REPORT ON

Limited FCC CFR 47: Parts 15, 22 and 24
and Industry Canada RSS-132 and 133 Testing
of a SAGEM Communications MC2004a Handset

COMMERCIAL-IN-CONFIDENCE

FCC ID: M9HMC2004A

Report No OR615015/01 Issue 3 **May 2006**

Product Service

Competence. Certainty. Quality

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REPORT ON Limited FCC CFR 47: Parts 15, 22 and 24 and Industry Canada RSS-132 and 133 Testing of a SAGEM Communications MC2004a Handset

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FCC ID: M9HMC2004A

PREPARED FOR

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DATED 16th May 2006

This report has been up issued due to additional testing

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

R Carr

P Harrison

UKAS TESTING 0141 Group

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CONTENTS

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 Communications MC2004a Handset

1.1 STATUS

Equipment Under Test	MC2004a Handset
Objective	To undertake measurements to determine the Equipment Under Test's (EUT's) compliance with the specification.
Name and Address of Client	SAGEM Communications Mobile Phones Research and Development Mobile Communication Business Group 2, rue deu Petit Albi – BP 28250 95801 Cergy Pontoise Cedex France
Type	Mobile Dual Band Handset
Part Number(s)	Handset - MC2004a Battery – 188973731 AC Charger (US) – 189107196 AC Charger (CE) – 189107154 AC Charger (UK) – 189107188 AC Charger (AUS) – 188692000 Mono Headset – 188448080 Cigar Adapter – 188718424 Data Cable - 188672363
Serial Number(s)	IMEI 01084300950022-5 IMEI 01084300950020-9 IMEI 01084300950019-1
Hardware Version	V0x
Software Version	L 5, 8B
Declared Variants	None
Test Specification/Issue/Date	FCC CFR 47: Part 15, Subpart B: 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 3: 2005 RSS-Gen: 2005
Number of Items Tested	Three
Security Classification of EUT	Commercial-in-Confidence
Incoming Release Date	Declaration of Build Status 13th March 2005

1.1 STATUS

Disposal	Held pending disposal
Order Number	PTP
Date	11th January 2006
Start of Test	22nd February 2006
Finish of Test	4th May 2006
Related Documents	ANSI C63.4: 2001 RSS-212, Issue 1: 1999 SRSP-503, Issue 6: 2003 SRSP-510, Issue 3: 2003

1.2 INTRODUCTION

The information contained within this report is intended to show limited verification of compliance of the SAGEM Communications MC2004a Handset to the requirements of FCC Specification Parts 15, 22 and 24 and Indusrty Canada Radio Specifications RSS-132, RSS-133 and RSS-Gen.

Testing has been performed under the following site accreditations

FCC Accreditation
90987 Octagon House, Fareham Test Laboratory

Industry Canada Accreditation
IC4270 Octagon House, Fareham Test Laboratory

1.2 INTRODUCTION

1.2.1 Declaration of Build Status

MAIN EUT	
MANUFACTURING DESCRIPTION	Dual Band Handset
MANUFACTURER	Sagem Communications
TYPE	Dual Band Handset
PART NUMBER	MC2004a
SERIAL NUMBER	See Test pages
HARDWARE VERSION	V0X
SOFTWARE VERSION	L5,8B
TRANSMITTER 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 1989.8
COUNTRY OF ORIGIN	China
INTERMEDIATE FREQUENCIES	None
ITU DESIGNATION OF EMISSION	850 Band – 1900 Band -
HIGHEST INTERNALLY GENERATED FREQUENCY	GSM 850 band : 1737.8 -1787.8 MHz PCS 1900 band : 1929.9 - 1989.9 MHz
OUTPUT POWER (W or dBm)	GSM 850 band: Class 4 (PCL 5) 2W or 33 dBm PCS 1900 band: Class 0 (PCL 0) 1W or 30 dBm
FCC ID	M9HMC2004A
INDUSTRY CANADA ID	N/A
TECHNICAL DESCRIPTION (a brief description of the intended use and operation)	Dual Band handset
BATTERY/POWER SUPPLY	
MANUFACTURING DESCRIPTION	Battery – Li-ION 730 mAh Power Supply – Dual Voltage 110-220V
MANUFACTURER	Battery – Desay – Part no. 188973731 Power Supply – Astec Part no.189107196
VOLTAGE	3.9V nominal

Signature Mickael Robic

Date 14/03/2006
D of B S Serial No OS615015

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.

Product Service

1.3 BRIEF SUMMARY OF RESULTS

A brief summary of the tests carried out is shown below.

