FCC 47 CFR PART 24 SUBPART E

TEST REPORT

For

900/ 1800/ 1900/ Bluetooth Mobile Handset

Brand Name: CMCS

Model Number: Konstanze

Prepared for

Chi Mei Communication Systems, Inc.
11F, No. 39, Chung Hua Road, Sec. 1,
Taipei City, Taiwan, R.O.C.

Prepared by

Compliance Certification Services Inc.
No. 81-1, Lane 210, Bade Rd. 2, Luchu Hsiang,
Taoyuan Hsien, (338) Taiwan, R.O.C.
TEL: 886-3-324-0332
FAX: 886-3-324-5235

CNLA 0363 ILAC MRA

TABLE OF CONTENTS

1. TEST RESULT CERTIFICATION

Applicant:	Chi Mei Communication Systems, Inc. 11F, No. 39, Chung Hua Road, Sec. 1, Taipei City, Taiwan, R.O.C.
Equipment Under Test:	900/ 1800/ 1900/ Bluetooth Mobile Handset
Trade Name:	CMCS
Model:	Konstanze
Model Difference	N/A
Report Number:	B30715208-RP
Date of Test:	September 2 ~ 6, 2003

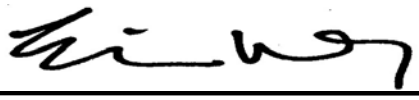
APPLICABLE STANDARDS	
STANDARD	**TEST RESULT**
FCC Part 24 Subpart E	No non-compliance noted

We hereby certify that:

The above equipment was tested by Compliance Certification Services Inc. 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-603-1-1998 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 FCC Part 24 Subpart E.

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

Approved by: ***Reviewed by:***



Jonson Lee
Director of Linkou Laboratory
Compliance Certification Services Inc.

Eric Wong
Section Manager
Compliance Certification Services Inc.

2. EUT DESCRIPTION

Product	900/ 1800/ 1900/ Bluetooth Mobile Handset
Trade Name	CMCS
Model No.	Konstanze
Model Discrepancy	N/A
Frequency Range	TX: 1850 ~ 1910MHz (for GSM) RX: 1930 MHz – 1989.8 MHz (for GSM) 2402 ~ 2480MHz (for Bluetooth)
Cellular Phone Standards	GSM (PCS) / GPRS / (FHSS)
Transmit Power	29.58 dBm
Antenna Type	PIFA Antenna
Antenna Gain	-2 dBi
Power Supply	Battery: Rated 3.7Vdc, 630mAh
	Charger: Input: AC100-240V, 0.5A, 50/60Hz Output: 5Vdc, 550mA

Note: *This submittal(s) (test report) is intended for FCC ID: QDJ-0307KON01 filing to comply with Part 24 of the FCC 47 CFR Rules.*

3. TEST METHODOLOGY

Both conducted and radiated testing were performed according to the procedures document on chapter 13 of ANSI C63.4 (1992) and FCC CFR 47, 2.1046, 2.1047, 2.1049, 2.1051, 2.1053, 2.1055 and 2.1057.

3.1 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.

3.2 EUT EXERCISE

The EUT (900/ 1800/ 1900/ Bluetooth Mobile Handset) was operated in the engineering mode to fix the Tx frequency that was for the purpose of the measurements.

3.3 GENERAL TEST PROCEDURES

Conducted Emissions

The EUT is placed on a turn table which is 0.8 m above ground plane. According to the requirements in Section 13.1.4.1 of ANSI C63.4-1992.Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-Peak and Average detector mode.

Radiated Emissions

The EUT is placed on a turn table which is 1.0 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 according to the requirements in Section 13.1.4.1 of ANSI C63.4-1992.

3.4 FCC PART 15.205 RESTRICTED BANDS OF OPERATIONS

(a) Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
[1]0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 -	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.52525	2655 - 2900	22.01 - 23.12
8.41425 - 8.41475	156.7 - 156.9	3260 - 3267	23.6 - 24.0
12.29 - 12.293	162.0125 - 167.17	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	167.72 - 173.2	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	240 - 285	3600 - 4400	([2])
13.36 - 13.41	322 - 335.4		

[1] Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.

[2] Above 38.6

(b) Except as provided in paragraphs (d) and (e), the field strength of emissions appearing within these frequency bands shall not exceed the limits shown in Section 15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in Section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.

3.5 DESCRIPTION OF TEST MODES

The EUT (900/1800/1900/ Bluetooth Mobile Handset) has been tested under operating condition.

Condition A (Mobile phone operation): The EUT is programmed into the Engineering mode and set to transmit continuously. Channel Low, Mid and High versus each orthogonal axis operation have been evaulated.

Condition B (Co-located operation): Radiated Emissions among the combination of the Mobile phone operation (with the worst case emission setup) with one of the Bluetooth channel (with the worst case emission setup).

(The field strength of spurious radiation emission was measured in the following position: EUT stand-up position (X mode) and laid-down position (Y, Z mode))

4. 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.

5. FACILITIES AND ACCREDITATIONS

5.1 FACILITIES

All measurement facilities used to collect the measurement data are located at

☒ No. 81-1, Lane 210, Pa-de 2nd Road, Luchu Hsiang, Taoyuan Hsien, Taiwan

☐ No. 199, Chunghsen Road, Hsintien City, Taipei Hsien, Taiwan

The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 and CISPR Publication 22.

5.2 EQUIPMENT

Radiated emissions are measured with one or more of the following types of linearly polarized antennas: tuned dipole, biconical, log periodic, bi-log, and/or ridged waveguide, horn. Spectrum analyzers with pre-selectors and quasi-peak detectors are used to perform radiated measurements.

Conducted emissions are measured with Line Impedance Stabilization Networks and EMI Test Receivers.

Calibrated wideband preamplifiers, coaxial cables, and coaxial attenuators are also used for making measurements.

All receiving equipment conforms to CISPR Publication 16-1, “Radio Interference Measuring Apparatus and Measurement Methods.”

5.3 LABORATORY ACCREDITATIONS AND LISTING

The test facilities used to perform radiated and conducted emissions tests are accredited by National Voluntary Laboratory Accreditation Program for the specific scope of accreditation under Lab Code: 200600-0 to perform Electromagnetic Interference tests according to FCC PART 15 AND CISPR 22 requirements. No part of this report may be used to claim or imply product endorsement by NVLAP or any agency of the US Government. In addition, the test facilities are listed with Federal Communications Commission (registration no: 93105 and 90471).

5.4 TABLE OF ACCREDITATIONS AND LISTINGS

Country	Agency	Scope of Accreditation	Logo
USA	NVLAP*	EN 55011, EN 55014-1, AS/NZS 1044, CNS 13783-1, EN 55022, CNS 13438, EN 61000-3-2, EN 61000-3-3, ANSI C63.4, FCC OST/MP-5, AS/NZS 3548IEC 61000-4-2, IEC 61000-4-3, IEC 61000-4-4, IEC 61000-4-5, IEC 61000-4-6, IEC 61000-4-8, IEC 61000-4-11	NVLAP 200600-0
USA	FCC	3/10 meter Open Area Test Sites to perform FCC Part 15/18 measurements	FC 93105, 90471
Japan	VCCI	4 3/10 meter Open Area Test Sites to perform conducted/radiated measurements	VCCI R-393/1066/725/879 C-402/747/912
Norway	NEMKO	EN 50081-1/2, EN 50082-1/2, IEC 61000-6-1/2, EN 50091-2, EN 50130-4, EN 55011, EN 5513, EN 55014-1/2, EN 55015, EN 55022, EN 55024, EN 61000-3-2/3, EN 61326-1, IEC 61000-4-2/3/4/5/6/8/11, EN 60601-1-2, EN 300 328-2, EN 300 422-2, EN 301 419-1, EN 301 489-01/03/07/08/09/17, EN 301 419-2/3, EN 300 454-2, EN 301 357-2	N ELA 124a ELA 124b ELA 124c
Taiwan	CNLA	EN 300 328-1, EN 300 328-2, EN 300 220-1, EN 300 220-2, EN 300 220-3, 47 CFR FCC Part 15 Subpart C, EN 61000-3-2, EN 61000-3-3, CNS 13439, CNS 13783-1, CNS 14115, CNS 13438, AS/NZS 3548, CNS 13022-1, IEC 1000-4-3/4/5/6/8/11, CNS 13022-2/3	CNLA 0363 ILAC MRA
Taiwan	BSMI	CNS 13438, CNS 13783-1, CNS 13439, CNS 14115	SL2-IS-E-0014 SL2-IN-E-0014 SL2-A1-E-0014 SL2-R1-E-0014 SL2-R2-E-0014 SL2-L1-E-0014
Canada	Industry Canada	RSS212, Issue 1	Canada IC 3991-3 IC 3991-4

** No part of this report may be used to claim or imply product endorsement by NVLAP or any agency of the US Government.*

6. SETUP OF EQUIPMENT UNDER TEST

6.1 SETUP CONFIGURATION OF EUT

6.2 SUPPORT EQUIPMENT

Device Type	Brand	Model	FCC ID	Series No.	Data Cable	Power Cord
N/A	N/A	N/A	N/A	N/A	N/A	N/A

Notes:

1. *All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.*
2. *Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.*

7. FCC PART 24.200 REQUIREMENTS

CONDITION A: MOBILE PHONE OPERATION

7.1. RF POWER OUTPUT MEASUREMENT

LIMIT

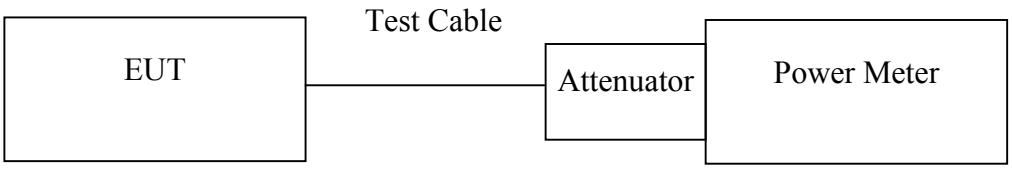
According to FCC §2.1046.

MEASUREMENT EQUIPMENT USED

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Power Meter	Agilant	436A	2709A29207	03/15/2004
Power Sensor	Agilant	8481A	2702A61366	03/15/2004
Attenuator	Mini-circuit	10dB	N/A	05/14/2004

Remark: *Each piece of equipment is scheduled for calibration once a year.*

TEST CONFIGURATION



Note: *Measurement setup for testing on Antenna connector*

TEST 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.

TEST RESULTS

No non-compliance noted

Test Data

Test Mode	CH	Frequency (MHz)	Power Meter Reading (dBm)	Factor (dB)	Average Power (dBm)	Output Power (W)
GSM 1900	512	1850.20	15.58	14	29.58	0.90782
	661	1880.00	15.38	14	29.38	0.86696
	810	1910.00	15.55	14	29.55	0.90157
GPRS 1900 (Class 10)	512	1850.20	15.57	14	29.57	0.90573
	661	1880.00	15.11	14	29.11	0.81470
	810	1910.00	15.42	14	29.42	0.87498

Note: The value of factor includes both the loss of cable and external attenuator

7.2. ERP & EIRP MEASUREMENT

LIMIT

According to FCC §2.1046
FCC 22.913(b): The Effective Radiated Power (ERP) of mobile transmitters must not exceed 7 Watts.
FCC 24.232(b): The equivalent Isotropic Radiated Power (EIRP) must not exceed 2 Watts.

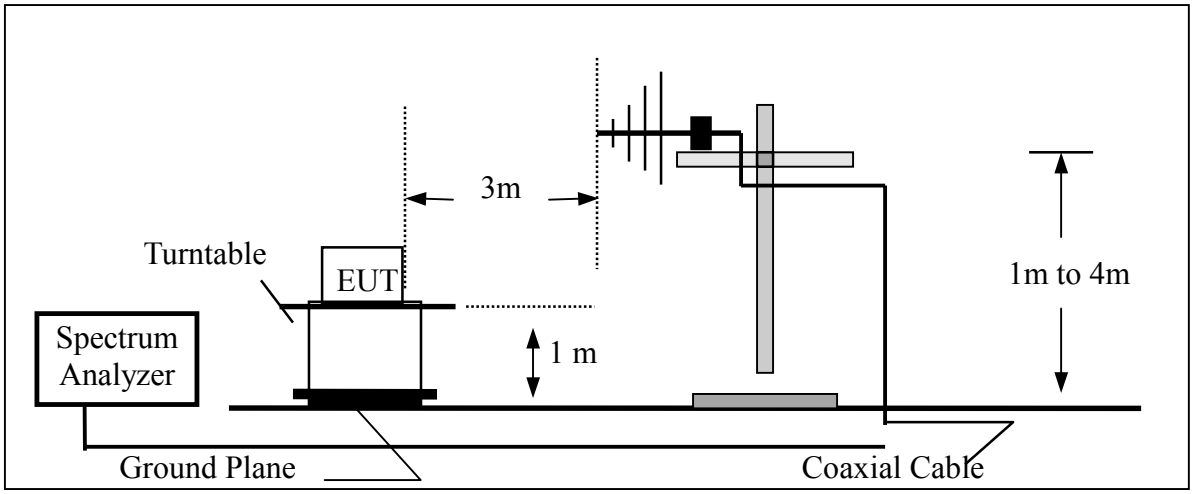
MEASUREMENT EQUIPMENT USED

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	E4446A	US42510252	04/27/2004
Spectrum Analyzer	R&S	FSP30	100112	06/28/2004
Pre-Amplifier	HP	8447D	2944A09173	03/03/2004
Horn antenna	EMCO	3115	00022250	02/26/2004
Pre-Amplifier	HP	8449B	3008B00965	10/02/2003
Low Loss Cable#40	HUBER+SUHNER	SUCOFLEX	19431	04/08/2004
Turn Table	EMCO	2081-1.21	9709-1885	N.C.R
Antenna Tower	EMCO	2075-2	9707-2060	N.C.R
Controller	EMCO	2090	9709-1256	N.C.R
Site NSA	C&C	N/A	N/A	09/06/2004
S.G.	HP	83630B	3844A01022	01/14/2004
Low Loss Cable#38	HUBER+SUHNER	SUCOFLEX	19443	04/08/2004
Substituted Horn	EMCO	3115	00022256	02/26/2004

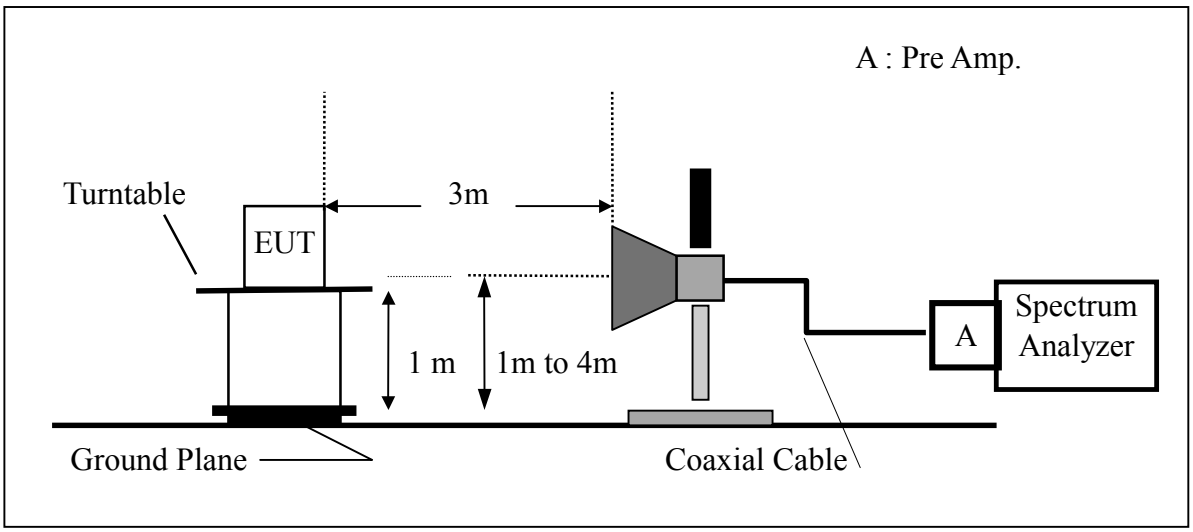
Remark: *Each piece of equipment is scheduled for calibration once a year.*

TEST CONFIGURATION

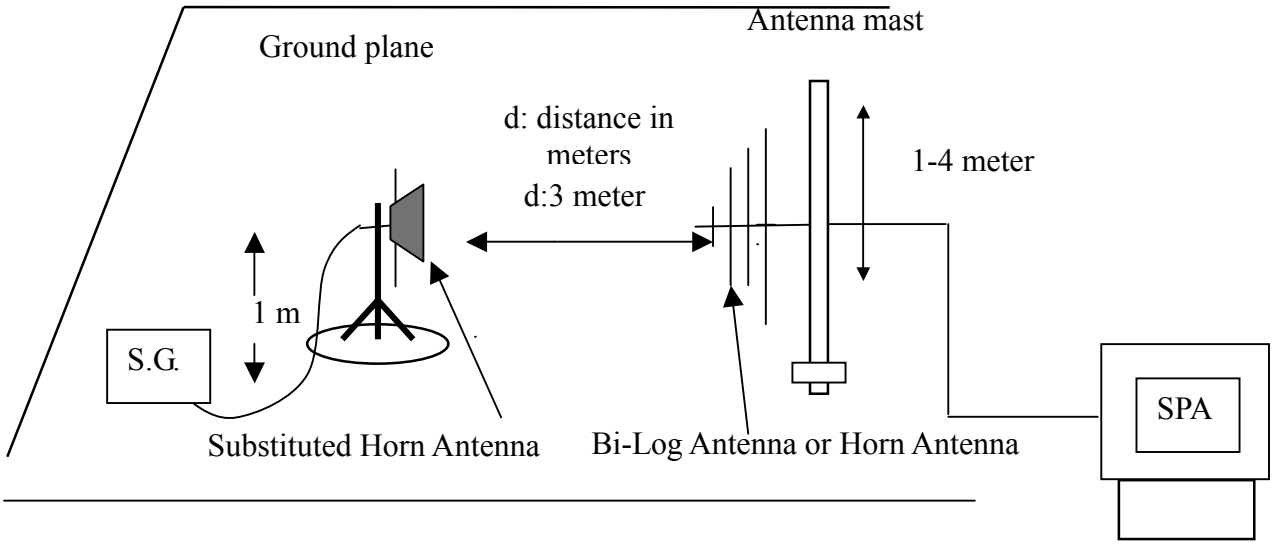
For Frequencies Below 1 GHz



For Frequencies Above 1 GHz



For Substituted Method Test Set-UP



TEST 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 of the EUT, the resolution bandwidth was set to 3MHz and the average bandwidth was set to 3MHz. The highest emission was recorded with the rotation of the turntable and the lowering of the test antenna. The reading was recorded and the field strength (E in dBuV/m) was calculated.

ERP in frequency band 824-849MHz, and EIRP in frequency band 1851.25 –1910MHz were measured using a substitution method. The EUT was replaced by half-wave dipole (824-849MHz) or horn antenna (1851.25-1910MHz) connected to a signal generator. The spectrum analyzer reading was recorded and ERP/EIRP was calculated as follows:

ERP = S.G. output (dBm) + Antenna Gain (dBd) – Cable (dB)

EIRP = S.G. output (dBm) + Antenna Gain (dBi) – Cable (dB)

TEST RESULTS

No non-compliance noted

GSM Test Data

EUT Mode	EUT Pol.	Frequency (MHz)	CH	Antenna Pol.	SPA Reading (dBuV)	S.G. Output (dBm)	Antenna Gain (dBi)	Cable Loss (dB)	EIRP (dBm)	Limit (dBm)
GSM	X	1850.20	512	V	129.66	26.77	6.30	3.95	29.12	33.00
	Y	1850.20	512	H	26.58	23.98	6.30	3.95	26.33	33.00
	Z	1850.20	512	H	129.58	26.98	6.30	3.96	29.32	33.00
GSM	X	1880.00	661	V	129.34	26.64	6.33	3.99	28.98	33.00
	Y	1880.00	661	H	125.89	23.52	6.33	3.99	25.86	33.00
	Z	1880.00	661	H	129.31	26.78	6.33	3.99	29.12	33.00
GSM	X	1909.80	810	V	129.34	26.78	6.35	4.04	29.09	33.00
	Y	1909.80	810	H	121.69	19.38	6.35	4.04	21.69	33.00
	Z	1909.80	810	H	129.77	27.46	6.35	4.04	29.77	33.00

GPRS Test Data

EUT Mode	EUT Pol.	Frequency (MHz)	CH	Antenna Pol.	SPA Reading (dBuV)	S.G. Output (dBm)	Antenna Gain (dBi)	Cable Loss (dB)	EIRP (dBm)	Limit (dBm)
GPRS (Class 10)	X	1850.20	512	V	129.69	26.80	6.30	3.95	29.15	33.00
	Y	1850.20	512	H	126.66	24.06	6.30	3.95	26.41	33.00
	Z	1850.20	512	H	129.67	27.07	6.30	3.96	29.41	33.00
GPRS (Class 10)	X	1880.00	661	V	129.34	26.65	6.33	3.99	28.99	33.00
	Y	1880.00	661	H	125.89	23.46	6.33	3.99	25.80	33.00
	Z	1880.00	661	H	129.31	26.88	6.33	3.99	29.22	33.00
GPRS (Class 10)	X	1909.80	810	V	129.42	26.86	6.35	4.04	29.17	33.00
	Y	1909.80	810	H	121.59	19.28	6.35	4.04	21.59	33.00
	Z	1909.80	810	H	129.53	27.22	6.35	4.04	29.53	33.00

7.3. OCCUPIED BANDWIDTH MEASUREMENT

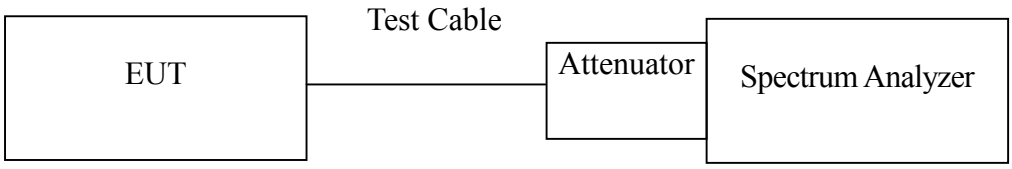
LIMIT

According to §FCC 2.1049.

MEASUREMENT EQUIPMENT USED

EQUIPMENT TYPE	MFR	Model No.	Serial No.	Cal. Due.
Spectrum Analyzer	Agilent	E4446A	US42510252	04/27/2004
Spectrum Analyzer	R&S	FSP30	100112	06/28/2004
Attenuator	Mini-circuit	20dB	N/A	05/14/2004

TEST CONFIGURATION



Note: *Measurement setup for testing on Antenna connector*

TEST 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 is set to 3 times the RBW, -26dBc display line was placed on the screen (or 99% bandwidth), the occupied bandwidth is the delta frequency between the two points where the display line intersects the signal trace.

