

Radio Satellite Communication  
Untertürkheimer Straße 6-10 . D-66117 Saarbrücken  
Telefon: +49 (0)681 598-0 Telefax: - 9075

Test report No.: 2\_3637-01-02/04

This test report consists of 41 pages

Page 1 (41)

Recognized by the  
Federal Communications Commission  
**Anechoic Chamber Registration No.: 90462 (FCC)**  
**Anechoic Chamber Registration No.: 3463 (IC)**  
**TCB ID: DE 0001**



Accredited by the  
German Accreditation Council  
**DAR-Registration Number**  
**TTI-P-G 081/94-D0**



Independent ETSI  
compliance test house



**Test Report No.: 2\_3637-01-02/04**

**Applicant: Sony Ericsson Mobile Communications AB**

**Type: AAB-1021042-BV**

**Test Standards: FCC Part 22, 24**

**RSS132, 133**

**FCC ID: PY7A1021042**

**IC: 4170B-A1021042**

## Table of Contents

<b>1</b>	<b>GENERAL INFORMATION.....</b>	<b>3</b>
1.1	NOTES .....	3
1.2	TESTING LABORATORY .....	3
1.3	DETAILS OF APPLICANT .....	4
1.4	APPLICATION DETAILS.....	4
1.5	TEST ITEM.....	5
1.6	TEST STANDARDS .....	6
<b>2</b>	<b>STATEMENT OF COMPLIANCE.....</b>	<b>7</b>
2.1	SUMMARY OF MEASUREMENT RESULTS .....	7
2.1.1	PCS1900.....	7
2.1.2	GSM 850.....	7
<b>3</b>	<b>MEASUREMENTS AND RESULTS .....</b>	<b>8</b>
3.1	PART PCS 1900 .....	8
3.1.1	RF Power Output.....	8
3.1.2	Frequency Stability.....	12
3.1.3	Radiated Emissions .....	15
3.1.4	Receiver Radiated Emissions .....	21
3.1.5	Conducted Spurious Emissions.....	24
3.1.6	Block Edge Compliance .....	28
3.1.7	Occupied Bandwidth.....	30
<b>4</b>	<b>TEST EQUIPMENT AND ANCILLARIES USED FOR TESTS .....</b>	<b>40</b>
 <b>ANNEX A: PART 15 B TESTS</b>		
<b>ANNEX B: TEST SETUP PHOTOS</b>		
<b>ANNEX C: EXTERNAL PHOTOS</b>		
<b>ANNEX D: INTERNAL PHOTOS</b>		

## 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

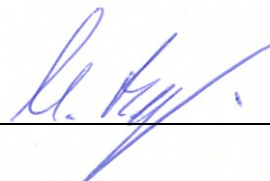
Accredited testing laboratory

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

#### Laboratory Manager :

2004-06-01	RSC 8431	Berg M.	
Date	Section	Name	Signature

#### Technical responsibility for area of testing:

2004-06-01	RSC 8412	Hausknecht D.	
Date	Section	Name	Signature

## 1.3 Details of Applicant

Name: Sony Ericsson Mobile Communications AB  
Address: Nya Vattentorget  
City: 221 88 Lund  
Country: Sweden  
Phone: +46 46 193242  
Fax: +46 46 193295  
Contact: Mr. Bo Johansson  
Phone: +46 46 193242  
Fax: +46 46 193295  
e-mail: bo.g.johansson@sonyericsson.com

## 1.4 Application Details

Date of test: 2004-06-01 to 2004-06-02

## 1.5 Test Item

Type of equipment: GSM / PCS Module GSM900/1800/1900  
Type name: AAB-1021042-BV

Manufacturer: Sony Ericsson Mobile Communications AB  
Address: Nya Vattentorget  
City: 221 88 Lund  
Country: Sweden

Frequency: 1850.2 – 1909.8 MHz  
Type of modulation: 300KGXW / 200KQ7W  
Number of channels: 300 (PCS1900)  
Antenna: Integral antenna  
Power supply (normal): 3,6 V DC Li-Polymer Battery  
Output power GSM 850: -  
Output power GSM 1900: cond : 30.3 dBm Peak, ERP: 27.10 dBm (Burst);  
EIRP: 29.25 dBm (Burst)  
Transmitter Spurious (worst case) 0,16  $\mu$ W (noise floor)  
Receiver Spurious (worst case) 79.4  $\mu$ V/m @ 3m

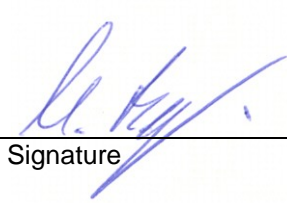
FCC ID: PY7A1021042  
Certification No. IC: 4170B-A1021042  
Open Area Test Site IC No.: 3436  
IC Standards RSS132, Issue 1, RSS133, Issue 2, Rev. 1

### ATTESTATION:

**DECLARATION OF COMPLIANCE:** I declare that the testing was performed or supervised by me; that the test measurements were made in accordance with the above-mentioned Industry Canada standard(s); and that the equipment identified in this application has been subjected to all the applicable test conditions specified in the Industry Canada standards and all of the requirements of the standard have been met.

### Laboratory Manager :

2004-06-01      RSC 8411      Berg M.  
Date              Section          Name

  
Signature

## Test Setup

Hardware: FP2  
Software: R2A033

Mobile; S/N: CB500TBJB1; IMEI: 004601.01.517849.01

Sony Ericsson Standard charger CST-13 AC/DC Adapter  
Type : 4020073-BV

The radiated measurements were performed with an AC/DC charging unit.

## 1.6 Test Standards

FCC:	CFR Part 22 H
	CFR Part 24 E
IC:	RSS 132, Issue 1
	RSS 133, Issue 2, Rev. 1

## **2 STATEMENT OF COMPLIANCE**

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

### **2.1 Summary of Measurement Results**

#### **2.1.1 PCS1900**

Section in this Report	Test Name	Verdict
3.1.1	RF Power Output	pass
3.1.2	Frequency Stability	pass
3.1.3	Radiated Emissions	pass
3.1.4	Receiver Radiated Emissions	pass
3.1.5	Conducted Spurious Emissions	pass
3.1.6	Block Edge Compliance	pass
3.1.7	Occupied Bandwidth	pass

#### **2.1.2 GSM 850**

Section in this Report	Test Name	Verdict
3.2.1	RF Power Output	Not applicable
3.2.2	Frequency Stability	Not applicable
3.2.3	Radiated Emissions	Not applicable
3.2.4	Receiver Radiated Emissions	Not applicable
3.2.5	Conducted Spurious Emissions	Not applicable
3.2.6	Block Edge Compliance	Not applicable
3.2.7	Occupied Bandwidth	Not applicable
3.2.8	Mobile Emissions in the Base Frequency Range	Not applicable

### **3 MEASUREMENTS AND RESULTS**

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

All measurements in this report are done in GSM mode. Device is able to transmit data in GPRS mode also. But because the current measurements are performed in PEAK mode no other results from GPRS mode are possible. The only different is the modulation average power, which is 3 dB higher (by using 2 timeslots in the Up-link ).

#### **3.1 PART PCS 1900**

##### **3.1.1 RF Power Output**

###### **Reference**

FCC:	CFR Part 24.232, 2.1046
IC:	RSS 133, Issue 2, Rev. 1, Section 6.2

###### **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	$\pm 2$

###### **Test Results: Output Power (conducted)**

Frequency (MHz)	Power Step	Peak Output Power (dBm)	Average Output Power (dBm)
1850.2	0	30.30	30.20
1880.0	0	30.18	30.15
1908.8	0	30.30	30.20
Measurement uncertainty		$\pm 0.5$ dB	



**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

$E \text{ (dBuV/m)} = \text{Reading (dBuV)} + \text{Total Correction Factor (dB/m)}$

(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° 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.

(l) 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

$E \text{ (dBuV/m)} = \text{Reading (dBuV)} + \text{Total Correction Factor (dB/m)}$

(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 }.

(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° about a vertical axis until a higher maximum signal was received.

(l) 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:

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

$$\text{EIRP} = P + G1 = P3 + L2 - L1 + A + G1$$

$$\text{ERP} = \text{EIRP} - 2.15 \text{ dB}$$

$$\text{Total Correction factor in EMI Receiver \# 2} = L2 - L1 + G1$$

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

## Test Results: Output Power (radiated)

Frequency (MHz)	Power Step	BURST PEAK EIRP (dBm)
1850.2	0	28.40
1880.0	0	29.25
1909.8	0	28.60
Measurement uncertainty	±3 dB	

## Sample Calculation:

Freg	SA Reading	SG Setting	Ant. gain	Dipol gain	Cable loss	ERIP Result			
MHz	dBμV	dBm	dBd	dBd	dB	dBm			
1880.0	126.5	24.18	8.4	0.0	3.33	29.25			

$$\text{EIRP} = \text{SG (dBm)} - \text{Cable Loss (dB)} + \text{Ant. gain (dBi)}$$

### 3.1.2 Frequency Stability

#### Reference

FCC:	CFR Part 24.235, 2.1055
IC:	RSS 133, Issue 2, Rev. 1, Section 7

#### 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 3.6 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 3.6 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 3.6 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:

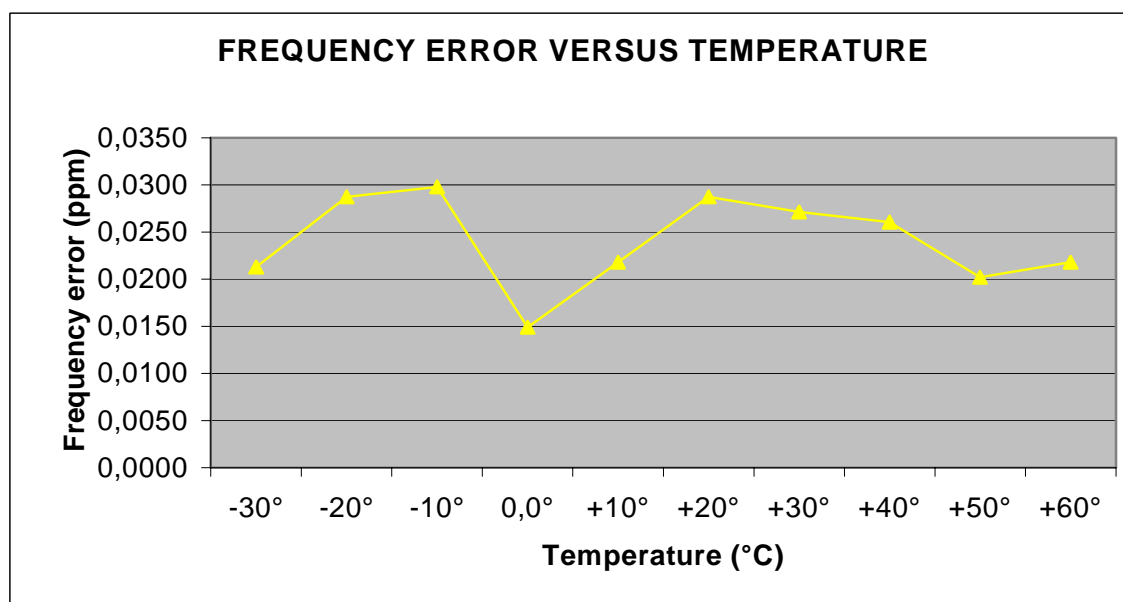
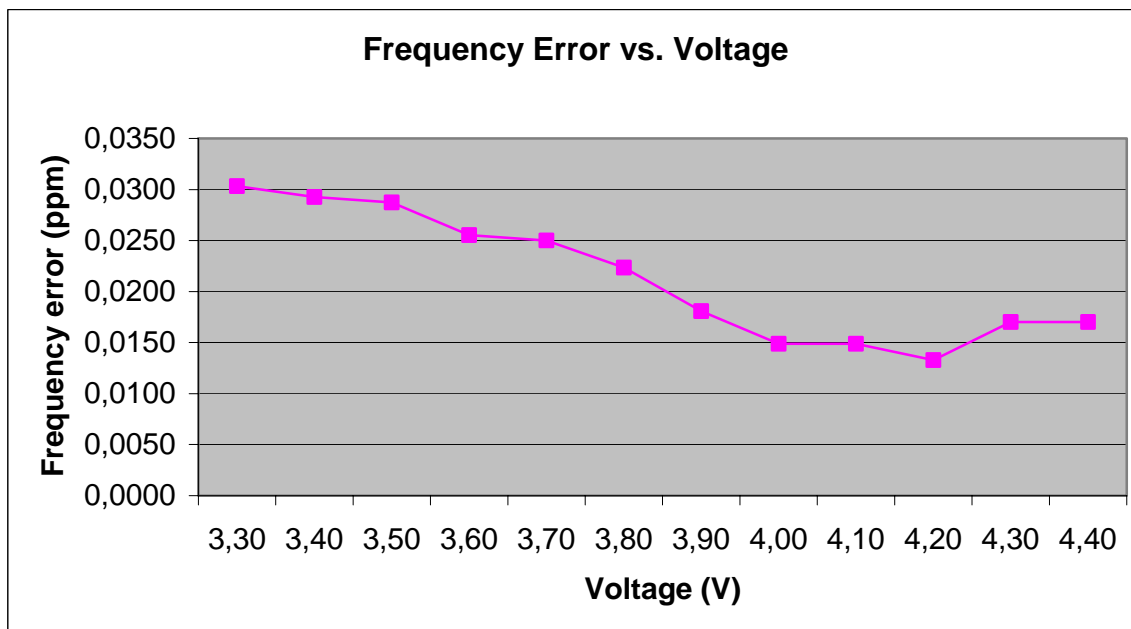
According to the JTC standard the frequency stability of the carrier shall be accurate to within 0.1 ppm of the received frequency from the base station. This accuracy is sufficient to meet Sec. 24.235, Frequency Stability. The frequency stability shall be sufficient to ensure that the fundamental emission 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 3.6 V dc.

