REPORT ON

Limited FCC CFR 47: Parts 15, 22 and 24
and Industry Canada RSS-132 and 133 Testing
of a SAGEM Communication A2005sca+ Dual Band GSM850 / GSM1900 handset

COMMERCIAL-IN-CONFIDENCE

FCC ID: M9HA5SCPE2

Report No OR615146/01 Issue 4 **June 2006**

Product Service

Competence. Certainty. Quality

COMMERCIAL-IN-CONFIDENCE

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June 2006

PREPARED FOR SAGEM Communication
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DATED 29th June 2006

This report has been Up-issued to Issue 4 due to typographical errors.

ENGINEERING STATEMENT

The measurements shown in this report were made in accordance with the procedures described on test pages. All reported testing was carried out on a sample equipment to demonstrate limited compliance with FCC CFR 47: Parts 15, 22 and 24. The sample tested was found to comply with the requirements defined in the applied rules.

Test Engineers;

S Bennett T Guy P Harrison S Hartley

UKAS TESTING 0141 Group

Product Service

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Product Service

SECTION 1

REPORT SUMMARY

Limited FCC CFR 47: Parts 15, 22 and 24
and Industry Canada RSS-132 and 133 Testing
of a SAGEM Communication A2005sca+ Dual Band GSM850 / GSM1900 handset

Product Service

1.1 STATUS

Equipment Under Test	SAGEM A2005sca+ Dual Band GSM850 / GSM1900 handset
Objective	To undertake measurements to determine the Equipment Under Test's (EUT's) compliance with the specification.
Name and Address of Client	SAGEM Communication 2, rue du Petit Albi – BP 28250 95801 Cergy Pontoise Cedex France
SAGEM Contact	Mr. Jean Marquet +33 1 58 11 91 72
Type Number	A2005sca+
Serial Numbers	IMEI 01086400000084-1 IMEI 01086400000072-6
Hardware Version	V0x
Software Version	J 3,U4
Declared Variants	None
Test Specification/Issue/Date	FCC CFR 47: Part 15, Subparts B and C: 2003 FCC CFR 47: Part 22, Subpart H: 2004 FCC CFR 47: Part 24, Subpart D: 2004 RSS-132: Issue 1: 2002 RSS-133: Issue 4: 2005
Number of Items Tested	Two
Security Classification of EUT	Commercial-in-Confidence
Incoming Release **Date**	A2005sca+ EUT Checklist Revision 3 10th March 2006
Disposal **Reference Number** **Date**	Held pending disposal Not Applicable Not Applicable
Order Number **Date**	2910064534 27th April 2006
Start of Test **Finish of Test**	13th April 2006 30th April 2006
Related Documents	ANSI C63.4: 2001 RSS-212, Issue 1: 1999 SRSP-503, Issue 6: 2003 SRSP-510, Issue 4: 2003

1.2 INTRODUCTION

The information contained within this report is intended to show limited verification of compliance of the SAGEM Communication A2005sca+ Dual Band GSM850 / GSM1900 handset to the requirements of FCC Specification Parts 15, 22 and 24 and Indusrty Canada Radio Specifications RSS-132 and RSS-133.

Testing has been performed under the following site accreditations

FCC Accreditation
90987 Octagon House, Fareham, or Maplewood, Basingstoke Test Laboratory

Industry Canada Accreditation
IC5208 Octagon House, Fareham Test Laboratory
IC4270 Maplewood, Basingstoke Test Laboratory

1.2 INTRODUCTION

1.2.1 Declaration of Build Status

MAIN EUT	
MANUFACTURING DESCRIPTION	Dual Band Handset
MANUFACTURER	Sagem Communications
TYPE	A2005sca+
PART NUMBER	-
SERIAL NUMBER	IMEI 01086400000084-1 IMEI 01086400000072-6
HARDWARE VERSION	V0x
SOFTWARE VERSION	J 3,U4
TRANSMITER OPERATING RANGE	GSM850: 824.2 to 848.8 GSM1900: 1850.2 to 1909.8
RECEIVER OPERATING RANGE	GSM850: 869.2 to 893.8 GSM1900: 1930.2 to 1969.8
COUNTRY OF ORIGIN	France
INTERMEDIATE FREQUENCIES	None
ITU DESIGNATION OF EMISSION	GSM850 band GSM1900 band
HIGHEST INTERNALLY GENERATED FREQUENCY	GSM850 band: 1737.8 - 1787.8 MHz GSM1900 band: 1929.9 - 1989.9 MHz
OUTPUT POWER (W or dBm)	GSM850 band: Class 4 (PCL 5) 2W or 33dBm GSM1900 band: Class 0 (PCL 0) 1W or 30dBm
FCC ID	M9HA5DCPE2
INDUSTRY CANADA ID	N/A
TECHNICAL DESCRIPTION (a brief description of the intended use and operation)	Dual Band Handset
BATTERY/POWER SUPPLY	
MNAUFACTURING DESCRIPTION	Battery - LI-ION 720 mAh Power Supply - Dual Voltage 110-220V
MANUFACTURER	Battery - Desay Power Supply - Astec
VOLTAGE	3.7C nominal

Signature:	
Date	11th May 2006
D of B Serial No	OR615146

TUV Product Service Limited formally certifies that the manufacturer's declaration as reproduced in this report is a true and accurate record of the original received from the applicant.

1.3 BRIEF SUMMARY OF RESULTS

A brief summary of the tests carried out for each configuration are shown below.

FCC CFR 47: Part 15, Subparts B and C, RSS-132 and RSS-133

Configuration 1: A2005sca+ with EU1 Charger					
Test	Spec Clause		Test Description	Result	IMEI Number Tested
	FCC	Industry Canada			
2.1	Part 15.109	RSS-132, 4.6 RSS-133, 6.7 RSS-Gen, 6	Spurious Radiated Emissions	Pass	01086400000081-7
2.2	Part 15.107	RSS-Gen, 7.2.2	Conducted Emissions	Pass	01086400000084-1

Configuration 2: A2005sca+ with EU2 Charger					
Test	Spec Clause		Test Description	Result	IMEI Number Tested
	FCC	Industry Canada			
2.1	Part 15.109	RSS-132, 4.6 RSS-133, 6.7 RSS-Gen, 6	Spurious Radiated Emissions	Pass	01086400000081-7
2.2	Part 15.107	RSS-Gen, 7.2.2	Conducted Emissions	Pass	01086400000084-1

Configuration 3: A2005sca+ with AUS Charger					
Test	Spec Clause		Test Description	Result	IMEI Number Tested
	FCC	Industry Canada			
2.1	Part 15.109	RSS-132, 4.6 RSS-133, 6.7 RSS-Gen, 6	Spurious Radiated Emissions	Pass	01086400000081-7
2.2	Part 15.107	RSS-Gen, 7.2.2	Conducted Emissions	Pass	01086400000084-1

Configuration 4: A2005sca+ with ARG Charger					
Test	Spec Clause		Test Description	Result	IMEI Number Tested
	FCC	Industry Canada			
2.1	Part 15.109	RSS-132, 4.6 RSS-133, 6.7 RSS-Gen, 6	Spurious Radiated Emissions	Pass	01086400000081-7
2.2	Part 15.107	RSS-Gen, 7.2.2	Conducted Emissions	Pass	01086400000084-1

1.3 BRIEF SUMMARY OF RESULTS

Configuration 5: A2005sca+ with US Charger					
Test	Spec Clause		Test Description	Result	IMEI Number Tested
	FCC	Industry Canada			
2.1	Part 15.109	RSS-132, 4.6 RSS-133, 6.7 RSS-Gen, 6	Spurious Radiated Emissions	Pass	01086400000081-7
2.2	Part 15.107	RSS-Gen, 7.2.2	Conducted Emissions	Pass	01086400000084-1

Configuration 6: A2005sca+ with UK Charger					
Test	Spec Clause		Test Description	Result	IMEI Number Tested
	FCC	Industry Canada			
2.1	Part 15.109	RSS-132, 4.6 RSS-133, 6.7 RSS-Gen, 6	Spurious Radiated Emissions	Pass	01086400000081-7
2.2	Part 15.107	RSS-Gen, 7.2.2	Conducted Emissions	Pass	01086400000084-1

Configuration 7 A2005sca+ with DC Charger					
Test	Spec Clause		Test Description	Result	IMEI Number Tested
	FCC	Industry Canada			
2.1	Part 15.109	RSS-132, 4.6 RSS-133, 6.7 RSS-Gen, 6	Spurious Radiated Emissions	Pass	01086400000081-7
	Part 15.107	RSS-Gen, 7.2.2	Conducted Emissions	N/A	

Configuration 8: A2005sca+ with Hands Free Kit					
Test	Spec Clause		Test Description	Result	IMEI Number Tested
	FCC	Industry Canada			
2.1	Part 15.109	RSS-132, 4.6 RSS-133, 6.7 RSS-Gen, 6	Spurious Radiated Emissions	Pass	01086400000081-7
	Part 15.107	RSS-Gen, 7.2.2	Conducted Emissions	N/A	

Configuration 9: A2005sca+ with Data Cable					
Test	Spec Clause		Test Description	Result	IMEI Number Tested
	FCC	Industry Canada			
2.1	Part 15.109	RSS-132, 4.6 RSS-133, 6.7 RSS-Gen, 6	Spurious Radiated Emissions	Pass	01086400000081-7
	Part 15.107	RSS-Gen, 7.2.2	Conducted Emissions	N/A	

1.3 BRIEF SUMMARY OF RESULTS

FCC CFR 47: Part 22, Subpart H and RSS-132

Test	Spec Clause		Test Description	Result	IMEI Number Tested
	FCC	Industry Canada			
2.3	Part 22.913 (a)	RSS-132, 4.4	Effective Radiated Power – Conducted	Pass	01086400000072-6
2.4	Part 22.913 (a)	RSS-132, 4.4	Effective Radiated Power – Radiated	Pass	01086400000084-1
2.5	Part 2.1047(d)	RSS-132, 4.2	Modulation Characteristics	Pass	01086400000072-6
2.6	Part 2.1049, Part 22.917 (b)	RSS-132, 4.5	Occupied Bandwidth	Pass	01086400000072-6
2.7	Part 2.1051, Part 22.905 Part 22.917	RSS-132, 4.5	Spurious Emissions at Antenna Terminals (+/- 1MHz)	Pass	01086400000072-6
2.8	Part 2.1053, Part 22.917	RSS-132, 4.5	Radiated Spurious Emissions	Pass	01086400000084-1
2.9	Part 2.1051, Part 22.917(a)	RSS-132, 4.5	Conducted Spurious Emissions	Pass	01086400000072-6
2.10	Part 2.1055, Part 22.355	RSS-132, 4.3	Frequency Stability Under Temperature Variations	Pass	01086400000072-6
2.11	Part 2.1055, Part 22.355	RSS-132, 4.3	Frequency Stability Under Voltage Variations	Pass	01086400000072-6

1.3 BRIEF SUMMARY OF RESULTS

FCC CFR 47: Part 24, Subpart E and RSS-133

Test	Spec Clause		Test Description	Result	IMEI Number Tested
	FCC	Industry Canada			
2.12	Part 2.1046 Part 24.232 (b)	RSS-133, 4.3/6.4	Maximum Peak Output Power - Radiated	Pass	01086400000084-1
2.13	Part 2.1046 Part 24.232	RSS-133, 4.3/6.4	Maximum Peak Output Power - Conducted	Pass	01086400000072-6
2.14	Part 2.1047(d)	RSS-133,6.2	Modulation Characteristics	Pass	01086400000072-6
2.15	Part 2.1049, Part 24.238 (b)	RSS-133. 2.6/6.5 RSS-Gen 4.4	Occupied Bandwidth	Pass	01086400000072-6
2.16	Part 2.1051, Part 24.229 Part 24.238	RSS-133, 4.4/6.5	Spurious Emissions at Antenna Terminals (+/- 1MHz)	Pass	01086400000072-6
2.17	Part 2.1053, Part 24.238	RSS-133, 4.4/6.5	Radiated Spurious Emissions	Pass	01086400000084-1
2.18	Part 2.1051, Part 24.238 (a)	RSS-133, 4.4/6.5	Conducted Spurious Emissions	Pass	01086400000072-6
2.19	Part 2.1055, Part 24.235	RSS-133, 4.2/6.3	Frequency Stability Under Temperature Variations	Pass	01086400000072-6
2.20	Part 2.1055, Part 24.235	RSS-133, 4.2/6.3	Frequency Stability Under Voltage Variations	Pass	01086400000072-6

1.4 PRODUCT INFORMATION

1.4.1 Technical Description

The Equipment Under Test (EUT) was a SAGEM Communication A2005sca+ Dual Band GSM850 / GSM1900 handset, designed to work with various accessories.

1.4.2 Modes of Operation

Modes of operation of the EUT during testing were as given in section 1.4.3:

Applicable testing was carried out with the EUT transmitting at maximum power or receiving as detailed in section 1.4.3.

Maximum Output Powers and Classes were;

GSM (Class 4) GSM 850 = 32.0dBm
GSM (Class 1) PCS 1900 = 29.3dBm

1.4.3 Test Configuration

The nine Configurations of the SAGEM A2005sca+, detailed below were set up, in turn, for all tests in a Semi-Anechoic Chamber, Screened Enclosure or Test Hall as appropriate and tested in accordance with the specification.

Configuration	Hardware Configuration	Ancillary reference numbers		Operation Mode
		HW	SN	
1	A2005sca+ with EU1 Charger	DA2-3102EUWR-S4	18 910 715-4	GSM
2	A2005sca+ with EU2 Charger	PS49/2088	18 909 159-1	GSM
3	A2005sca+ with AUS Charger	DA2-3102AUWR	18 869 200-0	GSM
4	A2005sca+ with ARG Charger	DA2-3102ARWR	18 867 925-5	GSM
5	A2005sca+ with US Charger	DA2-3102USWR-S4	18 910 719-6	GSM
6	A2005sca+ with UK Charger	DA2-3102UKWR-S4	18 910 718-8	GSM
7	A2005sca+ with DC Charger	CLA-3102	18 871 842 4	GSM
8	A2005sca+ with Handsfree Kit	Version Nr.: EM-SG580G	18 844 809-3	GSM
9	A2005sca+ with Data Cable	Version Nr.: CA9300333	18 867 236 3	GSM

Product information

For all tests Battery Type number: US383450 A7T and Serial Number: 28 707 127-4 was used.

1.4 PRODUCT INFORMATION

1.4.3 Test Configuration

Test Configuration – GSM 850 Mode

850MHz transmitting on the following channels and frequencies;
Bottom Channel 128: 824.2MHz
Middle Channel 189: 836.4MHz
Top Channel 251: 848.8MHz
850MHz receiving on the following channels and frequencies;
Middle Channel 189: 836.40MHz

Test Configuration – GPRS 1900 Mode

1900MHz transmitting on the following channels and frequencies;
Bottom Channel 512: 1850.2MHz
Middle Channel 661: 1880.0MHz
Top Channel 810: 1909.8MHz
1900MHz receiving on the following channels and frequencies;
Middle Channel 661: 1880.0MHz

1.5 TEST CONDITIONS

The EUT was set-up simulating a typical user installation at the Test Laboratory, as listed in Section 1.2 and tested in accordance with the applicable specification.

For all tests, the SAGEM Communication A2005sca+ Dual Band GSM850 / GSM1900 handset was powered via a battery, dc supply or 120V, 60Hz supply via an ac adapter.

1.6 DEVIATIONS FROM THE STANDARD

Not Applicable

1.7 MODIFICATION RECORD

Not Applicable

1.8 ALTERNATIVE TEST SITE

Under our group UKAS Accreditation, TUV Product Service conducted the following tests at our Maplewood, Basingstoke Test Laboratory:

FCC Part 15 B, Industry Canada RSS-132 and RSS-133

2.1 Spurious Radiated Emissions (Enclosure Port)

Product Service

SECTION 2

TEST RESULTS

Limited FCC CFR 47: Parts 15, 22 and 24
and Industry Canada RSS-132 and 133 Testing
of a SAGEM Communication A2005sca+ Dual Band GSM850 / GSM1900 handset

2.1 SPURIOUS RADIATED EMISSIONS

2.1.1 Specification Reference

FCC CFR 47: Part 15 Subpart B, Section 15.109,
Industry Canada RSS-132, 4.6, RSS-133, 6.7 and RSS-Gen, 6

2.1.2 Equipment Under Test

SAGEM A2005sca+

2.1.3 Date of Test

13th April 2006, Maplewood
29th and 30th April 2006, Octagon House

2.1.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.1.5 Test Procedure

Test Performed in accordance with ANSI C63.4 and RSS-212.

A preliminary profile of the Spurious Radiated Emissions was obtained by operating the EUT on a remotely controlled turntable within a semi-anechoic chamber. Measurements of emissions from the EUT were obtained with the Measurement Antenna in both Horizontal and Vertical Polarisations. The profiling produced a list of the worst-case emissions together with the EUT azimuth and antenna polarisation.

Using the information from the preliminary profiling of the EUT. The list of emissions was then confirmed or updated under Alternative Open Site conditions. Emission levels were maximised by adjusting the antenna height, antenna polarisation and turntable azimuth.

Emissions identified within the range 30MHz – 1GHz were then formally measured using a CISPR Quasi-Peak detector.

Emissions identified within the range 1GHz – 4.5GHz for GSM850 and 1GHz - 10GHz for PCS1900 were then formally measured using Peak and Average Detectors, as appropriate.

The measurements were performed at a 3m distance unless otherwise stated.

2.1 SPURIOUS RADIATED EMISSIONS

2.1.6 Test Results

Equipment Designation: Unintentional Radiator.

The EUT met the requirements of FCC CFR 47: Part 15 Subpart B, Section 15.109 and Industry Canada RSS-132, 4.6, RSS-133, 6.7 and RSS-Gen, 6 for Spurious Radiated Emissions (30MHz – 4.5GHz).

Measurements were made with the EUT in GSM 850 Idle Mode.

Configuration 1:
Tested at Octagon House, 29th April.

Frequency	Polarisation	Height	Azimuth	Field Strength		Limit	
MHz		cm	degree	dBµV/m	µV/m	dBµV/m	µV/m
50.28	Vertical	100	12	21.1	11.4	40.0	100.0
54.96	Vertical	100	312	18.2	8.1	40.0	100.0
57.17	Vertical	100	312	22.9	14.0	40.0	100.0
58.17	Vertical	100	312	23.8	15.5	40.0	100.0
59.37	Vertical	100	312	22.6	13.5	40.0	100.0
77.29	Vertical	102	287	16.9	7.0	40.0	100.0

No other emissions were detected with in 25dB of the limit from 30MHz to 4.5GHz.

Configuration 2:
Tested at Octagon House, 29th April.

Frequency	Polarisation	Height	Azimuth	Field Strength		Limit	
MHz		cm	degree	dBµV/m	µV/m	dBµV/m	µV/m
39.41	Vertical	100	340	32.4	41.7	40.0	100.0
41.60	Vertical	100	340	26.6	21.4	40.0	100.0
48.86	Vertical	100	67	21.6	12.0	40.0	100.0
52.28	Vertical	100	67	31.6	38.0	40.0	100.0
54.21	Vertical	100	67	29.5	29.9	40.0	100.0
57.13	Vertical	100	67	24.7	17.2	40.0	100.0

No other emissions were detected with in 25dB of the limit from 30MHz to 4.5GHz.

2.1 SPURIOUS RADIATED EMISSIONS

2.1.6 Test Results

Configuration 3:
Tested at Octagon House, 29th April.

Frequency	Polarisation	Height	Azimuth	Field Strength		Limit	
MHz		cm	degree	dBµV/m	µV/m	dBµV/m	µV/m
50.38	Vertical	100	69	22.7	13.6	40.0	100.0
52.38	Vertical	100	293	17.6	7.6	40.0	100.0
52.75	Vertical	100	347	17.8	7.8	40.0	100.0
53.31	Vertical	100	347	19.2	9.1	40.0	100.0
54.05	Vertical	100	347	20.5	10.6	40.0	100.0
55.28	Vertical	100	347	17.2	7.2	40.0	100.0

No other emissions were detected with in 25dB of the limit from 30MHz to 4.5GHz.

Configuration 4:
Tested at Octagon House, 29th April.

Frequency	Polarisation	Height	Azimuth	Field Strength		Limit	
MHz		cm	degree	dBµV/m	µV/m	dBµV/m	µV/m
50.41	Vertical	100	357	21.7	12.2	40.0	100.0
54.47	Vertical	100	293	26.1	20.2	40.0	100.0
56.18	Vertical	100	293	29.0	28.2	40.0	100.0
57.20	Vertical	100	293	29.4	29.5	40.0	100.0
59.04	Vertical	100	293	27.9	24.8	40.0	100.0
82.04	Vertical	100	207	19.7	9.7	40.0	100.0

No other emissions were detected with in 25dB of the limit from 30MHz to 4.5GHz.

Configuration 5:
Tested at Octagon House, 29th April and 30th April.

Frequency	Polarisation	Height	Azimuth	Field Strength		Limit	
MHz		cm	degree	dBµV/m	µV/m	dBµV/m	µV/m
50.40	Vertical	100	298	20.1	10.1	40.0	100.0
54.78	Vertical	100	256	27.6	24.0	40.0	100.0
60.82	Vertical	100	240	26.9	22.1	40.0	100.0
67.95	Vertical	100	240	26.9	22.1	40.0	100.0
73.14	Vertical	100	240	30.5	33.5	40.0	100.0
72.36	Vertical	100	240	29.5	29.9	40.0	100.0

No other emissions were detected with in 25dB of the limit from 30MHz to 4.5GHz.

2.1 SPURIOUS RADIATED EMISSIONS

2.1.6 Test Results

Configuration 6:
Tested at Octagon House, 30th April.

Frequency	Polarisation	Height	Azimuth	Field Strength		Limit	
MHz		cm	degree	dBµV/m	µV/m	dBµV/m	µV/m
52.95	Vertical	100	74	31.3	36.7	40.0	100.0
54.06	Vertical	100	74	32.0	39.8	40.0	100.0
54.49	Vertical	100	326	27.3	23.2	40.0	100.0
56.17	Vertical	100	326	32.0	39.8	40.0	100.0
56.87	Vertical	100	326	31.1	35.9	40.0	100.0
58.41	Vertical	100	326	30.5	33.5	40.0	100.0

No other emissions were detected with in 25dB of the limit from 30MHz to 4.5GHz.

Configuration 7:
Tested at Octagon House, 30th April.

Frequency	Polarisation	Height	Azimuth	Field Strength		Limit	
MHz		Cm	degree	dBµV/m	µV/m	dBµV/m	µV/m
30.49	Vertical	100	109	24.3	16.4	40.0	100.0
31.09	Vertical	100	109	24.0	15.8	40.0	100.0
34.26	Vertical	100	163	22.9	14.0	40.0	100.0
48.49	Vertical	100	262	17.4	7.4	40.0	100.0
50.22	Vertical	100	313	20.9	11.1	40.0	100.0
50.45	Vertical	100	313	20.2	10.2	40.0	100.0

No other emissions were detected with in 25dB of the limit from 30MHz to 4.5GHz.

Configuration 8:
Tested at Octagon House, 30th April.

Frequency	Polarisation	Height	Azimuth	Field Strength		Limit	
MHz		cm	degree	dBµV/m	µV/m	dBµV/m	µV/m
30.57	Vertical	100	120	19.0	8.9	40.0	100.0
34.21	Vertical	100	263	20.1	10.1	40.0	100.0
48.49	Vertical	100	271	18.6	8.5	40.0	100.0
48.85	Vertical	100	276	18.5	8.4	40.0	100.0
50.24	Vertical	100	306	20.1	10.1	40.0	100.0
50.37	Vertical	100	306	20.0	10.0	40.0	100.0

No other emissions were detected with in 25dB of the limit from 30MHz to 4.5GHz.

2.1 SPURIOUS RADIATED EMISSIONS

2.1.6 Test Results

Configuration 9:
Tested at Octagon House, 30th April.