TEST RESULTS

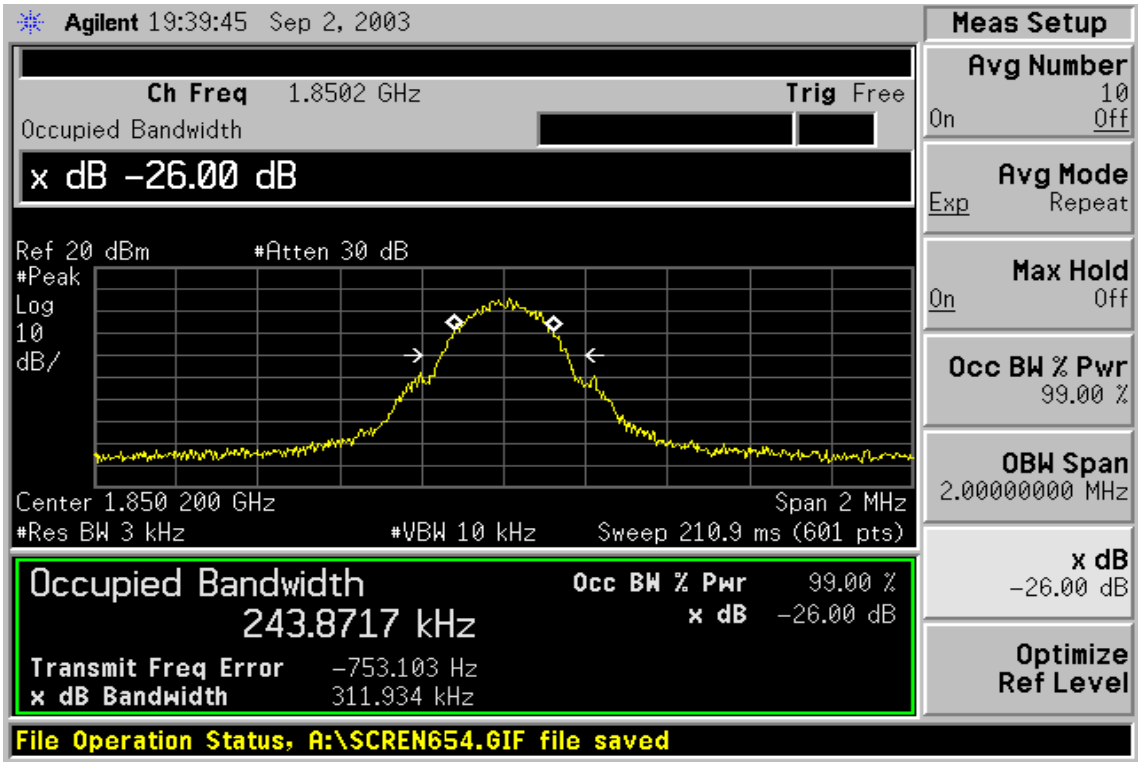
No non-compliance noted

GSM Test Data

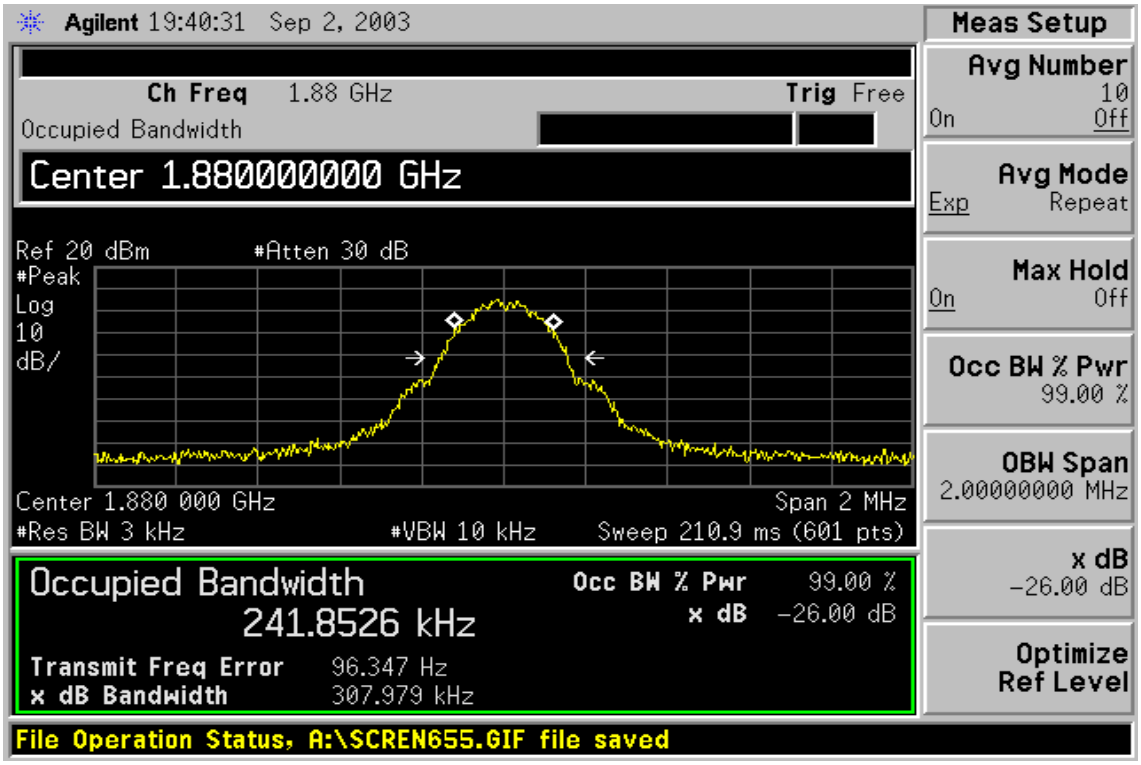
Test Mode	Frequency (MHz)	CH	Bandwidth (KHz)
GSM	1850.20	512	243.8717
	1880.00	661	241.8526
	1909.80	810	245.0832
GPRS (Class 10)	1850.20	512	236.6333
	1880.00	661	240.8064
	1909.80	810	234.7646

Test Plot

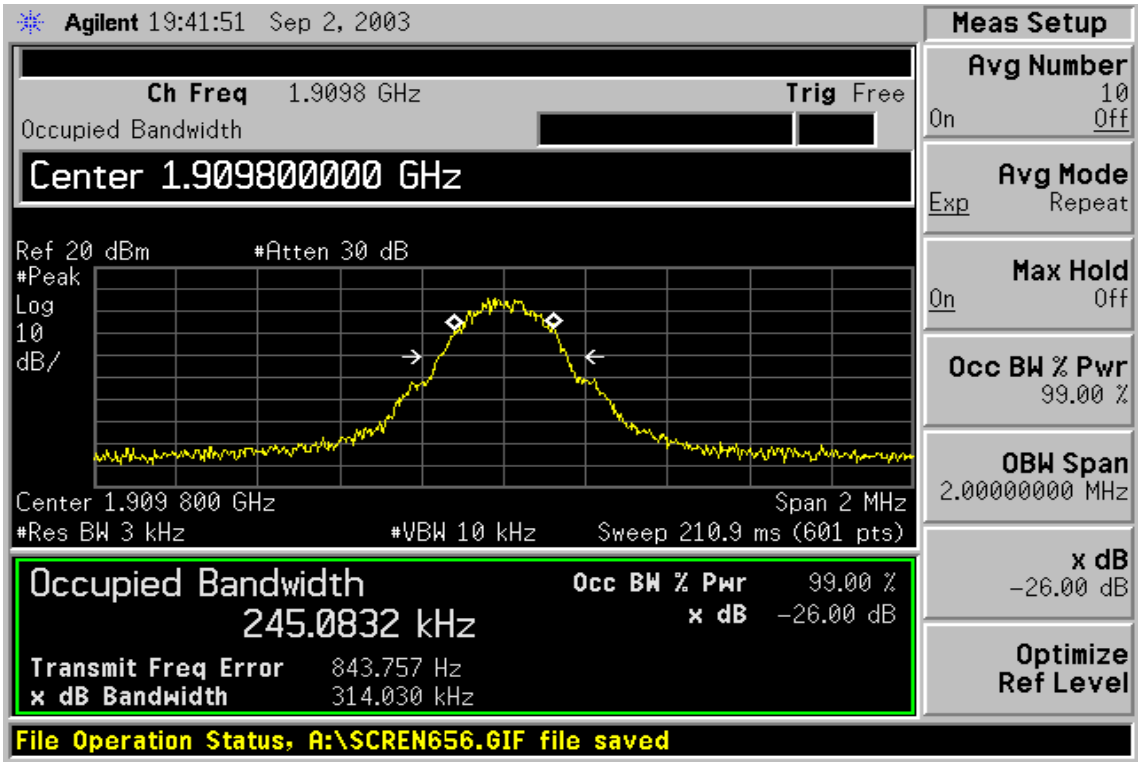
GSM CH Low



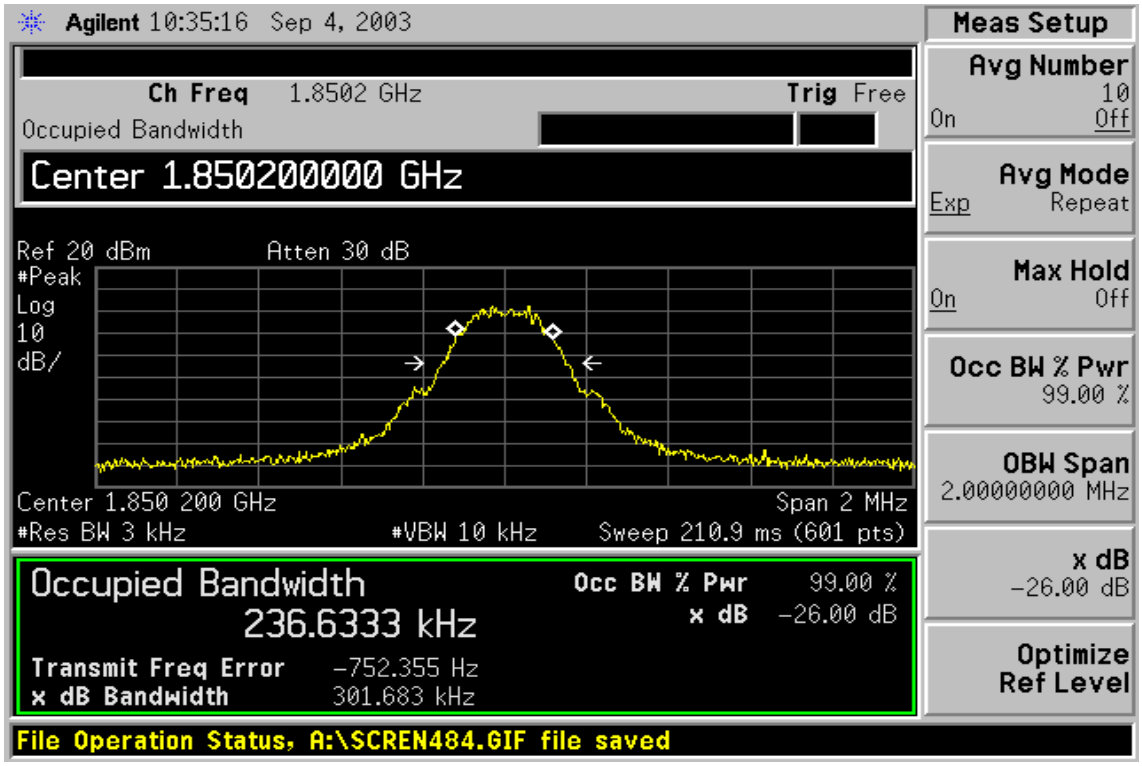
GSM CH Mid



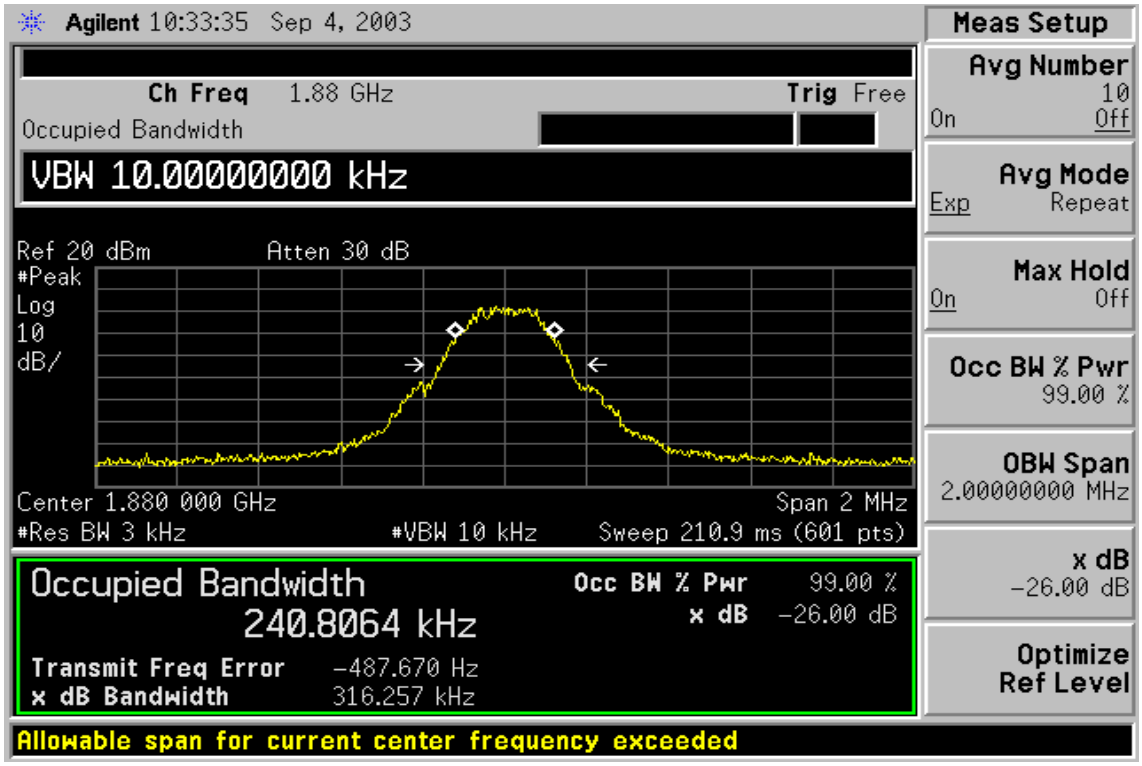
GSM CH High


Agilent 19:41:51 Sep 2, 2003
Ch Freq 1.9098 GHz
Trig Free
Occupied Bandwidth
Center 1.909800000 GHz
Ref 20 dBm
#Atten 30 dB
#Peak
Log
10
dB/
Center 1.909 800 GHz
Span 2 MHz
#Res BW 3 kHz
#VBW 10 kHz
Sweep 210.9 ms (601 pts)
Occupied Bandwidth
245.0832 kHz
Occ BW % Pwr 99.00 %
x dB -26.00 dB
Transmit Freq Error 843.757 Hz
x dB Bandwidth 314.030 kHz
File Operation Status, A:\SCREN656.GIF file saved
Meas Setup
Avg Number
10
On Off
Avg Mode
Exp Repeat
Max Hold
On Off
Occ BW % Pwr
99.00 %
OBW Span
2.00000000 MHz
x dB
-26.00 dB
Optimize
Ref Level

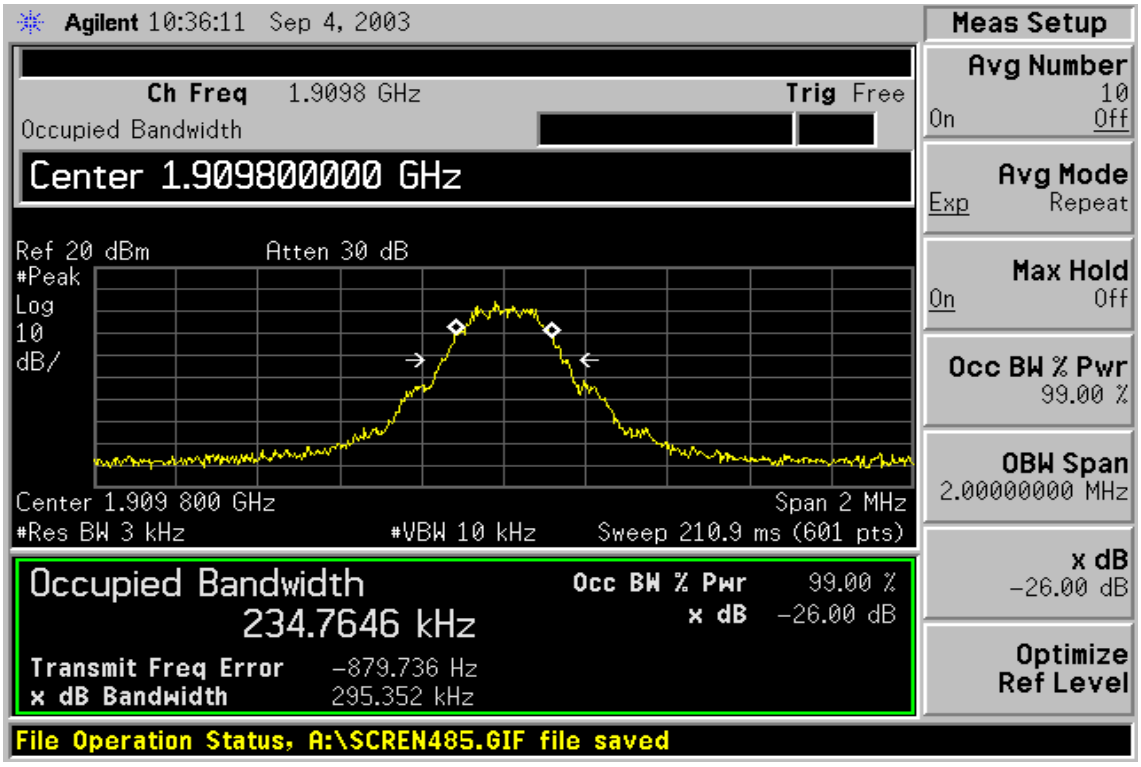
GPRS CH Low



GPRS CH Mid



GPRS CH High


Agilent 10:36:11 Sep 4, 2003
Ch Freq 1.9098 GHz
Trig Free
Occupied Bandwidth
Center 1.909800000 GHz
Ref 20 dBm
Atten 30 dB
#Peak
Log
10
dB/
Center 1.909 800 GHz
Span 2 MHz
#Res BW 3 kHz
#VBW 10 kHz
Sweep 210.9 ms (601 pts)
Occupied Bandwidth
234.7646 kHz
Occ BW % Pwr 99.00 %
x dB -26.00 dB
Transmit Freq Error -879.736 Hz
x dB Bandwidth 295.352 kHz
File Operation Status, A:\SCREN485.GIF file saved
Meas Setup
Avg Number
10
On Off
Avg Mode
Exp Repeat
Max Hold
On Off
Occ BW % Pwr
99.00 %
OBW Span
2.00000000 MHz
x dB
-26.00 dB
Optimize
Ref Level

7.4. OUT OF BAND EMISSION AT ANTENNA TERMINALS

LIMIT

According to FCC §2.1051, FCC §2.2917(f), FCC §24.238(a),

Out of Band Emissions: The mean power of emission must be attenuated below the mean power of the non-modulated carrier (P) on any frequency twice or more than twice the fundamental frequency by at lease 43 + 10 log P dB.

Mobile Emissions in Base Frequency Range: The mean power of any emissions appearing in the base station frequency range from cellular mobile transmitters operated must be attenuated to a level not exceed –80 dBm at the transmit antenna connector.

Band Edge Requirements: In the 1MHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of at lease 1% of the emission bandwidth of the fundamental emission of the transmitter may be employed to measure the Out of band Emission

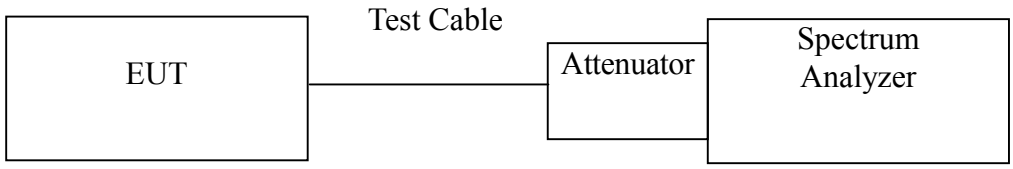
MEASUREMENT EQUIPMENT USED

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	E4446A	US42510252	04/27/2004
Attenuator	Mini-circuit	10dB	N/A	05/14/2004

Remark: *Each piece of equipment is scheduled for calibration once a year.*

TEST CONFIGURATION

Out of band emission at antenna terminals:



TEST 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(1850MHz and 1910MHz) : 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.

TEST RESULTS

No non-compliance noted

Test Data

Table 7-1: Out of Band emissions

Location	Mode	CH	Description
Figure 7-1	GSM	512	Conducted spurious emissions, 30MHz - 2.5GHz
Figure 7-2	GSM	512	Conducted spurious emissions, 2.5GHz - 20GHz
Figure 7-3	GSM	661	Conducted spurious emissions, 30MHz - 2.5GHz
Figure 7-4	GSM	661	Conducted spurious emissions, 2.5GHz - 20GHz
Figure 7-5	GSM	810	Conducted spurious emissions, 30MHz - 2.5GHz
Figure 7-6	GSM	810	Conducted spurious emissions, 2.5GHz - 20GHz
Figure 7-7	GPRS (Class 10)	512	Conducted spurious emissions, 30MHz - 2.5GHz
Figure 7-8	GPRS (Class 10)	512	Conducted spurious emissions, 2.5GHz - 20GHz
Figure 7-9	GPRS (Class 10)	661	Conducted spurious emissions, 30MHz - 2.5GHz
Figure 7-10	GPRS (Class 10)	661	Conducted spurious emissions, 2.5GHz - 20GHz
Figure 7-11	GPRS (Class 10)	810	Conducted spurious emissions, 30MHz - 2.5GHz
Figure 7-12	GPRS (Class 10)	810	Conducted spurious emissions, 2.5GHz - 20GHz