**Test Results: AFC FREQ ERROR vs. VOLTAGE**

Voltage (V)	Frequency Error (Hz)	Frequency Error (%)	Frequency Error (ppm)
3.3	57	0,00000303	0,0303
3.4	55	0,00000293	0,0293
3.5	54	0,00000287	0,0287
3.6	48	0,00000255	0,0255
3.7	47	0,00000250	0,0250
3.8	42	0,00000223	0,0223
3.9	34	0,00000181	0,0181
4.0	28	0,00000149	0,0149
4.1	28	0,00000149	0,0149
4.2	25	0,00000133	0,0133
4.3	32	0,00000170	0,0170
4.4	32	0,00000170	0,0170

**Test Results: AFC FREQ ERROR vs. TEMPERATURE**

TEMPERATURE (°C)	Frequency Error (Hz)	Frequency Error (%)	Frequency Error (ppm)
-30	40	0,00000213	0,0213
-20	54	0,00000287	0,0287
-10	56	0,00000298	0,0298
±0.0	28	0,00000149	0,0149
+10	41	0,00000218	0,0218
+20	54	0,00000287	0,0287
+30	51	0,00000271	0,0271
+40	49	0,00000261	0,0261
+50	38	0,00000202	0,0202
+60	41	0,00000218	0,0218



### 3.1.3 Radiated Emissions

#### Reference

FCC:	CFR Part 24.238, 2.1053
IC:	RSS 133, Issue 2, Rev. 1, Section 6.3

#### 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 1 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  $43+10\log(P)$  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.

## Measurement Results: Radiated Emissions

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.

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

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

Harmonic	Tx ch.-512 Freq. (MHz)	Level (dBm)	Tx ch.-661 Freq. (MHz)	Level (dBm)	Tx ch.-810 Freq. (MHz)	Level (dBm)
2	3700.4		3760		3819.6	
3	5550.6		5640		5729.4	
4	7400.8		7520		7639.2	
5	9251.0		9400		9549.0	
6	11101.2		11280		11458.8	
7	12951.4		13160		13368.6	
8	14801.6		15040		15278.4	
9	16651.8		16920		17188.2	
10	18502.0		18800		19098.0	

## Sample calculation:

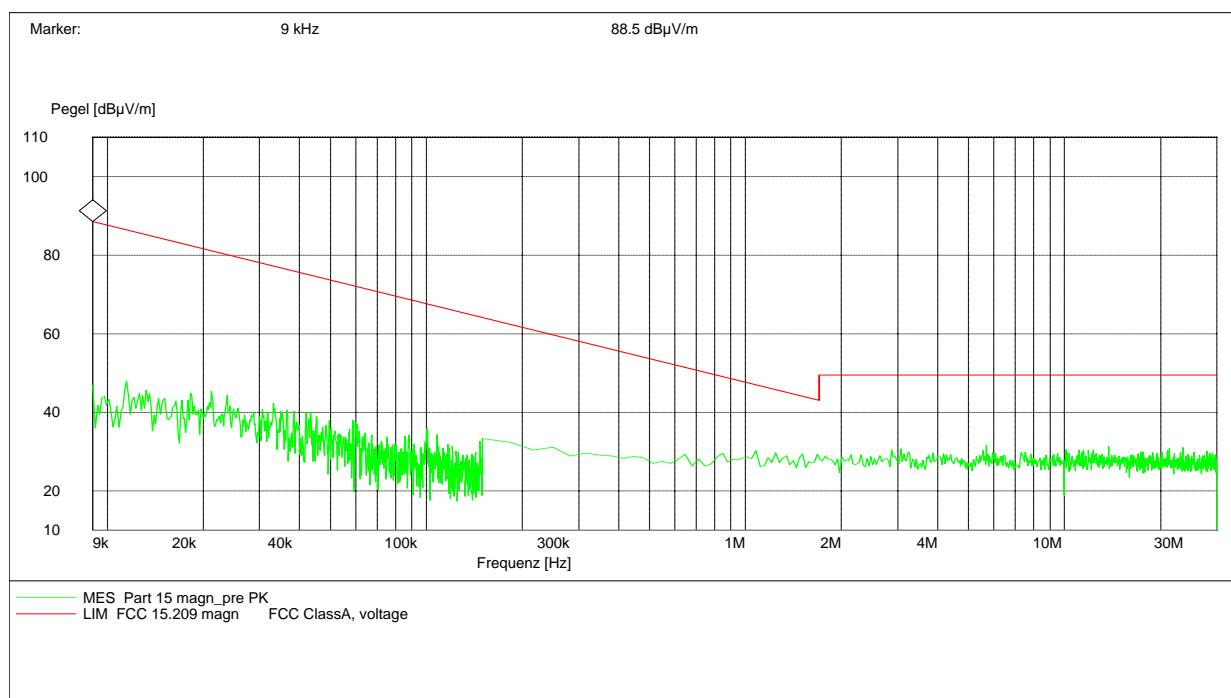
Freq	SA Reading	SG Setting	Ant. gain	Dipol gain	Cable loss	ERIP Result			
MHz	dBμV	dBm	dB	dBd	dB	dBm			
1880.0	122.5	26.7	8.4	0.0	3.33	29.2			

$$\text{EIRP} = \text{SG (dBm)} - \text{Cable Loss (dB)} + \text{Ant. gain (dBi)}$$

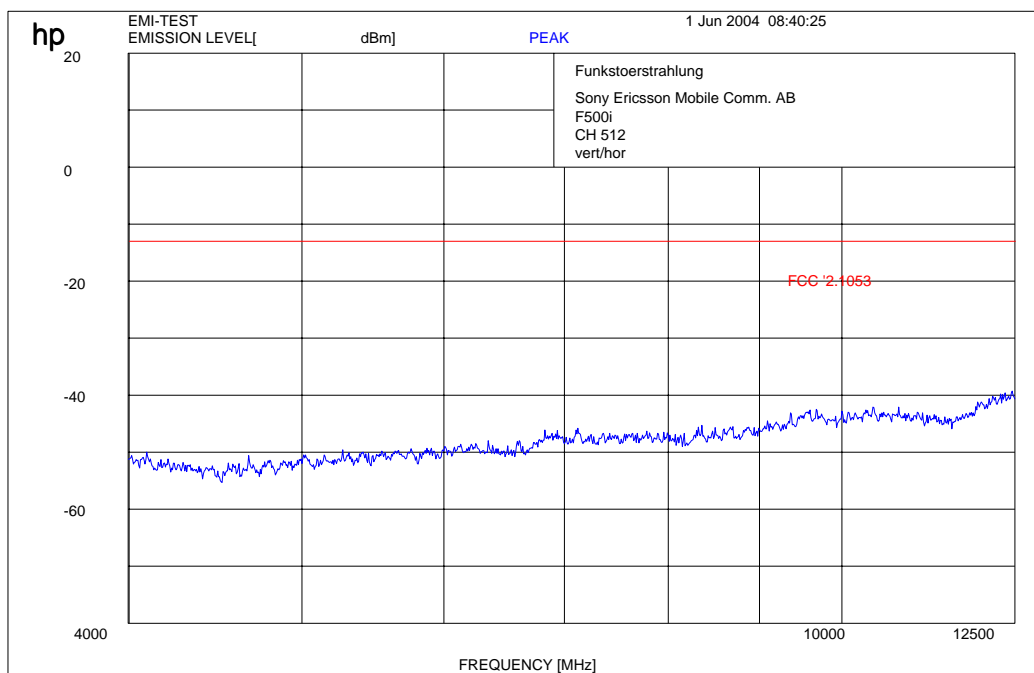
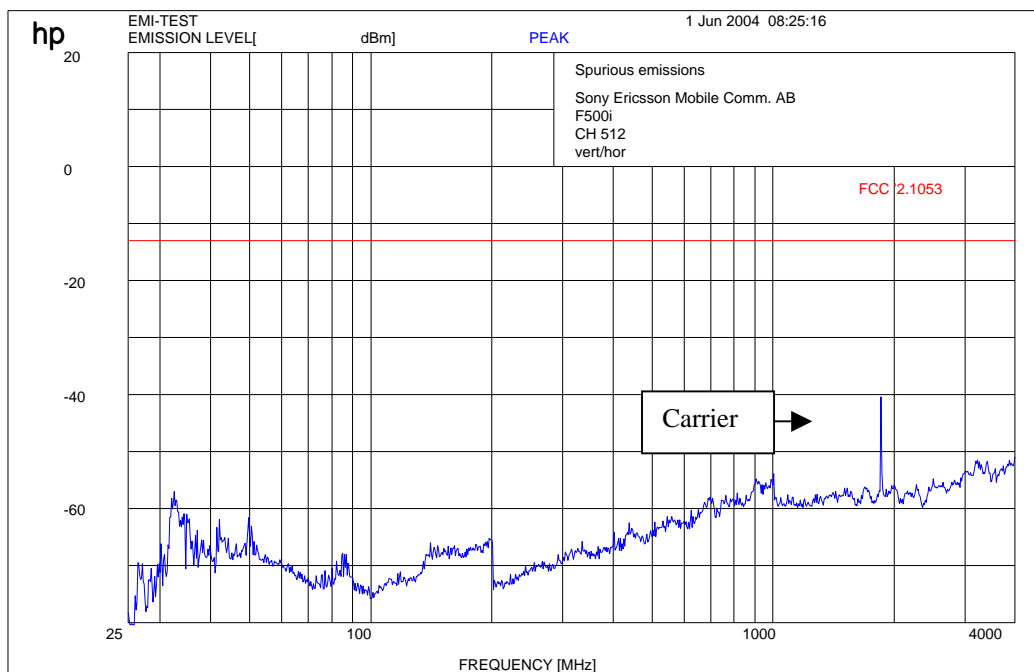


