29.84	46.00	-16.16
3819.60	H	Peak	39.28	5.17	44.45	54.00	-9.55
5729.40	H	---					
7639.20	H	---					
9549.00	H	---					
11458.80	H	---					
13368.60	H	---					
15278.40	H	---					
17188.20	H	---					
19098.00	H	---					

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Operation Band	:GSM 1900	Test Date	:2014-02-05
Fundamental Frequency	:1909.8 MHz	Temp./Humi.	:24 deg_C / 59 RH
Operation Mode	:RX HIGH	Engineer	:Curry
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:HORIZONTAL

Actual FS(dBμV/m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV/m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.

“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.

“---” : denotes Noise Floor.

The trace on RE(radiation emission) plot is as colored blue, and the detection manner we’ve employed is peak detector.

Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
61.04	S	Peak	45.13	-13.77	31.36	40.00	-8.64
138.64	S	Peak	50.13	-13.29	36.84	43.50	-6.66
240.49	S	Peak	36.37	-13.24	23.13	46.00	-22.87
299.66	S	Peak	43.60	-11.24	32.36	46.00	-13.64
372.41	S	Peak	42.58	-9.74	32.84	46.00	-13.16
600.36	S	Peak	35.70	-5.51	30.19	46.00	-15.81
3819.60	H	Peak	39.64	5.17	44.81	54.00	-9.19
5729.40	H	---					
7639.20	H	---					
9549.00	H	---					
11458.80	H	---					
13368.60	H	---					
15278.40	H	---					
17188.20	H	---					
19098.00	H	---					

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11 FREQUENCY STABILITY V.S. TEMPERATURE MEASUREMENT

11.1 Standard Applicable:

According to FCC §2.1055(a) (1)

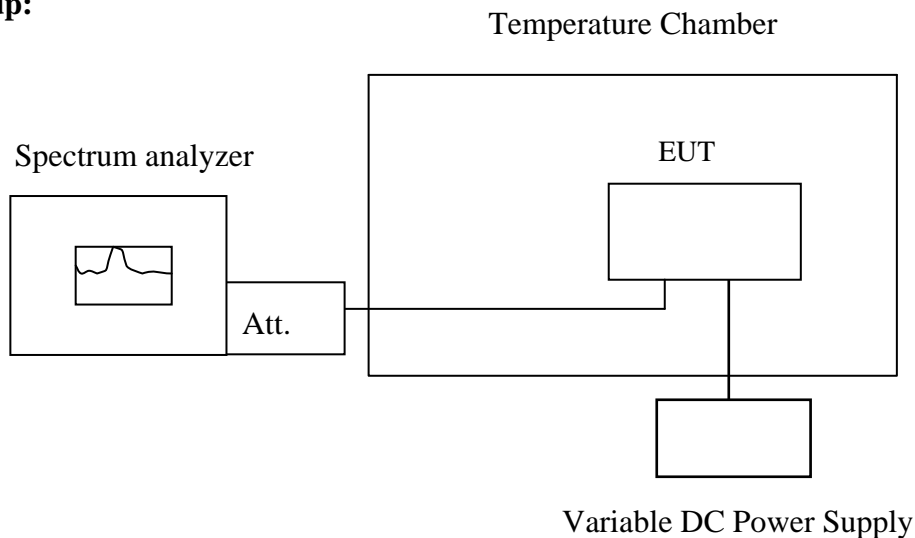
Frequency Tolerance: +/-2.5ppm for 850MHz band

+/-2.5ppm for 1900MHz band

According to RSS-133 §6.3, RSS-132 §5.3

The carrier frequency shall not depart from the reference frequency in excess of ± 2.5 ppm for mobile stations

11.2 Test Set-up:



Note : Measurement setup for testing on Antenna connector

11.3 Measurement Procedure:

The equipment under test was connected to an external AC or DC power supply and input rated voltage. RF output was connected to a frequency counter or spectrum analyzer via feed through attenuators. The EUT was placed inside the temperature chamber. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and measure EUT 25°C operating frequency as reference frequency. Turn EUT off and set the chamber temperature to -30°C. After the temperature stabilized for approximately 30 minutes recorded the frequency. Repeat step measure with 10°C increased per stage until the highest temperature of +50°C reached.

11.4 Measurement Equipment Used:

Refer to section 2.4 in this report

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11.5 Measurement Result:

Reference Frequency: GPRS 850 Mid Channel 836.6 MHz				
Limit: +/- 2.5 ppm = 2091 Hz				
Power Supply	Environment	Frequency	Delta (Hz)	Limit (Hz)
Vdc	Temperature (°C)	(MHz)		
3.8	50	836599967	-12	2091
3.8	40	836599981	2	2091
3.8	30	836599978	-1	2091
3.8	20	836599979	0	2091
3.8	10	836599970	-9	2091
3.8	0	836599976	-3	2091
3.8	-10	836599984	5	2091
3.8	-20	836599959	-20	2091
3.8	-30	836599958	-21	2091

Reference Frequency: GPRS 1900 Mid Channel 1880 MHz				
Limit: +/- 2.5 ppm = 4700 Hz				
Power Supply	Environment	Frequency	Delta (Hz)	Limit (Hz)
Vdc	Temperature (°C)	(MHz)		
3.8	50	1879999945	10	4700
3.8	40	1879999933	-2	4700
3.8	30	1879999918	-17	4700
3.8	20	1879999935	0	4700
3.8	10	1879999910	-25	4700
3.8	0	1879999917	-18	4700
3.8	-10	1879999943	8	4700
3.8	-20	1879999939	4	4700
3.8	-30	1879999930	-5	4700

Note: The battery is rated 3.8V dc.

