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Test report No.: 4-1220-06-04/04 This test report consists of 120 pages

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Accredited Bluetooth<sup>TM</sup> Test Facility (BQTF)

Test report no.:	4-1220-06-04/04
Applicant:	Sagem
Туре	A 2003agR2
FCC Part	24 / 22 / 15
FCC ID:	M9H95A03AG2



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### **1** General information

### 1.1 Notes

The test results of this test report relate exclusively to the test item specified in 1.5. The CETECOM ICT Services GmbH does not assume responsibility for any conclusions and generalizations drawn from the test results with regard to other specimens or samples of the type of the equipment represented by the test item. The test report may only be reproduced or published in full. Reproduction or publication of extracts from the report requires the prior written approval of the CETECOM ICT Services GmbH.

#### **1.2** Testing laboratory

CETECOM ICT Services GmbH Untertürkheimer Straße 6 - 10 66117 Saarbrücken Germany Telephone : + 49 681 598 - 9100 Telefax : + 49 681 598 - 9075 E-mail : info@ict.cetecom.de Internet : www.cetecom-ict.de

Accredited testing laboratory The test laboratory (area of testing) is accredited according to DIN EN ISO/IEC 17025. DAR registration number: TTI-P-G-081/94-D0 Listed by : Federal Communications Commission (FCC) Identification/Registration No : 90462 Accredited Bluetooth<sup>TM</sup> Test Facility (BQTF) BLUETOOTH<sup>TM</sup> is a trademark owned by Bluetooth SIG, Inc. and licensed to CETECOM

#### **1.3** Details of applicant

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Country	:	France
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Telephone	:	+ 33 1 34 25 37 37
e-mail	:	jean.marquet@sagem.com

### 1.4 Application details

Date of test

: 2004-03-03 to 2004-03-05



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### 1.5 Test item

Type of equipment Type designation Manufacturer	:	GSM/Dual band mobile phone 850/1900 A2003agR2 (myX-1ag twin) applicant
Street City	• : :	appreant
Country	:	
Serial numbers	:	

Additional information:	:	
Frequency	:	1850.2 – 1909.8 MHz and 824.2 – 848.8 MHz
Type of modulation	:	300KGXW / 200KQ7W
Number of channels	:	300 (PCS1900) and 125 (PCS850)
Antenna	:	Integral antenna
Power supply (normal)	:	3,9 V DC Li-Polymer Battery
Power supply (extreme)	:	3.55 V to 3.90 V
Output power GSM 850	:	cond.: 33.4 dBm Peak, ERP: 24.4 dBm (Burst);
		EIRP: 26.55 dBm (Burst)
Output power GSM 1900	:	cond : 29.8 dBm Peak, ERP: 25.95 dBm (Burst);
		EIRP: 28.1 dBm (Burst)
Type of equipment	:	Temperature range : -30°C - +60°C
FCC – ID	:	M9H95A03AG2
Hardware	:	V0x
Software	:	J3, FK

### Test set up

Mobile; S/N: 2242394395; IMEI: 351816950006209 Mobile; S/N: 2242394385; IMEI: 351816950006217 Mobile; S/N: 2242394402; IMEI: 351816950006190 Headset (Deluxe Pedestrian Kit) S/N: 188133803 USB Data Cable; S/N:251214324 Cigar Light Charger: S/N: 188187794 Multi Countries AC/DC Adapter; S/N 188218106 CE AC/DC Adapter; S/N: 187849535 US AC/DC Adapter; S/N: 185982340

1.6	Test standards:	FCC Part 24, 22
		FCC Part 15



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#### 2 Technical test

For Part 24/22 we use the substitution method (TIA/EIA 603).

All measurements in this report were performed in GSM circuit - switched mode in both bands 850 and 1900 MHz. The handset does not offer GPRS or multislot service.

**Remarks:** 

Test setup: The radiated measurements were performed with an AC/DC charging unit

No deviations from the technical specification(s) were ascertained in the course of the tests performed.

#### FINAL VERDICT: PASS

Technical responsibility for area of testing :

2004-03-08	RSC 8431	Gillmann	a
Date	Section	Name	Signature

Technical responsibility for area of testing :

2004-03-08	RSC8412	Hausknecht D.	D. Kaustum
Date	Section	Name	Signature



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#### **PART PCS 1900**

### POWER OUTPUT

SUBCLAUSE § 24.232

#### Summary:

This paragraph contains both average, peak output powers and EIRP measurements for the mobile station. In all cases, the peak output power is within the required mask (this mask is specified in the JTC standards, TIA PN3389 Vol. 1 Chap 7, and is no FCC requirement).

#### Method of Measurements:

The mobile was set up for the max. output power with pseudo random data modulation. The power was measured with R&S Signal Analyzer FSIQ 26 (peak and average) This measurements were done at 3 frequencies, 1850.2 MHz, 1880.0 MHz and 1909.8 MHz (bottom, middle and top of operational frequency range)

#### Limits:

Power Step	Nominal Peak Output Power (dBm)	Tolerance (dB)
0	+30	± 2

#### **Power Measurements:**

#### **Conducted:**

Frequency (MHz)	Power Step	Peak Output Power (dBm)	Average in the burst Output Power (dBm)
1850.2	0	29.8	29.7
1880.0	0	29.6	29.6
1909.8	0	29.5	29.4
Measuremen	t uncertainty	±0.	5 dB



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#### **EIRP Measurements**

Description: This is the test for the maximum radiated power from the phone.

Rule Part 24.232(b) specifies that "Mobile/portable stations are limited to 2 watts e.i.r.p. peak power..." and 24.232(c) specifies that "Peak transmit power must be measured over any interval of continuous transmission using instrumentation calibrated in terms of an rms-equivalent voltage."

#### Measuring the EIRP of Spurious/Harmonic Emissions using Substitution Method

(a) The measurements was performed with full rf output power and modulation.

(b) Test was performed at listed 3m test site (listed with FCC, IC).

(c) The transmitter under test was placed at the specified height on a non-conducting turntable (80 cm height)

(d) The BICONILOG antenna (20 MHz to 1 GHz) or HORN antenna (1 GHz to 18 GHz) was used for measuring.

(e) Load an appropriate correction factors file in EMI Receiver for correcting the field strength reading level

Total Correction Factor recorded in the EMI Receiver = Cable Loss + Antenna Factor

E (dBuV/m) = Reading (dBuV) + Total Correction Factor (dB/m)

(f) Set the EMI Receiver and #2 as follows:

Center Frequency: test frequency Resolution BW: 100 kHz Video BW: same Detector Mode: positive Average: off Span: 3 x the signal bandwidth

(g) The test antenna was lowered or raised from 1 to 4 meters until the maximum signal level was detected.

(h) The transmitter was rotated through 360 o about a vertical axis until a higher maximum signal was received.

(i) The test antenna was lowered or raised again from 1 to 4 meters until a maximum was obtained. This level was recorded.

(j) The recorded reading was corrected to the true field strength level by adding the antenna factor, cable loss and subtracting the pre-amplifier gain.

(k) The above steps were repeated with both transmitters' antenna and test receiving antenna placed in vertical and horizontal polarization. Both readings with the antennas placed in vertical and horizontal polarization shall be recorded.

(1) Repeat for all different test signal frequencies

### Measuring the EIRP of Spurious/Harmonic Emissions using Substitution Method

(a) Set the EMI Receiver (for measuring E-Field) and Receiver #2 (for measuring EIRP) as follows:

Center Frequency	: equal to the signal source
Resolution BW	: 10 kHz
Video BW	: same
Detector Mode	: positive
Average	: off
Span	: 3 x the signal bandwidth

(b) Load an appropriate correction factors file in EMI Receiver for correcting the field strength reading level Total Correction Factor recorded in the EMI Receiver = Cable Loss + Antenna Factor

E (dBuV/m) = Reading (dBuV) + Total Correction Factor (dB/m)

(c) Select the frequency and E-field levels for ERP/EIRP measurements.

(d) Substitute the EUT by a signal generator and one of the following transmitting antenna (substitution antenna): .DIPOLE antenna for frequency from 30-1000 MHz or .HORN antenna for frequency above 1 GHz }.



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(e) Mount the transmitting antenna at 1.5 meter high from the ground plane.

(f) Use one of the following antenna as a receiving antenna: .DIPOLE antenna for frequency from 30-1000 MHz or .HORN antenna for frequency above 1 GHz }.

(g) If the DIPOLE antenna is used, tune it's elements to the frequency as specified in the calibration manual.

(h) Adjust both transmitting and receiving antenna in a VERTICAL polarization.

(i) Tune the EMI Receivers to the test frequency.

(j) Lower or raise the test antenna from 1 to 4 meters until the maximum signal level was detected.

(k) The transmitter was rotated through 360 o about a vertical axis until a higher maximum signal was received.

(1) Lower or raise the test antenna from 1 to 4 meters until the maximum signal level was detected.

(m) Adjust input signal to the substitution antenna until an equal or a known related level to that detected from the transmitter was obtained in the test receiver.

(n) Record the power level read from the Average Power Meter and calculate the ERP/EIRP as follows:

P = P1 - L1 = (P2 + L2) - L1 = P3 + A + L2 - L1

EIRP = P + G1 = P3 + L2 - L1 + A + G1

#### ERP = EIRP - 2.15 dB

Total Correction factor in EMI Receiver #2 = L2 - L1 + G1

Where: P: Actual RF Power fed into the substitution antenna port after corrected.

- P1: Power output from the signal generator
- P2: Power measured at attenuator A input
- P3: Power reading on the Average Power Meter
- EIRP: EIRP after correction
- ERP: ERP after correction

(o) Adjust both transmitting and receiving antenna in a HORIZONTAL polarization, then repeat step (k) to (o)

(p) Repeat step (d) to (o) for different test frequency

(q) Repeat steps (c) to (j) with the substitution antenna oriented in horizontal polarization.

(r) Actual gain of the EUT's antenna is the difference of the measured EIRP and measured RF power at the RF port. Correct the antenna gain if necessary.

Limits:

Power Step	Burst PEAK EIRP (dBm)
0	<33

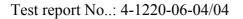
#### Power Measurements (Radiated)

		BURST PEAK EIRP (dBm)		MODULATION AVERAGE		
Frequency	Power Step			(dBm)		
(MHz)		EIRP	ERP	EIRP	ERP	
1850.2	0	28.1	25.95	19.1	16.95	
1880.0	0	27.8	25.65	18.8	16.65	
1909.8	0	27.8	25.65	18.8	16.65	
Measurement unce	Measurement uncertainty		±3 dB			

Sample calculation:

Freg	SA Reading	SG Setting	Ant. gain	Dipol gain	Cable loss	ERIP Result		
MHz	dBµV	dBm	dBi	dBd	dB	dBm		
1880.0	126.5	21.0	8.4	0.0	3.33	28.1		

EIRP = SG (dBm) - Cable Loss (dB) + Ant. gain (dBi)



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### FREQUENCY STABILITY

### SUBCLAUSE § 24.235

#### Method of Measurement:

In order to measure the carrier frequency under the condition of AFC lock, it is necessary to make measurements with the mobile station in a "call mode". This is accomplished with the use of a R&S CMU 200 DIGITAL RADIOCOMMUNICATION TESTER.

1. Measure the carrier frequency at room temperature.

2. Subject the mobile station to overnight soak at -30 C.

3. With the mobile station, powered with 3.7 Volts, connected to the CMU 200 and in a simulated call on channel 661 (center channel), measure the carrier frequency. These measurements should be made within 2 minutes of powering up the mobile station, to prevent significant self warming.

4. Repeat the above measurements at 10 C increments from -30 C to +60 C. Allow at least 1 1/2 hours at each temperature, un-powered, before making measurements.

5. Re-measure carrier frequency at room temperature with nominal 3.8 Volts. Vary supply voltage from minimum 3.3 Volts to maximum 4.4 Volts, in 12 steps re-measuring carrier frequency at each voltage. Pause at 3.7 V dc Volts for 1 1/2 hours un-powered, to allow any self heating to stabilize, before continuing.

6. Subject the mobile station to overnight soak at +60 C.

7. With the mobile station, powered with 3.7 Volts, connected to the CMU 200 and in a simulated call on channel 661(center channel), measure the carrier frequency. These measurements should be made within 2 minutes of powering up the mobile station, to prevent significant self warming.

8. Repeat the above measurements at 10 C increments from +60 C to -30 C. Allow at least 1 1/2 hours at each temperature, un-powered, before making measurements.

9. At all temperature levels hold the temperature to +/-0.5 C during the measurement procedure.

#### **Measurement Limit:**

According to the JTC standard the frequency stability of the carrier shall be accurate to within 0.1 ppm of the received frequency from the base station. This accuracy is sufficient to meet Sec. 24.235, Frequency Stability. The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.. This transceiver is specified to operate with an input voltage of between 3.3 V dc and 4.4 V dc, with a nominal voltage of 3.7 V dc.



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### AFC FREQ ERROR vs. VOLTAGE

Voltage (V)	Frequency Error (Hz)	Frequency Error (%)	Frequency Error (ppm)
3.5	18	0,0000096	0,0096
3.6	24	0,00000128	0,0128
3.7	22	0,00000117	0,0117
3.8	20	0,00000106	0,0106
3.9	16	0,0000085	0,0085
4.0	23	0,00000122	0,0122
4.1	16	0,0000085	0,0085
4.2	23	0,00000122	0,0122
4.3	18	0,0000096	0,0096
4.4	12	0,0000064	0,0064

### AFC FREQ ERROR vs. TEMPERATURE

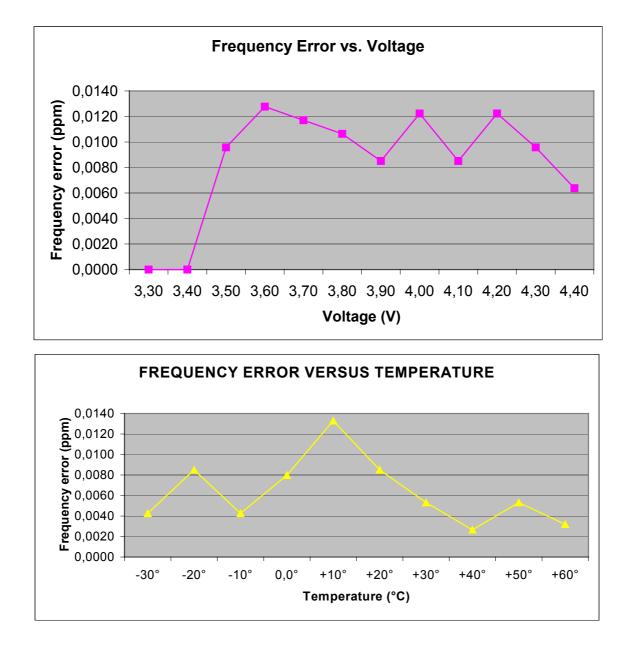
TEMPERATURE (°C)	Frequency Error (Hz)	Frequency Error (%)	Frequency Error (ppm)
-30	8	0,00000043	0,0043
-20	16	0,0000085	0,0085
-10	8	0,00000043	0,0043
±0.0	15	0,0000080	0,0080
+10	25	0,00000133	0,0133
+20	16	0,0000085	0,0085
+30	10	0,00000053	0,0053
+40	5	0,0000027	0,0027
+50	10	0,00000053	0,0053
+60	6	0,0000032	0,0032



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#### EMISSIONS LIMITS

**§24.238** 

#### **Measurement Procedure:**

The following steps outline the procedure used to measure the radiated emissions from the mobile station. The site is constructed in accordance with ANSI C63.4 – 1992 requirements and is recognized by the FCC to be in compliance for a 3 and a 10 meter site. The spectrum was scanned from 30 MHz to the 10th harmonic of the highest frequency generated within the equipment, which is the transmitted carrier that can be as high as 1910 MHz. This was rounded up to 20 GHz. The resolution bandwidth is set as outlined in Part 24.238. The spectrum was scanned with the mobile station transmitting at carrier frequencies that pertain to low, mid and high channels of the USPCS band.

#### The final open field emission (here 10m semi-anechoic chamber listed by FCC) test procedure is as follows:

a) The test item was placed on a 0.8 meter high non-conductive stand at a 3 meter test distance from the receive antenna.

b) The antenna output was terminated in a 50 ohm load.

c) A double ridged waveguide antenna was placed on an adjustable height antenna mast 3 meters from the test item for emission measurements.

d) Detected emissions were maximized at each frequency by rotating the test item and adjusting the receive antenna height and polarization. The maximum meter reading was recorded. The radiated emission measurements of the harmonics of the transmit frequency through the 10th harmonic were measured with peak detector and I MHz bandwidth. If the harmonic could not be detected above the noise floor, the ambient level was recorded.e) Now each detected emissions were substituted by the Substitution method, in accordance with the TIA/EIA 603.

#### **Measurement Limit:**

Sec. 24.238 Emission Limits.

(a) On any frequency outside a licensee's frequency block (e.g. A, D, B, etc.) within the USPCS spectrum, the power of any emission shall be attenuated below the transmitter power (P, in Watts) by at least 43+10Log(P) dB. The specification that emissions shall be attenuated below the transmitter power (P) by at least  $43+10 \log (P) dB$ , translates in the relevant power range (1 to 0.001 W) to -13 dBm. At 1 W the specified minimum attenuation becomes 43 dB and relative to a 30 dBm (1 W) carrier becomes a limit of -13 dBm. At 0.001 W (0 dBm) the minimum attenuation is 13 dB which again yields a limit of -13 dBm. In this way a translation of the specification from relative to absolute terms is carried out.



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#### **Measurement Results:**

Radiated emissions measurements were made only at the upper, center, and lower carrier frequencies of the USPCS band (1850.2 MHz, 1879.8 MHz and 1909.8 MHz). It was decided that measurements at these three carrier frequencies would be sufficient to demonstrate compliance with emissions limits because it was seen that all the significant spurs occur well outside the band and no radiation was seen from a carrier in one block of the USPCS band into any of the other blocks. The equipment must still, however, meet emissions requirements with the carrier at all frequencies over which it is capable of operating and it is the manufacturer's responsibility to verify this.

#### **RESULTS OF OPEN FIELD RADIATED TEST FOR FCC-24:**

The final open field radiated levels are presented on the next pages.

<u>All measurements were done in horizontal and vertical polarization, the plots show the worst case.</u> As can be seen from this data, the emissions from the test item were within the specification limit.