## Magn. Fieldstrength up to 30 MHz

EUT: AAB-1021042-BV  
Manufacturer: Sony Ericsson  
Operating Condition: Traffic mode  
Test Site: Cetecom, Room 6  
Operator: Berg M.  
Test Specification: 15.109  
Comment: 115 V/ 60Hz  
Start of Test: 02.06.04 / 07:41:53



## Channel 512 (up to 12 GHz)

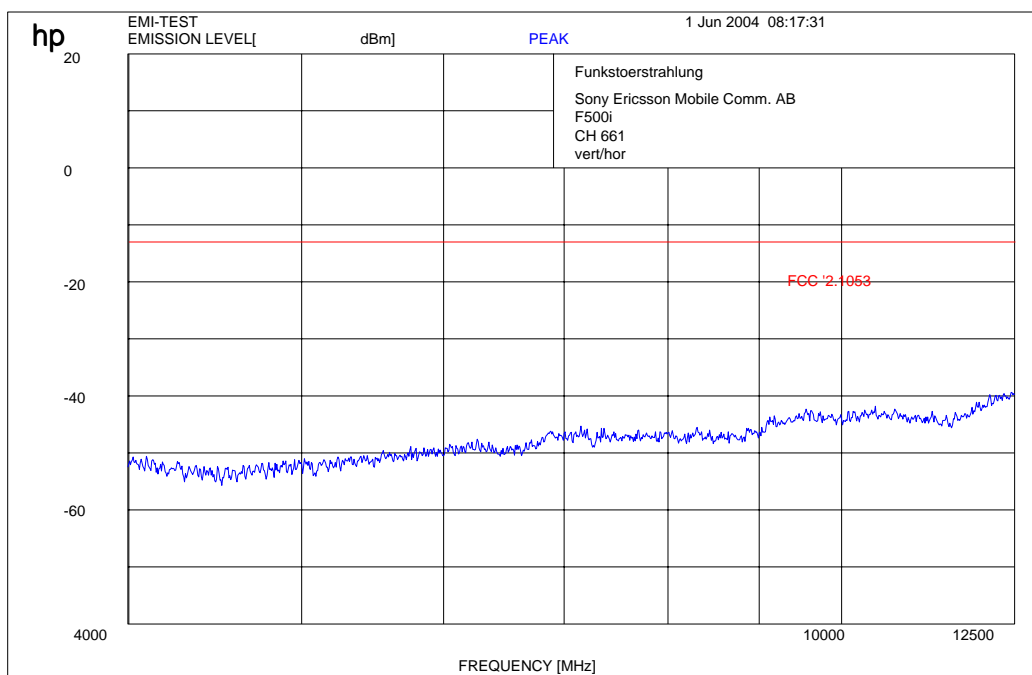
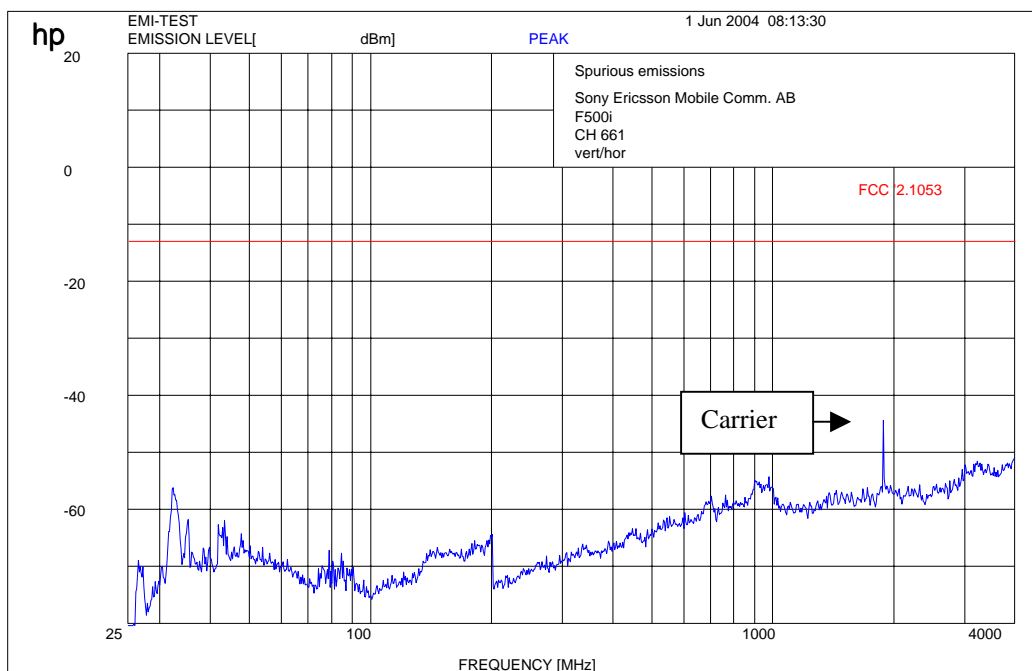


$f < 1 \text{ GHz}$  : RBW/VBW: 100 kHz

$f \geq 1 \text{ GHz}$  : RBW / VBW 1 MHz

Carrier suppressed with a rejection filter

## Channel 661 (up to 12 GHz)

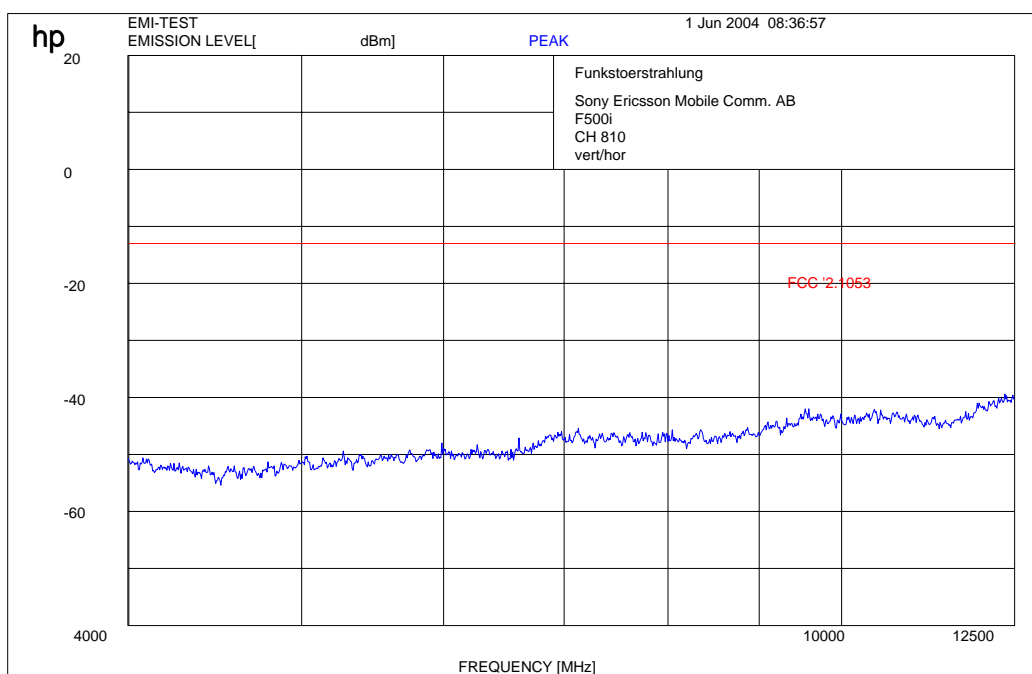
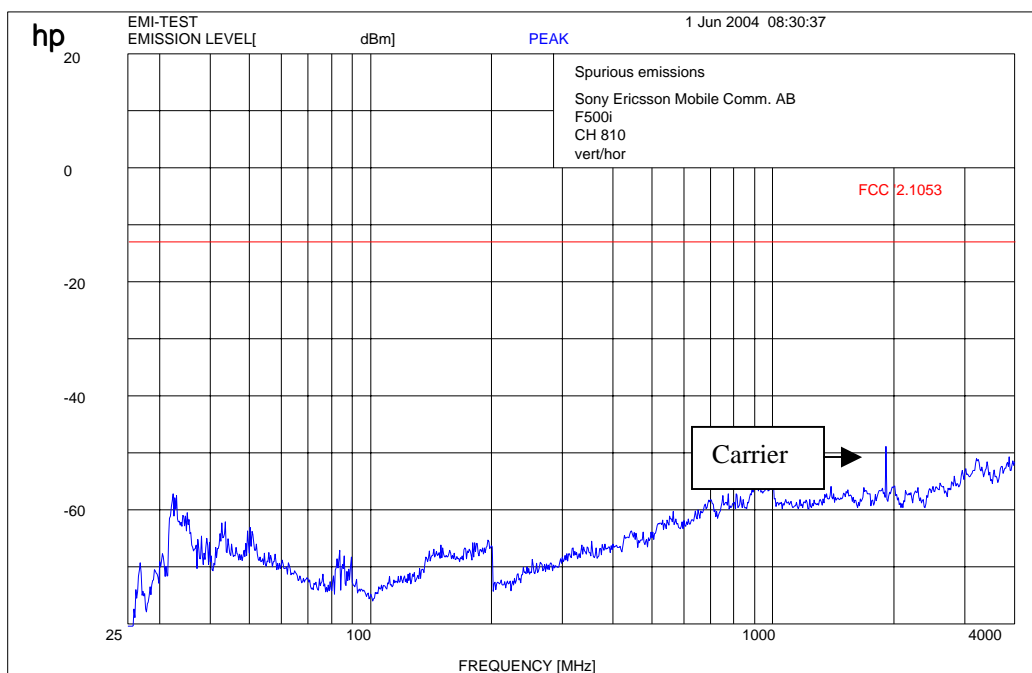


$f < 1 \text{ GHz}$  : RBW/VBW: 100 kHz

$f \geq 1 \text{ GHz}$  : RBW / VBW 1 MHz

Carrier suppressed with a rejection filter.

## Channel 810 (up to 4 GHz)



$f < 1 \text{ GHz}$  : RBW/VBW: 100 kHz

$f \geq 1 \text{ GHz}$  : RBW / VBW 1 MHz

Carrier suppressed with a rejection filter

## 3.1.4 Receiver Radiated Emissions

### Reference

FCC:	CFR Part 15.109, 2.1053
IC:	RSS 133, Issue 2, Rev. 1, Section 6.3

### Measurement Results

SPURIOUS EMISSIONS LEVEL ( $\mu\text{V/m}$ )								
CH 512			CH 661			CH 810		
f (MHz)	Detector	Level ( $\mu\text{V/m}$ )	f (MHz)	Detector	Level ( $\mu\text{V/m}$ )	f (MHz)	Detector	Level ( $\mu\text{V/m}$ )
No peaks found								
Measurement uncertainty			$\pm 3$ dB					