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12 FREQUENCY STABILITY V.S. VOLTAGE MEASUREMENT

12.1 Standard Applicable:

According to FCC §2.1055(d) (2)

Frequency Tolerance: +/-2.5ppm for 850MHz band

+/-2.5ppm for 1900MHz band

According to RSS-133 §6.3, RSS-132 §5.3

The carrier frequency shall not depart from the reference frequency in excess of ± 2.5 ppm for mobile stations.

12.2 Test Set-up:

Refer to section 11.2 in this report

12.3 Measurement Procedure:

Set chamber temperature to 25°C. Use a variable AC power supply / DC power source to power the EUT and set the voltage to rated voltage. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and recorded the frequency.

Reduce the input voltage to specified extreme voltage variation (+/- 15%) and endpoint, record the maximum frequency change.

12.4 Measurement Equipment Used:

Refer to section 2.4 in this report

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12.5 Measurement Result:

Reference Frequency: GPRS 850 Mid Channel 836.6 MHz				
Limit: +/- 2.5 ppm = 2091 Hz				
Power Supply	Environment	Frequency	Delta (Hz)	Limit (Hz)
Vdc	Temperature (°C)	(MHz)		
4.35	20	836599972	-7	2091
3.8	20	836599979	0	2091
3.3	20	836599951	-28	2091
3.2 (Shutdown point)	20	836599935	-44	2091

Reference Frequency: GPRS 1900 Mid Channel 1880 MHz				
Limit: +/- 2.5 ppm = 4700 Hz				
Power Supply	Environment	Frequency	Delta (Hz)	Limit (Hz)
Vdc	Temperature (°C)	(MHz)		
4.35	20	1879999914	-21	4700
3.8	20	1879999935	0	4700
3.3	20	1879999944	9	4700
3.1 (Shutdown point)	20	1879999967	32	4700

Note: The battery is rated 3.8V dc.

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13 PEAK TO AVERAGE RATIO

13.1 Standard Applicable:

According FCC 24.232(d) – The peak-to-average ration (PAR) of the transmission may not exceed 13dB.

According to issue 3 of RSS 132, section 5.4, issue 6 of RSS 133, section 6.4. Transmitter power is measured in terms of average value, the peak-to-average ratio of the power shall not exceed 13 dB.

13.2 Test SET-UP (Block Diagram of Configuration):

Refer to section 2.4 in this report

13.3 Measurement Procedure:

KDB 971168 D01 is employed as the following procedure is proper adjusted accordingly:

Set resolution/measurement bandwidth \geq signal's occupied bandwidth; & internal =1ms

Set the number of counts to a value that stabilizes the measured CCDF curve.

13.4 Measurement Equipment Used:

Refer to section 2.4 in this report

13.5 Measurement Result:

Refer to next page for plot.

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Figure 13-1: GSM 850 Channel Low