Test Plot

GSM

Figure 7-1: Out of Band emission at antenna terminals– GSM CH Low

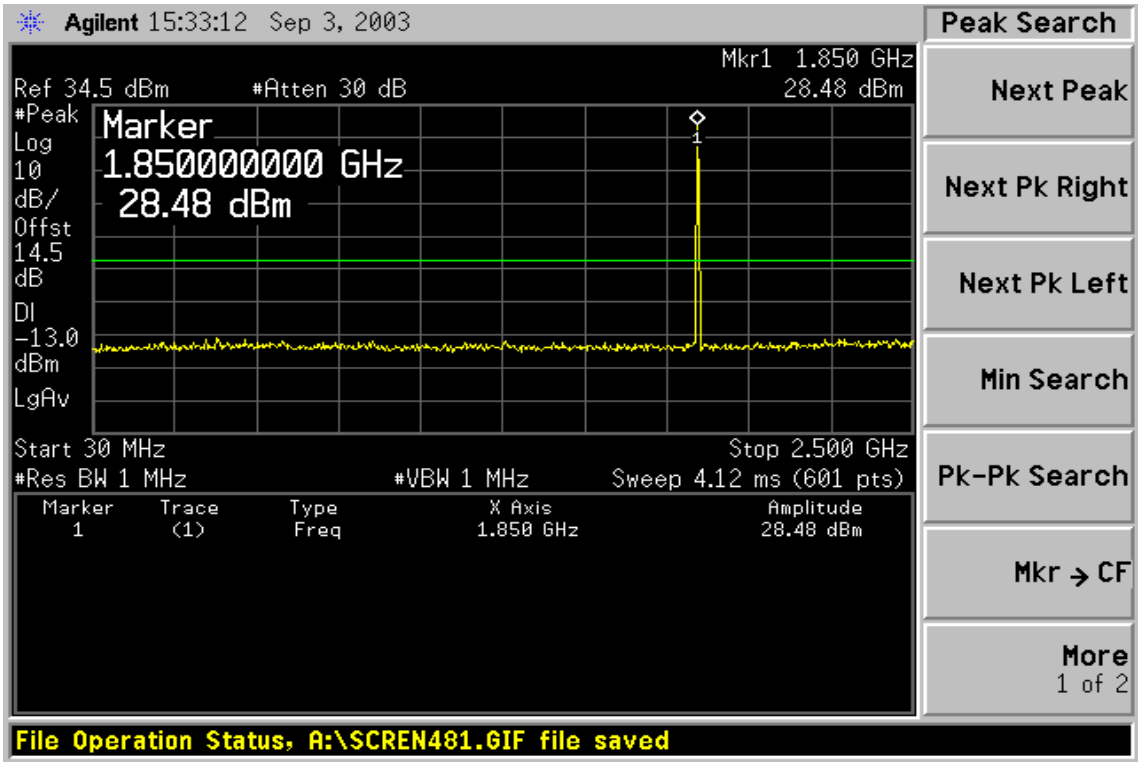


Figure 7-2: Out of Band emission at antenna terminals–GSM CH Low

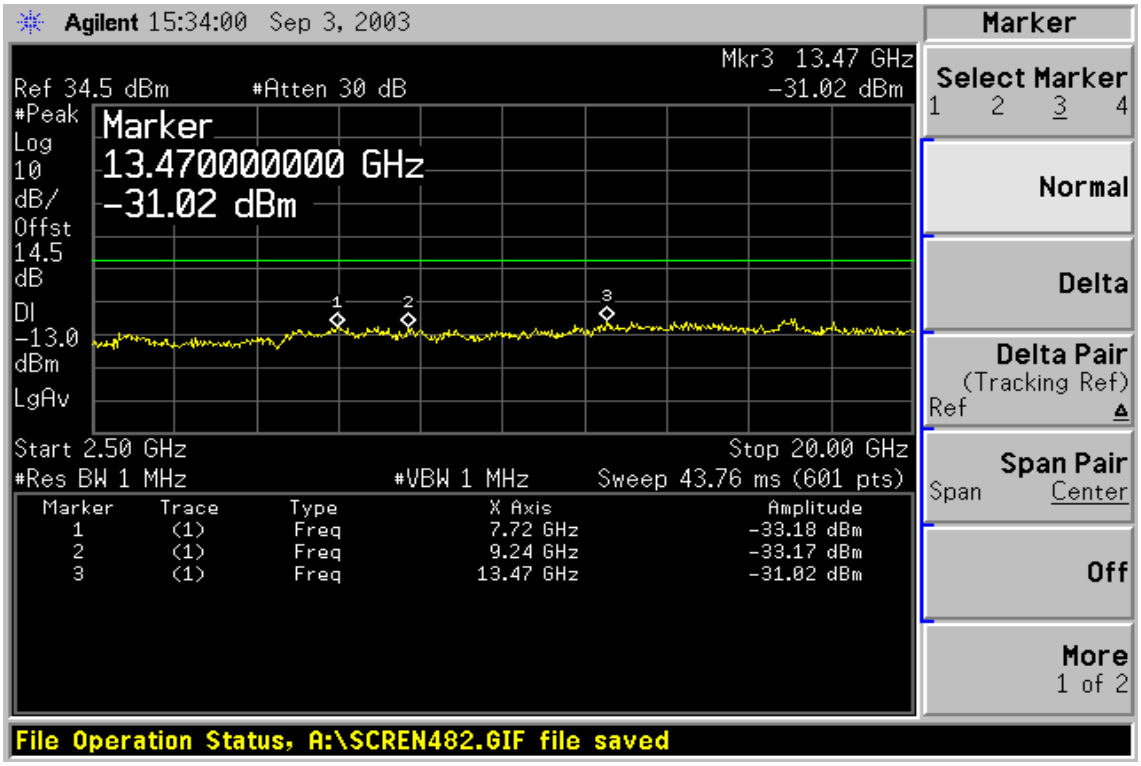


Figure 7-3: Out of Band emission at antenna terminals –GSM CH Mid

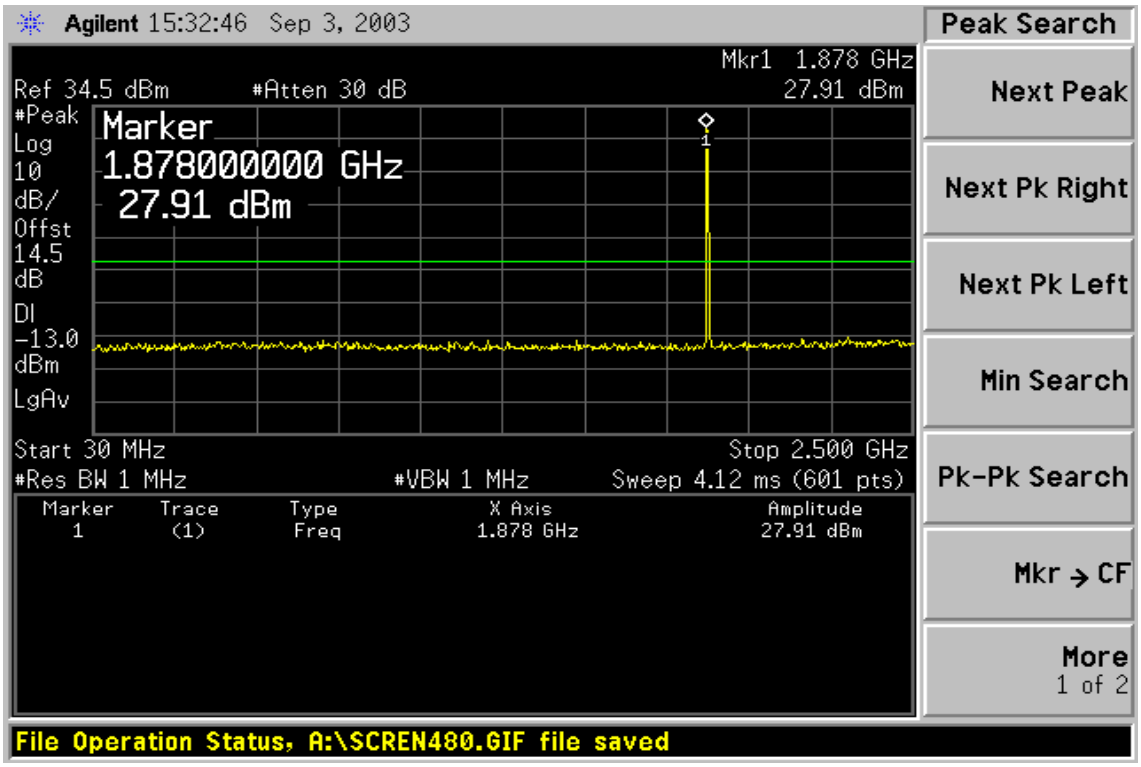


Figure 7-4: Out of Band emission at antenna terminals –GSM CH Mid

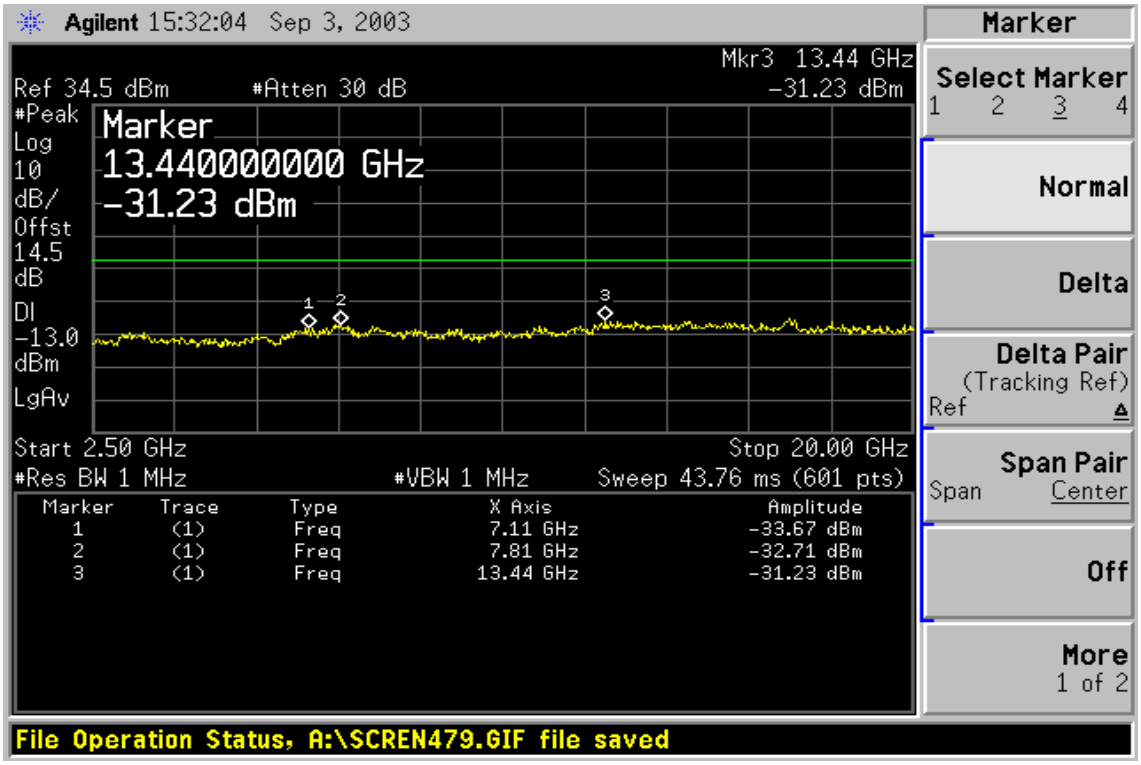


Figure 7-5: Out of Band emission at antenna terminals–GSM CH High

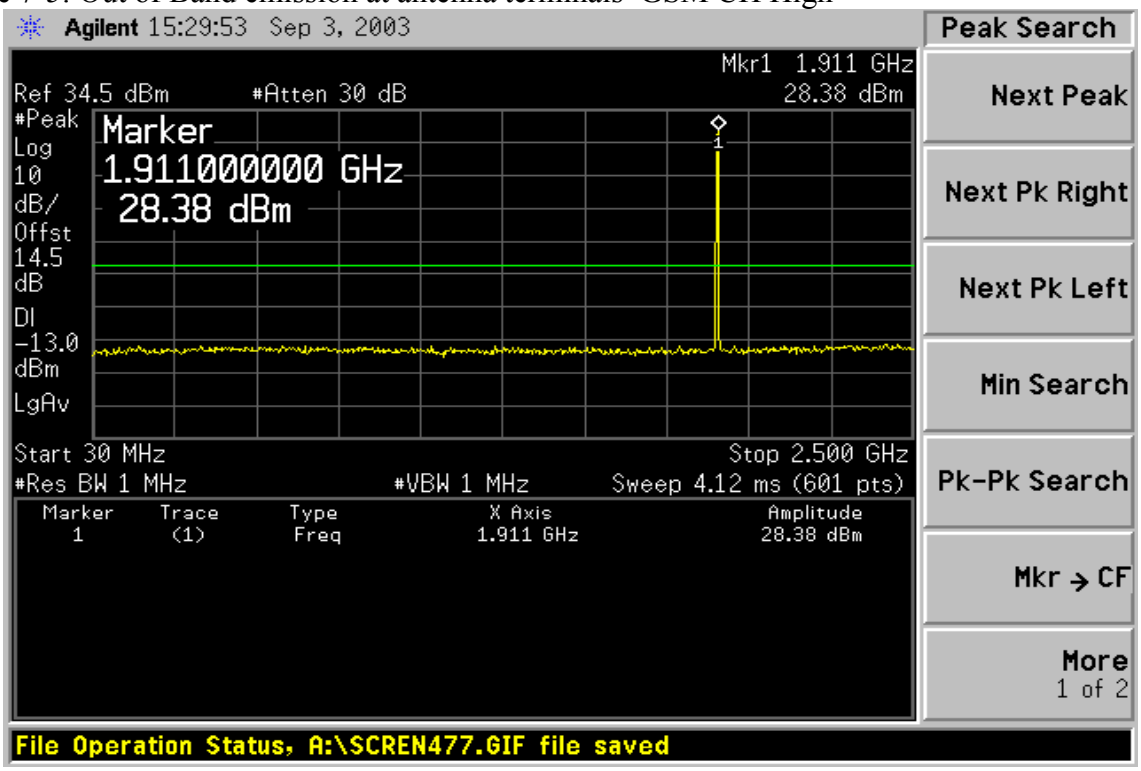
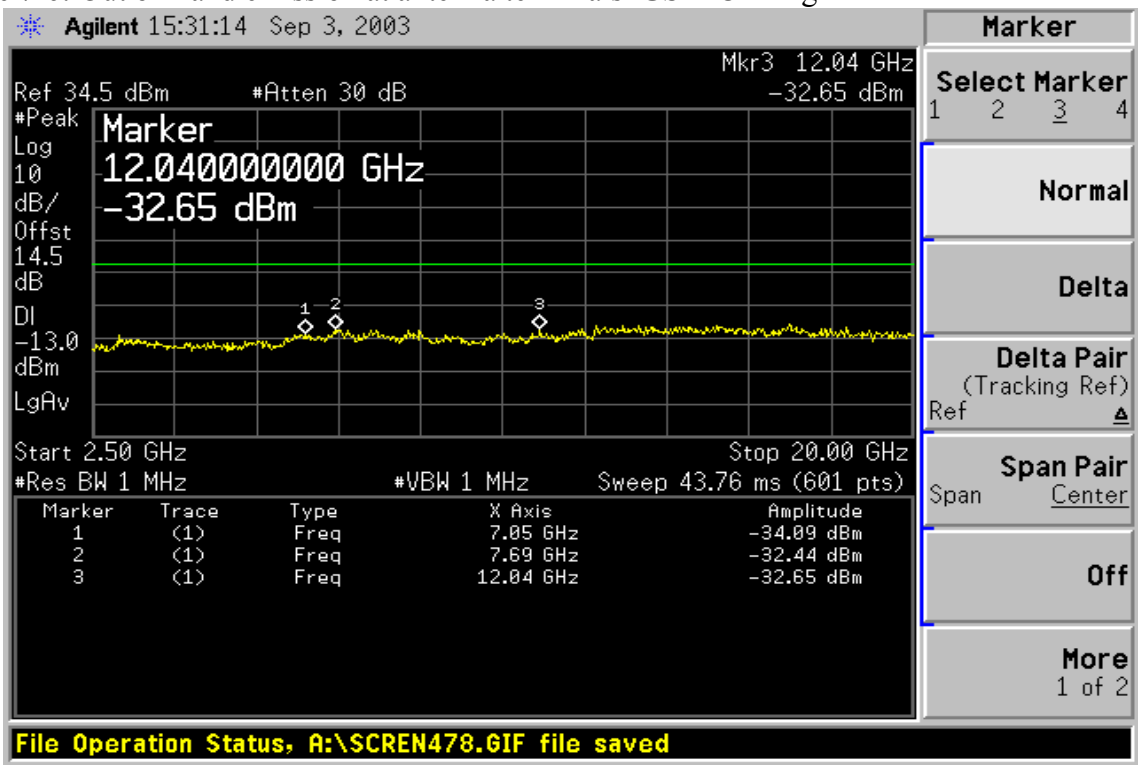