 $f < 1 \text{ GHz}$  : RBW/VBW: 100 kHz

 $f \geq 1 \text{ GHz}$  : RBW/VBW: 1 MHz

H = Horizontal ; V= Vertical

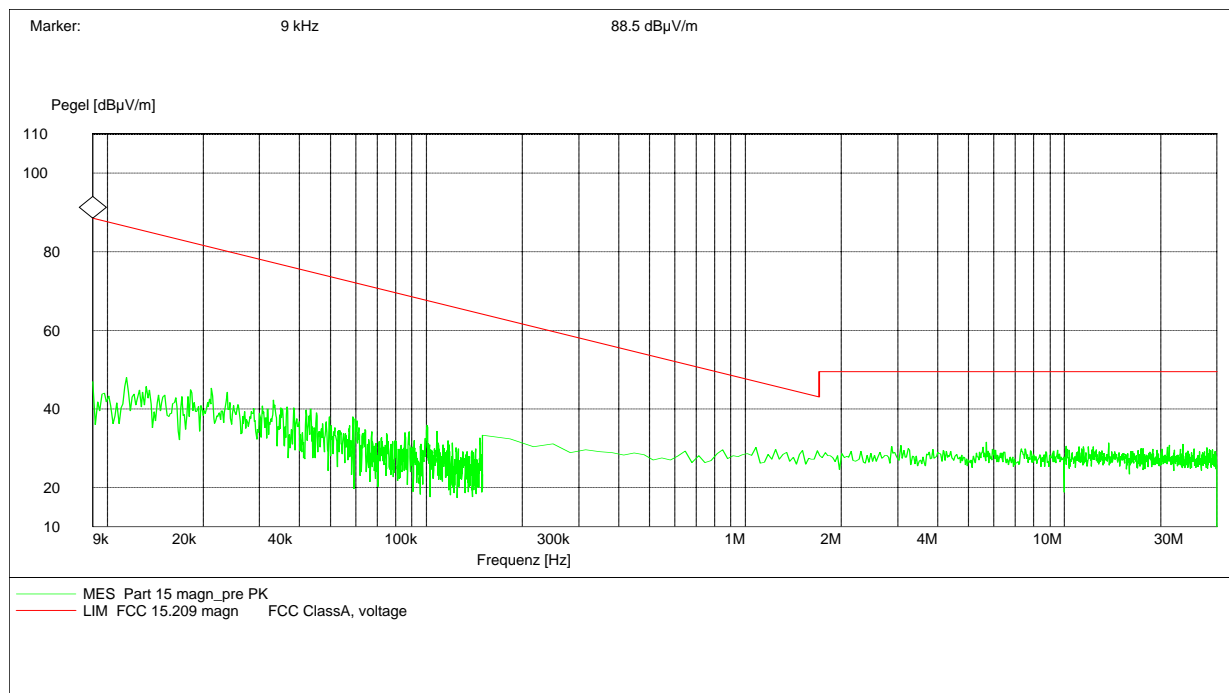
For measurement distance see table below

**Limits:** § 15.109

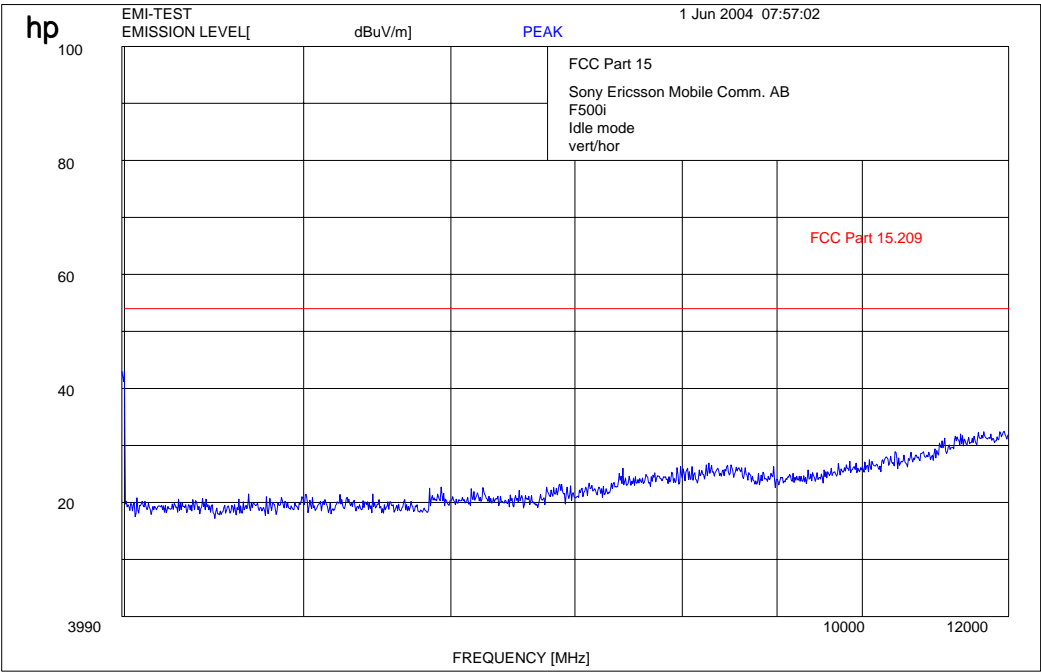
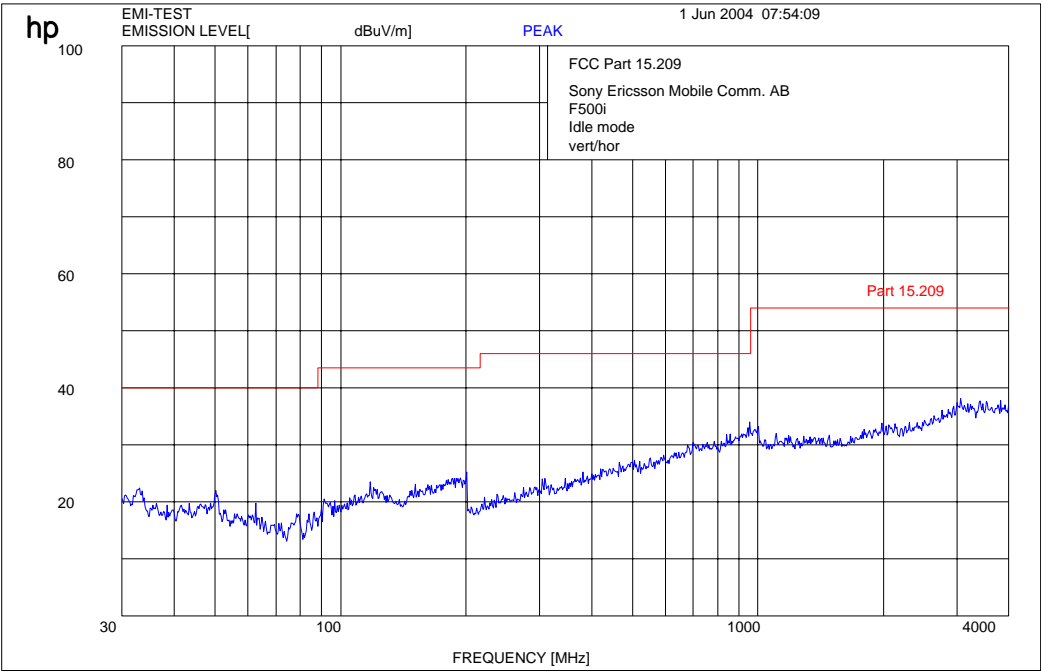
Frequency (MHz)	Field strength ( $\mu\text{V/m}$ )	Measurement distance (m)
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30.0	30	30
30 - 88	100	3
88 - 216	150	3
216 - 960	200	3
above 960	500	3

## Idle-Mode (up to 30 MHz)

EUT: AAB-1021042-BV  
Manufacturer: Sony Ericsson  
Operating Condition: Idle mode  
Test Site: Cetecom, Room 6  
Operator: Berg M.  
Test Specification: 15.109  
Comment: 115 V/ 60Hz  
Start of Test: 02.06.04 / 07:47:05



Idle-Mode (up to 12 GHz)



$f < 1 \text{ GHz}$  : RBW/VBW: 100 kHz

$f \geq 1 \text{ GHz}$  : RBW/VBW 1 MHz

### 3.1.5 Conducted Spurious Emissions

#### Reference

FCC:	CFR Part 24.238, 2.10.51
IC:	RSS 133, Issue 2, Rev. 1, Section 6.3

#### 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:

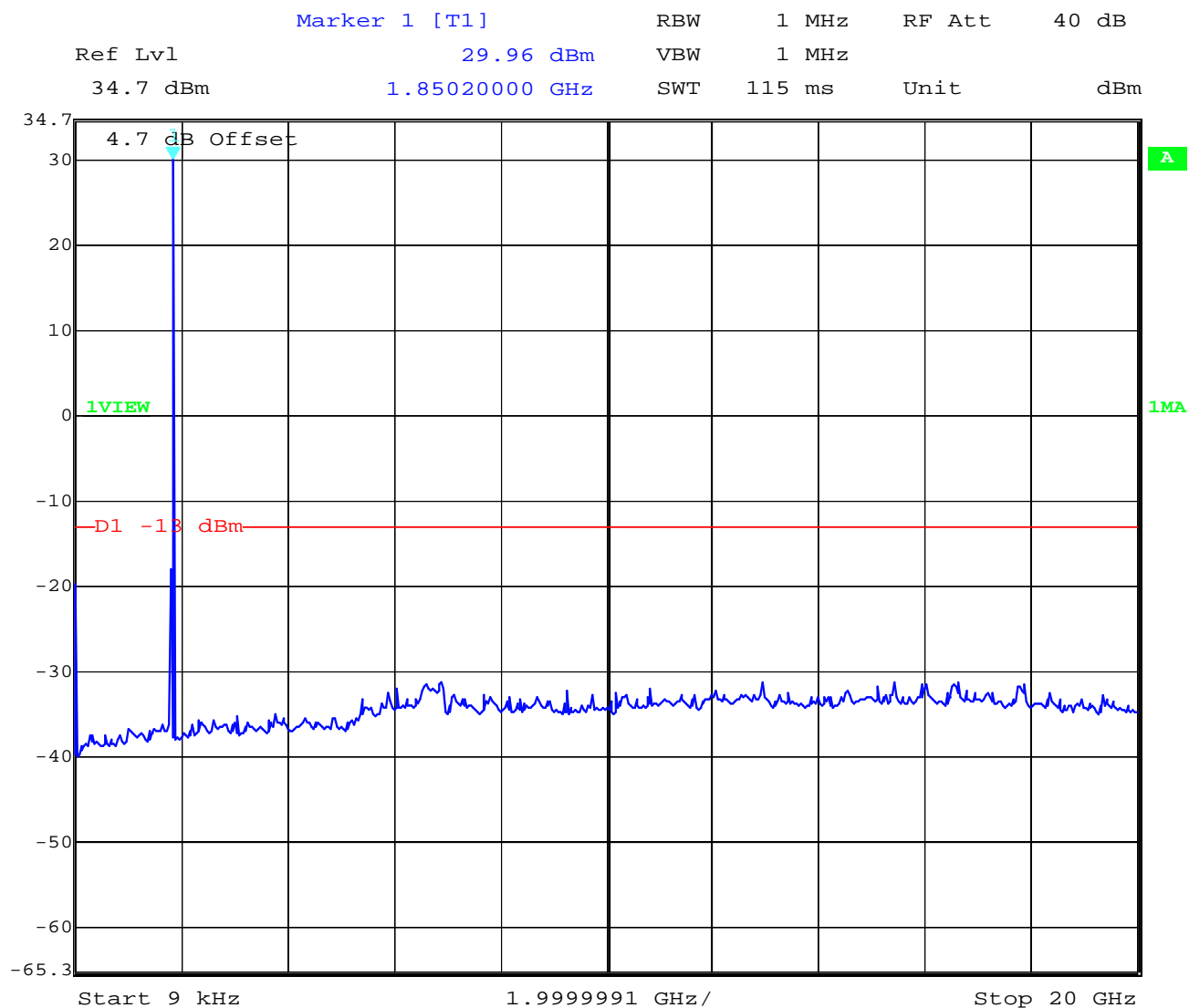
(a) On any frequency outside frequency band of the USPCS spectrum, the power of any emission shall be attenuated below the transmitter power (P, in Watts) by at least  $43+10\log(P)$  dB. For all power levels +30 dBm to 0 dBm, this becomes a constant specification limit of -13 dBm.