#### **RESULTS OF OPEN FIELD RADIATED TEST FOR FCC-24:**

	EM	ISSION LIMITAT	IONS	
f (MHz)	amplitud of emission (dBm)	max. allowed	actual attenuation below frequency of operation (dBc)	results
	·	CH 512		
1850.2	28.1	-13.0	-	carrier
-	-	(44.8 dBc)	-	-
-	-		-	-
		CH 661		
1880.0	27.8	-13.0	-	carrier
-	-	(44.0 dBc)	-	-
-	-		-	-
		CH 810		
1909.8	27.8	-13.0	-	carrier
		(44.2 dBc)	-	-
			-	-
Measurement	uncertainty		± 0.5dB	

Sample calculation:

Freg	SA	SG	Ant.	Dipol	Cable	ERIP		
	Reading	Setting	gain	gain	loss	Result		
MHz	dBµV	dBm	dBi	dBd	dB	DBm		
1880.0	125.0	26.7	8.4	0.0	3.33	31.8		

EIRP = SG (dBm) - Cable Loss (dB) + Ant. gain (dBi)

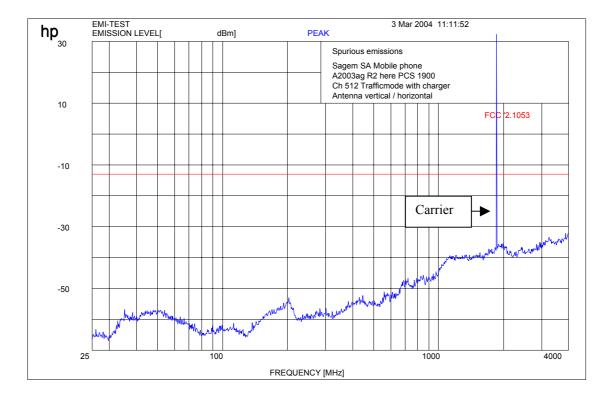


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### Channel 512 (up to 4 GHz)



f < 1 GHz : RBW/VBW: 100 kHz

 $f \ge 1$ GHz : RBW / VBW 1 MHz

Carrier suppressed with a rejection filter

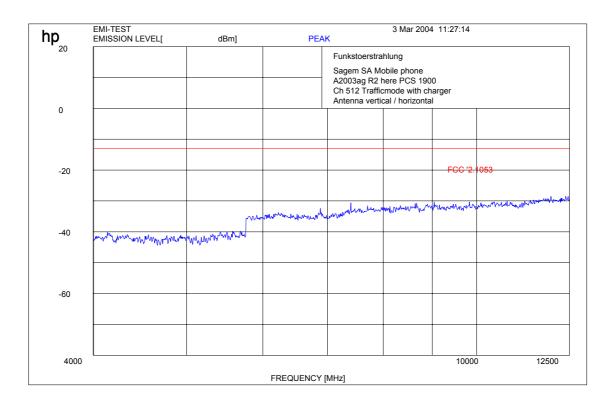


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### Channel 512 (up to 12 GHz)



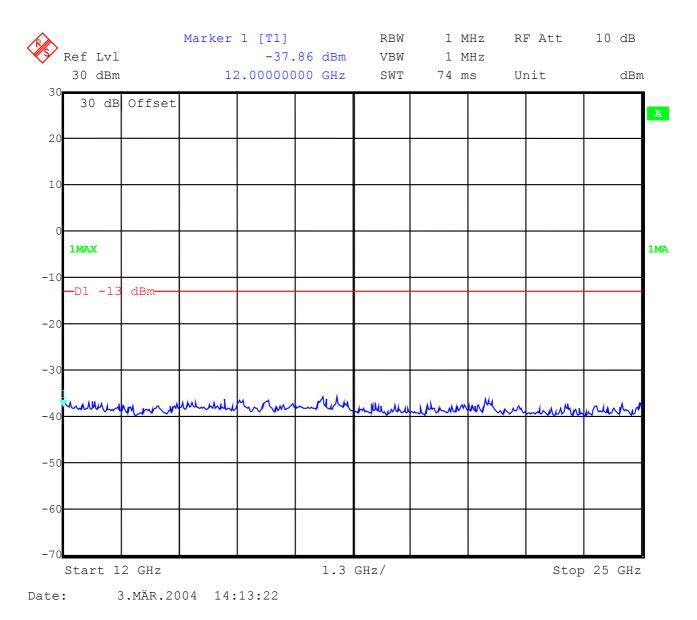
f < 1 GHz : RBW/VBW: 100 kHz



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### Channel 512 (up to 25 GHz)



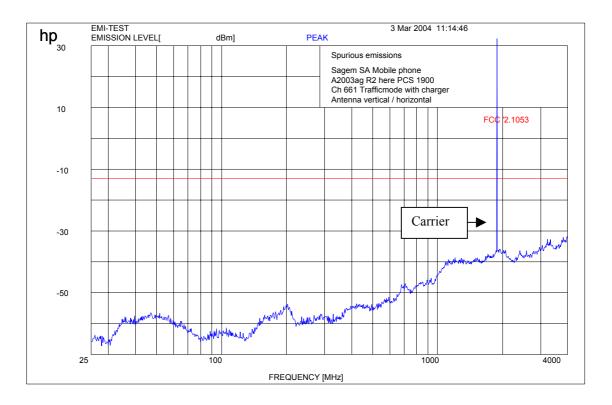


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### Channel 661 (up to 4 GHz)



f < 1 GHz : RBW/VBW: 100 kHz

 $f \ge 1$ GHz : RBW / VBW 1 MHz

Carrier suppressed with a rejection filter.

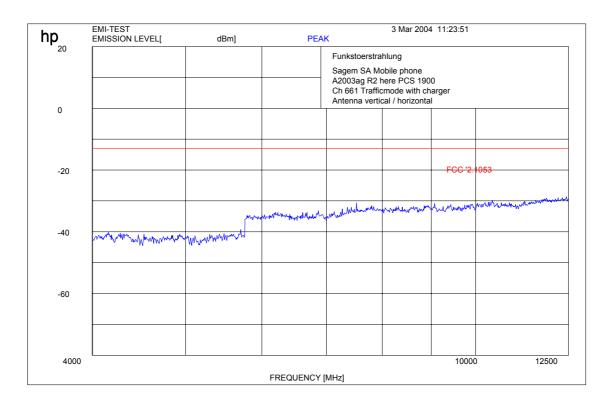


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### Channel 661 (up to 12 GHz)



f < 1 GHz : RBW/VBW: 100 kHz

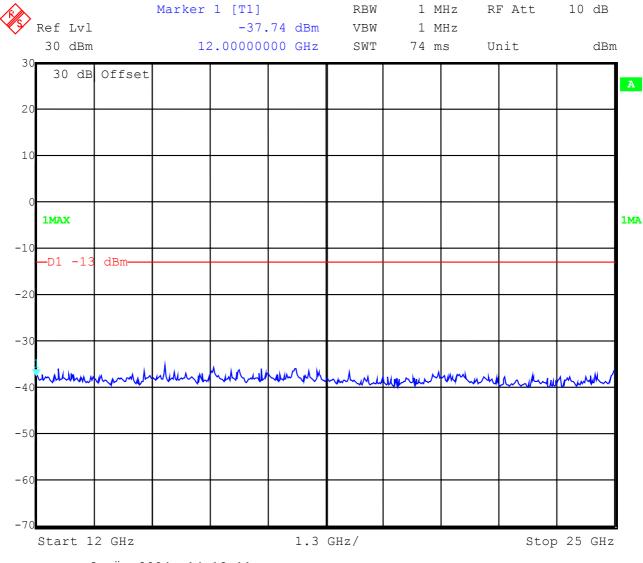


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### Channel 661 (up to 25 GHz)



3.MÄR.2004 14:12:11

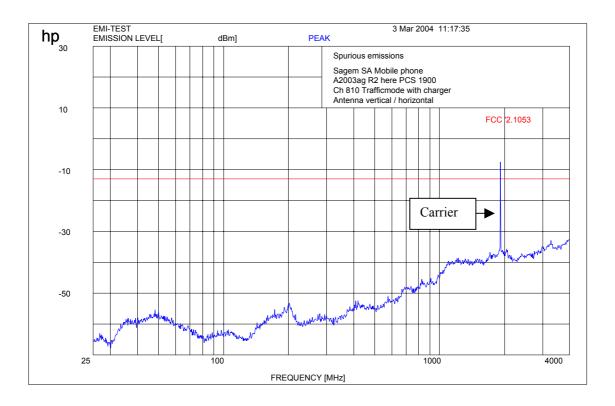


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### Channel 810 (up to 4 GHz)



f < 1 GHz: RBW/VBW: 100 kHz

 $f \ge 1GHz$ : RBW / VBW 1 MHz

Carrier suppressed with a rejection filter

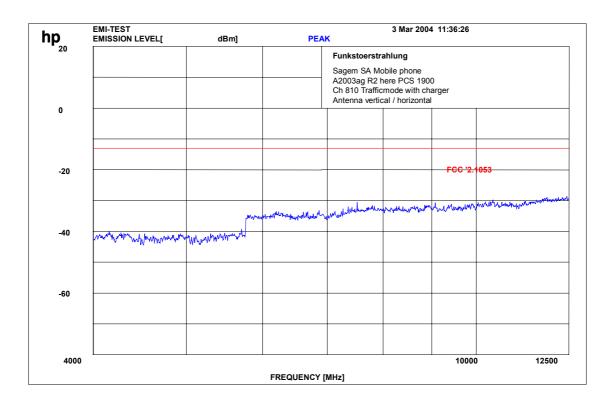


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### Channel 810 (up to 12 GHz)



f < 1 GHz : RBW/VBW: 100 kHz

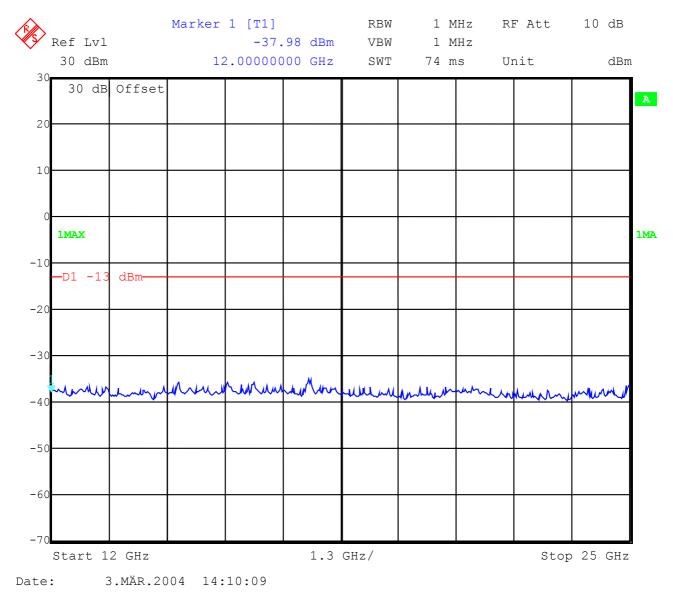


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#### Channel 810 (up to 25 GHz)





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### **RECEIVER SPURIOUS RADIATION**

### § 15.109

Radiated

		SPU	RIOUS E	MISSIONS	LEVEL (µ	.V/m)		
Cl	H 512,661,8	10						
f (MHz)	Detector	Level (µV/m)	f (MHz)	Detector	Level (µV/m)	f (MHz)	Detector	Level (µV/m)
no	peaks	found						
Measur	ement unco	ertainty		11	±3 (	dB	1	I

f < 1 GHz : RBW/VBW: 100 kHz

 $f \ge 1$ GHz : RBW/VBW: 1 MHz

H = Horizontal ; V= Vertical

### Measurement distance see table

Limits

### **SUBCLAUSE § 15.109**

Frequency (MHz)	Field strength (µV/m)	Measurement distance (m)
0.009 - 0.490	2400/F(kHz)	300
0.490 - 1.705	24000/F(kHz)	30
1.705 - 30.0	30	30
30 - 88	100	3
88 - 216	150	3
216 - 960	200	3
above 960	500	3

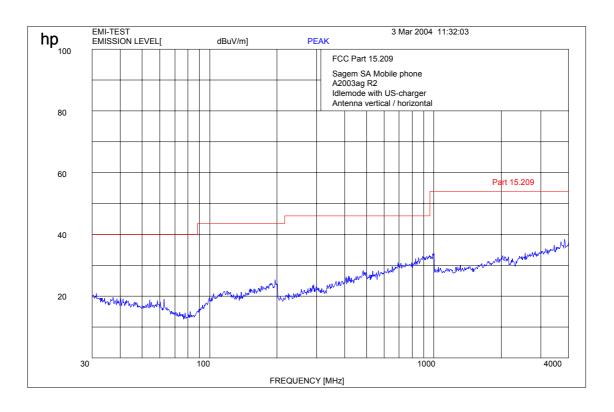


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### Idle-Mode (up to 4 GHz)



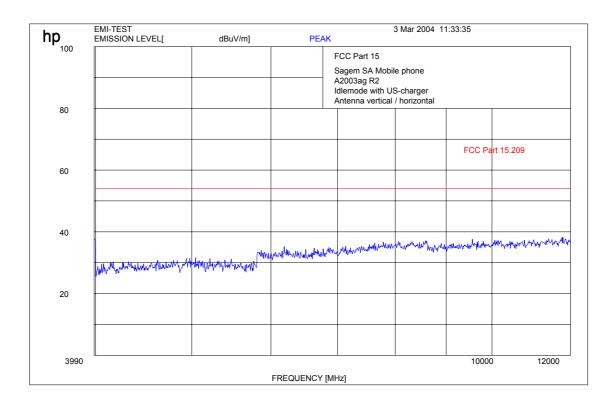
f < 1 GHz : RBW/VBW: 100 kHz



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### Idle-Mode (up to 12 GHz)



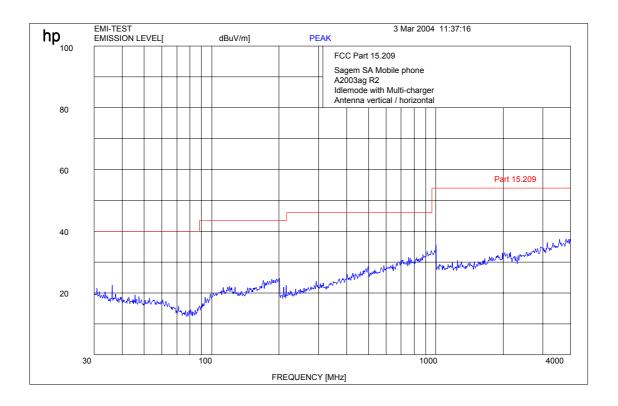
f < 1 GHz : RBW/VBW: 100 kHz



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### Idle-Mode (up to 4 GHz)

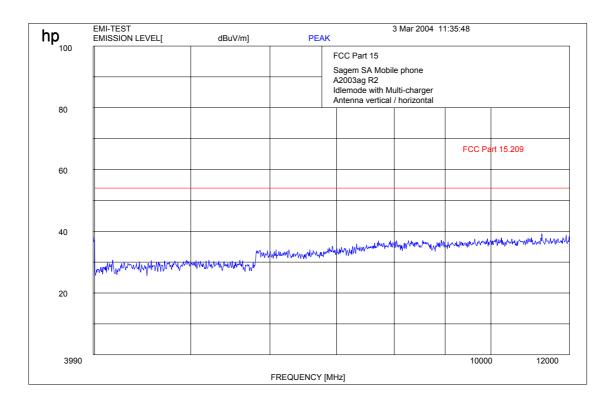


f < 1 GHz : RBW/VBW: 100 kHz



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### Idle-Mode (up to 12 GHz)



f < 1 GHz : RBW/VBW: 100 kHz

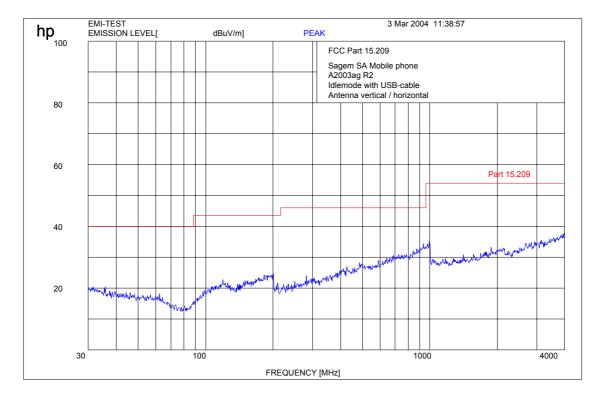


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### Idle-Mode (up to 4 GHz)



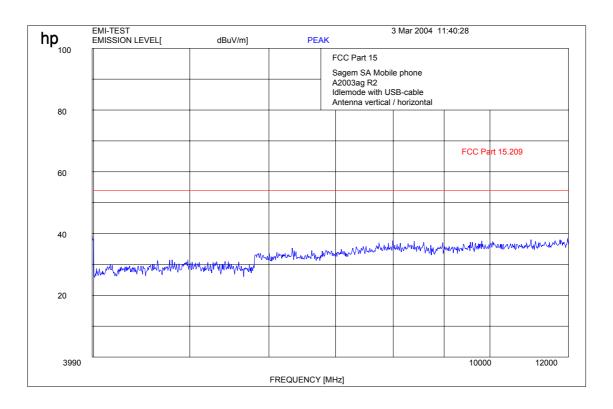
f < 1 GHz : RBW/VBW: 100 kHz



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### Idle-Mode (up to 12 GHz)



f < 1 GHz : RBW/VBW: 100 kHz

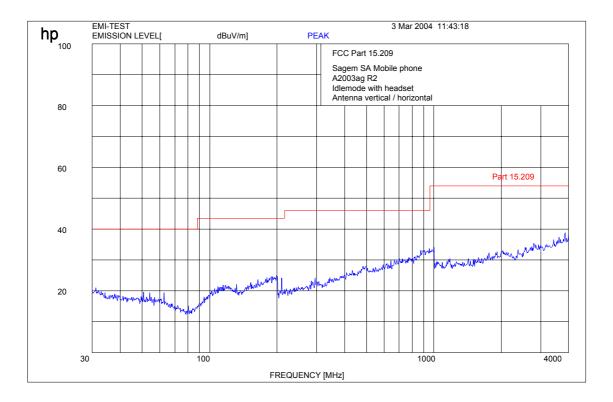


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### Idle-Mode (up to 4 GHz)



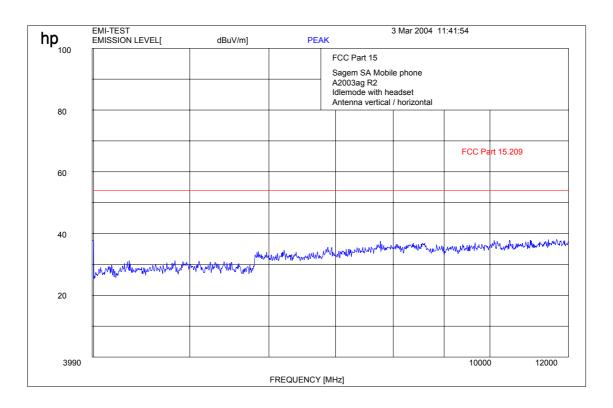
f < 1 GHz : RBW/VBW: 100 kHz



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### Idle-Mode (up to 12 GHz)



f < 1 GHz : RBW/VBW: 100 kHz

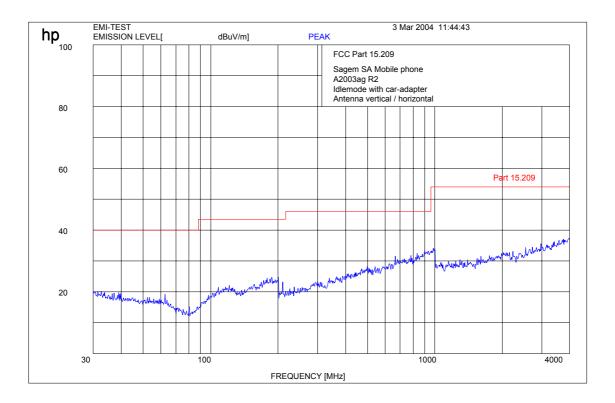


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### Idle-Mode (up to 4 GHz)



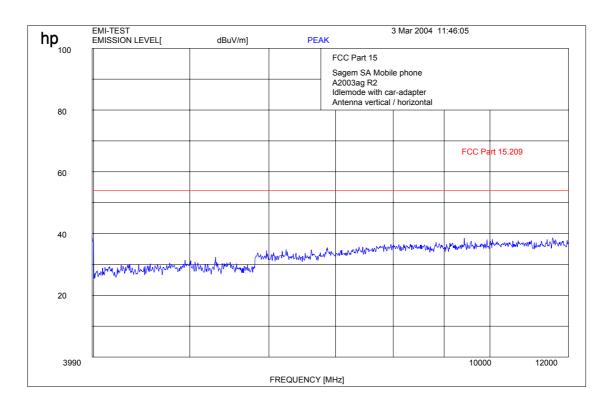
f < 1 GHz : RBW/VBW: 100 kHz



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### Idle-Mode (up to 12 GHz)

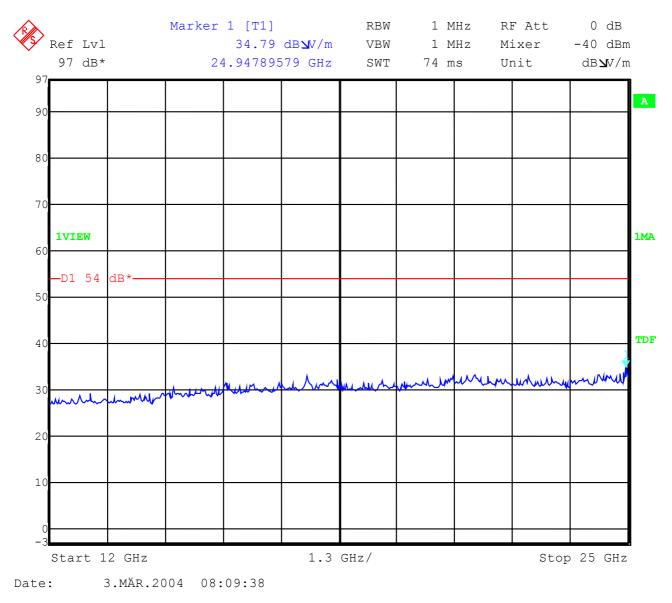


f < 1 GHz : RBW/VBW: 100 kHz



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### Idle-Mode (up to 25 GHz)



For this measurement we used a special wideband horn antenna and a low noise preamp.