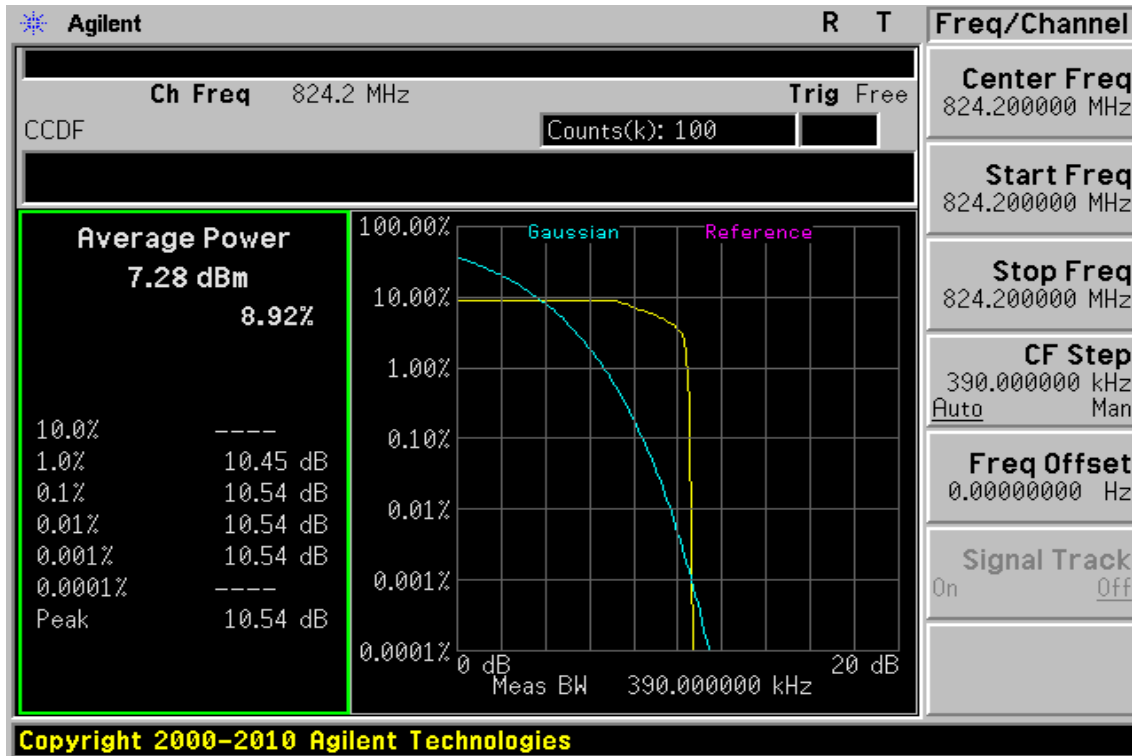
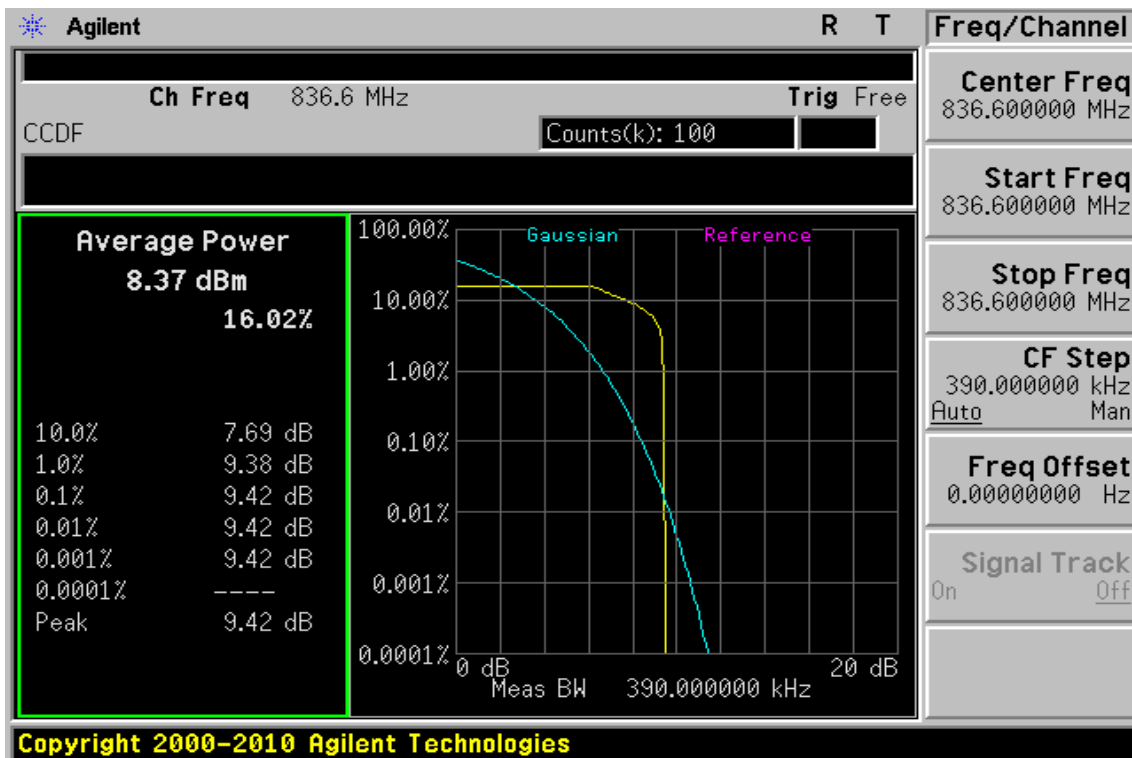


Figure 13-2: GSM 850 Channel Mid



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Figure 13-3: GSM 850 Channel High

