ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT INTENTIONAL RADIATOR CERTIFICATION TO FCC PART 24 SUBPART E REQUIREMENT

OF

900/1800/1900GSM+GPRS Mobile Handset

Model No.: Johann

Brand Name: CMCS

FCC ID: QDJ-0306JHN01

Report No: B30704201-RP

Issue Date: July 18, 2003

Prepared for

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Prepared by

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VERIFICATION OF COMPLIANCE

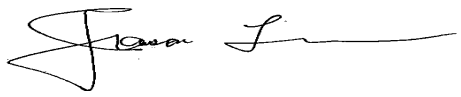
Applicant:	Chi Mei Communication Systems, Inc. No. 188, Wen Hwa 2nd RD., Kuei Shan Hsiang, Taoyuan Hsien, Taiwan, R.O.C.
Equipment Under Test:	900/1800/1900GSM+GPRS Mobile Handset
Model No.:	Johann
Brand Name:	CMCS
Model Difference:	N/A
Serial Number:	N/A
File Number:	B30704201-RP
Date of Test:	July 4, 2003

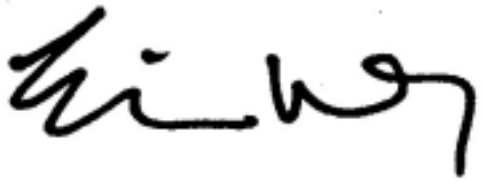
We hereby certify that:

The above equipment was tested by C&C Laboratory Co., Ltd. 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
C&C Laboratory Co., Ltd.

Eric Wong / Section Manager
C&C Laboratory Co., Ltd.

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1. GENERAL INFORMATION

1.1 Product Description

Product	900/1800/1900GSM+GPRS Mobile Handset	
Model Name	Johann	
Model Difference:	N/A	
Frequency Range and Power	TX: 1850 MHz – 1910 MHz, RX: 1930 MHz – 1989.8 MHz	30.0 dBm
Cellular Phone Standards	GSM (PCS)	
Type of Emission	242KGXW--	
Antenna Type	Helix Antenna (Integrated, non-retractable)	
Antenna Gain	-6 dBi	
Power Supply	Battery: Rated 3.7Vdc	
	Charger: Input: AC100-240V, 0.5A, 50/60Hz Output: 5Vdc, 450mA	

1.2 Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for FCC ID: QDJ-0306JHN01 filing to comply with Part 24 of the FCC CFR 47 Rules.

1.3 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.

1.4 Test Facility

The open area test site and conducted measurement facility used to collect the radiated data is located on the address of C&C Laboratory, Co., Ltd. No. 81-1, 210 Lane, Pa-de 2nd Road, Lu-Chu Hsiang, Taoyuan, Taiwan, R.O.C. The Open Area Test Sites and the Line Conducted labs are constructed and calibrated to meet the FCC requirements in documents ANSI C63.4: 1992 and CISPR 22/EN 55022 requirements. The test facility are listed with Federal Communications Commission (reference number 90471 (Site No. 1 and 3) and 93105 (Site No. 4).

1.5 Special Accessories

Not available for this EUT intended for grant.

1.6 Equipment Modifications

Not available for this EUT intended for grant.

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 engineering mode to fix the Tx frequency which was for the purpose of the measurements.

2.3 Test Procedure

2.3.1 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.

2.3.2 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.

2.4 Configuration of Tested System

Fig. 2-1 Configuration of Tested System

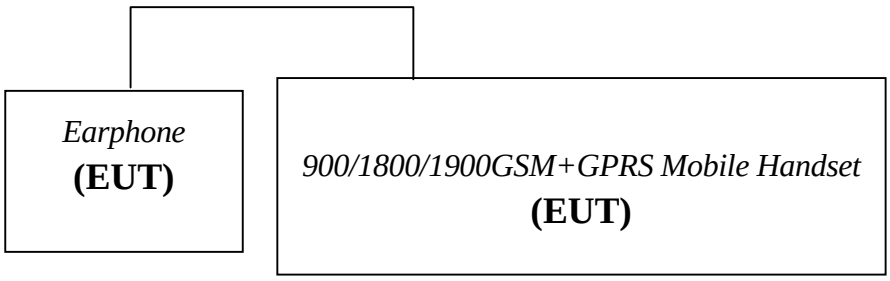


Table 2-1 Equipment Used in Tested System

Item	Equipment	Mfr/Brand	Model/Type No.	FCC ID	Series No.	Remark
	N/A	N/A	N/A	N/A	N/A	N/A

3. SUMMARY OF TEST RESULTS

FCC Rules	Description Of Test	Result
§ 2.1046	RF Power Output	Compliant
§ 2.1046 § 24.232(b)	EIRP	Compliant
§ 2.1047	Modulation Characteristics	N/A
§ 2.1049	Occupied Bandwidth	Compliant
§ 2.1051 § 24.238(a)	Out of Band Emissions at Antenna Terminals Mobile Emission In Base Frequency Range	Compliant
§ 2.1053 § 24.238(a)	Field Strength of Spurious Radiation	Compliant
§ 2.1055, § 24.235	Frequency Stability vs. Temperature	Compliant
§ 2.1055, § 24.235	Frequency Stability vs. Voltage	Compliant
§ 15.107; § 15.207	AC Power Line Conducted Emission	Compliant

4. DESCRIPTION OF TEST MODES

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

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

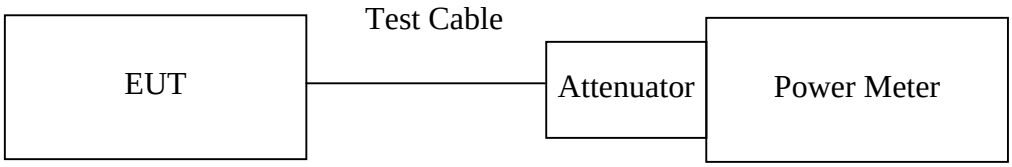
(The field strength of spurious radiation emission was measured in the following position: EUT stand-up position (X mode) and laid-down position (Y, Z mode))

5. RF POWER OUTPUT MEASUREMENT

5.1 Standard Applicable

According to FCC § 2.1046.

5.2 Test Set-up:



Note: *Measurement setup for testing on Antenna connector*

5.3 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.

5.4 Measurement Equipment Used:

EQUIPMENT TYPE	MFR	Model No.	Serial No.	LAST CAL.	Cal. Due.
Power Meter	HP	E4416A	GB41291611	05/06/2003	05/05/2004
Power Sensor	HP	E9327A	US40441097	03/13/2003	03/12/2004
Attenuator	Mini-circuit	20dB	N/A	05/15/2003	05/14/2004

5.5 Measurement Result

EUT Mode	Frequency (MHz)	CH	Power Meter Reading (dBm)	Attenuator (dB)	Output Power (dBm)	Output Power W
GSM 1900	1850.20	512	4.67	25	29.67	0.92683
	1880.00	661	4.71	25	29.71	0.93541
	1910.00	810	4.79	25	29.79	0.95280
GPRS 1900 (Class 10)	1850.20	512	4.67	25	29.67	0.92683
	1880.00	661	4.69	25	29.69	0.93111
	1910.00	810	4.77	25	29.77	0.94842

Note: The value of attenuator including cable and external attenuator

6. EIRP MEASUREMENT

6.1 Standard Applicable

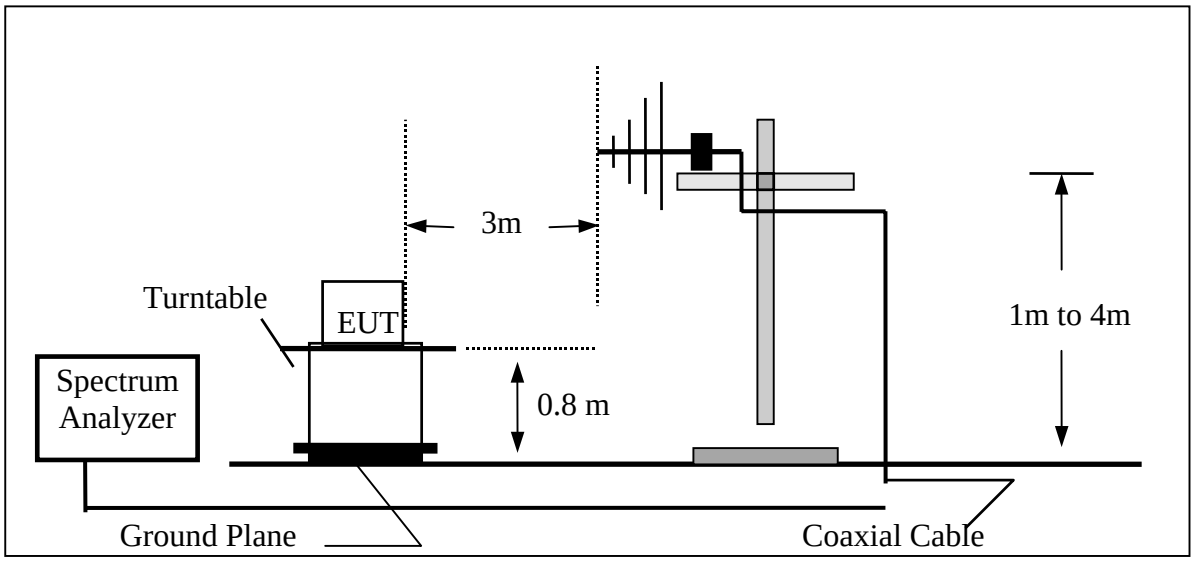
According to FCC § 2.1046

FCC 22.913(b): The Effective Radiated Power (ERP) of mobile transmitters shall not exceed 7 watts.

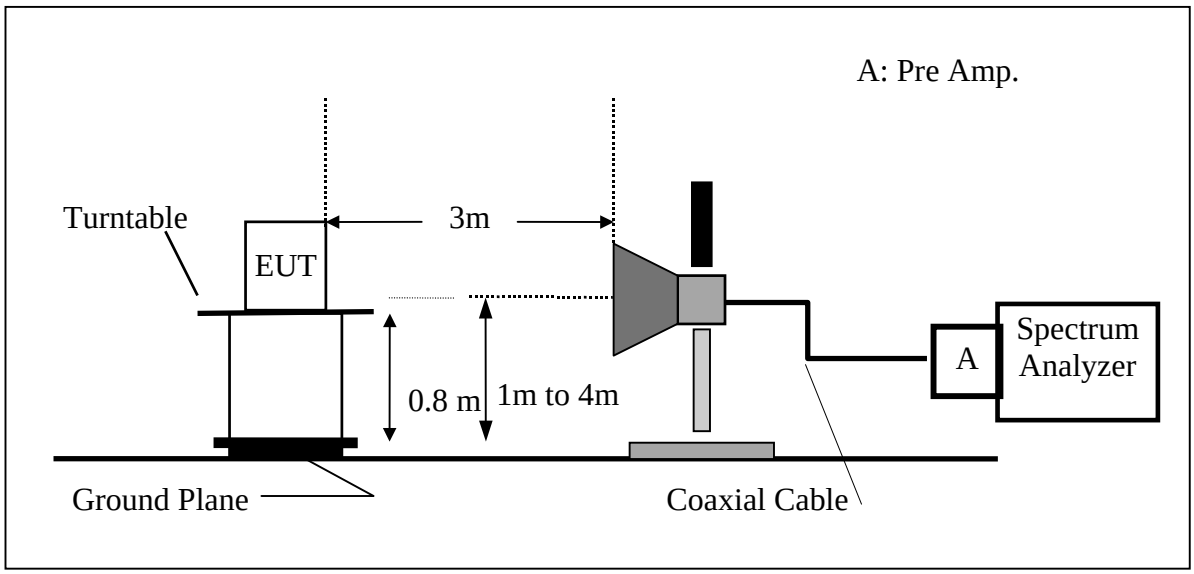
FCC 24.232(b): The Equivalent Isotropic Radiated Power (EIRP) shall not exceed 2 watts.

6.2 Test Set-up (Block Diagram of Configuration)

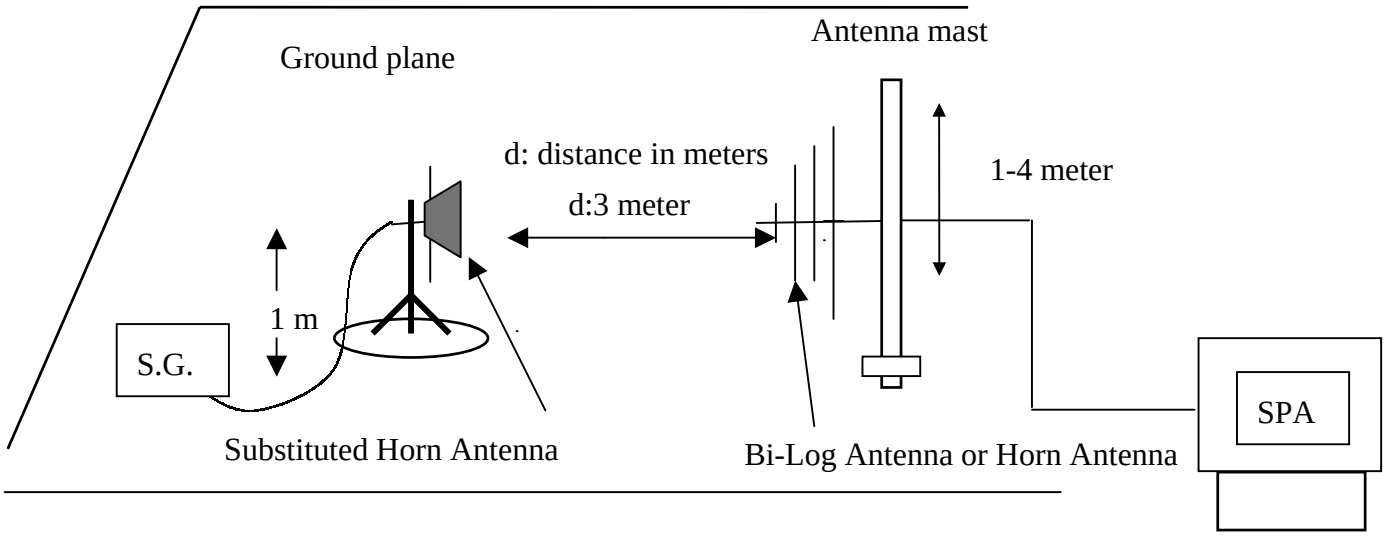
(A) Radiated Emission Test Set-up (Frequency below 1GHz)



(B) Radiated Emission Test Set-up (Frequency above 1GHz)



(C) Substituted Method Test Set-up



6.3 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 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 (dBi) – Cable (dB)

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

6.4 Measurement Equipment Used:

EQUIPMENT TYPE	MFR	Model No.	Serial No.	LAST CAL.	Cal. Due.
Spectrum Analyzer	Agilent	E4446A	US42510252	04/28/2003	04/27/2004
Spectrum Analyzer	R&S	FSP30	100112	06/29/2003	06/28/2004
Pre-Amplifier	HP	8447D	2944A09173	03/04/2003	03/03/2004
Horn antenna	EMCO	3115	00022250	02/25/2003	02/26/2004
Pre-Amplifier	HP	8449B	3008B00965	10/01/2002	10/02/2003
Low Loss Cable#40	HUBER+SUHNER	SUCOFLEX 104EPA-10M	19431	04/09/2003	04/08/2004
Turn Table	EMCO	2081-1.21	9709-1885	N.C.R	N.C.R
Antenna Tower	EMCO	2075-2	9707-2060	N.C.R	N.C.R
Controller	EMCO	2090	9709-1256	N.C.R	N.C.R
Site NSA	C&C	N/A	N/A	09/07/2002	09/06/2003
S.G.	HP	83630B	3844A01022	01/15/2003	01/14/2004
Low Loss Cable#38	HUBER+SUHNER	SUCOFLEX 104EPA-6M	19443	04/09/2003	04/08/2004
Substituted Horn	EMCO	3115	00022256	02/25/2003	02/26/2004

6.5 Measurement Result

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	129.00	26.11	8.45	3.95	30.61	33.00
	Y	1850.20	512	H	126.33	23.73	8.45	3.95	28.23	33.00
	Z	1850.20	512	H	129.17	26.57	8.45	3.96	31.06	33.00
GSM	X	1880.00	661	V	128.33	25.64	8.48	3.99	30.13	33.00
	Y	1880.00	661	H	126.17	23.74	8.48	3.99	28.23	33.00
	Z	1880.00	661	H	128.50	26.07	8.48	3.99	30.56	33.00
GSM	X	1910.00	810	V	127.17	24.67	8.51	4.04	29.14	33.00
	Y	1910.00	810	H	125.00	22.74	8.51	4.04	27.21	33.00
	Z	1910.00	810	H	129.00	26.74	8.51	4.04	31.21	33.00

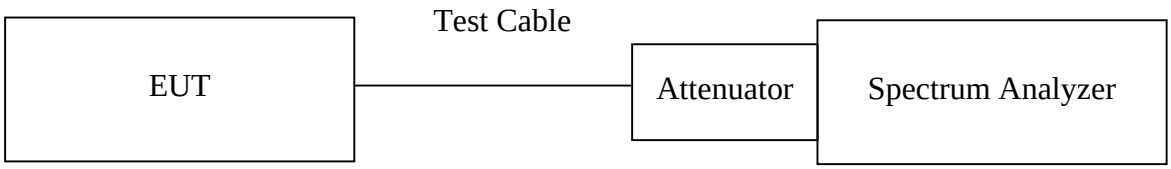
EUT Mode	EUT Pol.	Frequency (MHz)	CH	Antenna Pol.	SPA Reading (dBuV)	S.G. Output (dBm)	Antenna Gain (dBi)	Cable Loss (dB)	EIRP (dBm)	Limit (dBm)
GPRS (Class 10)	X	1850.20	512	V	129.00	26.11	8.45	3.95	30.61	33.00
	Y	1850.20	512	H	126.50	23.90	8.45	3.95	28.40	33.00
	Z	1850.20	512	H	128.83	26.23	8.45	3.96	30.72	33.00
GPRS (Class 10)	X	1880.00	661	V	128.17	25.48	8.48	3.99	29.97	33.00
	Y	1880.00	661	H	126.83	24.40	8.48	3.99	28.89	33.00
	Z	1880.00	661	H	128.67	26.24	8.48	3.99	30.73	33.00
GPRS (Class 10)	X	1910.00	810	V	127.17	24.67	8.51	4.04	29.14	33.00
	Y	1910.00	810	H	127.00	24.74	8.51	4.04	29.21	33.00
	Z	1910.00	810	H	129.00	26.74	8.51	4.04	31.21	33.00

7. OCCUPIED BANDWIDTH MEASUREMENT

7.1 Standard Applicable

According to § FCC 2.1049.

7.2 Test Set-up:



Note: *Measurement setup for testing on Antenna connector*

7.3 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 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.

7.4 Measurement Equipment Used:

EQUIPMENT TYPE	MFR	Model No.	Serial No.	LAST CAL.	Cal. Due.
Spectrum Analyzer	Agilent	E4446A	US42510252	04/28/2003	04/27/2004
Spectrum Analyzer	R&S	FSP30	100112	06/29/2003	06/28/2004
Attenuator	Mini-circuit	20dB	N/A	05/15/2003	05/14/2004

7.5 Measurement Result:

EUT Mode	Frequency (MHz)	CH	Bandwidth (kHz)
GSM	1850.20	512	316.2090
	1880.00	661	311.5720
	1910.00	810	311.7460