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED (for reference numbers see test equipment listing) 17 – 24, 64



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#### **CONDUCTED SPURIOUS EMISSIONS**

### Measurement Procedure:

The following steps outline the procedure used to measure the conducted emissions from the mobile station.

1. Determine frequency range for measurements: From CFR 2.1057 the spectrum should be investigated from the lowest radio frequency generated in the equipment up to at least the 10th harmonic of the carrier frequency.

For the mobile station equipment tested, this equates to a frequency range of 13 MHz to 19.1 GHz, data taken from 10 MHz to 20 GHz.

2. Determine mobile station transmit frequencies: below outlines the band edge frequencies pertinent to conducted emissions testing.

### **USPCS Transmitter**

Channel Frequency 512 1850.2 MHz 661 1880.0 MHz 810 1909.8 MHz

#### **Measurement Limit:**

Sec. 24.238 Emission Limits.

(a) On any frequency outside frequency band of the USPCS spectrum, the power of any emission shall be attenuated below the transmitter power (P, in Watts) by at least 43+10Log(P) dB. For all power levels +30 dBm to 0 dBm, this becomes a constant specification limit of -13 dBm.

	EMI	SSION LIMITATI	ONS	
f (MHz)	amplitude of emission (dBm)	limit max. allowed emission power (dBm)	actual attenuation below frequency of operation (dBc)	results
		CH 512		
1 850.2	29.8	-13.0		carrier
1 850.0	- 14.9	(42.8 dBc)	44.7	carrier
3 668.5	- 29.2		59.0	complies
		CH 661		
1 880.0	29.6	-13.0		carrier
3 734.2	- 30.9	(42.6 dBc)	60.5	complies
		CH 810		
1 909.8	29.5	-13.0		carrier
1 910.5	- 15.3	(42.5 dBc)	44.8	carrier
Measuremen	t uncertainty		± 0.5dB	



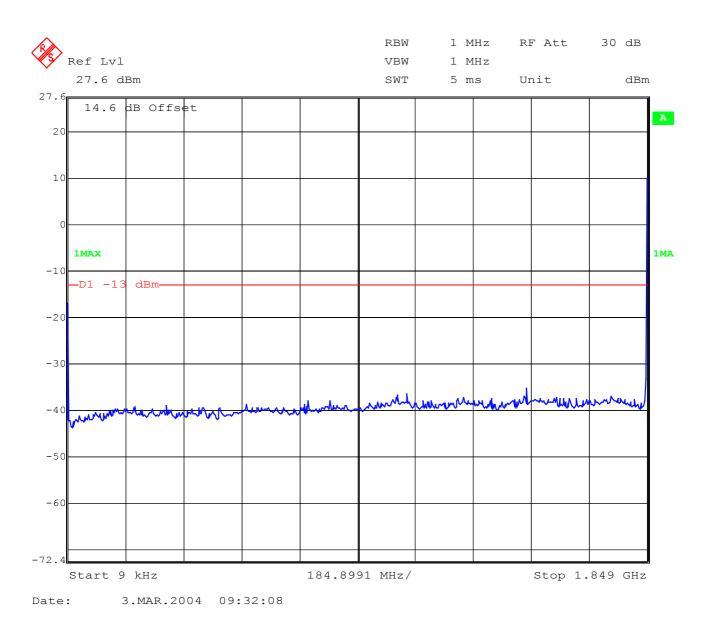
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#### Measurements:

#### Channel: 512

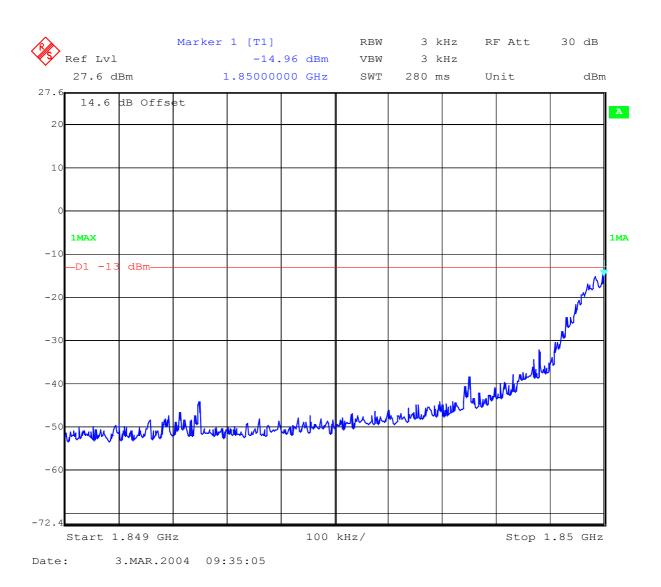


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### Channel 512



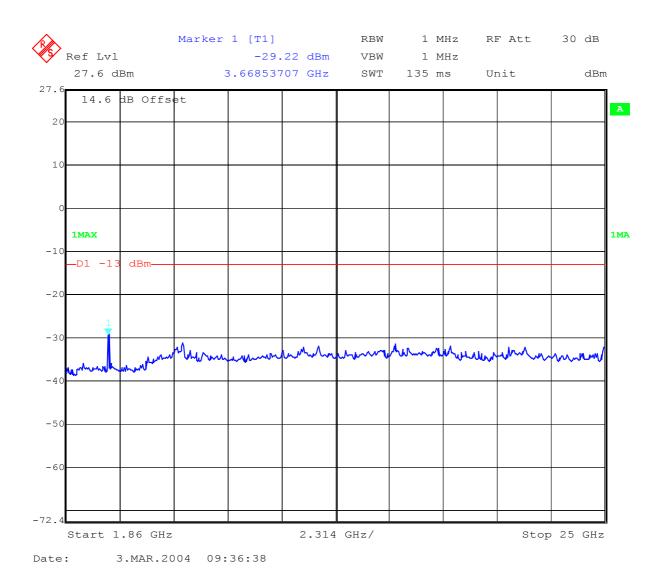


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### Channel 512



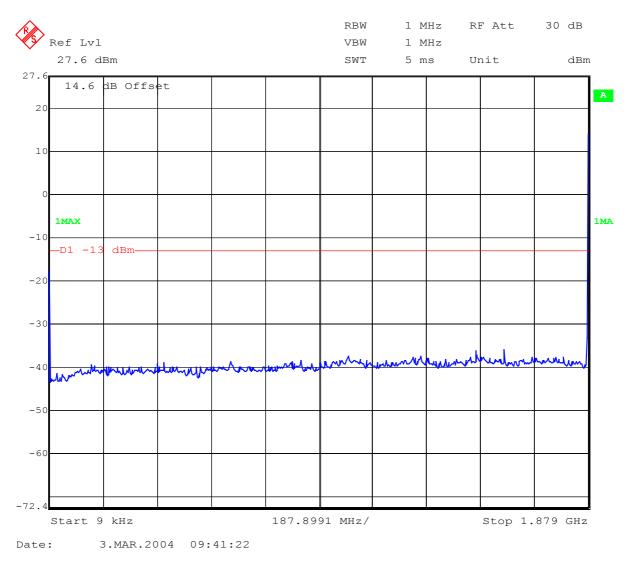


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### Channel 661



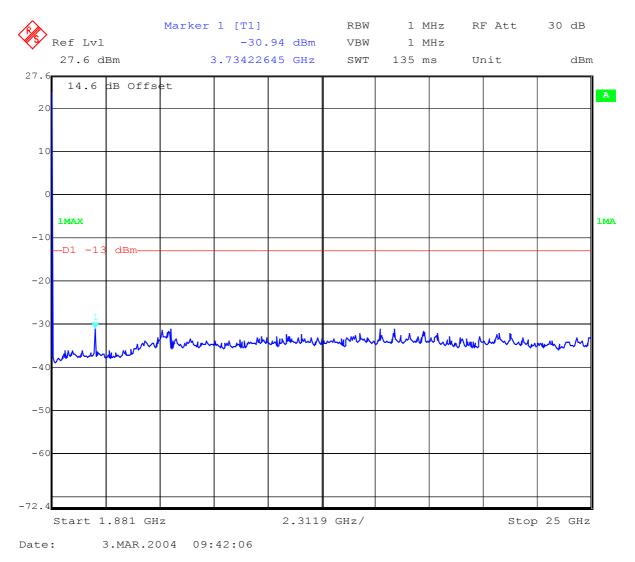


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### Channel 661

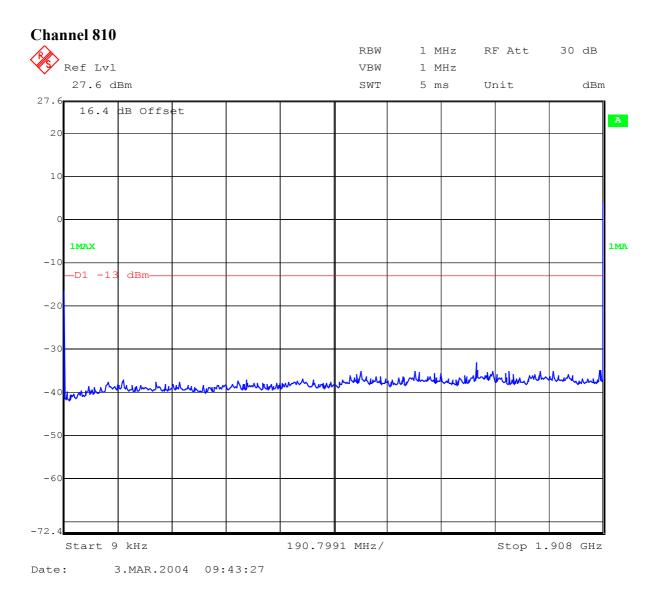




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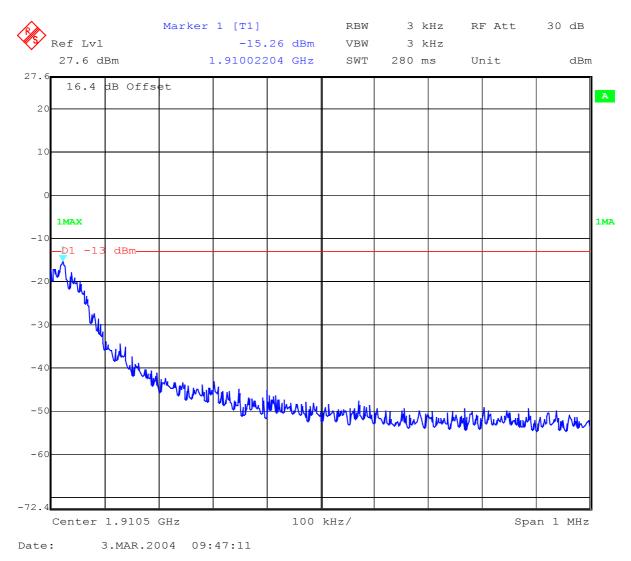


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#### Channel 810



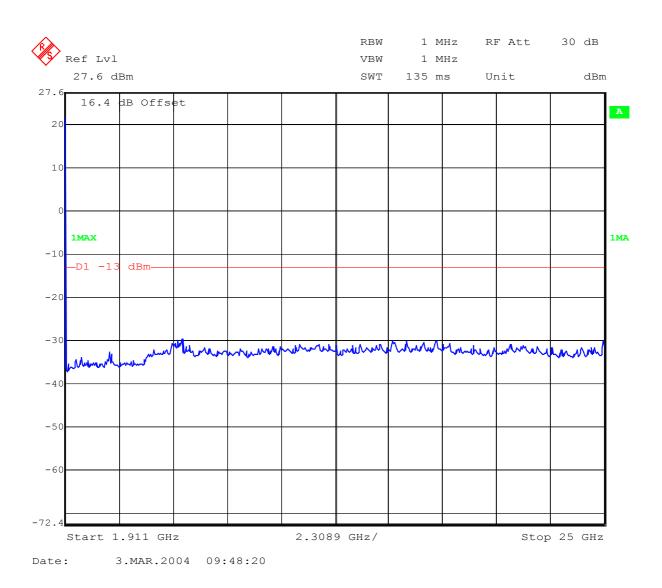


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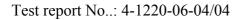
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### Channel 810







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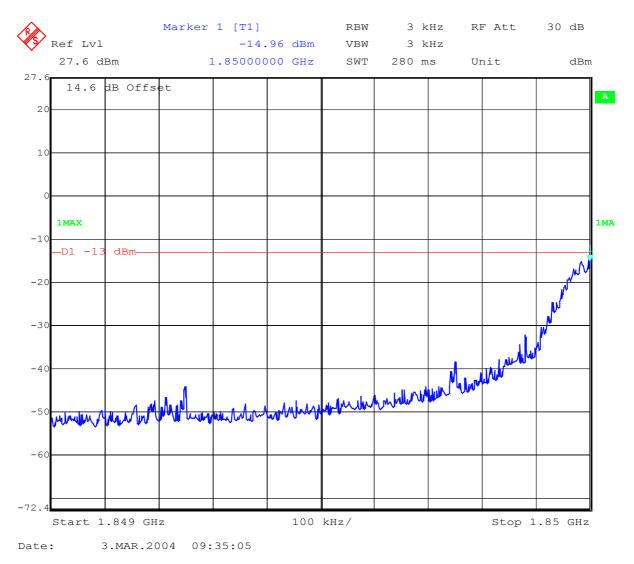
### **BLOCK EDGE COMPLIANCE FOR BLOCK A AND C**

#### **Measurement Limit:**

Sec. 24.238 Emission Limits.

(a) On any frequency outside frequency band of the USPCS spectrum, the power of any emission shall be attenuated below the transmitter power (P, in Watts) by at least 43+10Log(P) dB. For all power levels +30 dBm to 0 dBm, this becomes a constant specification limit of -13 dBm.

#### Measurements: Block A Channel 512

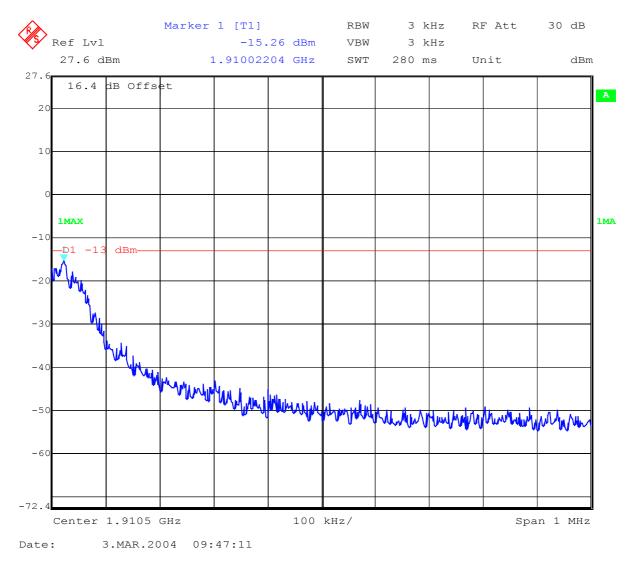


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#### **Block C Channel 810**







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#### **OCCUPIED BANDWIDTH**

#### <u>§2.989</u>

#### **Occupied Bandwidth Results**

Similar to conducted emissions, occupied bandwidth measurements are only provided for selected frequencies in order to reduce the amount of submitted data. Data were taken at the extreme and mid frequencies of the USPCS frequency band. Table 8.2 below lists the measured 99% power and -26dBC occupied bandwidths. Spectrum analyzer plots are included on the following pages.

Frequency	99% Occupied Bandwidth	-26 dBc Bandwidth
1850.2 MHz	284.569	316.633
1880.0 MHz	286.573	314.629
1909.8 MHz	284.569	324.649

Part 24.238 (a) requires a measurement bandwidth of at least 1% of the occupied bandwidth. For ca. 299.7 kHz, this equates to a resolution bandwidth of at least 3.0 kHz. For this testing, a resolution bandwidth 3.0 kHz was used.