#### Measurement Results:

Harmonic	Tx ch.-512 Freq. (MHz)	Level (dBm)	Tx ch.-661 Freq. (MHz)	Level (dBm)	Tx ch.-810 Freq. (MHz)	Level (dBm)
2	3700.4	-	3760	-	3819.6	-
3	5550.6	-	5640	-	5729.4	-
4	7400.8	-	7520	-	7639.2	-
5	9251.0	-	9400	-32.48	9549.0	-
6	11101.2	-	11280	-	11458.8	-
7	12951.4	-	13160	-	13368.6	-
8	14801.6	-	15040	-	15278.4	-
9	16651.8	-	16920	-	17188.2	-
10	18502.0	-	18800	-	19098.0	-

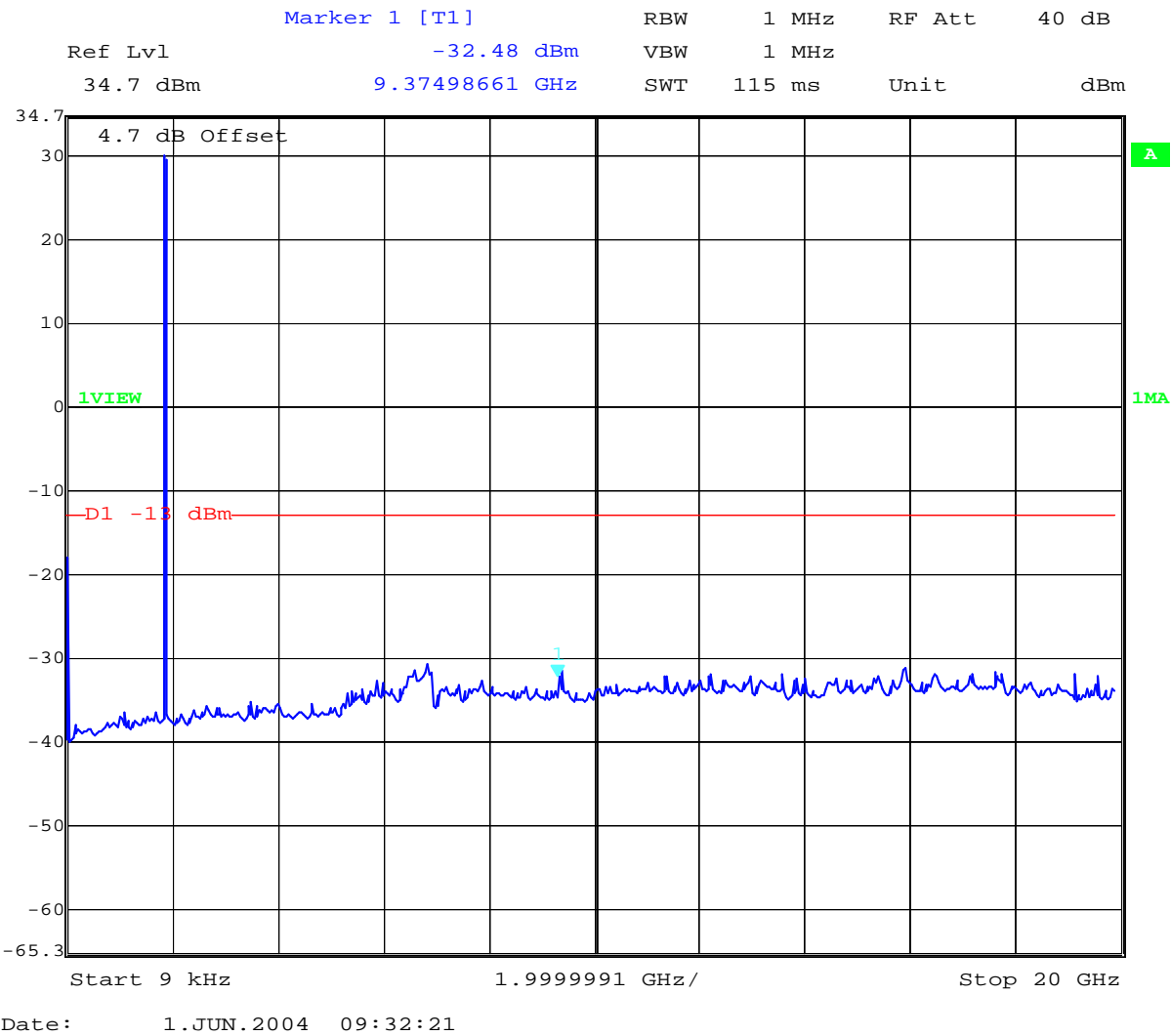


## Channel: 512



Date: 1.JUN.2004 09:34:34

Channel 661



## Channel 810



Date: 1.JUN.2004 09:30:34

## 3.1.6 Block Edge Compliance

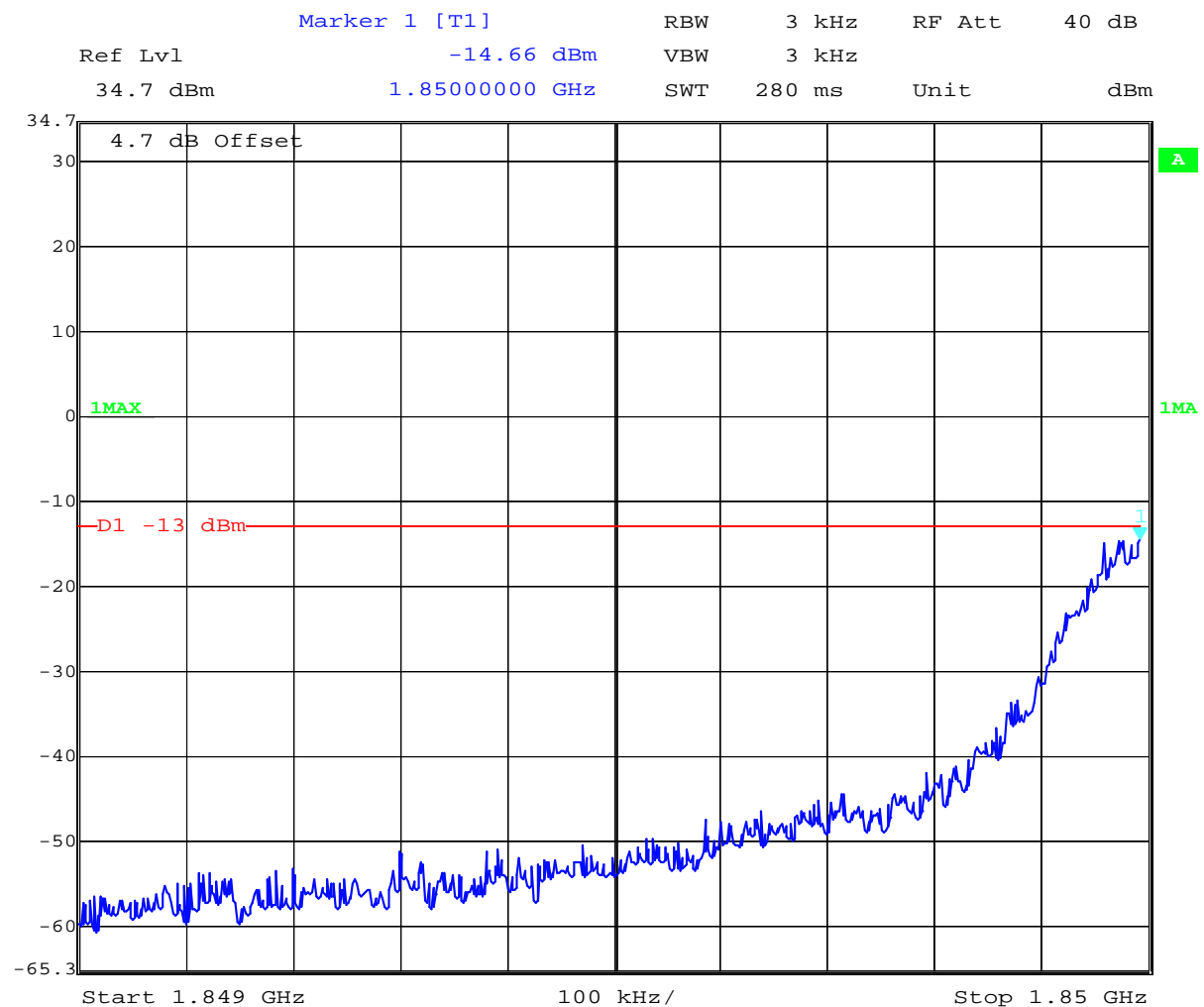
### Reference

FCC:	CFR Part 24.238
IC:	RSS 133, Issue 2, Rev. 1, Section 6.3

### Measurement Limit:

(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  $43+10\log(P)$  dB. For all power levels +30 dBm to 0 dBm, this becomes a constant specification limit of -13 dBm.

### Block 1 Channel 512



Date: 1.JUN.2004 09:36:10

## Block 6 Channel 810



Date: 1.JUN.2004 09:36:59

### 3.1.7 Occupied Bandwidth

#### Reference

FCC:	CFR Part 24.238, 2.1049
IC:	RSS 133, Issue 2, Rev. 1, Section 5.6

#### Occupied Bandwidth Results

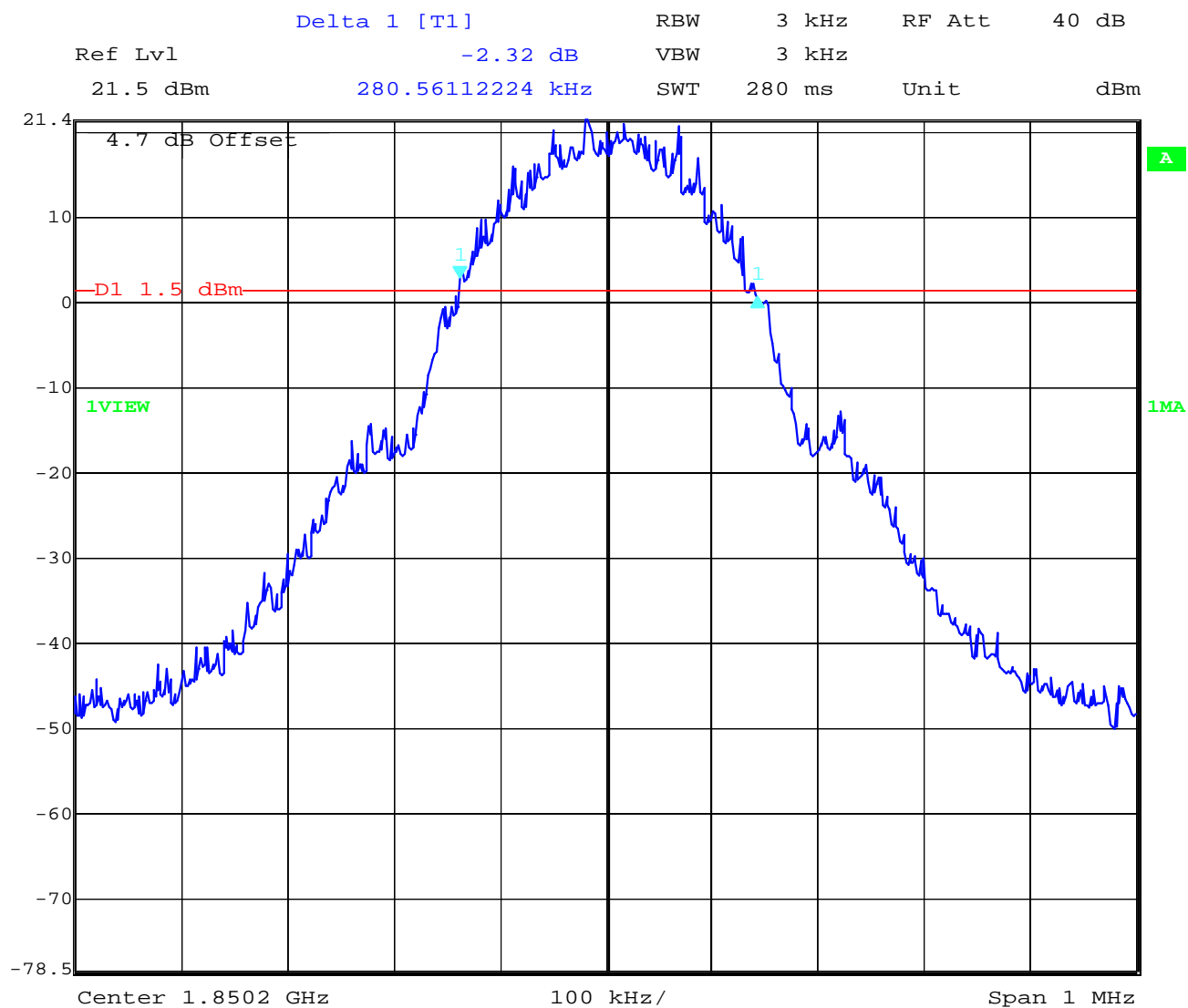
Similar to conducted emissions, occupied bandwidth measurements are only provided for selected frequencies in order to reduce the amount of submitted data. Data were taken at the extreme and mid frequencies of the USPCS frequency band. Table 8.2 below lists the measured 99% power and -26dBC occupied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

Frequency	99% Occupied Bandwidth kHz	-26 dBc Bandwidth kHz
1850.2 MHz	280.561	318.637
1880.0 MHz	274.549	312.625
1909.8 MHz	284.569	320.641

Part 24.238 (a) requires a measurement bandwidth of at least 1% of the occupied bandwidth. For ca. 320 kHz, this equates to a resolution bandwidth of at least 3.0 kHz. For this testing, a resolution bandwidth 3.0 kHz was used.