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

Test	Spec Clause		Test Description	Result	IMEI Number
	FCC	Industry Canada			
2.1	Part 15.109	RSS-132, 6.6 RSS-133, 6.7 RSS-Gen 6	Spurious Radiated Emissions	Pass	01084300950022-5
2.2	Part 15.107	RSS-Gen 7.2.2	Conducted Emissions	Pass	01084300950020-9

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

Test	Spec Clause		Test Description	Result	Comments
	FCC	Industry Canada			
2.3	Part 22.913 (a)	RSS-132, 4.4	Effective Radiated Power – Conducted	Pass	01084300950019-1
2.4	Part 22.913 (a)	RSS-132, 4.4	Effective Radiated Power –Radiated (EIRP Method)	Pass	01084300950022-5
2.5	Part 22.1047(d)	RSS-132, 4.2	Modulation Characteristics	Pass	01084300950019-1
2.6	Part 22.1049, Part 22.917 (b)	RSS-132, 4.5	Occupied Bandwidth	Pass	01084300950019-1
2.7	Part 22.1051, Part 22.905 Part 22.917	RSS-132, 4.5	Spurious Emissions at Antenna Terminals (+/- 1MHz)	Pass	01084300950019-1
2.8	Part 22.1053, Part 22.917	RSS-132, 4.5	Radiated Spurious Emissions	Pass	01084300950022-5
2.9	Part 22.1051, Part 22.917(a)	RSS-132, 4.5	Conducted Spurious Emissions	Pass	01084300950019-1
2.10	Part 22.1055, Part 22.355	RSS-132, 4.3	Frequency Stability Under Temperature Variations	Pass	01084300950019-1
2.11	Part 22.1055, Part 22.355	RSS-132, 4.3	Frequency Stability Under Voltage Variations	Pass	01084300950019-1

1.3 BRIEF SUMMARY OF RESULTS

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

Test	Spec Clause		Test Description	Result	Comments
	FCC	Industry Canada			
2.12	Part 22.1046 Part 24.232 (b)	RSS-133, 4.3 and 6.4	Maximum Peak Output Power – Radiated (EIRP Method)	Pass	01084300950022-5
2.13	Part 2.1046 Part 24.232	RSS-133, 4.3 and 6.4	Maximum Peak Output Power - Conducted	Pass	01084300950019-1
2.14	Part 2.1047(d)	RSS-133, 6.2	Modulation Characteristics	Pass	01084300950019-1
2.15	Part 2.1049, Part 24.238 (b)	RSS-133. 2.6, 6.5 and RSS-Gen 4.4	Occupied Bandwidth	Pass	01084300950019-1
2.16	Part 2.1051, Part 24.229 Part 24.238	RSS-133, 4.4 and 6.5	Spurious Emissions at Antenna Terminals (+/- 1MHz)	Pass	01084300950019-1
2.17	Part 22.1053, Part 24.238	RSS-133, 4.4 and 6.5	Radiated Spurious Emissions	Pass	01084300950022-5
2.18	Part 2.1051, Part 24.238 (a)	RSS-133, 4.4 and 6.5	Conducted Spurious Emissions	Pass	01084300950019-1
2.19	Part 2.1055, Part 24.235	RSS-133, 4.2 and 6.3	Frequency Stability Under Temperature Variations	Pass	01084300950019-1
2.20	Part 2.1055, Part 24.235	RSS-133, 4.2 and 6.3	Frequency Stability Under Voltage Variations	Pass	01084300950019-1

1.4 PRODUCT INFORMATION

1.4.1 Technical Description

The Equipment Under Test (EUT) was a SAGEM Communications MC2004a Handset designed for communication in the GSM 850 and PCS 1900 networks.

1.4.2 Modes of Operation

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

1.4.3 Test Configuration

Test Configuration – GSM 850 Mode

850MHz transmitting on the following channels and frequencies;
Bottom Channel 128: 824.20MHz
Middle Channel 189: 836.40MHz
Top Channel 251: 848.80MHz
850MHz receiving on the following channels and frequencies;
Middle Channel 189: 836.40MHz

Test Configuration – PCS 1900 Mode

1900MHz transmitting on the following channels and frequencies;
Bottom Channel 512: 1820.20MHz
Middle Channel 661: 1880.00MHz
Top Channel 810: 1909.80MHz
1900MHz receiving on the following channels and frequencies;
Middle Channel 661: 1880.00MHz

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 Communications MC2004a Handset was powered via an AC adaptor.

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 Ltd conducted the following tests at our Maplewood, Basingstoke Test Laboratory.