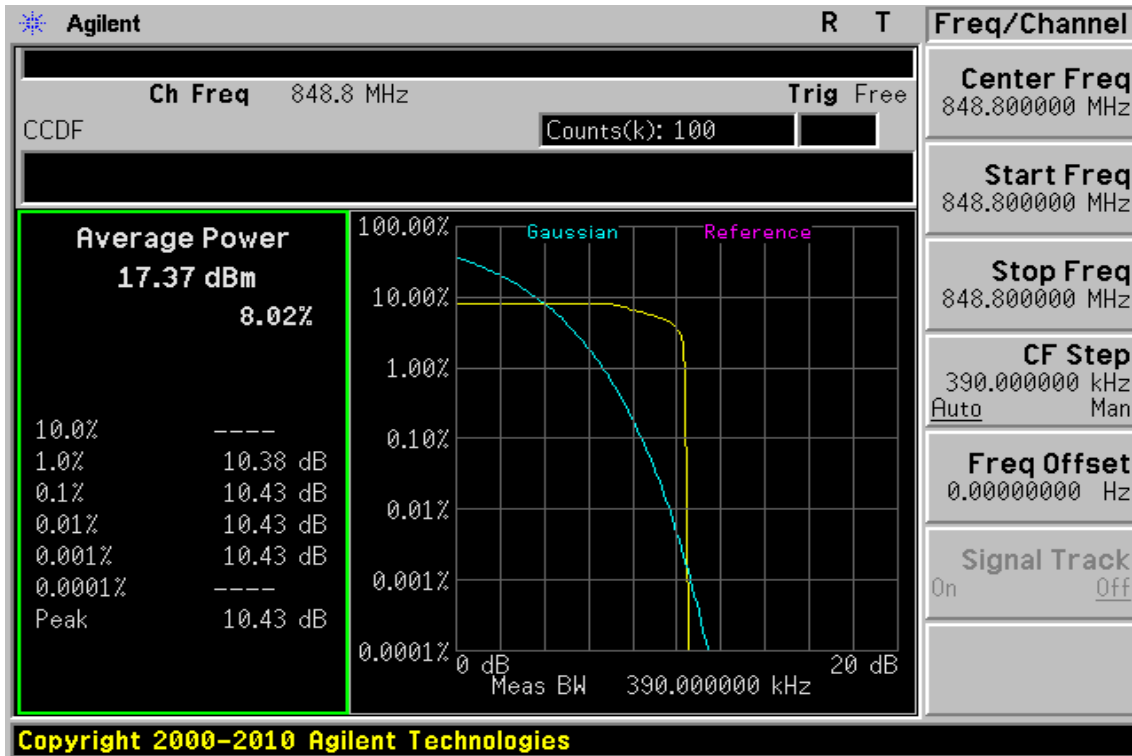
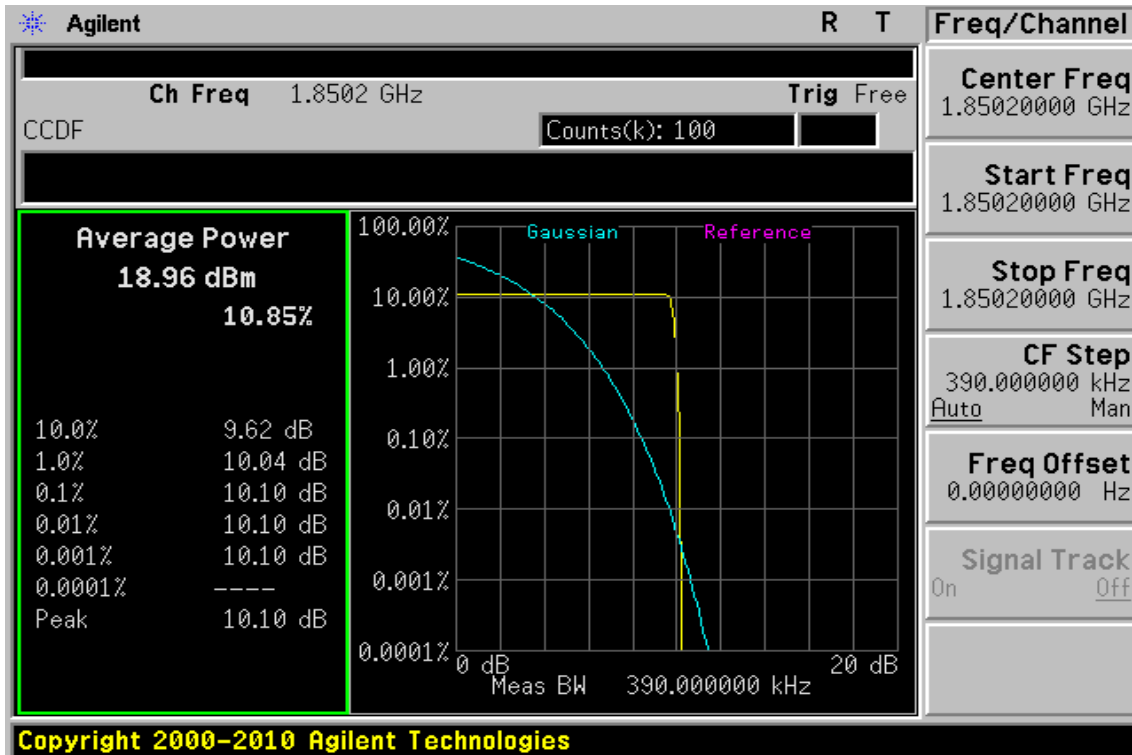


Figure 13-4: GSM 1900 Channel Low



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Figure 13-5: GSM 1900 Channel Mid