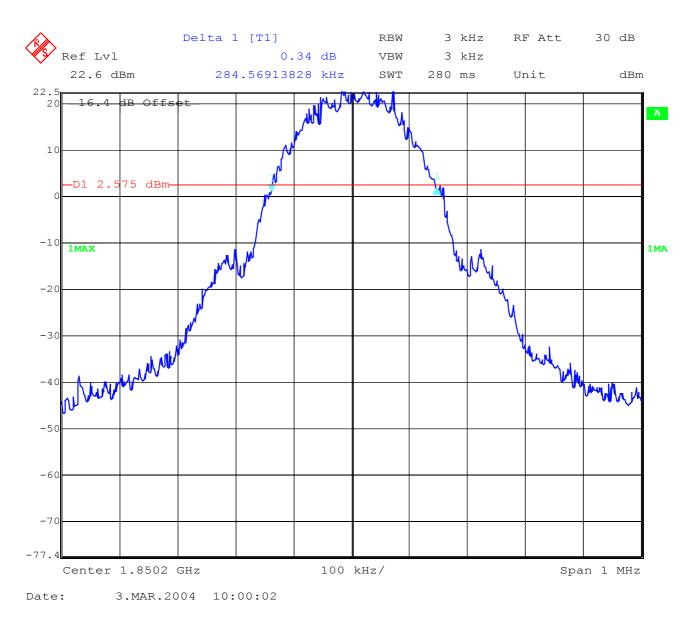


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## Channel 512 99% Occupied Bandwidth



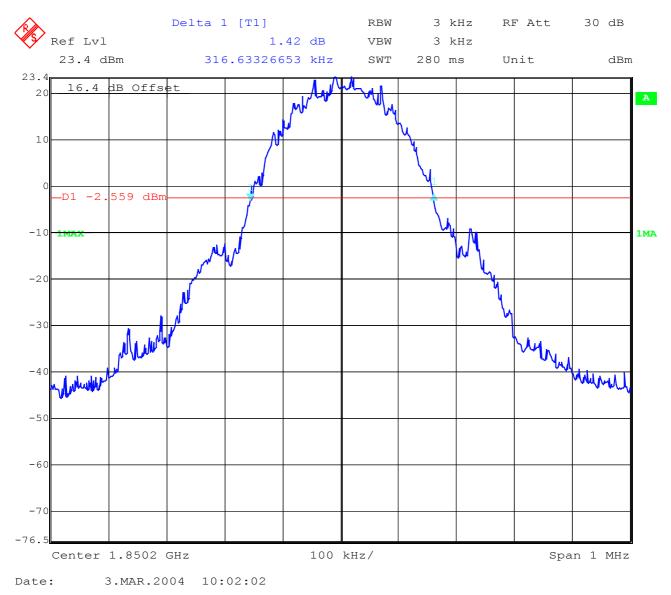


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### Channel 512 -26 dBc Bandwidth



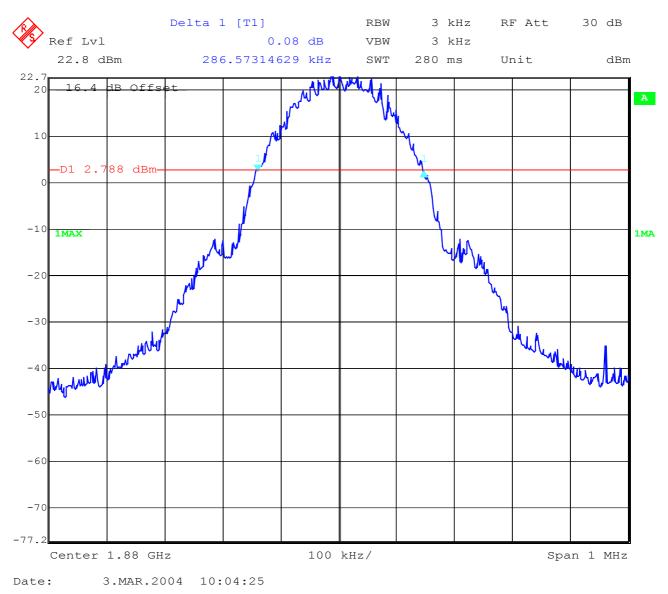


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### Channel 661 99% Occupied Bandwidth



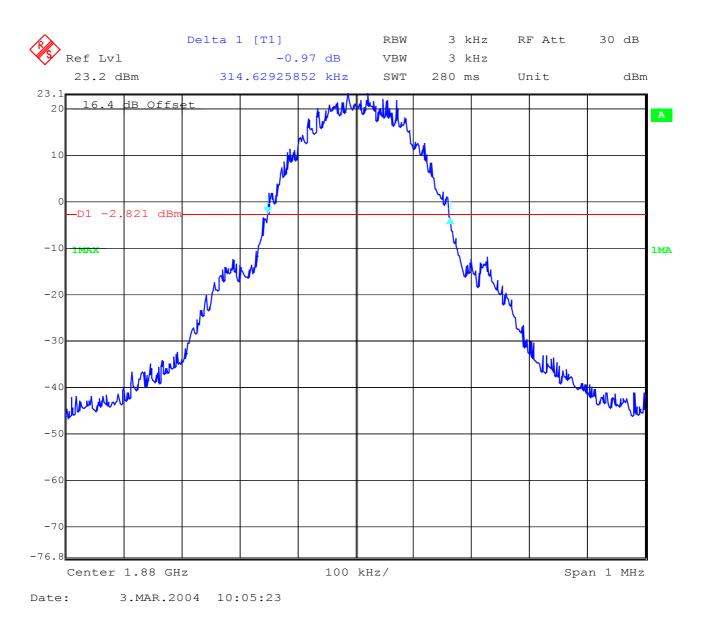


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#### Channel 661 -26 dBc Bandwidth



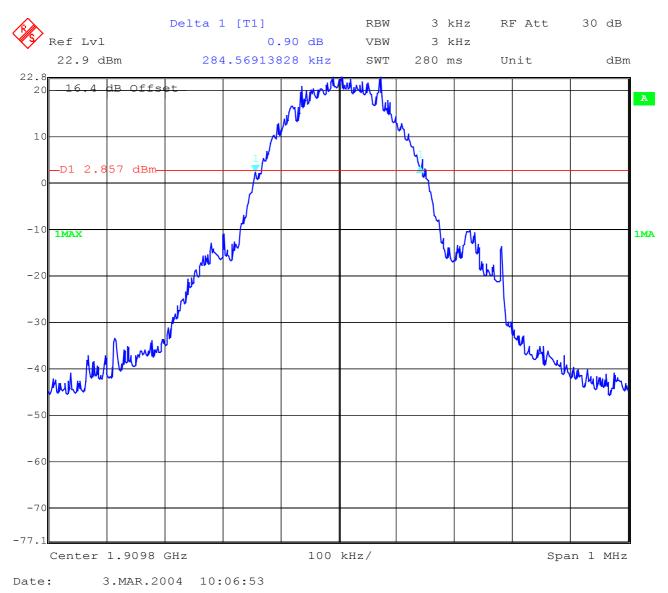


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### Channel 810 99% Occupied Bandwidth



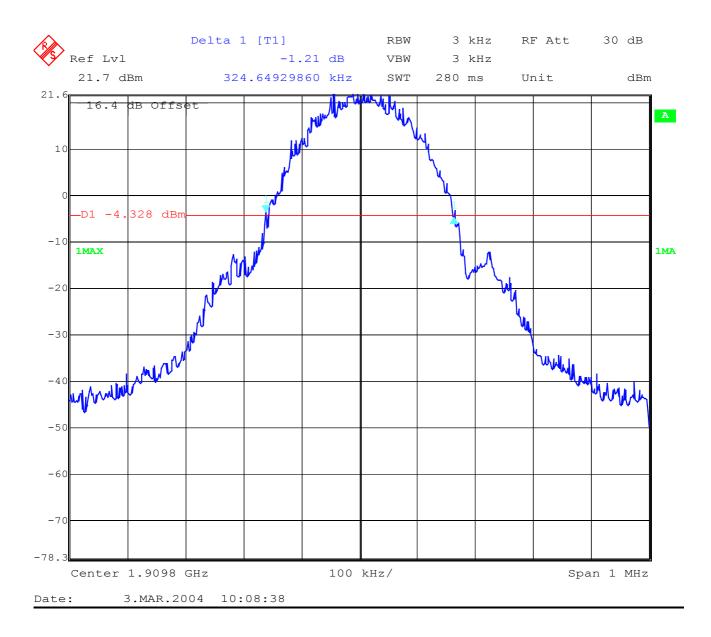


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### Channel 810 -26 dBc Bandwidth





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#### **PART PCS 850**

#### **POWER OUTPUT**

SUBCLAUSE § 22.913

#### Summery:

This paragraph contains both average, peak output powers and EIRP measurements for the mobile station. In all cases, the peak output power is within the required mask (this mask is specified in the JTC standards, TIA PN3389 Vol. 1 Chap 7, and is no FCC requirement).

Method of Measurements:

The mobile was set up for the max. output power with pseudo random data modulation. The power was measured with R&S Signal Analyzer FSIQ 26 (peak and average) This measurements were done at 3 frequencies, 824.2 MHz, 836.2 MHz and 848.8 MHz (bottom, middle and top of operational frequency range)

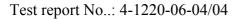
Limits:

Power Step	Nominal Peak Output Power (dBm)	Tolerance (dB)
5	+33	± 2

#### **Power Measurements:**

#### **Conducted:**

Frequency (MHz)	Power Step	Peak Output Power (dBm)	Average Output Power (dBm)
824.2	5	32.8	32.7
836.4	5	33.1	33.0
848.8	5	33.4	33.3
Measuremen	t uncertainty	±0.5	5 dB



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#### **ERP** Measurements

Description: This is the test for the maximum radiated power from the phone. Rule Part 22.913 specifies that "Mobile/portable stations are limited to 7 watts ERP.

#### Measuring the EIRP of Spurious/Harmonic Emissions using Substitution Method

(a) The measurements was performed with full rf output power and modulation.

(b) Test was performed at listed 3m test site (listed with FCC, IC).

(c) The transmitter under test was placed at the specified height on a non-conducting turntable (80 cm height)

(d) The BICONILOG antenna (20 MHz to 1 GHz) or HORN antenna (1 GHz to 18 GHz) was used for measuring. (e) Load an appropriate correction factors file in EMI Receiver for correcting the field strength reading level

Total Correction Factor recorded in the EMI Receiver = Cable Loss + Antenna Factor

E (dBuV/m) = Reading (dBuV) + Total Correction Factor (dB/m)

(f) Set the EMI Receiver and #2 as follows:

Center Frequency: test frequency Resolution BW: 100 kHz Video BW: same Detector Mode: positive Average: off Span: 3 x the signal bandwidth

(g) The test antenna was lowered or raised from 1 to 4 meters until the maximum signal level was detected.

(h) The transmitter was rotated through 360 o about a vertical axis until a higher maximum signal was received.

(i) The test antenna was lowered or raised again from 1 to 4 meters until a maximum was obtained. This level was recorded.

(i) The recorded reading was corrected to the true field strength level by adding the antenna factor, cable loss and subtracting the pre-amplifier gain.

(k) The above steps were repeated with both transmitters' antenna and test receiving antenna placed in vertical and horizontal polarization. Both readings with the antennas placed in vertical and horizontal polarization shall be recorded.

(1) Repeat for all different test signal frequencies

#### Measuring the EIRP of Spurious/Harmonic Emissions using Substitution Method

(a) Set the EMI Receiver (for measuring E-Field) and Receiver #2 (for measuring EIRP) as follows: : equal to the signal source Center Frequency Resolution BW : 10 kHz Video BW : same Detector Mode : positive Average : off : 3 x the signal bandwidth Span

(b) Load an appropriate correction factors file in EMI Receiver for correcting the field strength reading level Total Correction Factor recorded in the EMI Receiver = Cable Loss + Antenna Factor

E (dBuV/m) = Reading (dBuV) + Total Correction Factor (dB/m)

(c) Select the frequency and E-field levels for ERP/EIRP measurements.

(d) Substitute the EUT by a signal generator and one of the following transmitting antenna (substitution antenna): .DIPOLE antenna for frequency from 30-1000 MHz or .HORN antenna for frequency above 1 GHz }.





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(e) Mount the transmitting antenna at 1.5 meter high from the ground plane.

(f) Use one of the following antenna as a receiving antenna: .DIPOLE antenna for frequency from 30-1000 MHz or .HORN antenna for frequency above 1 GHz }.

(g) If the DIPOLE antenna is used, tune it's elements to the frequency as specified in the calibration manual.

(h) Adjust both transmitting and receiving antenna in a VERTICAL polarization.

(i) Tune the EMI Receivers to the test frequency.

(j) Lower or raise the test antenna from 1 to 4 meters until the maximum signal level was detected.

(k) The transmitter was rotated through 360 o about a vertical axis until a higher maximum signal was received.

(1) Lower or raise the test antenna from 1 to 4 meters until the maximum signal level was detected.

(m) Adjust input signal to the substitution antenna until an equal or a known related level to that detected from the transmitter was obtained in the test receiver.

(n) Record the power level read from the Average Power Meter and calculate the ERP/EIRP as follows:

P = P1 - L1 = (P2 + L2) - L1 = P3 + A + L2 - L1

EIRP = P + G1 = P3 + L2 - L1 + A + G1

#### ERP = EIRP - 2.15 dB

Total Correction factor in EMI Receiver # 2 = L2 - L1 + G1

Where: P: Actual RF Power fed into the substitution antenna port after corrected.

- P1: Power output from the signal generator
- P2: Power measured at attenuator A input

P3: Power reading on the Average Power Meter

- EIRP: EIRP after correction
- ERP: ERP after correction

(o) Adjust both transmitting and receiving antenna in a HORIZONTAL polarization, then repeat step (k) to (o)

(p) Repeat step (d) to (o) for different test frequency

(q) Repeat steps (c) to (j) with the substitution antenna oriented in horizontal polarization.

(r) Actual gain of the EUT's antenna is the difference of the measured EIRP and measured RF power at the RF port. Correct the antenna gain if necessary.

#### Limits:

Power Step	
	Burst Peak (dBm)
0	<33

#### Power Measurements (Radiated)

Frequency	Power Step	BURST Peak (dBm)		MODULATION AVERAGE (dBm)	
(MHz)		EIRP	ERP	EIRP	ERP
824.2	5	25.45	23.3	16.45	14.3
836.4	5	26.55	24.4	17.55	15.4
848.8	5	25.85	23.7	16.85	14.7
Measurement unce	ertainty	±3 dB			

Sample calculation:

Freg	SA Reading	SG Setting	Ant. gain	Dipol gain	Cable loss	ERIP Result	ERP	Substitution Antenna
MHz	dBµV	dBm	dBi	dBd	dB	dBm	dBm	
836.4	122.5	33.1		-10.50	1.67		24.4	UHAP chwarzbeck S/N 460

ERP = SG (dBm) - Cable Loss (dB) + Ant. gain (dB)

\*ERP can be calculated from EIRP by subtracting the gain of the dipole, ERP = EIRP -2.1dBi



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### FREQUENCY STABILITY

### SUBCLAUSE § 22.355

#### Method of Measurement:

In order to measure the carrier frequency under the condition of AFC lock, it is necessary to make measurements with the mobile station in a "call mode". This is accomplished with the use of a R&S CMU 200 DIGITAL RADIOCOMMUNICATION TESTER..

1. Measure the carrier frequency at room temperature.

2. Subject the mobile station to overnight soak at -30 C.

3. With the mobile station, powered with 3.7 Volts, connected to the CMU 200 and in a simulated call on channel 661 (centre channel), measure the carrier frequency. These measurements should be made within 2 minutes of powering up the mobile station, to prevent significant self warming.

4. Repeat the above measurements at 10 C increments from -30 C to +60 C. Allow at least 1 1/2 hours at each temperature, un-powered, before making measurements.

5. Re-measure carrier frequency at room temperature with nominal 3.7 Volts. Vary supply voltage from minimum 3.3 Volts to maximum 4.4 Volts, in 13 steps re-measuring carrier frequency at each voltage. Pause at 3.7 V ac Volts for 1 1/2 hours un-powered, to allow any self heating to stabilize, before continuing.

6. Subject the mobile station to overnight soak at +60 C.

7. With the mobile station, powered with 3.7 Volts, connected to the CMU 200 and in a simulated call on channel 661(center channel), measure the carrier frequency. These measurements should be made within 2 minutes of powering up the mobile station, to prevent significant self warming.

8. Repeat the above measurements at 10 C increments from +60 C to -30 C. Allow at least 1 1/2 hours at each temperature, un-powered, before making measurements.

9. At all temperature levels hold the temperature to  $\pm -0.5$  C during the measurement procedure.

#### **Measurement Limit:**

According to the JTC standard the frequency stability of the carrier shall be accurate to within 0.1 ppm of the received frequency from the base station. This accuracy is sufficient to meet Sec. 22.355, Frequency Stability. The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.. This transceiver is specified to operate with an input voltage of between 3.3 V dc and 4.4 V dc, with a nominal voltage of 3.7 V dc.



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## AFC FREQ ERROR vs. VOLTAGE

Voltage	Frequency Error	Frequency Error	Frequency Error
(V)	(Hz)	(%)	(ppm)
3.3			
3.4			
3.5	24	0,00000128	0,0128
3.6	29	0,0000154	0,0154
3.7	35	0,0000186	0,0186
3.8	42	0,0000223	0,0223
3.9	37	0,0000197	0,0197
4.0	32	0,00000170	0,0170
4.1	27	0,00000144	0,0144
4.2	23	0,00000122	0,0122
4.3	12	0,0000064	0,0064
4.4	9	0,0000048	0,0048

## AFC FREQ ERROR vs. TEMPERATURE

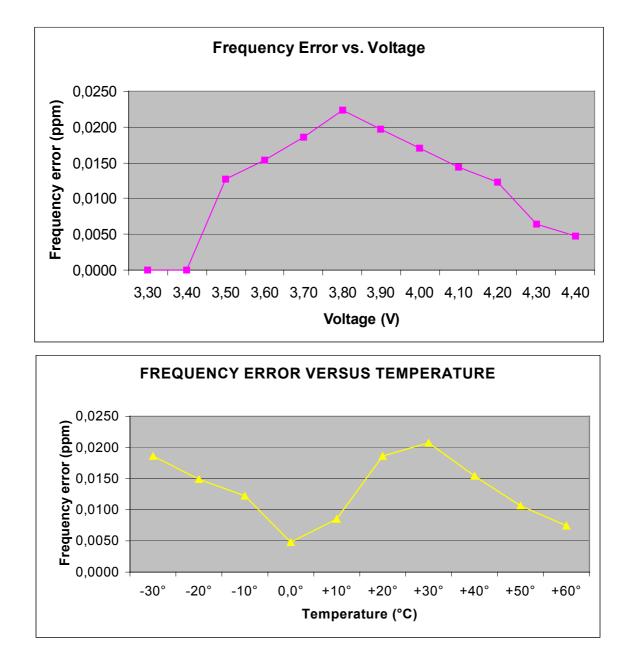
TEMPERATURE (°C)	Frequency Error (Hz)	Frequency Error (%)	Frequency Error (ppm)
-30	35	0,00000186	0,0186
-20	28	0,00000149	0,0149
-10	23	0,00000122	0,0122
±0.0	9	0,0000048	0,0048
+10	16	0,0000085	0,0085
+20	35	0,0000186	0,0186
+30	39	0,0000207	0,0207
+40	29	0,00000154	0,0154
+50	20	0,00000106	0,0106
+60	14	0,0000074	0,0074



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#### **EMISSIONS LIMITS**

**§22.917** 

#### **Measurement Procedure:**

The following steps outline the procedure used to measure the radiated emissions from the mobile station. The site is constructed in accordance with ANSI C63.4 – 1992 requirements and is recognized by the FCC to be in compliance for a 3 and a10 meter site. The spectrum was scanned from 30 MHz to the 10th harmonic of the highest frequency generated within the equipment, which is the transmitted carrier that can be as high as 848.8 MHz. This was rounded up to 12 GHz. The resolution bandwidth is set as outlined in Part 22.917. The spectrum was scanned with the mobile station transmitting at carrier frequencies that pertain to low, mid and high channels of the USPCS band.