Figure 7-1: GSM Channel Low

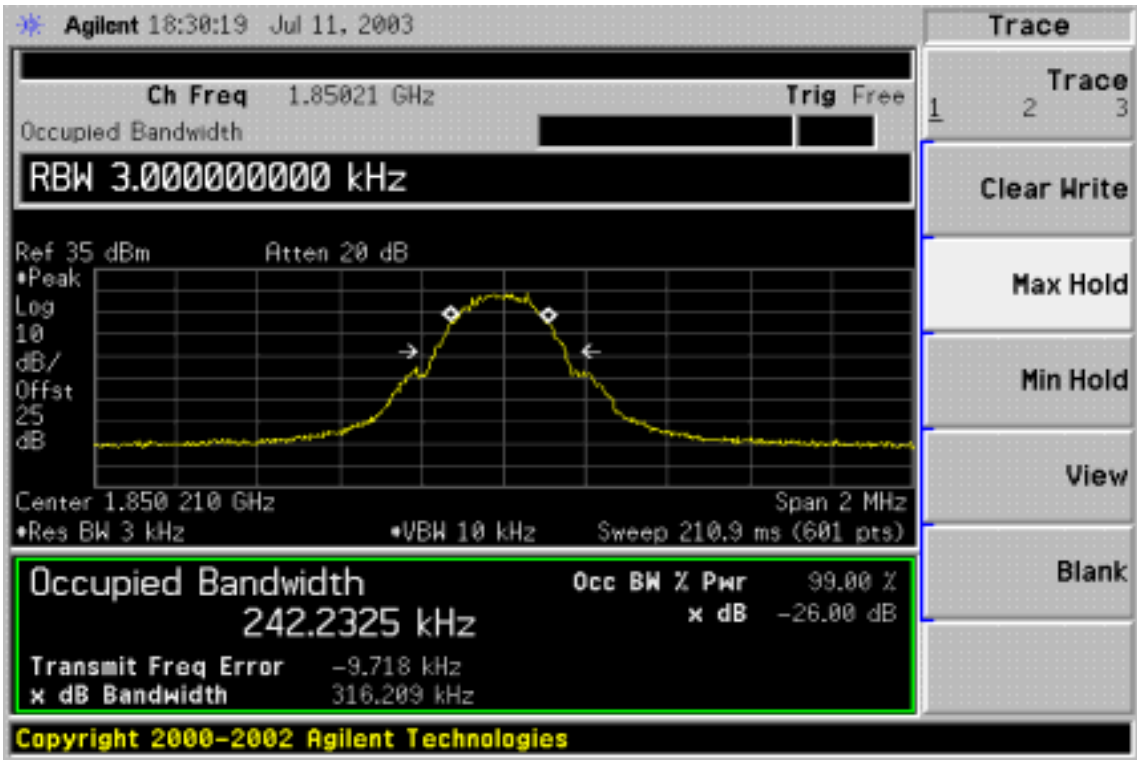


Figure 7-2 GSM Channel Mid

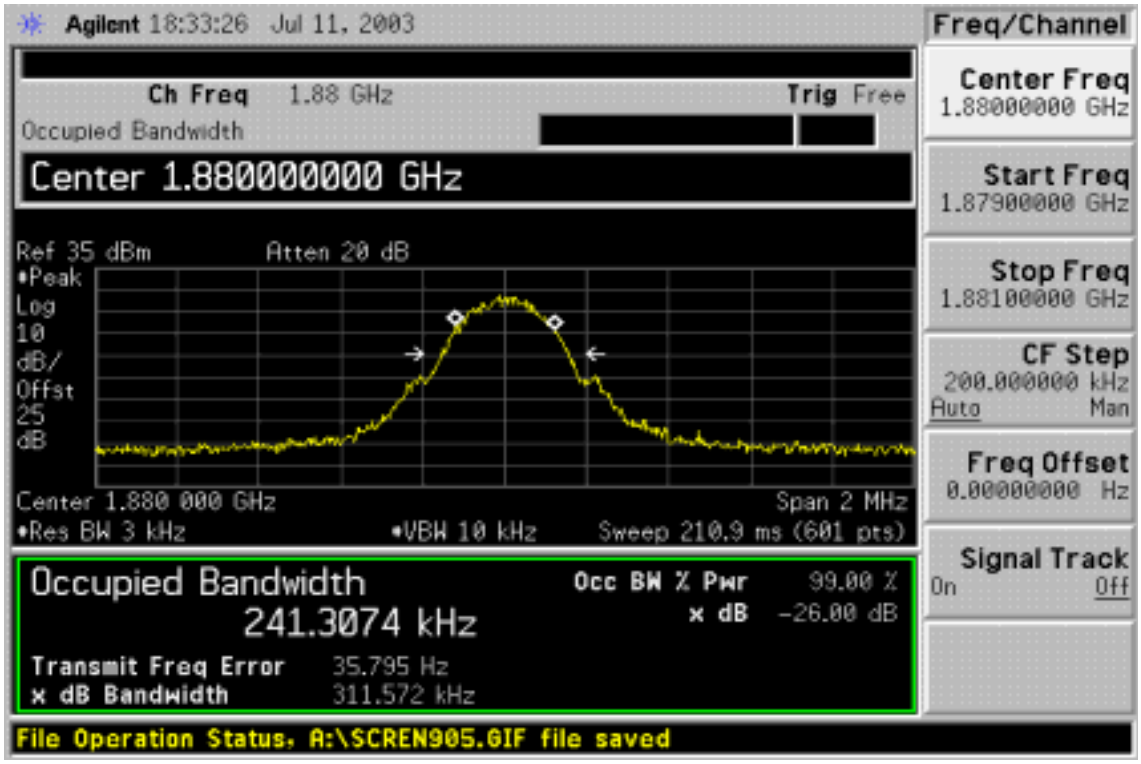
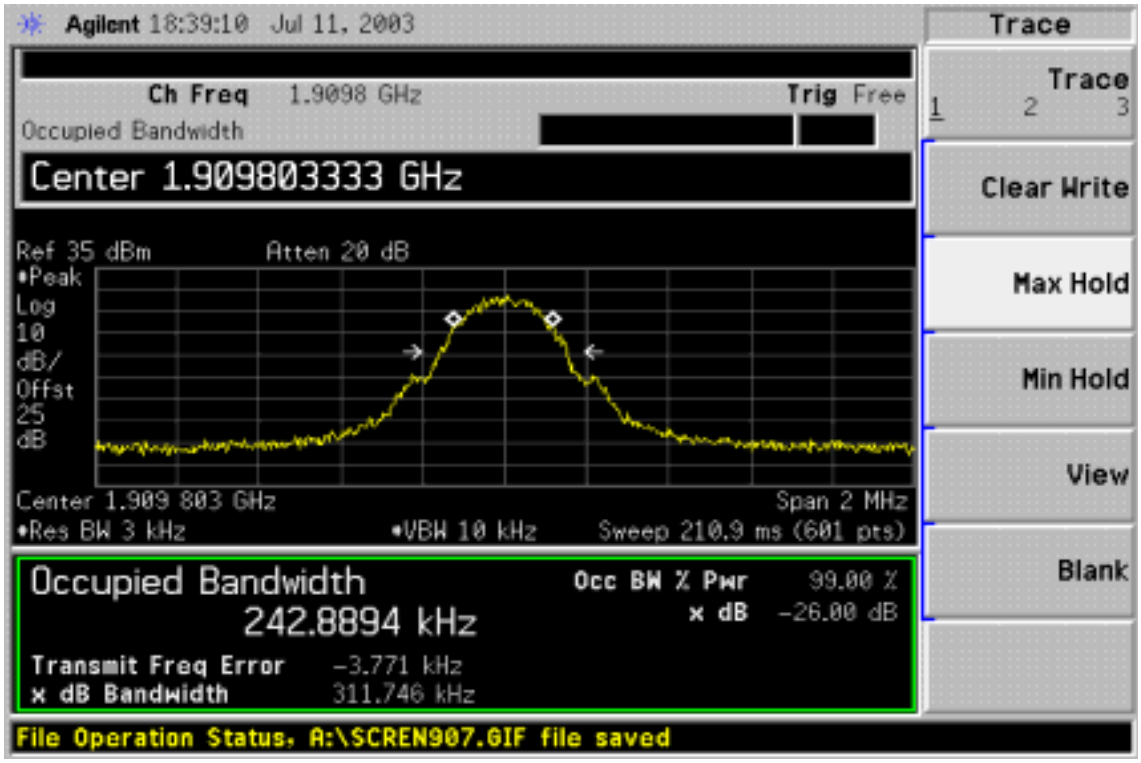


Figure 7-3: GSM Channel High



EUT Mode	Frequency (MHz)	CH	Bandwidth (kHz)
GPRS Class 10	1850.20	512	308.0250
	1880.00	661	315.3610
	1910.00	810	309.4980

Figure 7-4: GPRS Channel Low

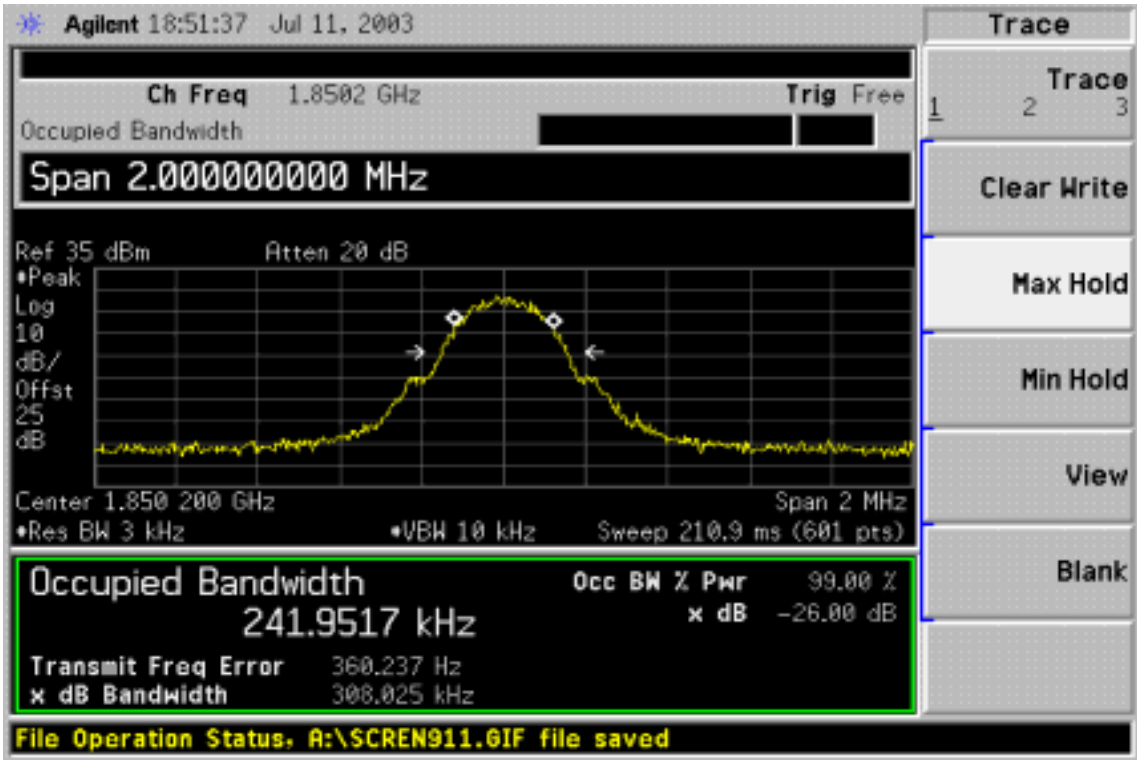


Figure 7-5 GPRS Channel Mid

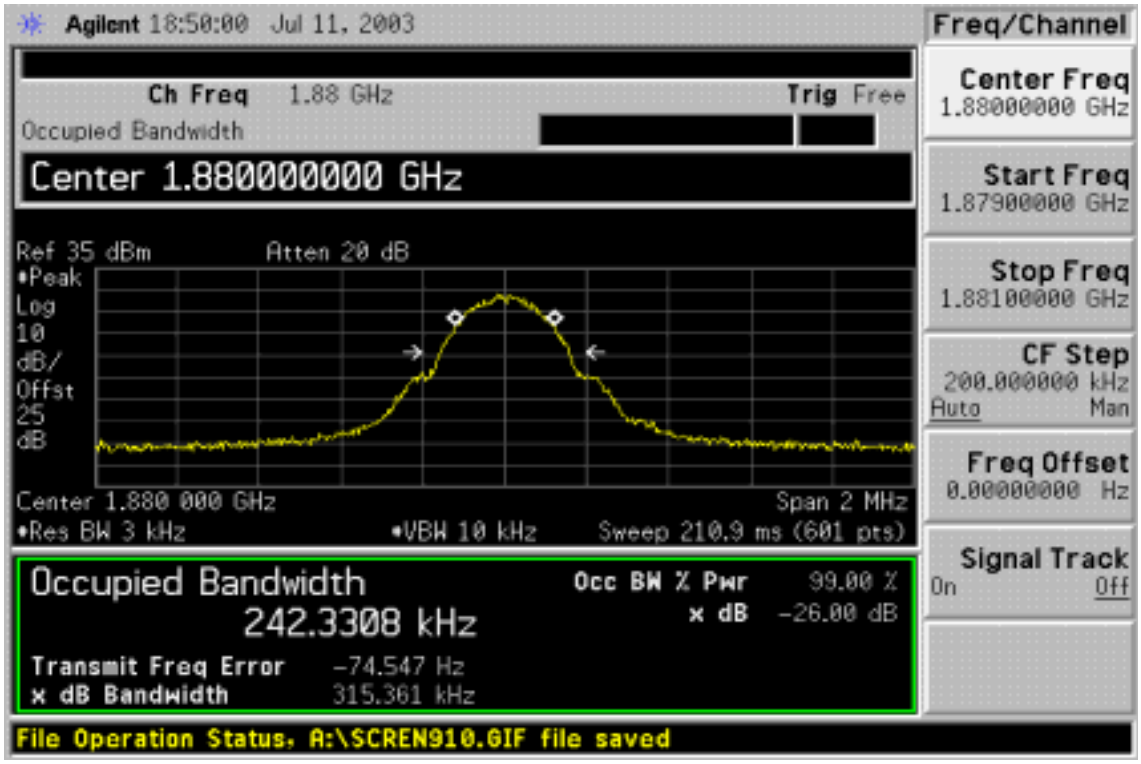
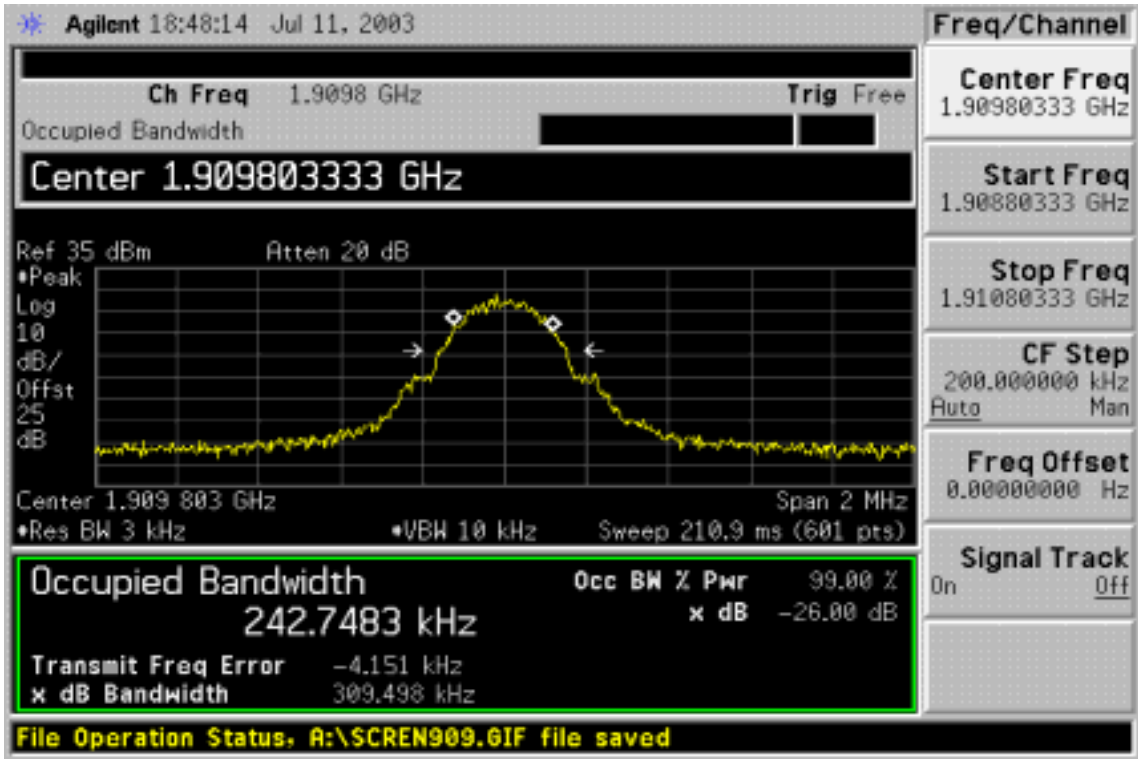


Figure 7-6: GPRS Channel High



8. OUT OF BAND EMISSION AT ANTENNA TERMINALS

8.1 Standard Applicable

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

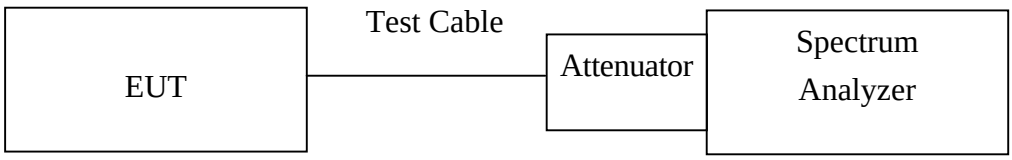
Out of Band Emissions: The mean power of emission must be attenuated below the mean power of the unpopulated carrier (P) on any frequency twice or more than twice the fundamental frequency by at lease 43 + 10 log P dB.

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.

Block Edge: 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.

8.2 Test Set-up

Out of band emission at antenna terminals:



8.3 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

Block 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.

8.4 Measurement Equipment Used:

EQUIPMENT TYPE	MFR	Model No.	Serial No.	LAST CAL.	Cal. Due.
Spectrum Analyzer	Agilent	E4446A	US42510252	04/28/2003	04/27/2004
Attenuator	Mini-circuit	20dB	N/A	05/15/2003	05/14/2004

8.5 Measurement Result

8.5.1 Out of Band emissions

Table 8-1: Summary of test result locations

Location	Mode	CH	Description
Figure 8-1	GSM	512	Out of Band emissions, 30MHz - 2.5GHz
Figure 8-2	GSM	512	Out of Band emissions, 2.5GHz - 20GHz
Figure 8-3	GSM	661	Out of Band emissions, 30MHz - 2.5GHz
Figure 8-4	GSM	661	Out of Band emissions, 2.5GHz - 20GHz
Figure 8-5	GSM	810	Out of Band emissions, 30MHz - 2.5GHz
Figure 8-6	GSM	810	Out of Band emissions, 2.5GHz - 20GHz
Figure 8-7	GPRS	512	Out of Band emissions, 30MHz - 2.5GHz
Figure 8-8	GPRS	512	Out of Band emissions, 2.5GHz - 20GHz
Figure 8-9	GPRS	661	Out of Band emissions, 30MHz - 2.5GHz
Figure 8-10	GPRS	661	Out of Band emissions, 2.5GHz - 20GHz
Figure 8-11	GPRS	810	Out of Band emissions, 30MHz - 2.5GHz
Figure 8-12	GPRS	810	Out of Band emissions, 2.5GHz - 20GHz