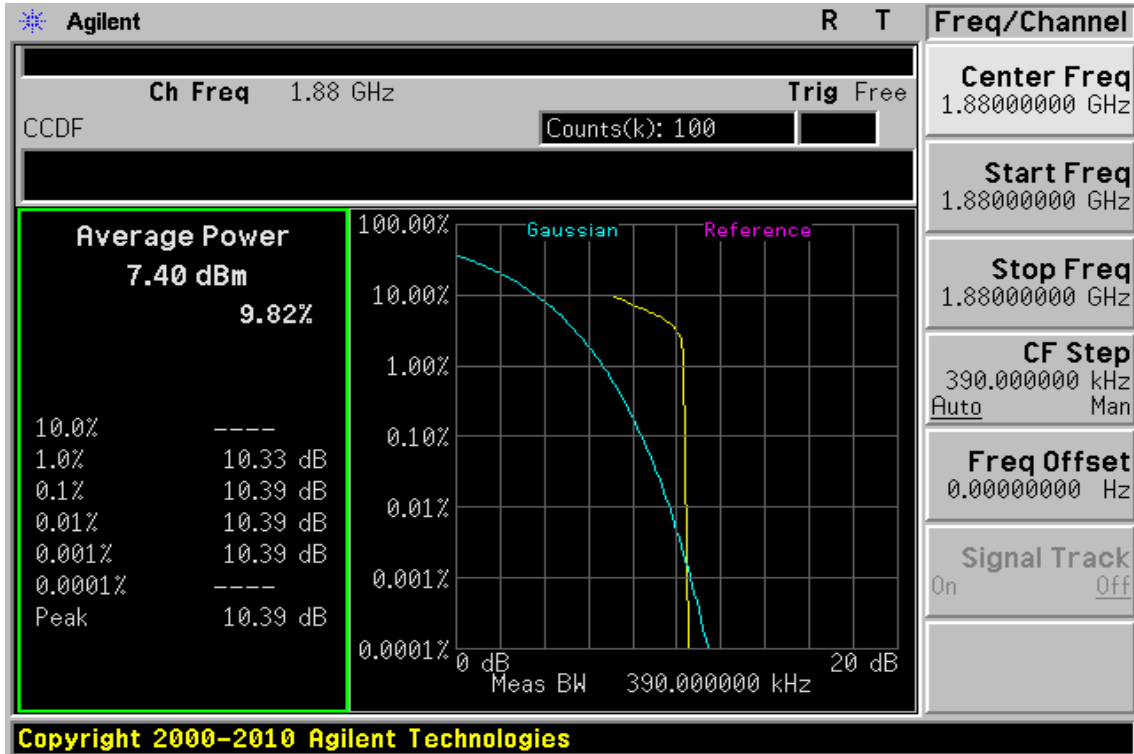
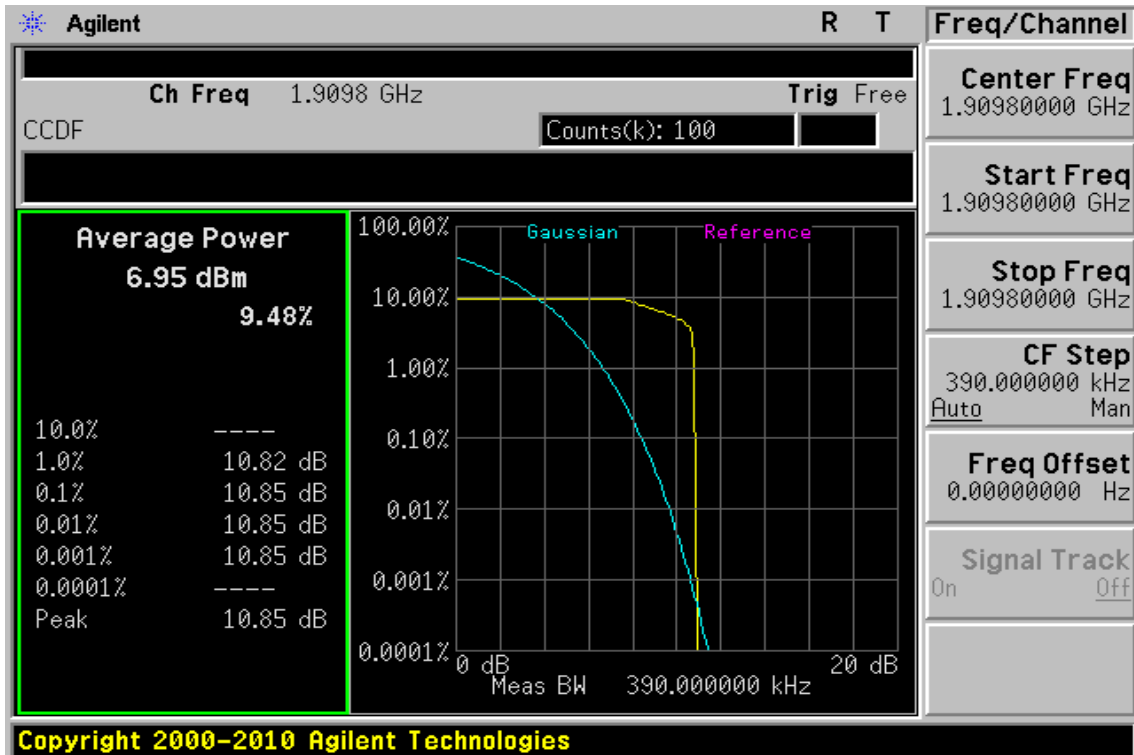


Figure 13-6: GSM 1900 Channel High



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Figure 13-7: GPRS 850 Channel Low