Figure 7-6: Out of Band emission at antenna terminals–GSM CH High



GPRS

Figure 7-7: Out of Band emission at antenna terminals–GPRS CH Low

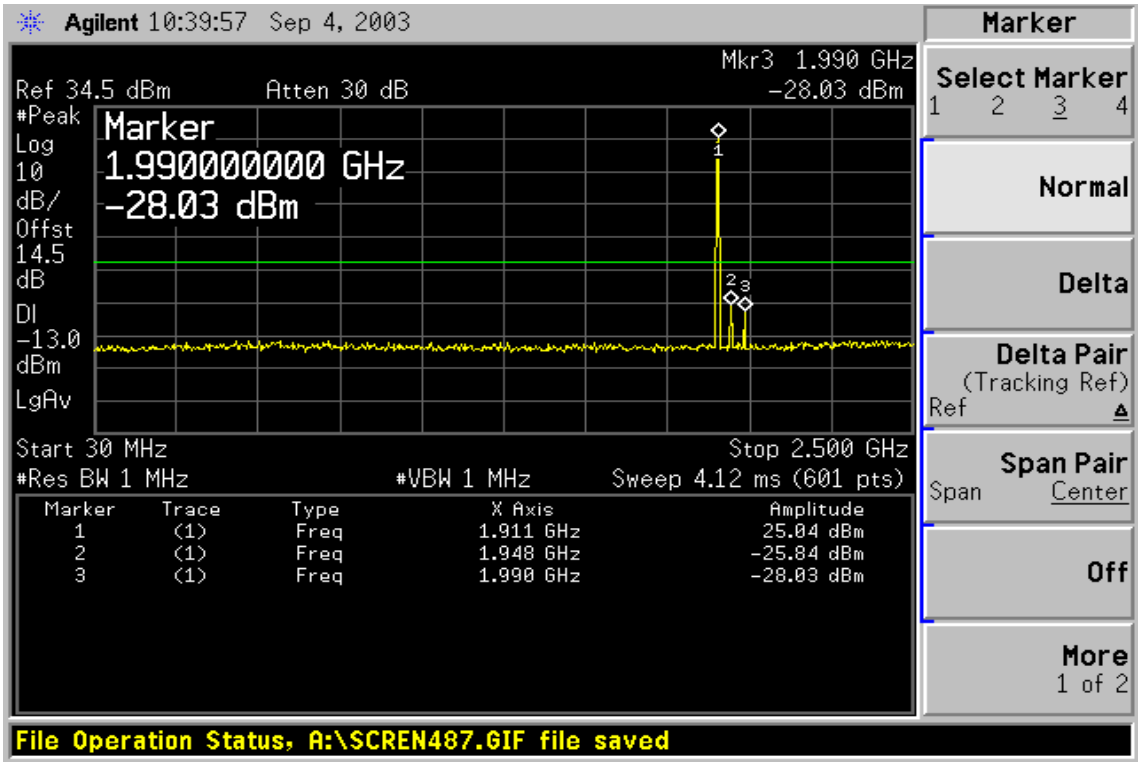


Figure 7-8: Out of Band emission at antenna terminals–GPRS CH Low

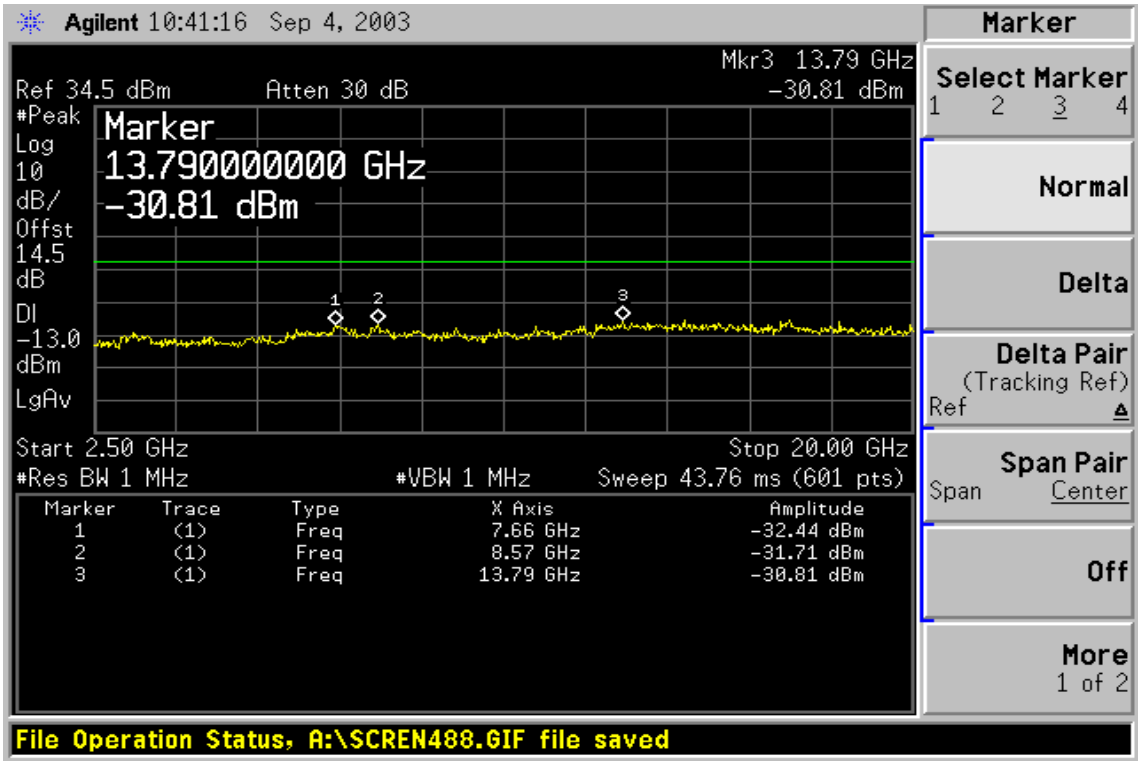


Figure 7-9: Out of Band emission at antenna terminals –GPRS CH Mid

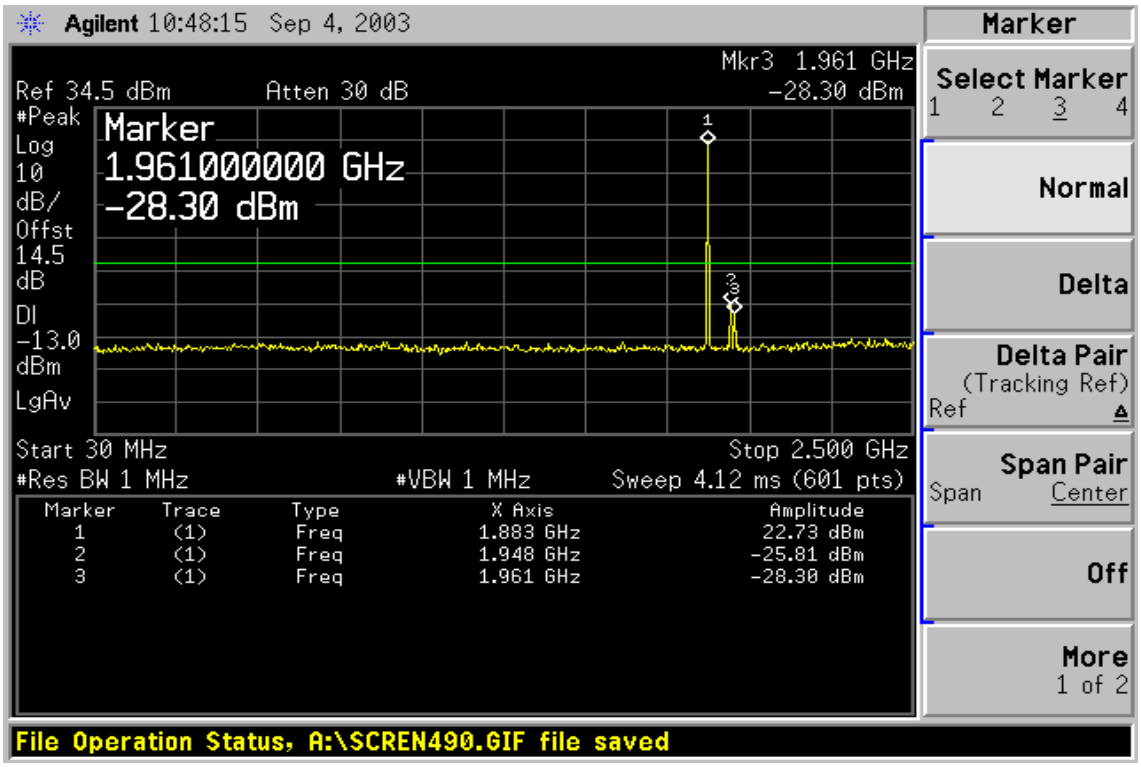


Figure 7-10: Out of Band emission at antenna terminals –GPRS CH Mid

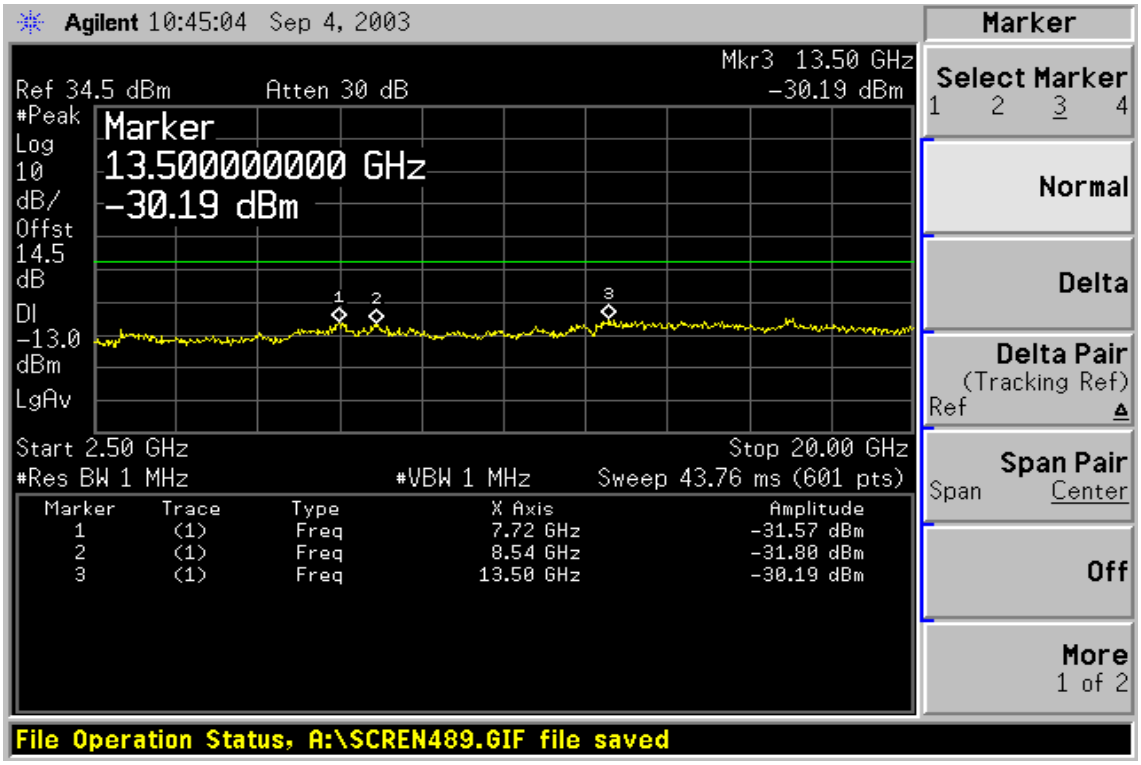


Figure 7-11: Out of Band emission at antenna terminals–GPRS CH High

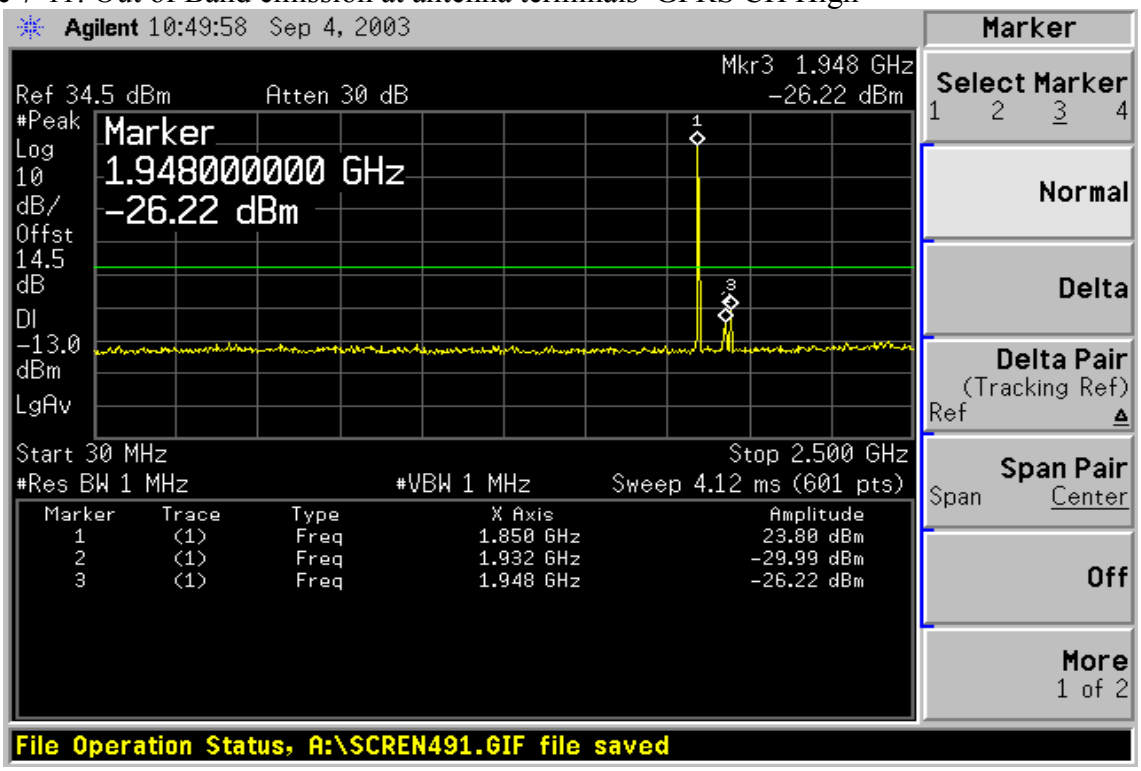


Figure 7-12: Out of Band emission at antenna terminals–GPRS CH High

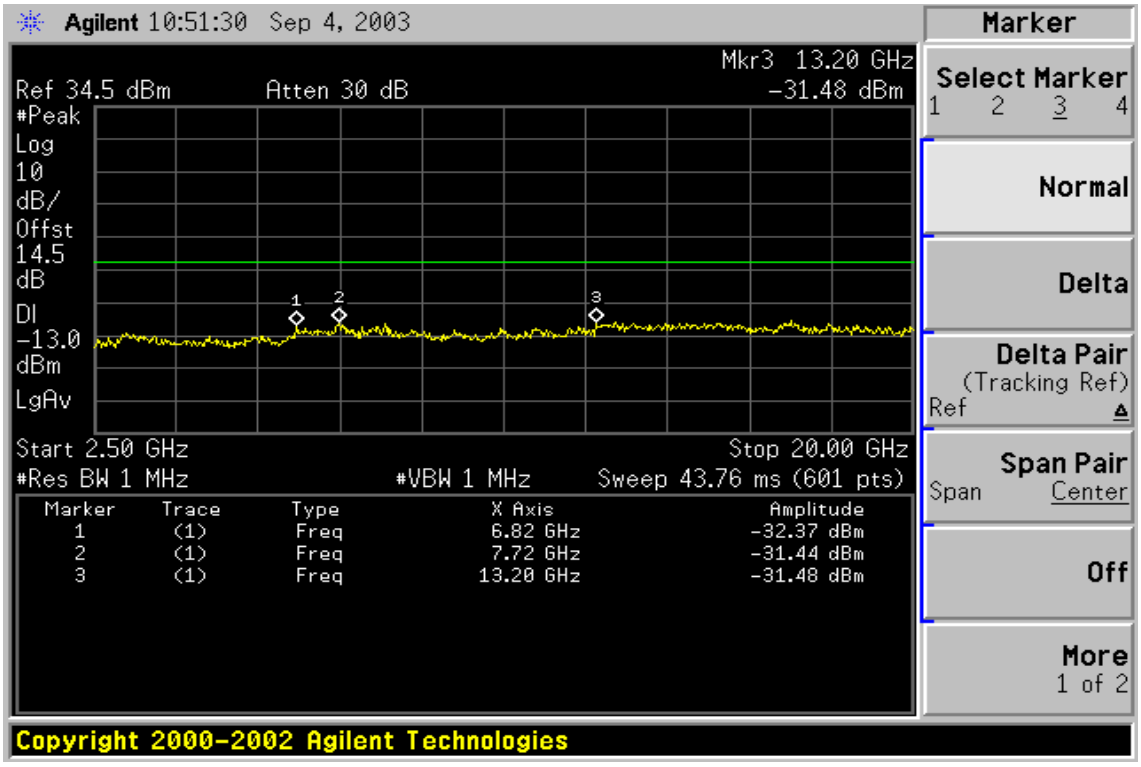


Table 7-2: Block Edge emissions

Location	Mode	CH	Description
Figure 7-13	GSM	512	Block Edge Emssion
Figure 7-14	GSM	585	Block Edge Emssion
Figure 7-15	GSM	587	Block Edge Emssion
Figure 7-16	GSM	610	Block Edge Emssion
Figure 7-17	GSM	612	Block Edge Emssion
Figure 7-18	GSM	685	Block Edge Emssion
Figure 7-19	GSM	687	Block Edge Emssion
Figure 7-20	GSM	710	Block Edge Emssion
Figure 7-21	GSM	712	Block Edge Emssion
Figure 7-22	GSM	735	Block Edge Emssion
Figure 7-23	GSM	737	Block Edge Emssion
Figure 7-24	GSM	810	Block Edge Emssion
Figure 7-25	GPRS (Class 10)	512	Block Edge Emssion
Figure 7-26	GPRS (Class 10)	585	Block Edge Emssion
Figure 7-27	GPRS (Class 10)	587	Block Edge Emssion
Figure 7-28	GPRS (Class 10)	610	Block Edge Emssion
Figure 7-29	GPRS (Class 10)	612	Block Edge Emssion
Figure 7-30	GPRS (Class 10)	685	Block Edge Emssion
Figure 7-31	GPRS (Class 10)	687	Block Edge Emssion
Figure 7-32	GPRS (Class 10)	710	Block Edge Emssion
Figure 7-33	GPRS (Class 10)	712	Block Edge Emssion
Figure 7-34	GPRS (Class 10)	735	Block Edge Emssion
Figure 7-35	GPRS (Class 10)	737	Block Edge Emssion
Figure 7-36	GPRS (Class 10)	810	Block Edge Emssion