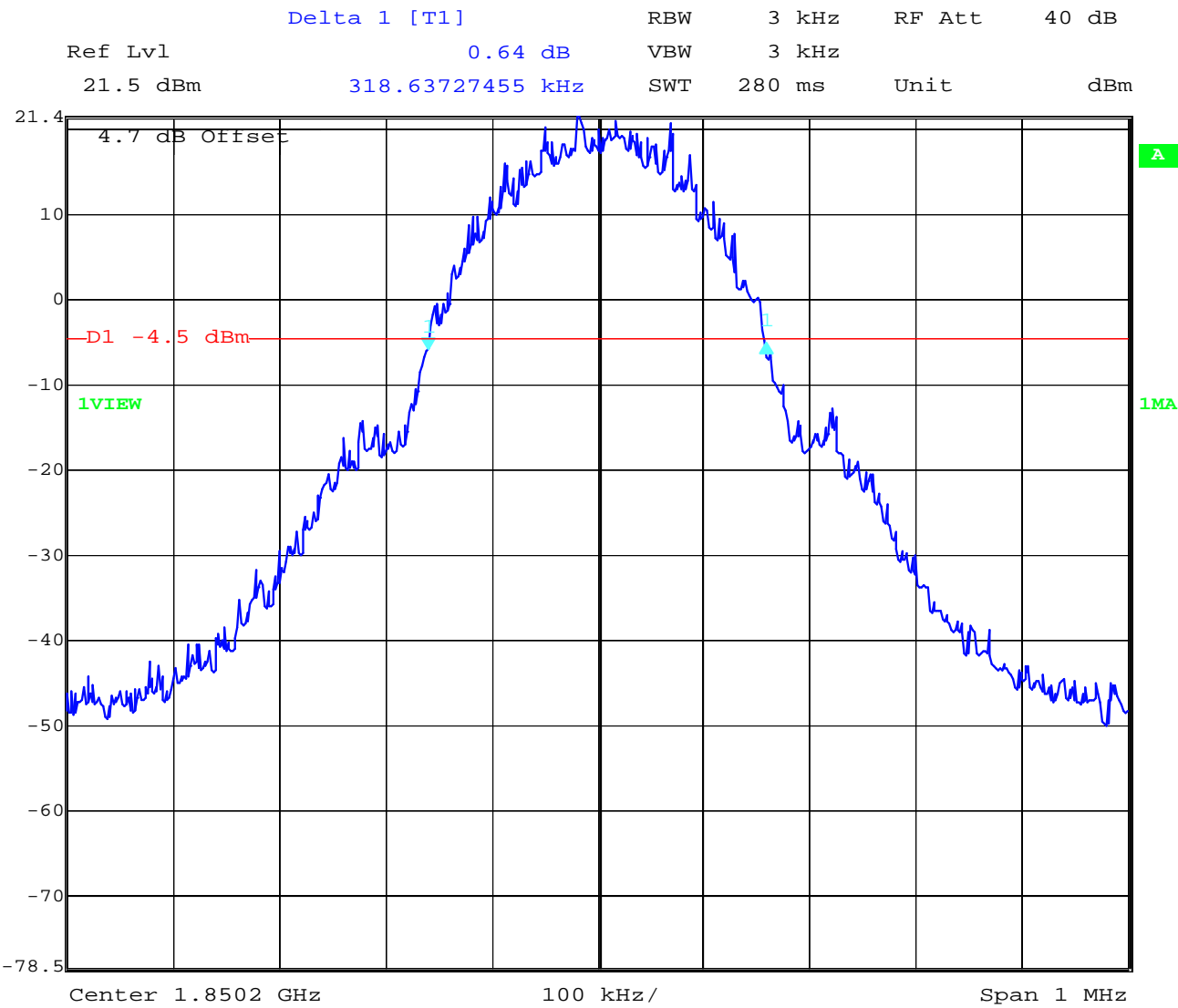
## Channel 512

### 99% (-20 dB) Occupied Bandwidth



Date: 1.JUN.2004 09:43:11

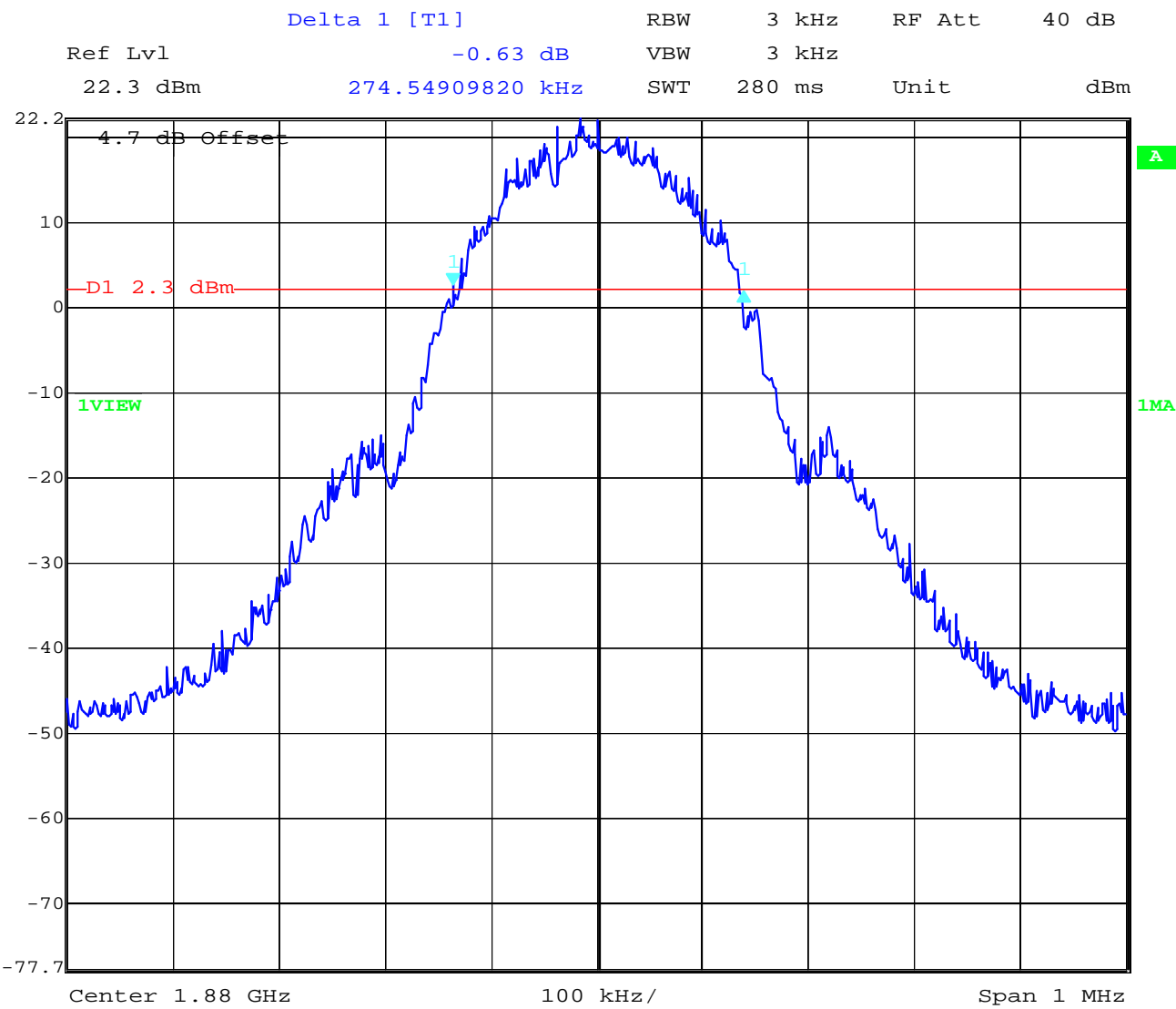
Channel 512  
-26 dBc Bandwidth



Date: 1.JUN.2004 09:43:57

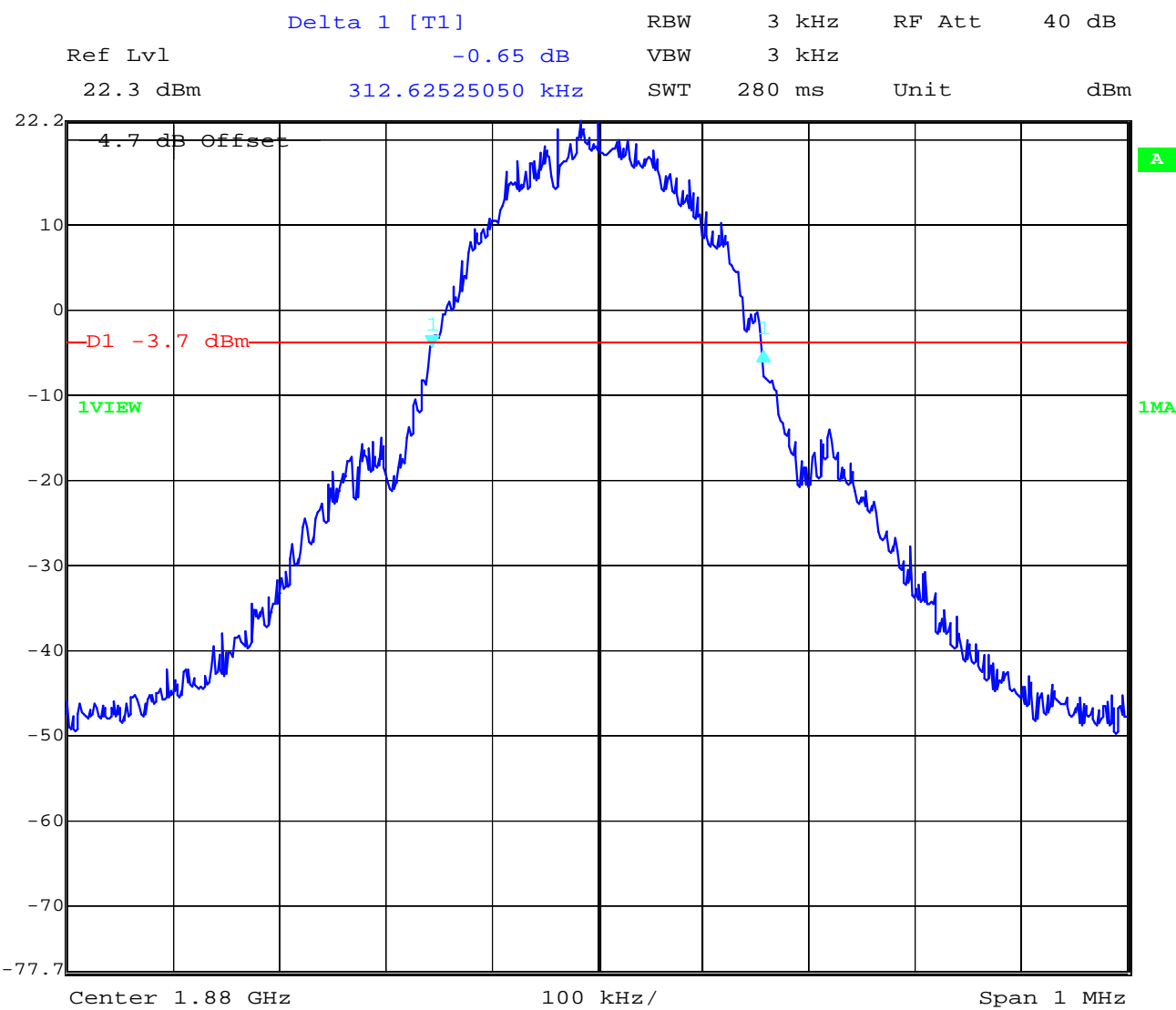


Channel 661  
99% (-20 dB) Occupied Bandwidth



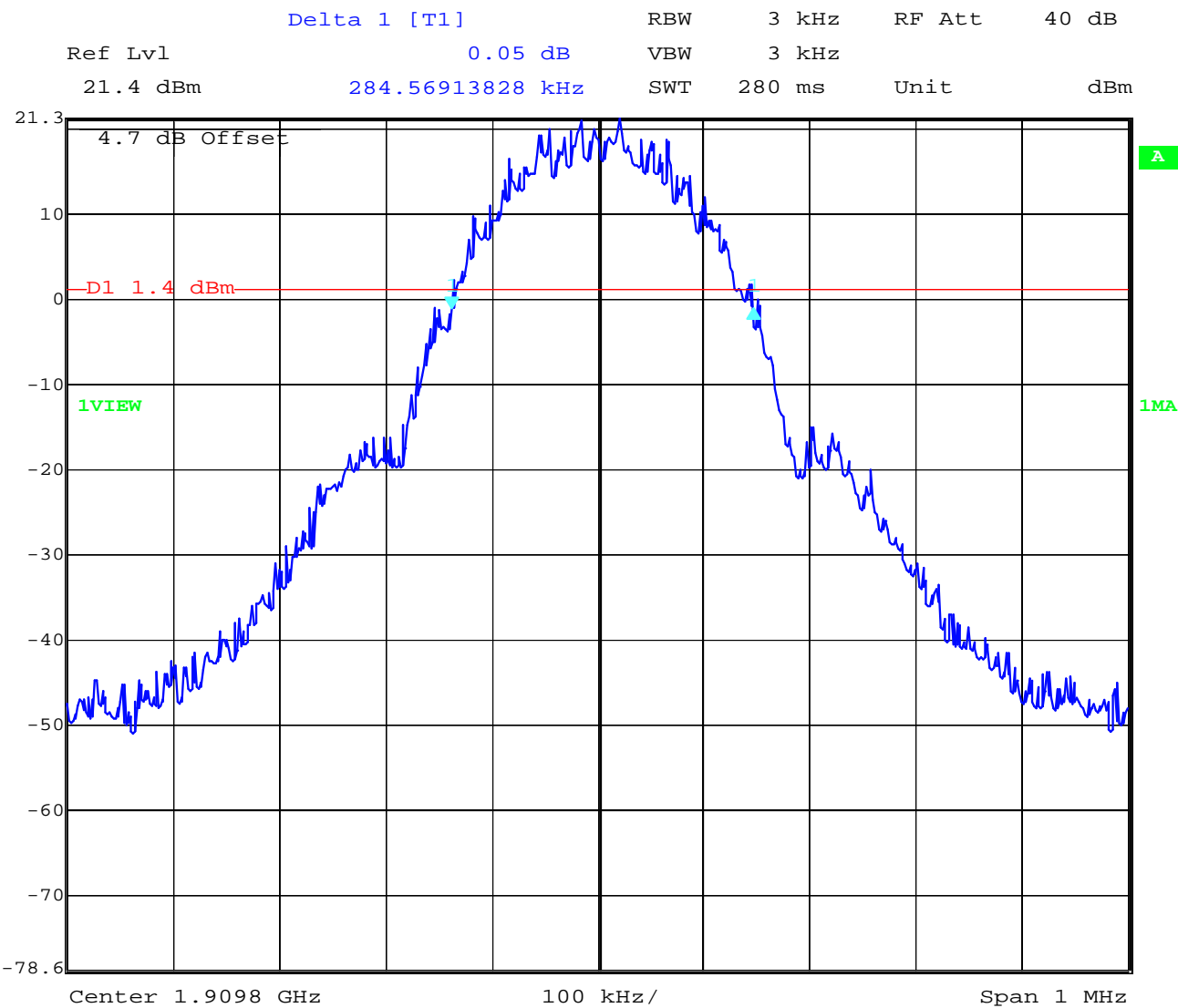
Date: 1.JUN.2004 09:41:15

Channel 661  