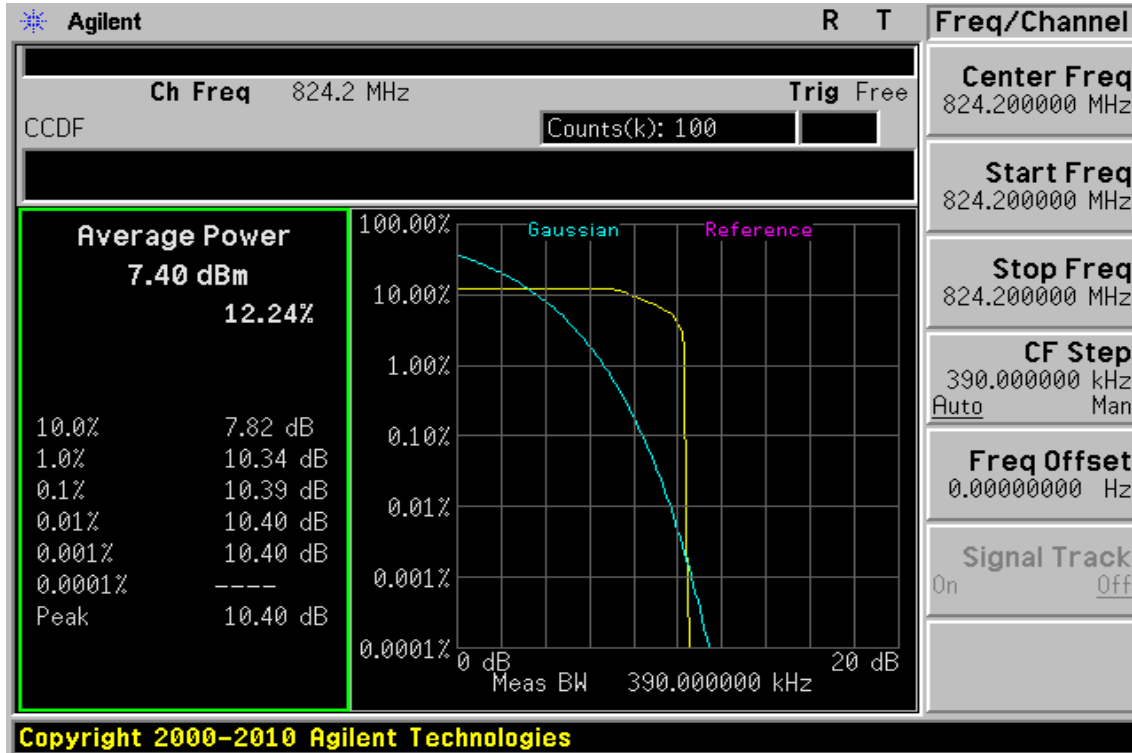
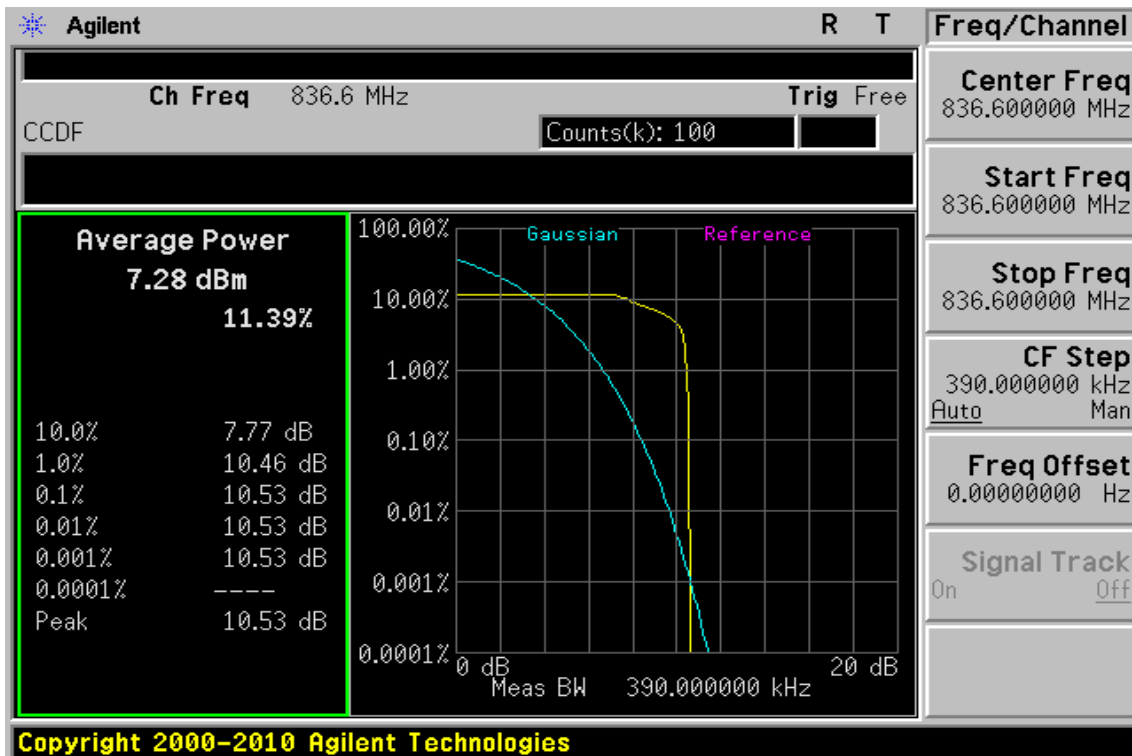


Figure 13-8: GPRS 850 Channel Mid



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Figure 13-9: GPRS 850 Channel High