GSM

Figure 7-13 Block edge emission at antenna terminals –GSM Block A

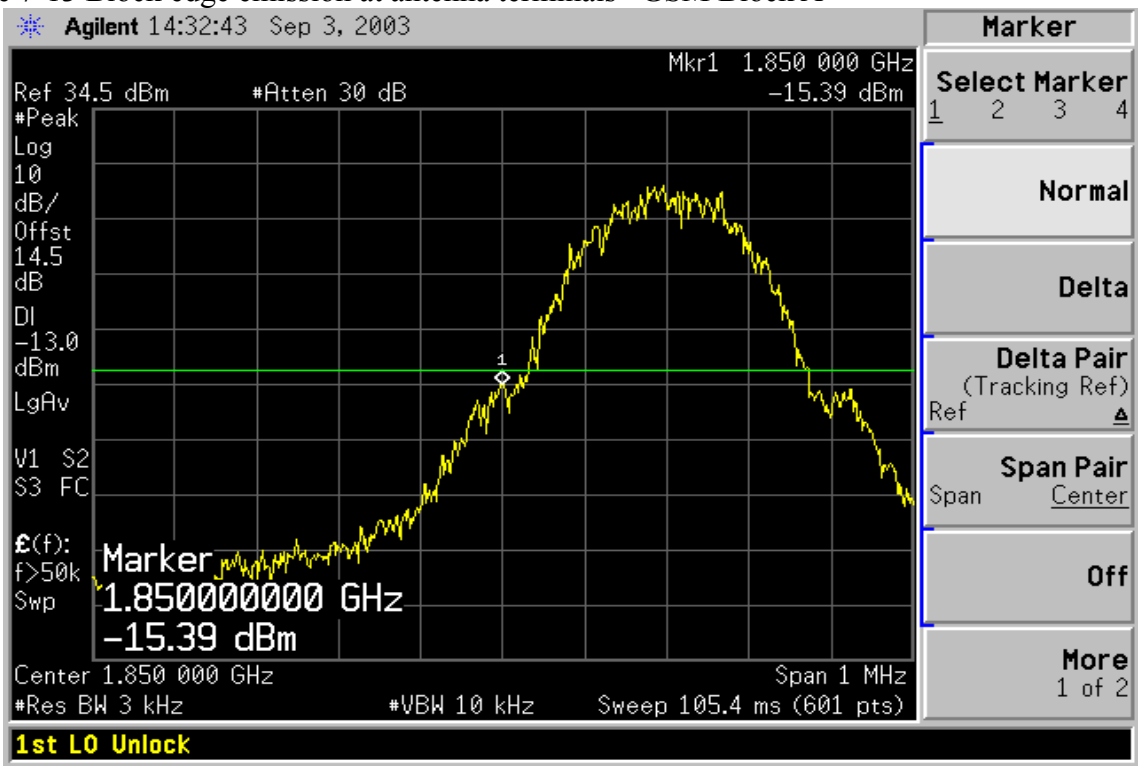


Figure 7-14: Block edge emission at antenna terminals –GSM Block A

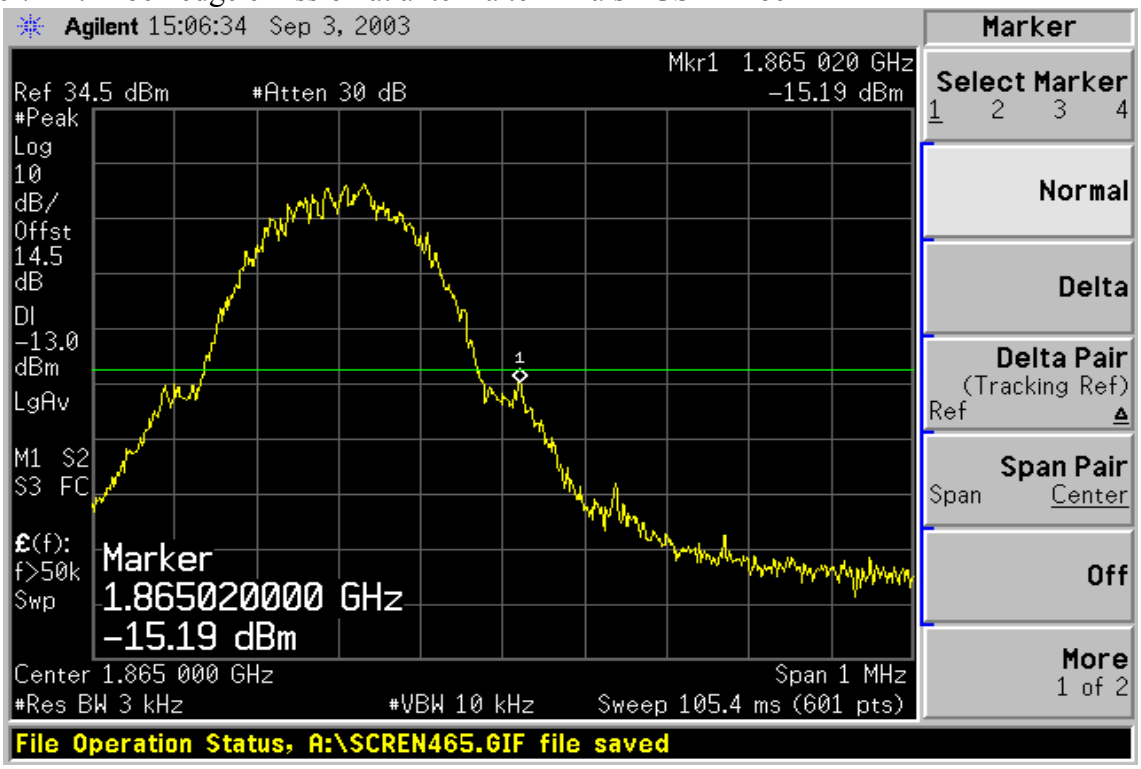


Figure 7-15 Block edge emission at antenna terminals –GSM Block D

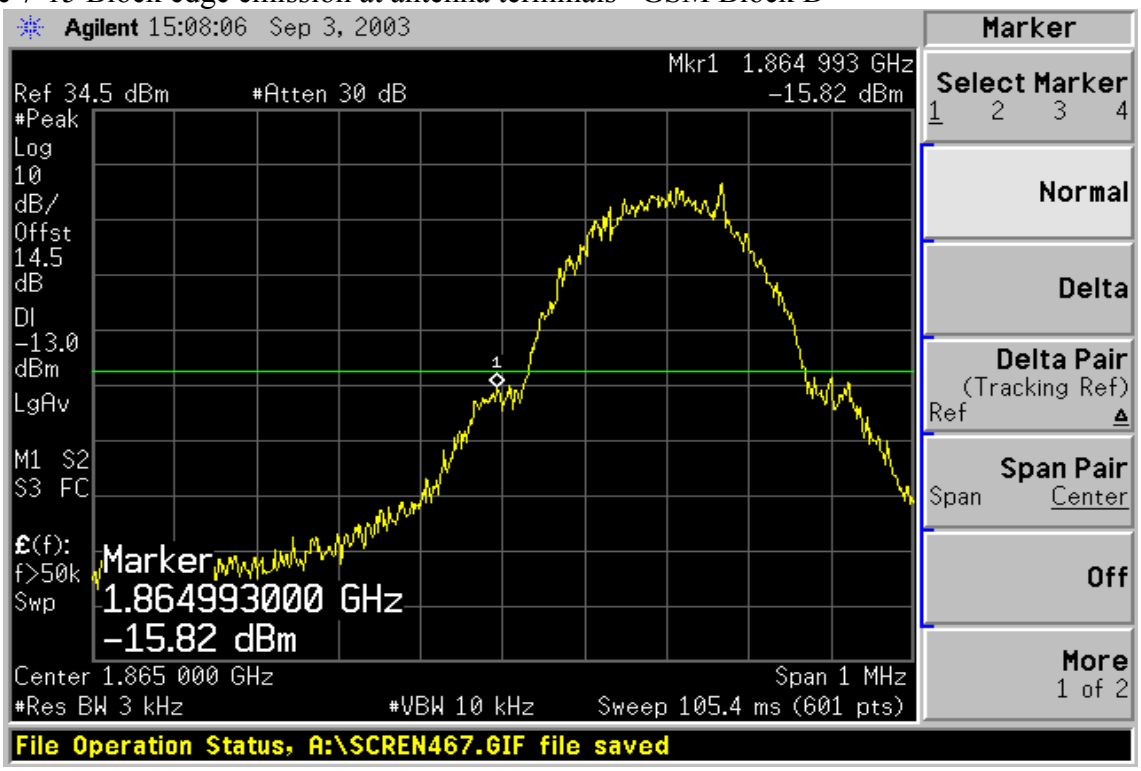


Figure 7-16 Block edge emission at antenna terminals –GSM Block D

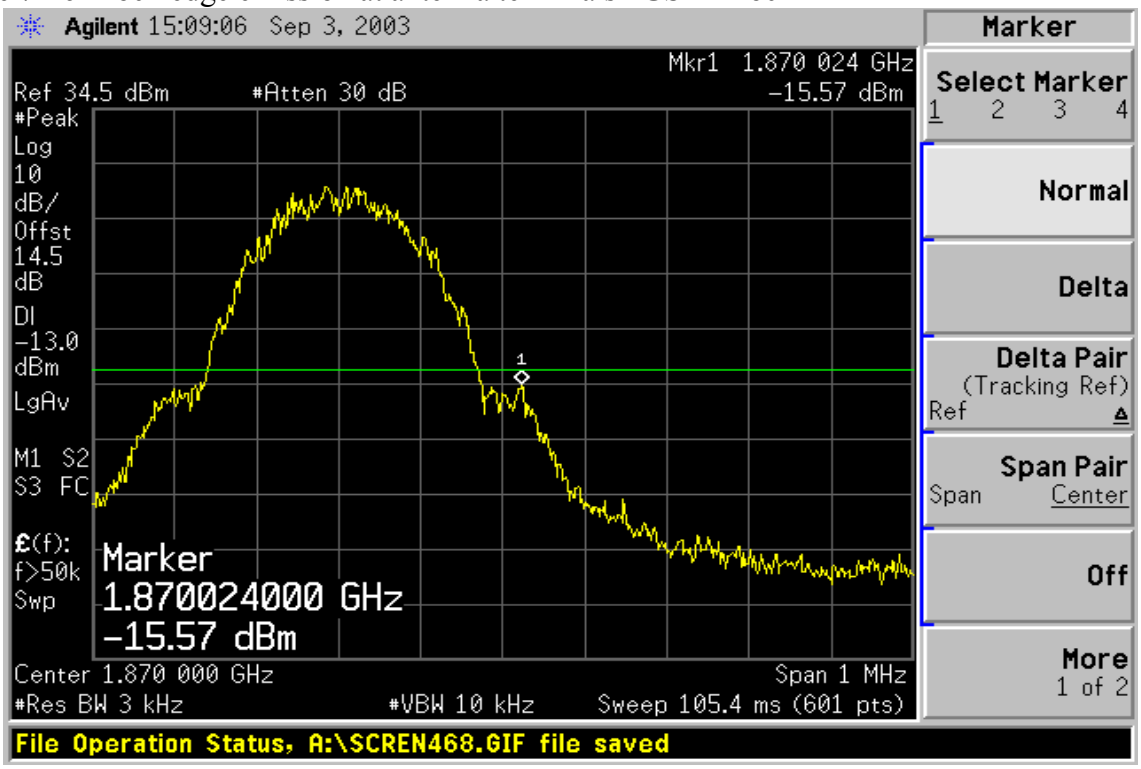


Figure 7-17 Block edge emission at antenna terminals –GSM Block B

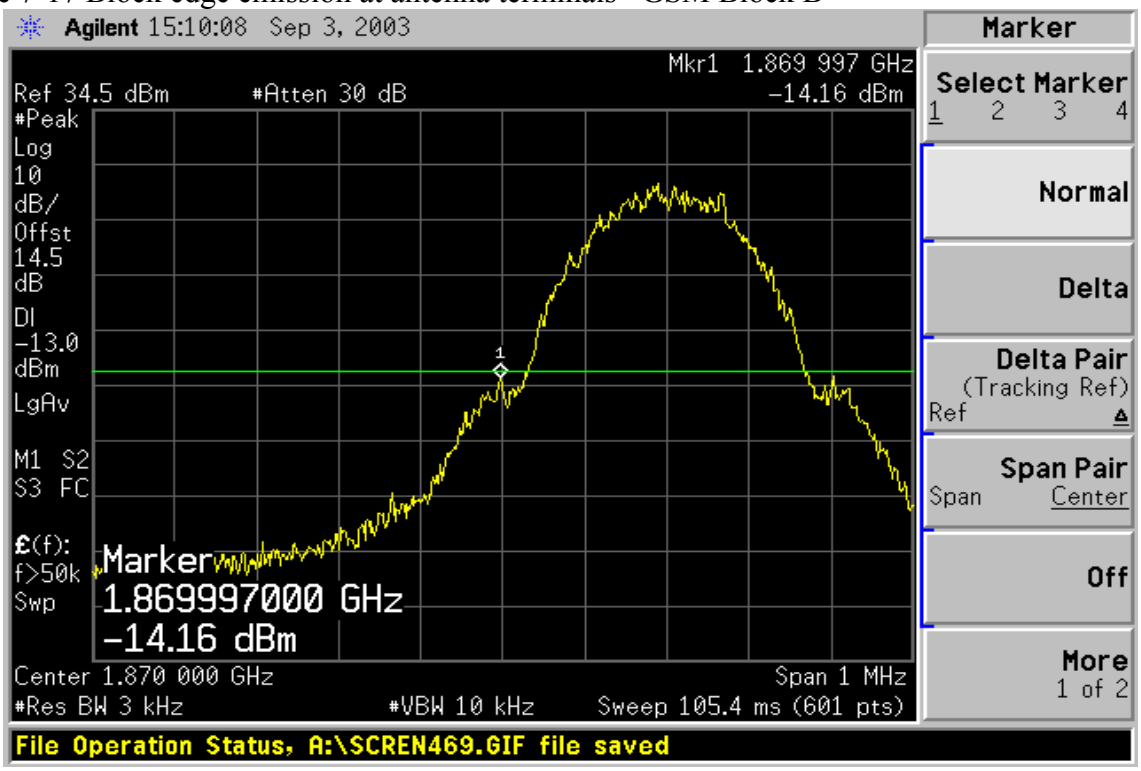


Figure 7-18 Block edge emission at antenna terminals –GSM Block B

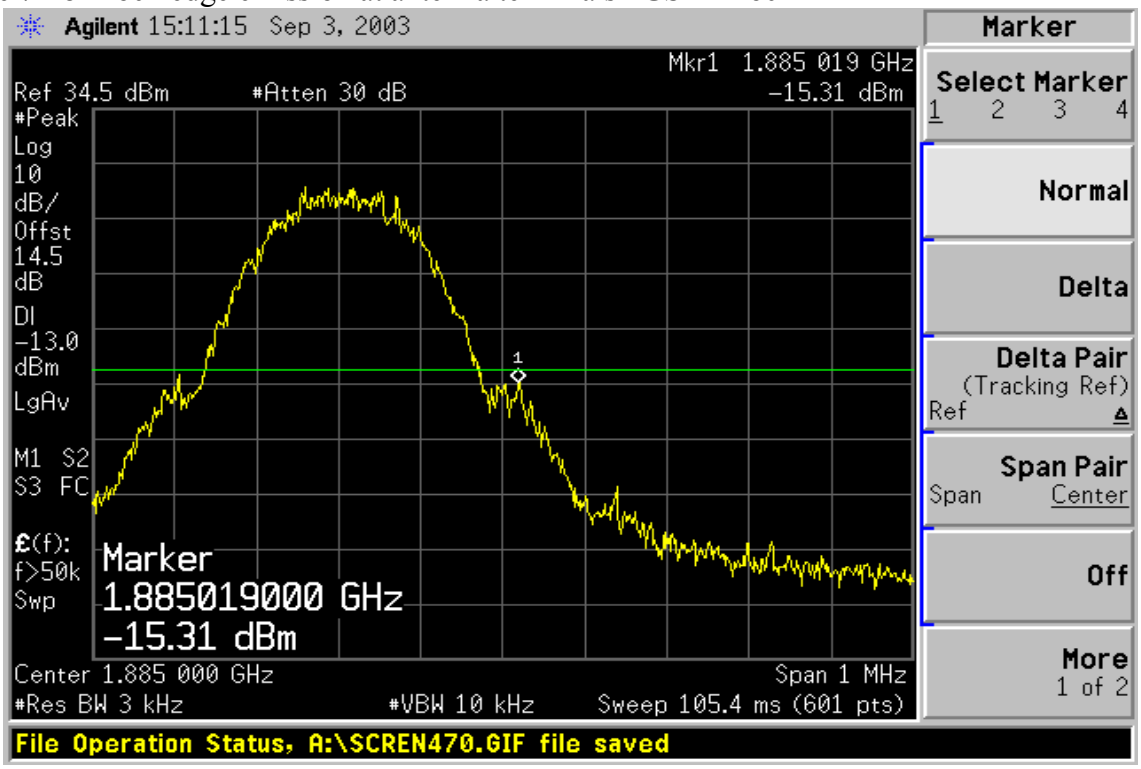


Figure 7-19 Block edge emission at antenna terminals –GSM Block E

Figure 7-20 Block edge emission at antenna terminals –GSM Block E

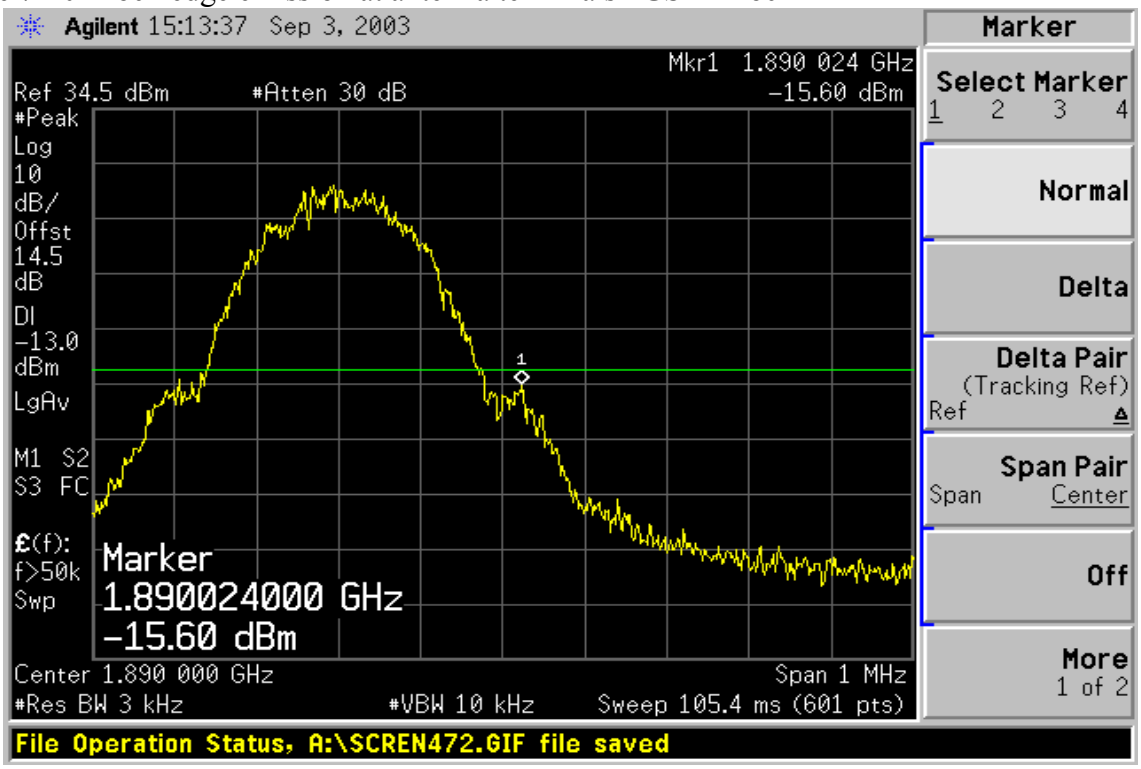


Figure 7-21 Block edge emission at antenna terminals –GSM Block F

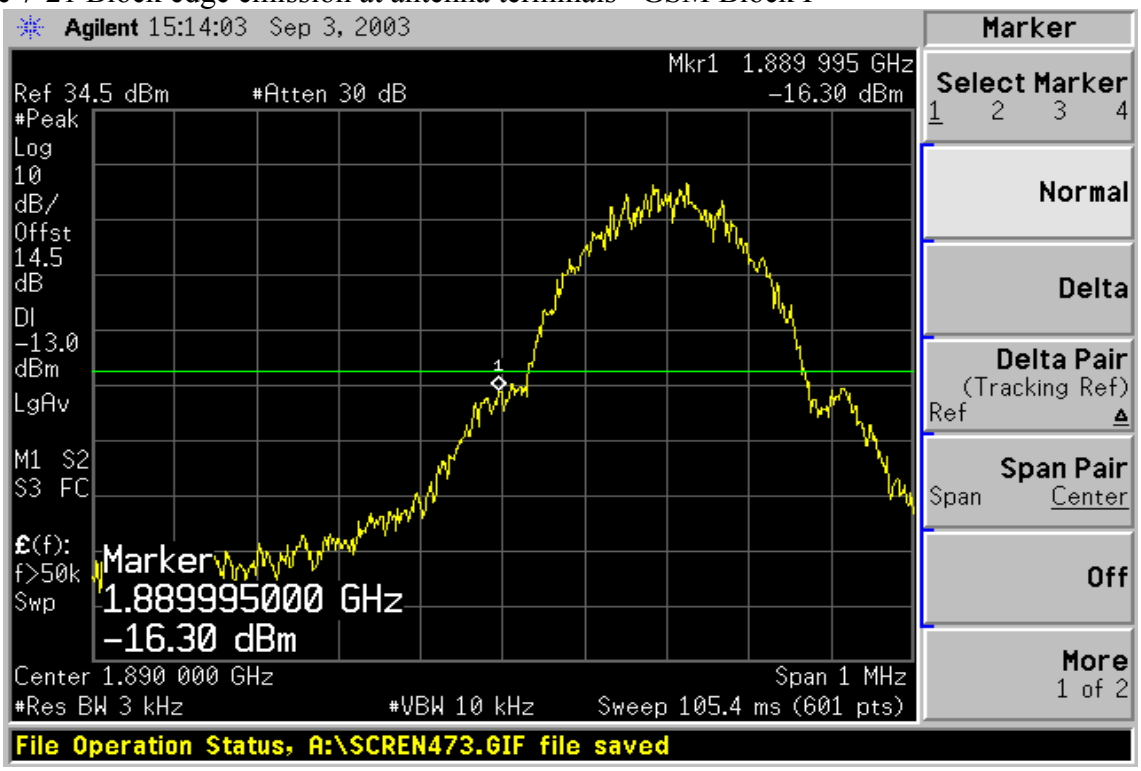


Figure 7-22 Block edge emission at antenna terminals –GSM Block F

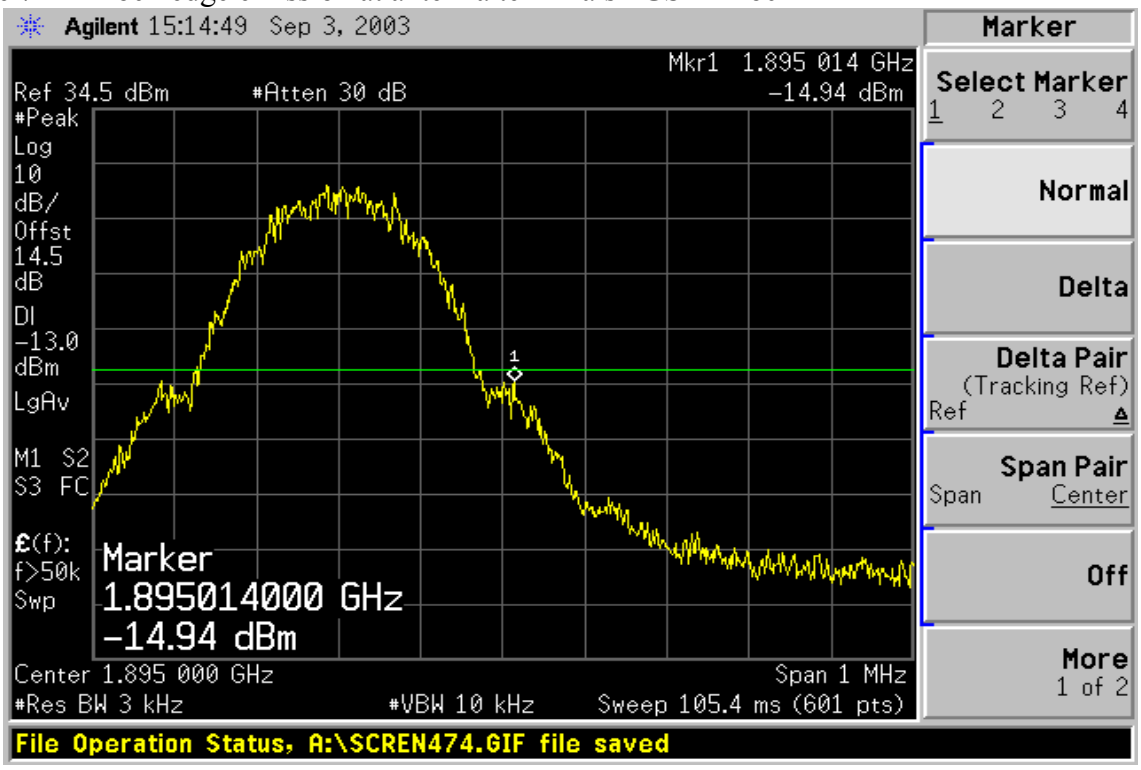
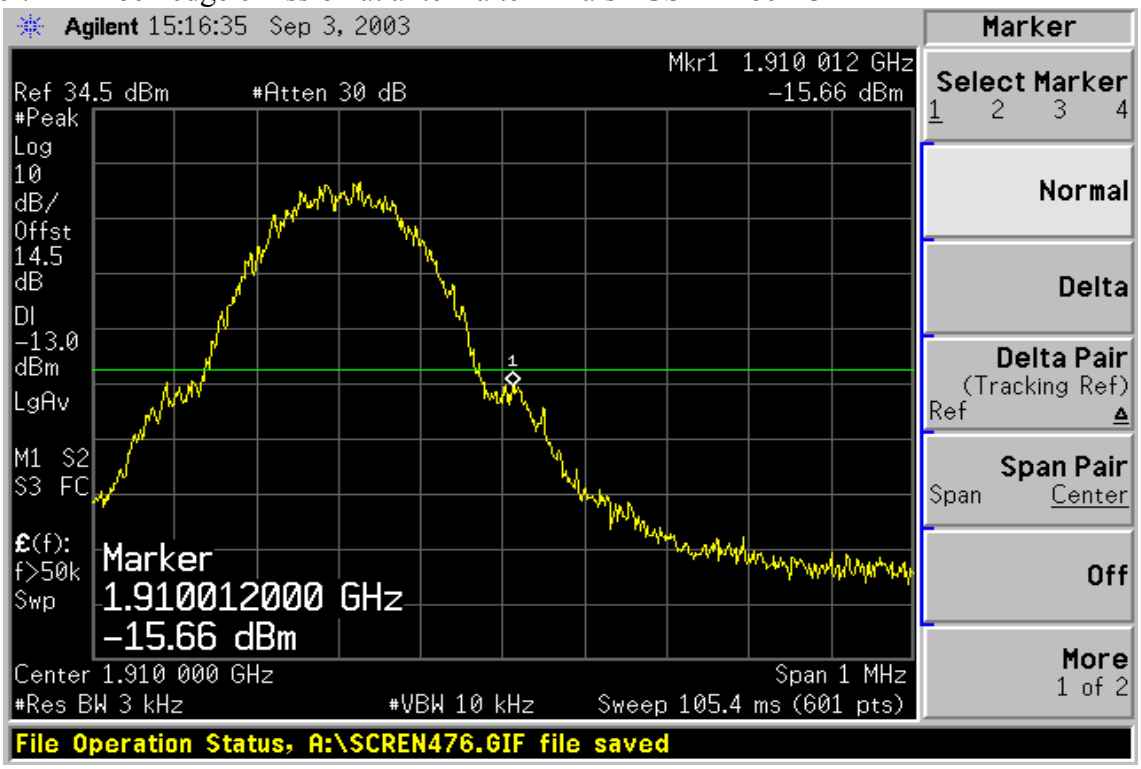