Frequency	Polarisation	Height	Azimuth	Field Strength		Limit	
MHz		cm	degree	dBµV/m	µV/m	dBµV/m	µV/m
30.87	Vertical	100	63	18.7	8.6	40.0	100.0
34.72	Vertical	100	260	17.0	7.1	40.0	100.0
50.24	Vertical	100	297	20.8	11.0	40.0	100.0
50.46	Vertical	100	297	19.5	9.4	40.0	100.0
48.27	Vertical	100	112	17.8	7.8	40.0	100.0
48.52	Vertical	100	112	17.2	7.2	40.0	100.0

No other emissions were detected with in 25dB of the limit from 30MHz to 4.5GHz.

2.1 SPURIOUS RADIATED EMISSIONS

2.1.6 Test Results

Equipment Designation: Unintentional Radiator.

The EUT met the requirements of FCC CFR 47: Part 15 Subpart B, Section 15.109 and Industry Canada RSS-132, 4.6, RSS-133, 6.7 and RSS-Gen, 6 for Spurious Radiated Emissions (30MHz – 10GHz).

Measurements were made with the EUT in GSM 1900 Idle Mode.

Configuration 1:
Tested at Maplewood, 13th April.

Frequency	Polarisation	Height	Azimuth	Field Strength		Limit	
MHz		cm	degree	dBµV/m	µV/m	dBµV/m	µV/m
30.50*	Vertical	-	-	22.37	13.1	40.0	100.0
60.68	Vertical	100	46	15.1	5.7	40.0	100.0
83.44	Vertical	100	245	21.3	11.6	40.0	100.0
227.00*	Vertical	-	-	18.37	8.3	46.0	200.0
419.00*	Vertical	-	-	26.81	21.9	46.0	200.0
611.0*	Vertical	-	-	31.25	36.5	46.0	200.0

* These emissions are noise floor measurements.

Configuration 2:
Tested at Maplewood, 13th April.

Frequency	Polarisation	Height	Azimuth	Field Strength		Limit	
MHz		cm	degree	dBµV/m	µV/m	dBµV/m	µV/m
30.68	Vertical	100	320	28.4	26.3	40.0	100.0
37.32	Vertical	100	0	23.0	14.1	40.0	100.0
42.96	Vertical	100	0	24.2	16.2	40.0	100.0
57.92	Vertical	100	0	29.6	30.2	40.0	100.0
55.96	Vertical	100	40	29.0	28.2	40.0	100.0
76.8	Vertical	100	230	20.5	10.6	40.0	100.0

No other emissions were detected with in 25dB of the limit from 30MHz to 10GHz.

2.1 SPURIOUS RADIATED EMISSIONS

2.1.6 Test Results

Configuration 3:
Tested at Maplewood, 13th April.

Frequency	Polarisation	Height	Azimuth	Field Strength		Limit	
MHz		cm	degree	dBµV/m	µV/m	dBµV/m	µV/m
35.00*	Vertical	-	-	22.4	13.2	40.0	100.0
57.16	Vertical	100	40	21.2	11.5	40.0	100.0
60.88	Vertical	100	40	21.2	11.5	40.0	100.0
154.96	Vertical	100	80	22.2	12.9	43.52	100.0
227.00*	Vertical	-	-	18.4	8.3	46.0	200.0
419.00*	Vertical	-	-	26.8	21.9	46.0	200.0

Configuration 4:
Tested at Maplewood, 13th April.

Frequency	Polarisation	Height	Azimuth	Field Strength		Limit	
MHz		cm	degree	dBµV/m	µV/m	dBµV/m	µV/m
35.00*	Vertical	-	-	22.4	13.2	40.0	100.0
58.52	Vertical	100	37	30.9	35.1	40.0	100.0
77.64	Vertical	100	268	19.6	9.5	40.0	100.0
227.00*	Vertical	-	-	18.4	8.3	46.0	200.0
419.00*	Vertical	-	-	26.8	21.9	46.0	200.0
611.00*	Vertical	-	-	31.3	36.7	46.0	200.0

* These emissions are noise floor measurements.

2.1 SPURIOUS RADIATED EMISSIONS

2.1.6 Test Results

Configuration 5:
Tested at Maplewood, 13th April.

Frequency	Polarisation	Height	Azimuth	Field Strength		Limit	
MHz		cm	degree	dBµV/m	µV/m	dBµV/m	µV/m
35.00*	Vertical	-	-	22.4	13.2	40.0	100.0
50.44	Vertical	100	0	18.5	8.4	40.0	100.0
57.00	Vertical	100	38	33.0	44.7	40.0	100.0
74.60	Vertical	100	285	16.9	7.0	40.0	100.0
227.00*	Vertical	-	-	18.4	8.3	46.0	200.0
419.00*	Vertical	-	-	26.8	21.9	46.0	200.0

Configuration 6:
Tested at Maplewood, 13th April.

Frequency	Polarisation	Height	Azimuth	Field Strength		Limit	
MHz		cm	degree	dBµV/m	µV/m	dBµV/m	µV/m
35.00*	Vertical	-	-	22.4	13.2	40.0	100.0
58.76	Vertical	100	40	33.1	45.2	40.0	100.0
227.00*	Vertical	-	-	18.4	8.3	46.0	200.0
419.00*	Vertical	-	-	26.8	21.9	46.0	200.0
611.00*	Vertical	-	-	31.3	36.7	46.0	200.0
995.00*	Vertical	-	-	34.5	53.1	54.0	500.0

Configuration 7:
Tested at Maplewood, 13th April.

Frequency	Polarisation	Height	Azimuth	Field Strength		Limit	
MHz		cm	degree	dBµV/m	µV/m	dBµV/m	µV/m
33.8	Vertical	100	0	24.9	17.6	40.0	100.0
35.00*	Vertical	-	-	22.4	13.2	40.0	100.0
227.00*	Vertical	-	-	18.4	8.3	46.0	200.0
419.00*	Vertical	-	-	26.8	21.9	46.0	200.0
611.00*	Vertical	-	-	31.3	36.7	46.0	200.0
995.00*	Vertical	-	-	34.5	53.1	54.0	500.0

* These emissions are noise floor measurements.

2.1 SPURIOUS RADIATED EMISSIONS

2.1.6 Test Results

Configuration 8:
Tested at Maplewood, 13th April.

Frequency	Polarisation	Height	Azimuth	Field Strength		Limit	
MHz		cm	degree	dBµV/m	µV/m	dBµV/m	µV/m
35.00*	Vertical	-	-	22.4	13.2	40.0	100.0
107.00	Vertical	100	0	21.9	12.5	43.52	100.0
227.00*	Vertical	-	-	18.4	8.3	46.0	200.0
419.00*	Vertical	-	-	26.8	21.9	46.0	200.0
611.00*	Vertical	-	-	31.3	36.7	46.0	200.0
995.00*	Vertical	-	-	34.5	53.1	54.0	500.0

Configuration 9:
Tested at Maplewood, 13th April.

Frequency	Polarisation	Height	Azimuth	Field Strength		Limit	
MHz		cm	degree	dBµV/m	µV/m	dBµV/m	µV/m
35.00*	Vertical	-	-	22.4	13.2	40.0	100.0
67.40	Vertical	100	40	19.1	9.0	40.0	100.0
227.00*	Vertical	-	-	18.4	8.3	46.0	200.0
419.00*	Vertical	-	-	26.8	21.9	46.0	200.0
611.00*	Vertical	-	-	31.3	36.7	46.0	200.0
995.00*	Vertical	-	-	34.5	53.1	54.0	500.0

* These emissions are noise floor measurements.

2.2 CONDUCTED EMISSIONS ON POWER PORTS

2.2.1 Specification Reference

FCC CFR 47: Part 15 Subpart C, Section 15.107
Industry Canada RSS-Gen, 7.2.2

2.2.2 Equipment Under Test

SAGEM A2005sca+

2.2.3 Date of Test

12th and 13th April 2006, Octagon House

2.2.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.2.5 Test Procedure

Test performed in accordance with ANSI C63.4 and RSS-212.

Conducted Emission Measurements were undertaken within the semi-anechoic chamber. Emissions were measured on the Live and Neutral Lines in turn.

Emissions were formally measured using a Quasi-Peak and Average Detectors, which meet the CISPR requirements. The details of the worst-case emissions for the Live and Neutral Lines for the configurations tested are shown in the following tables.

The EUT was supplied from a 120V, 60Hz supply.

2.2 CONDUCTED EMISSIONS ON POWER PORTS

2.2.6 Test Results

The EUT met the Class B requirements of FCC CFR 47: Part 15 Subpart C, Section 15.107 and Industry Canada RSS-Gen, 7.2.2 for Conducted Emissions on the Live and Neutral Lines.

Measurements were made with the EUT in GSM 850 Idle Mode.

Configuration 1:

EUT Transmitting on Middle Channel (836.4MHz) – Live Line

Frequency MHz	Quasi-Peak Level dBµV	Quasi-Peak Limit dBµV	Average Level dBµV	Average Limit dBµV
0.159	51.6	65.5	34.3	55.5
0.170	55.4	65.0	31.9	55.0
0.420	43.2	57.4	22.5	47.4
0.443	46.7	57.0	23.0	47.0
0.646	38.5	56.0	24.9	46.0
0.780	40.4	56.0	26.7	46.0

The margin between the specification requirements and all other emissions were 17.3dB or more below the specified Quasi-Peak limit and -17.9dB or more below the Average limit.

EUT Transmitting on Middle Channel (836.4MHz) – Neutral Line

Frequency MHz	Quasi-Peak Level dBµV	Quasi-Peak Limit dBµV	Average Level dBµV	Average Limit dBµV
0.151	59.6	65.9	41.7	55.9
0.192	58.2	63.9	39.8	53.9
0.193	58.1	63.9	39.8	53.9
0.240	55.7	62.1	36.6	52.1
0.241	55.7	62.1	36.9	52.1
0.288	52.3	60.6	34.2	50.6

The margin between the specification requirements and all other emissions were 8.2dB or more below the specified Quasi-peak limit and 15.7dB or more below the specified Average limit.

2.2 CONDUCTED EMISSIONS ON POWER PORTS

2.2.6 Test Results - continued

Configuration 2:

EUT Transmitting on Middle Channel (836.4MHz) – Live Line

Frequency MHz	Quasi-Peak Level dBµV	Quasi-Peak Limit dBµV	Average Level dBµV	Average Limit dBµV
0.205	43.8	63.4	20.0	53.4
0.285	39.6	60.7	4.7	50.7
1.374	36.6	56.0	15.7	46.0
1.942	36.3	56.0	18.9	46.0
3.279	36.5	56.0	19.9	46.0
3.668	36.8	56.0	31.1	46.0

The margin between the specification requirements and all other emissions were 21.1dB or more below the specified Quasi-Peak limit and -15.8dB or more below the Average limit.

EUT Transmitting on Middle Channel (836.4MHz) – Neutral Line

Frequency MHz	Quasi-Peak Level dBµV	Quasi-Peak Limit dBµV	Average Level dBµV	Average Limit dBµV
0.161	50.9	65.4	39.5	55.4
2.001	39.1	56.0	29.8	46.0
2.317	38.9	56.0	28.9	46.0
2.444	40.0	56.0	29.0	46.0
3.520	39.7	56.0	26.9	46.0
3.643	40.2	56.0	27.1	46.0

The margin between the specification requirements and all other emissions were 16.9dB or more below the specified Quasi-peak limit and 16.3dB or more below the specified Average limit.

2.2 CONDUCTED EMISSIONS ON POWER PORTS

2.2.6 Test Results - continued

Configuration 3:

EUT Transmitting on Middle Channel (836.4MHz) – Live Line

Frequency MHz	Quasi-Peak Level dBµV	Quasi-Peak Limit dBµV	Average Level dBµV	Average Limit dBµV
0.161	49.5	65.4	33.3	55.4
0.177	47.3	64.6	27.9	54.6
0.198	42.2	63.7	22.5	53.7
0.408	42.5	57.7	27.0	47.7
0.443	40.7	57.0	21.9	47.0
0.657	40.4	56.0	27.1	46.0

The margin between the specification requirements and all other emissions were 21.4dB or more below the specified Quasi-Peak limit and 24.3dB or more below the Average limit.

EUT Transmitting on Middle Channel (836.4MHz) – Neutral Line

Frequency MHz	Quasi-Peak Level dBµV	Quasi-Peak Limit dBµV	Average Level dBµV	Average Limit dBµV
0.158	56.0	65.6	32.8	55.6
0.183	53.3	64.3	38.8	54.3
0.283	49.1	60.7	29.5	50.7
0.369	45.3	58.5	27.2	48.5
0.392	46.7	58.0	21.4	48.0
0.464	44.7	56.6	21.2	46.6

The margin between the specification requirements and all other emissions were 11.7dB or more below the specified Quasi-peak limit and 16.7dB or more below the specified Average limit.

2.2 CONDUCTED EMISSIONS ON POWER PORTS

2.2.6 **Test Results** - continued

Configuration 4:

EUT Transmitting on Middle Channel (836.4MHz) – Live Line

Frequency MHz	Quasi-Peak Level dBµV	Quasi-Peak Limit dBµV	Average Level dBµV	Average Limit dBµV
0.157	51.1	65.6	35.3	55.6
0.164	56.0	65.3	32.6	55.3
0.229	51.6	62.5	21.2	52.5
0.344	47.9	59.1	21.8	49.1
0.361	45.6	58.7	26.8	48.7
0.443	48.0	57.0	22.5	47.0

The margin between the specification requirements and all other emissions were 14.6dB or more below the specified Quasi-Peak limit and 16.0dB or more below the Average limit.

EUT Transmitting on Middle Channel (836.4MHz) – Neutral Line

Frequency MHz	Quasi-Peak Level dBµV	Quasi-Peak Limit dBµV	Average Level dBµV	Average Limit dBµV
0.162	55.7	65.4	37.7	55.4
0.163	50.3	65.3	39.2	55.3
0.181	51.6	64.4	44.8	54.4
0.435	47.7	57.2	22.5	57.2
0.451	41.7	56.9	22.5	46.9
0.727	39.6	56.0	24.2	46.0

The margin between the specification requirements and all other emissions were 16.2dB or more below the specified Quasi-peak limit and 13.1dB or more below the specified Average limit.

2.2 CONDUCTED EMISSIONS ON POWER PORTS

2.2.6 **Test Results** - continued

Configuration 5:

EUT Transmitting on Middle Channel (836.4MHz) – Live Line

Frequency MHz	Quasi-Peak Level dBµV	Quasi-Peak Limit dBµV	Average Level dBµV	Average Limit dBµV
0.151	50.3	66.0	38.1	56.0
0.166	49.1	65.2	29.8	55.2
0.182	47.4	64.4	37.2	54.4
0.183	47.1	64.4	37.2	54.4
0.363	45.1	58.7	21.8	48.7
0.462	41.8	56.7	25.8	46.7

The margin between the specification requirements and all other emissions were 17.2dB or more below the specified Quasi-Peak limit and 22.1dB or more below the Average limit.

EUT Transmitting on Middle Channel (836.4MHz) – Neutral Line

Frequency MHz	Quasi-Peak Level dBµV	Quasi-Peak Limit dBµV	Average Level dBµV	Average Limit dBµV
0.161	54.8	65.4	37.1	55.4
0.174	53.4	64.8	33.5	54.6
0.326	46.3	58.7	26.8	48.7
0.358	45.7	58.8	26.8	48.8
0.459	46.6	56.7	28.5	46.7
0.775	42.8	56.0	26.3	46.0

The margin between the specification requirements and all other emissions were 13.3dB or more below the specified Quasi-peak limit and 16.6dB or more below the specified Average limit.

2.2 CONDUCTED EMISSIONS ON POWER PORTS

2.2.6 **Test Results** - continued

Configuration 6:

EUT Transmitting on Middle Channel (836.4MHz) – Live Line

Frequency MHz	Quasi-Peak Level dBµV	Quasi-Peak Limit dBµV	Average Level dBµV	Average Limit dBµV
0.157	56.5	65.6	33.3	55.6
0.178	51.2	64.6	32.5	54.6
0.197	51.0	63.7	30.5	53.7
0.348	45.5	59.0	21.1	49.0
0.446	43.6	56.9	23.0	46.9
0.467	41.2	56.6	26.9	46.6

The margin between the specification requirements and all other emissions were 15.2dB or more below the specified Quasi-Peak limit and 19.8dB or more below the Average limit.

EUT Transmitting on Middle Channel (836.4MHz) – Neutral Line

Frequency MHz	Quasi-Peak Level dBµV	Quasi-Peak Limit dBµV	Average Level dBµV	Average Limit dBµV
0.154	51.6	65.8	33.9	55.8
0.191	46.7	64.0	25.0	54.0
0.350	40.6	59.0	28.1	49.0
0.413	44.9	57.6	21.9	47.6
0.446	47.6	56.6	23.0	46.6
0.467	41.4	56.6	21.9	46.6

The margin between the specification requirements and all other emissions were 18.3dB or more below the specified Quasi-peak limit and 22.2dB or more below the specified Average limit.

2.2 CONDUCTED EMISSIONS ON POWER PORTS

2.2.6 **Test Results** - continued

Measurements were made with the EUT in GSM 1900 Idle Mode.

Configuration 1:

EUT Transmitting on Middle Channel (1880.0MHz) – Live Line

Frequency MHz	Quasi-Peak Level dBµV	Quasi-Peak Limit dBµV	Average Level dBµV	Average Limit dBµV
0.157	54.7	65.6	36.1	55.6
0.173	49.8	64.8	27.3	54.8
0.181	48.7	64.4	33.9	54.4
0.408	46.0	57.7	22.0	47.7
0.415	42.2	57.5	21.9	47.5
0.456	42.1	56.8	22.5	46.8

The margin between the specification requirements and all other emissions were 15.2dB or more below the specified Quasi-Peak limit and 15.8dB or more below the Average limit.

EUT Transmitting on Middle Channel (1880.0MHz) – Neutral Line

Frequency MHz	Quasi-Peak Level dBµV	Quasi-Peak Limit dBµV	Average Level dBµV	Average Limit dBµV
0.157	51.5	65.6	33.3	55.6
0.171	49.9	64.9	27.3	54.9
0.189	47.1	64.1	25.0	54.1
0.413	45.9	57.6	21.9	47.6
0.441	45.9	57.0	23.0	47.0
0.470	39.6	56.5	16.2	46.5

The margin between the specification requirements and all other emissions were 16.8dB or more below the specified Quasi-peak limit and 22.0dB or more below the specified Average limit.

2.2 CONDUCTED EMISSIONS ON POWER PORTS

2.2.6 Test Results - continued

Configuration 2:

EUT Transmitting on Middle Channel (1880.0MHz) – Live Line

Frequency MHz	Quasi-Peak Level dBµV	Quasi-Peak Limit dBµV	Average Level dBµV	Average Limit dBµV
0.205	36.0	63.4	31.6	53.4
1.571	31.9	56.0	17.6	46.0
2.237	28.6	56.0	21.9	46.0
2.516	30.0	56.0	26.3	46.0
2.781	28.5	56.0	28.9	46.0
3.038	28.6	56.0	24.2	46.0

The margin between the specification requirements and all other emissions were 27.4dB or more below the specified Quasi-Peak limit and 14.8dB or more below the Average limit.

EUT Transmitting on Middle Channel (1880.0MHz) – Neutral Line

Frequency MHz	Quasi-Peak Level dBµV	Quasi-Peak Limit dBµV	Average Level dBµV	Average Limit dBµV
0.167	34.8	65.1	16.9	55.1
0.184	32.6	64.3	24.7	54.3
2.185	24.7	56.0	26.3	46.0
2.591	31.7	56.0	15.9	46.0
3.458	31.9	56.0	27.6	46.0
3.668	31.8	56.0	24.3	46.0

The margin between the specification requirements and all other emissions were 31.7dB or more below the specified Quasi-peak limit and 19.0dB or more below the specified Average limit.

2.2 CONDUCTED EMISSIONS ON POWER PORTS

2.2.6 **Test Results** - continued

Configuration 3:

EUT Transmitting on Middle Channel (1880.0MHz) – Live Line

Frequency MHz	Quasi-Peak Level dBµV	Quasi-Peak Limit dBµV	Average Level dBµV	Average Limit dBµV
0.163	49.3	65.3	31.1	55.3
0.185	45.5	64.3	24.1	54.3
0.352	46.7	58.9	21.1	48.9
0.454	46.1	56.8	21.9	46.8
0.501	41.6	56.0	20.5	46.0
0.638	37.8	56.0	21.5	46.0

The margin between the specification requirements and all other emissions were 18.8dB or more below the specified Quasi-Peak limit and 21.1dB or more below the Average limit.

EUT Transmitting on Middle Channel (1880.0MHz) – Neutral Line

Frequency MHz	Quasi-Peak Level dBµV	Quasi-Peak Limit dBµV	Average Level dBµV	Average Limit dBµV
0.163	49.4	65.3	30.6	55.3
0.354	39.0	58.9	16.1	48.9
0.448	40.2	56.9	21.2	46.9
0.650	33.4	56.0	24.6	46.0
0.718	34.5	56.0	25.8	46.0
0.775	34.7	56.0	15.5	46.0

The margin between the specification requirements and all other emissions were 22.4dB or more below the specified Quasi-peak limit and 21.4dB or more below the specified Average limit.

2.2 CONDUCTED EMISSIONS ON POWER PORTS

2.2.6 Test Results - continued

Configuration 4:

EUT Transmitting on Middle Channel (1880.0MHz) – Live Line

Frequency MHz	Quasi-Peak Level dBµV	Quasi-Peak Limit dBµV	Average Level dBµV	Average Limit dBµV
0.152	51.5	65.9	33.0	55.9
0.163	50.3	65.3	35.1	55.3
0.179	51.4	64.5	33.5	54.5
0.425	43.5	57.3	22.5	47.3
0.448	42.3	56.9	27.3	46.9
0.813	38.4	56.0	12.9	46.0

The margin between the specification requirements and all other emissions were 17.4dB or more below the specified Quasi-Peak limit and 20.7dB or more below the Average limit.

EUT Transmitting on Middle Channel (1880.0MHz) – Neutral Line

Measurements were made with the EUT in RLAN Mode 1.

Frequency MHz	Quasi-Peak Level dBµV	Quasi-Peak Limit dBµV	Average Level dBµV	Average Limit dBµV
0.157	56.6	65.6	35.7	55.6
0.166	55.8	65.2	32.5	55.2
0.190	57.9	64.0	39.8	54.0
0.233	51.6	62.3	36.9	52.3
0.282	52.4	60.8	34.7	50.8
0.428	47.2	57.3	29.3	47.3

The margin between the specification requirements and all other emissions were 10.7dB or more below the specified Quasi-peak limit and 19.6dB or more below the specified Average limit.

2.2 CONDUCTED EMISSIONS ON POWER PORTS

2.2.6 **Test Results** - continued

Configuration 5:

EUT Transmitting on Middle Channel (1880.0MHz) – Live Line

Frequency MHz	Quasi-Peak Level dBµV	Quasi-Peak Limit dBµV	Average Level dBµV	Average Limit dBµV
0.162	54.4	65.4	33.7	55.4
0.194	50.4	63.9	33.5	53.9
0.334	46.2	59.4	24.4	49.4
0.352	46.2	58.9	26.1	48.9
0.448	46.4	56.9	25.8	46.9
0.504	39.8	56.0	21.2	46.0

The margin between the specification requirements and all other emissions were 16.0dB or more below the specified Quasi-Peak limit and 22.8dB or more below the Average limit.

EUT Transmitting on Middle Channel (1880.0MHz) – Neutral Line

Frequency MHz	Quasi-Peak Level dBµV	Quasi-Peak Limit dBµV	Average Level dBµV	Average Limit dBµV
0.153	34.6	65.8	55.4	55.8
0.168	33.0	65.1	53.7	55.1
0.179	34.5	64.5	52.5	54.5
0.189	35.0	64.1	51.3	54.1
0.435	27.6	57.2	46.3	47.2
0.473	25.8	57.1	44.3	47.1

The margin between the specification requirements and all other emissions were 12.8dB or more below the specified Quasi-peak limit and 18.8dB or more below the specified Average limit.

2.2 CONDUCTED EMISSIONS ON POWER PORTS

2.2.6 **Test Results** - continued

Configuration 6:

EUT Transmitting on Middle Channel (1880.0MHz) – Live Line

Frequency MHz	Quasi-Peak Level dBµV	Quasi-Peak Limit dBµV	Average Level dBµV	Average Limit dBµV
0.157	56.1	65.6	34.4	55.6
0.162	55.7	65.4	34.3	55.4
0.184	52.8	64.3	36.6	54.3
0.361	45.5	58.7	27.5	48.7
0.451	47.5	56.9	26.2	46.9
0.476	44.8	56.4	25.4	46.4

The margin between the specification requirements and all other emissions were 13.2dB or more below the specified Quasi-Peak limit and 19.2dB or more below the Average limit.