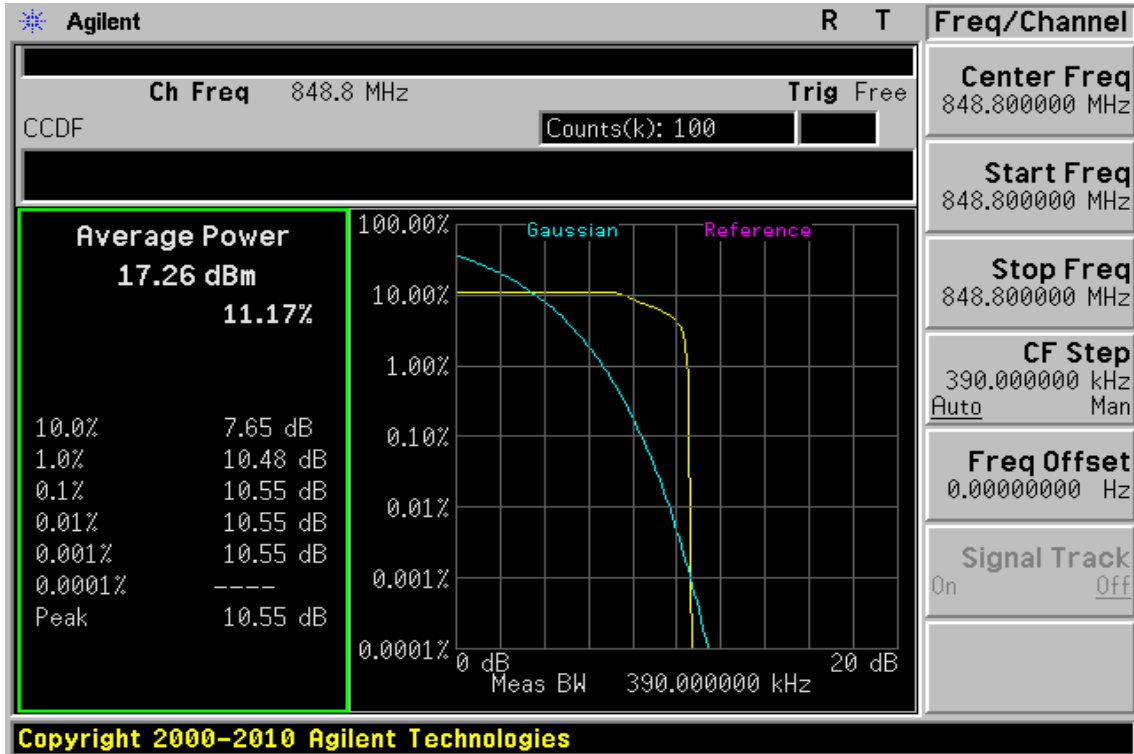
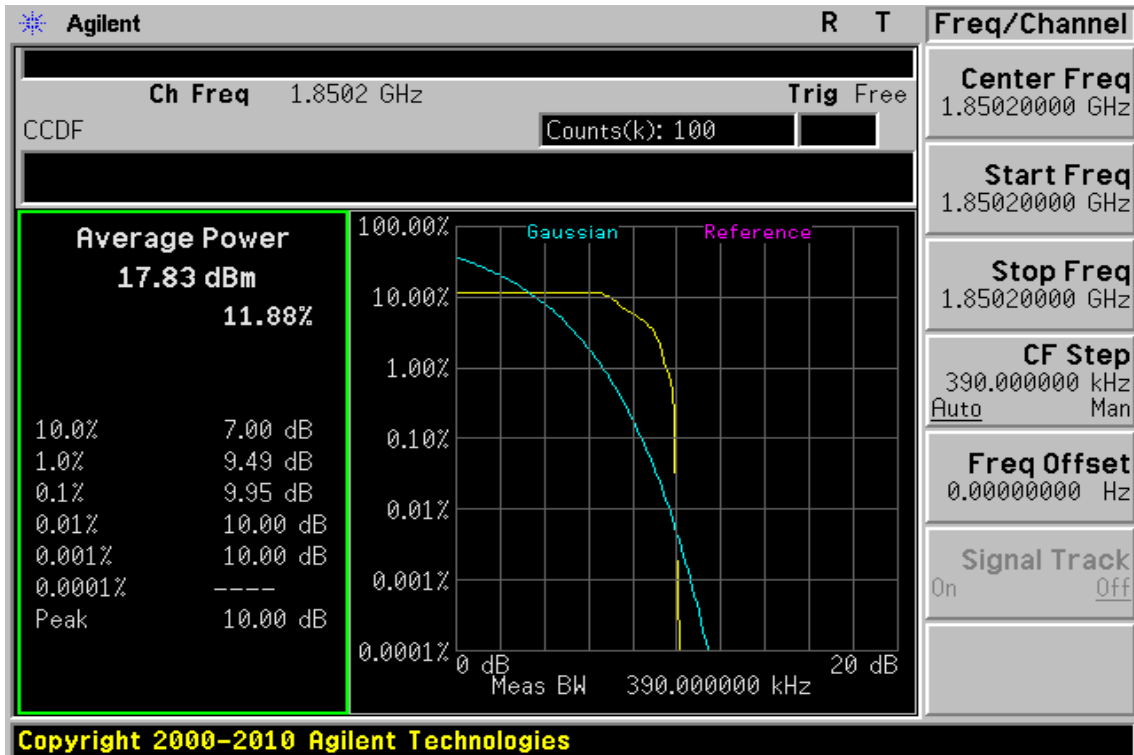


Figure 13-10: GPRS 1900 Channel Low



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Figure 13-11: GPRS 1900 Channel Mid