GSM

Figure 8-1: Out of Band emission at antenna terminals– GSM Channel Low

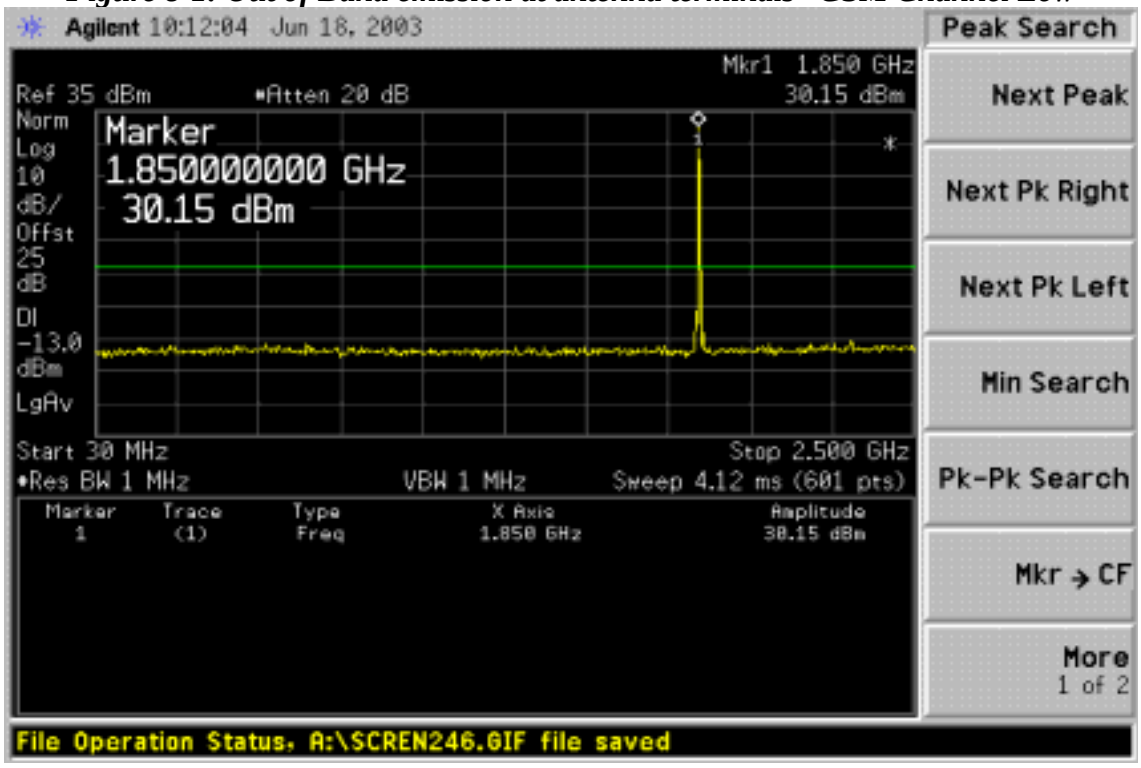


Figure 8-2: Out of Band emission at antenna terminals–GSM Channel Low

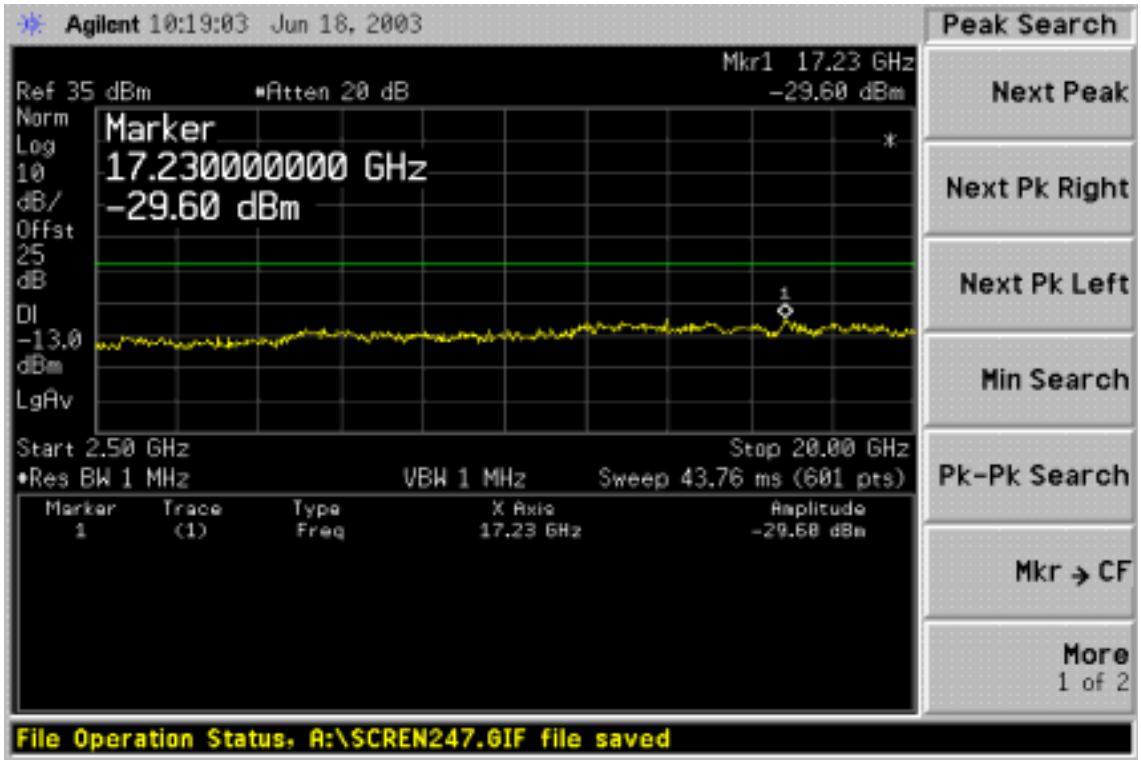


Figure 8-3: Out of Band emission at antenna terminals –GSM Channel Mid

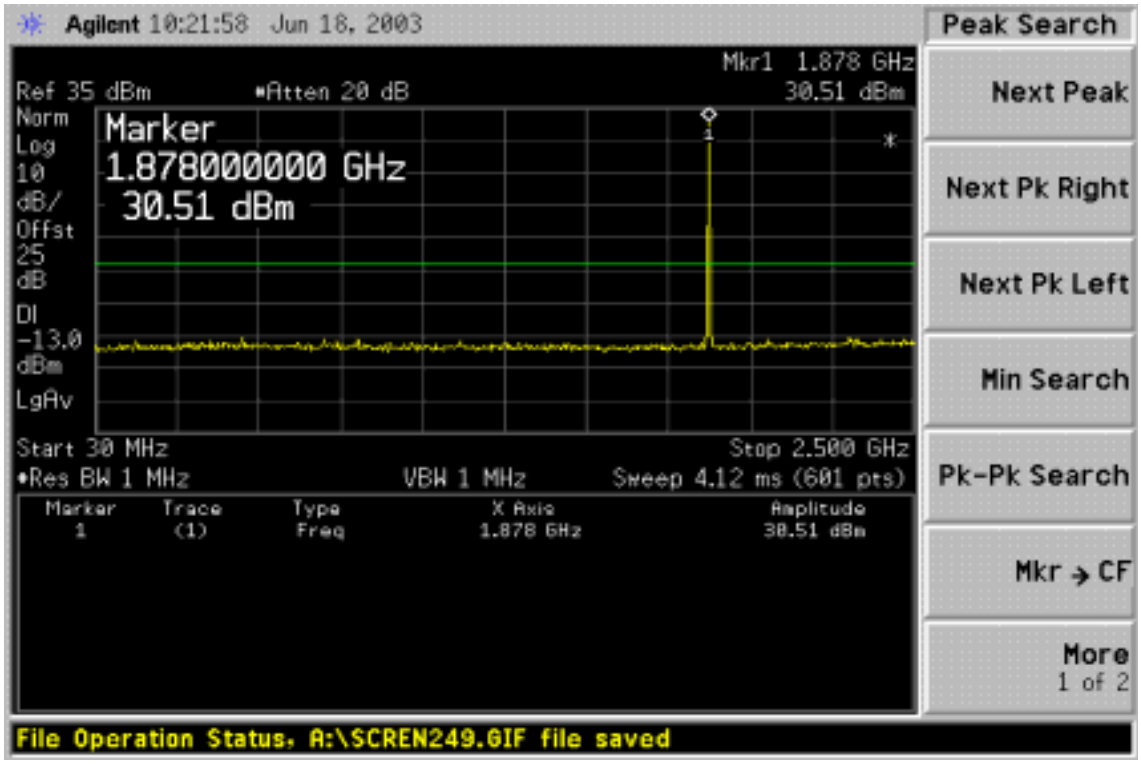


Figure 8-4: Out of Band emission at antenna terminals –GSM Channel Mid

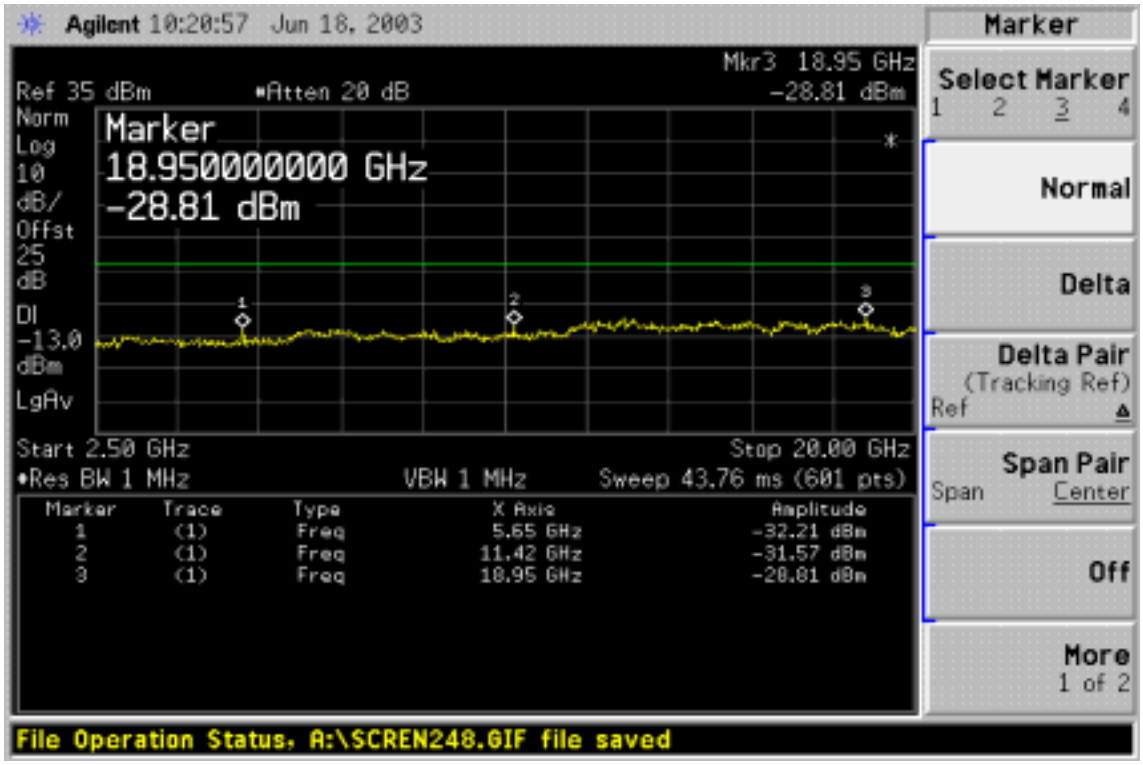


Figure 8-5: Out of Band emission at antenna terminals–GSM Channel High

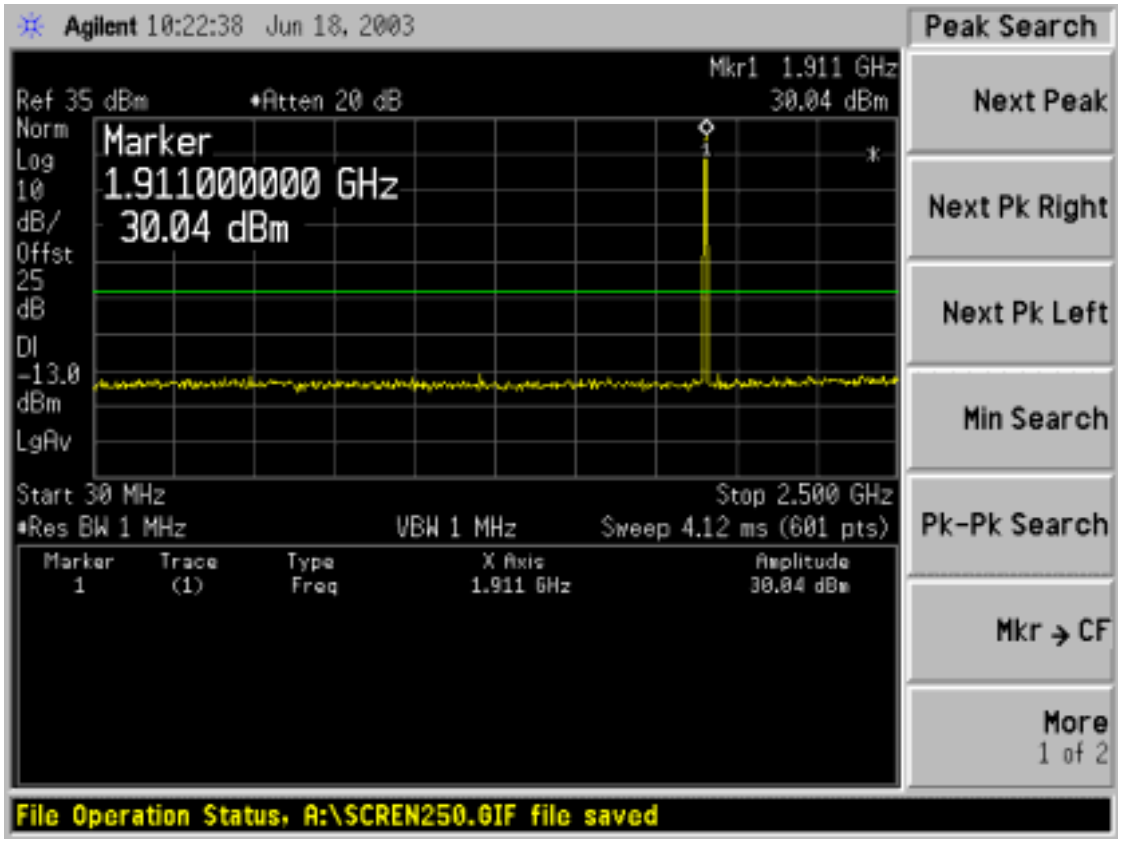
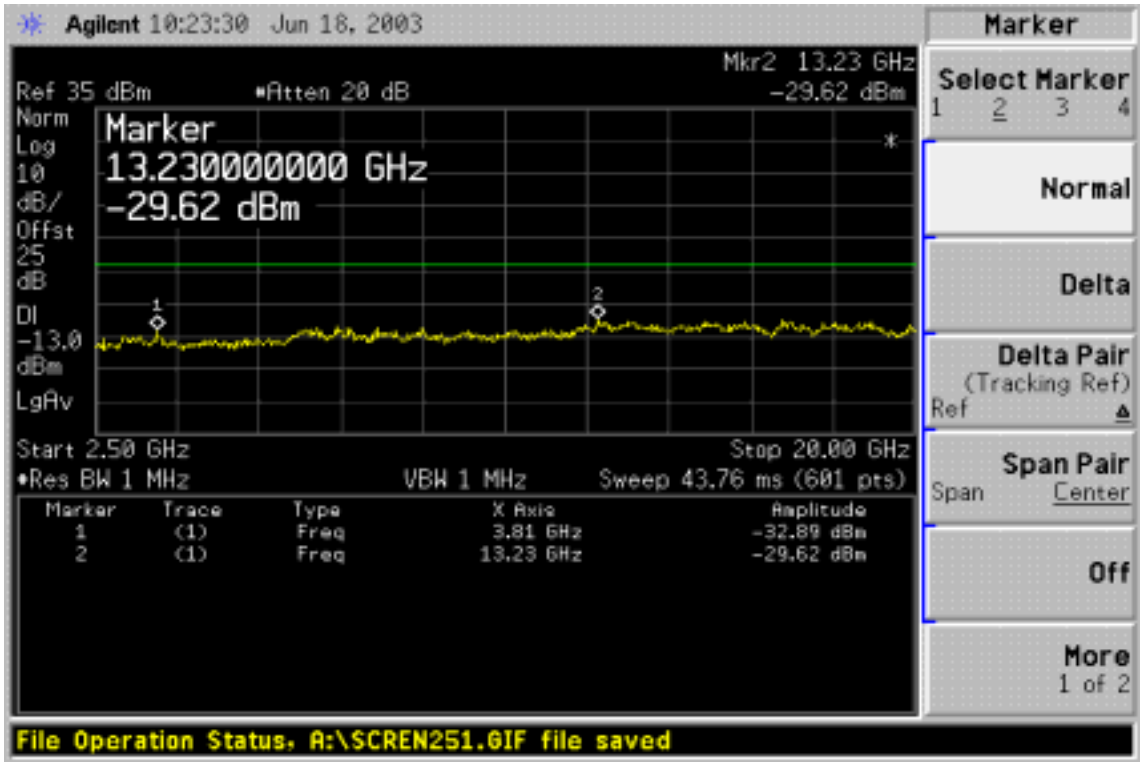