#### The final open field emission ( here 10m semi-anechoic chamber listed by FCC) test procedure is as follows:

a) The test item was placed on a 0.8 meter high non-conductive stand at a 3 meter test distance from the receive antenna.

b) The antenna output was terminated in a 50 ohm load.

c) A double ridged wave guide antenna was placed on an adjustable height antenna mast 3 meters from the test item for emission measurements.

d) Detected emissions were maximized at each frequency by rotating the test item and adjusting the receive antenna height and polarization. The maximum meter reading was recorded. The radiated emission measurements of the harmonics of the transmit frequency through the 10th harmonic were measured with peak detector and I MHz bandwidth. If the harmonic could not be detected above the noise floor, the ambient level was recorded. The equivalent power into a dipole antenna was calculated from the field intensity levels measured at 3 meters using the equation shown below:

e)Now each detected emissions were substituted by the Substitution method, in accordance with the TIA/EIA 603 .

#### Measurement Limit:

#### Sec. 22.917 Emission Limits.

(a) On any frequency outside a licensee's frequency block (e.g. A, D, B, etc.) within the USPCS spectrum, the power of any emission shall be attenuated below the transmitter power (P, in Watts) by at least 43+10Log(P) dB. The specification that emissions shall be attenuated below the transmitter power (P) by at least  $43+10 \log (P) dB$ , translates in the relevant power range (1 to 0.001 W) to -13 dBm. At 1 W the specified minimum attenuation becomes 43 dB and relative to a 30 dBm (1 W) carrier becomes a limit of -13 dBm. At 0.001 W (0 dBm) the minimum attenuation is 13 dB which again yields a limit of -13 dBm. In this way a translation of the specification from relative to absolute terms is carried out.



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#### **Measurement Results:**

Radiated emissions measurements were made only at the upper, center, and lower carrier frequencies of the USPCS band (824.2 MHz, 836.2 MHz and 848.8 MHz). It was decided that measurements at these three carrier frequencies would be sufficient to demonstrate compliance with emissions limits because it was seen that all the significant spurs occur well outside the band and no radiation was seen from a carrier in one block of the USPCS band into any of the other blocks. The equipment must still, however, meet emissions requirements with the carrier at all frequencies over which it is capable of operating and it is the manufacturer's responsibility to verify this.

#### **RESULTS OF OPEN FIELD RADIATED TEST FOR FCC-22:**

The final open field radiated levels are presented on the next pages.

<u>All measurements were done in horizontal and vertical polarization, the plots shows the worst case.</u> As can be seen from this data, the emissions from the test item were within the specification limit.

	EMIS	SSION LIMITAT	IONS	
f (MHz)	amplitude of emission ERP (dBm)	limit max. allowed emission power (dBm)	actual attenuation below frequency of operation (dBc)	results
·		CH 128	· • · · ·	
824.2	23.3	-13.0	-	carrier
-	-	(36.3 dBc)	-	-
		CH 189	· · ·	
836.4	24.4	-13.0	-	carrier
1 672.4	- 34.5	(37.4 dBc)	58.8	complies
		CH 251		
848.8	23.7	-13.0	-	carrier
1 697.6	- 28.2	(36.7 dBc)	51.9	complies
Measurement u	incertainty		± 0.5dB	

Sample calculation:

Freg	SA Reading	SG Setting	Ant. gain	Dipol gain	Cable loss	ERIP Result	ERP	Substitution Antenna
MHz	dBµV	dBm	dBi	dBd	dB	dBm	dBm	
836.4	122.5	36.5		-10.50	1.67		24.4	UHAP chwarzbeck S/N 460

ERP = SG (dBm) - Cable Loss (dB) + Ant. gain (dB)

\*ERP can be calculated from EIRP by subtracting the gain of the dipole, ERP = EIRP -2.1dBi

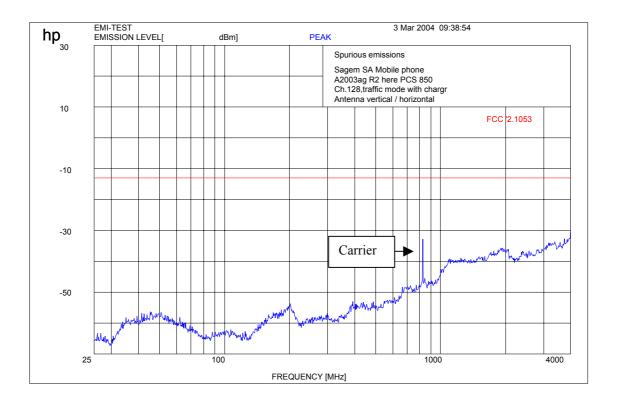


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### Channel 128 (up to 4 GHz)



f < 1 GHz : RBW/VBW: 100 kHz Carrier suppressed with a rejection filter  $f \ge 1GHz$  : RBW/VBW 1 MHz

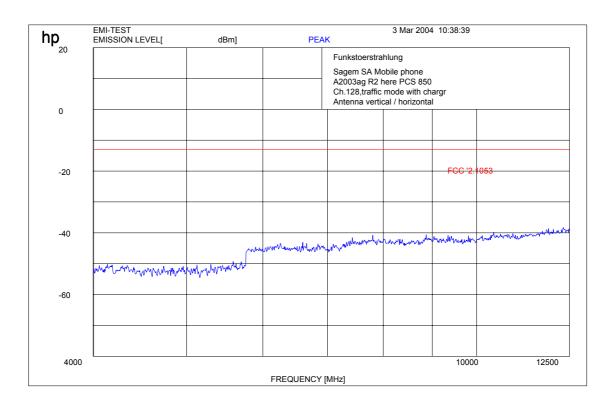


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## Channel 128 (up to 12 GHz)



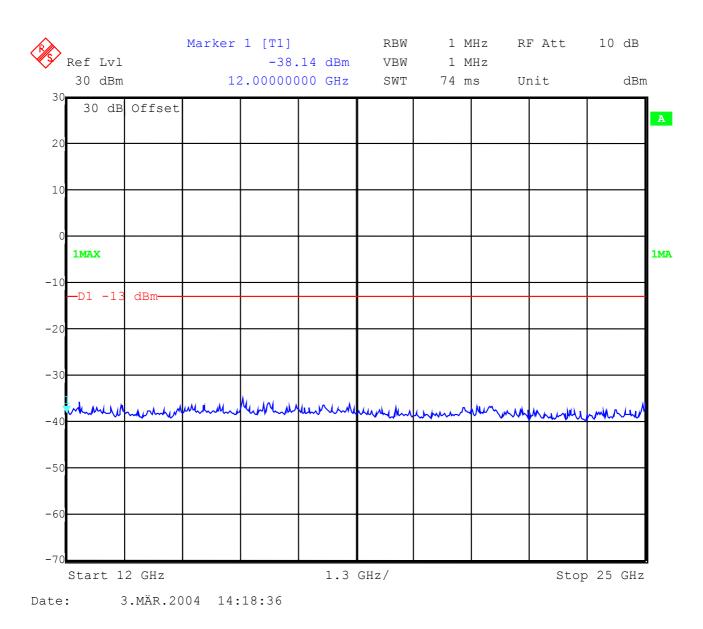
f < 1 GHz : RBW/VBW: 100 kHz

 $f \ge 1$ GHz : RBW/VBW 1 MHz



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### Channel 128 (up to 25 GHz)



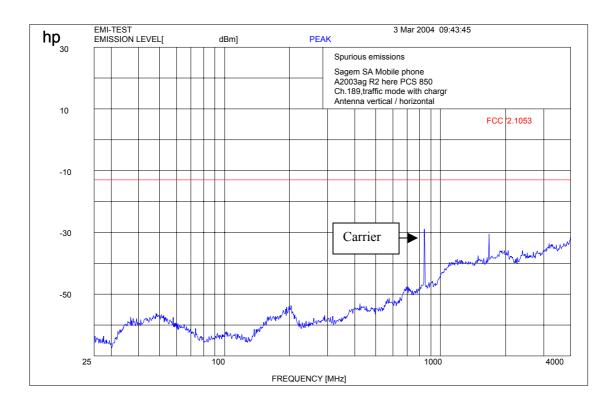


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Date: 2004.03.08

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### Channel 189 (up to 4 GHz)



f < 1 GHz: RBW/VBW: 100 kHz  $f \ge 1 \text{ GHz}$ : RBW/VBW 1 MHz Carrier suppressed with a rejection filter

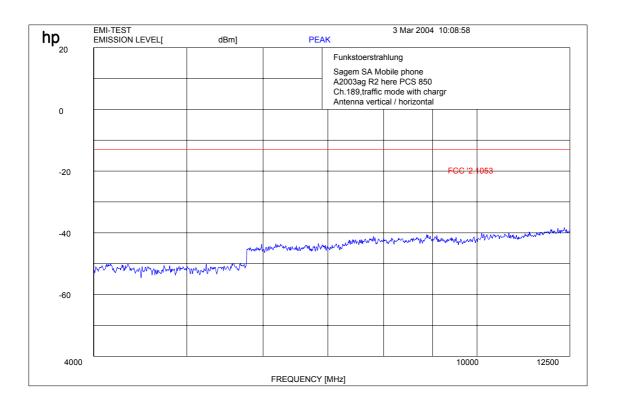


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## Channel 189 (up to 12 GHz)



f < 1 GHz : RBW/VBW: 100 kHz

 $f \ge 1$ GHz : RBW/VBW 1 MHz

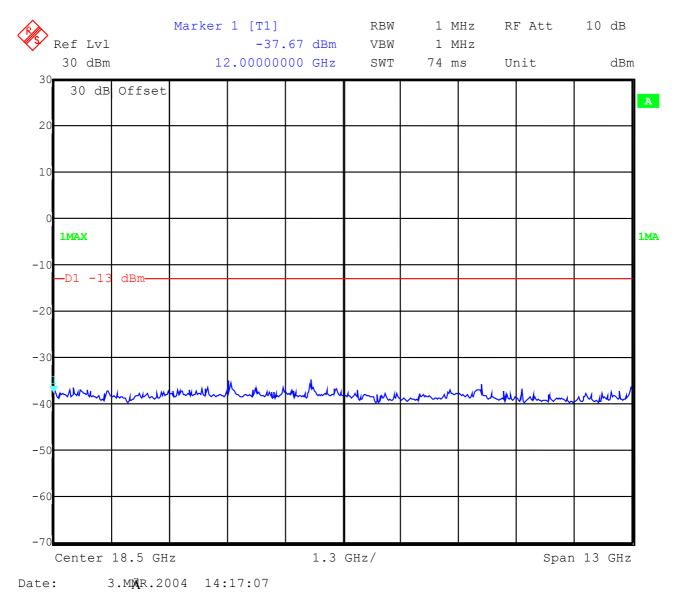


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#### Channel 189 (up to 25 GHz)



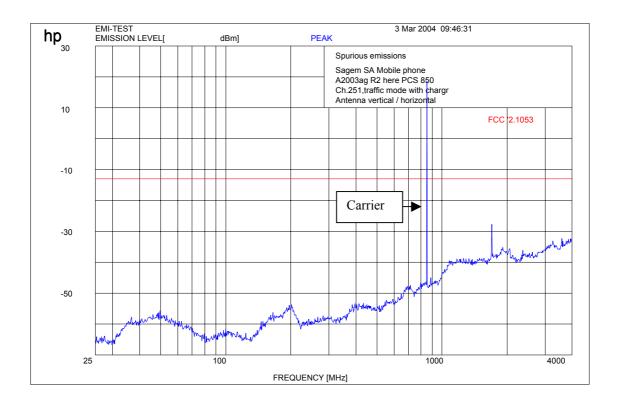


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### Channel 251 (up to 4 GHz)



f < 1 GHz : RBW/VBW: 100 kHz  $f \ge 1 \text{ GHz}$  : RBW/VBW 1 MHz Carrier suppressed with a rejection filter

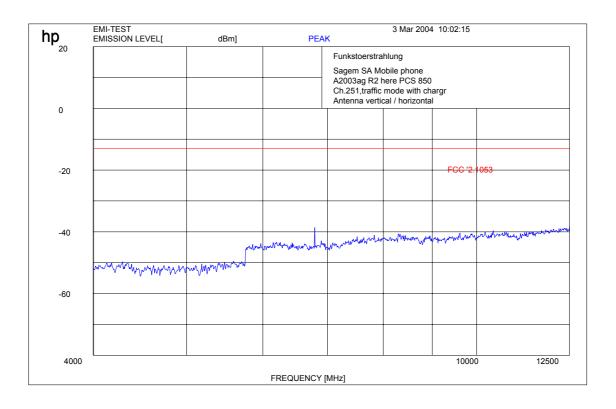


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## Channel 251 (up to 12 GHz)



f < 1 GHz : RBW/VBW: 100 kHz

 $f \ge 1$ GHz : RBW/VBW 1 MHz

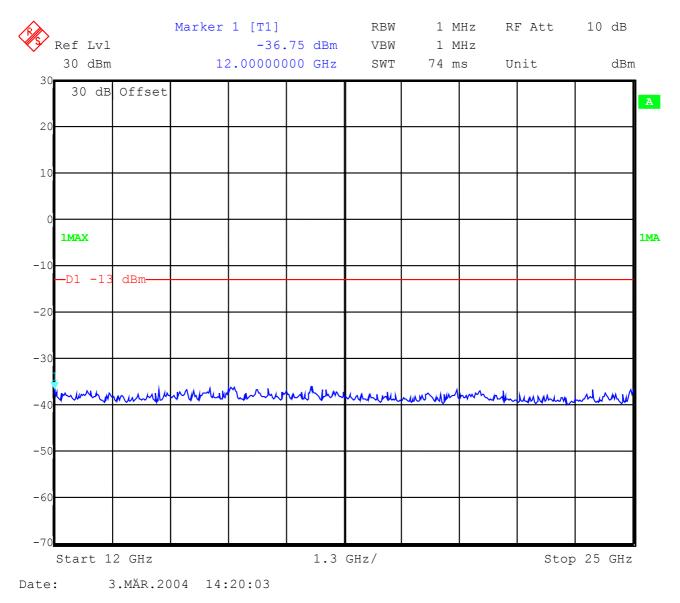


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#### Channel 251 (up to 25 GHz)





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#### **RECEIVER SPURIOUS RADIATION** Radiated

### § 15.109

		SPU	RIOUS E	MISSIONS	LEVEL (µ	.V/m)		
Cl	H 128,189,2	51						
f	Detector	Level	f	Detector	Level	f	Detector	Level
(MHz)		(µV/m)	(MHz)		(µV/m)	(MHz)		(µV/m)
no	peaks	found						
Measur	ement unco	ertainty		<u>.                                    </u>	±3 (	dB	•	
f<1 GHz:	<b>RBW/VBW:</b>	100 kHz	f≥1	GHz:RBW/	VBW: 1 MH	Z		

f < 1 GHz : RBW/VBW: 100 kHz H = Horizontal ; V= Vertical

#### Measurement distance see table

#### Limits

### SUBCLAUSE § 15.109

Frequency (MHz)	Field strength (µV/m)	Measurement distance (m)
0.009 - 0.490	2400/F(kHz)	300
0.490 - 1.705	24000/F(kHz)	30
1.705 - 30.0	30	30
30 - 88	100	3
88 - 216	150	3
216 - 960	200	3
above 960	500	3

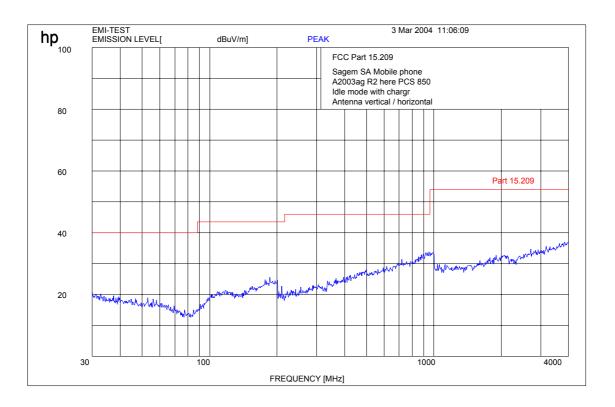


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### Idle-Mode (this is valid for all channels and up to 4 GHz)



f < 1 GHz : RBW/VBW: 100 kHz

 $f \ge 1$ GHz : RBW/VBW 1 MHz

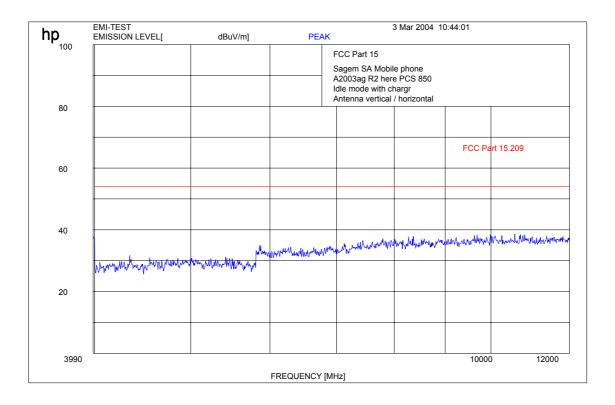


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### Idle-Mode (this is valid for all channels and up to 12 GHz)



f < 1 GHz : RBW/VBW: 100 kHz

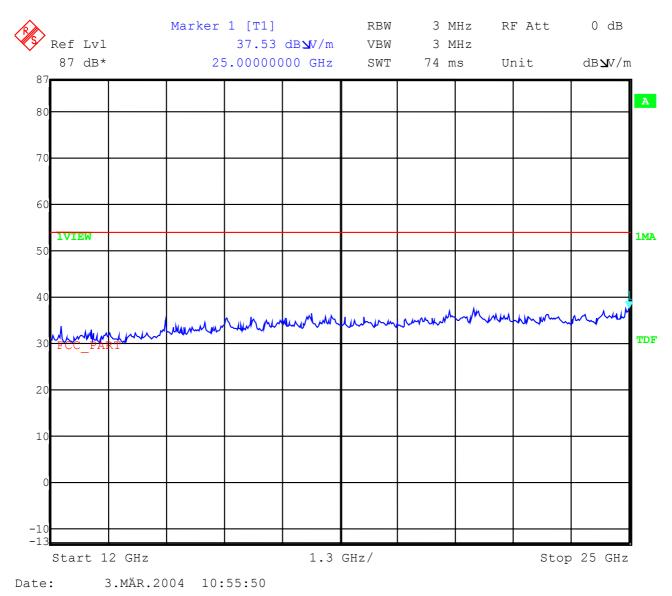
 $f \ge 1$ GHz : RBW/VBW 1 MHz



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### Idle-Mode (this is valid for all 3 channels and up to 25 GHz)

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED (for reference numbers see test equipment listing) 17 – 24, 64



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#### **CONDUCTED SPURIOUS EMISSIONS**

#### **Measurement Procedure:**

The following steps outline the procedure used to measure the conducted emissions from the mobile station.

1. Determine frequency range for measurements: From CFR 2.1057 the spectrum should be investigated from the lowest radio frequency generated in the equipment up to at least the 10th harmonic of the carrier frequency.

For the mobile station equipment tested, this equates to a frequency range of 13 MHz to 19.1 GHz, data taken from 10 MHz to 20 GHz.

2. Determine mobile station transmit frequencies: below outlines the band edge frequencies pertinent to conducted emissions testing.

### **USPCS Transmitter**

**Channel Frequency** 

128 824.2 MHz

189 836.2 MHz

251 848.8 MHz

#### **Measurement Limit:**

Sec. 24.238 Emission Limits.