-26 dBc Bandwidth



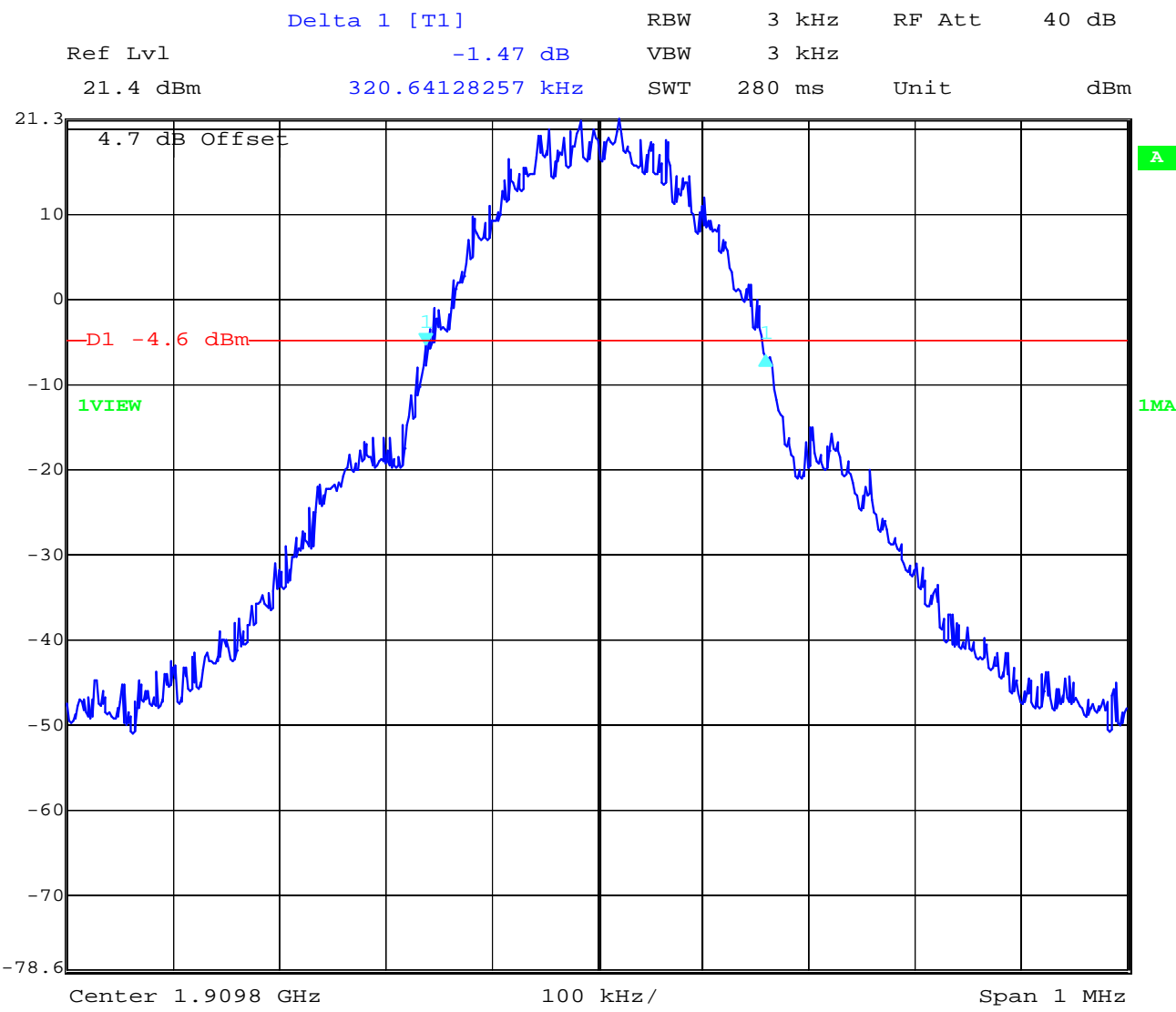
Date: 1.JUN.2004 09:41:52

Channel 810  
99% (-20 dB) Occupied Bandwidth



Date: 1.JUN.2004 09:39:09

Channel 810  
-26 dBc Bandwidth



Date: 1.JUN.2004 09:39:39

## ANNEX A: PART 15 B TESTS

### Conducted Limits

#### Reference

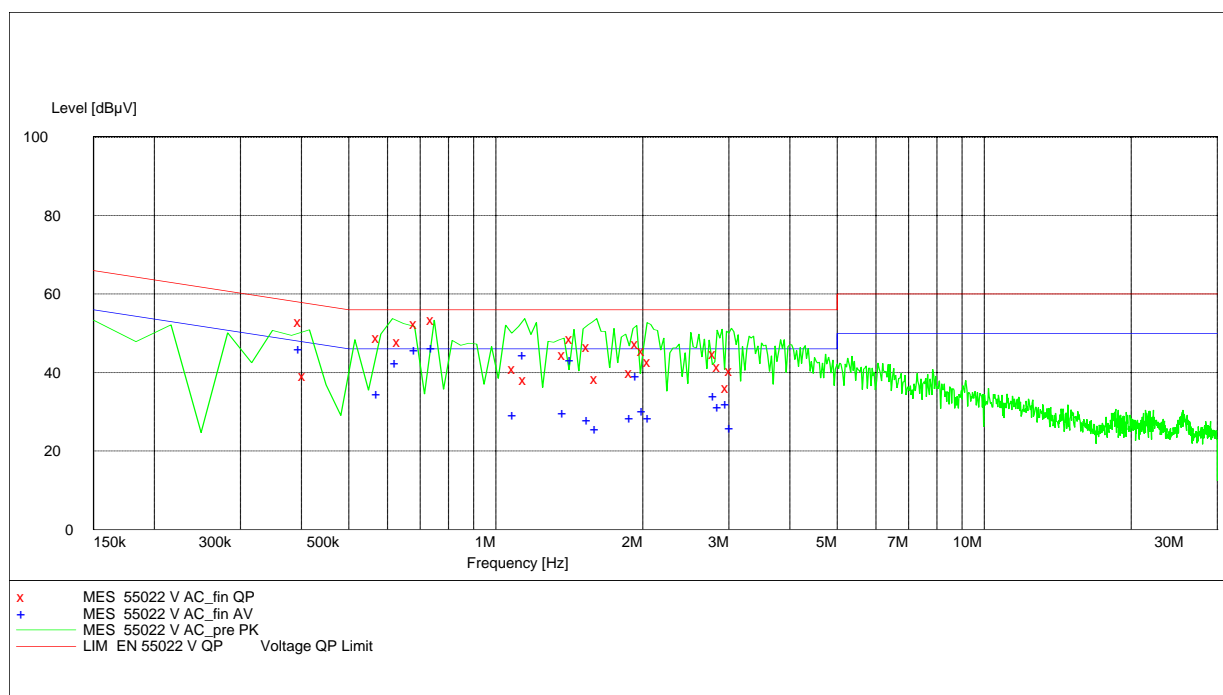
FCC:	CFR Part 15.207, 15.107
IC:	RSS 210, Issue 4, Section 6.6 , 7.4