EUT Transmitting on Middle Channel (1880.0MHz) – Neutral Line

Frequency MHz	Quasi-Peak Level dBµV	Quasi-Peak Limit dBµV	Average Level dBµV	Average Limit dBµV
0.154	56.4	65.8	34.5	55.8
0.163	55.5	65.3	34.2	55.3
0.191	51.8	64.0	35.8	54.0
0.352	46.6	58.9	24.9	48.9
0.454	47.3	56.8	25.4	46.8
0.487	42.8	56.2	25.4	46.2

The margin between the specification requirements and all other emissions were 13.4dB or more below the specified Quasi-peak limit and 16.9dB or more below the specified Average limit.

2.3 EFFECTIVE RADIATED POWER (CONDUCTED)

2.3.1 Specification Reference

FCC CFR 47: Part 22 Subpart H, Section 22.913(a)
Industry Canada RSS-132, 4.4

2.3.2 Equipment Under Test

SAGEM A2005sca+

2.3.3 Date of Test

10th April 2006

2.3.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.3.5 Test Procedure

Using a spectrum analyser and attenuator(s), the output power of the EUT was measured at the antenna terminals. The EUT supports a GMSK modulation scheme. The carrier power was measured with GMSK modulation and performed with TS3 active.

The spectrum analyser RBW and VBW were set to 1MHz and the path loss measured and entered as a reference level offset.

2.3.6 Test Results

The EUT complies with CFR 47 22.913(a) and Industry Canada RSS-132, 4.4. The EUT does not exceed 6.3W at the measured frequencies.

Maximum Power – GMSK 850 Mode

Frequency MHz	Output Power dBm	Path Loss dB	Result dBm	Result W
824.20	15.08	17.5	32.58	1.81
836.40	15.27	17.5	32.77	1.89
848.80	15.19	17.4	32.59	1.82

Limit for FCC 22.913(a)	<7W
Limit for RSS-132	<6.3W

2.4 EFFECTIVE RADIATED POWER

2.4.1 Specification Reference

FCC CFR 47: Part 22 Subpart H, Section 22.913(a)
Industry Canada RSS-132, 4.4

2.4.2 Equipment Under Test

SAGEM A2005sca+

2.4.3 Date of Test

11th April 2006

2.4.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.4.5 Test Procedure

Test Performed in accordance with ANSI C63.4.

The Spectrum Analyser was tuned to the test frequency. The device Output Power setting was controlled as specified in the Product Information, Section 1.5 of this document. The device was then rotated through 360 degrees until the highest power level was observed in both horizontal and vertical polarisation. The device was then replaced with a substitution antenna, who's input signal the antenna was adjusted until the received level matched that of the previously detected emission.

2.4.6 Test Results

The EUT met the requirements of FCC CFR 47: Part 22 Subpart H, Section 22.913(a) and Industry Canada RSS-132, 4.4 for Effective Radiated Power.

Measurements were made with the EUT in GSM 850 Mode.

Frequency (MHz)	Result ERP (dBm)	Result ERP (W)
824.2	30.9	1.23
836.4	31.4	1.38
848.8	30.9	1.23
Limit	<+38.45dBm or <7W	

2.5 MODULATION CHARACTERISTICS

2.5.1 Specification Reference

FCC CFR 47: Part 22 Subpart E, Section 2.1047(d)
Industry Canada RSS-132, 4.2

2.5.2 Equipment Under Test

SAGEM A2005sca+

2.5.3 Date of Test

10th April 2006

2.5.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.5.5 Test Procedure

Two views are shown for the GMSK mode of operation. One view shows the active slot(s) over a complete screen. The other view shows the active slot 5, over a complete frame.

2.5 MODULATION CHARACTERISTICS

2.5.5 Modulation Description

Modulation format for GMSK

Modulating symbol rate
The modulating symbol rate is 1/T = 1 625/6 ksymb/s (i.e. approximately 270.833 ksymb/s), which corresponds to 1 625/6 kbit/s (i.e. 270.833 kbit/s). T is the symbol period.

Start and stop of the burst
Before the first bit of the bursts as defined in 3GPP TS 45.002 [3] enters the modulator, the modulator has an internal state as if a modulating bit stream consisting of consecutive ones (di = 1) had entered the differential encoder. Also after the last bit of the time slot, the modulator has an internal state as if a modulating bit stream consisting of consecutive ones (di = 1) had continued to enter the differential encoder. These bits are called dummy bits and define the start and the stop of the active and the useful part of the burst as illustrated in figure 1. Nothing is specified about the actual phase of the modulator output signal outside the useful part of the burst.

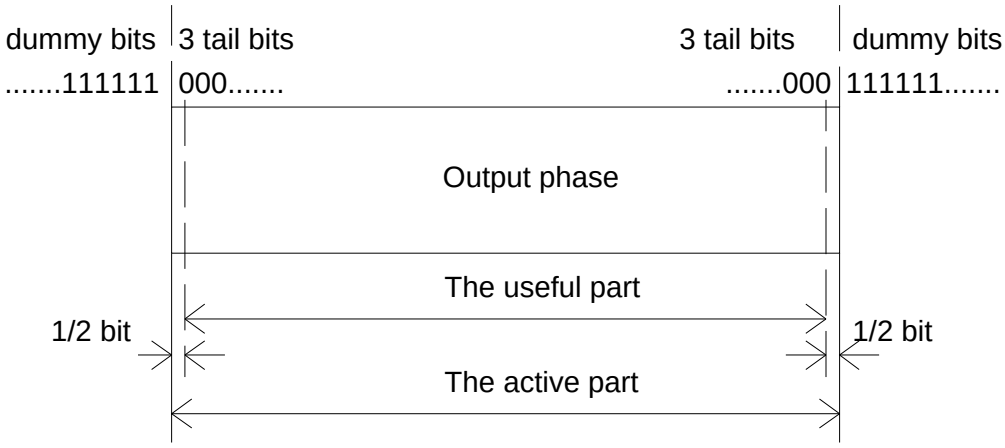


Figure 1: Relation between active part of burst, tail bits and dummy bits. For the normal burst the useful part lasts for 147 modulating bits

Differential encoding

Each data value $d_i = [0,1]$ is differentially encoded. The output of the differential encoder is:

$$\bar{d}_i = d_i \oplus d_{i-1} \qquad (d_i \in \{0,1\})$$

where $\oplus$ denotes modulo 2 addition.
The modulating data value α_i input to the modulator is:

$$\alpha_i = 1 - 2\bar{d}_i \qquad (\alpha_i \in \{-1,+1\})$$

2.5 MODULATION CHARACTERISTICS

2.5.5 Modulation Description - continued

Filtering

The modulating data values α_i as represented by Dirac pulses excite a linear filter with impulse response defined by:

$$g(t) = h(t) * rect\left(\frac{t}{T}\right)$$

where the function *rect(x)* is defined by:

$$rect\left(\frac{t}{T}\right) = \frac{1}{T} \qquad for\ |t| < \frac{T}{2}$$

$$rect\left(\frac{t}{T}\right) = 0 \qquad otherwise$$

and * means convolution. *h(t)* is defined by:

$$h(t) = \frac{\exp\left(\frac{-t^2}{2\delta^2 T^2}\right)}{\sqrt{(2\pi)}\ .\ \delta T}$$

where $\delta = \frac{\sqrt{\ln(2)}}{2\pi BT} \qquad and\ BT = 0.3$

where B is the 3 dB bandwidth of the filter with impulse response *h(t)*. This theoretical filter is associated with tolerances defined in 3GPP TS 45.005 [4].

Output phase

The phase of the modulated signal is:

$$\varphi(t') = \sum_i \alpha_i \pi h \int_{-\infty}^{t'-iT} g(u)du$$

where the modulating index *h* is 1/2 (maximum phase change in radians is $\pi/2$ per data interval). The time reference *t' = 0* is the start of the active part of the burst as shown in figure 1. This is also the start of the bit period of bit number 0 (the first tail bit) as defined in 3GPP TS 45.002 [2].

Modulation

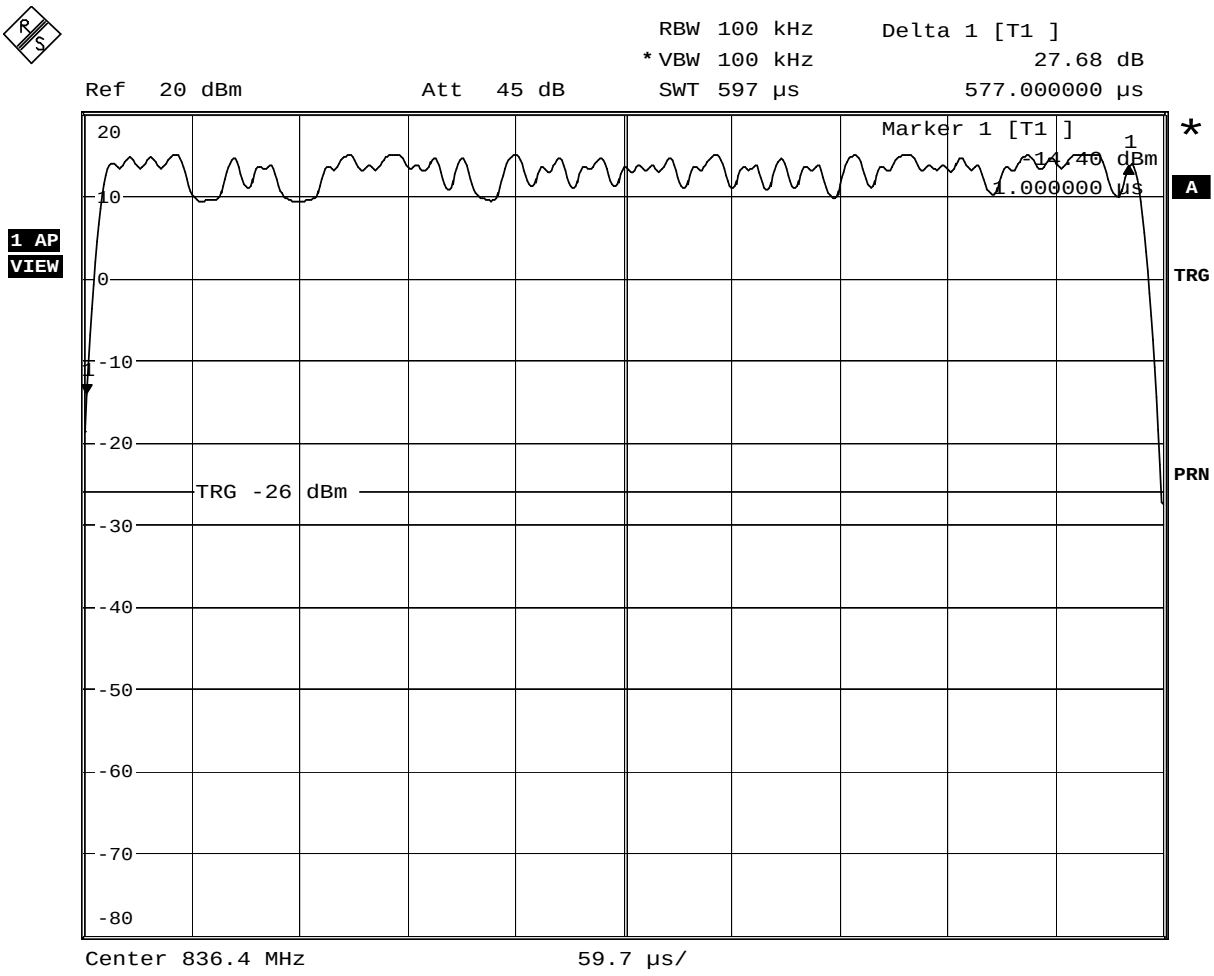
The modulated RF carrier, except for start and stop of the TDMA burst may therefore be expressed as:

$$x(t') = \sqrt{\frac{2E_c}{T}}\ .\ \cos(2\pi f_0 t' + \varphi(t') + \varphi_0)$$

where E_c is the energy per modulating bit, f_0 is the centre frequency and φ_0 is a random phase and is constant during one burst.

2.5 MODULATION CHARACTERISTICS

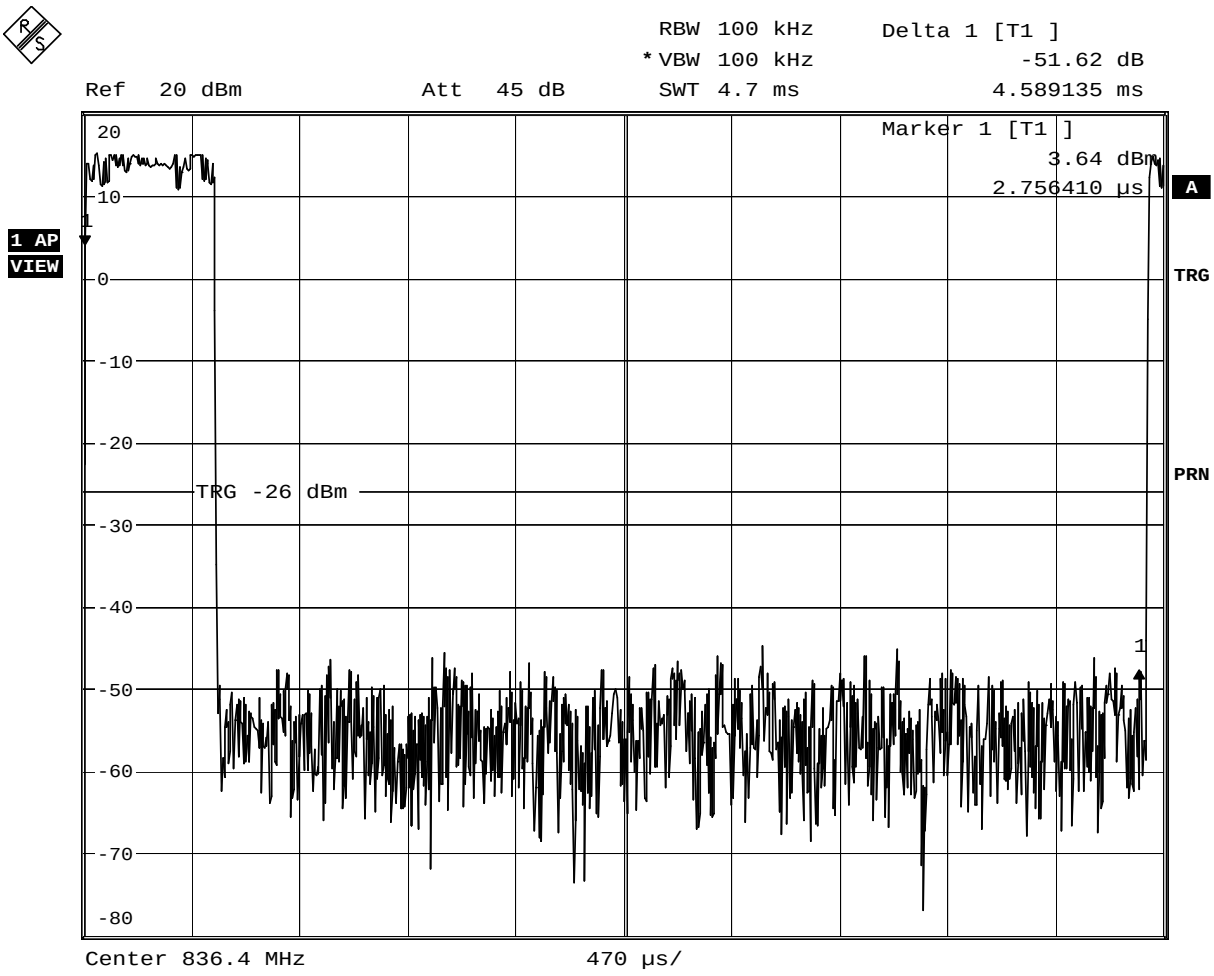
2.5.7 Test Results



GSM Mode. View of TS3

2.5 MODULATION CHARACTERISTICS

2.5.7 Test Results



GSM Mode. View of One Complete Frame Showing TS3

2.6 OCCUPIED BANDWIDTH

2.6.1 Specification Reference

FCC CFR 47: Part 22 Subpart H, Section 2.1049(h), 22.917(b)
Industry Canada RSS-132, 4.5

2.6.2 Equipment Under Test

SAGEM A2005sca+

2.6.3 Date of Test

10th April 2006

2.6.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.6.5 Test Procedure

The EUT was transmitting at maximum power with GMSK modulation and TS3 was active. Using a resolution bandwidth of 10 kHz and a video bandwidth of 30 kHz, the –26dBc points were established and the emission bandwidth determined.

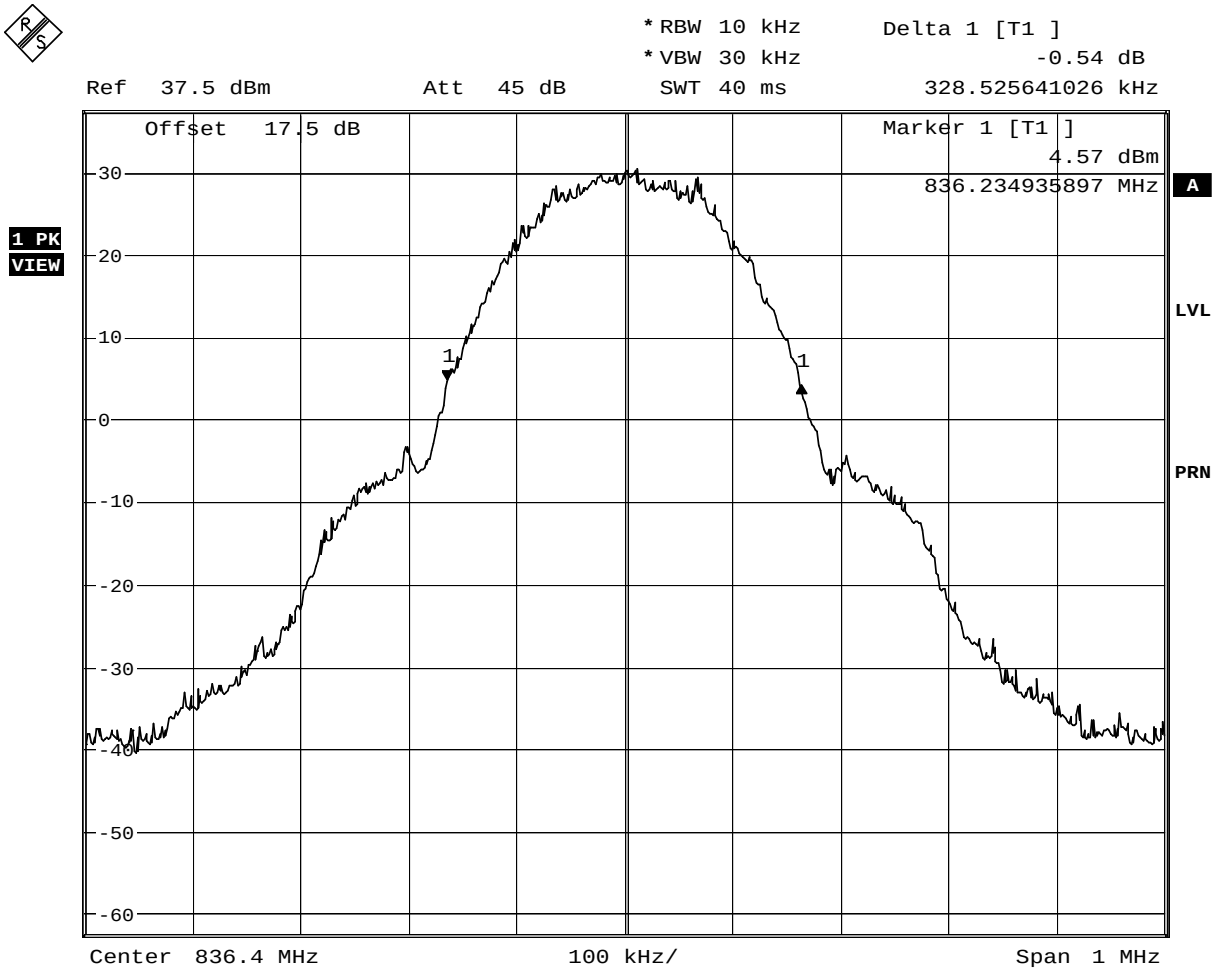
The plot below shows the resultant display from the Spectrum Analyser.

Frequency MHz	26dB Bandwidth kHz
836.6	328.525641

2.6 OCCUPIED BANDWIDTH

2.6.6 Test Results

Occupied Bandwidth As Defined By The –26dBc Points



Date: 10.APR.2006 10:21:06

Maximum Power – GSM 850

2.7 SPURIOUS EMISSIONS AT ANTENNA TERMINALS (+/-1MHz)

2.7.1 Specification Reference

FCC CFR 47: Part 22 Subpart H, Section 2.1051, 22.905, 22.917
Industry Canada RSS-132, 4.5

2.7.2 Equipment Under Test

SAGEM A2005sca+

2.7.3 Date of Test

10th April 2006

2.7.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.7.5 Test Procedure

In accordance with 22.917(e) and 22.905, using a spectrum analyser and attenuator(s), the emissions were measured between the block edge frequency up to 1MHz to ensure compliance with the 43 + 10 log(P). The measurements were performed using a peak detector with the trace display set to Max Hold. A RBW of at least 1% of the measured 26dB bandwidth was used, in this case 10 RBW and 30 VBW.

The measured path loss was entered as a reference level offset into the Spectrum Analyser.

2.7.6 Test Results

Below are the Frequency Blocks the EUT was tested against along with the tested channels.

Measurements were made with the EUT in GMSK 850 Mode.

Communication Channel Pair Blocks

Frequency Block MHz	Lower Block Edge Test Channels/Frequencies	Upper Block Edge Test Channels/Frequencies
824.0 – 835.0	Channel : 129 Frequency : 824.4MHz	Channel : 250 Frequency : 848.6MHz

The channels shown in the table above are the minimum and maximum channels that can be used in each block to maintain compliance. Channels used outside of those stated in the table exceed the specification limits, thus they cannot be used.