Figure 7-23 Block edge emission at antenna terminals –GSM Block C

Figure 7-24 Block edge emission at antenna terminals –GSM Block C



GPRS

Figure 7-25 Block edge emission at antenna terminals –GPRS Block A

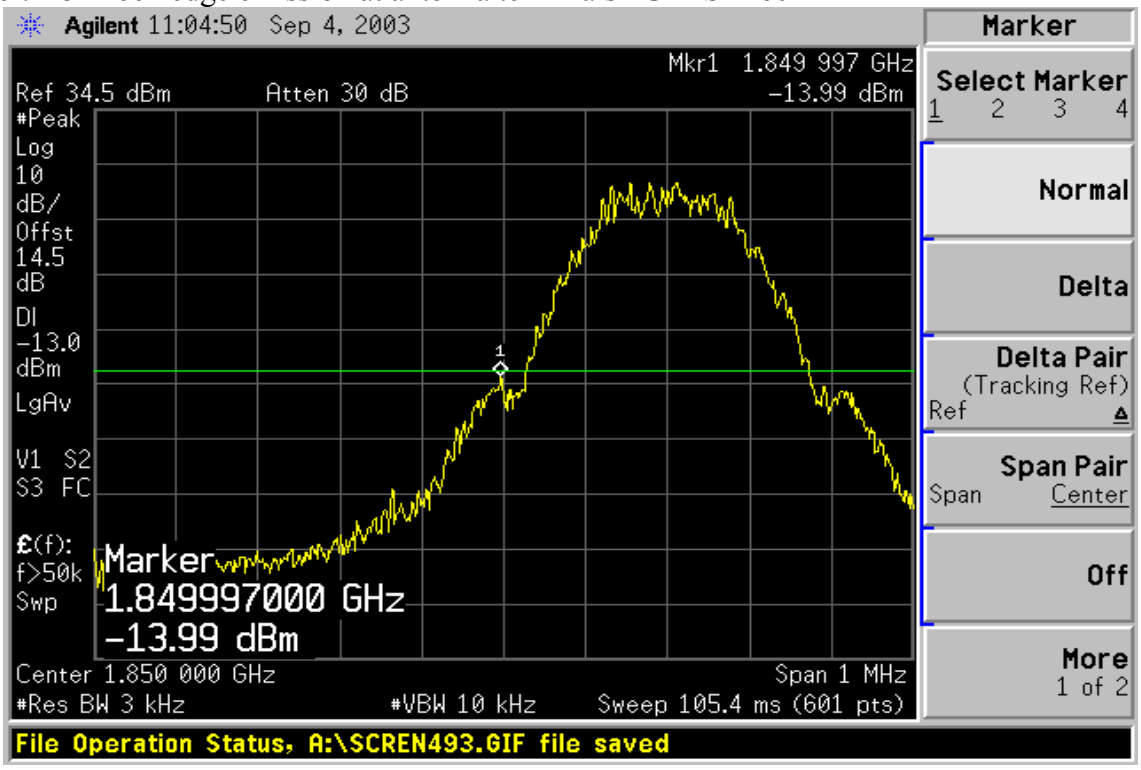


Figure 7-26 Block edge emission at antenna terminals –GPRS Block A

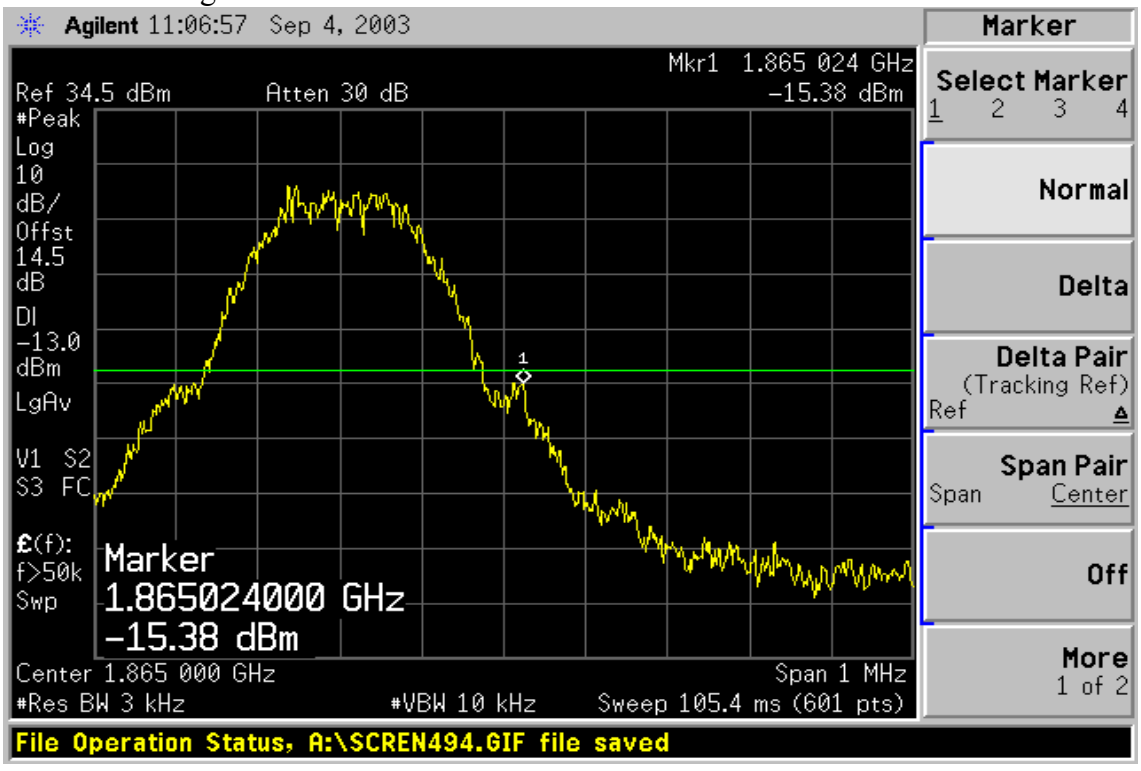


Figure 7-27 Block edge emission at antenna terminals –GPRS Block D

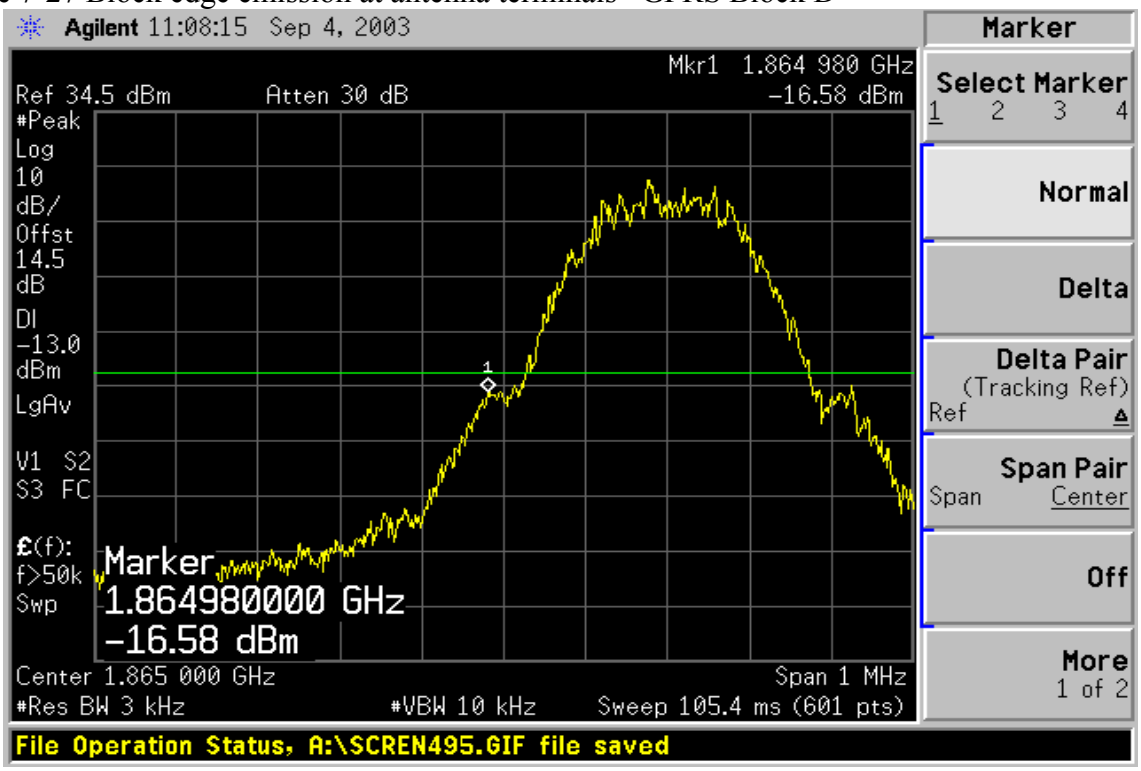


Figure 7-28 Block edge emission at antenna terminals –GPRS Block D

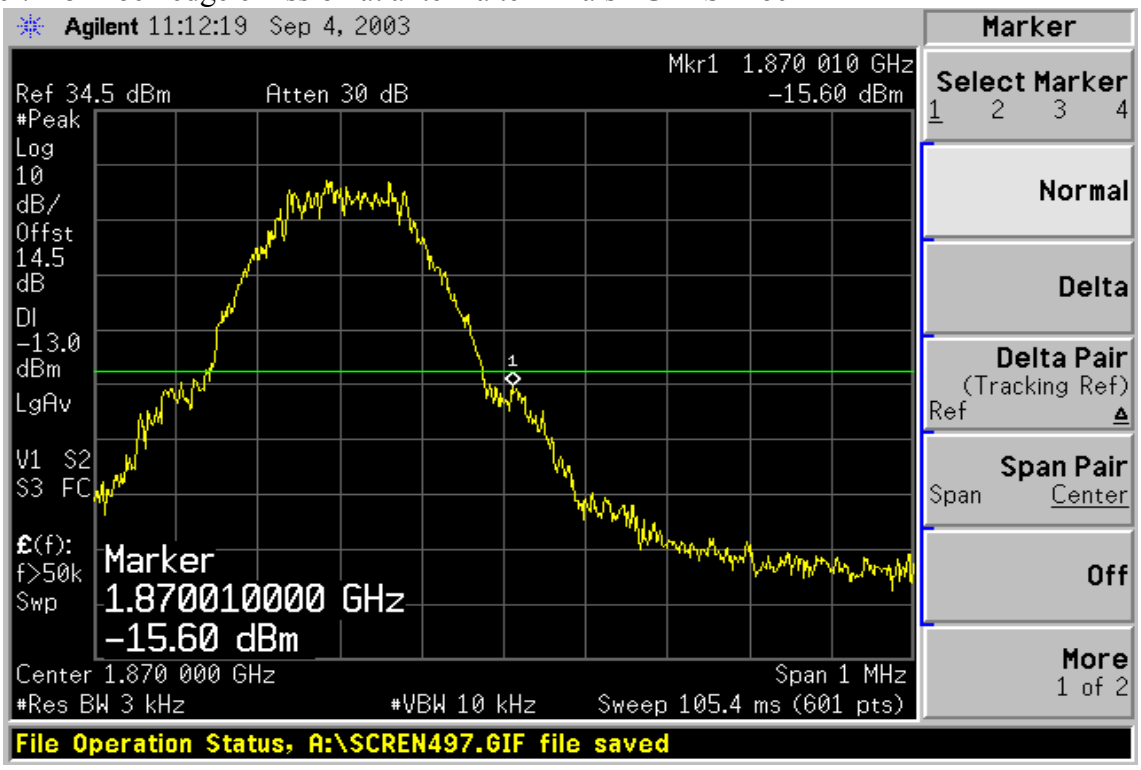


Figure 7-29 Block edge emission at antenna terminals –GPRS Block B

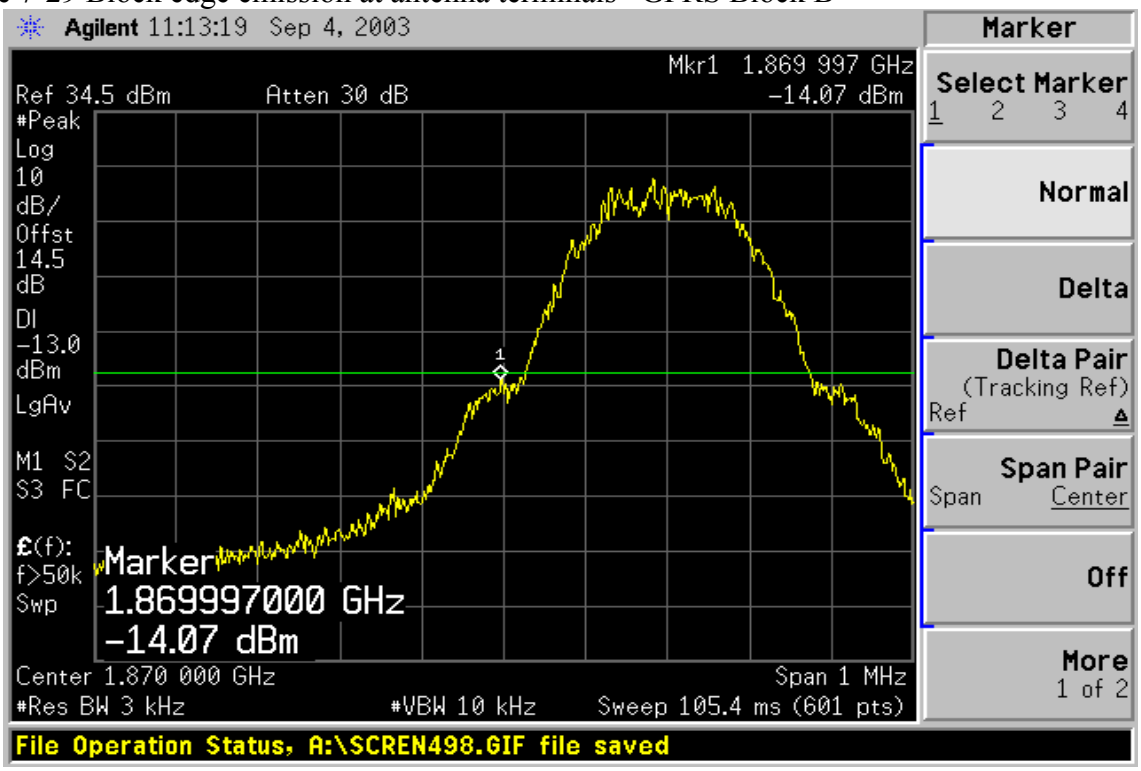


Figure 7-30 Block edge emission at antenna terminals –GPRS Block B

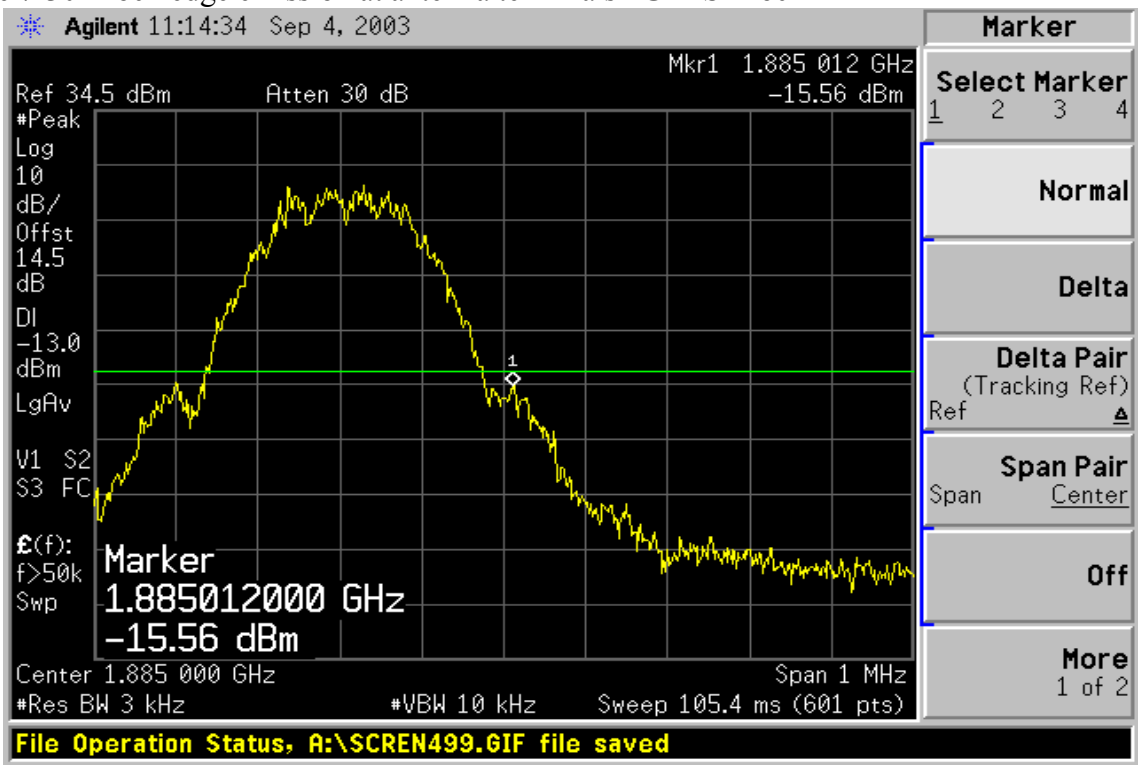


Figure 7-31 Block edge emission at antenna terminals –GPRS Block E

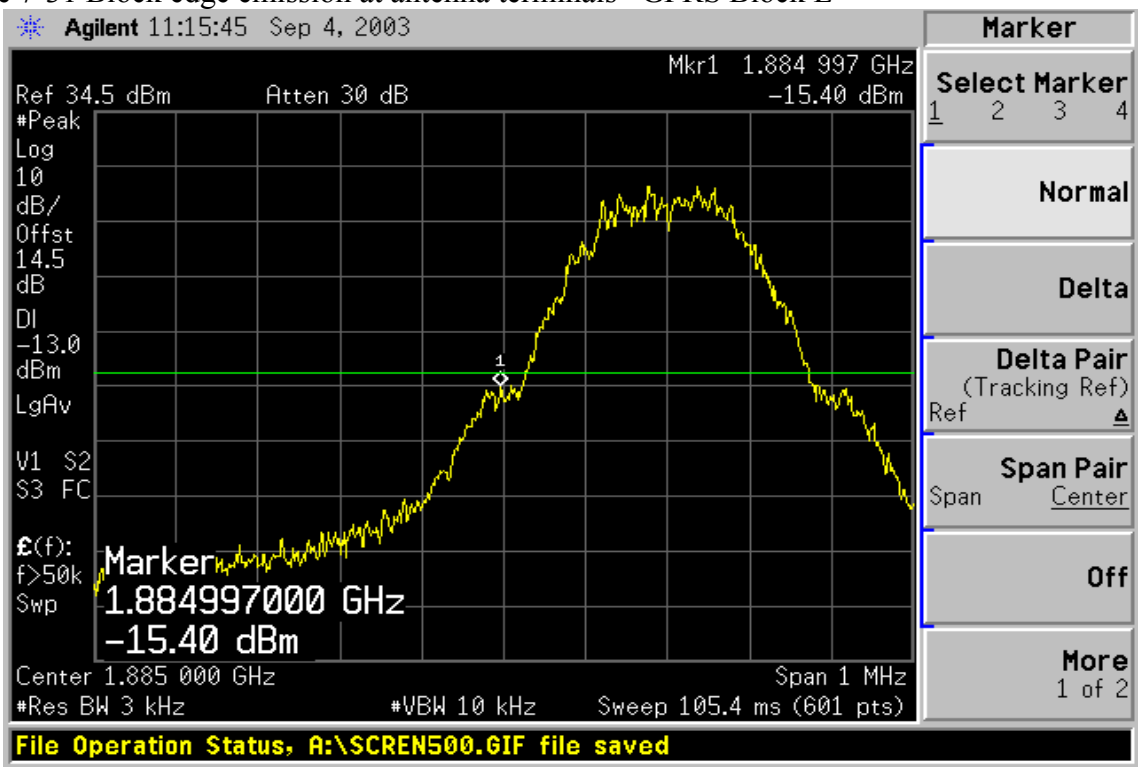


Figure 7-32 Block edge emission at antenna terminals –GPRS Block E

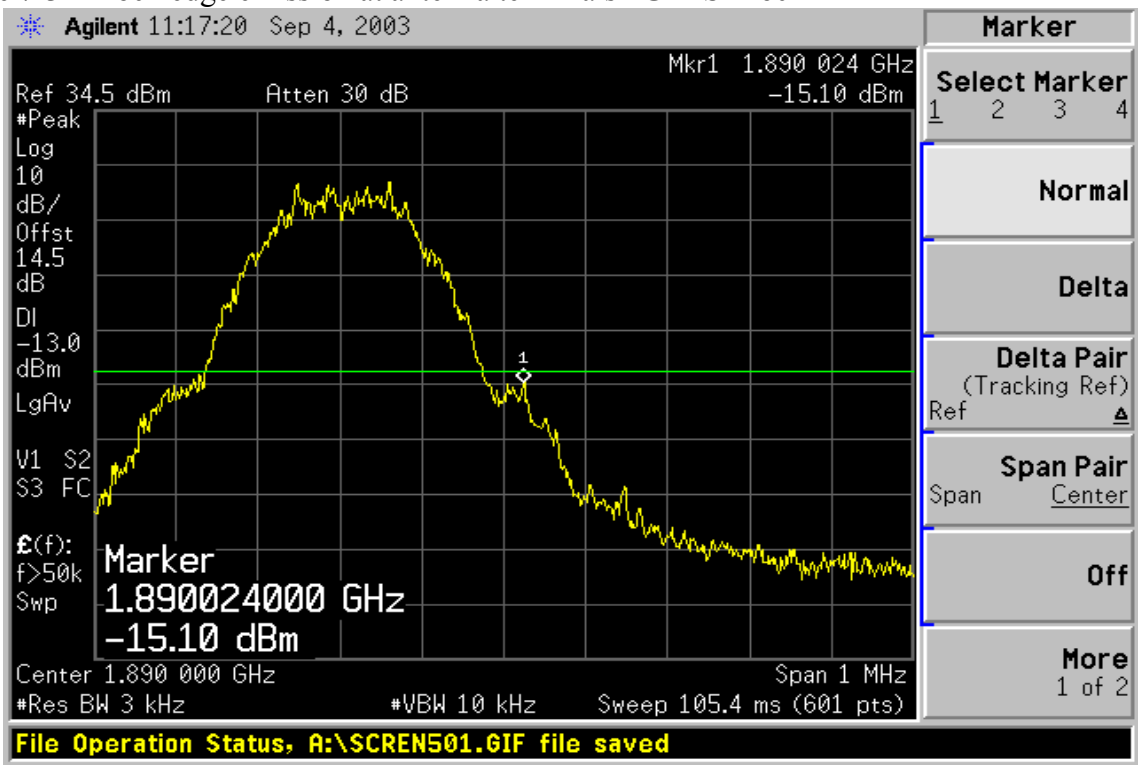


Figure 7-33 Block edge emission at antenna terminals –GPRS Block F

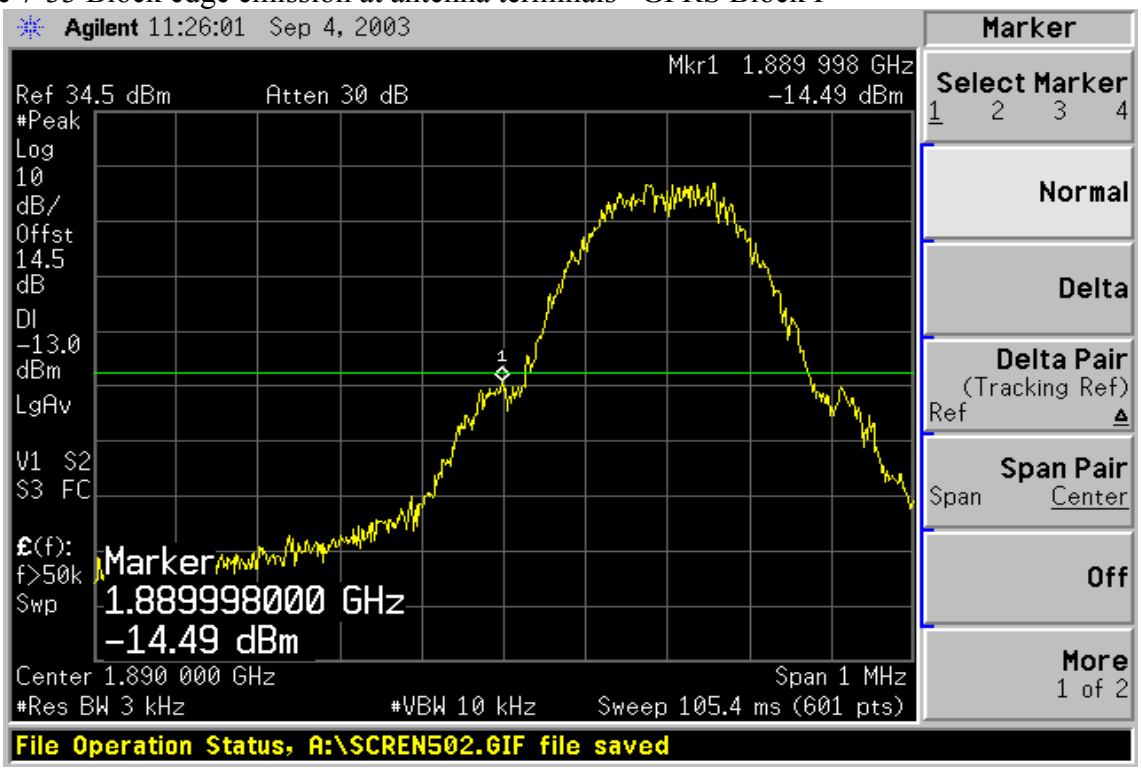


Figure 7-34 Block edge emission at antenna terminals –GPRS Block F

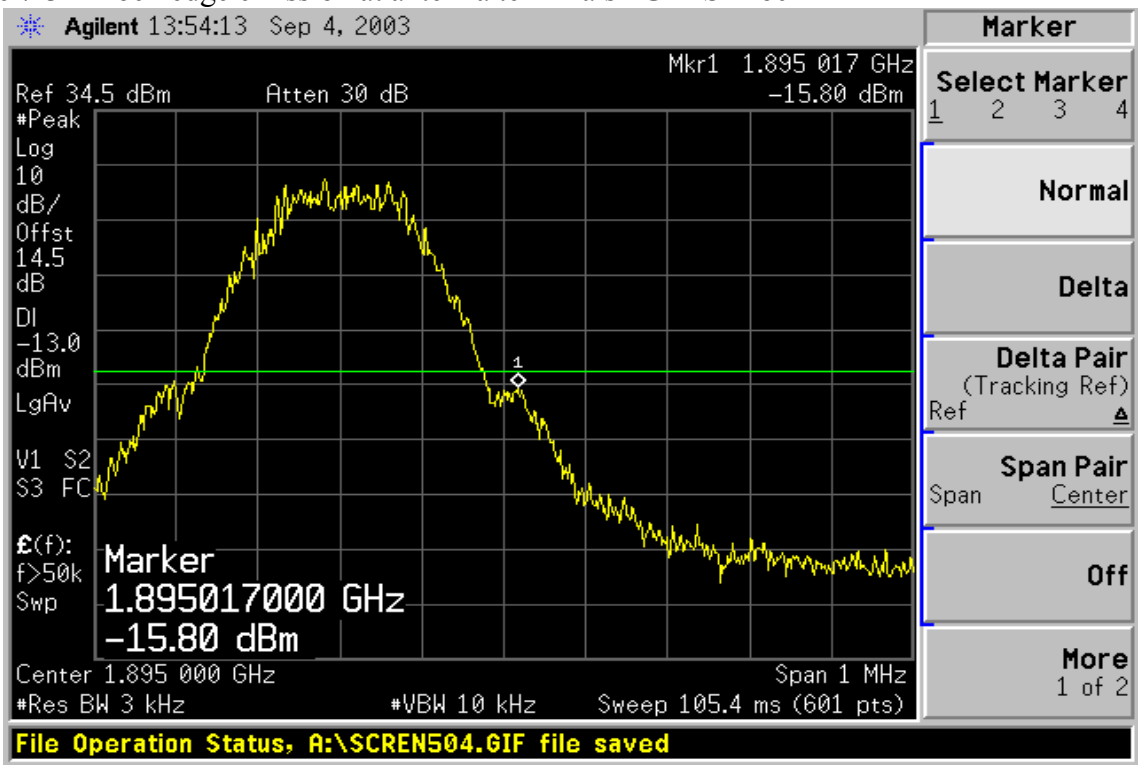


Figure 7-35 Block edge emission at antenna terminals –GPRS Block C

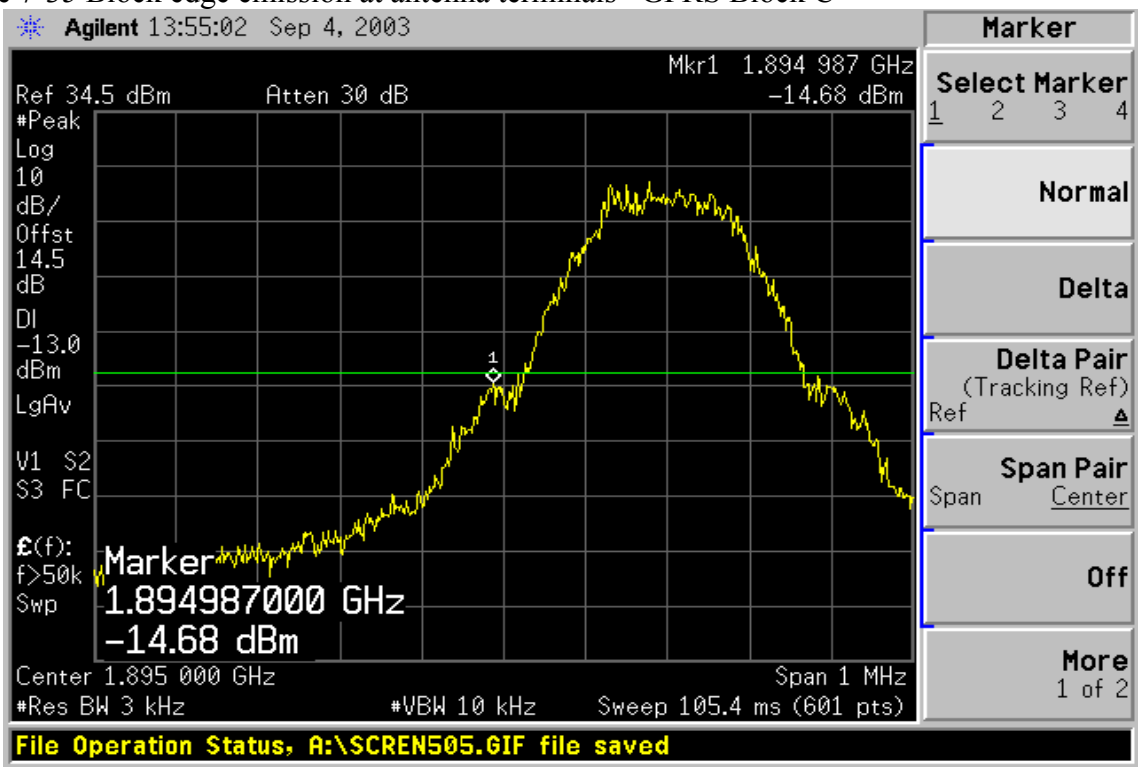
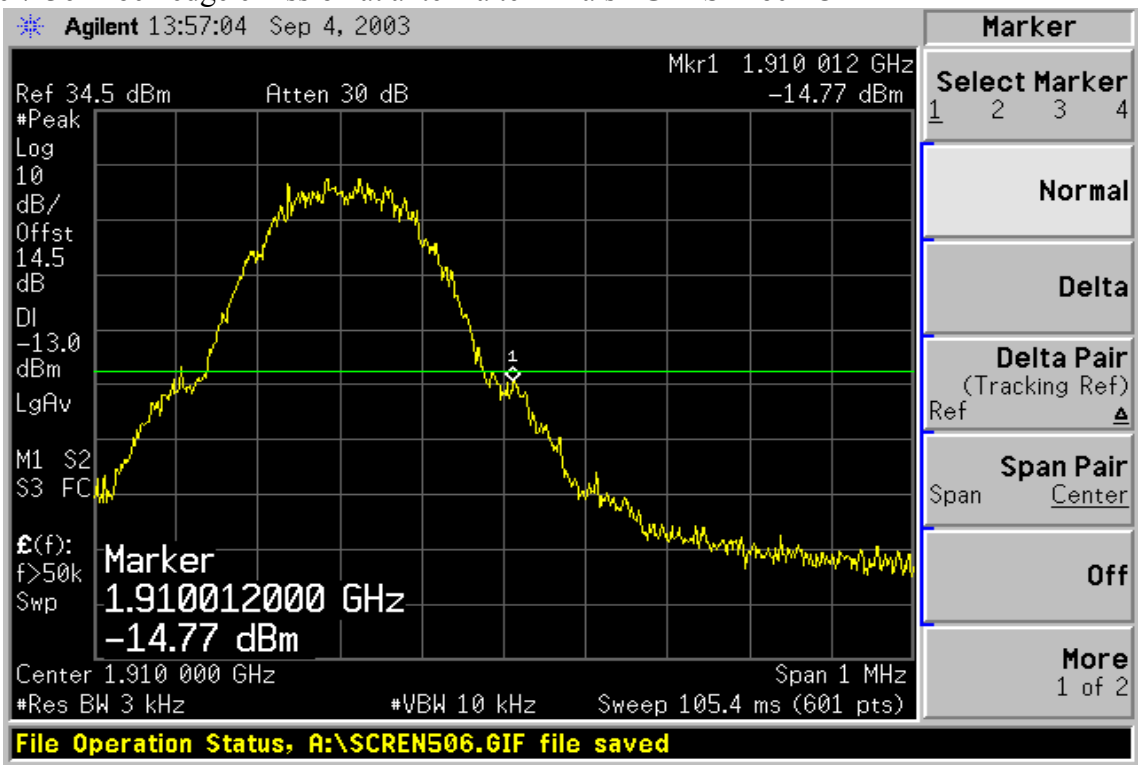


Figure 7-36 Block edge emission at antenna terminals –GPRS Block C



7.5. FIELD STRENGTH OF SPURIOUS RADIATION MEASUREMENT

LIMIT

According to FCC §2.1053

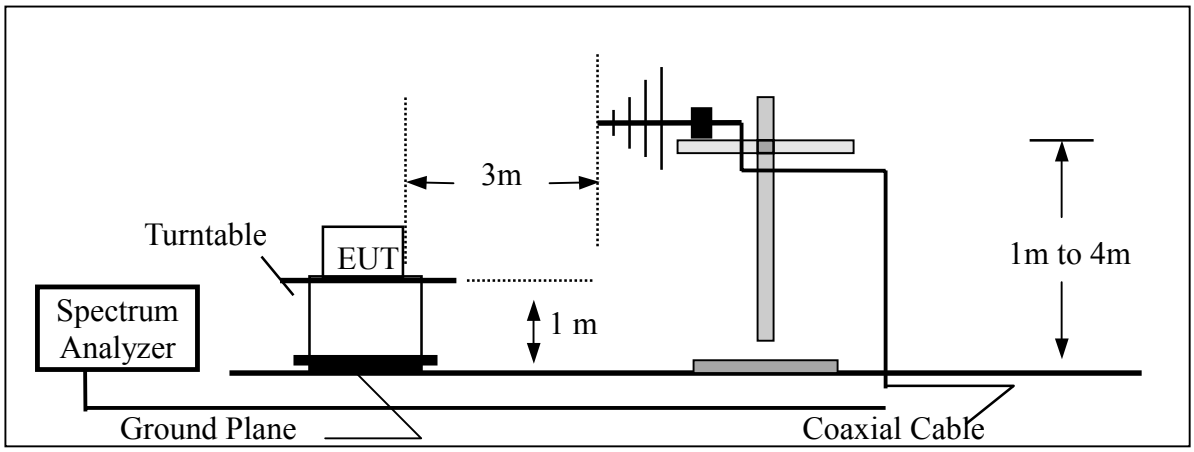
MEASUREMENT EQUIPMENT USED

Open Area Test Site # 3				
Name of Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Due**
Spectrum Analyzer	Agilent	E4446A	US42510252	04/27/2004
Spectrum Analyzer	R&S	FSP30	100112	06/28/2004
Pre-Amplifier	HP	8447D	2944A09173	03/03/2004
Bi-log Antenna	SCHWAZBECK	VULB9163	145	07/05/2004
Horn antenna	EMCO	3115	00022250	02/26/2004
Pre-Amplifier	HP	8449B	3008B00965	10/02/2003
Reject Filter	Micro-Tronics	HPM13194	003	04/27/2004
Low Loss Cable#40	HUBER+SUHNER	SUCOFLEX	19431	04/08/2004
Turn Table	EMCO	2081-1.21	9709-1885	N.C.R
Antenna Tower	EMCO	2075-2	9707-2060	N.C.R
Controller	EMCO	2090	9709-1256	N.C.R
Site NSA	C&C	N/A	N/A	09/06/2004
S.G.	HP	83630B	3844A01022	01/14/2004
Low Loss Cable#38	HUBER+SUHNER	SUCOFLEX	19443	04/08/2004
Substituted Dipole	SCHWAZBECK	VHAP/UHAP	998 +999/	06/12/2004
Substituted Horn	EMCO	3115	00022256	02/26/2004

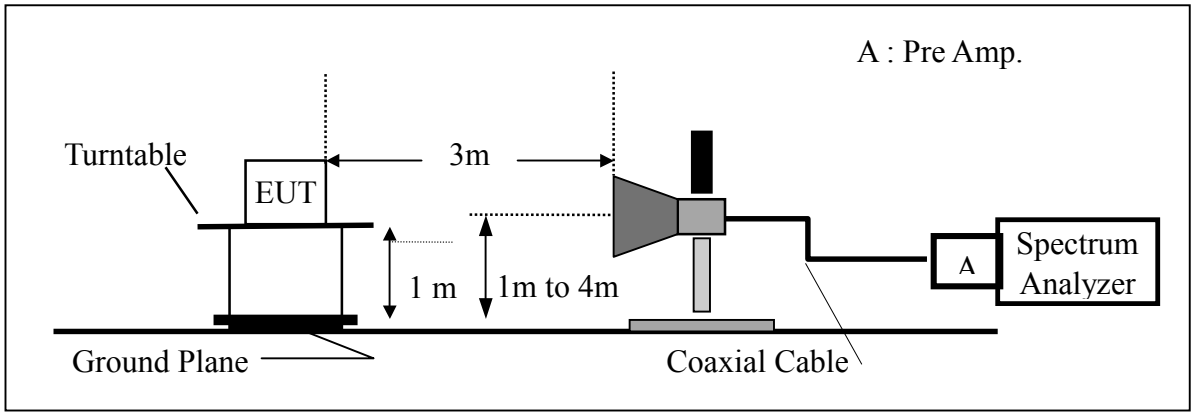
Remark: *Each piece of equipment is scheduled for calibration once a year.*

TEST CONFIGURATION

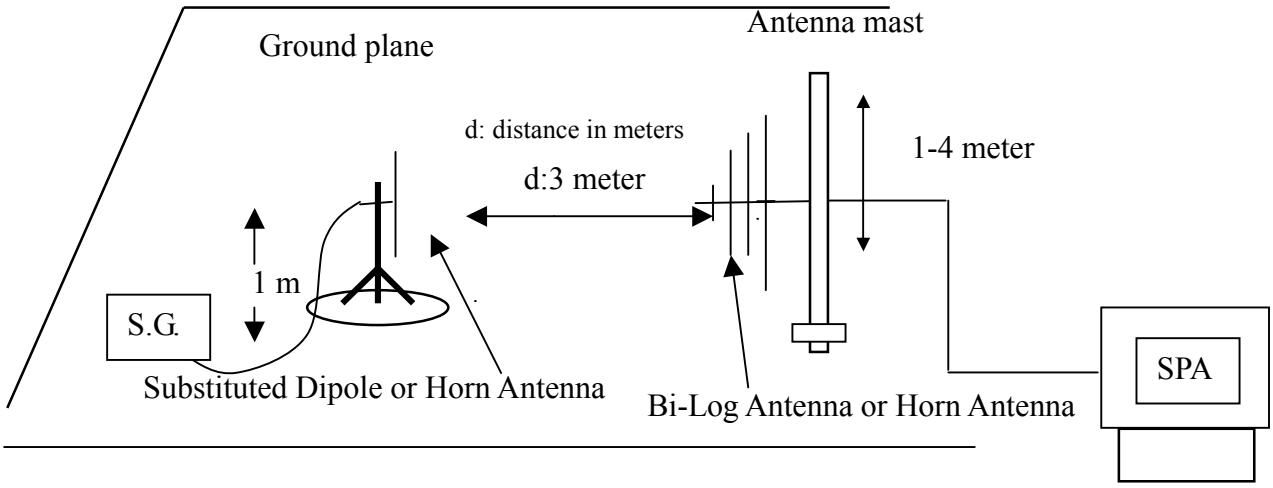
For Frequencies Below 1 GHz



For Frequencies Above 1 GHz



For Substituted Method Test Set-up



TEST 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 were 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. output (dBm) + Antenna Gain (dBd) – Cable (dB)

EIRP = S.G. output (dBm) + Antenna Gain (dBi) – Cable (dB)

TEST RESULTS

Refer to the attached tabular data sheets.