Limits: § 15.107 / 15.207

Frequency of Emission (MHz)	Conducted Limit (dBµV)	
	Quasi-peak	Average
0.15 – 0.5	66 to 56 *	56 to 46 *
0.5 – 5	56	46
5 - 30	60	50

\* Decreases with the logarithm of the frequency

EUT: AAB-1021042-BV  
 Manufacturer: Sony Ericsson Mobile Communications AB  
 Operating Condition: Idle mode  
 Test Site: Room 006 (Shielded chamber)  
 Operator: Berg M.  
 Test Specification: CISPR 22 (EN 55022)  
 Comment: 115V / 60 Hz  
 Start of Test: 02.06.04 / 07:14:39



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

02.06.04 07:22

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Line	PE
0.405000	52.80	10.7	58	5.0	L1	GND
0.412500	39.30	10.7	58	18.3	L1	GND
0.585000	48.80	10.5	56	7.2	L1	FLO
0.645000	47.90	10.5	56	8.1	L1	FLO
0.697500	52.30	10.5	56	3.7	L1	FLO
0.757500	53.40	10.6	56	2.6	L1	FLO
1.110000	40.90	10.5	56	15.1	L1	GND
1.170000	38.20	10.5	56	17.8	L1	GND
1.402500	44.40	10.5	56	11.6	L1	FLO
1.455000	48.50	10.4	56	7.5	L1	FLO
1.575000	46.70	10.4	56	9.3	N	FLO
1.635000	38.30	10.5	56	17.7	N	FLO
1.927500	39.90	10.5	56	16.1	L1	GND
1.980000	47.30	10.5	56	8.7	L1	GND

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

02.06.04 07:22

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Line	PE
0.405000	46.10	10.7	48	1.7	L1	GND
0.585000	34.70	10.5	46	11.3	L1	FLO
0.637500	42.50	10.5	46	3.5	L1	FLO
0.697500	45.80	10.5	46	0.2	L1	FLO
0.757500	46.30	10.6	46	-0.3	L1	FLO
1.110000	29.20	10.5	46	16.8	L1	GND
1.162500	44.50	10.5	46	1.5	L1	GND
1.402500	29.80	10.5	46	16.2	L1	FLO
1.455000	43.20	10.4	46	2.8	L1	FLO
1.575000	27.90	10.4	46	18.1	N	FLO
1.635000	25.80	10.5	46	20.2	N	FLO
1.927500	28.60	10.5	46	17.4	L1	GND
1.980000	39.30	10.5	46	6.7	L1	GND
2.040000	30.20	10.5	46	15.8	L1	GND

EUT:

Manufacturer:

Operating Condition: Traffic mode

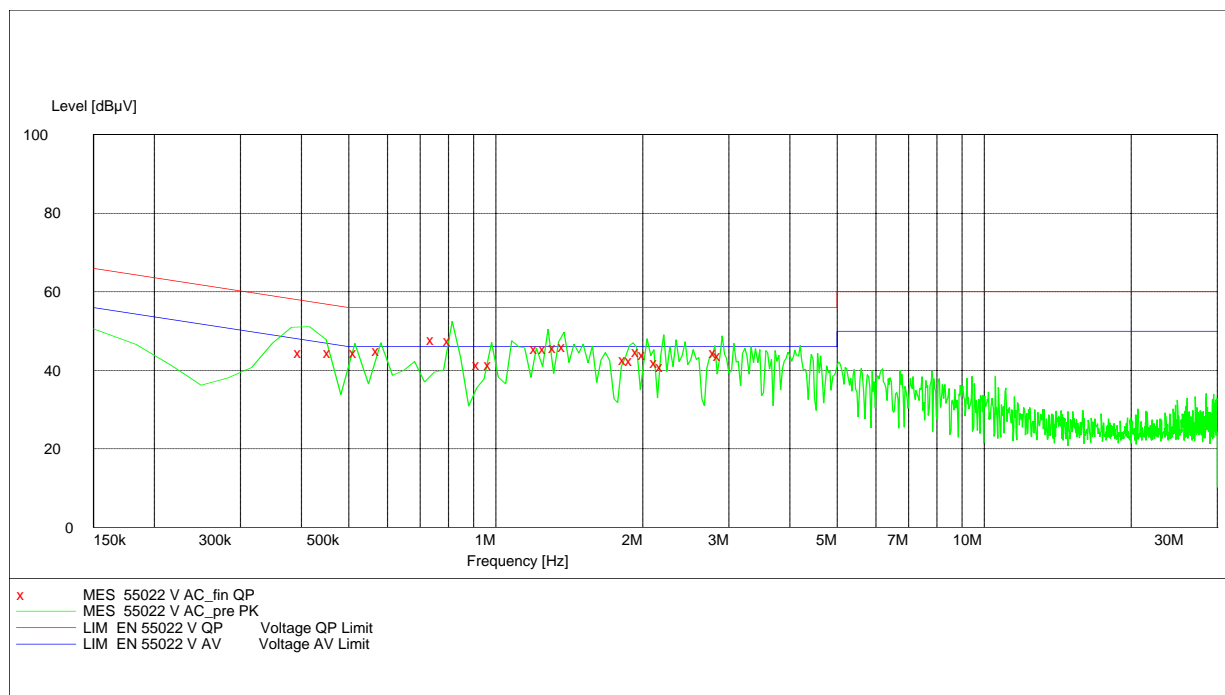
Test Site: Room 006 (Shielded chamber)

Operator: Berg M.

Test Specification: EN 301 489-1/-x (EN 55022)

Comment: 115V / 60 Hz

Start of Test: 02.06.04 / 07:28:50



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

02.06.04 07:36

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.405000	44.40	10.7	58	13.4	L1	GND
0.465000	44.50	10.6	57	12.1	L1	GND
0.525000	44.50	10.6	56	11.5	L1	FLO
0.585000	44.90	10.5	56	11.1	L1	FLO
0.757500	47.70	10.6	56	8.3	L1	FLO
0.817500	47.50	10.5	56	8.5	L1	FLO
0.937500	41.50	10.6	56	14.5	N	GND
0.990000	41.50	10.6	56	14.5	N	GND
1.230000	45.60	10.5	56	10.4	L1	FLO
1.282500	45.60	10.5	56	10.4	L1	FLO
1.342500	45.80	10.5	56	10.2	L1	GND
1.402500	46.10	10.5	56	9.9	L1	GND
1.867500	42.70	10.5	56	13.3	N	FLO
1.927500	42.30	10.5	56	13.7	N	FLO

**4 TEST EQUIPMENT AND ANCILLARIES USED FOR TESTS**

No	Instrument/Ancillary	Type	Manufacturer	Serial No.
01	Spectrum Analyzer	8566 A	Hewlett-Packard	1925A00257
02	Analyzer Display	8566 A	Hewlett-Packard	1925A00860
03	Oscilloscope	7633	Tektronix	230054
04	Radio Communication Analyzer	CMTA 54	Rohde & Schwarz	894 043/010
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	Function Generator	AFGU	Rohde & Schwarz	862 480/032
09	Regulating Transformer	MPL	Erfi	91350
10	LISN	NNLA 8120	Schwarzbeck	8120331
11	Relay-Matrix	PSU	Rohde & Schwarz	893 285/020
12	Power-Meter	436 A	Hewlett-Packard	2101A12378
13	Power-Sensor	8484 A	Hewlett-Packard	2237A10156
14	Power-Sensor	8482 A	Hewlett-Packard	2237A00616
15	Modulation Meter	9008	Racal-Dana	2647
16	Frequency 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	Hewlett-Packard	2816A16541
20	Quasi Peak Adapter	85650 A	Hewlett-Packard	2811A01131
21	RF-Preselector	85685 A	Hewlett-Packard	2833A00768
22	Biconical Antenna	3104	Emco	3758
23	Log. Per. Antenna	3146	Emco	2130
24	Double Ridged Horn	3115	Emco	3088
25	EMI-Testreceiver	ESAI	Rohde & Schwarz	863 180/013
26	EMI-Analyzer-Display	ESAI-D	Rohde & Schwarz	862 771/008
27	Biconical Antenna	HK 116	Rohde & Schwarz	888 945/013
28	Log. Per. Antenna	HL 223	Rohde & Schwarz	825 584/002
29	Relay-Switch-Unit	RSU	Rohde & Schwarz	375 339/002
30	Highpass	HM985955	FSY Microwave	001
31	Amplifier	P42-GA29	Tron-Tech	B 23602
32	Anechoic Chamber		Frankonia	
33	Control Computer	PSM 7	Rohde & Schwarz	834 621/004
34	EMI Test Receiver	ESMI	Rohde & Schwarz	827 063/010
35	EMI Test Receiver	Display	Rohde & Schwarz	829 808/010



No	Instrument/Ancillary	Type	Manufacturer	Serial No.
36	Control Computer	HD 100	Deisel	100/322/93
37	Relay Matrix	PSN	Rohde & Schwarz	829 065/003
38	Control Unit	GB 016 A2	Rohde & Schwarz	344 122/008
39	Relay Switch Unit	RSU	Rohde & Schwarz	316 790/001
40	Power Supply	6032A	Hewlett Packard	2846A04063
41	Spectrum Monitor	EZM	Rohde & Schwarz	883 720/006
42	Measuring Receiver	ESH 3	Rohde & Schwarz	890 174/002
43	Measuring Receiver	ESVP	Rohde & Schwarz	891 752/005
44	Bicon Ant. 20-300MHz	HK 116	Rohde & Schwarz	833 162/011
45	Logper Ant. 0.3-1 GHz	HL 223	Rohde & Schwarz	832 914/010
46	Amplifier 0.1-4 GHz	AFS4	Miteq Inc.	206461
47	Logper Ant. 1-18 GHz	HL 024 A2	Rohde & Schwarz	342 662/002
48	Polarisation Network	HL 024 Z1	Rohde & Schwarz	341 570/002
49	Double Ridged Horn Antenna 1-26.5 GHz	3115	EMCO	9107-3696
50	Microw. Sys. Amplifier 0.5-26.5 GHz	8317A	Hewlett Packard	3123A00105
51	Audio Analyzer	UPD	Rohde & Schwarz	1030.7500.04
52	Controler	PSM 7	Rohde & Schwarz	883 086/026
53	DC V-Network	ESH3-Z6	Rohde & Schwarz	861 406/005
54	DC V-Network	ESH3-Z6	Rohde & Schwarz	893 689/012
55	AC 2 Phase V-Network	ESH3-Z5	Rohde & Schwarz	861 189/014
56	AC 2 Phase V-Network	ESH3-Z5	Rohde & Schwarz	894 981/019
57	AC-3 Phase V-Network	ESH2-Z5	Rohde & Schwarz	882 394/007
58	Power Supply	6032A	Rohde & Schwarz	2933A05441
59	RF-Test Receiver	ESVP.52	Rohde & Schwarz	881 487/021
60	Spectrum Monitor	EZM	Rohde & Schwarz	883 086/026
61	RF-Test Receiver	ESH3	Rohde & Schwarz	881 515/002
62	Relay Matrix	PSU	Rohde & Schwarz	882 943/029
63	Relay Matrix	PSU	Rohde & Schwarz	828 628/007
64	Spectrum Analyzer	FSIQ 26	Rohde & Schwarz	119.6001.27
65	Spectrum Analyzer	HP 8565E	Hewlett Packard	3473A00773