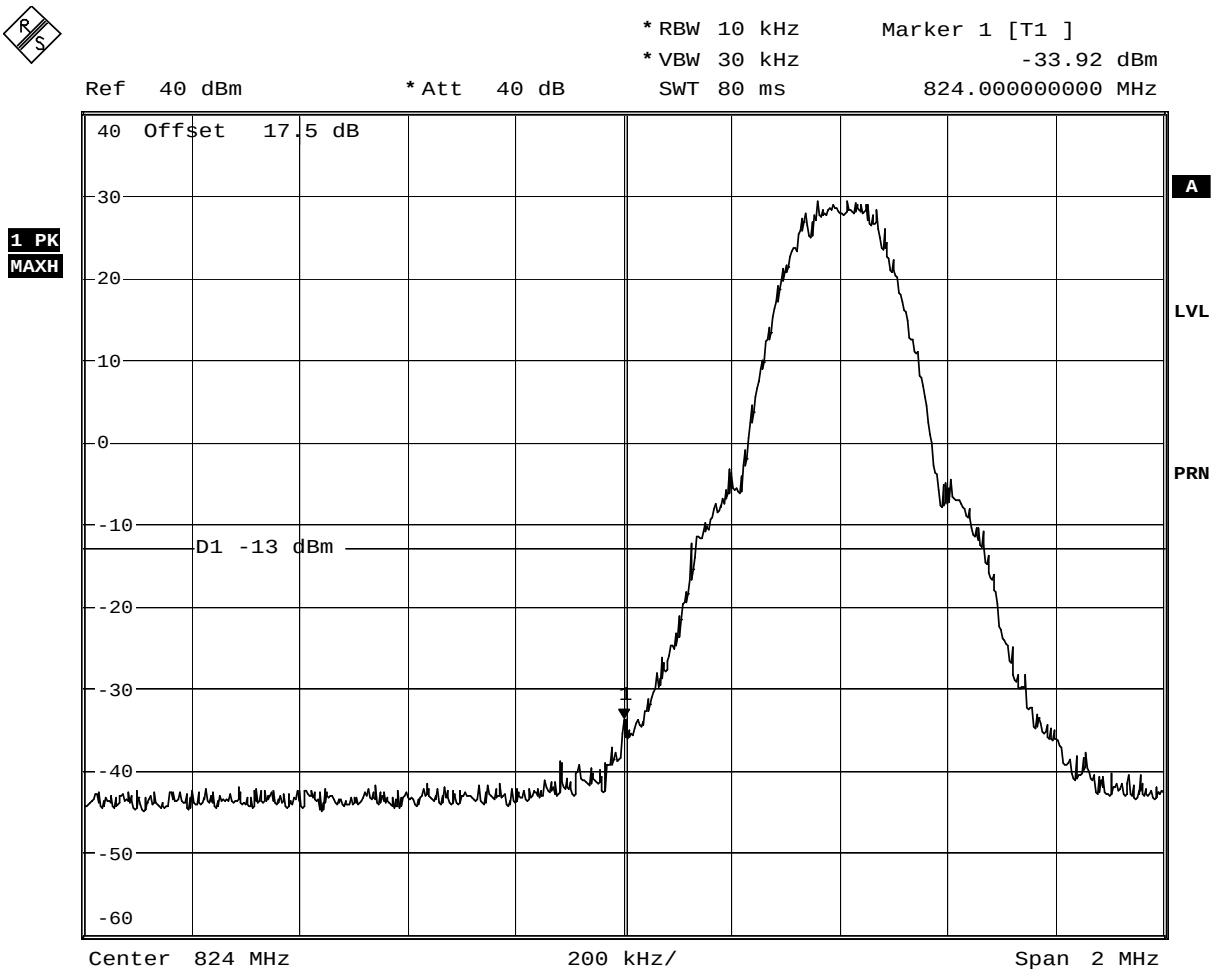
The channels outside of those shown in the table above were not tested at lower power levels to determine a level at which compliance would be achieved. Therefore, to maintain compliance, only the channels shown in the table above shall be used.

The measurement plots are shown on the following pages.

2.7 SPURIOUS EMISSIONS AT ANTENNA TERMINALS (+/-1MHz)

2.7.6 Test Results - continued

Block Edge Measurement with EUT Transmitting on Power Level 5, On Channel 129, (824.40MHz)

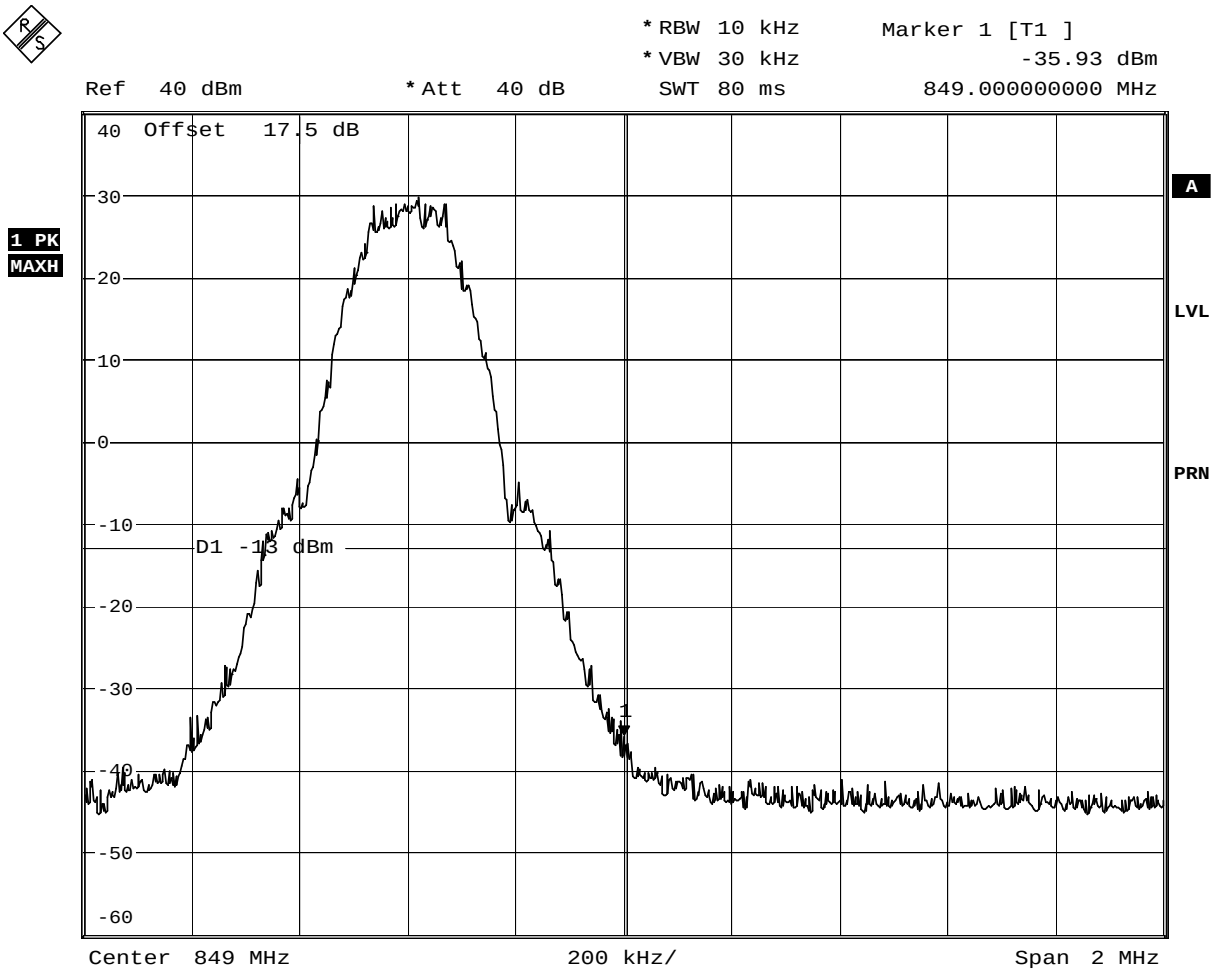


Block A
GMSK Modulation
824.0MHz – 849.0MHz

2.7 SPURIOUS EMISSIONS AT ANTENNA TERMINALS (+/-1MHz)

2.7.6 Test Results - continued

Block Edge Measurement With EUT Transmitting on Power Level 5, On Channel 250, (848.6MHz)



Block A
GMSK Modulation
824.0MHz – 849.0MHz

2.8 RADIATED SPURIOUS EMISSIONS

2.8.1 Equipment Reference

FCC CFR 47: Part 22 Subpart H, Section 22.917
Industry Canada RSS-132, 4.5

2.8.2 Equipment Under Test

SAGEM A2005sca+

2.8.3 Date of Test

11th April 2006

2.8.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.8.5 Test Procedure

Test Performed in accordance with ANSI C63.4.

In order to determine the Radiated Emission Limits, measurements of transmitter power (P) were first carried out on the top, middle and bottom channels using a peak detector, and the results are shown in the following table.

A preliminary profile of the Spurious Radiated Emissions was obtained by operating the EUT on a remotely controlled turntable within the Anechoic Chamber. Measurements of emissions from the EUT were obtained with the Measurement Antenna in both Horizontal and Vertical Polarisations. The profiling produced a list of the worst-case emissions together with the EUT azimuth and antenna polarisation.

Using the information from the preliminary profiling of the EUT. The list of emissions was then confirmed or updated in the Anechoic Chamber (3 metres). Emission levels were maximised by adjusting the antenna height, antenna polarisation and turntable azimuth.

Emissions identified within the range 30MHz – 1GHz were then formally measured using a Peak detector.

Emissions identified within the range 1GHz – 10GHz were then formally measured using Peak and Average Detectors, as appropriate.

The measurements were performed at a 3m distance unless otherwise stated.

2.8 RADIATED SPURIOUS EMISSIONS

2.8.6 Test Results

30MHz – 1GHz Frequency Range

Equipment Designation: Intentional Radiator.

The EUT met the requirements of FCC CFR 47: Part 22, Subpart H, 22.917 and Industry Canada RSS-132, 4.5 for Radiated Emissions (30MHz – 1GHz).

Measurements were made with the EUT in GSM 850 Mode.

EUT Transmitting on Bottom Channel (824.20MHz)

No EUT emissions were detected within 40dB of the specification limit.

EUT Transmitting on Middle Channel (836.40MHz)

No EUT emissions were detected within 40dB of the specification limit.

EUT Transmitting on Top Channel (848.80MHz)

No EUT emissions were detected within 40dB of the specification limit.

2.8 RADIATED SPURIOUS EMISSIONS

2.8.6 **Test Results** - continued

1GHz – 10GHz Frequency Range

Equipment Designation: Intentional Radiator.

The EUT met the requirements of FCC CFR 47: Part 22, Subpart H, 22.917 and Industry Canada RSS-132, 4.5 for Radiated Emissions (1GHz – 10GHz).

Measurements were made with the EUT in GSM 850 Mode

EUT Transmitting on Bottom Channel (824.20MHz)

Frequency	Antenna Polarisation	Height	Azimuth	Peak Result	Peak Limit
MHz		cm	degree	dBm	dBm
1649.0	Horizontal	100	196	-41.8	-13.0
2473.0	Horizontal	112	254	-40.5	-13.0

EUT Transmitting on Middle Channel (836.40MHz)

Frequency	Antenna Polarisation	Height	Azimuth	Peak Result	Peak Limit
MHz		cm	degree	dBm	dBm
1673.0	Horizontal	100	190	-41.2	-13.0
2509.0	Horizontal	113	266	-49.0	-13.0

EUT Transmitting on Top Channel (848.80MHz)

Frequency	Antenna Polarisation	Height	Azimuth	Peak Result	Peak Limit
MHz		cm	degree	dBm	dBm
1698.0	Horizontal	100	003	-42.5	-13.0
2546.0	Horizontal	102	045	-45.2	-13.0

2.9 CONDUCTED SPURIOUS EMISSIONS

2.9.1 Specification Reference

FCC CFR 47: Part 22 Subpart H, Section 2.1051, 22.917 (a)
Industry Canada RSS-132, 4.5

2.9.2 Equipment Under Test

SAGEM A2005sca+

2.9.3 Date of Test

10th April 2006

2.9.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.9.5 Test Procedure

In accordance with Part 2.1051 and 22.917, the spurious emissions from the antenna terminal were measured. The transmitter output power was attenuated using a combination of filters and attenuators and the frequency spectrum investigated from 9kHz to 9GHz. The EUT was set to transmit on full power on timeslot 3 for GMSK Modulation. The EUT was tested on Bottom, Middle and Top channels at a power level of 5. The resolution and video bandwidths were set to 1MHz thus meeting the requirements of Part 22.917(b). The spectrum analyser detector was set to Max Hold.

From 9kHz to 1.5GHz, a10dB attenuator was used. For measuring the range 1.5GHz to 9GHz, attenuators and a 1.5GHz high pass filter were used.

The maximum path loss across the measurement band was used as the reference level offset to ensure worst case.

2.9 CONDUCTED SPURIOUS EMISSIONS

2.9.6 Test Results

See test plots.

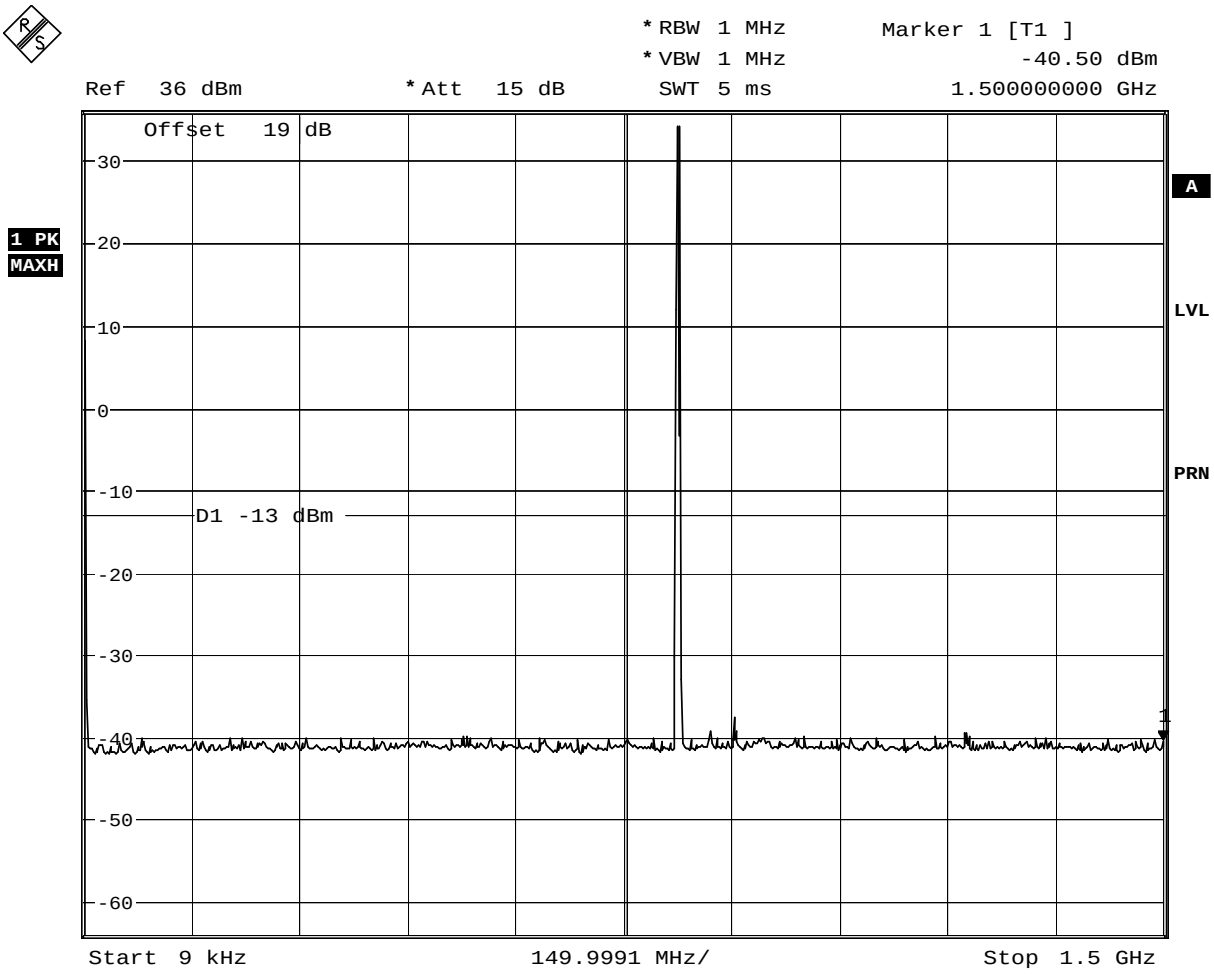
Remarks

The EUT passed the requirements laid out in 22.917(a) and RSS-132, 4.5.

The plots on the following pages show the frequency spectrum from 9kHz to 9GHz of the EUT.

2.9 CONDUCTED SPURIOUS EMISSIONS

2.9.6 Test Results

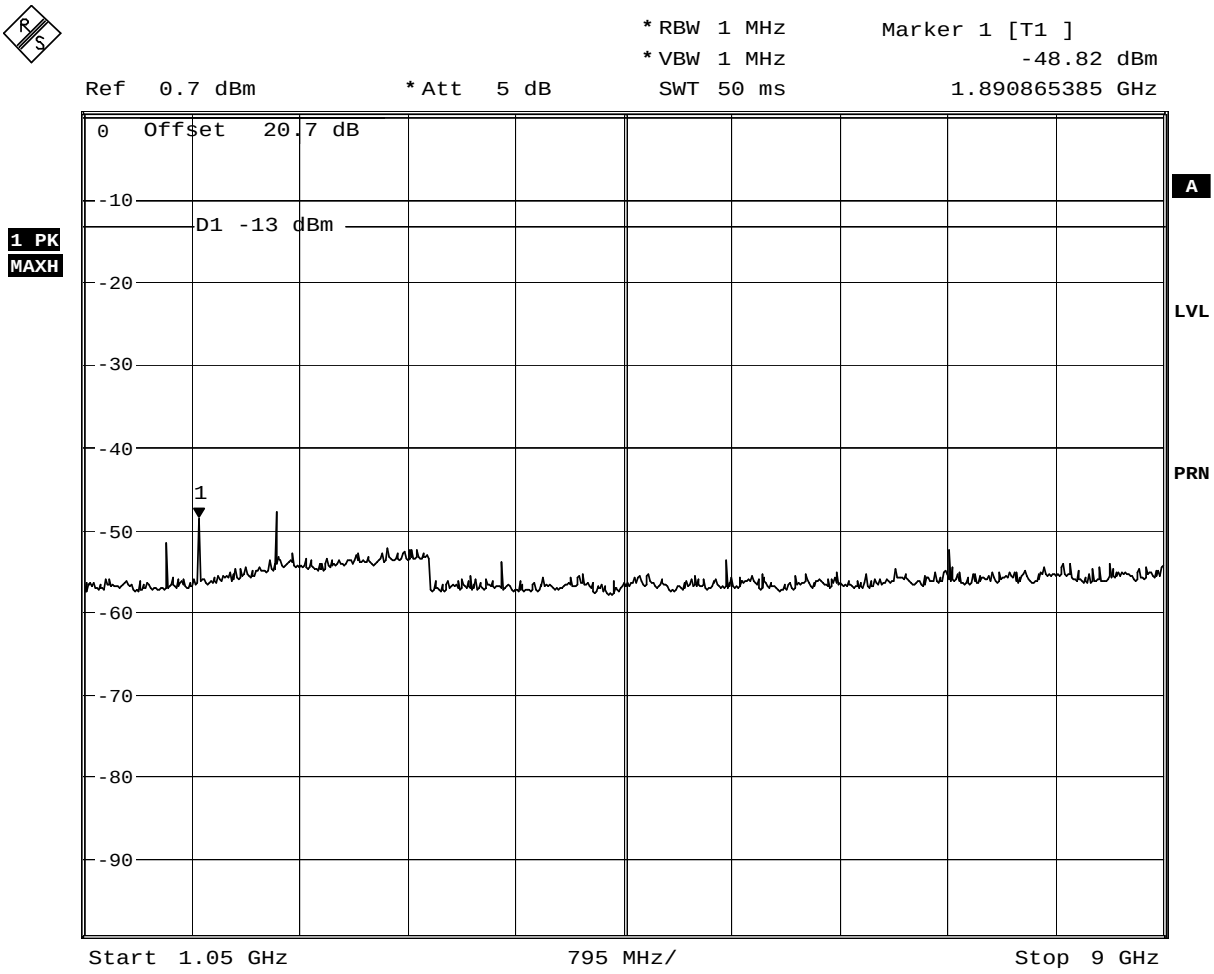


Date: 10.APR.2006 11:09:31

Spurious Emissions (9kHz – 1.5GHz)
Channel 128, (824.2MHz) – Maximum Power – GSM 850 Mode
3.9 V SUPPLY

2.9 CONDUCTED SPURIOUS EMISSIONS

2.9.6 **Test Results** - continued

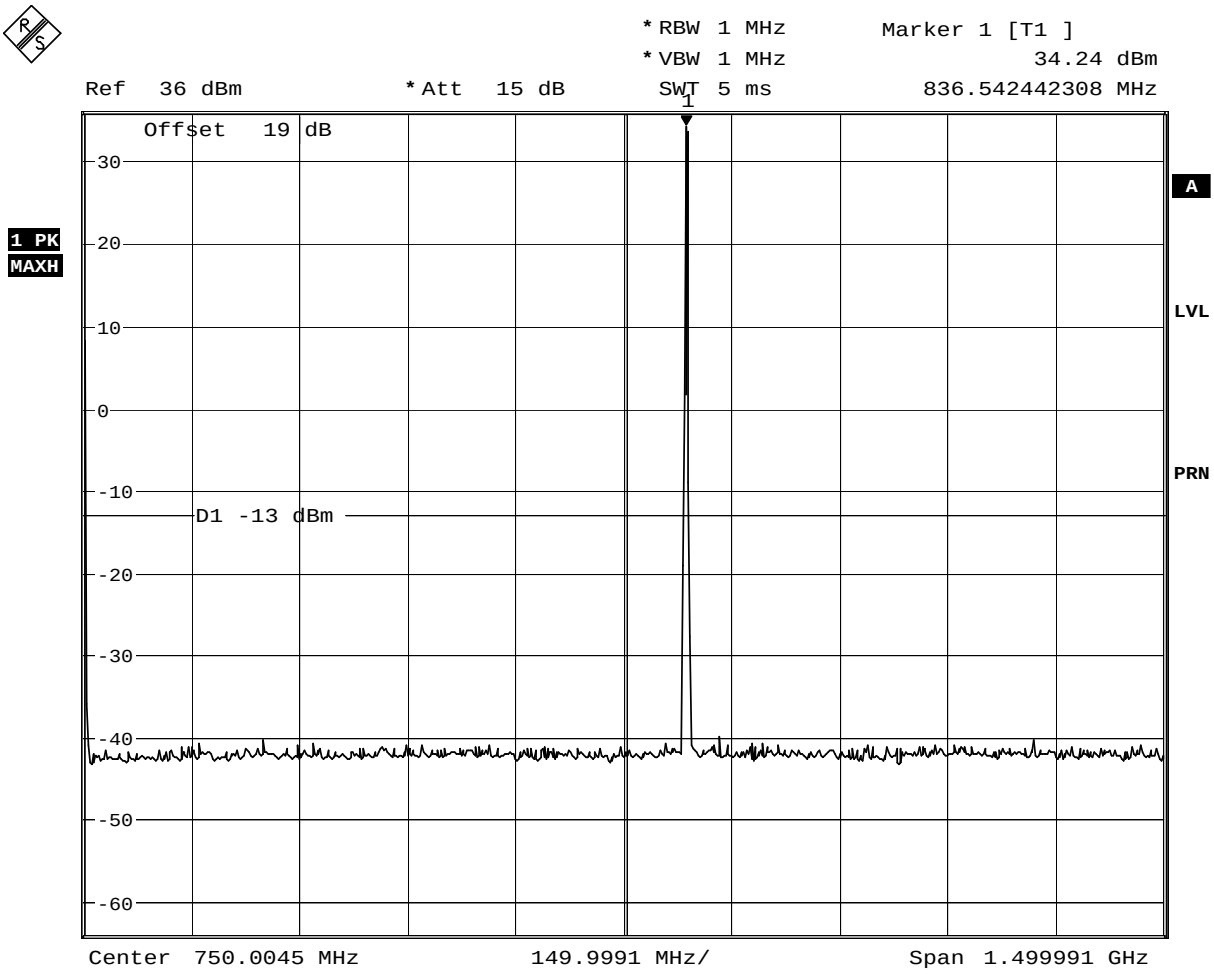


Date: 10.APR.2006 12:00:20

Spurious Emissions (1.5GHz – 9GHz)
Channel 128 (824.2MHz) - Maximum Power - GSM 850 Mode
3.9 V SUPPLY