Radiated Spurious Emission Measurement Result

Condition A: Mobile phone operation

Operation Mode:	TX CH Low X Mode GSM	**Test Date:**	September 5, 2003
Fundamental Frequency:	1850.2MHz	**Test by:**	Jim
Temperature:	30°C	**Polarity:**	Ver.
Humidity:	55%		

Frequency (MHz)	Reading Level (dBuV)	Antenna Polarization	S.G. (dBm)	Cable Loss (dB)	Ant. Gain (dBi)	Emission Level (dBm)	Limit (dBm)	Margin (dB)
3700.40	65.06	V	-45.40	5.90	7.21	-44.09	-13.00	-31.09
5550.60	55.30	V	-54.78	7.27	8.20	-53.85	-13.00	-40.85
7400.80	53.22	V	-55.89	8.37	8.33	-55.93	-13.00	-42.93
9251.00	52.73	V	-56.20	9.48	9.25	-56.42	-13.00	-43.42

Notes:

1. *Measuring frequencies from 30 MHz to the 10th harmonic of highest fundamental frequency.*
2. *Data of measurement within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
3. *Spectrum Setting:*
   30MHz- 1GHz, RBW= 100KHz, VBW= 100kHz, Sweep time= 200 ms.
   1GHz- 26GHz, RBW= 1MHz, VBW= 1MHz, Sweep time= 200 ms.
4. *X Mode means the EUT in stand-up position; Y, Z Mode means the EUT in lie-on position*

Operation Mode:	TX CH Mid X Mode GSM	**Test Date:**	September 5, 2003
Fundamental Frequency:	1880MHz	**Test by:**	Jim
Temperature:	30°C	**Polarity:**	Ver.
Humidity:	55% RH		

Frequency (MHz)	Reading Level (dBuV)	Antenna Polarization	S.G. (dBm)	Cable Loss (dB)	Ant. Gain (dBi)	Emission Level (dBm)	Limit (dBm)	Margin (dB)
3760.00	65.35	V	-45.04	5.96	7.20	-43.80	-13.00	-30.80
5640.00	51.89	V	-58.25	7.30	8.29	-57.26	-13.00	-44.26
7520.00	51.89	V	-57.09	8.44	8.27	-57.26	-13.00	-44.26

Notes:

1. *Measuring frequencies from 30 MHz to the 10th harmonic of highest fundamental frequency.*
2. *Data of measurement within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
3. *Spectrum Setting:*
   30MHz- 1GHz, RBW= 100KHz, VBW= 100kHz, Sweep time= 200 ms.
   1GHz- 26GHz, RBW= 1MHz, VBW= 1MHz, Sweep time= 200 ms.
4. *X Mode means the EUT in stand-up position; Y, Z Mode means the EUT in lie-on position*

Operation Mode:	TX CH High X Mode GSM	**Test Date:**	September 5, 2003
Fundamental Frequency:	1909.8MHz	**Test by:**	Jim
Temperature:	30°C	**Polarity:**	Ver.
Humidity:	55% RH		

Frequency (MHz)	Reading Level (dBuV)	Antenna Polarization	S.G. (dBm)	Cable Loss (dB)	Ant. Gain (dBi)	Emission Level (dBm)	Limit (dBm)	Margin (dB)
3819.60	65.26	V	-45.07	6.01	7.19	-43.89	-13.00	-30.89
5729.40	51.69	V	-58.51	7.32	8.37	-57.46	-13.00	-44.46
7639.20	51.91	V	-57.06	8.56	8.38	-57.24	-13.00	-44.24

Notes:

1. *Measuring frequencies from 30 MHz to the 10th harmonic of highest fundamental frequency.*
2. *Data of measurement within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
3. *Spectrum Setting:*
   30MHz- 1GHz, RBW= 100KHz, VBW= 100kHz, Sweep time= 200 ms.
   1GHz- 26GHz, RBW= 1MHz, VBW= 1MHz, Sweep time= 200 ms.
4. *X Mode means the EUT in stand-up position; Y, Z Mode means the EUT in lie-on position*

Operation Mode:	TX CH Low Y Mode GSM	**Test Date:**	September 5, 2003
Fundamental Frequency:	1850.2MHz	**Test by:**	Jim
Temperature:	30°C	**Polarity:**	Hor.
Humidity:	55%		

Frequency (MHz)	Reading Level (dBuV)	Antenna Polarization	S.G. (dBm)	Cable Loss (dB)	Ant. Gain (dBi)	Emission Level (dBm)	Limit (dBm)	Margin (dB)
3700.40	64.65	H	-45.81	5.90	7.21	-44.50	-13.00	-31.50
5550.60	56.39	H	-53.69	7.27	8.20	-52.76	-13.00	-39.76
7400.80	54.07	H	-55.04	8.37	8.33	-55.08	-13.00	-42.08
9251.00	52.38	H	-56.55	9.48	9.25	-56.77	-13.00	-43.77

Notes:

1. *Measuring frequencies from 30 MHz to the 10th harmonic of highest fundamental frequency.*
2. *Data of measurement within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
3. *Spectrum Setting:*
   30MHz- 1GHz, RBW= 100KHz, VBW= 100kHz, Sweep time= 200 ms.
   1GHz- 26GHz, RBW= 1MHz, VBW= 1MHz, Sweep time= 200 ms.
4. *X Mode means the EUT in stand-up position; Y, Z Mode means the EUT in lie-on position*

Operation Mode:	TX CH Mid Y Mode GSM	**Test Date:**	September 5, 2003
Fundamental Frequency:	1880MHz	**Test by:**	Jim
Temperature:	30°C	**Polarity:**	Hor.
Humidity:	55% RH		

Frequency (MHz)	Reading Level (dBuV)	Antenna Polarization	S.G. (dBm)	Cable Loss (dB)	Ant. Gain (dBi)	Emission Level (dBm)	Limit (dBm)	Margin (dB)
3760.00	62.13	H	-48.26	5.96	7.20	-47.02	-13.00	-34.02
5640.00	55.89	H	-54.25	7.30	8.29	-53.26	-13.00	-40.26
7520.00	54.14	H	-54.84	8.44	8.27	-55.01	-13.00	-42.01
9400.00	51.72	H	-57.37	9.43	9.37	-57.43	-13.00	-44.43

Notes:

1. *Measuring frequencies from 30 MHz to the 10th harmonic of highest fundamental frequency.*
2. *Data of measurement within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
3. *Spectrum Setting:*
   30MHz- 1GHz, RBW= 100KHz, VBW= 100kHz, Sweep time= 200 ms.
   1GHz- 26GHz, RBW= 1MHz, VBW= 1MHz, Sweep time= 200 ms.
4. *X Mode means the EUT in stand-up position; Y, Z Mode means the EUT in lie-on position*

Operation Mode:	TX CH High Y Mode GSM	**Test Date:**	September 5, 2003
Fundamental Frequency:	1909.8MHz	**Test by:**	Jim
Temperature:	30°C	**Polarity:**	Hor.
Humidity:	55% RH		

Frequency (MHz)	Reading Level (dBuV)	Antenna Polarization	S.G. (dBm)	Cable Loss (dB)	Ant. Gain (dBi)	Emission Level (dBm)	Limit (dBm)	Margin (dB)
3819.60	63.03	H	-47.30	6.01	7.19	-46.12	-13.00	-33.12
5729.40	54.83	H	-55.37	7.32	8.37	-54.32	-13.00	-41.32
7639.20	54.21	H	-54.76	8.56	8.38	-54.94	-13.00	-41.94
9549.00	51.83	H	-57.35	9.43	9.47	-57.32	-13.00	-44.32

Notes:

1. *Measuring frequencies from 30 MHz to the 10th harmonic of highest fundamental frequency.*
2. *Data of measurement within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
3. *Spectrum Setting:*
   30MHz- 1GHz, RBW= 100KHz, VBW= 100kHz, Sweep time= 200 ms.
   1GHz- 26GHz, RBW= 1MHz, VBW= 1MHz, Sweep time= 200 ms.
4. *X Mode means the EUT in stand-up position; Y, Z Mode means the EUT in lie-on position*

Operation Mode:	TX CH Low Z Mode GSM	**Test Date:**	September 5, 2003
Fundamental Frequency:	1850.2MHz	**Test by:**	Jim
Temperature:	30°C	**Polarity:**	Hor.
Humidity:	55%		

Frequency (MHz)	Reading Level (dBuV)	Antenna Polarization	S.G. (dBm)	Cable Loss (dB)	Ant. Gain (dBi)	Emission Level (dBm)	Limit (dBm)	Margin (dB)
3700.40	62.22	H	-48.24	5.90	7.21	-46.93	-13.00	-33.93
5550.60	53.45	H	-56.63	7.27	8.20	-55.70	-13.00	-42.70
7400.80	49.74	H	-59.37	8.37	8.33	-59.41	-13.00	-46.41
9251.00	48.76	H	-60.17	9.48	9.25	-60.39	-13.00	-47.39

Notes:

1. *Measuring frequencies from 30 MHz to the 10th harmonic of highest fundamental frequency.*
2. *Data of measurement within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
3. *Spectrum Setting:*
   30MHz- 1GHz, RBW= 100KHz, VBW= 100kHz, Sweep time= 200 ms.
   1GHz- 26GHz, RBW= 1MHz, VBW= 1MHz, Sweep time= 200 ms.
4. *X Mode means the EUT in stand-up position; Y, Z Mode means the EUT in lie-on position*

Operation Mode:	TX CH Mid Z Mode GSM	**Test Date:**	September 5, 2003
Fundamental Frequency:	1880MHz	**Test by:**	Jim
Temperature:	30°C	**Polarity:**	Hor.
Humidity:	55% RH		

Frequency (MHz)	Reading Level (dBuV)	Antenna Polarization	S.G. (dBm)	Cable Loss (dB)	Ant. Gain (dBi)	Emission Level (dBm)	Limit (dBm)	Margin (dB)
3760.00	62.12	H	-48.27	5.96	7.20	-47.03	-13.00	-34.03
5640.00	53.26	H	-56.88	7.30	8.29	-55.89	-13.00	-42.89
7520.00	49.38	H	-59.60	8.44	8.27	-59.77	-13.00	-46.77
9400.00	48.66	H	-60.43	9.43	9.37	-60.49	-13.00	-47.49

Notes:

1. *Measuring frequencies from 30 MHz to the 10th harmonic of highest fundamental frequency.*
2. *Data of measurement within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
3. *Spectrum Setting:*
   30MHz- 1GHz, RBW= 100KHz, VBW= 100kHz, Sweep time= 200 ms.
   1GHz- 26GHz, RBW= 1MHz, VBW= 1MHz, Sweep time= 200 ms.
4. *X Mode means the EUT in stand-up position; Y, Z Mode means the EUT in lie-on position*

Operation Mode:	TX CH High Z Mode GSM	**Test Date:**	September 5, 2003
Fundamental Frequency:	1909.8MHz	**Test by:**	Jim
Temperature:	30°C	**Polarity:**	Hor.
Humidity:	55% RH		

Frequency (MHz)	Reading Level (dBuV)	Antenna Polarization	S.G. (dBm)	Cable Loss (dB)	Ant. Gain (dBi)	Emission Level (dBm)	Limit (dBm)	Margin (dB)
3819.60	62.31	H	-48.02	6.01	7.19	-46.84	-13.00	-33.84
5729.40	53.32	H	-56.88	7.32	8.37	-55.83	-13.00	-42.83
7639.20	49.73	H	-59.24	8.56	8.38	-59.42	-13.00	-46.42
9549.00	48.70	H	-60.48	9.43	9.47	-60.45	-13.00	-47.45

Notes:

1. *Measuring frequencies from 30 MHz to the 10th harmonic of highest fundamental frequency.*
2. *Data of measurement within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
3. *Spectrum Setting:*
   30MHz- 1GHz, RBW= 100KHz, VBW= 100kHz, Sweep time= 200 ms.
   1GHz- 26GHz, RBW= 1MHz, VBW= 1MHz, Sweep time= 200 ms.
4. *X Mode means the EUT in stand-up position; Y, Z Mode means the EUT in lie-on position*

Operation Mode:	TX CH Low X Mode GPRS	**Test Date:**	September 5, 2003
Fundamental Frequency:	1850.2MHz	**Test by:**	Jim
Temperature:	30°C	**Polarity:**	Ver.
Humidity:	55%		

Frequency (MHz)	Reading Level (dBuV)	Antenna Polarization	S.G. (dBm)	Cable Loss (dB)	Ant. Gain (dBi)	Emission Level (dBm)	Limit (dBm)	Margin (dB)
3700.40	65.12	V	-45.34	5.90	7.21	-44.03	-13.00	-31.03
5550.60	55.26	V	-54.82	7.27	8.20	-53.89	-13.00	-40.89
7400.80	53.31	V	-55.80	8.37	8.33	-55.84	-13.00	-42.84
9251.00	52.56	V	-56.37	9.48	9.25	-56.59	-13.00	-43.59

Notes:

1. *Measuring frequencies from 30 MHz to the 10th harmonic of highest fundamental frequency.*
2. *Data of measurement within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
3. *Spectrum Setting:*
   30MHz- 1GHz, RBW= 100KHz, VBW= 100kHz, Sweep time= 200 ms.
   1GHz- 26GHz, RBW= 1MHz, VBW= 1MHz, Sweep time= 200 ms.
4. *X Mode means the EUT in stand-up position; Y, Z Mode means the EUT in lie-on position*

Operation Mode:	TX CH Mid X Mode GPRS	**Test Date:**	September 5, 2003
Fundamental Frequency:	1880MHz	**Test by:**	Jim
Temperature:	30°C	**Polarity:**	Ver.
Humidity:	55% RH		

Frequency (MHz)	Reading Level (dBuV)	Antenna Polarization	S.G. (dBm)	Cable Loss (dB)	Ant. Gain (dBi)	Emission Level (dBm)	Limit (dBm)	Margin (dB)
3760.00	65.26	V	-45.13	5.96	7.20	-43.89	-13.00	-30.89
5640.00	51.69	V	-58.45	7.30	8.29	-57.46	-13.00	-44.46
7520.00	51.91	V	-57.07	8.44	8.27	-57.24	-13.00	-44.24

Notes:

1. *Measuring frequencies from 30 MHz to the 10th harmonic of highest fundamental frequency.*
2. *Data of measurement within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
3. *Spectrum Setting:*
   30MHz- 1GHz, RBW= 100KHz, VBW= 100kHz, Sweep time= 200 ms.
   1GHz- 26GHz, RBW= 1MHz, VBW= 1MHz, Sweep time= 200 ms.
4. *X Mode means the EUT in stand-up position; Y, Z Mode means the EUT in lie-on position*

Operation Mode:	TX CH High X Mode GPRS	**Test Date:**	September 5, 2003
Fundamental Frequency:	1909.8MHz	**Test by:**	Jim
Temperature:	30°C	**Polarity:**	Ver.
Humidity:	55% RH		

Frequency (MHz)	Reading Level (dBuV)	Antenna Polarization	S.G. (dBm)	Cable Loss (dB)	Ant. Gain (dBi)	Emission Level (dBm)	Limit (dBm)	Margin (dB)
3819.60	65.28	V	-45.05	6.01	7.19	-43.87	-13.00	-30.87
5729.40	51.72	V	-58.48	7.32	8.37	-57.43	-13.00	-44.43
7639.20	51.89	V	-57.08	8.56	8.38	-57.26	-13.00	-44.26

Notes:

1. *Measuring frequencies from 30 MHz to the 10th harmonic of highest fundamental frequency.*
2. *Data of measurement within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
3. *Spectrum Setting:*
   30MHz- 1GHz, RBW= 100KHz, VBW= 100kHz, Sweep time= 200 ms.
   1GHz- 26GHz, RBW= 1MHz, VBW= 1MHz, Sweep time= 200 ms.
4. *X Mode means the EUT in stand-up position; Y, Z Mode means the EUT in lie-on position*

Operation Mode:	TX CH Low Y Mode GPRS	**Test Date:**	September 5, 2003
Fundamental Frequency:	1850.2MHz	**Test by:**	Jim
Temperature:	30°C	**Polarity:**	Hor.
Humidity:	55%		

Frequency (MHz)	Reading Level (dBuV)	Antenna Polarization	S.G. (dBm)	Cable Loss (dB)	Ant. Gain (dBi)	Emission Level (dBm)	Limit (dBm)	Margin (dB)
3700.40	64.56	H	-45.90	5.90	7.21	-44.59	-13.00	-31.59
5550.60	56.41	H	-53.67	7.27	8.20	-52.74	-13.00	-39.74
7400.80	54.12	H	-54.99	8.37	8.33	-55.03	-13.00	-42.03
9251.00	53.41	H	-55.52	9.48	9.25	-55.74	-13.00	-42.74

Notes:

1. *Measuring frequencies from 30 MHz to the 10th harmonic of highest fundamental frequency.*
2. *Data of measurement within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
3. *Spectrum Setting:*
   30MHz- 1GHz, RBW= 100KHz, VBW= 100kHz, Sweep time= 200 ms.
   1GHz- 26GHz, RBW= 1MHz, VBW= 1MHz, Sweep time= 200 ms.
4. *X Mode means the EUT in stand-up position; Y, Z Mode means the EUT in lie-on position*

Operation Mode:	TX CH Mid Y Mode GPRS	**Test Date:**	September 5, 2003
Fundamental Frequency:	1880MHz	**Test by:**	Jim
Temperature:	30°C	**Polarity:**	Hor.
Humidity:	55% RH		

Frequency (MHz)	Reading Level (dBuV)	Antenna Polarization	S.G. (dBm)	Cable Loss (dB)	Ant. Gain (dBi)	Emission Level (dBm)	Limit (dBm)	Margin (dB)
3760.00	62.21	H	-48.18	5.96	7.20	-46.94	-13.00	-33.94
5640.00	55.93	H	-54.21	7.30	8.29	-53.22	-13.00	-40.22
7520.00	54.26	H	-54.72	8.44	8.27	-54.89	-13.00	-41.89
9400.00	51.69	H	-57.40	9.43	9.37	-57.46	-13.00	-44.46

Notes:

1. *Measuring frequencies from 30 MHz to the 10th harmonic of highest fundamental frequency.*
2. *Data of measurement within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
3. *Spectrum Setting:*
   30MHz- 1GHz, RBW= 100KHz, VBW= 100kHz, Sweep time= 200 ms.
   1GHz- 26GHz, RBW= 1MHz, VBW= 1MHz, Sweep time= 200 ms.
4. *X Mode means the EUT in stand-up position; Y, Z Mode means the EUT in lie-on position*

Operation Mode:	TX CH High Y Mode GPRS	**Test Date:**	September 5, 2003
Fundamental Frequency:	1909.8MHz	**Test by:**	Jim
Temperature:	30°C	**Polarity:**	Hor.
Humidity:	55% RH		

Frequency (MHz)	Reading Level (dBuV)	Antenna Polarization	S.G. (dBm)	Cable Loss (dB)	Ant. Gain (dBi)	Emission Level (dBm)	Limit (dBm)	Margin (dB)
3819.60	63.12	H	-47.21	6.01	7.19	-46.03	-13.00	-33.03
5729.40	54.86	H	-55.34	7.32	8.37	-54.29	-13.00	-41.29
7639.20	54.63	H	-54.34	8.56	8.38	-54.52	-13.00	-41.52
9549.00	51.56	H	-57.62	9.43	9.47	-57.59	-13.00	-44.59

Notes:

1. *Measuring frequencies from 30 MHz to the 10th harmonic of highest fundamental frequency.*
2. *Data of measurement within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
3. *Spectrum Setting:*
   30MHz- 1GHz, RBW= 100KHz, VBW= 100kHz, Sweep time= 200 ms.
   1GHz- 26GHz, RBW= 1MHz, VBW= 1MHz, Sweep time= 200 ms.
4. *X Mode means the EUT in stand-up position; Y, Z Mode means the EUT in lie-on position*

Operation Mode:	TX CH Low Z Mode GPRS	**Test Date:**	September 5, 2003
Fundamental Frequency:	1850.2MHz	**Test by:**	Jim
Temperature:	30°C	**Polarity:**	Hor.
Humidity:	55%		

Frequency (MHz)	Reading Level (dBuV)	Antenna Polarization	S.G. (dBm)	Cable Loss (dB)	Ant. Gain (dBi)	Emission Level (dBm)	Limit (dBm)	Margin (dB)
3700.40	62.12	H	-48.34	5.90	7.21	-47.03	-13.00	-34.03
5550.60	53.51	H	-56.57	7.27	8.20	-55.64	-13.00	-42.64
7400.80	49.68	H	-59.43	8.37	8.33	-59.47	-13.00	-46.47
9251.00	48.52	H	-60.41	9.48	9.25	-60.63	-13.00	-47.63

Notes:

1. *Measuring frequencies from 30 MHz to the 10th harmonic of highest fundamental frequency.*
2. *Data of measurement within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
3. *Spectrum Setting:*
   30MHz- 1GHz, RBW= 100KHz, VBW= 100kHz, Sweep time= 200 ms.
   1GHz- 26GHz, RBW= 1MHz, VBW= 1MHz, Sweep time= 200 ms.
4. *X Mode means the EUT in stand-up position; Y, Z Mode means the EUT in lie-on position*

Operation Mode:	TX CH Mid Z Mode GPRS	**Test Date:**	September 5, 2003
Fundamental Frequency:	1880MHz	**Test by:**	Jim
Temperature:	30°C	**Polarity:**	Hor.
Humidity:	55% RH		

Frequency (MHz)	Reading Level (dBuV)	Antenna Polarization	S.G. (dBm)	Cable Loss (dB)	Ant. Gain (dBi)	Emission Level (dBm)	Limit (dBm)	Margin (dB)
3760.00	62.18	H	-48.21	5.96	7.20	-46.97	-13.00	-33.97
5640.00	53.19	H	-56.95	7.30	8.29	-55.96	-13.00	-42.96
7520.00	49.41	H	-59.57	8.44	8.27	-59.74	-13.00	-46.74
9400.00	48.52	H	-60.57	9.43	9.37	-60.63	-13.00	-47.63

Notes:

1. *Measuring frequencies from 30 MHz to the 10th harmonic of highest fundamental frequency.*
2. *Data of measurement within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
3. *Spectrum Setting:*
   30MHz- 1GHz, RBW= 100KHz, VBW= 100kHz, Sweep time= 200 ms.
   1GHz- 26GHz, RBW= 1MHz, VBW= 1MHz, Sweep time= 200 ms.
4. *X Mode means the EUT in stand-up position; Y, Z Mode means the EUT in lie-on position*

Operation Mode:	TX CH High Z Mode GPRS	**Test Date:**	September 5, 2003
Fundamental Frequency:	1909.8MHz	**Test by:**	Jim
Temperature:	30°C	**Polarity:**	Hor.
Humidity:	55% RH		

Frequency (MHz)	Reading level (dBuV)	Antenna Polarization	S.G. (dBm)	Cable loes (dB)	Ant. Gain (dBi)	Emission Level (dBm)	Limit (dBm)	Margin (dB)
3819.60	62.18	H	-48.15	6.01	7.19	-46.97	-13.00	-33.97
5729.40	53.48	H	-56.72	7.32	8.37	-55.67	-13.00	-42.67
7639.20	49.82	H	-59.15	8.56	8.38	-59.33	-13.00	-46.33
9549.00	48.72	H	-60.46	9.43	9.47	-60.43	-13.00	-47.43

Notes:

1. *Measuring frequencies from 30 MHz to the 10th harmonic of highest fundamental frequency.*
2. *Data of measurement within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
3. *Spectrum Setting:*
   30MHz- 1GHz, RBW= 100KHz, VBW= 100kHz, Sweep time= 200 ms.
   1GHz- 26GHz, RBW= 1MHz, VBW= 1MHz, Sweep time= 200 ms.
4. *X Mode means the EUT in stand-up position; Y, Z Mode means the EUT in lie-on position*

CONDITION B: CO-LOCATED OPERATION
(MOBILE PHONE & BLUETOOTH OPERATED SIMULTANEOUSLY)

7.6. FIELD STRENGTH OF SPURIOUS RADIATION MEASUREMENT

LIMIT

(Same as the above section <7.5>)

MEASUREMENT EQUIPMENT USED

(Same as the above section <7.5>)

TEST CONFIGURATION

(Same as the above section <7.5>)

TEST PROCEDURE

(Same as the above section <7.5>)

TEST RESULTS

Refer to the attached tabular data sheets.