Figure 8-6: Out of Band emission at antenna terminals–GSM Channel High



GPRS

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

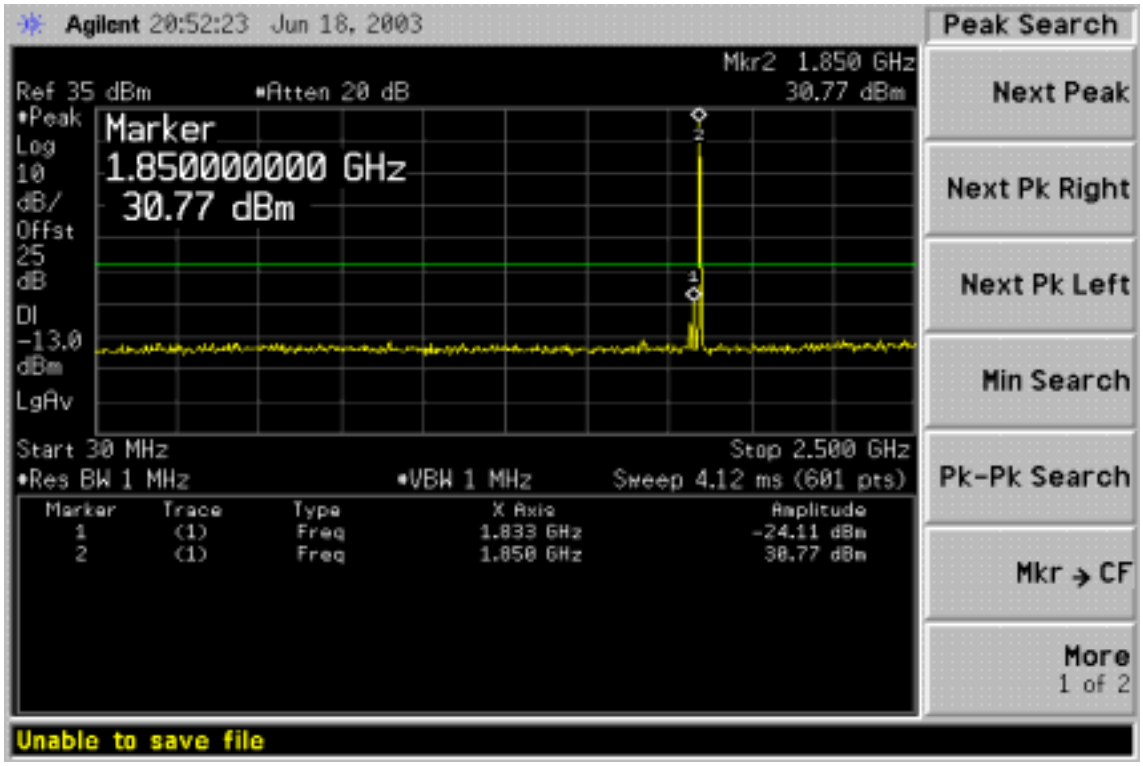


Figure 8-8: Out of Band emission at antenna terminals–GPRS Channel Low

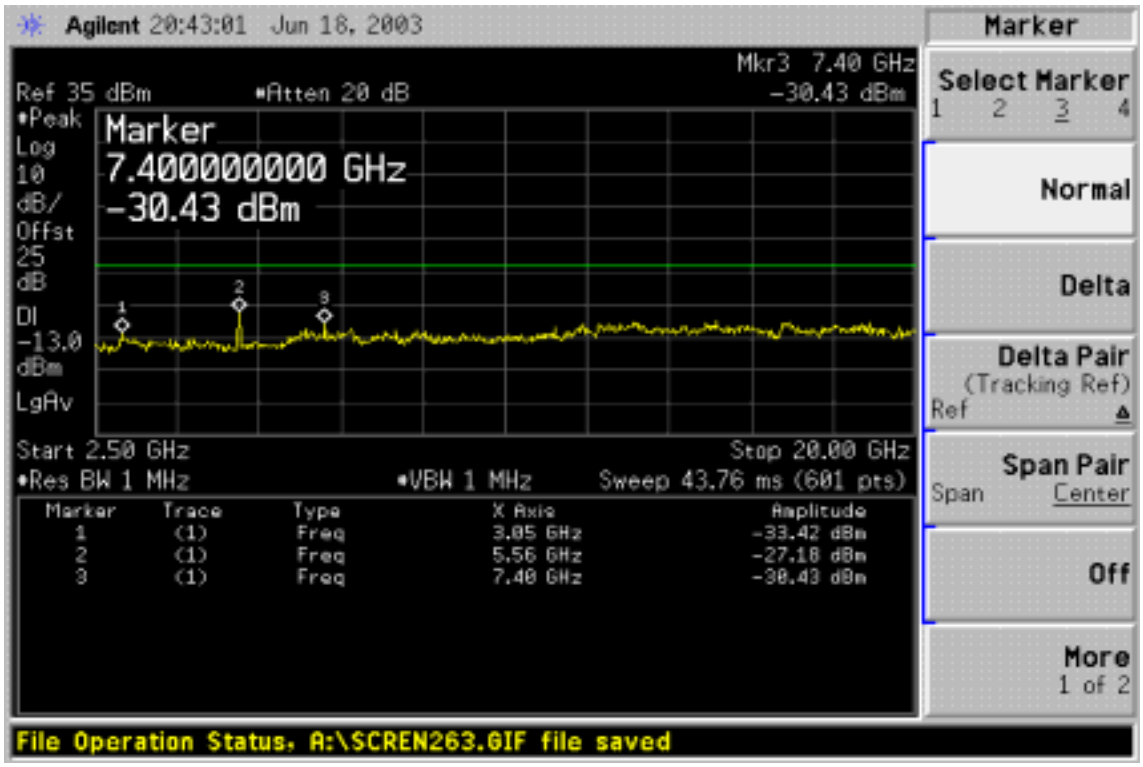


Figure 8-9: Out of Band emission at antenna terminals –GPRS Channel Mid

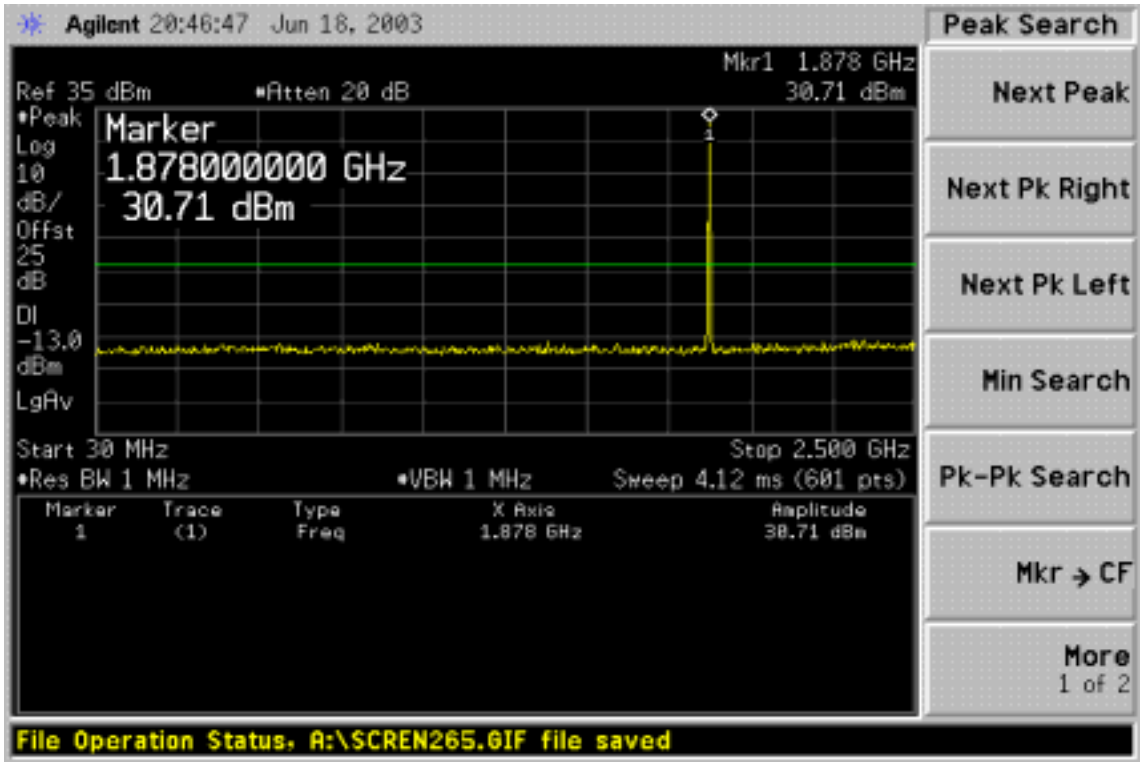


Figure 8-10: Out of Band emission at antenna terminals –GPRS Channel Mid

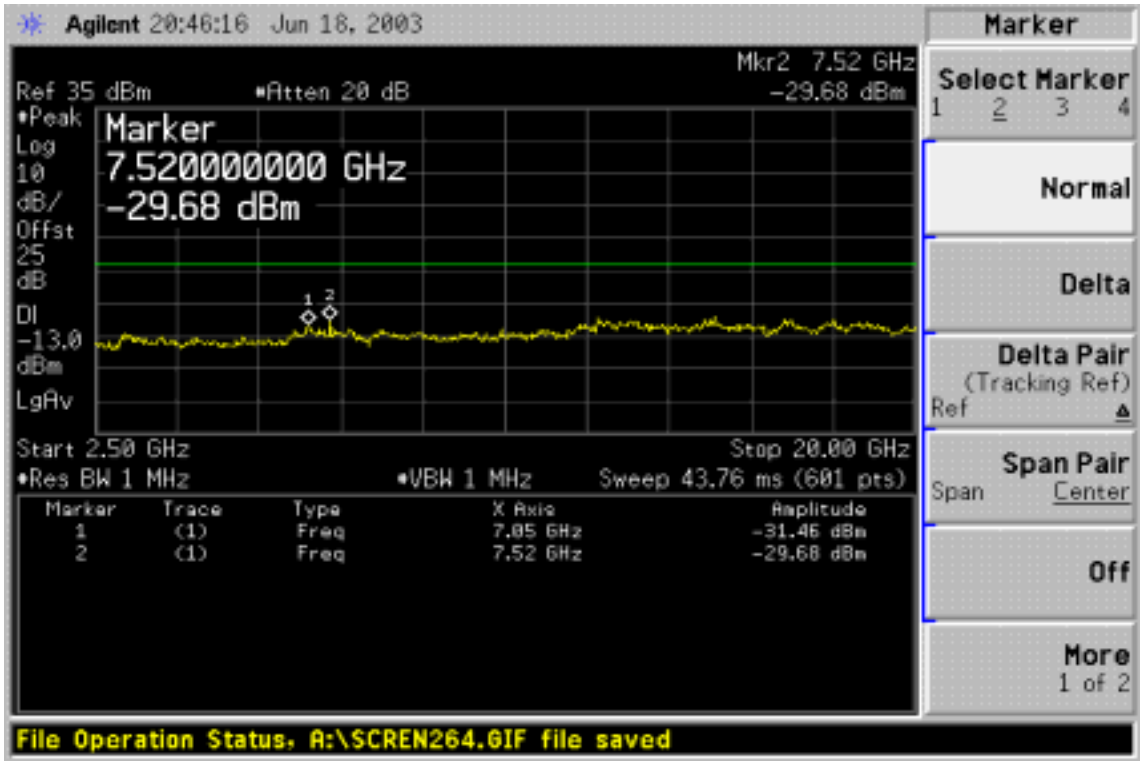


Figure 8-11: Out of Band emission at antenna terminals–GPRS Channel High

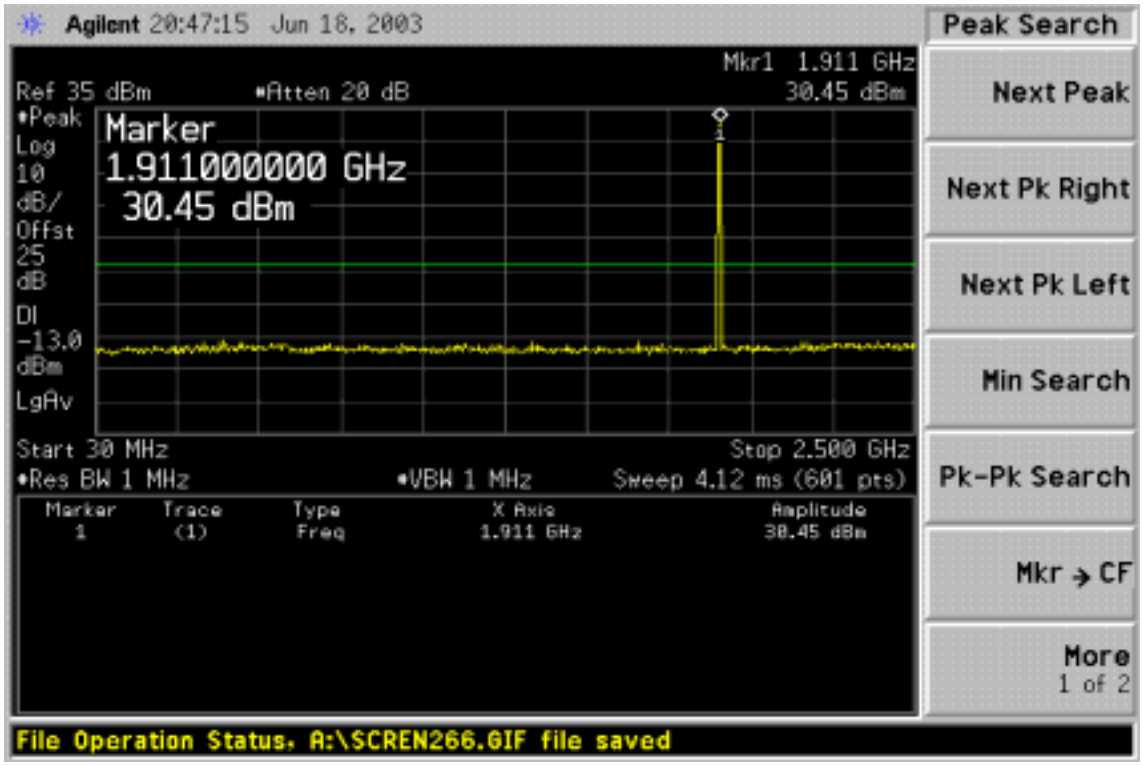
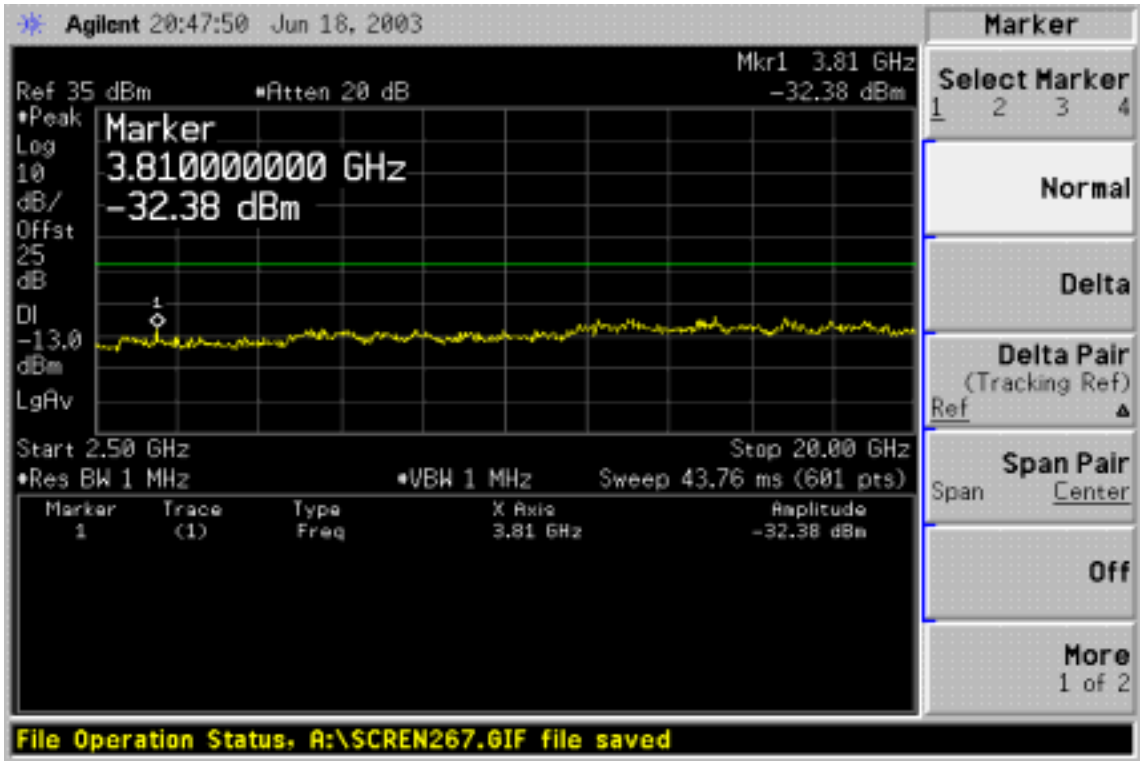


Figure 8-12: Out of Band emission at antenna terminals–GPRS Channel High



8.5.2 Block Edge emissions

Location	Mode	CH	Description
Figure 8-13	GSM	512	Block Edge Emssion
Figure 8-14	GSM	585	Block Edge Emssion
Figure 8-15	GSM	587	Block Edge Emssion
Figure 8-16	GSM	610	Block Edge Emssion
Figure 8-17	GSM	612	Block Edge Emssion
Figure 8-18	GSM	685	Block Edge Emssion
Figure 8-19	GSM	687	Block Edge Emssion
Figure 8-20	GSM	710	Block Edge Emssion
Figure 8-21	GSM	712	Block Edge Emssion
Figure 8-22	GSM	735	Block Edge Emssion
Figure 8-23	GSM	737	Block Edge Emssion
Figure 8-24	GSM	810	Block Edge Emssion
Figure 8-25	GPRS	512	Block Edge Emssion
Figure 8-26	GPRS	585	Block Edge Emssion
Figure 8-27	GPRS	587	Block Edge Emssion
Figure 8-28	GPRS	610	Block Edge Emssion
Figure 8-29	GPRS	612	Block Edge Emssion
Figure 8-30	GPRS	685	Block Edge Emssion
Figure 8-31	GPRS	687	Block Edge Emssion
Figure 8-32	GPRS	710	Block Edge Emssion
Figure 8-33	GPRS	712	Block Edge Emssion
Figure 8-34	GPRS	735	Block Edge Emssion
Figure 8-35	GPRS	737	Block Edge Emssion
Figure 8-36	GPRS	810	Block Edge Emssion