(a) On any frequency outside frequency band of the USPCS spectrum, the power of any emission shall be attenuated below the transmitter power (P, in Watts) by at least 43+10Log(P) dB. For all power levels +30 dBm to 0 dBm, this becomes a constant specification limit of -13 dBm.

EMISSION LIMITATIONS				
	amplitude of	limit max. allowed	actual attenuation	
f	emission	emission power	below	re
(MHz)	(dBm)	(dBm)	frequency of	sults
			operation (dBc)	
		CH 128		
824.200	32.8	-13.0		carrier
823.985	- 15.9	(45.8dBc)	48.7	carrier
6 590.180	- 31.7		64.5	complies
		CH 189		
836.4	33.1	-13.0		carrier
-	-	(46.1 dBc)		-
		CH 251		
848.800	33.4	-13.0		carrier
849.022	- 15.8	(46.4 dBc)	49.2	carrier
6 222.044	- 33.4		66.8	complies
Measurement uncertainty ± 0.5dB				



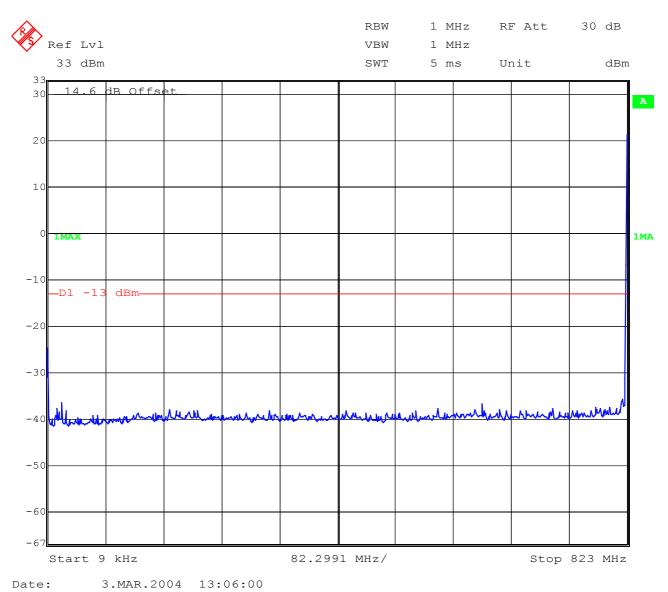
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### **Measurements:**

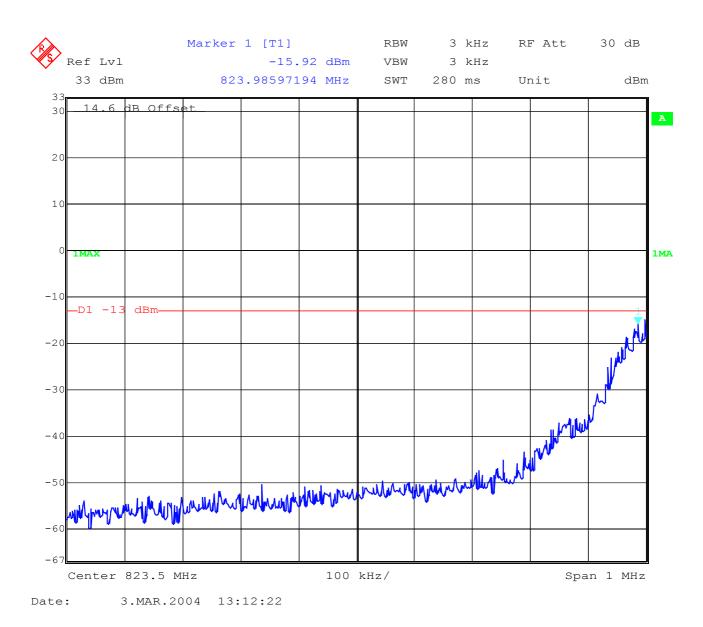
#### Channel: 128





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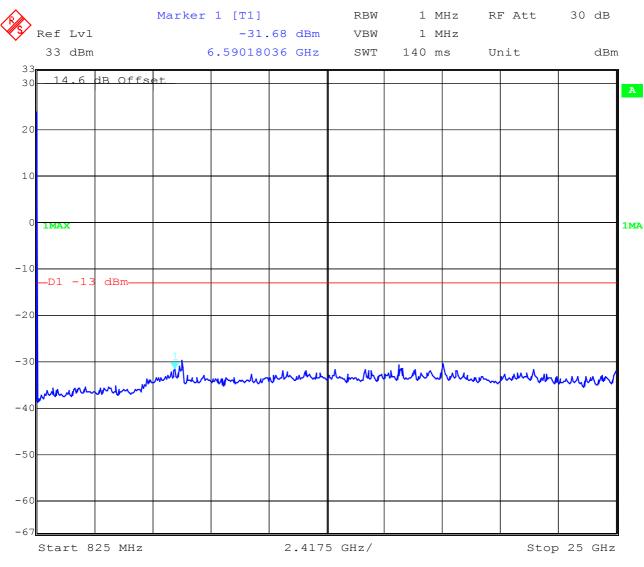
### Channel 128





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### Channel 128



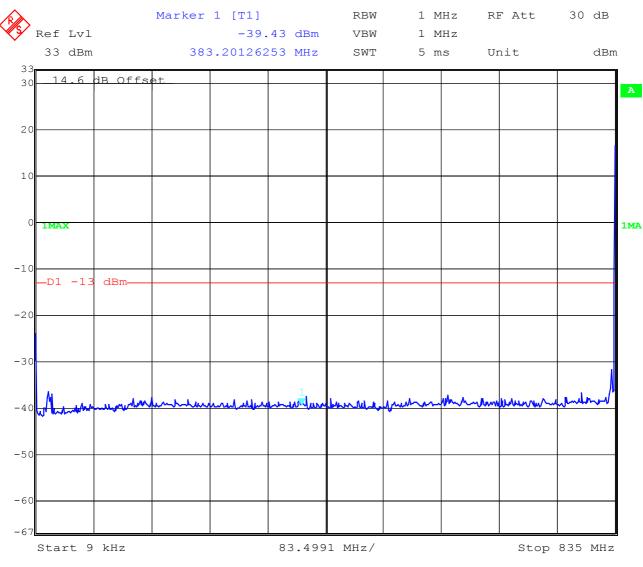


3.MAR.2004 13:13:20



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### Channel 189

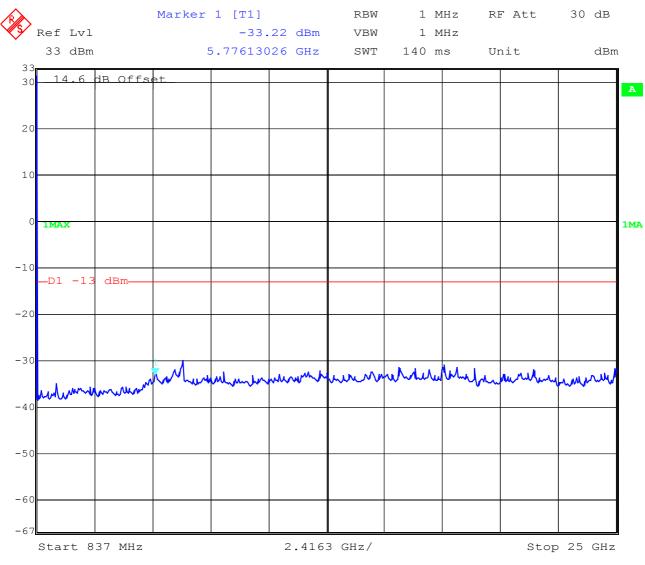


Date:

3.MAR.2004 13:15:05



### Channel 189



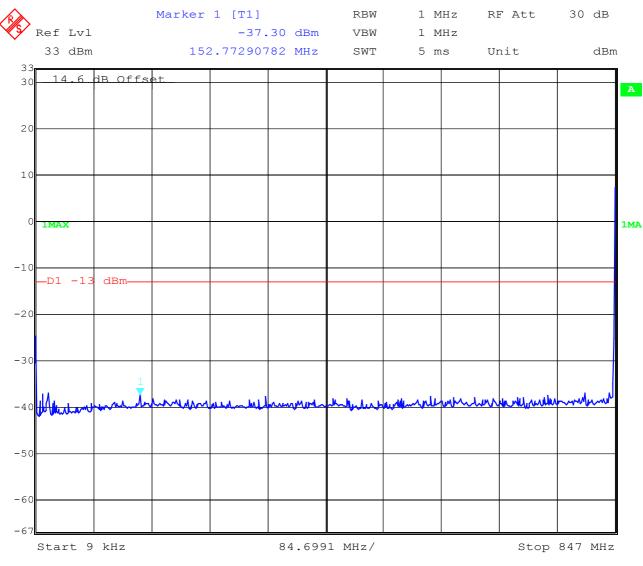


Date: 3.MAR.2004 13:16:03



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### Channel 251



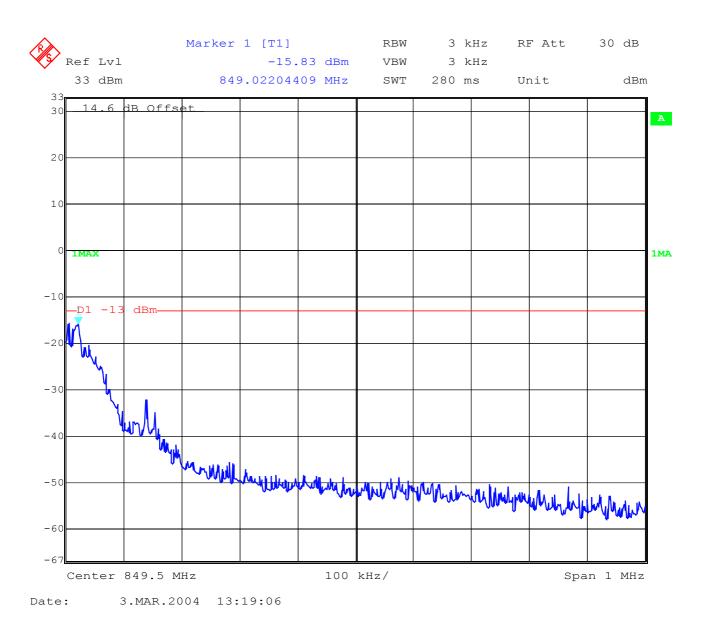


3.MAR.2004 13:17:56



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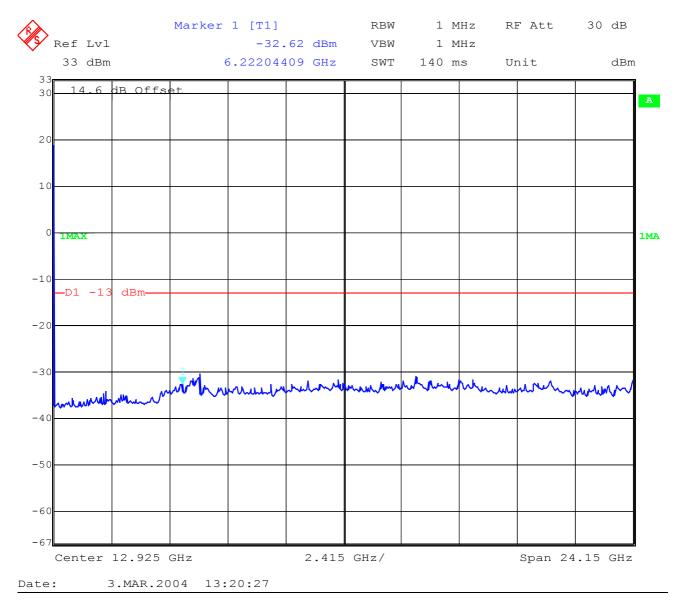
### Channel 251





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### Channel 251





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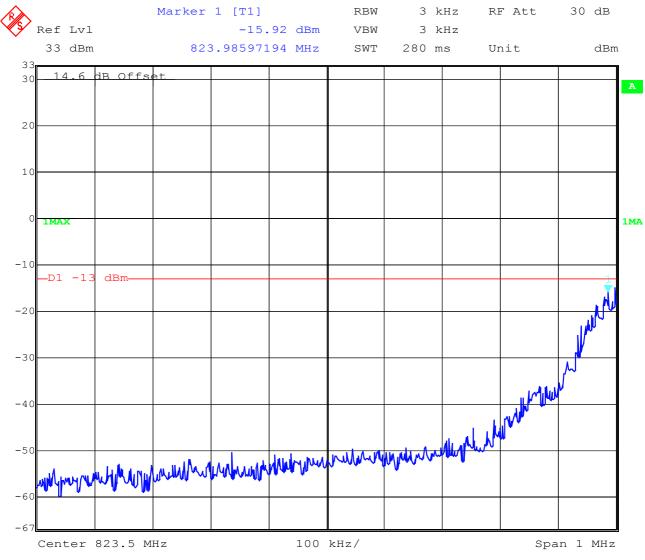
### **BLOCK EDGE REQUIREMENTS**

#### **Measurement Limit:**

Sec. 22.917(b) Emission Limits.

(a) On any frequency outside frequency band of the USPCS spectrum, the power of any emission shall be attenuated below the transmitter power (P, in Watts) by at least 43+10Log(P) dB. For all power levels +33 dBm to 0 dBm, this becomes a constant specification limit of -13 dBm.

#### Measurements: Block 1 Channel 128



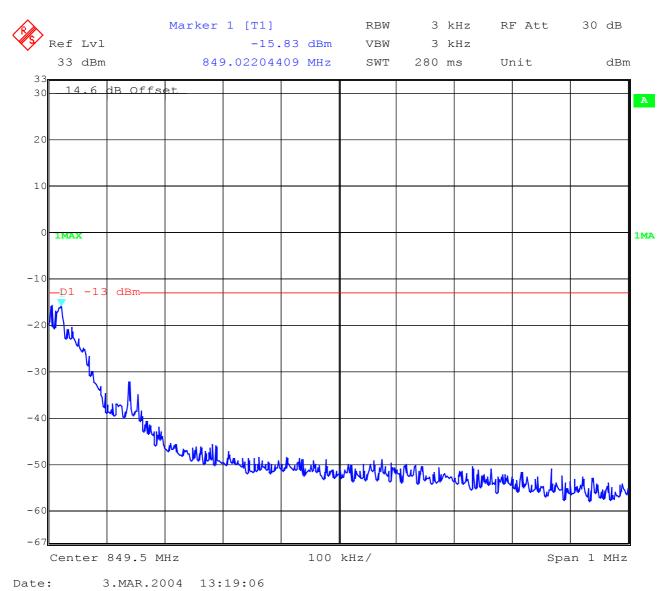


3.MAR.2004 13:12:22



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#### **Block 4 Channel 251**





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#### **OCCUPIED BANDWIDTH**

<u>§2.989</u>

#### **Occupied Bandwidth Results**

Similar to conducted emissions, occupied bandwidth measurements are only provided for selected frequencies in order to reduce the amount of submitted data. Data were taken at the extreme and mid frequencies of the USPCS frequency band. Table 8.2 below lists the measured 99% power and -26dBC occupied bandwidths. Spectrum analyzer plots are included on the following pages.

Frequency	99% Occupied Bandwidth	-26 dBc Bandwidth
824.2 MHz	276.553	324.649
836.4 MHz	274.549	312.625
848.8 MHz	280.561	314.629

Part 24.238 (a) requires a measurement bandwidth of at least 1% of the occupied bandwidth. For ca. 299 kHz, this equates to a resolution bandwidth of at least 3 kHz. For this testing, a resolution bandwidth 3.0 kHz was used.

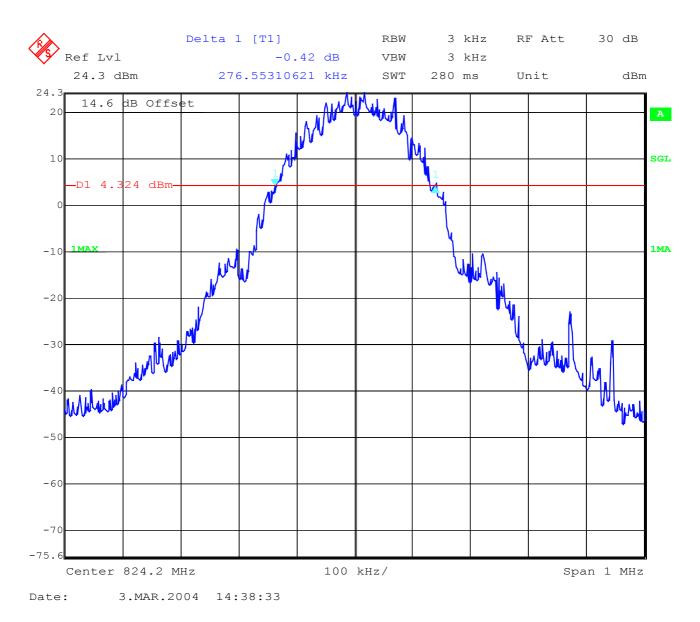


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### Channel 128 99% Occupied Bandwidth



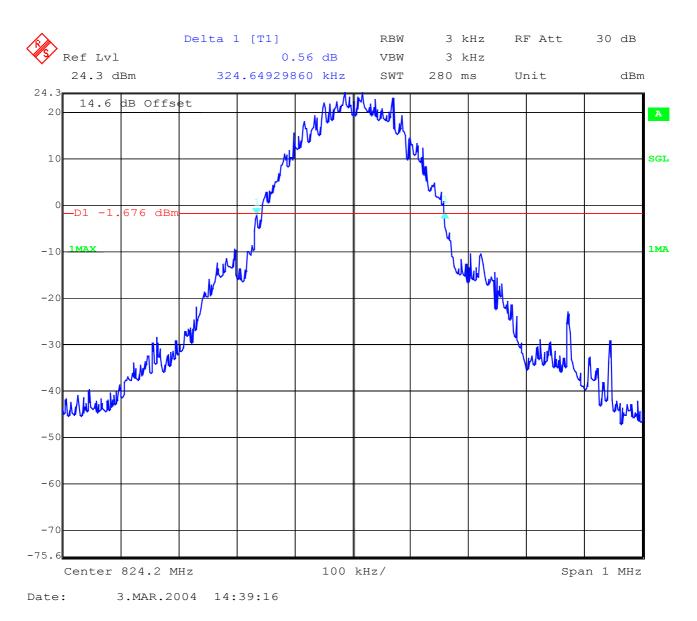


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### Channel 128 -26 dBc Bandwidth



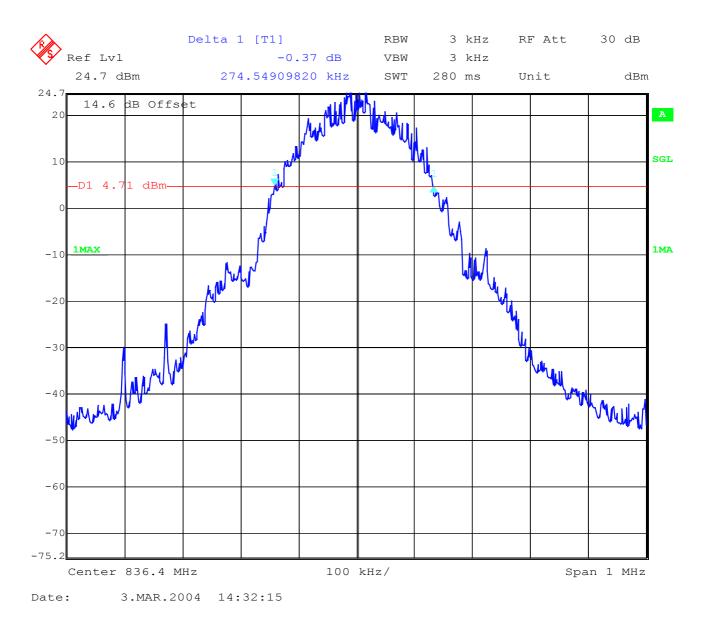


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### Channel 189 99% Occupied Bandwidth