2.9 CONDUCTED SPURIOUS EMISSIONS

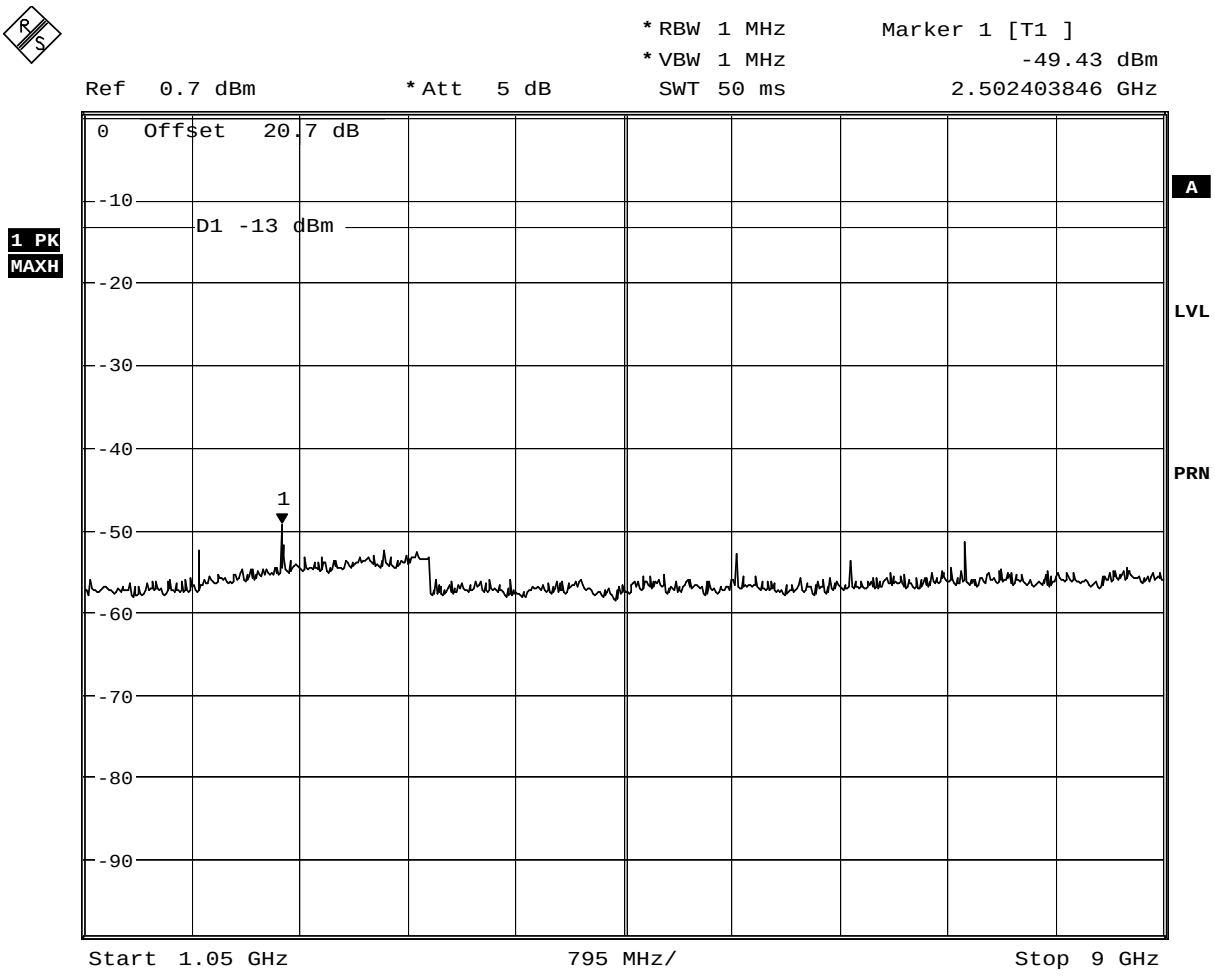
2.9.6 **Test Results** - continued



Spurious Emissions (9kHz – 1.5GHz)
Channel 189 (836.4MHz) - Maximum Power - GSM 850 Mode
3.9 V SUPPLY

2.9 CONDUCTED SPURIOUS EMISSIONS

2.9.6 **Test Results** - continued

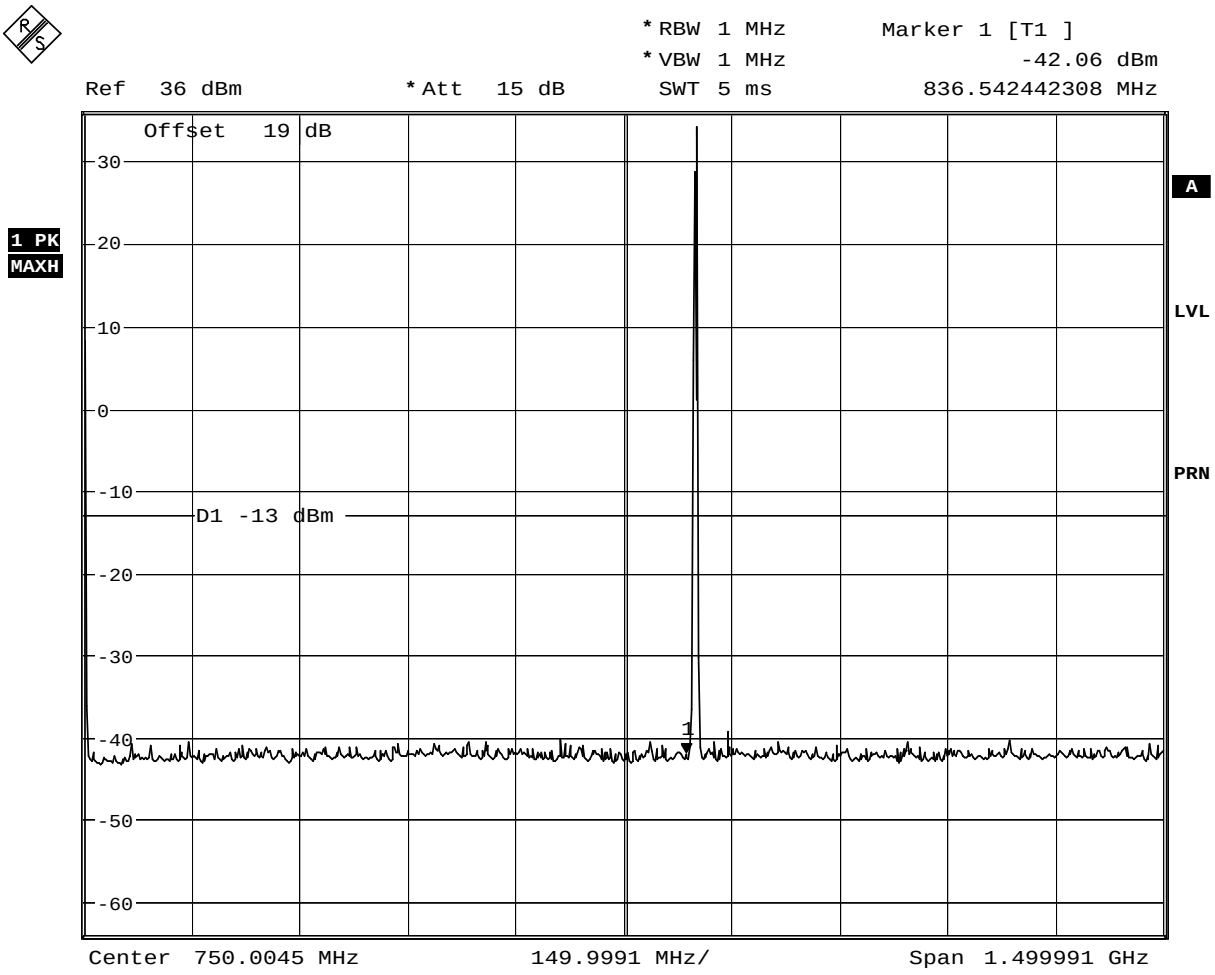


Date: 10.APR.2006 12:01:00

Spurious Emissions (1.5GHz - 9GHz)
Channel 189 (836.4MHz) - Maximum Power - GSM 850 Mode
3.9 V SUPPLY

2.9 CONDUCTED SPURIOUS EMISSIONS

2.9.6 **Test Results** - continued

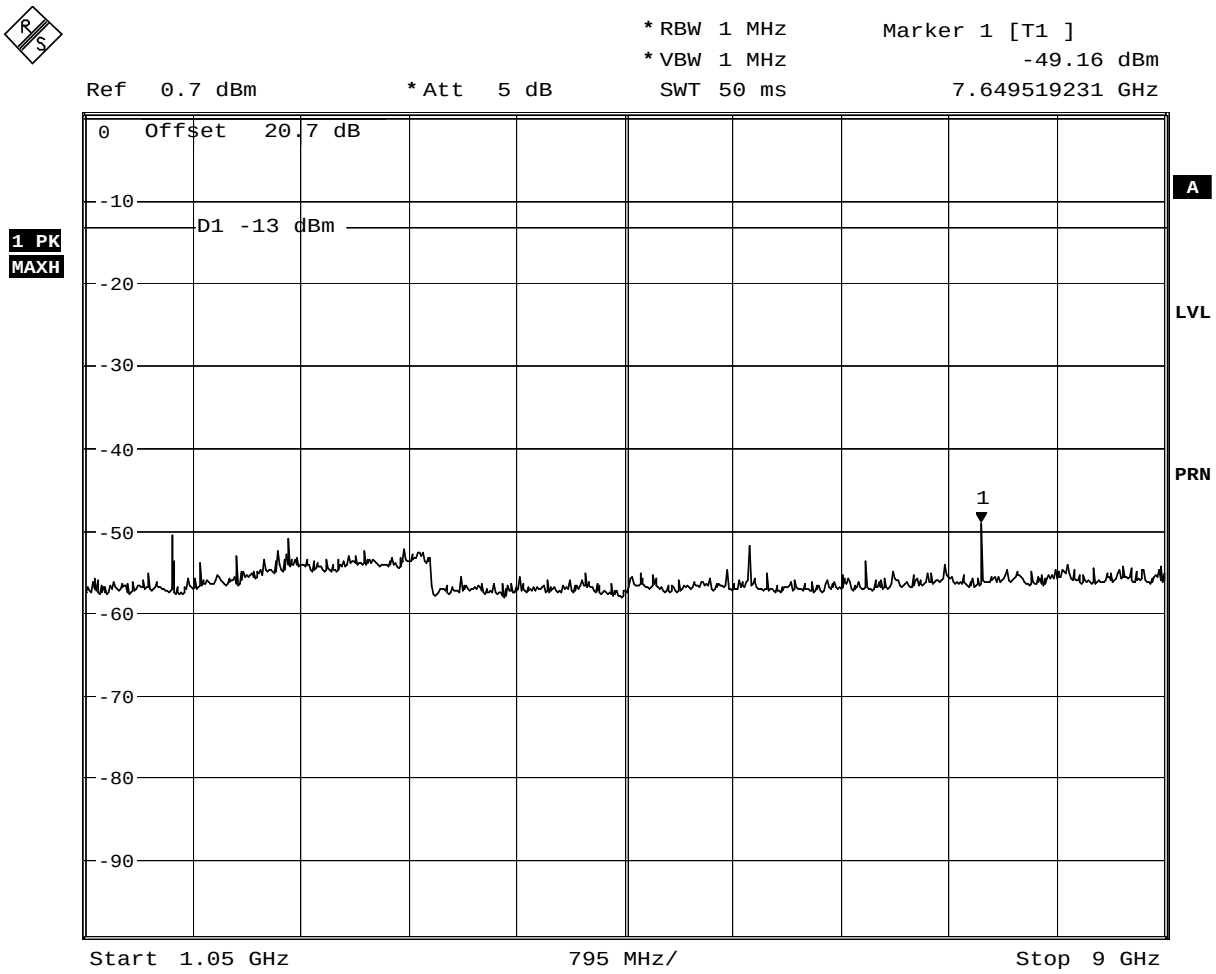


Date: 10.APR.2006 11:12:04

Spurious Emissions (9kHz – 1.5GHz)
Channel 251 (848.8MHz) - Maximum Power - GSM 850 Mode
3.9 V SUPPLY

2.9 CONDUCTED SPURIOUS EMISSIONS

2.9.6 **Test Results** - continued



Date: 10.APR.2006 12:02:02

Spurious Emissions (4GHz – 9GHz)
Channel 251 (848.8MHz) - Maximum Power - GSM 850 Mode
3.9 V SUPPLY

2.10 FREQUENCY STABILITY UNDER TEMPERATURE VARIATIONS

2.10.1 Specification Reference

FCC CFR 47: Part 22 Subpart H, Section 2.1055, 22.355
Industry Canada RSS-132, 4.3

2.10.2 Equipment Under Test

SAGEM A2005sca+

2.10.3 Date of Test

10th April 2006

2.10.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.10.5 Test Procedure

The EUT was set to transmit on power control level 5 with timeslot 3 active. A Digital Communication Analyser, (CMU200), was used to measure the frequency error. The maximum result was taken over 200 bursts. The temperature was adjusted between –30ºC and +50ºC in 10º steps as per 2.1055.

Measurements were conducted with the EUT in a GMSK mode of operation.

2.10 FREQUENCY STABILITY UNDER TEMPERATURE VARIATIONS

2.10.6 Test Results

3.9V SUPPLY – GMSK 850 Mode Modulation

Temperature Interval ºC	Test Frequency MHz	Deviation Hz	Limit kHz
-28	836.6	-20	±2.091
-20	836.6	-17	±2.091
-10	836.6	-14	±2.091
0	836.6	+21	±2.091
+10	836.6	-21	±2.091
+20	836.6	-23	±2.091
+30	836.6	-28	±2.091
+40	836.6	-23	±2.091
+50	836.6	-26	±2.091

Remarks

EUT complies with CFR 47 Part 22.355 and Industry Canada RSS-132, 4.3. The frequency stability of the EUT is sufficient to keep it within the authorised frequency blocks at any temperature interval across the measured range.

The EUT failed to operate below -28°C.

2.11 FREQUENCY STABILITY UNDER VOLTAGE VARIATIONS

2.11.1 Specification Reference

FCC CFR 47: Part 22 Subpart H, Section 2.1055, 22.355
Industry Canada RSS-132, 4.3

2.11.2 Equipment Under Test

SAGEM A2005sca+

2.11.3 Date of Test

10th April 2006

2.11.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.11.5 Test Procedure

The EUT was set to transmit on power control level 5 with measurements performed on timeslot 3. A Digital Communication Analyser, (CMU200), was used to measure the frequency error. The average result was taken over 200 bursts.

The voltage to the EUT was varied as shown in the table of results at a temperature of 20ºC.

2.11 FREQUENCY STABILITY UNDER VOLTAGE VARIATIONS

2.11.6 Test Results

3.8V SUPPLY GSM 850 Mode GMSK Modulation

DC Voltage V	Test Frequency MHz	Deviation Hz	Deviation Limit kHz
3.9	836.6	-25	± 2.091
3.55	836.6	-20	± 2.091

Remarks

EUT complies with CFR 47 Part 22.355 and RSS-132, 4.3. The EUT does not exceed ±2.091kHz at the measured frequency either at nominal or voltage variation.

2.12 MAXIMUM PEAK OUTPUT POWER (RADIATED)

2.12.1 Specification Reference

FCC CFR 47: Part 24 Subpart E, Section 24.232(a), 2.1046
Industry Canada RSS-133, 4.3/6.4

2.12.2 Equipment Under Test

SAGEM A2005sca+

2.12.3 Date of Test

10th April 2006

2.12.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.12.5 Test Procedure

Test Performed in accordance with ANSI C63.4.

The Spectrum Analyser was tuned to the test frequency. The device Output Power setting was controlled as specified in the Product Information, Section 1.5 of this document. The device was then rotated through 360 degrees until the highest power level was observed in both horizontal and vertical polarisation. The device was then replaced with a substitution antenna, who's input signal the antenna was adjusted until the received level matched that of the previously detected emission.

2.12.6 Test Results

The EUT met the requirements of FCC CFR 47: Part 24 Subpart E, Section 24.232(a) and Industry Canada RSS-133, 4.3/6.4 for Maximum Peak Output Power.

Test Voltage 3.9V DC

Frequency (MHz)	Result EIRP (dBm)	Result EIRP (W)
1850.2	31.5	1.41
1880.0	29.4	0.871
1909.8	27.9	0.617
Limit	<+33.0dBm or <2W	

2.13 MAXIMUM PEAK OUTPUT POWER (CONDUCTED)

2.13.1 Specification Reference

FCC CFR 47: Part 24 Subpart E, Section 24.232(a), 2.1046
Industry Canada RSS-133, 4.3/6.4

2.13.2 Equipment Under Test

SAGEM A2005sca+

2.13.3 Date of Test

4th April 2006

2.13.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.13.5 Test Procedure

Using a spectrum analyser and attenuator(s), the output power of the EUT was measured at the antenna terminals.

The EUT was set to transmit on power control level 0 with timeslot 3 active for GMKS modulation.

The spectrum analyser RBW and VBW were set to 1MHz and the path loss measured and entered as a reference level offset.

2.13.6 Test Results

The EUT complies with CFR 47 24.232(a) and 2.1046 and Industry Canada RSS-133, 4.3/6.4. The EUT does not exceed 2W or +33dBm at the measured frequencies.

Test Voltage 3.9V DC

Frequency MHz	Output Power dBm	Path Loss dB	Result dBm	Result W
1850.2	10.75	18.0	28.75	0.75
1880.0	110.4	18.0	29.04	0.80
1909.8	11.07	18.0	29.07	0.81

Limit	<2W or <+33dBm

2.14 MODULATION CHARACTERISTICS

2.14.1 Specification Reference

FCC CFR 47: Part 24 Subpart E, Section 2.1047(d) and Industry Canada RSS-132, 6.2

2.14.2 Equipment Under Test

SAGEM A2005sca+

2.14.3 Date of Test

10th April 2006

2.14.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.14.5 Test Procedure

Two views are shown for the GSM mode of operation. One view shows the active slot(s) over a complete screen. The other view shows the active slot(s) over a complete frame.

2.14 MODULATION CHARACTERISTICS

2.14.5 Modulation Description

Modulation format for GMSK

Modulating symbol rate
The modulating symbol rate is 1/T = 1 625/6 ksymb/s (i.e. approximately 270.833 ksymb/s), which corresponds to 1 625/6 kbit/s (i.e. 270.833 kbit/s). T is the symbol period.

Start and stop of the burst
Before the first bit of the bursts as defined in 3GPP TS 45.002 [3] enters the modulator, the modulator has an internal state as if a modulating bit stream consisting of consecutive ones (di = 1) had entered the differential encoder. Also after the last bit of the time slot, the modulator has an internal state as if a modulating bit stream consisting of consecutive ones (di = 1) had continued to enter the differential encoder. These bits are called dummy bits and define the start and the stop of the active and the useful part of the burst as illustrated in figure 1. Nothing is specified about the actual phase of the modulator output signal outside the useful part of the burst.

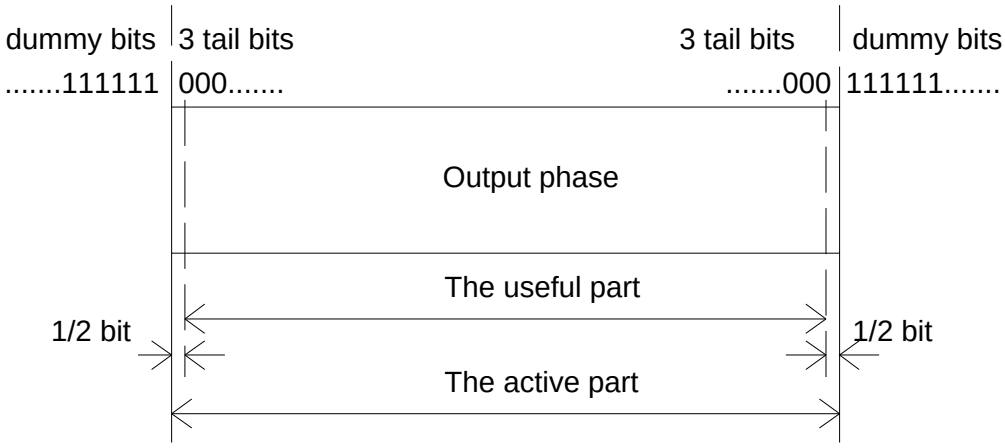


Figure 1: Relation between active part of burst, tail bits and dummy bits. For the normal burst the useful part lasts for 147 modulating bits

Differential encoding

Each data value $d_i = [0,1]$ is differentially encoded. The output of the differential encoder is:

$$\bar{d}_i = d_i \oplus d_{i-1} \qquad (d_i \in \{0,1\})$$

where $\oplus$ denotes modulo 2 addition.
The modulating data value α_i input to the modulator is:

$$\alpha_i = 1 - 2\bar{d}_i \qquad (\alpha_i \in \{-1,+1\})$$

2.14 MODULATION CHARACTERISTICS

2.14.5 Modulation Description - continued

Filtering

The modulating data values α_i as represented by Dirac pulses excite a linear filter with impulse response defined by:

$$g(t) = h(t) * rect\left(\frac{t}{T}\right)$$

where the function *rect(x)* is defined by:

$$rect\left(\frac{t}{T}\right) = \frac{1}{T} \qquad for\ |t| < \frac{T}{2}$$

$$rect\left(\frac{t}{T}\right) = 0 \qquad otherwise$$

and * means convolution. *h(t)* is defined by:

$$h(t) = \frac{\exp\left(\frac{-t^2}{2\delta^2 T^2}\right)}{\sqrt{(2\pi)}\ .\ \delta T}$$

where $\delta = \frac{\sqrt{\ln(2)}}{2\pi BT} \qquad and\ BT = 0.3$

where B is the 3 dB bandwidth of the filter with impulse response *h(t)*. This theoretical filter is associated with tolerances defined in 3GPP TS 45.005 [4].

Output phase

The phase of the modulated signal is:

$$\varphi(t') = \sum_i \alpha_i \pi h \int_{-\infty}^{t'-iT} g(u)du$$

where the modulating index *h* is 1/2 (maximum phase change in radians is $\pi/2$ per data interval). The time reference *t' = 0* is the start of the active part of the burst as shown in figure 1. This is also the start of the bit period of bit number 0 (the first tail bit) as defined in 3GPP TS 45.002 [2].

Modulation

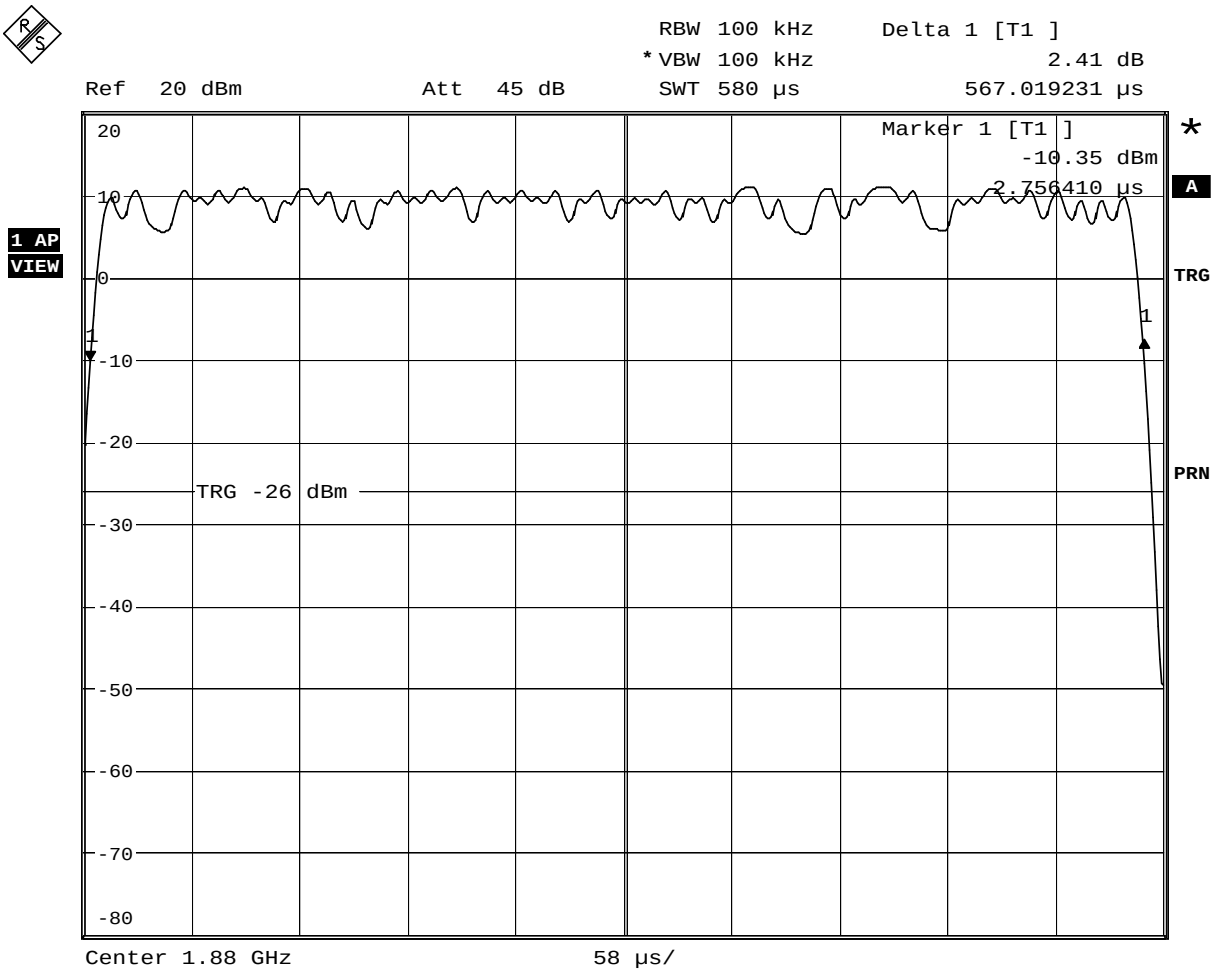
The modulated RF carrier, except for start and stop of the TDMA burst may therefore be expressed as:

$$x(t') = \sqrt{\frac{2E_c}{T}}\ .\ \cos(2\pi f_0 t' + \varphi(t') + \varphi_0)$$

where E_c is the energy per modulating bit, f_0 is the centre frequency and φ_0 is a random phase and is constant during one burst.