GSM

Figure 8-13 Block edge emission at antenna terminals –GSM Block A

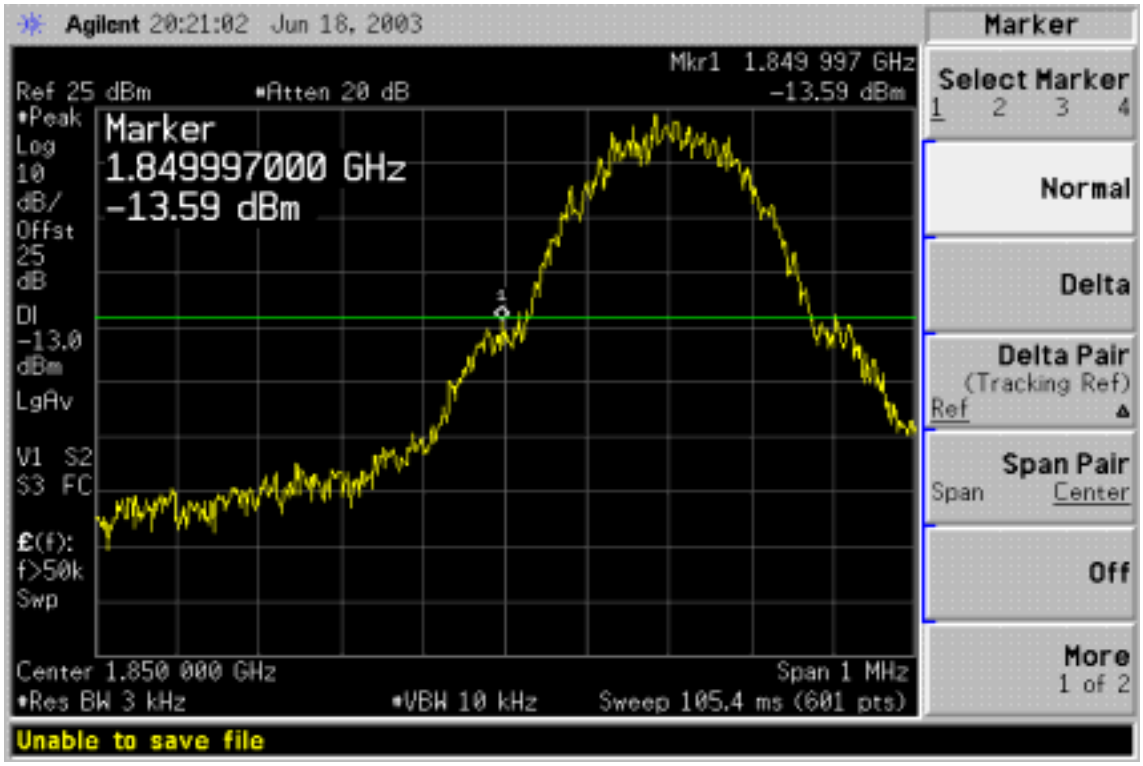


Figure 8-14: Block edge emission at antenna terminals –GSM Block A

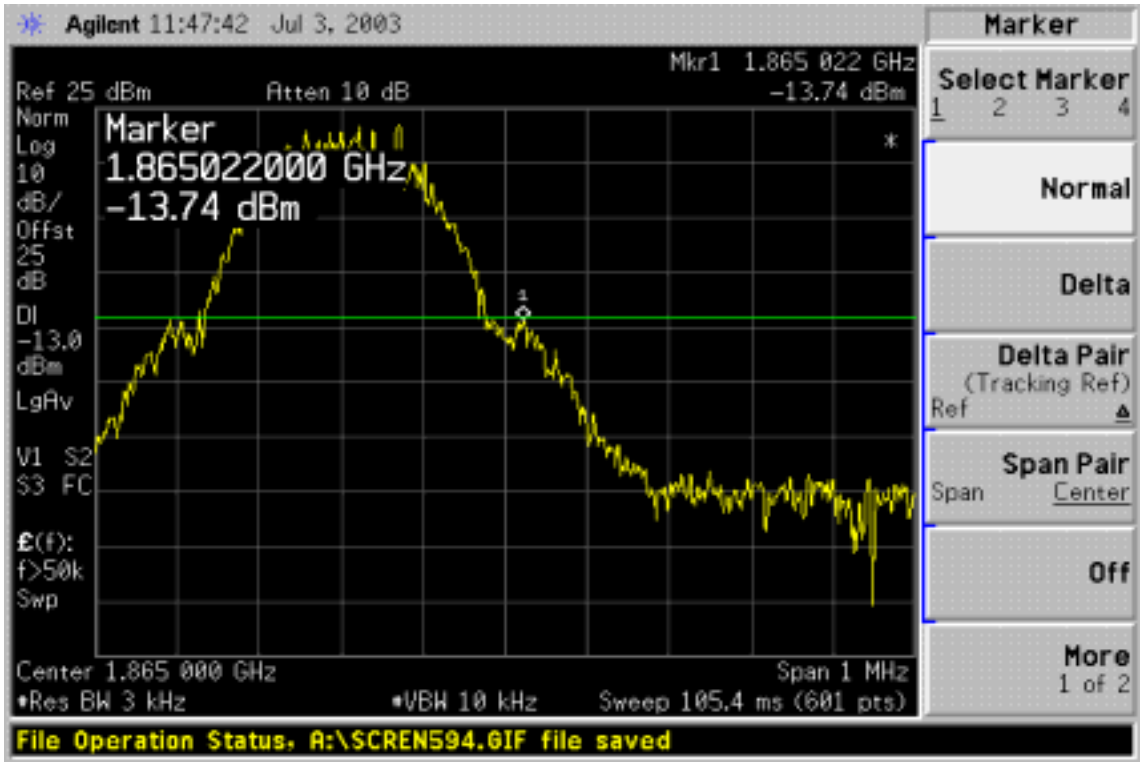


Figure 8-15 Block edge emission at antenna terminals –GSM Block D

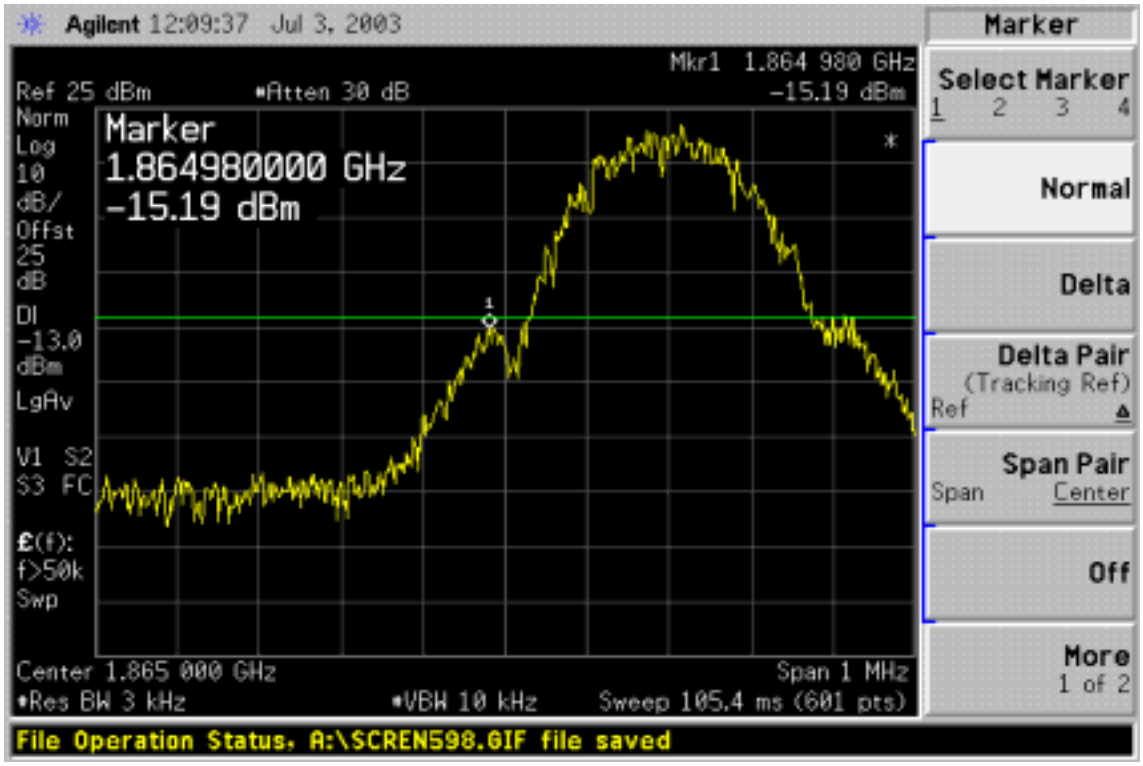


Figure 8-16 Block edge emission at antenna terminals –GSM Block D

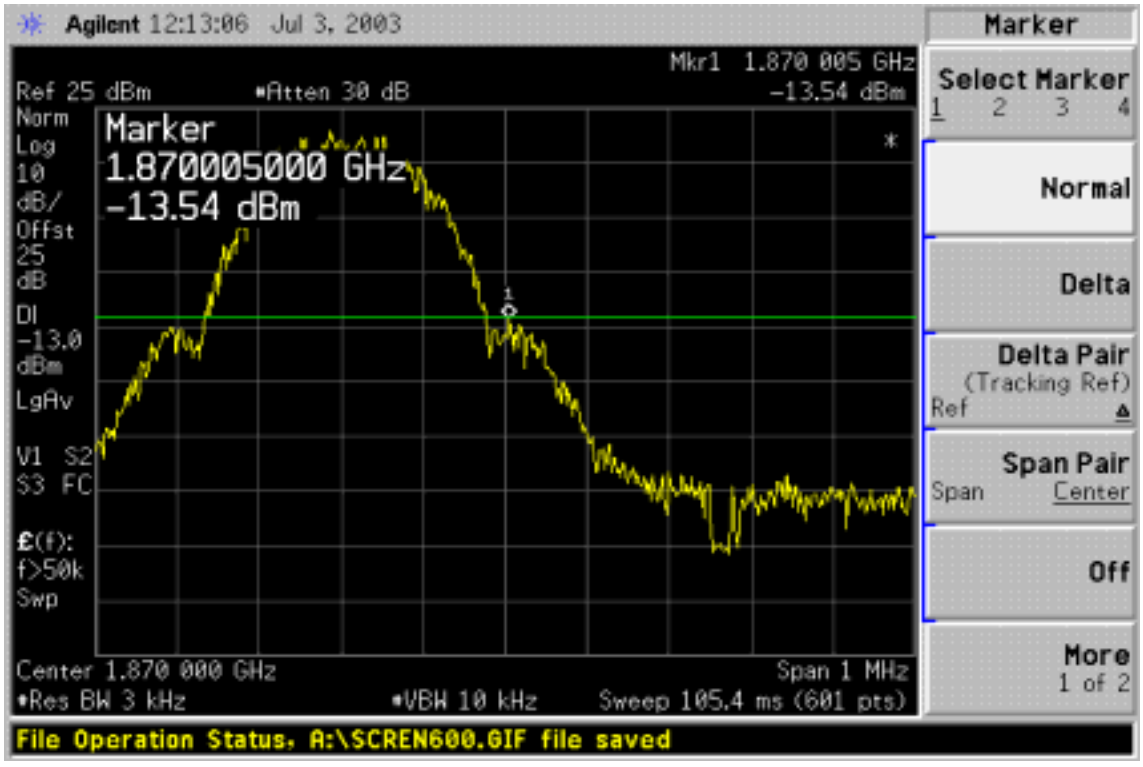


Figure 8-17 Block edge emission at antenna terminals –GSM Block B

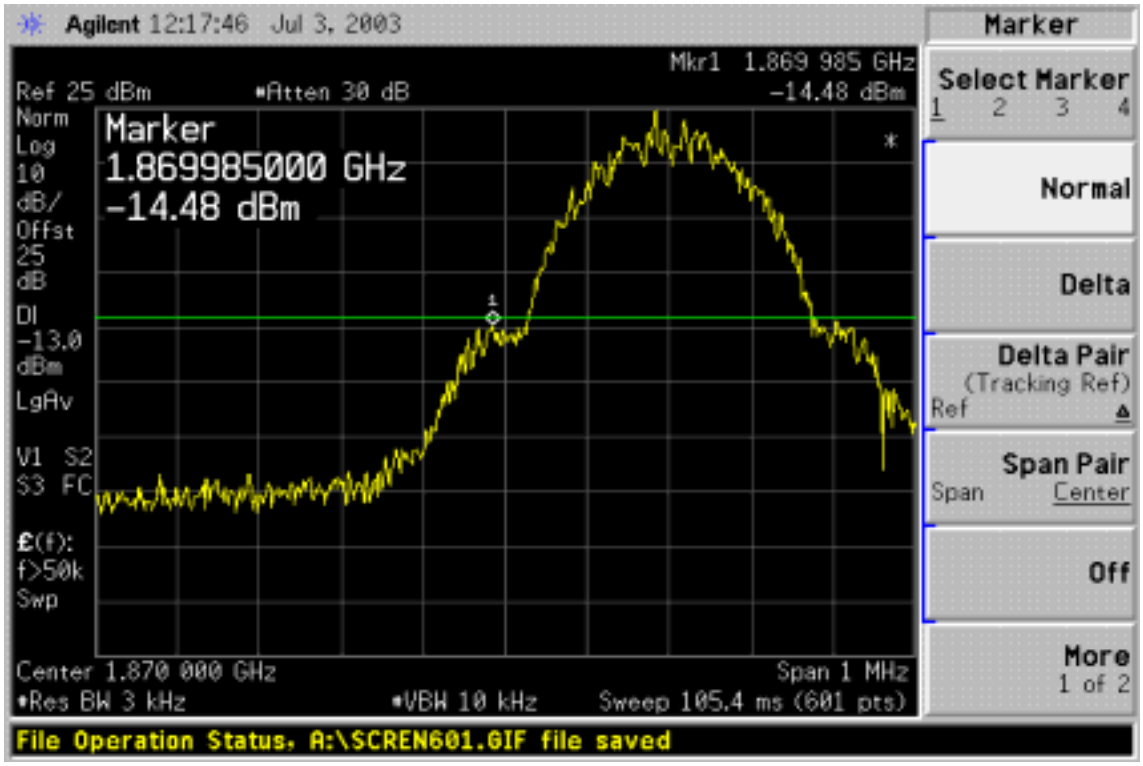


Figure 8-18 Block edge emission at antenna terminals –GSM Block B

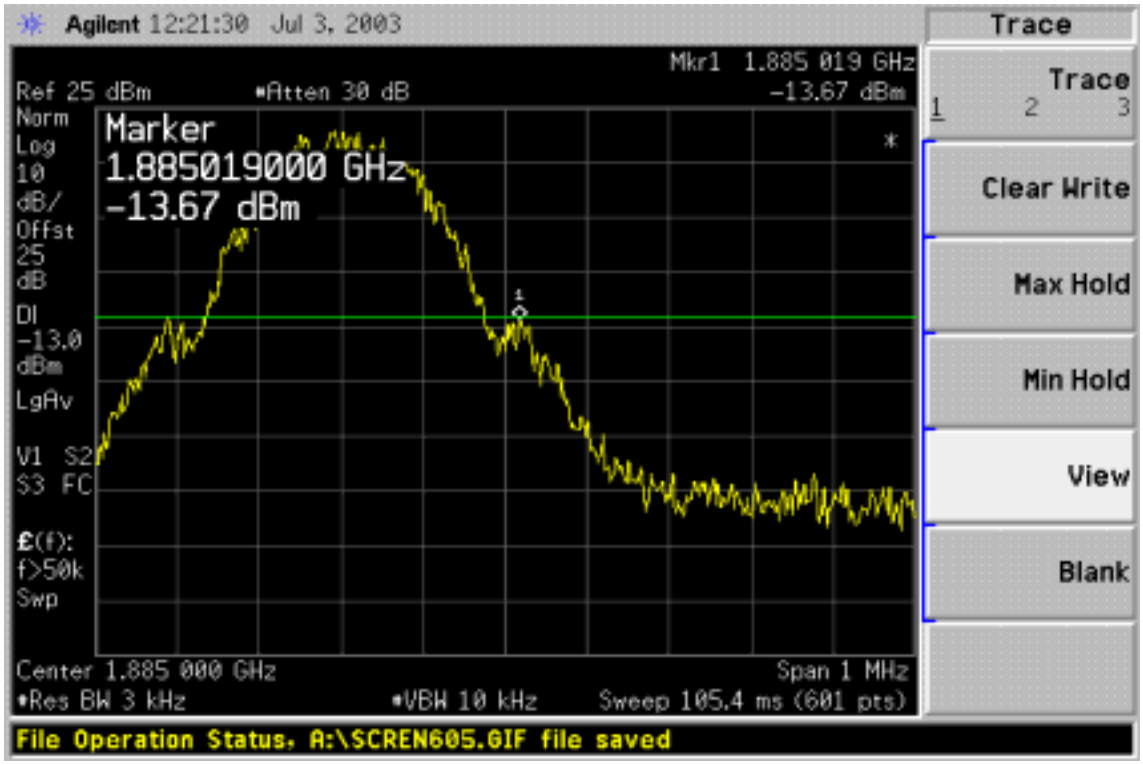


Figure 8-19 Block edge emission at antenna terminals –GSM Block E

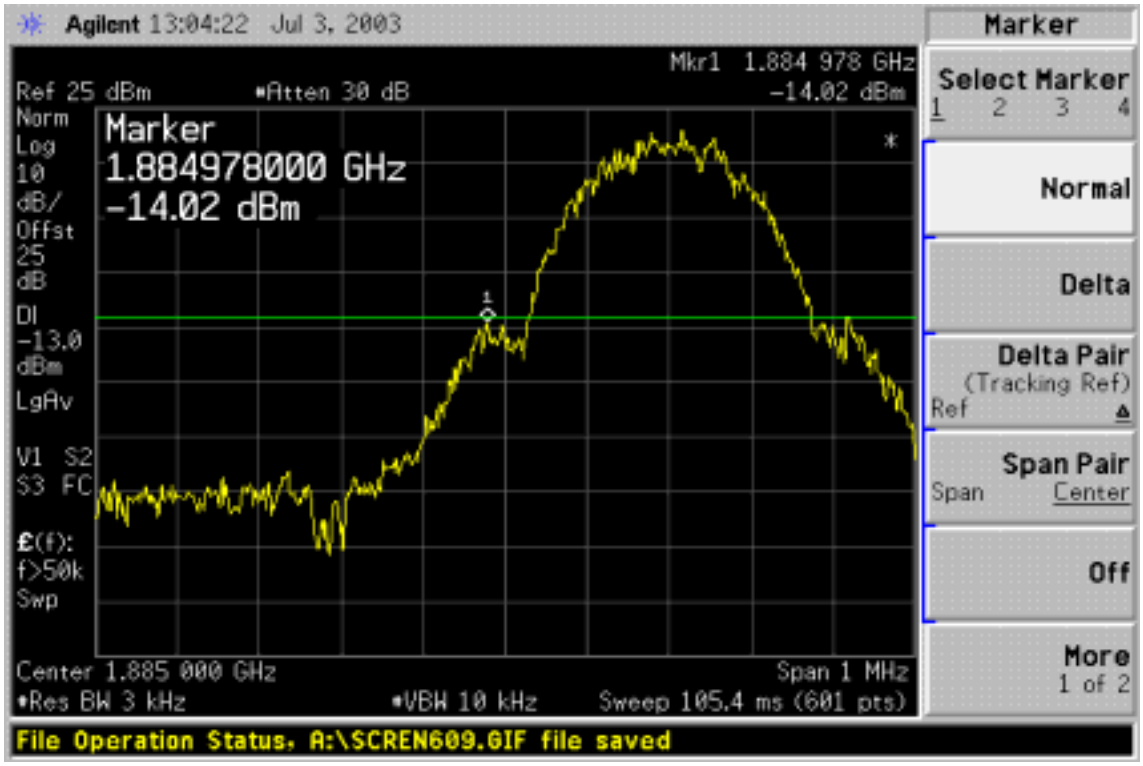


Figure 8-20 Block edge emission at antenna terminals –GSM Block E

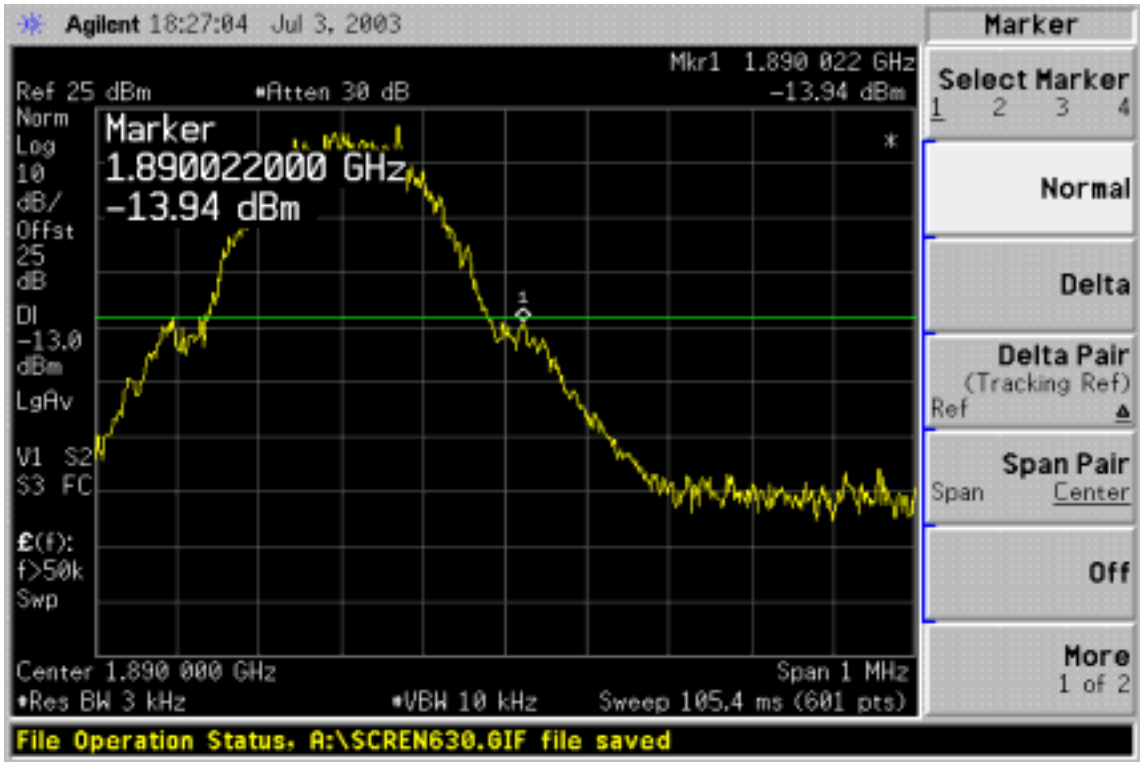


Figure 8-21 Block edge emission at antenna terminals –GSM Block F

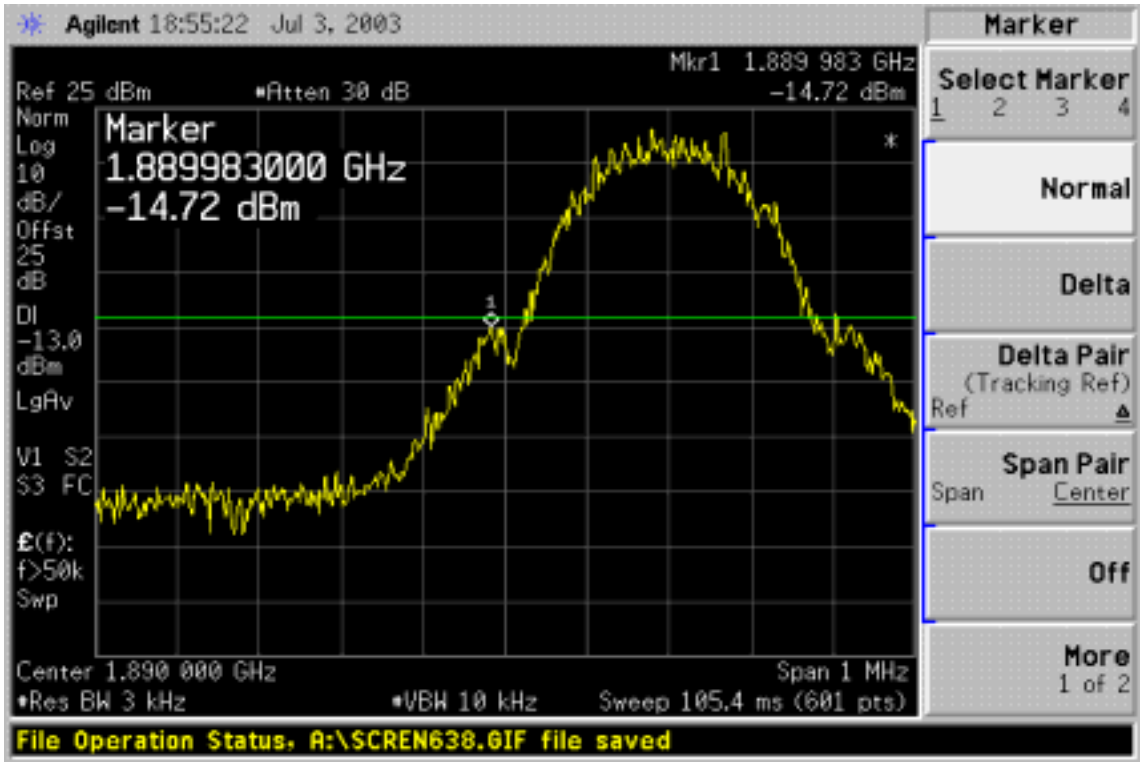


Figure 8-22 Block edge emission at antenna terminals –GSM Block F

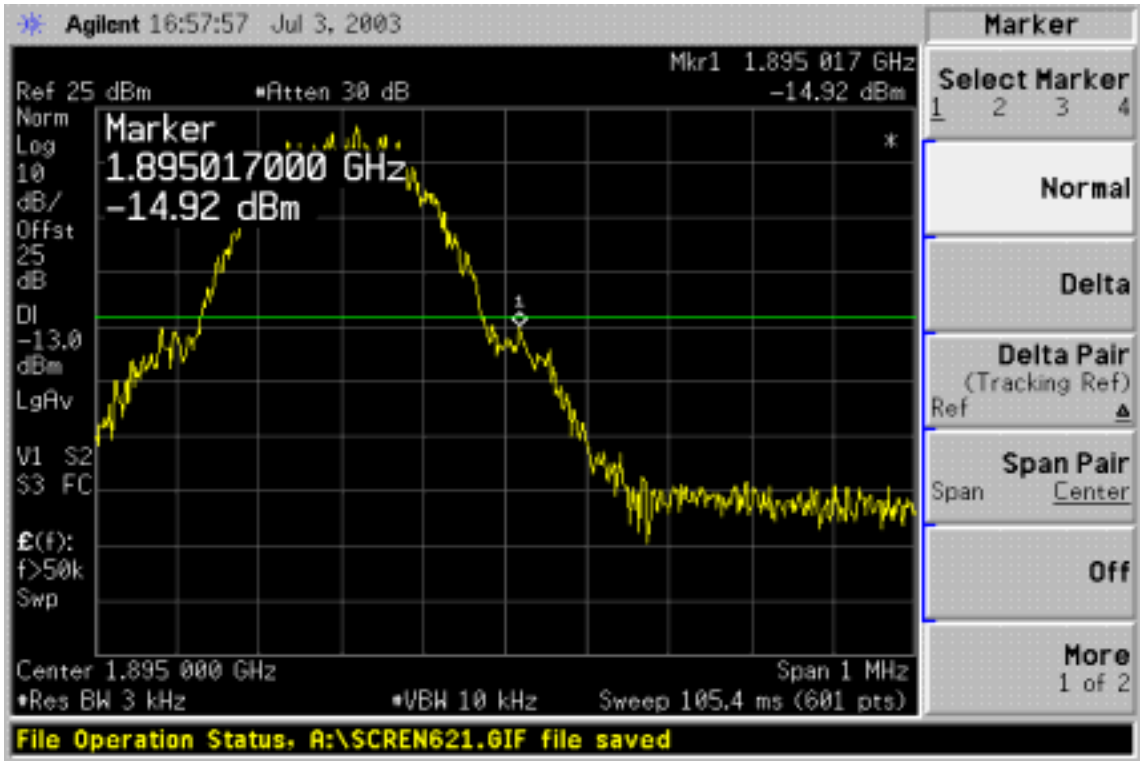


Figure 8-23 Block edge emission at antenna terminals –GSM Block C

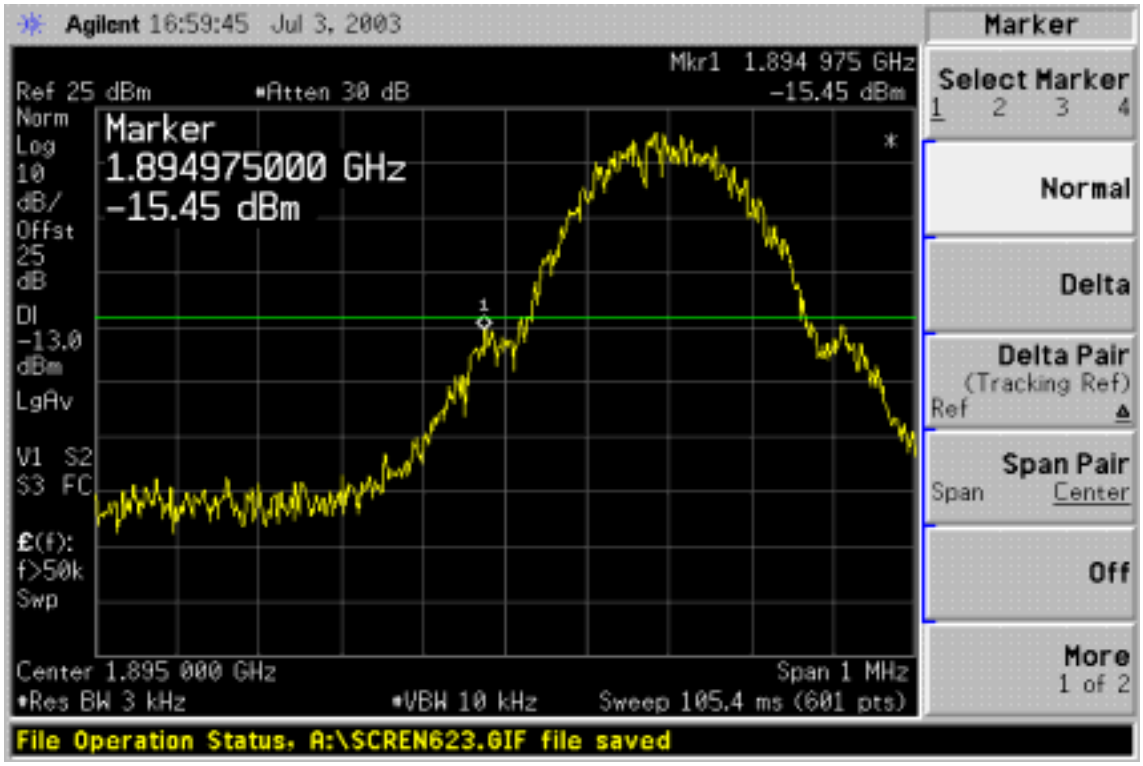
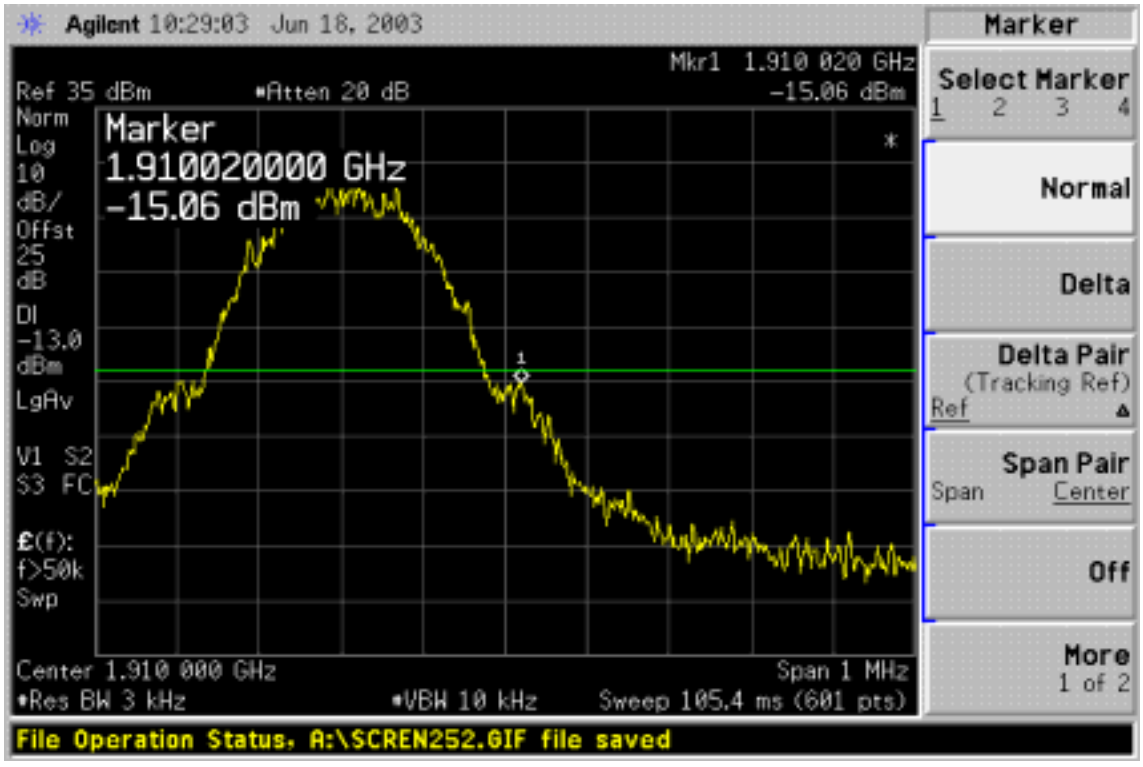