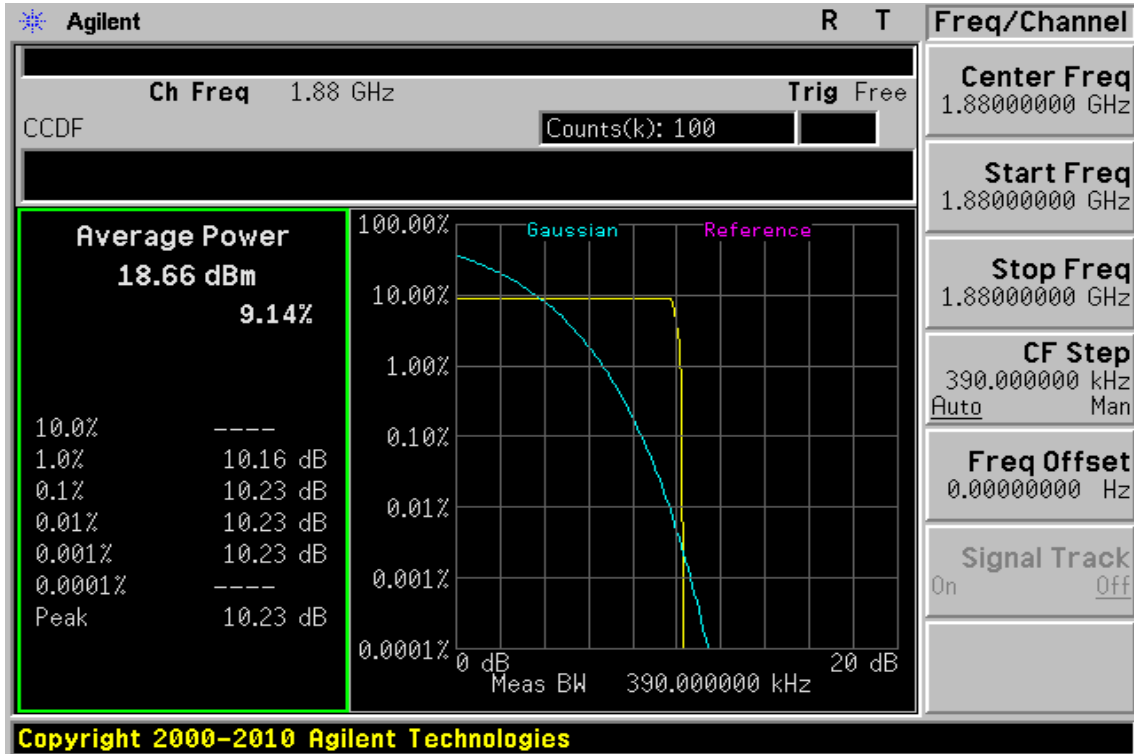
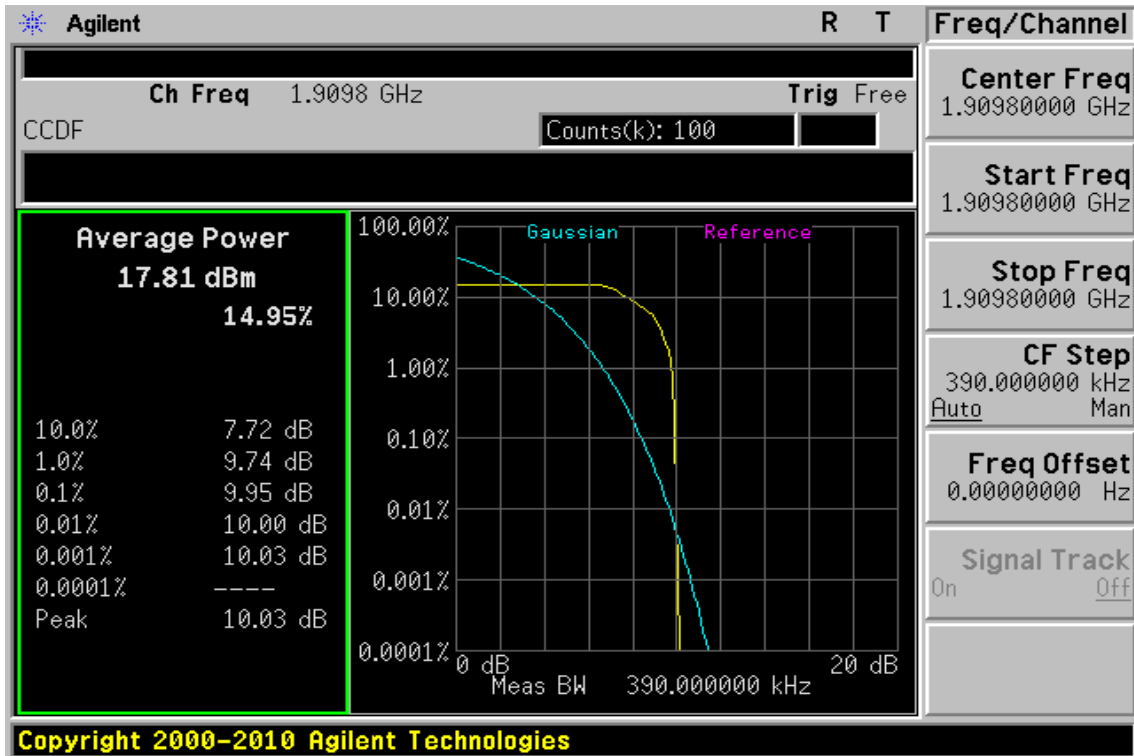


Figure 13-12: GPRS 1900 Channel High



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