2.14 MODULATION CHARACTERISTICS

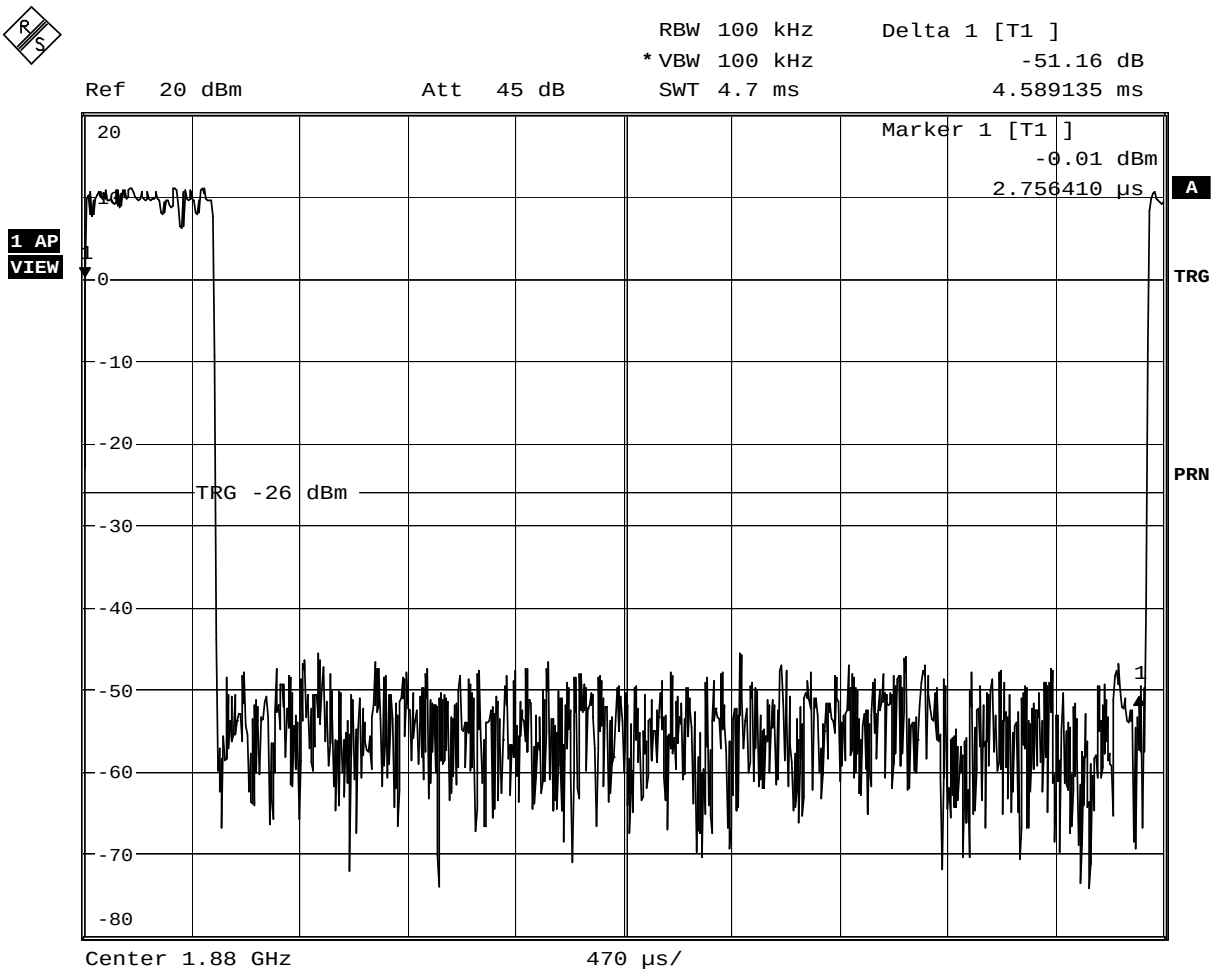
2.14.6 Test Results



GSM Mode. View of TS3

2.14 MODULATION CHARACTERISTICS

2.14.6 Test Results



GSM Mode. View of One Complete Frame Showing TS3

2.15 OCCUPIED BANDWIDTH

2.15.1 Specification Reference

FCC CFR 47: Part 24 Subpart E, Section 24.238(b), 2.1049
Industry Canada RSS-133, 2.6/6.5 and RSS Gen, 4.4

2.15.2 Equipment Under Test

SAGEM A2005sca+

2.15.3 Date of Test

10th April 2006

2.15.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.15.5 Test Procedure

The EUT was set to transmit on power control level 0 with GMSK modulation and Timeslot 3 was active.

Using a resolution bandwidth of 10kHz and a video bandwidth of 30kHz, the –26dBc points were established and the emission bandwidth determined.

The measurement was performed in GSM mode with.

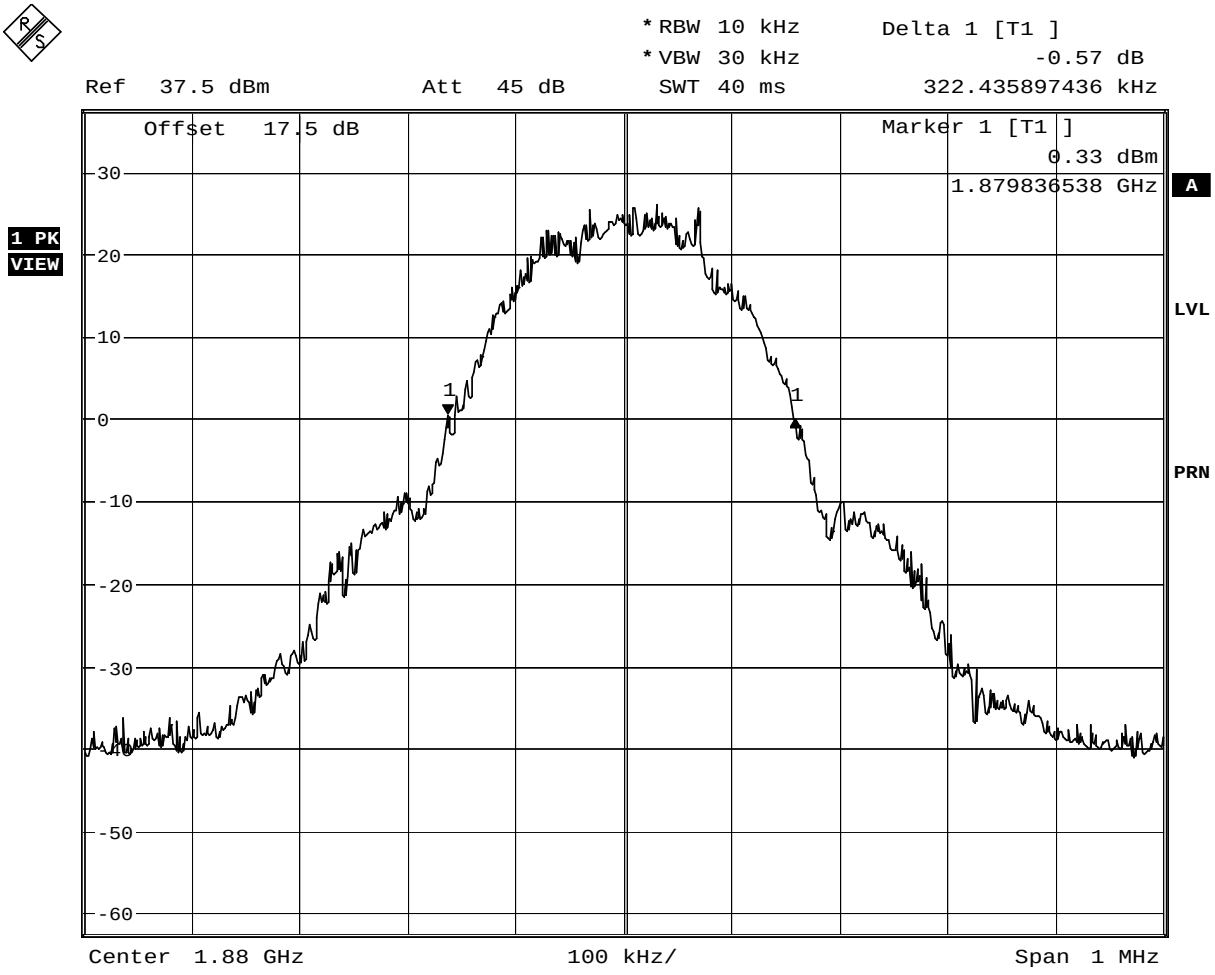
The plots below show the resultant display from the Spectrum Analyser.

Frequency MHz	26dB Bandwidth kHz
1880.0	322.435897

2.15 OCCUPIED BANDWIDTH

2.15.6 Test Results

Occupied Bandwidth As Defined By The - 26dBc Points



Power Control Level 0 – GSM

2.16 SPURIOUS EMISSIONS AT ANTENNA TERMINALS (+/-1MHz)

2.16.1 Specification Reference

FCC CFR 47: Part 24 Subpart E, Section 24.229, 24.238, 2.1051 and
Industry Canada RSS-133, 4.4/6.5

2.16.2 Equipment Under Test

SAGEM A2005sca+

2.16.3 Date of Test

10th April 2006

2.16.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.16.5 Test Procedure

In accordance with Part 24.238(b), 24.229 and RSS-133, 4.4/6.5, using a spectrum analyser and attenuators, the emissions were measured between the block edge frequency up to 1MHz away to ensure compliance with the 43 + 10 log P limit. Measurements were performed using a peak detector with the trace display set to Max Hold. A Resolution Bandwidth of at least 1% of the measured 26dB bandwidth was used, in this case 10kHz Resolution Bandwidth and 30kHz video bandwidth. The measured path loss was entered as a reference level offset into the Spectrum Analyser.

2.16 SPURIOUS EMISSIONS AT ANTENNA TERMINALS (+/-1MHz)

2.16.6 Test Results

Below are the Frequency Blocks the EUT was tested against along with the tested channels.

Measurements were made with the EUT in GMSK1900 Mode

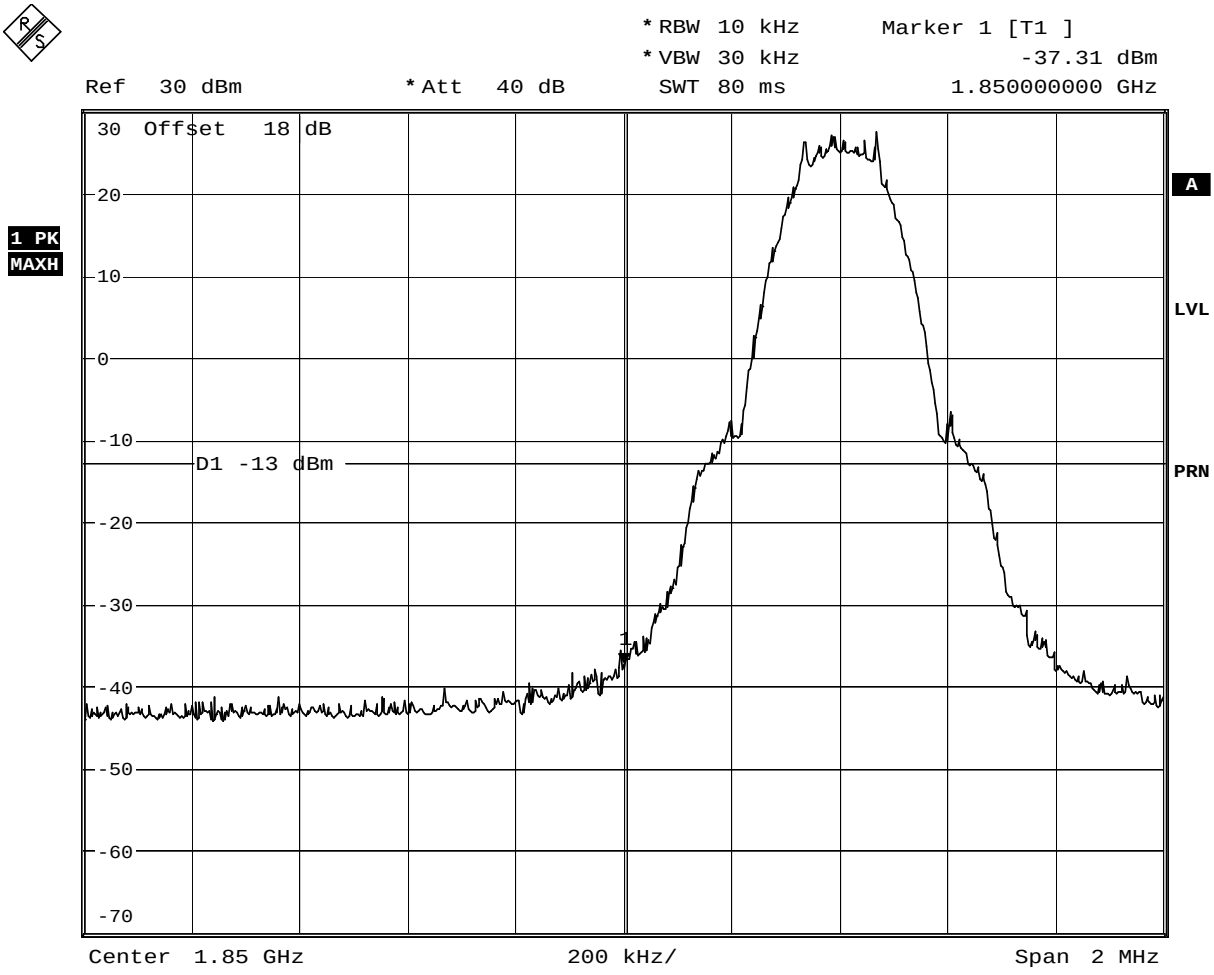
Frequency Block MHz	Lower Block Edge Test Channels/Frequencies	Upper Block Edge Test Channels/Frequencies
A	Channel : 513 Frequency : 1850.4MHz	-
C	-	Channel : 809 Frequency : 1909.8MHz

The measurement plots are shown on the following pages.

2.16 SPURIOUS EMISSIONS AT ANTENNA TERMINALS (+/-1MHz)

2.16.6 Test Results - continued

Block Edge Measurement with EUT Transmitting on full power on Channel 513, (1850.4MHz)



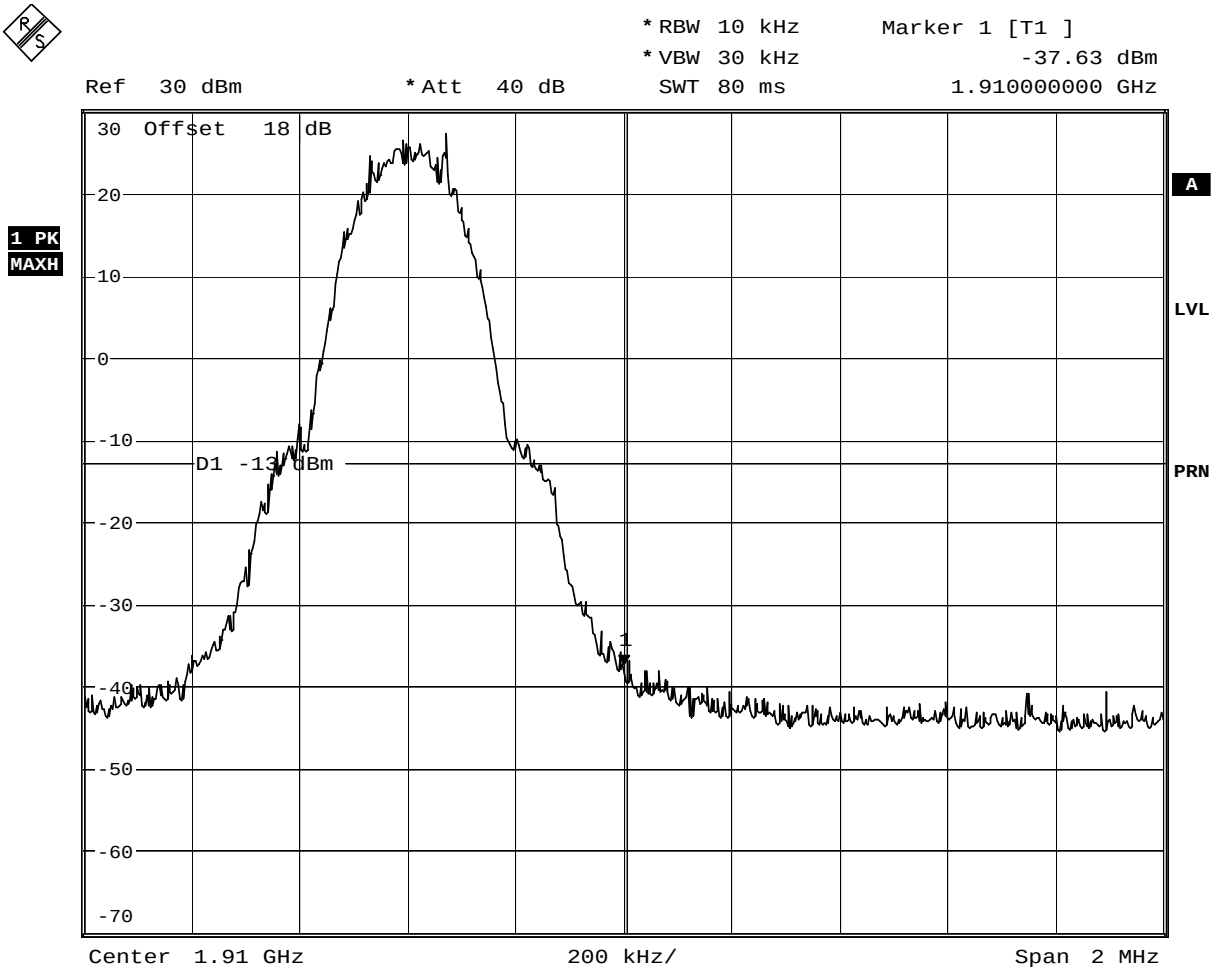
Date: 10.APR.2006 10:45:14

Block A
GMSK Modulation

2.16 SPURIOUS EMISSIONS AT ANTENNA TERMINALS (+/-1MHz)

2.16.6 Test Results - continued

Block Edge Measurement with EUT Transmitting on full power on Channel 809 (1909.8MHz)



Block C
GMSK Modulation

2.17 RADIATED SPURIOUS EMISSIONS

2.17.1 Specification Reference

FCC CFR 47: Part 24 Subpart E, Section 24.238
Industry Canada RSS-133, 4.4/6.5

2.17.2 Equipment Under Test

SAGEM A2005sca+

2.17.3 Date of Test

11th April 2006

2.17.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.17.5 Test Procedure

Test Performed in accordance with ANSI C63.4 and RSS-212.

A preliminary profile of the Spurious Radiated Emissions was obtained by operating the EUT on a remotely controlled turntable within a semi-anechoic chamber. Measurements of emissions from the EUT were obtained with the Measurement Antenna in both Horizontal and Vertical Polarisations. The profiling produced a list of the worst-case emissions together with the EUT azimuth and antenna polarisation.

Using the information from the preliminary profiling of the EUT, the list of emissions was then confirmed or updated under Anechoic Chamber alternative open area test site conditions. Emission levels were maximised by adjusting the antenna height, antenna polarisation and turntable azimuth.

Emissions identified within the range 30MHz – 1GHz were then formally measured using a CISPR Quasi-Peak detector.

Emissions identified within the range 1GHz – 20GHz were then formally measured using Peak and Average Detectors, as appropriate.

The measurements were performed at a 3m distance unless otherwise stated.

2.17 RADIATED SPURIOUS EMISSIONS

2.17.6 **Test Results** - continued

30MHz – 1GHz Frequency Range

Equipment Designation: Intentional Radiator.

The EUT met the requirements of FCC Part 24.238 and Industry Canada RSS-133, 4.4/6.5 for Radiated Emissions (30MHz – 1GHz).

Measurements were made with the EUT in PCS 1900 Mode

EUT Transmitting on Bottom Channel (1850.2MHz)

No EUT emissions were detected within 35dB of the specification limit.

EUT Transmitting on Middle Channel (1880.0MHz)

No EUT emissions were detected within 35dB of the specification limit.

EUT Transmitting on Top Channel (1909.8MHz)

No EUT emissions were detected within 35dB of the specification limit.

2.17 RADIATED SPURIOUS EMISSIONS

2.17.6 **Test Results** - continued

1GHz – 20GHz Frequency Range

Equipment Designation: Intentional Radiator.

The EUT met the requirements of FCC Part 24.238 and Industry Canada RSS-133,4.4/6.5 for Radiated Emissions (1GHz - 20GHz).

Measurements were made with the EUT in PCS 1900 Mode

EUT Transmitting on Bottom Channel (1850.2MHz)

Frequency	Antenna Polarisation	Height	Azimuth	Peak Result	Peak Limit
MHz		cm	degree	dBm	dBm
7401.0	Horizontal	100	210	-38.2	-13.0
9251.0	Vertical	100	157	-39.6	-13.0

EUT Transmitting on Middle Channel (1880.0MHz)

Frequency	Antenna Polarisation	Height	Azimuth	Peak Result	Peak Limit
MHz		cm	degree	dBm	dBm
5640.0	Vertical	100	300	-40.7	-13.0
7520.0	Horizontal	100	204	-44.0	-13.0
9400.0	Vertical	100	282	-43.9	-13.0

EUT Transmitting on Top Channel (1909.8MHz)

Frequency	Antenna Polarisation	Height	Azimuth	Peak Result	Peak Limit
MHz		cm	degree	dBm	dBm
7639.0	Vertical	100	181	-42.7	-13.0
9546.0	Vertical	100	280	-43.6	-13.0

2.18 CONDUCTED SPURIOUS EMISSIONS

2.18.1 Specification Reference

FCC CFR 47: Part 24 Subpart E, Section 24.238(a), 2.1051
Industry Canada RSS-133, 4.4/6.5

2.18.2 Equipment Under Test

SAGEM A2005sca+

2.18.3 Date of Test

10th April 2006

2.18.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.18.5 Test Procedure

In accordance with Part 2.1051 and 24.238, the spurious emissions from the antenna terminal were measured. The transmitter output power was attenuated using a combination of filters and attenuators and the frequency spectrum investigated from 9kHz to 20 GHz. The EUT was set to transmit on power control level 0 with timeslot 3 active in GSM mode. The EUT was tested on Bottom, Middle and Top channels. The resolution and video bandwidths were set to 1MHz in accordance with Part 24.238. The spectrum analyser detector was set to Max Hold.

For measuring the range 9kHz to 4GHz, on maximum power, a 10dB attenuator was used. From 4 to 20GHz, attenuators and a 4GHz high pass filter were used.