Figure 8-24 Block edge emission at antenna terminals –GSM Block C



GPRS

Figure 8-25 Block edge emission at antenna terminals –GPRS Block A

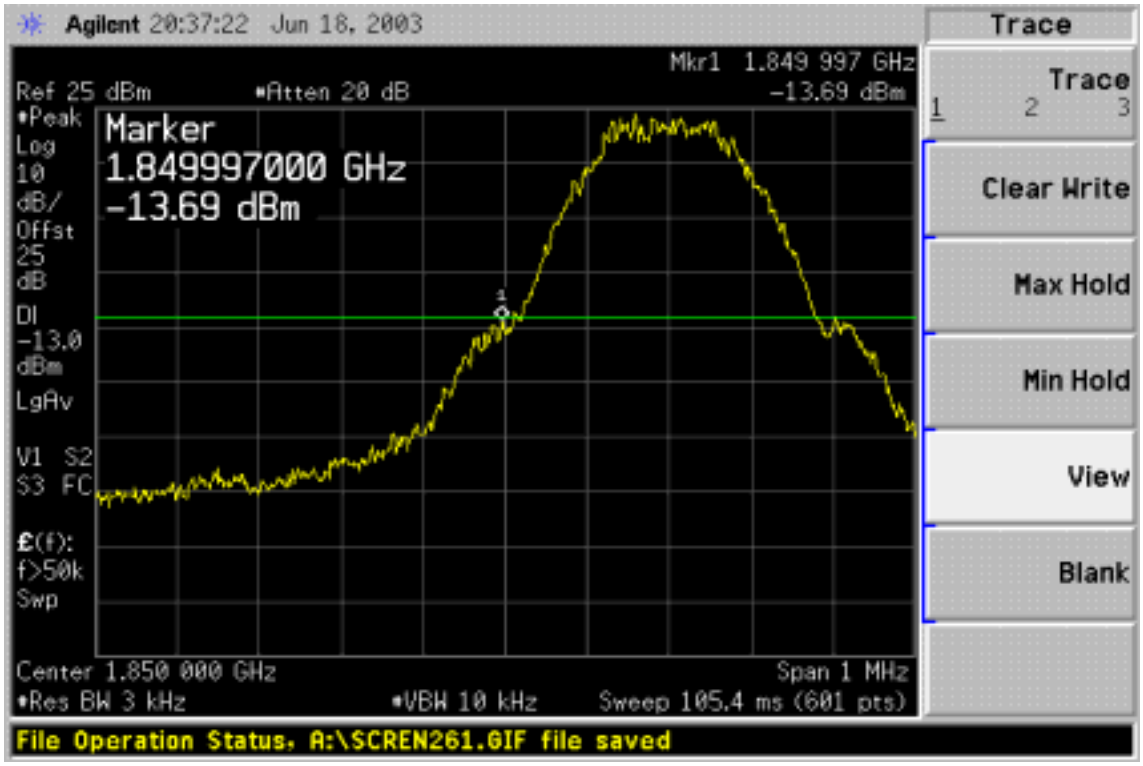


Figure 8-26 Block edge emission at antenna terminals –GPRS Block A

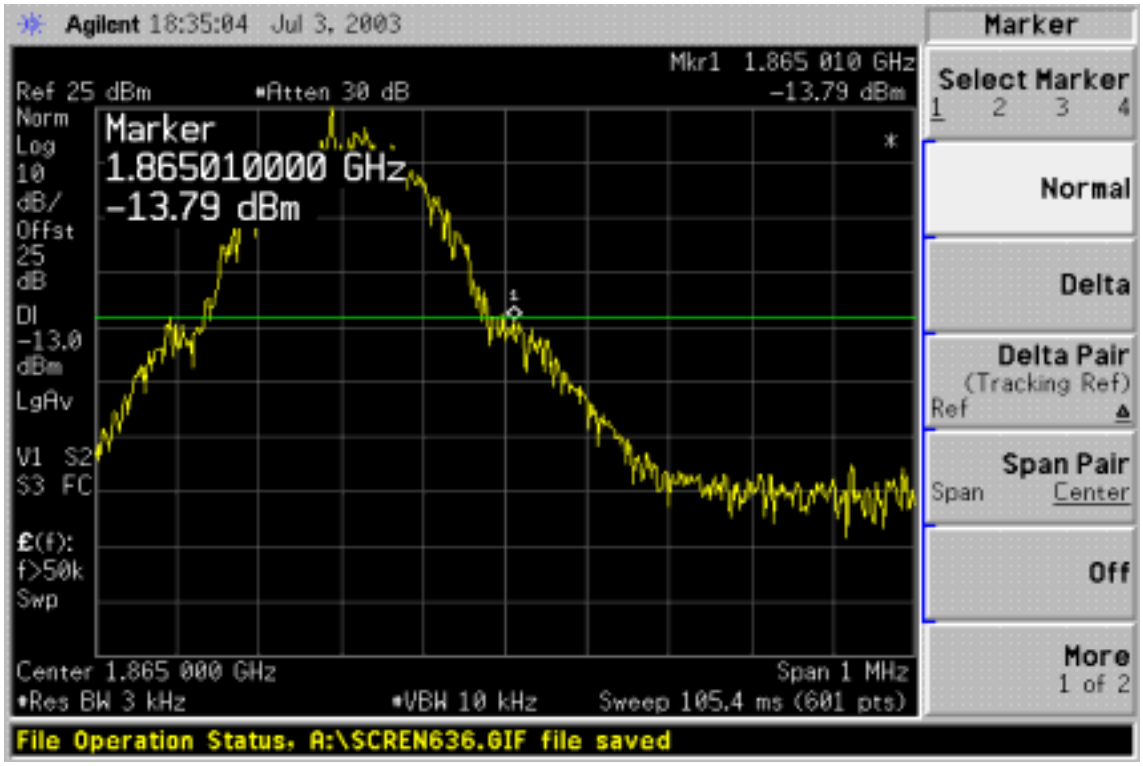


Figure 8-27 Block edge emission at antenna terminals –GPRS Block D

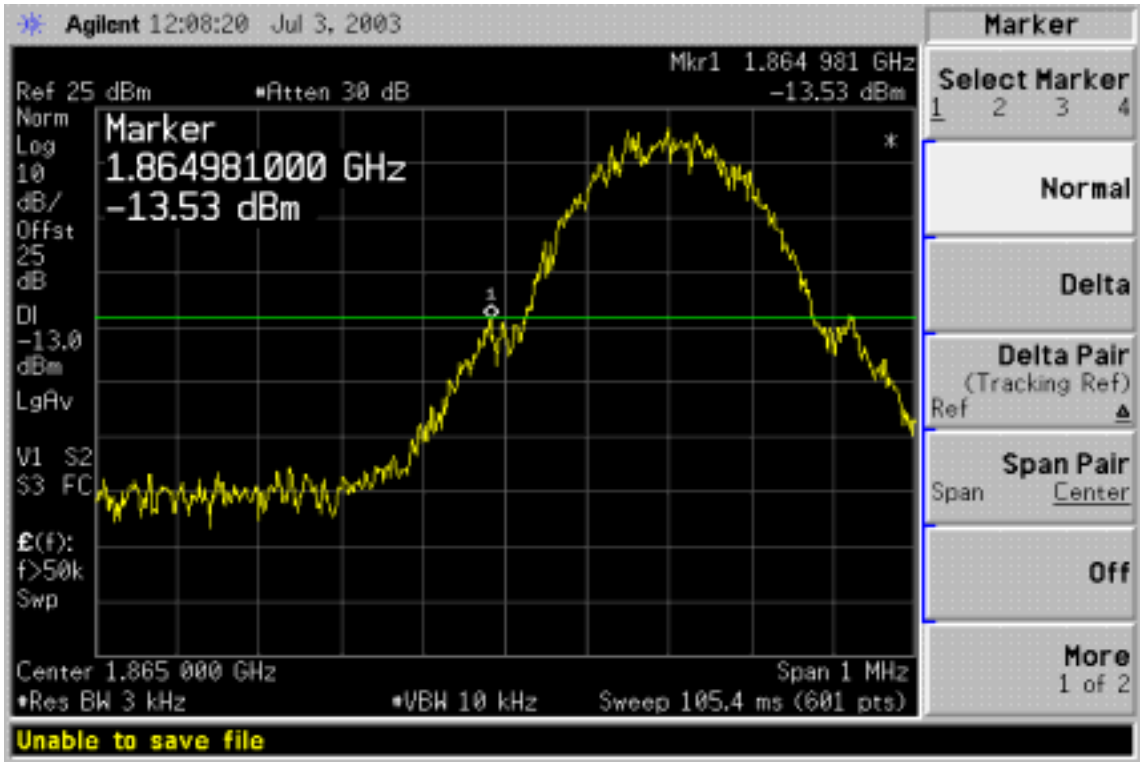


Figure 8-28 Block edge emission at antenna terminals –GPRS Block D

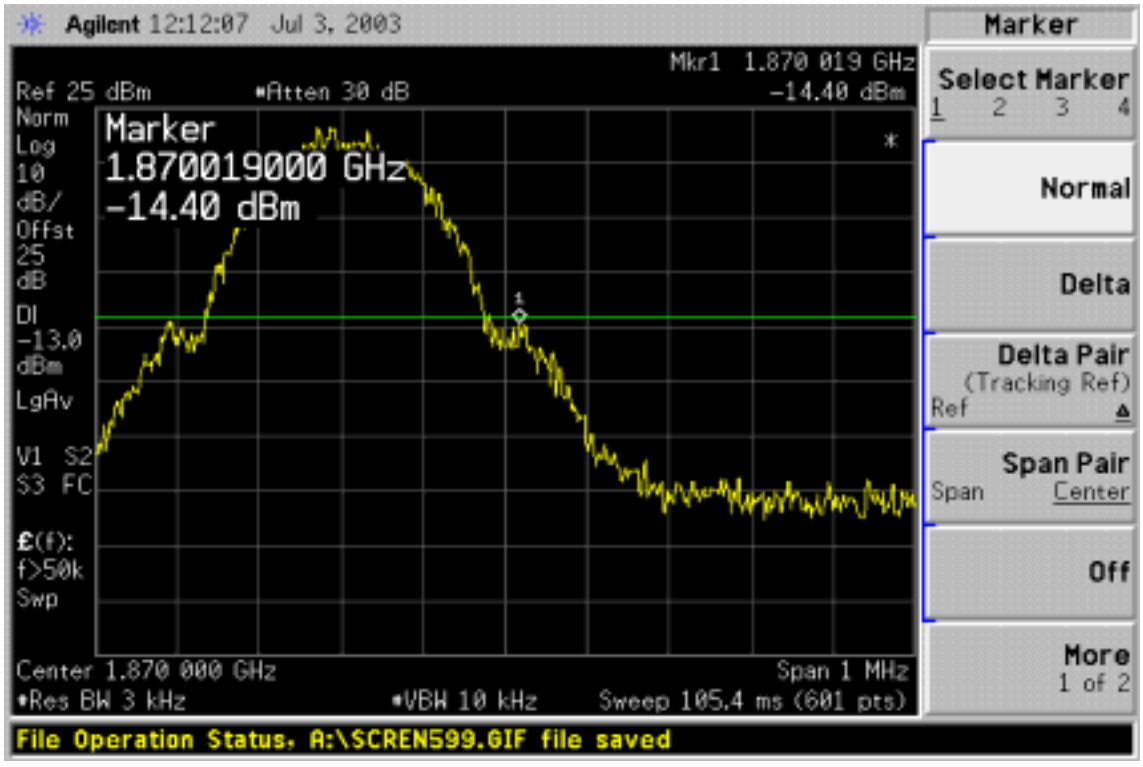


Figure 8-29 Block edge emission at antenna terminals –GPRS Block B

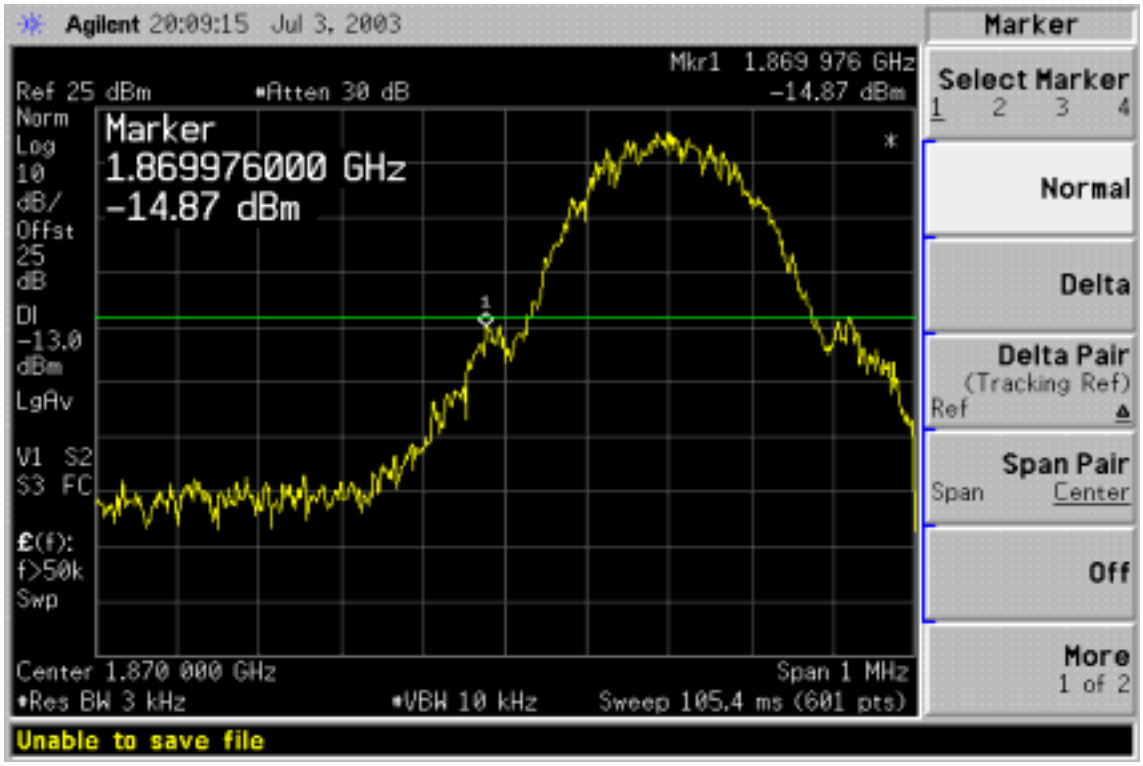


Figure 8-30 Block edge emission at antenna terminals –GPRS Block B

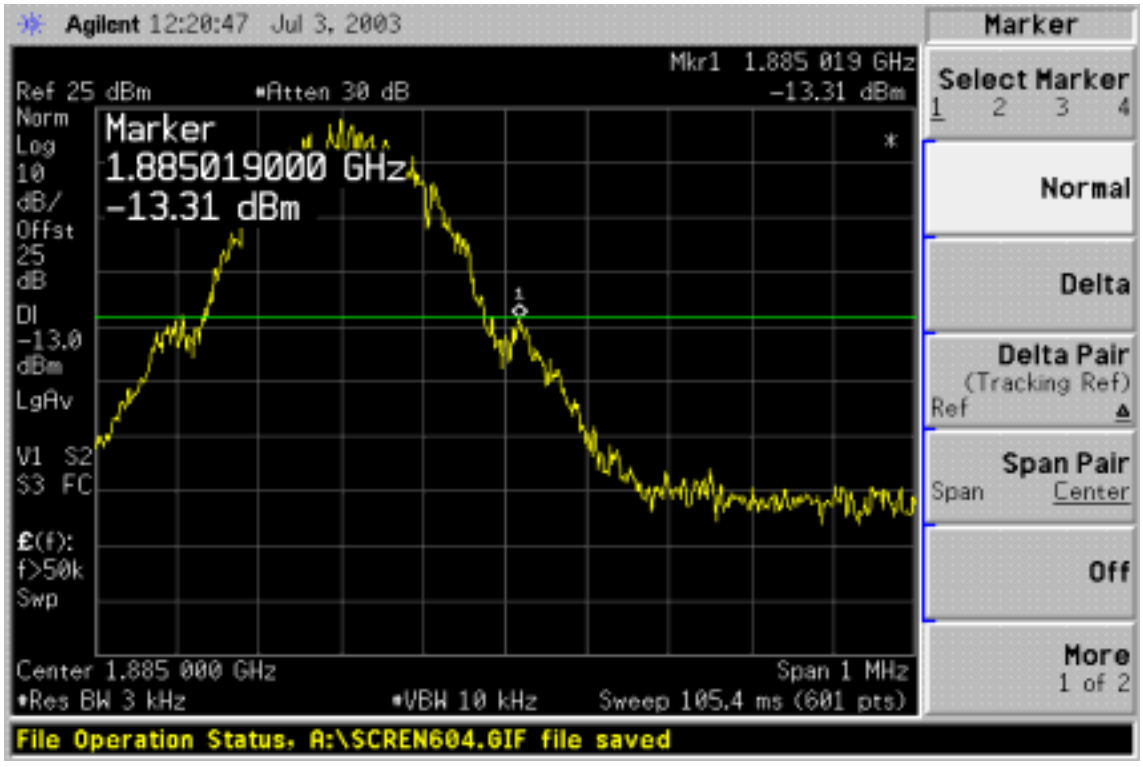


Figure 8-31 Block edge emission at antenna terminals –GPRS Block E

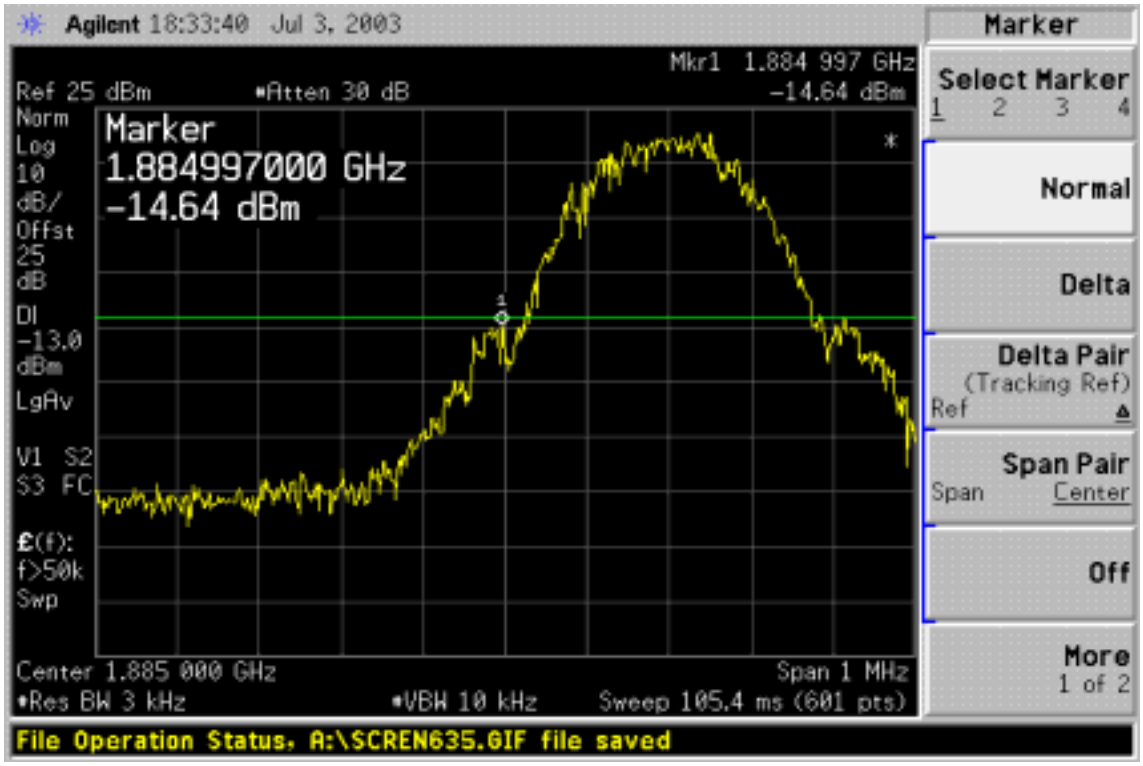


Figure 8-32 Block edge emission at antenna terminals –GPRS Block E

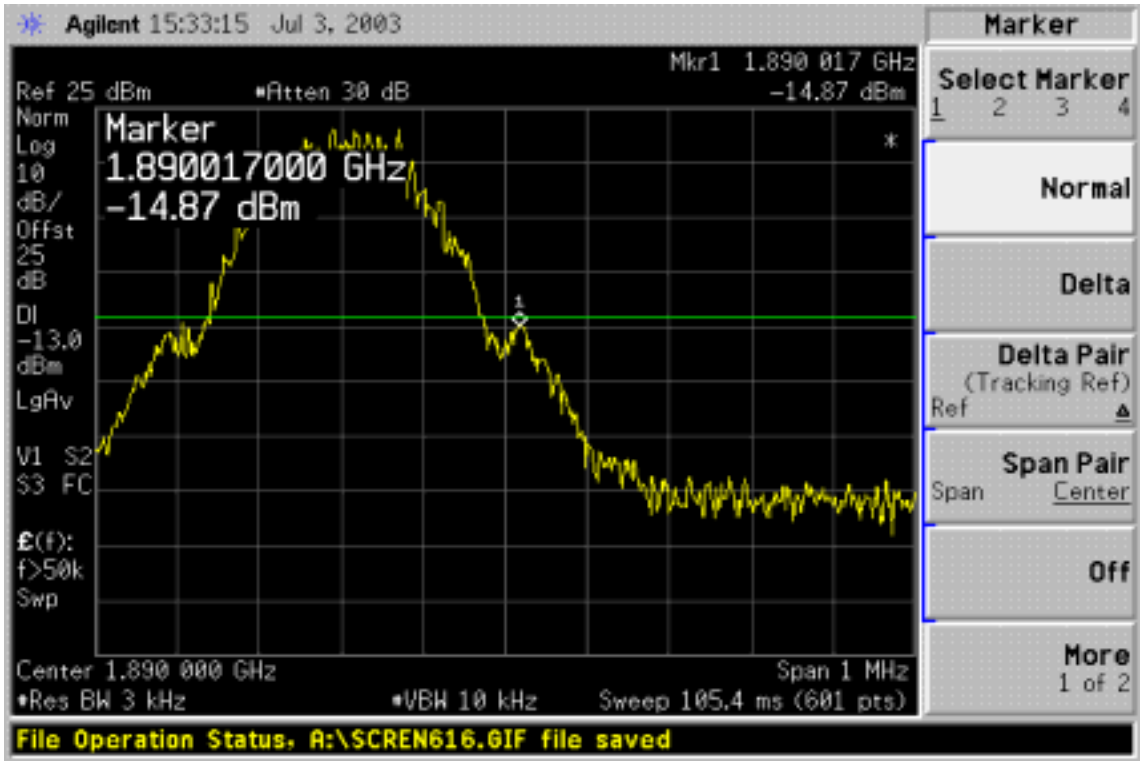


Figure 8-33 Block edge emission at antenna terminals –GPRS Block F

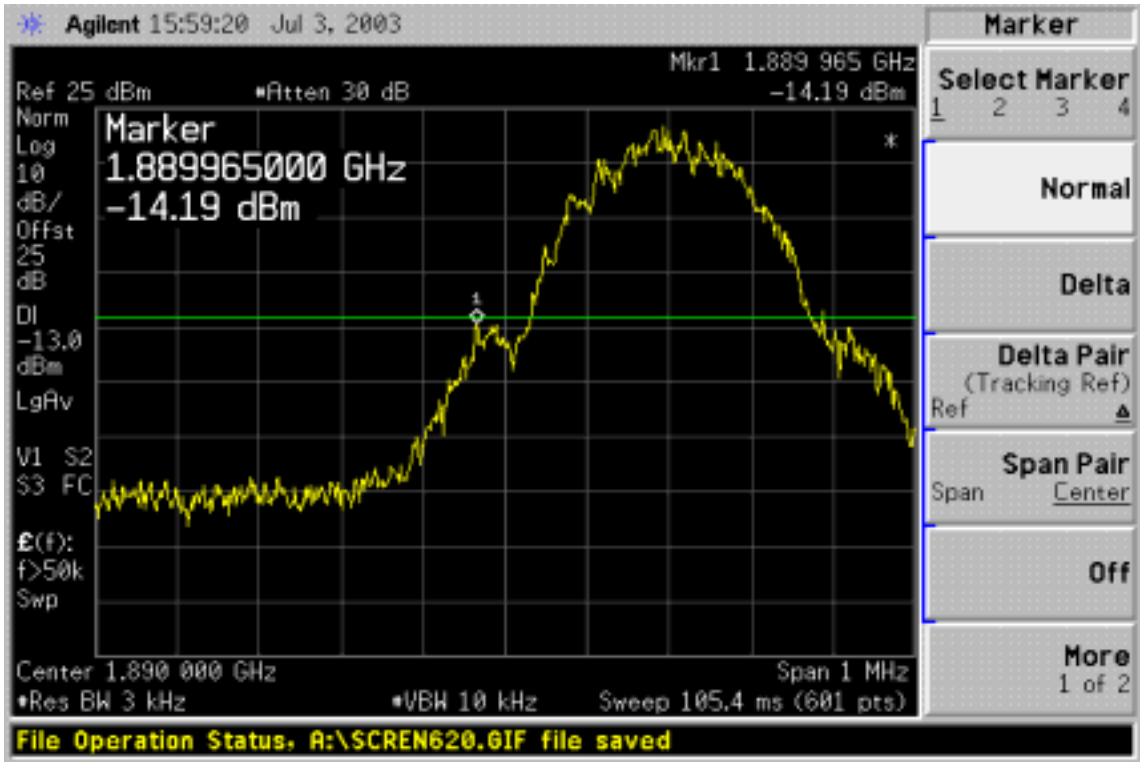


Figure 8-34 Block edge emission at antenna terminals –GPRS Block F

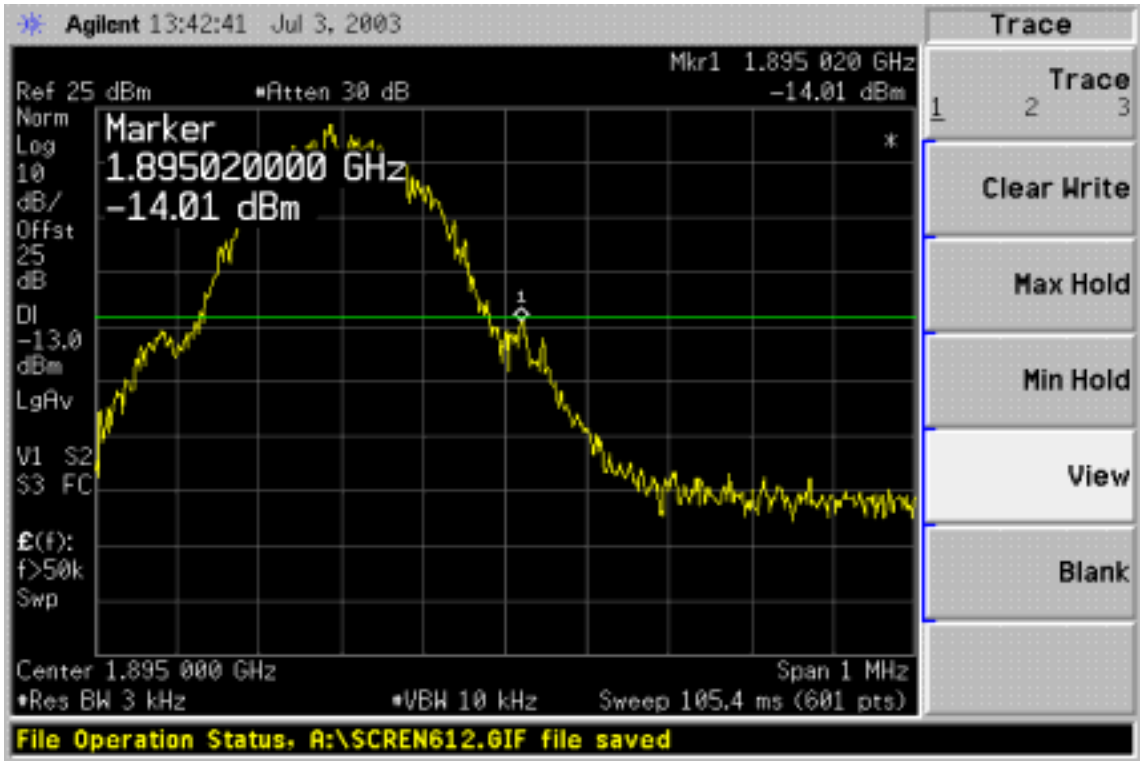


Figure 8-35 Block edge emission at antenna terminals –GPRS Block C

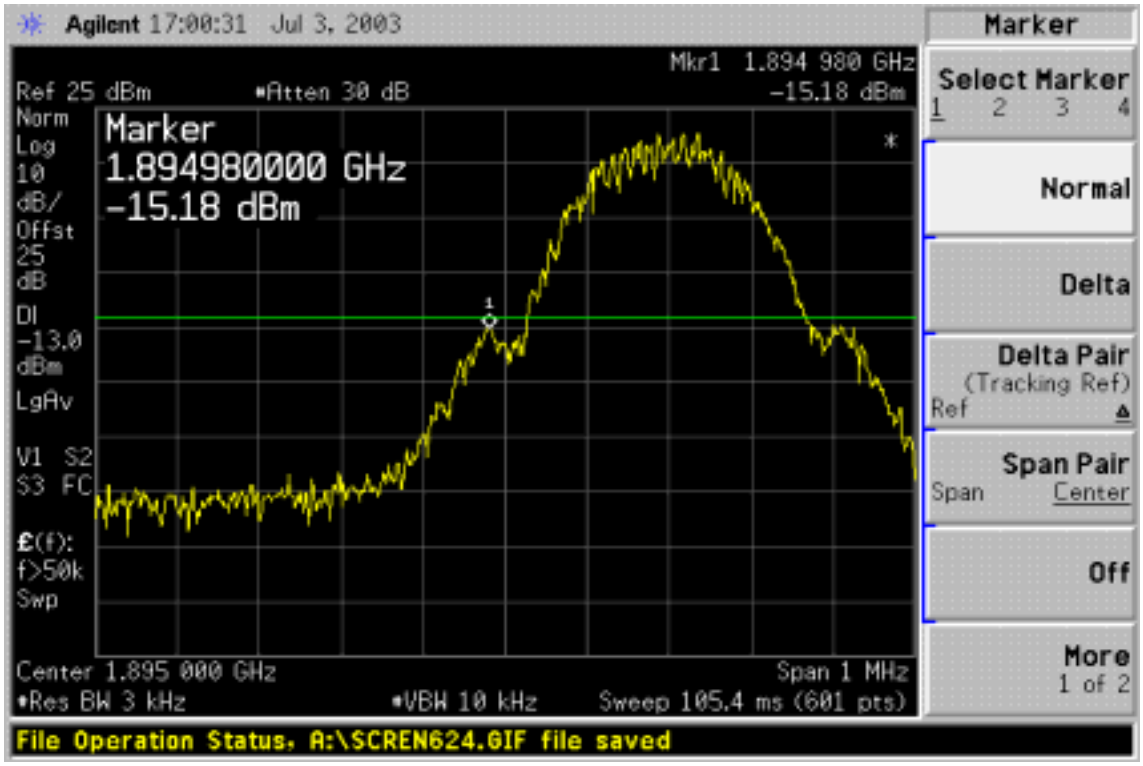
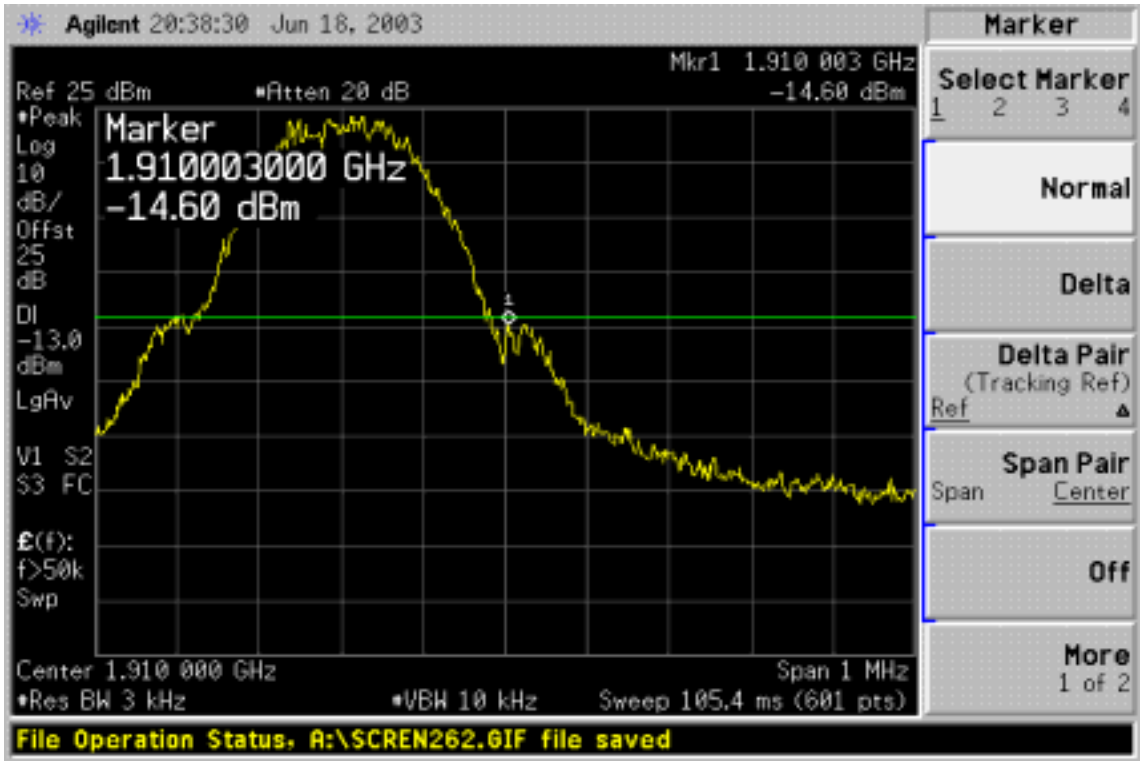


Figure 8-36 Block edge emission at antenna terminals –GPRS Block C



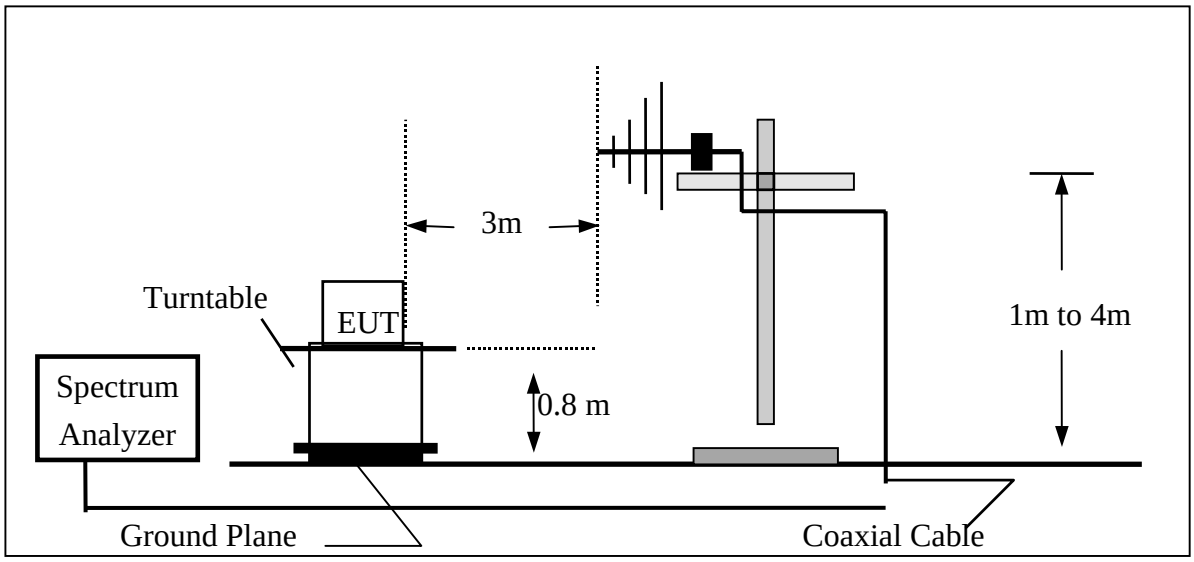
9. FIELD STRENGTH OF SPURIOUS RADIATION MEASUREMENT

9.1 Standard Applicable

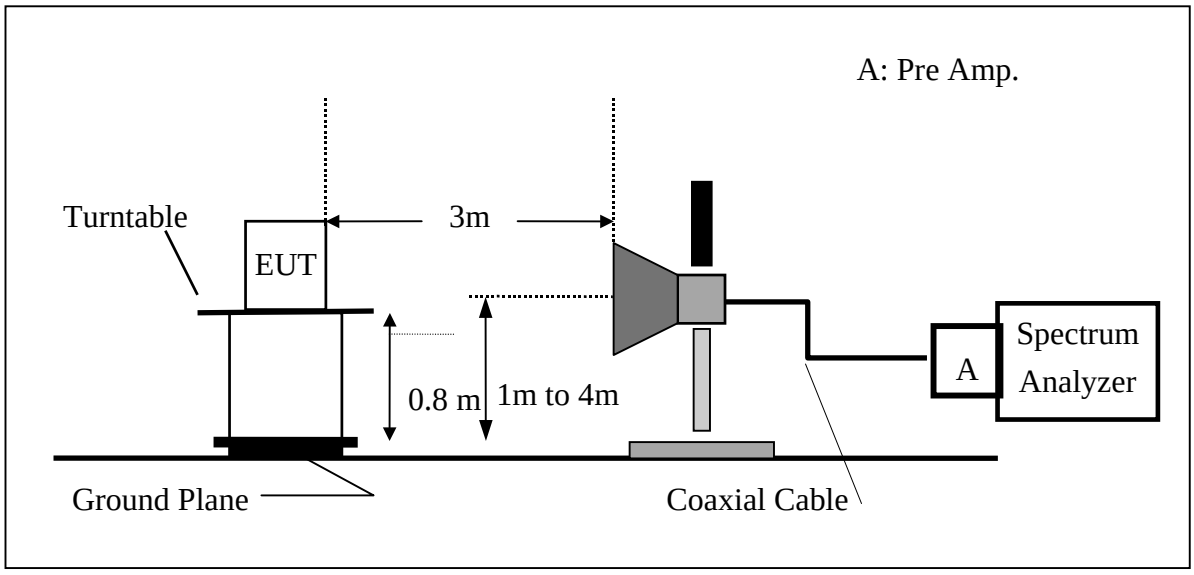
According to FCC § 2.1053

9.2 EUT Set-up (Block Diagram of Configuration)

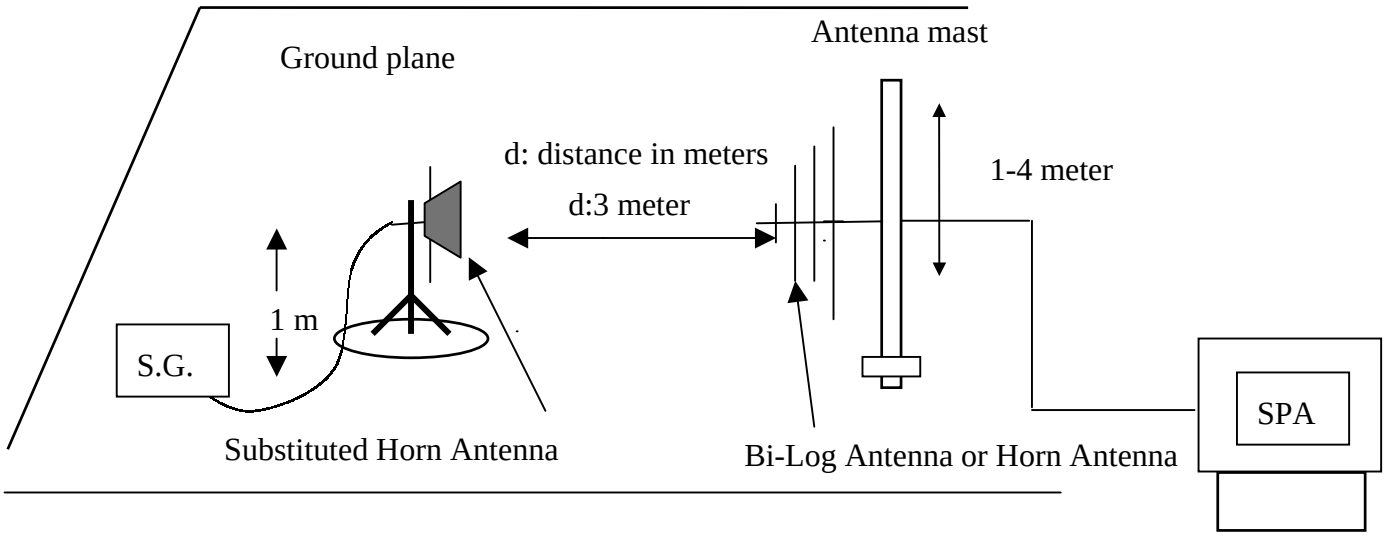
(A) Radiated Emission Test Set-up (Frequency below 1GHz)



(B) Radiated Emission Test Set-up (Frequency above 1GHz)



(C) Substituted Method Test Set-up



9.3 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 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 (dBi) – Cable (dB)

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

9.4 Measurement Equipment Used:

Open Area Test Site # 3					
EQUIPMENT TYPE	**MFR**	**MODEL NUMBER**	**SERIAL NUMBER**	**LAST CAL.**	**CAL DUE.**
Spectrum Analyzer	Agilent	E4446A	US42510252	04/28/2003	04/27/2004
Spectrum Analyzer	R&S	FSP30	100112	06/29/2003	06/28/2004
Pre-Amplifier	HP	8447D	2944A09173	03/04/2003	03/03/2004
Bi-log Antenna	SCHWAZBECK	VULB9163	145	07/06/2003	07/05/2004
Horn antenna	EMCO	3115	00022250	02/25/2003	02/26/2004
Pre-Amplifier	HP	8449B	3008B00965	10/01/2002	10/02/2003
Reject Filter	Micro-Tronics	HPM13194	003	04/28/2003	04/27/2004
Low Loss Cable#40	HUBER+SUHNER	SUCOFLEX 104EPA-10M	19431	04/09/2003	04/08/2004
Turn Table	EMCO	2081-1.21	9709-1885	N.C.R	N.C.R
Antenna Tower	EMCO	2075-2	9707-2060	N.C.R	N.C.R
Controller	EMCO	2090	9709-1256	N.C.R	N.C.R
Site NSA	C&C	N/A	N/A	09/07/2002	09/06/2003
S.G.	HP	83630B	3844A01022	01/15/2003	01/14/2004