Condition B: Co-located operation

Operation Mode:	Mobile phone & Bluetooth	**Test Date:**	September 6, 2003
Temperature:	30°C	**Test by:**	Jim
Humidity:	55% RH	**Polarity:**	Ver.

Frequency (MHz)	Reading Level (dBuV)	Antenna Polarization	S.G. (dBm)	Cable Loss (dB)	Ant. Gain (dBi)	Emission Level (dBm)	Limit (dBm)	Margin (dB)
1909.80	130.43	V	27.87	4.02	6.35	30.19	33.00	-2.81
2480.00	97.67	V	-14.25	4.54	7.31	-11.48	33.00	-44.48
3819.60	65.85	V	-28.79	6.01	7.19	-27.61	-13.00	-14.61
5729.40	57.83	V	-32.84	7.32	8.37	-31.80	-13.00	-18.80
7639.20	49.24	V	-36.67	8.56	8.38	-36.85	-13.00	-23.85
9549.00	44.75	V	-38.72	9.43	9.47	-38.68	-13.00	-25.68

Notes:

1. *Measuring frequencies from 30 MHz to the 10th harmonic of highest fundamental frequency.*
2. *Data of measurement within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
3. *Spectrum Setting:*
   30MHz- 1GHz, RBW= 100KHz, VBW= 100kHz, Sweep time= 200 ms.
   1GHz- 26GHz, RBW= 1MHz, VBW= 1MHz, Sweep time= 200 ms.
4. *X Mode means the EUT in stand-up position; Y, Z Mode means the EUT in lie-on position*

Operation Mode:	Mobile phone & Bluetooth	**Test Date:**	September 6, 2003
Temperature:	30°C	**Test by:**	Jim
Humidity:	55% RH	**Polarity:**	Hor.

Frequency (MHz)	Reading Level (dBuV)	Antenna Polarization	S.G. (dBm)	Cable Loss (dB)	Ant. Gain (dBi)	Emission Level (dBm)	Limit (dBm)	Margin (dB)
1850.20	125.45	H	22.85	3.95	6.30	25.20	33.00	-7.80
2480.00	91.48	H	-20.44	4.54	7.31	-17.67	33.00	-50.67
3700.40	60.67	H	-34.19	5.90	7.21	-32.88	-13.00	-19.88
5550.60	52.77	H	-37.92	7.27	8.20	-36.99	-13.00	-23.99
7400.80	46.01	H	-40.85	8.37	8.33	-40.89	-13.00	-27.89
9251.00	43.12	H	-40.28	9.48	9.25	-40.50	-13.00	-27.50
1850.20	129.26	H	26.66	3.95	6.30	29.01	33.00	-3.99
2480.00	94.01	H	-17.91	4.54	7.31	-15.14	33.00	-48.14
3700.40	61.25	H	-33.61	5.90	7.21	-32.30	-13.00	-19.30
5550.60	54.57	H	-36.12	7.27	8.20	-35.19	-13.00	-22.19
7400.80	45.25	H	-41.61	8.37	8.33	-41.65	-13.00	-28.65
9251.00	43.01	H	-40.39	9.48	9.25	-40.61	-13.00	-27.61

Notes:

1. *Measuring frequencies from 30 MHz to the 10th harmonic of highest fundamental frequency.*
2. *Data of measurement within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
3. *Spectrum Setting:*
   30MHz- 1GHz, RBW= 100KHz, VBW= 100kHz, Sweep time= 200 ms.
   1GHz- 26GHz, RBW= 1MHz, VBW= 1MHz, Sweep time= 200 ms.
4. *X Mode means the EUT in stand-up position; Y, Z Mode means the EUT in lie-on position*

7.7. FREQUENCY STABILITY V.S. TEMPERATURE MEASUREMENT

LIMIT

According to FCC §2.1055, FCC §24.235.

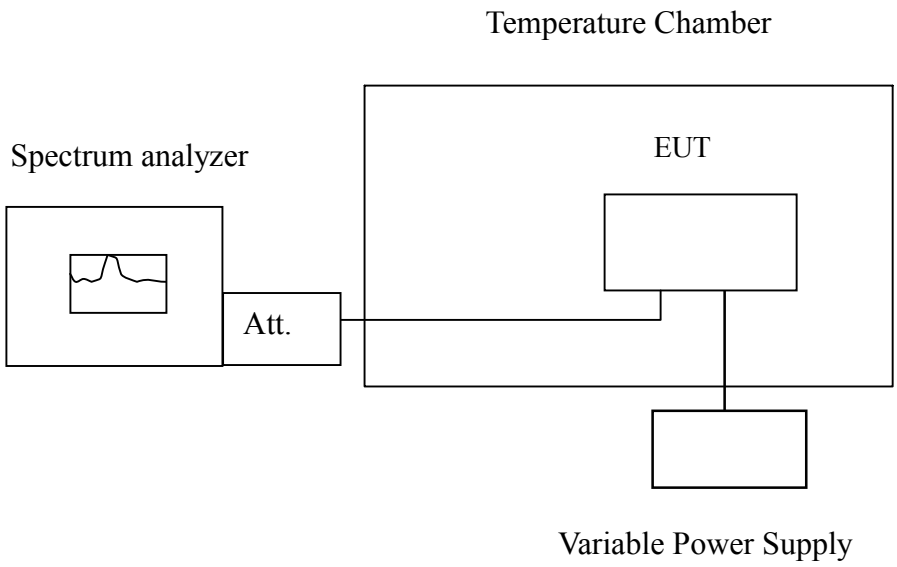
Frequency Tolerance: 2.5 ppm

MEASUREMENT EQUIPMENT USED

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
DC Power Source	Agilent	E3640A	MY40001774	01/12/2004
Temperature Chamber	K.son	THS-M1	242	03/20/2004
Spectrum Analyzer	Agilent	E4446A	US42510252	04/27/2004
Spectrum Analyzer	R&S	FSP30	100112	06/28/2004
Attenuator	Mini-circuit	20dB	N/A	05/14/2004
low loss cable#32	Huber + Suhner	SUCOFLEX 104EPA-6M	19428	04/08/2004

Remark: *Each piece of equipment is scheduled for calibration once a year.*

TEST CONFIGURATION



Note: *Measurement setup for testing on Antenna connector*

TEST 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.

TEST RESULTS

No non-compliance noted

Test Data

Reference Frequency: GSM Mid Channel 1880 MHz @ 25℃				
Limit: +/- 2.5 ppm = 4700 Hz				
Power Supply (Vdc)	**Environment Temperature (℃)**	**Frequency (MHz)**	**Delta (Hz)**	**Limit (Hz)**
4.3	50	1880.00045200	529.00	4700
4.3	40	1880.00016300	240.00	4700
4.3	30	1880.00012800	205.00	4700
4.3	25	1879.99992300	0.00	4700
4.3	20	1880.00039600	473.00	4700
4.3	10	1880.00041200	489.00	4700
4.3	0	1880.00048500	562.00	4700
4.3	-10	1880.00042300	500.00	4700
4.3	-20	1880.00042500	502.00	4700
4.3	-30	1880.00032100	398.00	4700

7.8. FREQUENCY STABILITY V.S. VOLTAGE MEASUREMENT

LIMIT

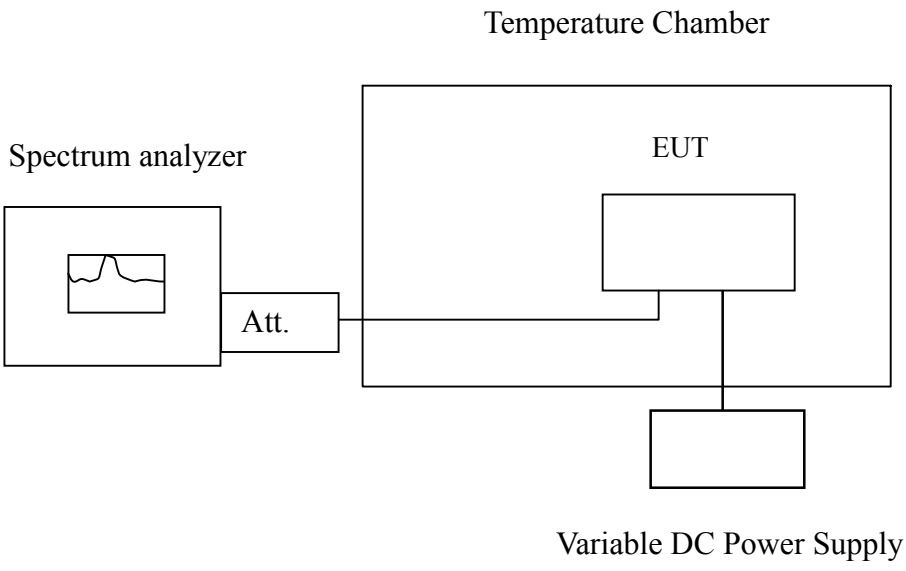
According to FCC §2.1055, FCC §24.235,
Frequency Tolerance: 2.5 ppm.

MEASUREMENT EQUIPMENT USED

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
DC Power Source	Agilent	E3640A	MY40001774	01/12/2004
Temperature Chamber	K.son	THS-M1	242	03/20/2004
Spectrum Analyzer	Agilent	E4446A	US42510252	04/27/2004
Spectrum Analyzer	R&S	FSP30	100112	06/28/2004
Attenuator	Mini-circuit	20dB	N/A	05/14/2004
Low loss cable#32	Huber + Suhner	SUCOFLEX 104EPA-6M	19428	04/08/2004

Remark: *Each piece of equipment is scheduled for calibration once a year.*

TEST CONFIGURATION



Note: *Measurement setup for testing on Antenna connector*

TEST PROCEDURE

Set chamber temperature to 25℃. 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.

TEST RESULTS

No non-compliance noted

Test Data

Reference Frequency: GSM Mid Channel 1880 MHz @ 25℃				
Limit: +/- 2.5 ppm = 4700 Hz				
Power Supply (Vdc)	**Environment Temperature (℃)**	**Frequency (MHz)**	**Delta (Hz)**	**Limit (Hz)**
4.3	25	1879.999869	-54	4700
3.7	25	1879.999923	0	4700
3.14	25	1880.00028	357	4700
3.00 (End Point)	25	1879.999765	-158	4700

7.9. POWERLINE CONDUCTED EMISSIONS

LIMIT

For an intentional radiator which is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed 250 microvolts (The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz). The limits at specific frequency range is listed as follows:

Frequency Range (MHz)	Limits (dBµV)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56	56 to 46
0.50 to 5	56	46
5 to 30	60	50

Compliance with this provision shall be based on the measurement of the radio frequency voltage between each power line (LINE and NEUTRAL) and ground at the power terminals.

MEASUREMENT EQUIPMENT USED

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
EMI Test Receiver	R&S	ESCS30	847793/012	12/20/2003
LISN	R&S	ESH2-Z5	843285/010	12/15/2003
LISN	EMCO	3825/2	9003-1628	07/25/2004

Remark: *Each piece of equipment is scheduled for calibration once a year.*

TEST CONFIGURATION

1. The conducted emission tests were performed in the test site, using the setup in accordance with the ANSI C63.4-1992.
2. The EUT was plug-in the host PC via USB port. The host PC system was placed on the center of the back edge on the test table. The peripherals like modem, monitor printer, K/B, and mouse were placed on the side of the host PC system. The rear of the EUT and peripherals were placed flushed with the rear of the tabletop.
3. The keyboard was placed directly in the front of the monitor, flushed with the front tabletop. The mouse was placed next to the Keyboard, flushed with the back of keyboard.
4. The spacing between the peripherals was 10 centimeters.
5. External I/O cables were draped along the edge of the test table and bundle when necessary.
6. The host PC system was connected with 110Vac/60Hz power source.

The EUT is set to transmit in a continuous mode.

TEST PROCEDURE

1. The EUT was placed on a table, which is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. Repeat above procedures until all frequency measured were complete.

TEST RESULTS

The initial step in collecting conducted data is a spectrum analyzer peak scan of the measurement range. Significant peaks are then marked as shown on the following data page, and these signals are then quasi-peaked.

Operation Mode:	Normal operating	**Test Date:**	September 6, 2003
Temperature:	30°C	**Tested by:**	Jim
Humidity:	56 % RH		

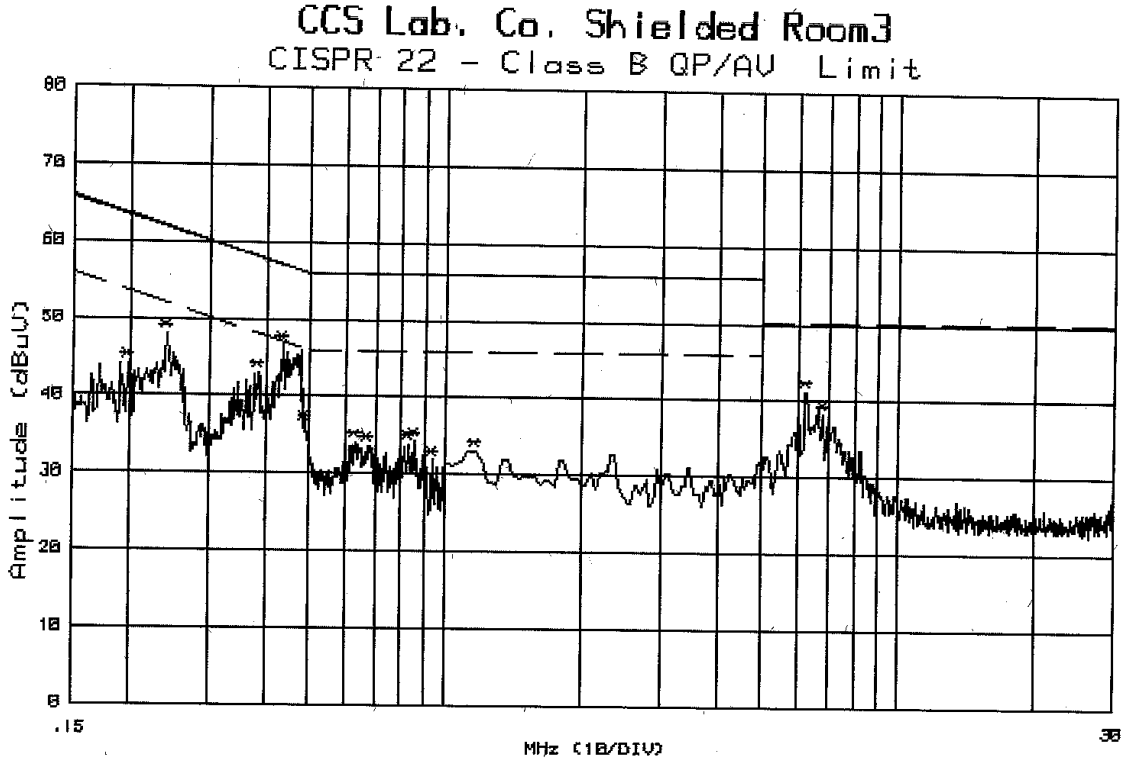
FREQ MHz	Q.P. Raw dBuV	AVG Raw dBuV	Q.P. Limit dBuV	AVG Limit dBuV	Q.P. Margin dB	AVG Margin dB	NOTE
0.199	38.90	---	63.65	53.65	-24.75	---	L1
0.241	39.80	---	62.06	52.06	-22.26	---	L1
0.386	39.00	---	58.15	48.15	-19.15	---	L1
0.438	41.20	---	57.10	47.10	-15.90	---	L1
0.491	34.30	---	56.15	46.15	-21.85	---	L1
6.261	38.60	---	60.00	50.00	-21.40	---	L1
0.228	41.20	---	62.52	52.52	-21.32	---	L2
0.247	40.30	---	61.86	51.86	-21.56	---	L2
0.440	34.10	---	57.06	47.06	-22.96	---	L2
0.679	35.80	---	56.00	46.00	-20.20	---	L2
6.593	39.60	---	60.00	50.00	-20.40	---	L2
7.007	39.10	---	60.00	50.00	-20.90	---	L2

Note:

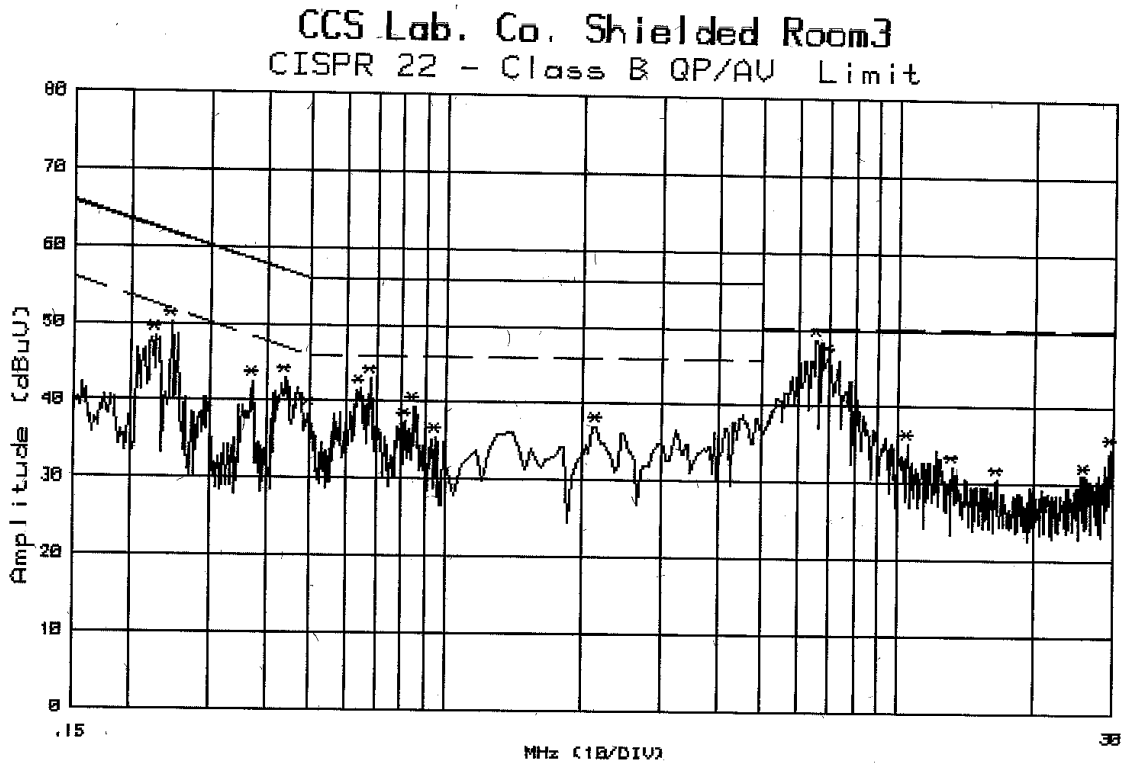
1. *Measuring frequencies from 0.15 MHz to 30MHz.*
2. *The emissions measured in frequency range from 0.15 MHz to 30MHz were made with an instrument using Quasi-peak detector and average detector.*
3. *"---" denotes the emission level was or more than 2dB below the Average limit*
4. *The IF bandwidth of SPA between 0.15MHz to 30MHz was 10kHz; the IF bandwidth of Test Receiver between 0.15MHz to 30MHz was 9kHz;*
5. *L1 = Line One (Live line) / L2 = Line Two (Neutral Line)*

Test Data Plots

Conducted emissions (Line 1)

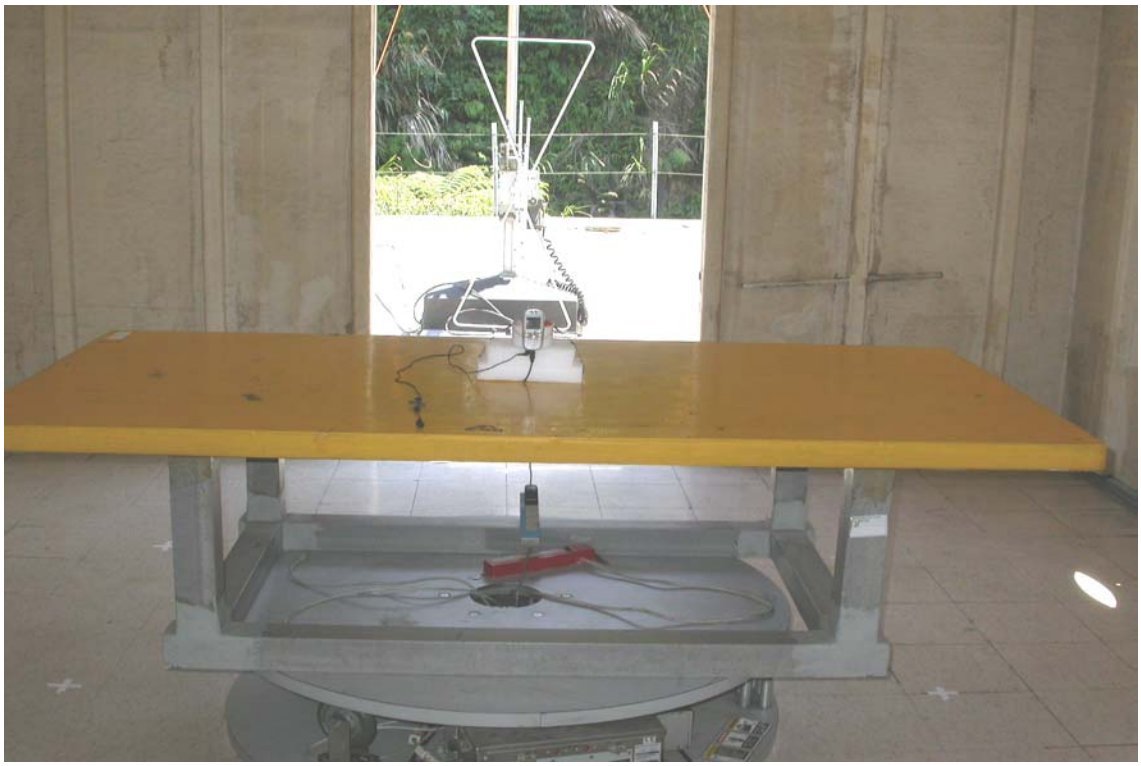


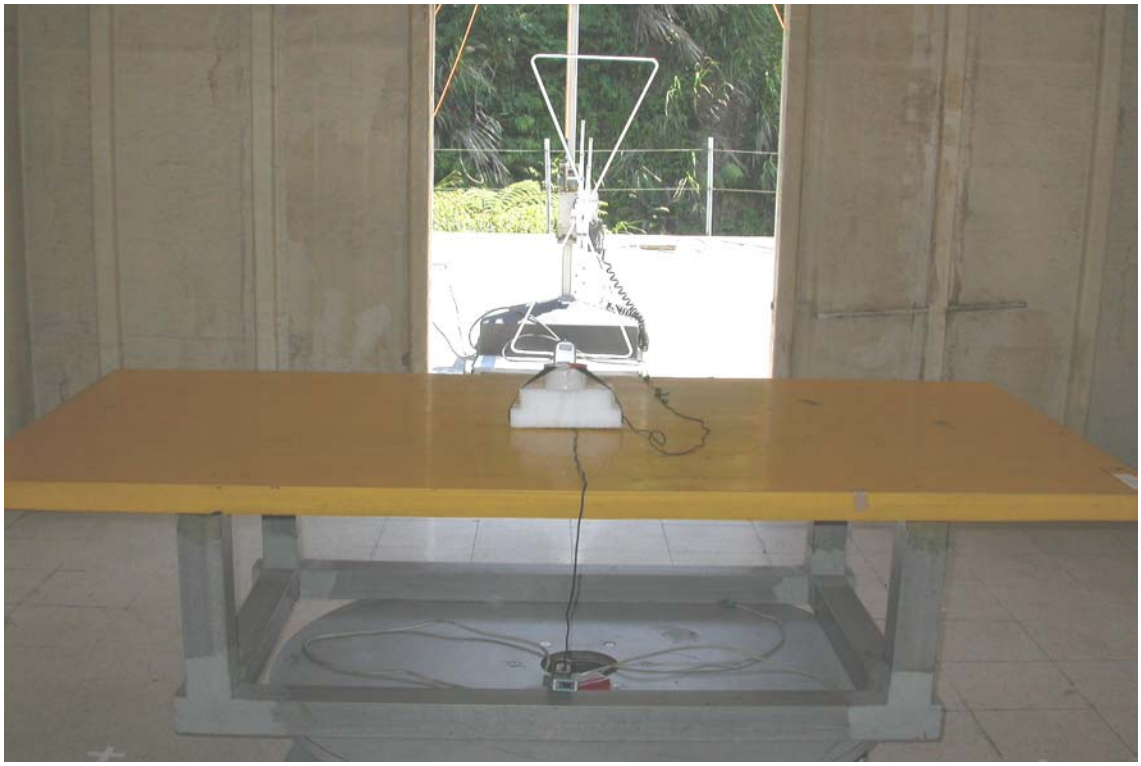
Conducted emissions (Line 2)



APPENDIX 1
PHOTOGRPHS OF TEST SETUP

Radiated Emission Set up Photos





Conducted Emission Set Up Photos