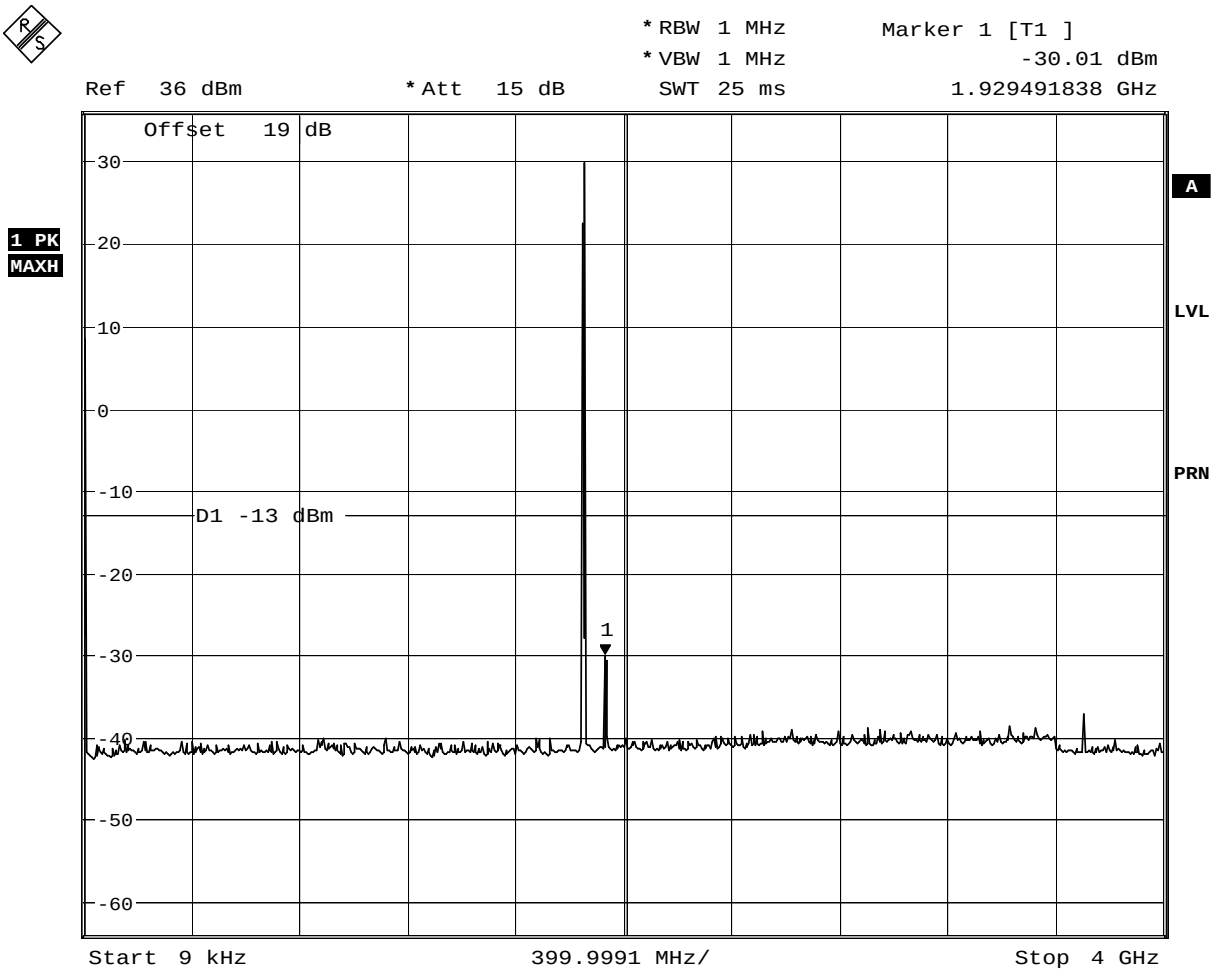
The maximum path loss across the measurement band was used as the reference level offset to ensure worst case.

2.18.6 Test Results

The EUT passed the requirements laid out in FCC Part 24.238 and RSS-133 4.4/6.5. The plots on the following pages show the frequency spectrum from 9kHz to 20GHz of the EUT.