Low Loss Cable#38	HUBER+SUHNER	SUCOFLEX 104EPA-6M	19443	04/09/2003	04/08/2004
Substituted Dipole	SCHWAZBECK	VHAP/UHAP	998 +999/ 981+982	06/13/2003	06/12/2004
Substituted Horn	EMCO	3115	00022256	02/25/2003	02/26/2004

9.5 Measurement Result

Refer to the attached tabular data sheets.

Radiated Spurious Emission Measurement Result

Operation Mode	: TX CH Low X Mode GSM	Test Date	: July 17, 2003
Fundamental Frequency	: 1850.2MHz	Tested By	: Jacky
Temperature	: 23°C	Pol.	: Vertical
Humidity	: 67%		

Frequency (MHz)	Reading level (dBuV)	Antenna Polarization	S.G. (dBm)	Cable loss (dB)	Ant. Gain (dBi)	Emission Level (dBm)	Limit (dBm)	Margin (db)
3700.00	44.34	V	-51.09	5.90	9.36	-62.66	-13.00	-49.66
5541.67	43.34	V	-47.42	7.27	10.34	-63.66	-13.00	-50.66

Remark:

(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 laid-downposition

Radiated Spurious Emission Measurement Result

Operation Mode	: TX CH Mid X Mode GSM	Test Date	: July 17, 2003
Fundamental Frequency	: 1880MHz	Tested By	: Jacky
Temperature	: 23°C	Pol	: Vertical
Humidity	: 67%		

Frequency (MHz)	Reading level (dBuV)	Antenna Polarization	S.G. (dBm)	Cable loss (dB)	Ant. Gain (dBi)	Emission Level (dBm)	Limit (dBm)	Margin (db)
3758.33	44.84	V	-50.23	5.95	9.35	-62.16	-13.00	-49.16
5633.33	45.50	V	-45.22	7.30	10.43	-61.50	-13.00	-48.50

Remark:

(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 laid-downposition

Radiated Spurious Emission Measurement Result

Operation Mode	: TX CH High X Mode GSM	Test Date	: July 17, 2003
Fundamental Frequency	: 1910MHz	Tested By	: Jacky
Temperature	: 23°C	Pol	: Vertical
Humidity	: 67%		

Frequency (MHz)	Reading level (dBuV)	Antenna Polarization	S.G. (dBm)	Cable loss (dB)	Ant. Gain (dBi)	Emission Level (dBm)	Limit (dBm)	Margin (db)
3816.67	41.67	V	-52.97	6.01	9.34	-65.33	-13.00	-52.33
5716.67	42.50	V	-48.18	7.32	10.51	-64.50	-13.00	-51.50

Remark:

(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 laid-downposition

Radiated Spurious Emission Measurement Result

Operation Mode	: TX CH Low Y Mode GSM	Test Date	: July 17, 2003
Fundamental Frequency	: 1850.2MHz	Tested By	: Jacky
Temperature	: 23°C	Pol.	: Horizontal
Humidity	: 67%		

Frequency (MHz)	Reading level (dBuV)	Antenna Polarization	S.G. (dBm)	Cable loss (dB)	Ant. Gain (dBi)	Emission Level (dBm)	Limit (dBm)	Margin (db)
3691.67	44.17	H	-50.76	5.89	9.36	-62.83	-13.00	-49.83
5541.70	42.00	H	-48.70	7.27	10.34	-65.00	-13.00	-52.00

Remark:

(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 laid-downposition

Radiated Spurious Emission Measurement Result

Operation Mode	: TX CH Mid Y Mode GSM	Test Date	: July 17, 2003
Fundamental Frequency	: 1880MHz	Tested By	: Jacky
Temperature	: 23°C	Pol	: Horizontal
Humidity	: 67%		

Frequency (MHz)	Reading level (dBuV)	Antenna Polarization	S.G. (dBm)	Cable loss (dB)	Ant. Gain (dBi)	Emission Level (dBm)	Limit (dBm)	Margin (db)
3691.67	44.67	H	-50.26	5.89	9.36	-62.33	-13.00	-49.33

Remark:

(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 laid-downposition

Radiated Spurious Emission Measurement Result

Operation Mode	: TX CH High Y Mode GSM	Test Date	: July 17, 2003
Fundamental Frequency	: 1910MHz	Tested By	: Jacky
Temperature	: 23°C	Pol	: Horizontal
Humidity	: 67%		

Frequency (MHz)	Reading level (dBuV)	Antenna Polarization	S.G. (dBm)	Cable loss (dB)	Ant. Gain (dBi)	Emission Level (dBm)	Limit (dBm)	Margin (db)
3691.67	47.67	H	-47.26	5.89	9.36	-59.33	-13.00	-46.33

Remark:

(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 laid-downposition

Radiated Spurious Emission Measurement Result

Operation Mode	: TX CH Low Z Mode GSM	Test Date	: July 17, 2003
Fundamental Frequency	: 1850.2MHz	Tested By	: Jacky
Temperature	: 23°C	Pol	: Horizontal
Humidity	: 67%		

Frequency (MHz)	Reading level (dBuV)	Antenna Polarization	S.G. (dBm)	Cable loss (dB)	Ant. Gain (dBi)	Emission Level (dBm)	Limit (dBm)	Margin (db)
3691.67	39.34	H	-55.59	5.89	9.36	-67.66	-13.00	-54.66

Remark:

(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 laid-downposition

Radiated Spurious Emission Measurement Result

Operation Mode	: TX CH Mid Z Mode GSM	Test Date	: July 17, 2003
Fundamental Frequency	: 1880MHz	Tested By	: Jacky
Temperature	: 23°C	Pol.	: Horizontal
Humidity	: 67%		

Frequency (MHz)	Reading level (dBuV)	Antenna Polarization	S.G. (dBm)	Cable loss (dB)	Ant. Gain (dBi)	Emission Level (dBm)	Limit (dBm)	Margin (db)
3758.33	44.17	H	-50.31	5.95	9.35	-62.83	-13.00	-49.83

Remark:

(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 laid-downposition

Radiated Spurious Emission Measurement Result

Operation Mode	: TX CH High Z Mode GSM	Test Date	: July 17, 2003
Fundamental Frequency	: 1910MHz	Tested By	: Jacky
Temperature	: 23°C	Pol.	: Horizontal
Humidity	: 67%		

Frequency (MHz)	Reading level (dBuV)	Antenna Polarization	S.G. (dBm)	Cable loss (dB)	Ant. Gain (dBi)	Emission Level (dBm)	Limit (dBm)	Margin (db)
3816.67	40.17	H	-53.85	6.01	9.34	-66.83	-13.00	-53.83
5716.67	41.34	H	-49.22	7.32	10.51	-65.66	-13.00	-52.66

Remark:

(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 laid-downposition

Radiated Spurious Emission Measurement Result

Operation Mode	: TX CH Low X Mode GPRS	Test Date	: July 17, 2003
Fundamental Frequency	: 1850.2MHz	Tested By	: Jacky
Temperature	: 23°C	Pol	: Vertical
Humidity	: 67%		

Frequency (MHz)	Reading level (dBuV)	Antenna Polarization	S.G. (dBm)	Cable loss (dB)	Ant. Gain (dBi)	Emission Level (dBm)	Limit (dBm)	Margin (db)
3691.67	45.50	V	-50.00	5.89	9.36	-61.50	-13.00	-48.50
5541.67	43.34	V	-47.42	7.27	10.34	-63.66	-13.00	-50.66

Remark:

(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 laid-downposition

Radiated Spurious Emission Measurement Result

Operation Mode	: TX CH Mid X Mode GPRS	Test Date	: July 17, 2003
Fundamental Frequency	: 1880MHz	Tested By	: Jacky
Temperature	: 23°C	Pol	: Vertical
Humidity	: 67%		

Frequency (MHz)	Reading level (dBuV)	Antenna Polarization	S.G. (dBm)	Cable loss (dB)	Ant. Gain (dBi)	Emission Level (dBm)	Limit (dBm)	Margin (db)
3758.33	46.67	V	-48.40	5.95	9.35	-60.33	-13.00	-47.33
5633.33	43.17	V	-43.17	7.30	10.43	-63.83	-13.00	-50.83

Remark:

(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 laid-downposition

Radiated Spurious Emission Measurement Result

Operation Mode	: TX CH High X Mode GPRS	Test Date	: July 17, 2003
Fundamental Frequency	: 1910MHz	Tested By	: Jacky
Temperature	: 23°C	Pol	: Vertical
Humidity	: 67%		

Frequency (MHz)	Reading level (dBuV)	Antenna Polarization	S.G. (dBm)	Cable loss (dB)	Ant. Gain (dBi)	Emission Level (dBm)	Limit (dBm)	Margin (db)
3808.33	41.50	V	-53.21	6.00	9.34	-65.50	-13.00	-52.50
5716.67	47.00	V	-43.68	7.32	10.51	-60.00	-13.00	-47.00

Remark:

(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 laid-downposition

Radiated Spurious Emission Measurement Result

Operation Mode	: TX CH Low Y Mode GPRS	Test Date	: July 17, 2003
Fundamental Frequency	: 1850.2MHz	Tested By	: Jacky
Temperature	: 23°C	Pol	: Horizontal
Humidity	: 67%		

Frequency (MHz)	Reading level (dBuV)	Antenna Polarization	S.G. (dBm)	Cable loss (dB)	Ant. Gain (dBi)	Emission Level (dBm)	Limit (dBm)	Margin (db)
3691.67	48.50	H	-46.43	5.89	9.36	-58.50	-13.00	-45.50

Remark:

(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 laid-downposition

Radiated Spurious Emission Measurement Result

Operation Mode	: TX CH Mid Y Mode GPRS	Test Date	: July 17, 2003
Fundamental Frequency	: 1880MHz	Tested By	: Jacky
Temperature	: 23°C	Pol	: Horizontal
Humidity	: 67%		

Frequency (MHz)	Reading level (dBuV)	Antenna Polarization	S.G. (dBm)	Cable loss (dB)	Ant. Gain (dBi)	Emission Level (dBm)	Limit (dBm)	Margin (db)
3758.33	44.17	H	-50.31	5.95	9.35	-62.83	-13.00	-49.83
5633.33	38.84	H	-51.79	7.30	10.43	-68.16	-13.00	-55.16

Remark:

(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 laid-downposition

Radiated Spurious Emission Measurement Result

Operation Mode	: TX CH High Y Mode GPRS	Test Date	: July 17, 2003
Fundamental Frequency	: 1910MHz	Tested By	: Jacky
Temperature	: 23°C	Pol	: Horizontal
Humidity	: 67%		

Frequency (MHz)	Reading level (dBuV)	Antenna Polarization	S.G. (dBm)	Cable loss (dB)	Ant. Gain (dBi)	Emission Level (dBm)	Limit (dBm)	Margin (db)
3816.67	42.34	H	-51.68	6.01	9.34	-64.66	-13.00	-51.66
5716.67	39.67	H	-50.89	7.32	10.51	-67.33	-13.00	-54.33

Remark:

(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 laid-downposition

Radiated Spurious Emission Measurement Result

Operation Mode	: TX CH Low Z Mode GPRS	Test Date	: July 17, 2003
Fundamental Frequency	: 1850.2MHz	Tested By	: Jacky
Temperature	: 23°C	Pol	: Horizontal
Humidity	: 67%		

Frequency (MHz)	Reading level (dBuV)	Antenna Polarization	S.G. (dBm)	Cable loss (dB)	Ant. Gain (dBi)	Emission Level (dBm)	Limit (dBm)	Margin (db)
3691.67	42.84	H	-52.09	5.89	9.36	-64.16	-13.00	-51.16

Remark:

(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 laid-downposition

Radiated Spurious Emission Measurement Result

Operation Mode	: TX CH Mid Z Mode GPRS	Test Date	: July 17, 2003
Fundamental Frequency	: 1880MHz	Tested By	: Jacky
Temperature	: 23°C	Pol	: Horizontal
Humidity	: 67%		

Frequency (MHz)	Reading level (dBuV)	Antenna Polarization	S.G. (dBm)	Cable loss (dB)	Ant. Gain (dBi)	Emission Level (dBm)	Limit (dBm)	Margin (db)
3750.00	39.34	H	-55.14	5.95	9.35	-67.66	-13.00	-54.66
5633.33	39.00	H	-51.63	7.30	10.43	-68.00	-13.00	-55.00

Remark:

(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 laid-downposition

Radiated Spurious Emission Measurement Result

Operation Mode	: TX CH High Z Mode GPRS	Test Date	: July 17, 2003
Fundamental Frequency	: 1910MHz	Tested By	: Jacky
Temperature	: 23°C	Pol	: Horizontal
Humidity	: 67%		

Frequency (MHz)	Reading level (dBuV)	Antenna Polarization	S.G. (dBm)	Cable loss (dB)	Ant. Gain (dBi)	Emission Level (dBm)	Limit (dBm)	Margin (db)
3816.67	40.67	H	-53.35	6.01	9.34	-66.33	-13.00	-53.33
5716.67	41.34	H	-49.22	7.32	10.51	-65.66	-13.00	-52.66

Remark:

(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 laid-downposition

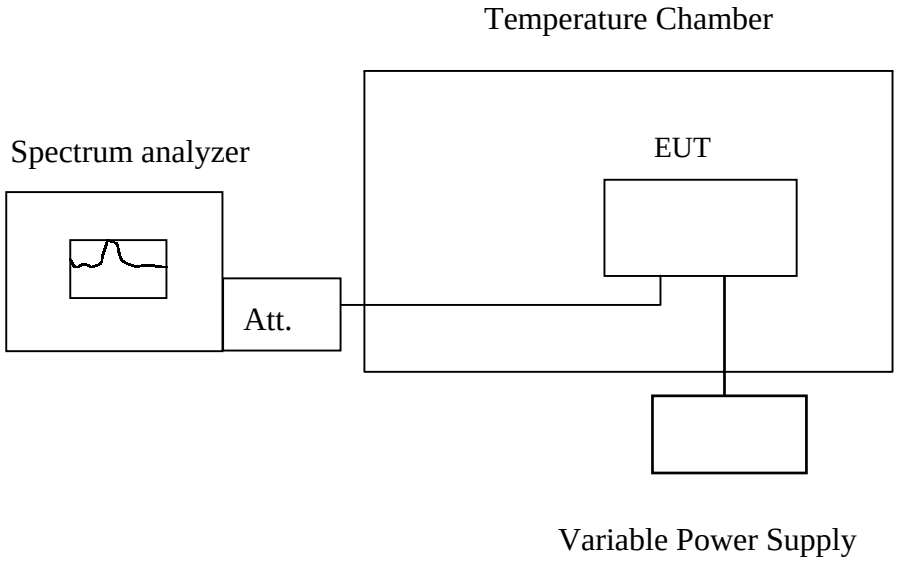
10. FREQUENCY STABILITY V.S. TEMPERATURE MEASUREMENT

10.1 Standard Applicable

According to FCC § 2.1055, FCC § 24.235.

Frequency Tolerance: 2.5 ppm

10.2 Test Set-up:



Note: Measurement setup for testing on Antenna connector

10.3 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.

10.4 Measurement Equipment Used:

EQUIPMENT TYPE	MFR	Model No.	Serial No.	LAST CAL.	Cal. Due.
DC Power Source	Agilent	E3640A	MY40001774	01/13/2003	01/12/2004
Temperature Chamber	KingSon	THS-M1	242	03/21/2003	03/20/2004
Spectrum Analyzer	Agilent	E4446A	US42510252	04/28/2003	04/27/2004
Spectrum Analyzer	R&S	FSP30	100112	06/29/2003	06/28/2004
Attenuator	Mini-circuit	20dB	N/A	05/15/2003	05/14/2004
low loss cable#32	Huber + Suhner	SUCOFLEX 104EPA-6M	19428	04/09/2003	04/08/2004

10.5 Measurement Result

Reference Frequency: 1880 MHz @ 25℃				
Limit: +/- 2.5 ppm = 4700 Hz				
Power Supply	Environment	Frequency	Delta (Hz)	Limit (Hz)
Vdc	Temperature (℃)	(MHz)		
3.7	50	1880.00023300	-267.00	4700
3.7	40	1880.00025600	-244.00	
3.7	30	1880.00027600	-224.00	
3.7	25	1880.00050000	0.00	
3.7	20	1880.00061200	112.00	
3.7	10	1880.00072100	221.00	
3.7	0	1880.00074300	243.00	
3.7	-10	1880.00083200	332.00	
3.7	-20	1880.00081400	314.00	
3.7	-30	1880.00079600	296.00	

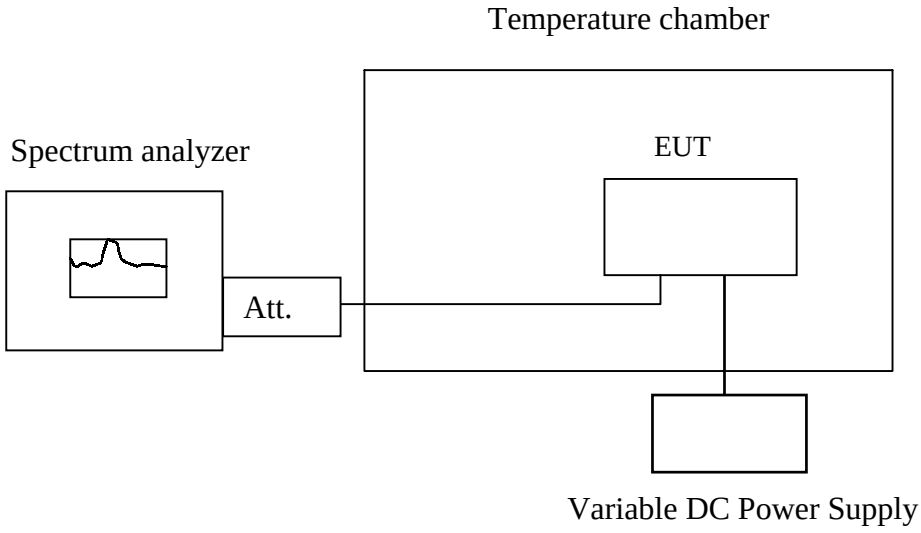
11. FREQUENCY STABILITY V.S. VOLTAGE MEASUREMENT

11.1 Standard Applicable

According to FCC § 2.1055, FCC § 24.235,

Frequency Tolerance: 2.5 ppm

11.2 Test Set-up:



Note: Measurement setup for testing on Antenna connector

11.3 Measurement 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.

11.4 Measurement Equipment Used:

EQUIPMENT TYPE	MFR	Model No.	Serial No.	LAST CAL.	Cal. Due.
DC Power Source	Agilent	E3640A	MY40001774	01/13/2003	01/12/2004
Temperature Chamber	KingSon	THS-M1	242	03/21/2003	03/20/2004
Spectrum Analyzer	Agilent	E4446A	US42510252	04/28/2003	04/27/2004
Spectrum Analyzer	R&S	FSP30	100112	06/29/2003	06/28/2004
Attenuator	Mini-circuit	20dB	N/A	05/15/2003	05/14/2004
Low loss cable#32	Huber + Suhner	SUCOFLEX 104EPA-6M	19428	04/09/2003	04/08/2004

11.5 Measurement Result:

Reference Frequency: Channel 1880 MHz @ 4.3Vdc				
Limit: +/- 2.5 ppm = 4700 Hz				
Power Supply	Environment	Frequency	Delta (Hz)	Limit (Hz)
Vdc	Temperature (℃)	(MHz)		
4.30	25	1879.999869	-419	4700
3.70		1880.000288	0	
3.14		1880.000463	175	
2.90 (End Point)		1879.999795	-493	

12. CONDUCTED EMISSION TEST

12.1 Standard Applicable

According to § 15.207. The emission value for frequency within 150KHz to 30MHz shall not exceed criteria of below chart.

Frequency range MHz	Limits dB(uV)	
	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
Note 1. The lower limit shall apply at the transition frequencies 2. The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.		

12.2 EUT Setup

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 DC power adaptor and was placed on the center of the back edge on the test table. The peripherals like earphone was placed on the side of the EUT. The rear of the EUT and peripherals were placed flushed with the rear of the tabletop.
3. The Power adaptor was connected with 110Vac/60Hz power source.

12.3 Measurement 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.

12.4 Measurement Equipment Used:

Conducted Emission Test Site # 3					
EQUIPMENT TYPE	**MFR**	**MODEL NUMBER**	**SERIAL NUMBER**	**LAST CAL.**	**CAL DUE.**
EMI Test Receiver	R&S	ESHS30	828144/003	08/08/2002	08/07/2003
LISN	R&S	ESH2-Z5	843285/010	12/16/2002	12/15/2003
LISN	EMCO	3825/2	9003-1628	07/26/2002	07/25/2003
Spectrum Analyzer	ADVANTEST	R3261A	91720031	N/A	N/A
2X2 WIRE ISN	R&S	ENY22	100020	06/28/2003	06/27/2004
FOUR WIRE ISN	R&S	ENY41	100006	06/28/2003	06/27/2004

12.5 Measurement Result

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.

LINE CONDUCTED TEST

Model Number: Johann **Tested by:** Jacky

Test Mode: Normal operating **Detector mode:** Quasi-Peak

Temperature: 22°C **Humidity:** 70%RH

(The chart below shows the highest readings taken from the final data)

Frequency MHz	Q.P. Raw dBuV	AVG Raw dBuV	Q.P. Limit dBuV	AVG Limit dBuV	Q.P. Margin dB	AVG Margin dB	NOTE
0.157	48.50	---	65.60	55.60	-17.10	---	L1
0.250	43.80	---	61.80	51.80	-18.00	---	L1
0.307	24.10	---	60.10	50.10	-36.00	---	L1
0.371	23.40	---	58.50	48.50	-35.10	---	L1
0.446	44.85	---	56.90	46.90	-12.05	---	L1
0.523	18.40	---	56.00	46.00	-37.60	---	L1
0.159	37.00	---	65.50	55.50	-28.50	---	L2
0.259	46.00	---	61.50	51.50	-15.50	---	L2
0.300	26.70	---	60.10	50.10	-33.40	---	L2
0.411	23.50	---	57.60	47.60	-34.10	---	L2
0.440	41.20	---	57.10	47.10	-15.90	---	L2
0.514	24.40	---	56.00	46.00	-31.60	---	L2

Remark:

(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.

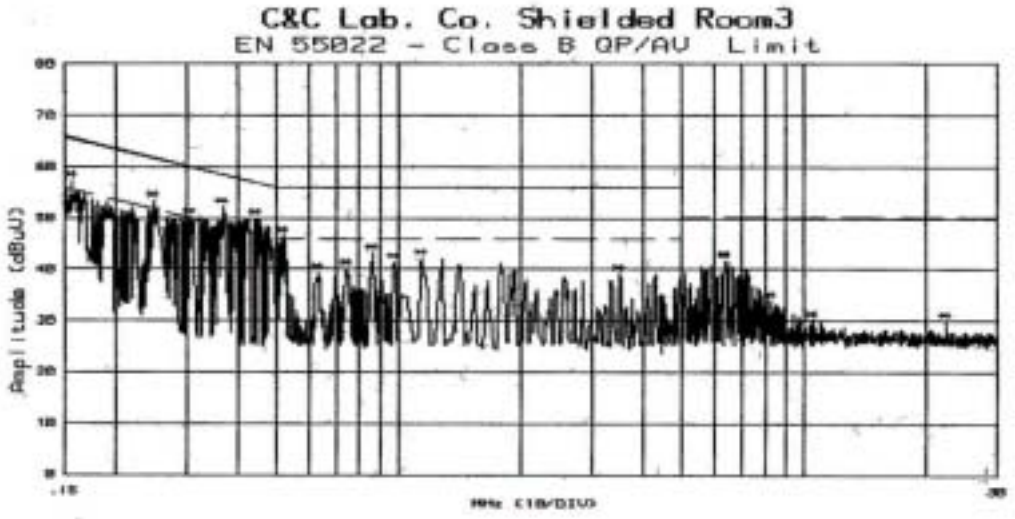
(3) "---" denotes the emission level was or more than 2dB below the Average limit, so no re-check anymore.

(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 side) / L2 = Line Two (Neutral Line side)

Conducted Emission Test Plot

L1

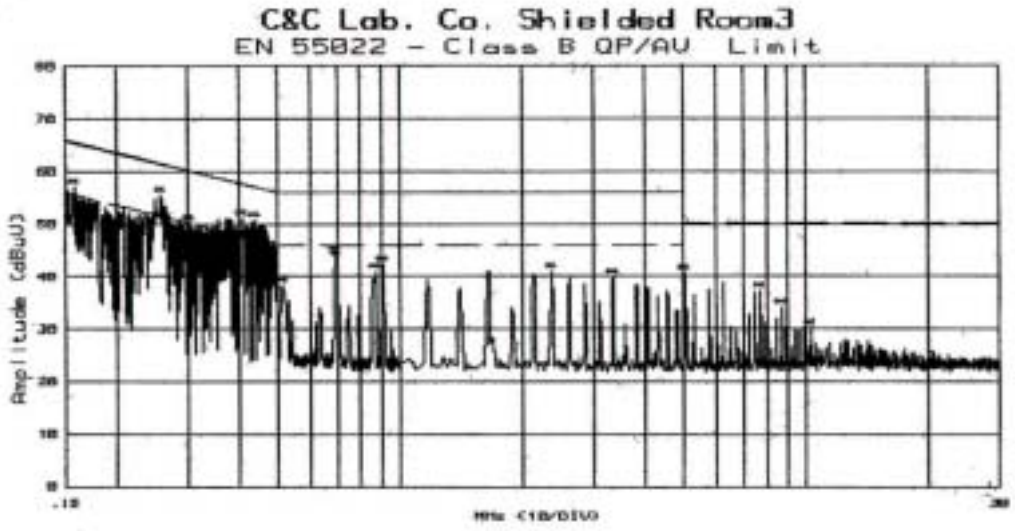


Customer:Chi Mei
Model :Johann
Mode :
Reading :Peak(R3261C SPA)
Remark :110V

File#: 4763
Humd.:70 (%)
Port :L1

Date :15 Jul 2003 23:31:24
Temp. :22 (C)
Tested by:jacky

L2



Customer:Chi Mei
Model :Johann
Mode :
Reading :Peak(R3261C SPA)
Remark :110V

File#: 4762
Humd.:70 (%)
Port :L2

Date :15 Jul 2003 23:25:51
Temp. :22 (C)
Tested by:jacky