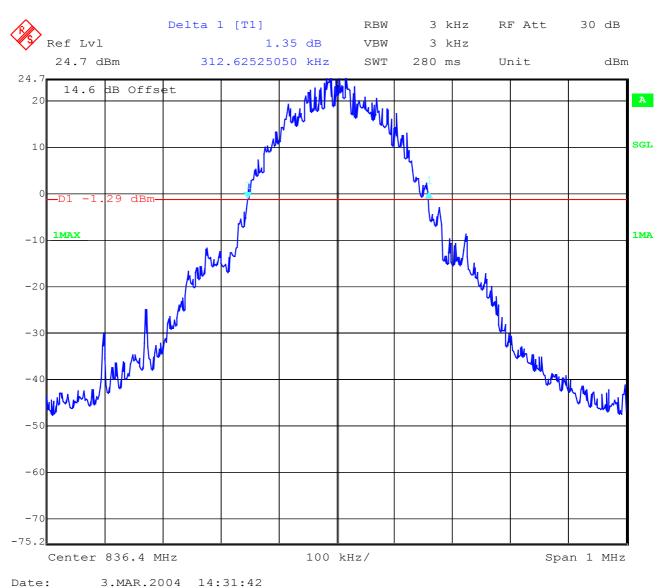


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### Channel 189 -26 dBc Bandwidth



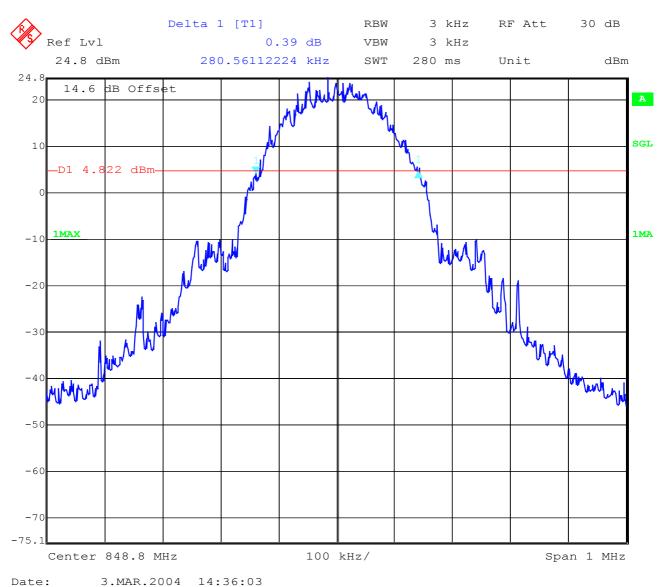


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### Channel 251 99% Occupied Bandwidth



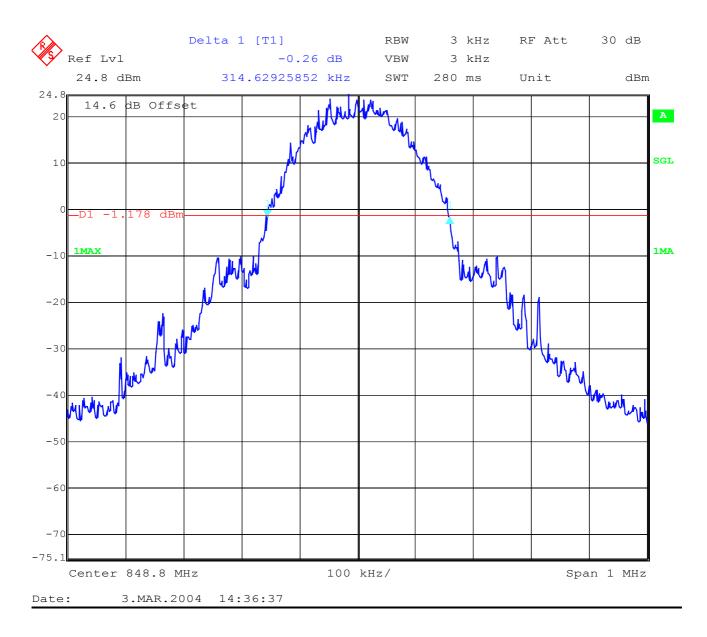


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### Channel 251 -26 dBc Bandwidth





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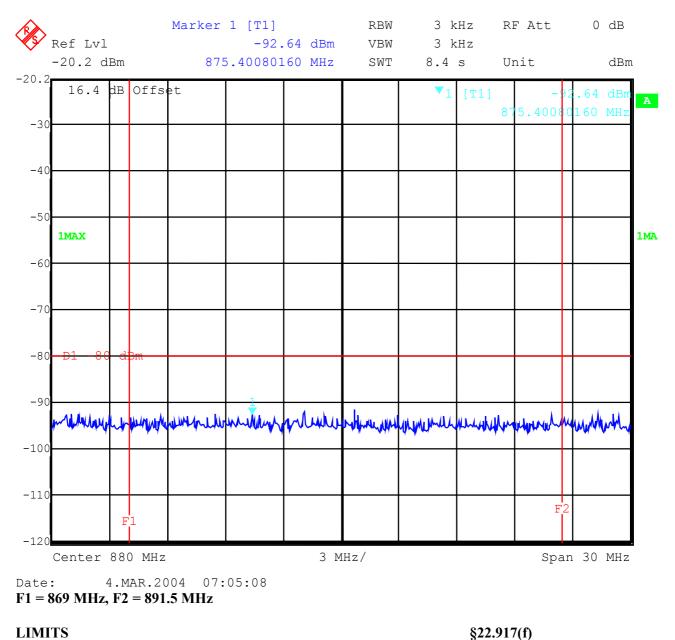
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### EMISSION LIMITATIONS FOR CELLULAR §22.917(F)

Mobile emissions in the base frequency range

#### All peaks are below -80 dBm in the base frequency range.

#### Idle Mode base station frequency range A



LIMITS §22.917(f) 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 to exceed -80dBm at the transmitter antenna connector

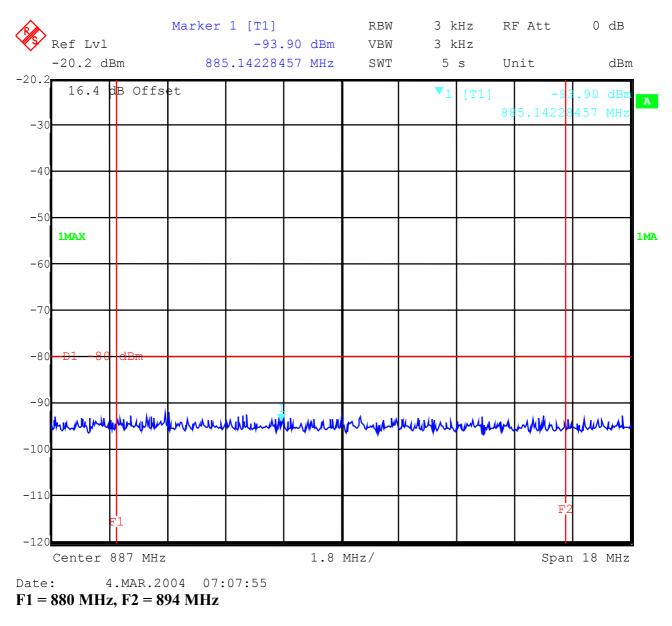


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# Mobile emissions in the base frequency range Idle Mode base station frequency range B



LIMITS §22.917(f) 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 to exceed –80dBm at the transmitter antenna connector

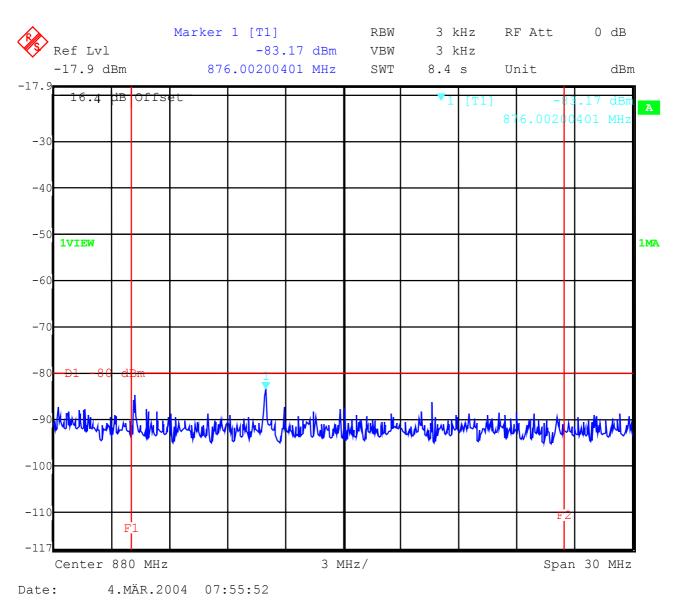


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# Mobile emissions in the base frequency range **TX Mode CH 128 base station frequency range A**



### F1 = 869 MHz, F2 = 891.5 MHz

LIMITS

§22.917(f)

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 to exceed -80dBm at the transmitter antenna connector

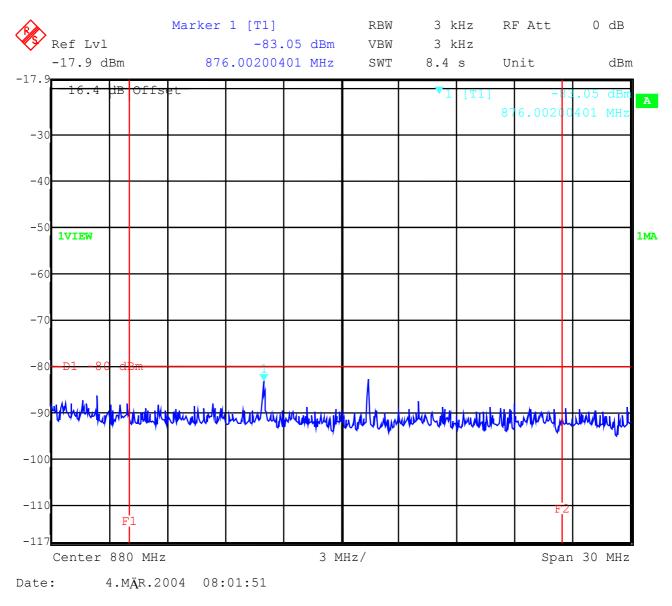


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# Mobile emissions in the base frequency range **TX Mode CH 189 base station frequency range A**



F1 = 869 MHz, F2 = 891.5 MHz

LIMITS §22.917(f) 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 to exceed –80dBm at the transmitter antenna connector

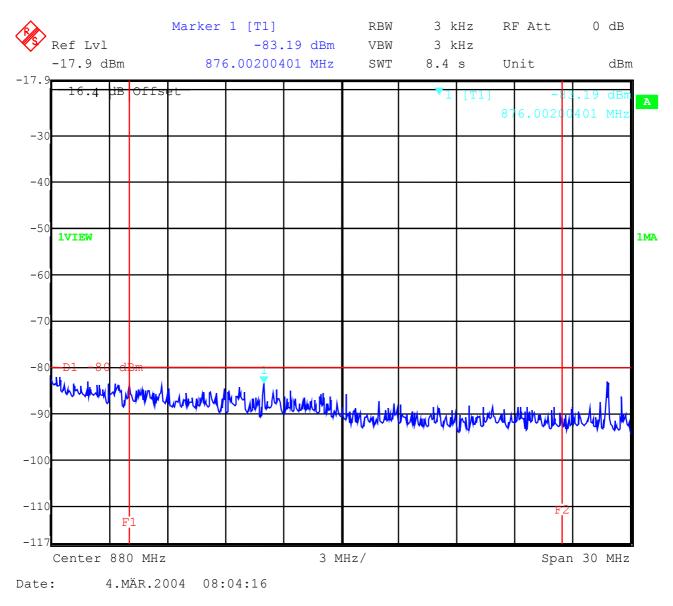


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### Mobile emissions in the base frequency range TX Mode CH 251 base station frequency range A



### F1 = 869 MHz, F2 = 891.5 MHz

LIMITS

§22.917(f)

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 to exceed -80dBm at the transmitter antenna connector

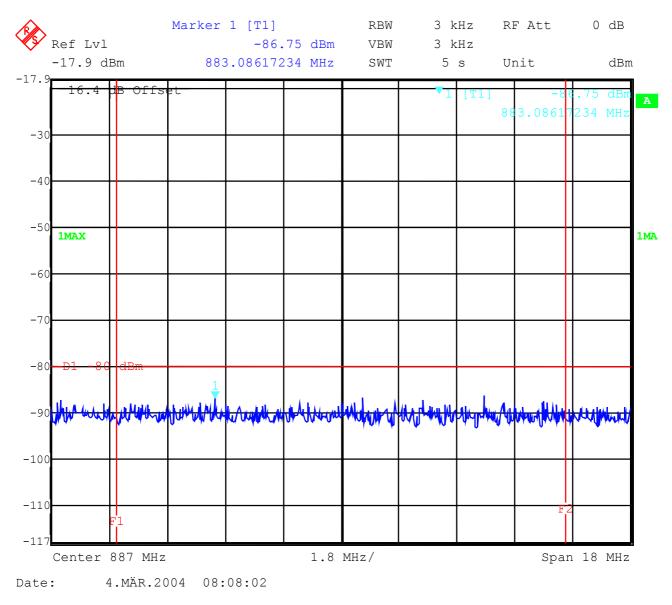


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# Mobile emissions in the base frequency range **TX Mode CH 128 base station frequency range B**



### F1 = 880 MHz, F2 = 894 MHz

LIMITS §22.917(f) 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 to exceed –80dBm at the transmitter antenna connector

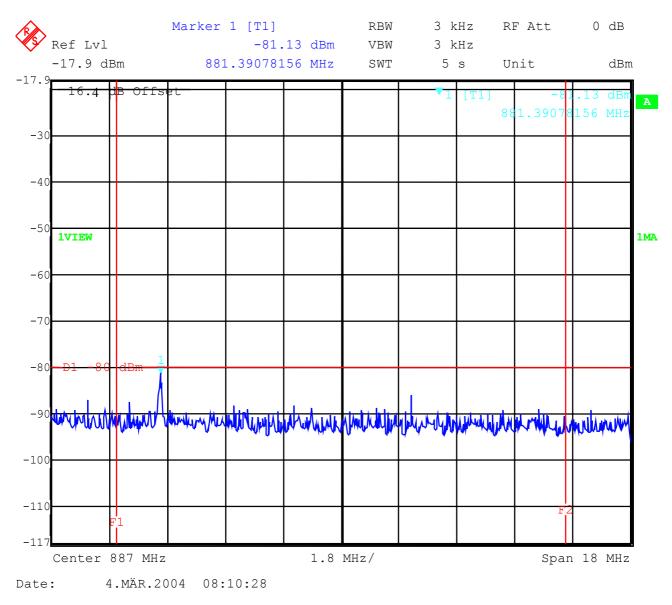


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### Mobile emissions in the base frequency range TX Mode CH 189 base station frequency range B



F1 = 880 MHz, F2 = 894 MHz

LIMITS

§22.917(f)

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 to exceed -80dBm at the transmitter antenna connector

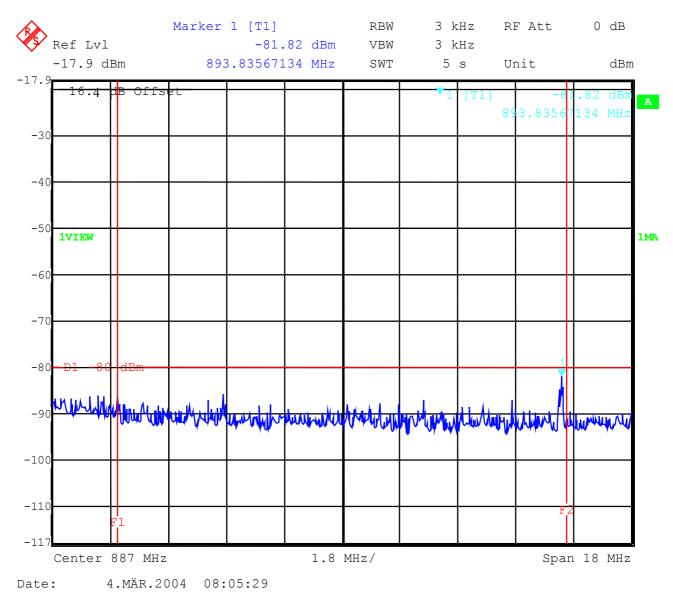


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### Mobile emissions in the base frequency range TX Mode CH 251 base station frequency range B



### F1 = 880 MHz, F2 = 894 MHz

LIMITS §22.917(f) 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 to exceed –80dBm at the transmitter antenna connector



Test report No..: 4-1220-06-04/04

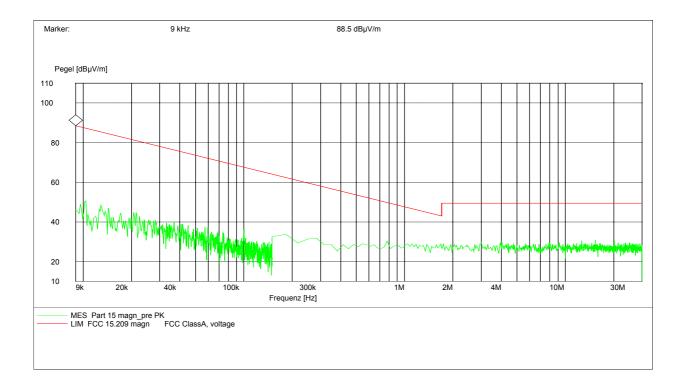
Date: 2004.03.08

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### FCC Rule 47

### Part 15 Magnetics

EUT:	My X1 with Euro charger
Manufacturer:	SÁGEM SA
Operating Condition:	Traffic PCS850 and 1900 and Idle mode, max hold
Test Site:	Cetecom, Room 6
Operator:	Ames
Test Specification:	15.109
Comment:	230V AC/ 50 Hz, pass



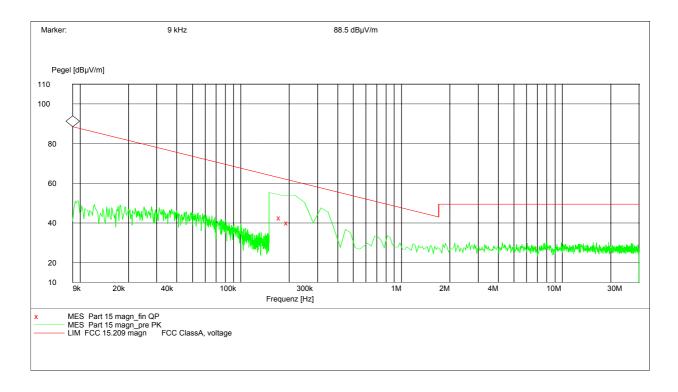


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### Part 15 Magnetics

EUT: Manufacturer: Operating Condition: Test Site: Operator: Test Specification:	My X1 with Multi country charger SAGEM SA Traffic PCS850 and 1900 and Idle, max hold Cetecom, Room 6 Ames 15.109
Comment:	115 V/ 60Hz, pass