2.18 CONDUCTED SPURIOUS EMISSIONS

2.18.6 **Test Results** - continued

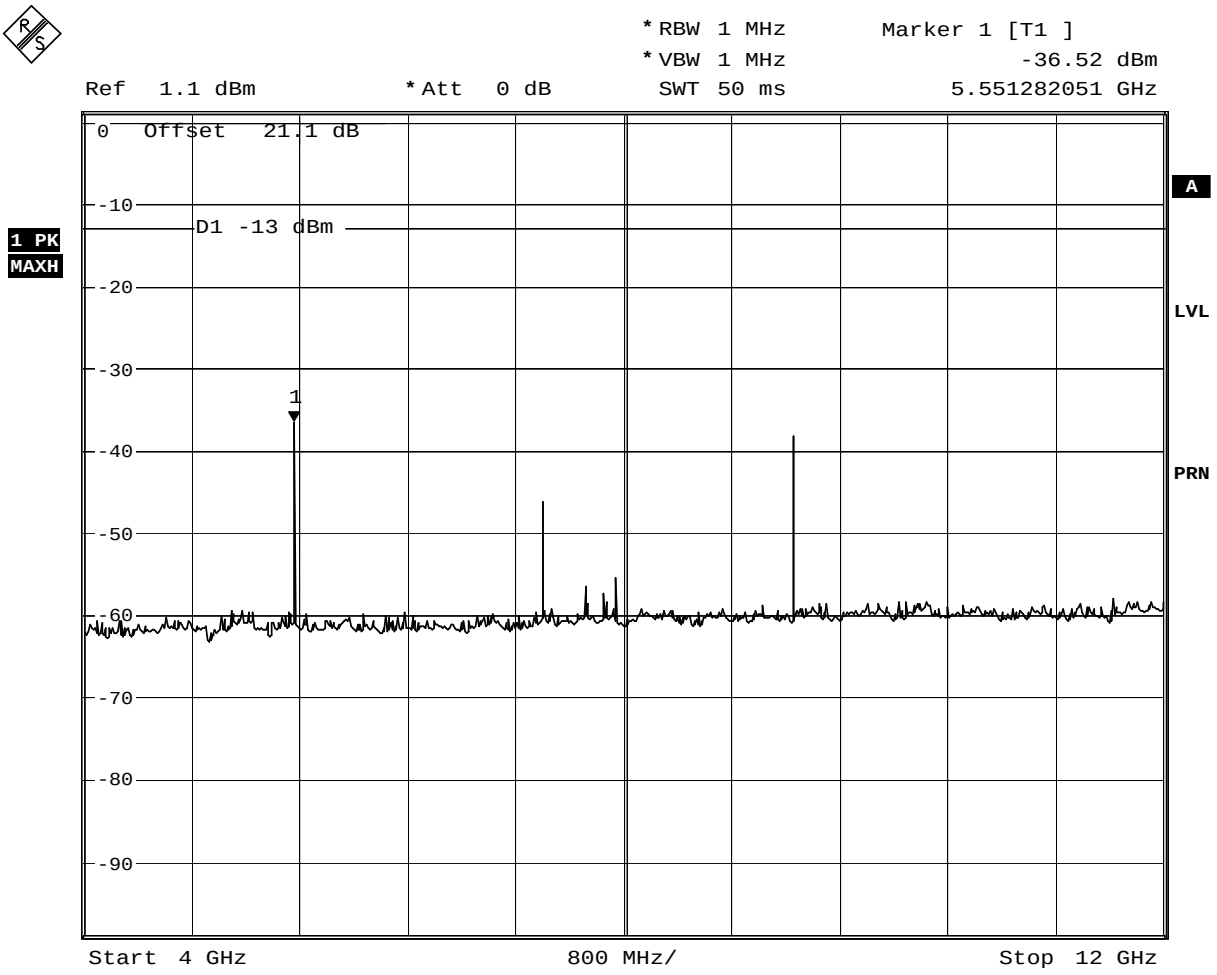


Date: 10.APR.2006 11:14:35

Spurious Emissions (9kHz – 4GHz)
Channel 512 (1850.2MHz) - Maximum Power

2.18 CONDUCTED SPURIOUS EMISSIONS

2.18.6 **Test Results** - continued

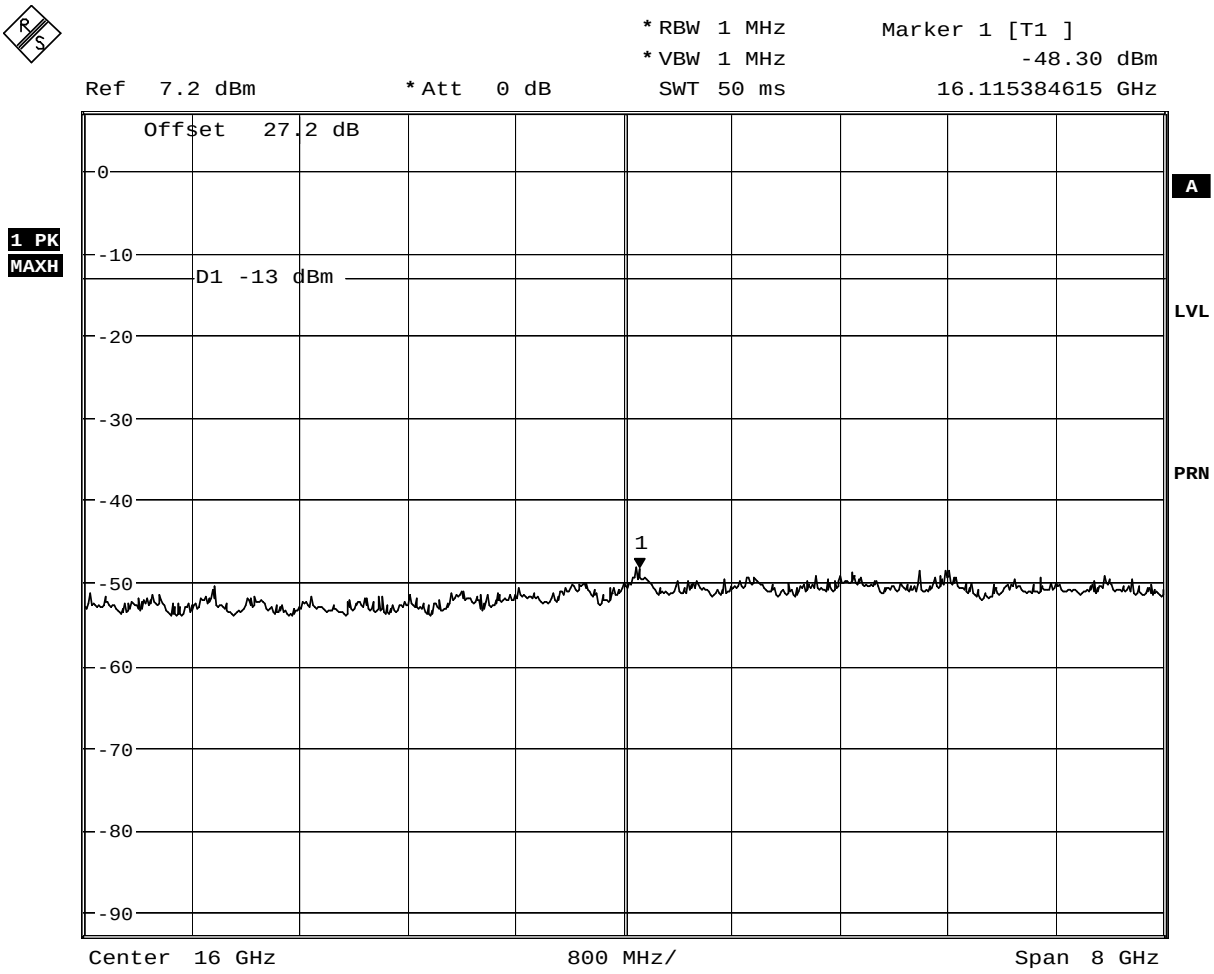


Date: 10.APR.2006 11:58:03

Spurious Emissions (4GHz – 12GHz)
Channel 512 (1850.2MHz) - Maximum Power

2.18 CONDUCTED SPURIOUS EMISSIONS

2.18.6 **Test Results** - continued

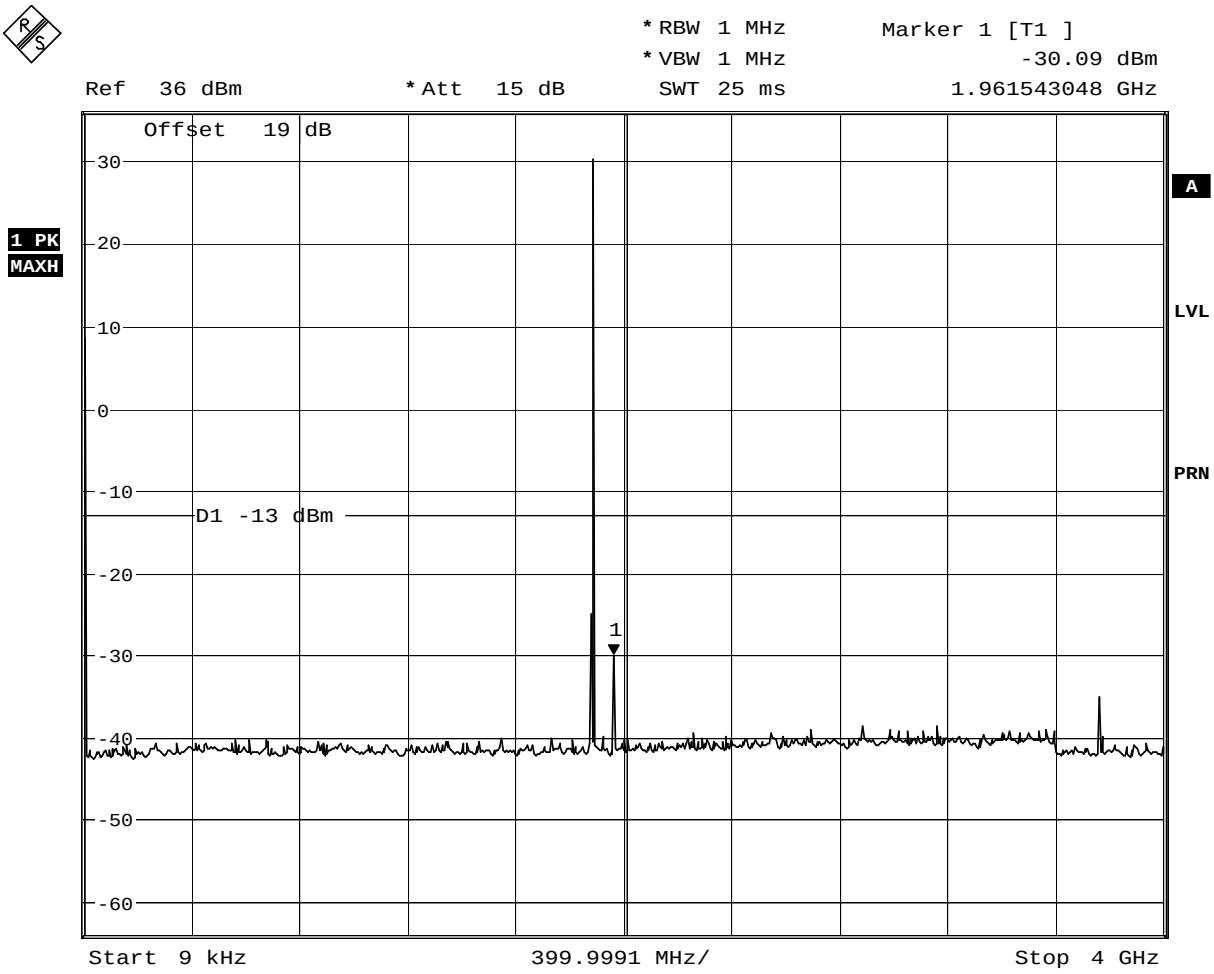


Date: 10.APR.2006 11:51:41

Spurious Emissions (12GHz – 20GHz)
Channel 512 (1850.2MHz) - Maximum Power

2.18 CONDUCTED SPURIOUS EMISSIONS

2.18.6 **Test Results** - continued

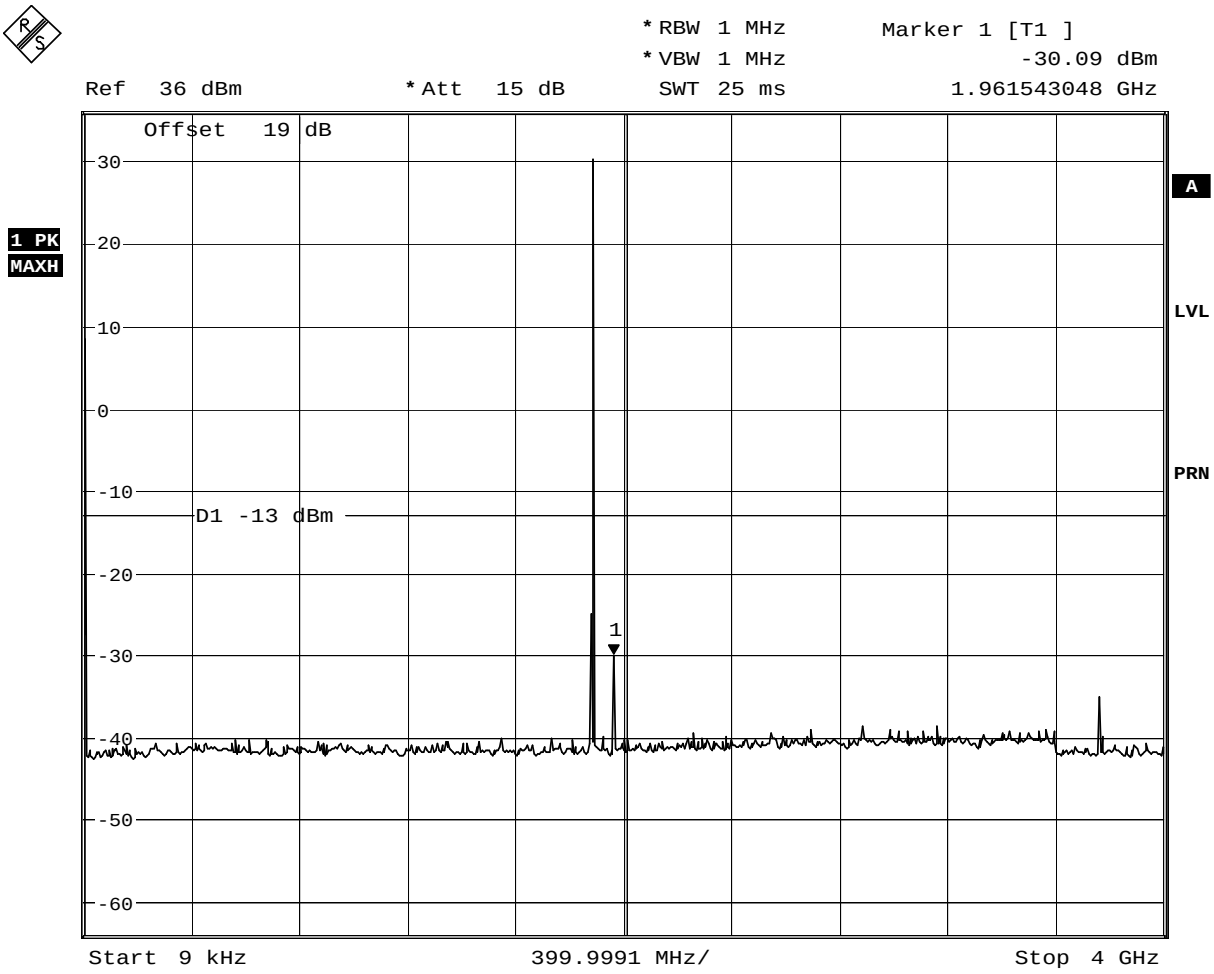


Date: 10.APR.2006 11:15:43

Spurious Emissions (9kHz – 4GHz)
Channel 661 (1880.0MHz) - Maximum Power

2.18 CONDUCTED SPURIOUS EMISSIONS

2.18.6 **Test Results** - continued

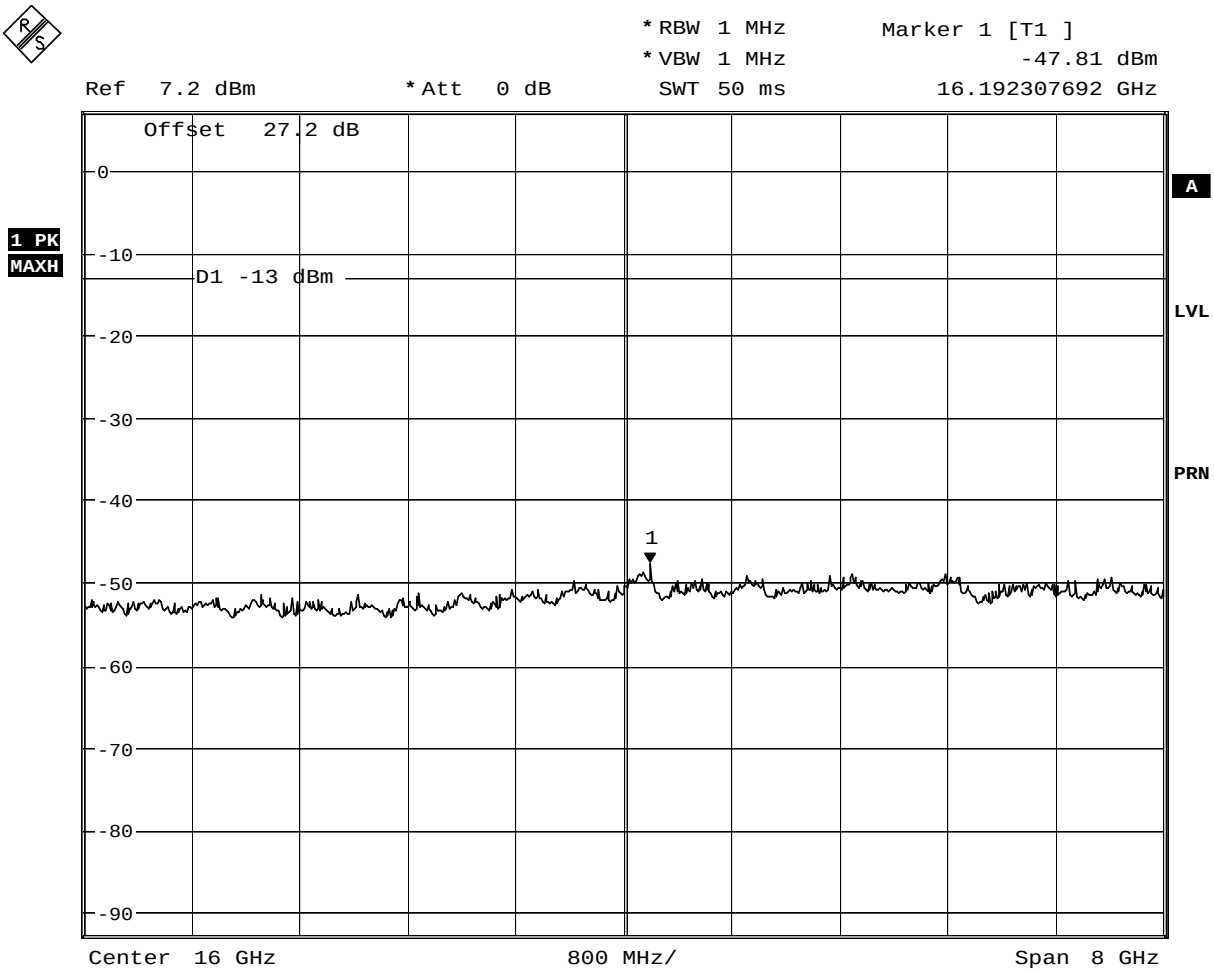


Date: 10.APR.2006 11:15:43

Spurious Emissions (4GHz – 12GHz)
Channel 661 (1880.0MHz) - Maximum Power

2.18 CONDUCTED SPURIOUS EMISSIONS

2.18.6 **Test Results** - continued

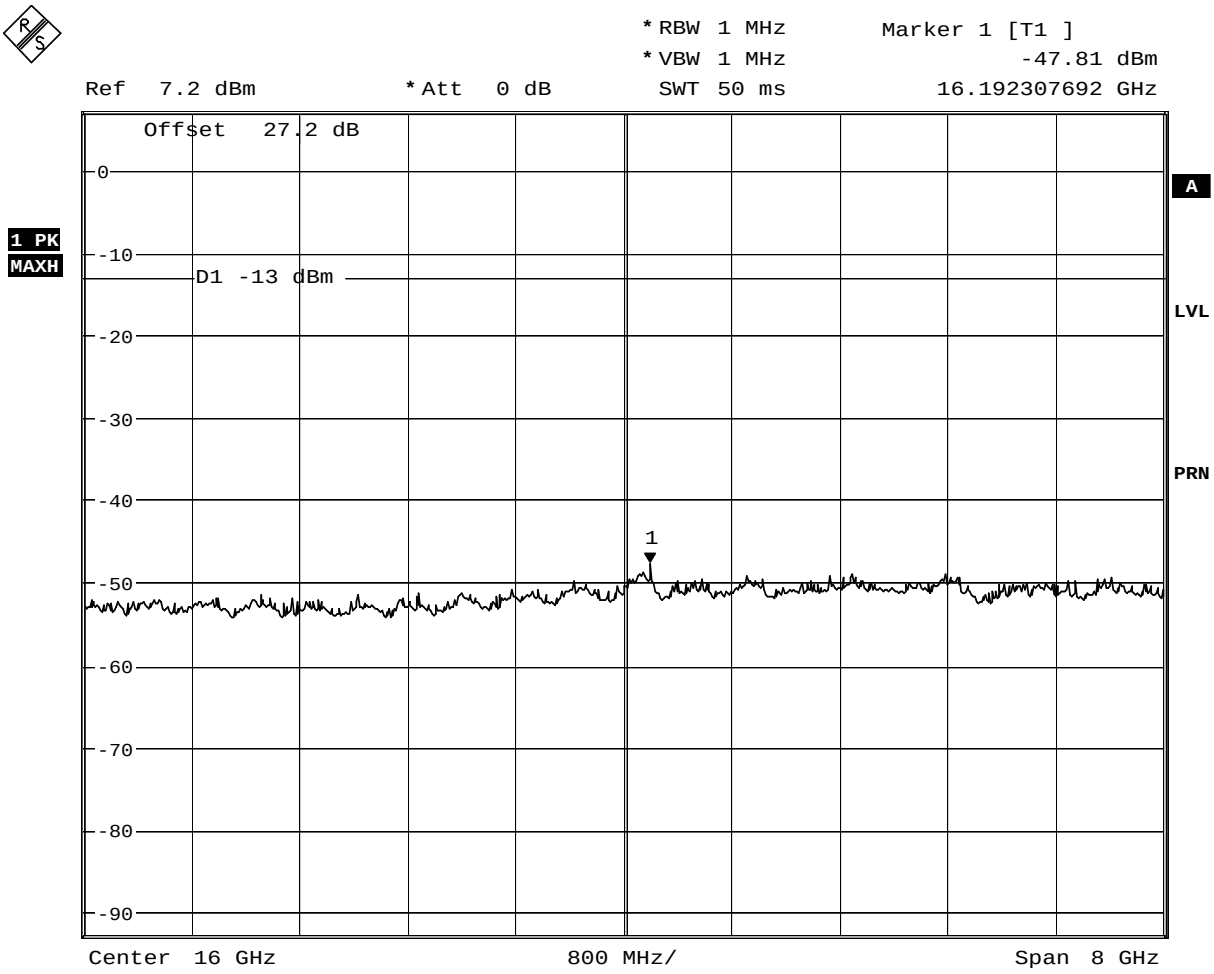


Date: 10.APR.2006 11:52:40

Spurious Emissions (12GHz – 20GHz)
Channel 661 (1880.0MHz) - Maximum Power

2.18 CONDUCTED SPURIOUS EMISSIONS

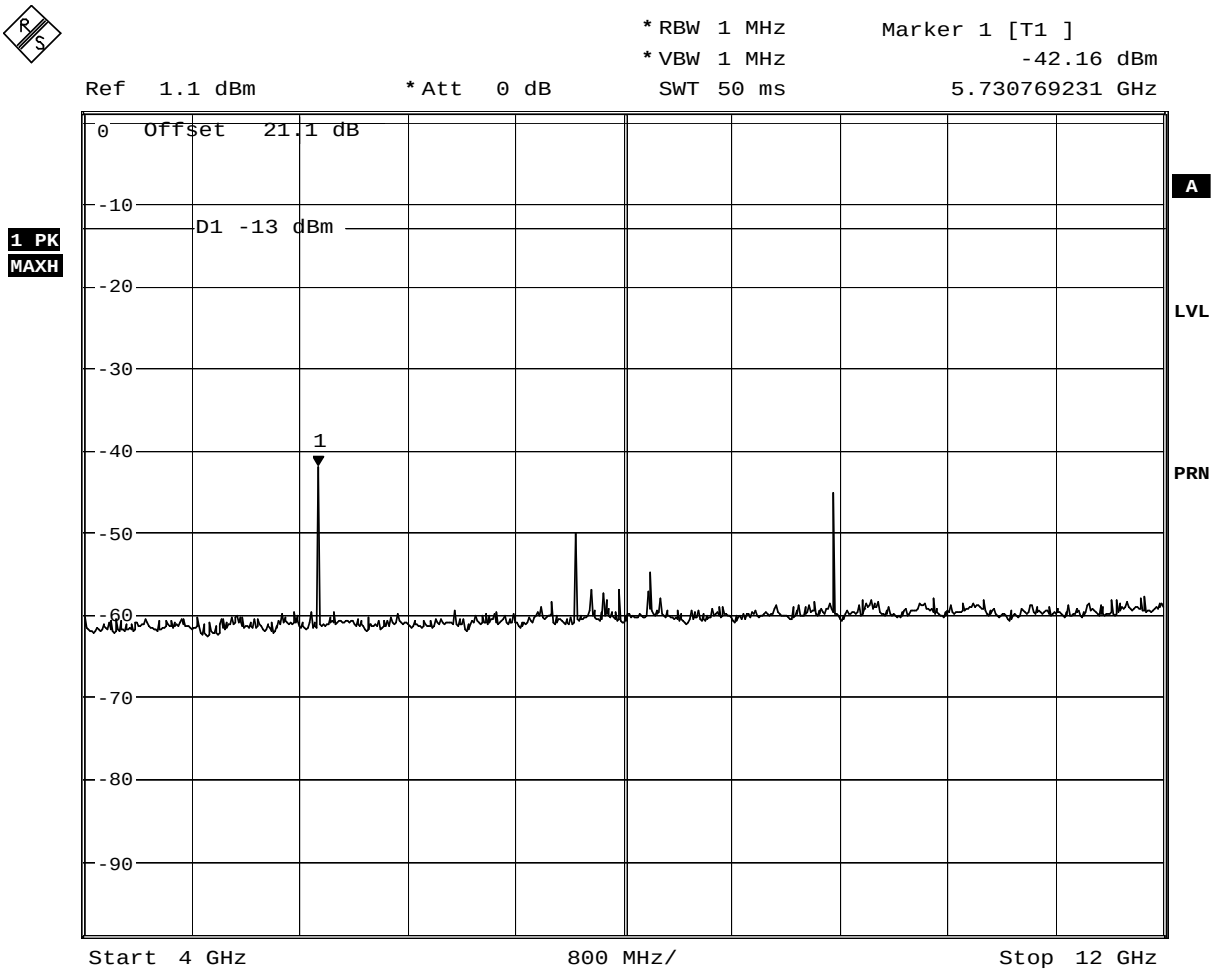
2.18.6 **Test Results** - continued



Spurious Emissions (9kHz – 4GHz)
Channel 810 (1909.8MHz) - Maximum Power

2.18 CONDUCTED SPURIOUS EMISSIONS

2.18.6 **Test Results** - continued

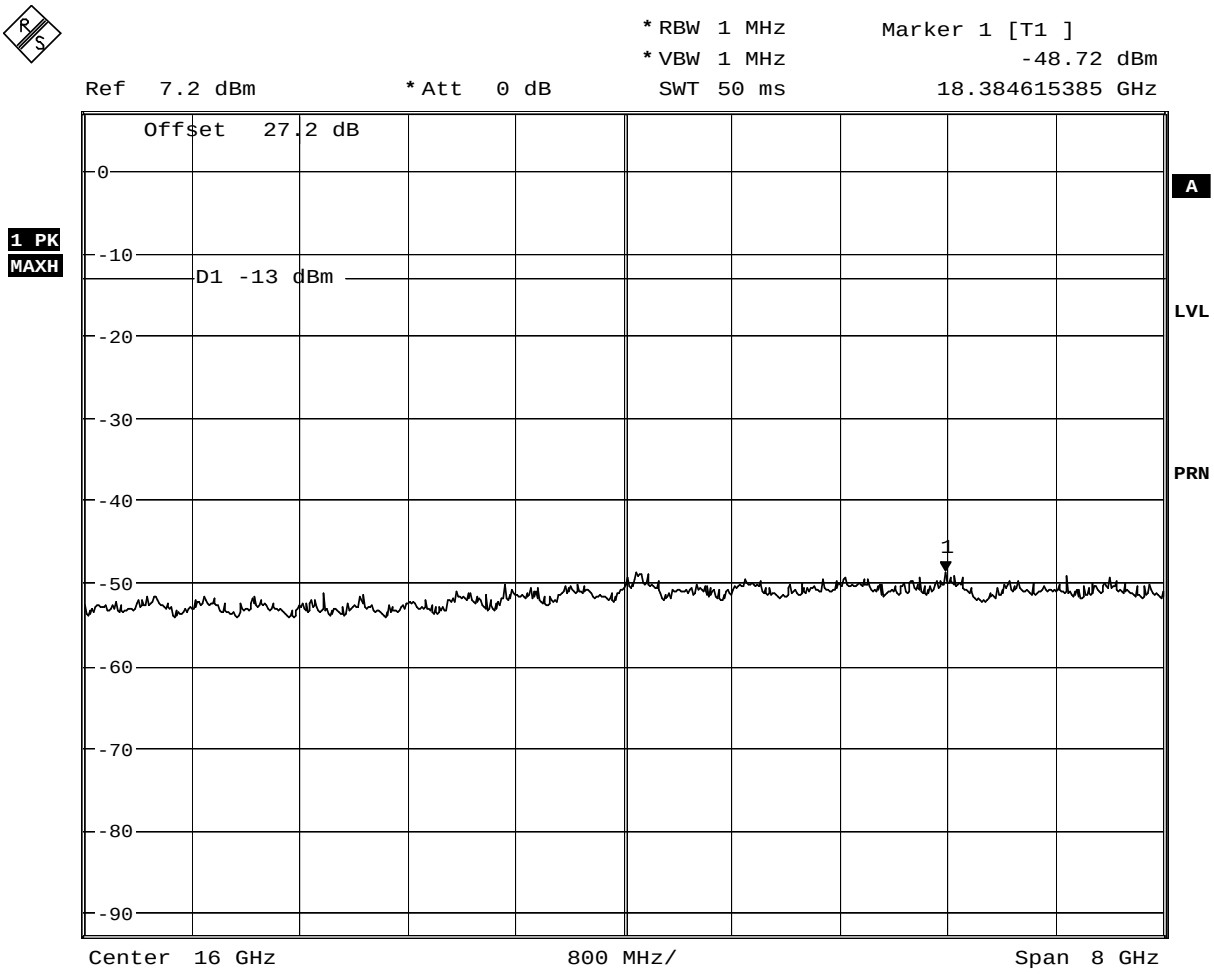


Date: 10.APR.2006 11:56:30

Spurious Emissions (4GHz – 12GHz)
Channel 810 (1909.8MHz) - Maximum Power

2.18 CONDUCTED SPURIOUS EMISSIONS

2.18.6 **Test Results** - continued



Spurious Emissions (12GHz – 20GHz)
Channel 810 (1909.8MHz) - Maximum Power

2.19 FREQUENCY STABILITY UNDER TEMPERATURE VARIATIONS

2.19.1 Specification Reference

FCC CFR 47: Part 24 Subpart E, Section 24.235, 2.1055
Industry Canada RSS-133, 4.2/6.3

2.19.2 Equipment Under Test

SAGEM A2005sca+

2.19.3 Date of Test

10th April 2006

2.19.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.19.5 Test Procedure

The EUT was set to transmit on power control level 0 with timeslot 3 active. A Digital Communications Analyser, (CMU200), was used to measure the Frequency Error. The maximum result of measurements made over 200 bursts was recorded.

The temperature was adjusted between -30ºC and +50ºC in 10º steps as per 2.1055. Measurements were conducted with the EUT in the GSM mode of operation.

2.19 FREQUENCY STABILITY UNDER TEMPERATURE VARIATIONS

2.19.6 Test Results

3.9V DC - PCS 1900 Mode, GMSK Modulation

Temperature Interval ºC	Test Frequency GHz	Deviation Hz	Limit kHz
- 28	1.88	+24	See Below
- 20	1.88	+21	See Below
- 10	1.88	+22	See Below
0	1.88	+16	See Below
+ 10	1.88	+34	See Below
+ 20	1.88	+21	See Below
+ 30	1.88	-25	See Below
+ 40	1.88	-22	See Below
+ 50	1.88	-26	See Below

Limit	The fundamental must remain within the authorized frequency block

Remarks

EUT complies with CFR 47 Part 24.135(a) and Industry Canada RSS-133, 4.2/6.3. The fundamental of the EUT remained within the authorized frequency block at the measured frequency at any temperature interval across the measured range.

The EUT failed to operate below -28°C.

2.20 FREQUENCY STABILITY UNDER VOLTAGE VARIATIONS

2.20.1 Specification Reference

FCC CFR 47: Part 24 Subpart E, Section 24.135(a), 2.1055
Industry Canada RSS-133, 4.2/6.3

2.20.2 Equipment Under Test

SAGEM A2005sca+

2.20.3 Date of Test

10th April 2006

2.20.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.20.5 Test Procedure

GSM

The EUT was set to transmit on power control level 0 with Timeslot 3 active. A Digital Communications Analyser, (CMU200), was used to measure the Frequency Error. The maximum result of measurements made over 200 bursts was recorded. Measurements were conducted with the EUT in GSM mode of operation. The voltage was varied as described in the results table.

2.20.6 Test Results - continued

3.9V DC Supply – PCS1900 mode, GMSK Modulation

DC Voltage V	Test Frequency GHz	Deviation Hz	Deviation Limit kHz
3.90	1.88	+21	See Below
3.55	1.88	+8	See Below

Limit	Fundamental must remain within authorized frequency block

Remarks

EUT complies with CFR 47 Part 24.135(a) and Industry Canada RSS-131 4.2/6.3. The EUT fundamental remains within the authorized frequency band at the measured frequency either at nominal or voltage variation.

SECTION 3

TEST EQUIPMENT

3.1 TEST EQUIPMENT

List of absolute measuring and other principal items of test equipment.

Instrument	Manufacturer	Type No	TE Number	Calibration Due
Section 2.2 EMC - Conducted Emissions				
Test Receiver	Rohde & Schwarz	ESH3	13	30/09/2006
Transient Limiter	Hewlett Packard	11947A	15	22/09/2006
LISN	Rohde & Schwarz	ESH2-Z5	16	17/08/2006
Spectrum Analyser	Rohde & Schwarz	EZM	291	O/P MON
GSM Test Set	Rohde & Schwarz	CMU 200	2809	13/01/2007
Section 2.4 & 2.12 EMC - Maximum Output Power Radiated				
Signal Generator	Rohde & Schwarz	SWM 02	62	15/01/2006
Antenna (Double Ridge Guide, 1GHz-18GHz)	EMCO	3115	234	01/07/2006
Antenna (Double Ridge Guide, 1GHz-18GHz)	EMCO	3115	235	01/07/2006
Test Receiver	Rohde & Schwarz	ESIB26	242	12/12/2006
GSM Test Set	Hewlett Packard	8922M	256	O/P MON
DCS Test Set	Hewlett Packard	83220E	257	O/P MON
Antenna (Dipole, 300MHz-1000MHz)	Schwarzbeck	UHAP	447	08/09/2007
Attenuator (10dB, 10W)	Marconi	6534/3	1048	O/P MON
Mast Controller	Inn-Co GmbH	CO 1000	1606	O/P MON
Turntable/Mast Controller	EMCO	2090	1607	O/P MON
GSM Test Set	Rohde & Schwarz	CMU 200	2809	13/01/2007
Bilog Antenna	Chase	CBL6143	2904	10/11/2007

3.1 TEST EQUIPMENT

List of absolute measuring and other principal items of test equipment.

Section 2.1 EMC – Radiated Emissions				
Spectrum Analyser	Hewlett Packard	8542E	18	09/02/2007
Signal Generator	Rohde & Schwarz	SWM 02	62	O/P MON
Amplifier	Miteq Corp	AMF-3d-001080-18-13P	231	O/P MON
Antenna (Double Ridge Guide, 1GHz-18GHz)	EMCO	3115	234	01/07/2006
Antenna (Double Ridge Guide, 1GHz-18GHz)	EMCO	3115	235	01/07/2006
Test Receiver	Rohde & Schwarz	ESIB26	242	12/12/2006
GSM Test Set	Hewlett Packard	8922M	256	O/P MON
DCS Test Set	Hewlett Packard	83220E	257	O/P MON
Filter (High Pass, 3GHz)	RLC Electronics	F-100-3000-5-R	563	01/11/2006
Attenuator (10dB, 10W)	Marconi	6534/3	1048	O/P MON
EMI Test Receiver	Rohde & Schwarz	ESI26	1505	18/04/2006
Bilog Antenna	Chase	CBL6111B	1508	16/04/2006
DRG Antenna	EMCO	3115	1509	O/P MON
DRG Antenna	EMCO	3115	1510	03/11/2006
Pre Amplifier	Phase One	PS04-0085	1532	13/07/2006
Pre Amplifier	Phase One	PS04-0086	1533	13/07/2006
Mast Controller	Inn-Co GmbH	CO 1000	1606	O/P MON
Turntable/Mast Controller	EMCO	2090	1607	O/P MON
3m N-N RF Cable	Rosenberger	3899	1871	11/04/2007
15m N-N RF Cable	Rosenberger	FA210A-150M	2026	11/04/2007
Amplifier (8GHz-18GHz)	Avantec	AWT-18036	2821	O/P MON
Hi Pass Filter	RLC Electronics	RLC-F100-1500-S-R	2843	16/05/2006
Bilog Antenna	Chase	CBL6143	2904	10/11/2007

3.2 MEASUREMENT UNCERTAINTY

For a 95% confidence level, the measurement uncertainties for defined systems are:-

Test Discipline	Frequency / Parameter	MU
Radiated Emissions, Bilog Antenna, AOATS	30MHz to 1GHz Amplitude	5.1dB*
Radiated Emissions, Horn Antenna, AOATS	1GHz to 40GHz Amplitude	6.3dB*
Conducted Power		0.5dB
Occupied Bandwidth		23kHz
Conducted Spurious		2.0dB
Frequency Stability		50Hz

Worst case error for both Time and Frequency measurement 12 parts in 10^6.

* In accordance with CISPR 16-4

SECTION 4

PHOTOGRAPHS

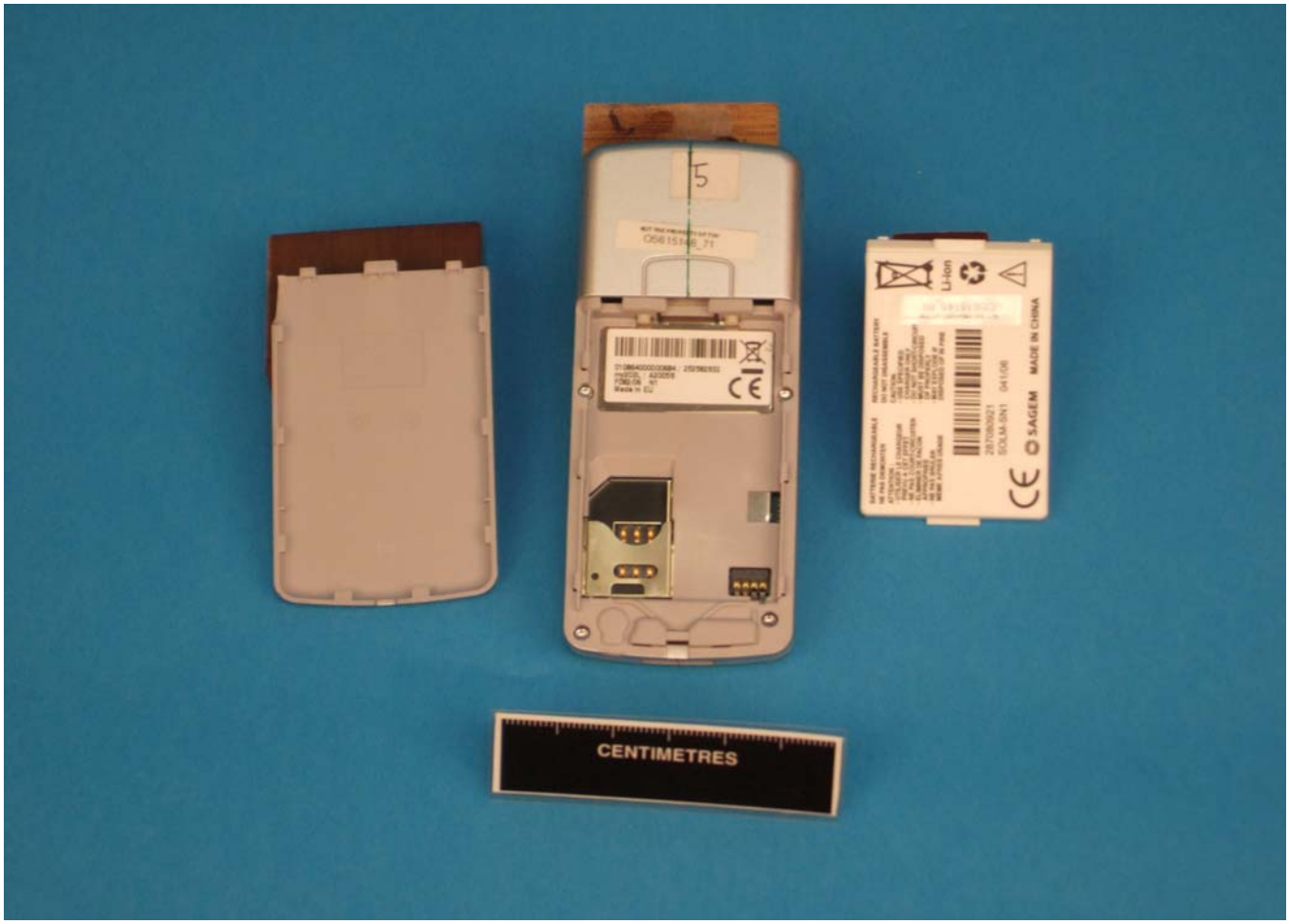
4.1 PHOTOGRAPHS OF EQUIPMENT UNDER TEST (EUT)

Front View

4.1 PHOTOGRAPHS OF EQUIPMENT UNDER TEST (EUT)

Rear View

4.1 PHOTOGRAPHS OF EQUIPMENT UNDER TEST (EUT)



Rear View - Battery Removed

4.1 PHOTOGRAPHS OF EQUIPMENT UNDER TEST (EUT)

Headset

4.1 PHOTOGRAPHS OF EQUIPMENT UNDER TEST (EUT)

Data Cable

4.1 PHOTOGRAPHS OF EQUIPMENT UNDER TEST (EUT)

Cigar Lighter Adapter

4.1 PHOTOGRAPHS OF EQUIPMENT UNDER TEST (EUT)

AC Charger

4.1 PHOTOGRAPHS OF EQUIPMENT UNDER TEST (EUT)

AC Charger

4.1 PHOTOGRAPHS OF EQUIPMENT UNDER TEST (EUT)

AC Charger

Product Service

4.1 PHOTOGRAPHS OF EQUIPMENT UNDER TEST (EUT)

AC Charger

4.1 PHOTOGRAPHS OF EQUIPMENT UNDER TEST (EUT)

AC Charger

4.1 PHOTOGRAPHS OF EQUIPMENT UNDER TEST (EUT)

AC Charger

Product Service

SECTION 5

ACCREDITATION, DISCLAIMERS AND COPYRIGHT

5.1 ACCREDITATION, DISCLAIMERS AND COPYRIGHT

Group

This report relates only to the actual item/items tested.

Our UKAS Accreditation does not cover opinions and interpretations and any expressed are outside the scope of our UKAS Accreditation.

Results of tests not covered by our UKAS Accreditation Schedule are marked NUA (Not UKAS Accredited).