### MEASUREMENT RESULT: "Part 15 magn\_fin QP"

Frequency			Limit	•	•		th
MHz	dBµV/m	dB	dBµV/m	dB		deg	
0.180000	42.60	20.1	62.5	19.9		0.00	
0.200000	40.20	20.1	61.6	21.4 -		0.00	



Test report No..: 4-1220-06-04/04

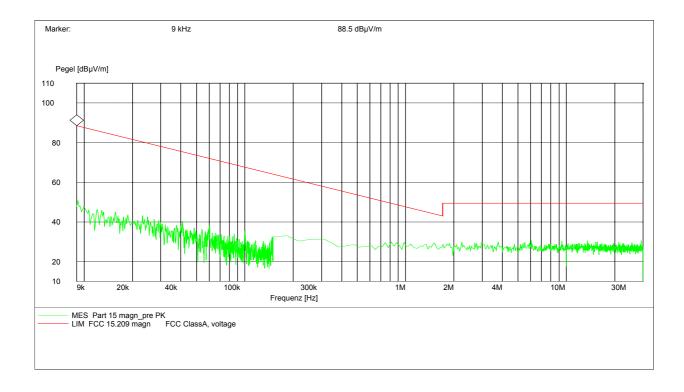
Date: 2004.03.08

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### FCC Rule 47

### Part 15 Magnetics

EUT:	My X1 with US-charger
Manufacturer:	Sagem SA
Operating Condition:	Traffic PCS850 and 1900 and idle mode, max hold
Test Site:	Cetecom, Room 6
Operator:	Ames
Test Specification:	15.109
Comment:	115 V/ 60Hz, pass





Test report No..: 4-1220-06-04/04

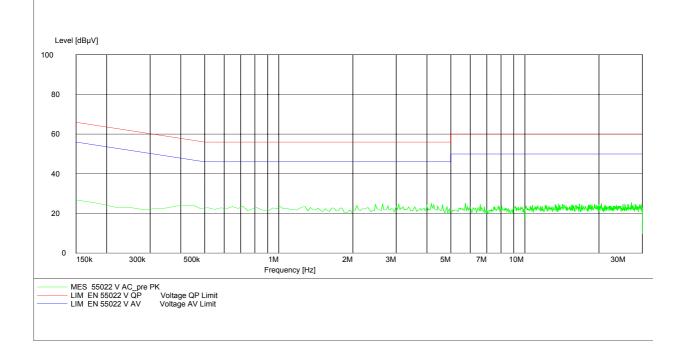
Date: 2004.03.08

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### ETSI 301 489-1, -7

### CISPR22

EUT:	My X1 with Euro charger
Manufacturer:	SAGEM
Operating Condition:	Traffic PCS 850 and 1900 and Idle mode, max hold
Test Site:	CETECOM ICT Services GmbH, Room 006
Operator:	Ames
Test Specification:	Cispr22, 220V AC
Comment:	pass





Test report No..: 4-1220-06-04/04

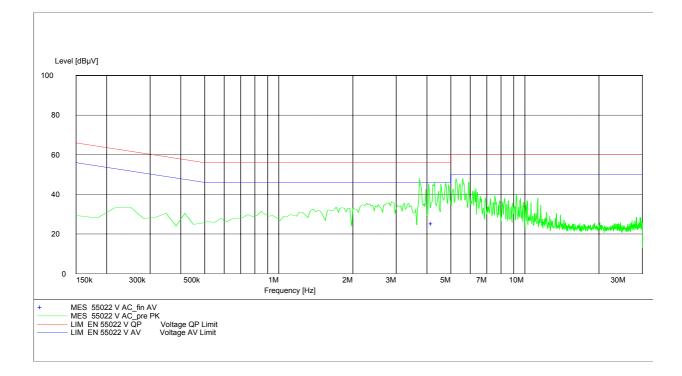
Date: 2004.03.08

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### ETSI 301 489-1, -7

### CISPR22

EUT:	My X1 with multi-country charger
Manufacturer:	SÁGEM
Operating Condition:	Traffic PCS 850 and 1900, and Idle , max hold
Test Site:	CETECOM ICT Services GmbH, Room 006
Operator:	Ames
Test Specification:	CISPR22, 110V AC
Comment:	pass



### MEASUREMENT RESULT: "55022 V AC\_fin AV"

Frequency MHz		Transd dB		Margin dB	Line	PE
4.245000	25.10	10.6	46	20.9	L1	FLO



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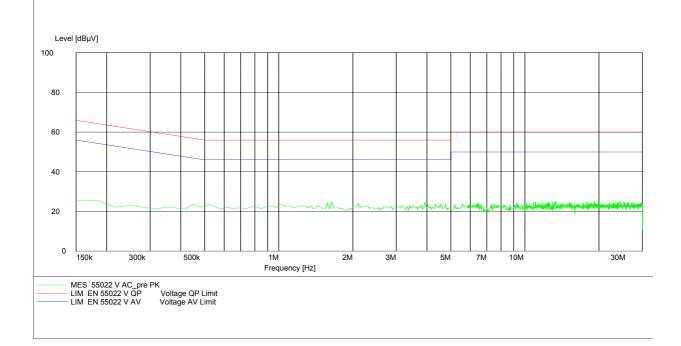
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### ETSI 301 489-1, -7

### CISPR22

EUT:	My X1 with US charger
Manufacturer:	SAGEM
Operating Condition:	Traffic PCS850 and 1900 and Idle mode, max hold
Test Site:	CETECOM ICT Services GmbH, Room 006
Operator:	Ames
Test Specification:	CISPR22, 110V AC
Comment:	pass





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### TEST EQUIPMENT AND ANCILLARIES USED FOR TESTS

To simplify the identification on each page of the test equipment used, on each page of the test report, each item of test equipment and ancillaries such as cables are identified (numbered) by the Test Laboratory, below.

No	Instrument/Ancillary	Туре	Manufacturer	Serial No.
01	Spectrum Analyzer	8566 A	Hewlett-Packard	1925A00257
01	Analyzer Display	8566 A	Hewlett-Packard	1925A00257
02	Oscilloscope	7633	Tektronix	230054
03	Radio Communication	CMTA 54	Rohde & Schwarz	894 043/010
04	Analyzer	CIVITA 54	Konue & Schwarz	874 043/010
05	System Power Supply	6038 A	Hewlett-Packard	2848A07027
06	Signal Generator	8111 A	Hewlett-Packard	2215G00867
07	Signal Generator	8662 A	Hewlett-Packard	2224A01012
08	<b>Function Generator</b>	AFGU	<b>Rohde &amp; Schwarz</b>	862 480/032
09	<b>Regulating Transformer</b>	MPL	Erfi	91350
10	LISN	NNLA 8120	Schwarzbeck	8120331
11	<b>Relay-Matrix</b>	PSU	<b>Rohde &amp; Schwarz</b>	893 285/020
12	<b>Power-Meter</b>	436 A	<b>Hewlett-Packard</b>	2101A12378
13	<b>Power-Sensor</b>	8484 A	<b>Hewlett-Packard</b>	2237A10156
14	<b>Power-Sensor</b>	8482 A	<b>Hewlett-Packard</b>	2237A00616
15	<b>Modulation Meter</b>	9008	Racal-Dana	2647
16	<b>Frequency</b> Counter	5340 A	Hewlett-Packard	1532A03899
17	Anechoic Chamber		MWB	87400/002
18	Spectrum Analyzer	85660 B	Hewlett-Packard	2747A05306
19	Analyzer Display	85662 A	<b>Hewlett-Packard</b>	2816A16541
20	Quasi Peak Adapter	85650 A	<b>Hewlett-Packard</b>	2811A01131
21	<b>RF-Preselector</b>	85685 A	Hewlett-Packard	2833A00768
22	<b>Biconical Antenna</b>	3104	Emco	3758
23	Log. Per. Antenna	3146	Emco	2130
24	Double Ridged Horn	3115	Emco	3088
25	<b>EMI-Testreceiver</b>	ESAI	<b>Rohde &amp; Schwarz</b>	863 180/013
26	EMI-Analyzer-Display	ESAI-D	<b>Rohde &amp; Schwarz</b>	862 771/008
27	<b>Biconical Antenna</b>	HK 116	<b>Rohde &amp; Schwarz</b>	888 945/013
28	Log. Per. Antenna	HL 223	<b>Rohde &amp; Schwarz</b>	825 584/002
29	<b>Relay-Switch-Unit</b>	RSU	<b>Rohde &amp; Schwarz</b>	375 339/002
30	Highpass	HM985955	<b>FSY Microwave</b>	001
31	Amplifier	P42-GA29	<b>Tron-Tech</b>	B 23602
32	Anechoic Chamber		Frankonia	
33	<b>Control Computer</b>	PSM 7	<b>Rohde &amp; Schwarz</b>	834 621/004
34	EMI Test Receiver	ESMI	<b>Rohde &amp; Schwarz</b>	827 063/010
35	EMI Test Receiver	Display	<b>Rohde &amp; Schwarz</b>	829 808/010



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## TEST EQUIPMENT AND ANCILLARIES USED FOR TESTS

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No	Instrument/Ancillary	Туре	Manufacturer	Serial No.
36	Control Computer	HD 100	Deisel	100/322/93
37	Relay Matrix	PSN	<b>Rohde &amp; Schwarz</b>	829 065/003
38	Control Unit	GB 016 A2	<b>Rohde &amp; Schwarz</b>	344 122/008
39	Relay Switch Unit	RSU	<b>Rohde &amp; Schwarz</b>	316 790/001
40	Power Supply	6032A	Hewlett Packard	2846A04063
41	Spectrum Monitor	EZM	<b>Rohde &amp; Schwarz</b>	883 720/006
42	Measuring Receiver	ESH 3	<b>Rohde &amp; Schwarz</b>	890 174/002
43	Measuring Receiver	ESVP	<b>Rohde &amp; Schwarz</b>	891 752/005
44	Bicon Ant. 20-300MHz	HK 116	<b>Rohde &amp; Schwarz</b>	833 162/011
45	Logper Ant. 0.3-1 GHz	HL 223	<b>Rohde &amp; Schwarz</b>	832 914/010
46	Amplifier 0.1-4 GHz	AFS4	Miteq Inc.	206461
47	Logper Ant. 1-18 GHz	HL 024 A2	<b>Rohde &amp; Schwarz</b>	342 662/002
48	<b>Polarisation Network</b>	HL 024 Z1	<b>Rohde &amp; Schwarz</b>	341 570/002
49	Double Ridged Horn	3115	EMCO	9107-3696
	Antenna 1-26.5 GHz			
50	Microw. Sys. Amplifier	8317A	Hewlett Packard	3123A00105
	0.5- 26.5 GHz			
51	Audio Analyzer	UPD	Rohde & Schwarz	1030.7500.04
52	Controler	PSM 7	<b>Rohde &amp; Schwarz</b>	883 086/026
53	DOUDI			
II	DC V-Network	ESH3-Z6	Rohde & Schwarz	861 406/005
54	DC V-Network DC V-Network	ESH3-Z6 ESH3-Z6	Rohde & Schwarz Rohde & Schwarz	861 406/005 893 689/012
54	DC V-Network	ESH3-Z6	Rohde & Schwarz	893 689/012
54 55	DC V-Network AC 2 Phase V-Network	ESH3-Z6 ESH3-Z5	Rohde & Schwarz Rohde & Schwarz	893 689/012 861 189/014
54 55 56	DC V-Network AC 2 Phase V-Network AC 2 Phase V-Network	ESH3-Z6 ESH3-Z5 ESH3-Z5	Rohde & Schwarz Rohde & Schwarz Rohde & Schwarz	893 689/012 861 189/014 894 981/019
54 55 56 57	DC V-Network AC 2 Phase V-Network AC 2 Phase V-Network AC-3 Phase V-Network	ESH3-Z6 ESH3-Z5 ESH3-Z5 ESH2-Z5	Rohde & SchwarzRohde & SchwarzRohde & SchwarzRohde & Schwarz	893 689/012   861 189/014   894 981/019   882 394/007
54 55 56 57 58	DC V-Network AC 2 Phase V-Network AC 2 Phase V-Network AC-3 Phase V-Network Power Supply	ESH3-Z6 ESH3-Z5 ESH3-Z5 ESH2-Z5 6032A	Rohde & SchwarzRohde & SchwarzRohde & SchwarzRohde & SchwarzRohde & Schwarz	893 689/012 861 189/014 894 981/019 882 394/007 2933A05441
54 55 56 57 58 59	DC V-Network AC 2 Phase V-Network AC 2 Phase V-Network AC-3 Phase V-Network Power Supply RF-Test Receiver	ESH3-Z6 ESH3-Z5 ESH3-Z5 ESH2-Z5 6032A ESVP.52	Rohde & SchwarzRohde & SchwarzRohde & SchwarzRohde & SchwarzRohde & SchwarzRohde & SchwarzRohde & Schwarz	893 689/012   861 189/014   894 981/019   882 394/007   2933A05441   881 487/021
54   55   56   57   58   59   60	DC V-Network AC 2 Phase V-Network AC 2 Phase V-Network AC-3 Phase V-Network Power Supply RF-Test Receiver Spectrum Monitor	ESH3-Z6 ESH3-Z5 ESH3-Z5 ESH2-Z5 6032A ESVP.52 EZM	Rohde & SchwarzRohde & Schwarz	893 689/012 861 189/014 894 981/019 882 394/007 2933A05441 881 487/021 883 086/026
54   55   56   57   58   59   60   61	DC V-Network AC 2 Phase V-Network AC 2 Phase V-Network AC-3 Phase V-Network Power Supply RF-Test Receiver Spectrum Monitor RF-Test Receiver	ESH3-Z6 ESH3-Z5 ESH3-Z5 ESH2-Z5 6032A ESVP.52 EZM ESH3	Rohde & SchwarzRohde & Schwarz	893 689/012   861 189/014   894 981/019   882 394/007   2933A05441   881 487/021   883 086/026   881 515/002
54   55   56   57   58   59   60   61   62	DC V-Network AC 2 Phase V-Network AC 2 Phase V-Network AC-3 Phase V-Network Power Supply RF-Test Receiver Spectrum Monitor RF-Test Receiver Relay Matrix	ESH3-Z6 ESH3-Z5 ESH3-Z5 ESH2-Z5 6032A ESVP.52 EZM ESH3 PSU	Rohde & SchwarzRohde & Schwarz	893 689/012   861 189/014   894 981/019   882 394/007   2933A05441   881 487/021   883 086/026   881 515/002   882 943/029
54   55   56   57   58   59   60   61   62   63	DC V-Network AC 2 Phase V-Network AC 2 Phase V-Network AC-3 Phase V-Network Power Supply RF-Test Receiver Spectrum Monitor RF-Test Receiver Relay Matrix Relay Matrix	ESH3-Z6 ESH3-Z5 ESH3-Z5 ESH2-Z5 6032A ESVP.52 EZM ESH3 PSU PSU	Rohde & SchwarzRohde & Schwarz	893 689/012   861 189/014   894 981/019   882 394/007   2933A05441   881 487/021   883 086/026   881 515/002   882 943/029   828 628/007
54   55   56   57   58   59   60   61   62   63   64	DC V-Network AC 2 Phase V-Network AC 2 Phase V-Network AC-3 Phase V-Network Power Supply RF-Test Receiver Spectrum Monitor RF-Test Receiver Relay Matrix Relay Matrix Spectrum Analyzer	ESH3-Z6 ESH3-Z5 ESH3-Z5 ESH2-Z5 6032A ESVP.52 EZM ESH3 PSU PSU FSIQ 26	Rohde & SchwarzRohde & Schwarz	893 689/012   861 189/014   894 981/019   882 394/007   2933A05441   881 487/021   883 086/026   881 515/002   882 943/029   828 628/007   119.6001.27
54   55   56   57   58   59   60   61   62   63   64   65	DC V-Network AC 2 Phase V-Network AC 2 Phase V-Network AC-3 Phase V-Network Power Supply RF-Test Receiver Spectrum Monitor RF-Test Receiver Relay Matrix Relay Matrix Spectrum Analyzer	ESH3-Z6 ESH3-Z5 ESH3-Z5 ESH2-Z5 6032A ESVP.52 EZM ESH3 PSU PSU FSIQ 26	Rohde & SchwarzRohde & Schwarz	893 689/012   861 189/014   894 981/019   882 394/007   2933A05441   881 487/021   883 086/026   881 515/002   882 943/029   828 628/007   119.6001.27

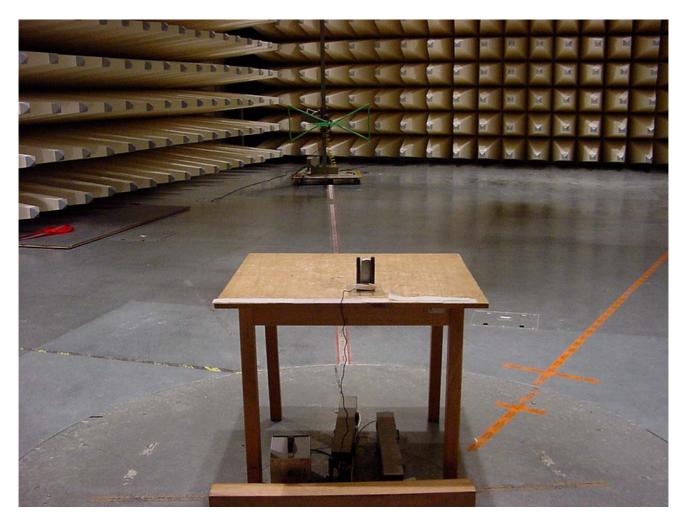


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Test site



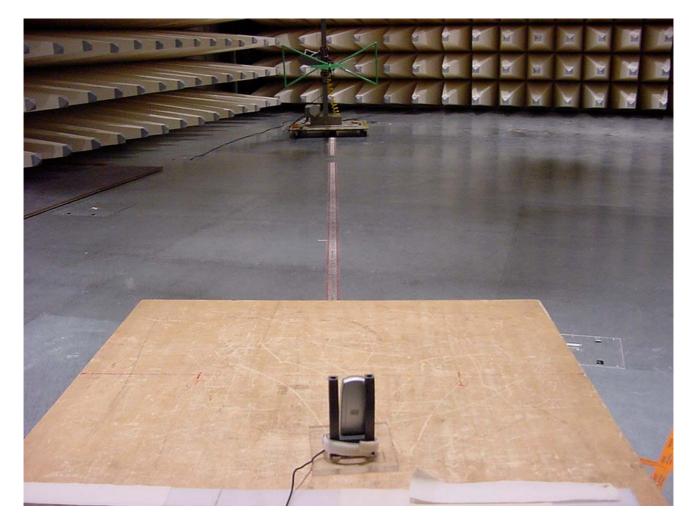


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Photographs of Equipment





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