- FCC: Part 15.109, Spurious Radiated Emissions
- FCC: Part 15.107, Conducted Emissions
- FCC: Part 22.913(a), Effective Radiated Power (EIRP Method)
- FCC: Part 24.232(b), Maximum Peak Output Power (EIRP Method)
- FCC: Part 22.917, Radiated Spurious Emissions
- FCC: Part 24.238, Radiated Spurious Emissions

Product Service

SECTION 2

TEST RESULTS

Limited FCC CFR 47: Parts 15, 22 and 24
and Industry Canada RSS-132, 133 and Gen Testing
of a SAGEM Communications MC2004a 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, 6.6 and RSS-133, 9

2.1.2 Equipment Under Test

MC2004a Handset

2.1.3 Date of Test

3rd March 2006 (Handset with US Charger)
4th May 2006 (Handset and Ancillary Equipment)

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 – 10GHz 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, 6.6 and RSS-133, 9 for Spurious Radiated Emissions (30MHz – 20GHz).

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

EUT Receiving on Middle Channel (836.4MHz)

Handset with US Charger
No emissions were detected. Therefore a table of noise floor measurements is presented.

Frequency	Antenna Polarisation	Height	Azimuth	Quasi-Peak Result	Quasi-Peak Limit
MHz		cm	degree	dBµV/m	dBµV/m
35.0	Vertical	100	000	22.7	40.0
227.0	Vertical	100	000	18.7	46.0
419.0	Vertical	100	000	27.1	46.0
611.0	Vertical	100	000	31.5	46.0
800.0	Vertical	100	000	34.8	46.0
900.0	Vertical	100	000	36.4	46.0

Handset with UK Charger

Frequency	Antenna Polarisation	Height	Azimuth	Quasi-Peak Result	Quasi-Peak Limit
MHz		cm	degree	dBµV/m	dBµV/m
54.43	Vertical	100	270	31.7	40.0

No other emissions detected.

Handset with EU Charger

Frequency	Antenna Polarisation	Height	Azimuth	Quasi-Peak Result	Quasi-Peak Limit
MHz		cm	degree	dBµV/m	dBµV/m
58.02	Vertical	100	137	19.6	40.0
69.60	Vertical	100	137	21.7	40.0

No other emissions detected.

2.1 SPURIOUS RADIATED EMISSIONS

2.1.6 Test Results - continued

Handset with AUS Charger

Frequency	Antenna Polarisation	Height	Azimuth	Quasi-Peak Result	Quasi-Peak Limit
MHz		cm	degree	dBµV/m	dBµV/m
55.80	Vertical	100	197	17.8	40.0

No other emissions detected.

Handset with DC Charger
No emissions were detected.

Handset with Simple Hands Free, No Power Applied
No emissions were detected.

USB Cable to Handset, Power Supplied
No emissions were detected.

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

EUT Receiving on Middle Channel (1880.0MHz)

Handset with US Charger`
No emissions were detected. Therefore the noise floor measurements are presented below: -

Frequency	Antenna Polarisation	Height	Azimuth	Quasi-Peak Result	Quasi-Peak Limit
MHz		cm	degree	dBµV/m	dBµV/m
35.0	Vertical	100	000	25.6	40.0
227.0	Vertical	100	000	18.7	46.0
419.0	Vertical	100	000	27.1	46.0
611.0	Vertical	100	000	31.5	46.0
800.0	Vertical	100	000	34.8	46.0
900.0	Vertical	100	000	36.4	46.0

Handset with UK Charger

Frequency	Antenna Polarisation	Height	Azimuth	Quasi-Peak Result	Quasi-Peak Limit
MHz		cm	degree	dBµV/m	dBµV/m
54.96	Vertical	100	270	30.8	40.0

No other emissions detected.

2.1 SPURIOUS RADIATED EMISSIONS

2.1.6 **Test Results** - continued

Handset with EU Charger

Frequency	Antenna Polarisation	Height	Azimuth	Quasi-Peak Result	Quasi-Peak Limit
MHz		cm	degree	dBµV/m	dBµV/m
58.05	Vertical	100	137	19.7	40.0
69.60	Vertical	100	137	21.8	40.0

No other emissions detected.

Handset with AUS Charger

Frequency	Antenna Polarisation	Height	Azimuth	Peak Result	Quasi-Peak Limit
MHz		cm	degree	dBµV/m	dBµV/m
56.13	Vertical	100	197	18.7	40.0

No other emissions detected.

Handset with DC Charger
No emissions were detected.

Handset with Simple Hands Free, No Power Applied
No emissions were detected.

USB Cable to Handset, Power Supplied
No emissions were detected.

2.2 CONDUCTED EMISSIONS ON POWER PORTS

2.2.1 Specification Reference

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

2.2.2 Equipment Under Test

MC2004a Handset

2.2.3 Date of Test

28th February 2006(Handset with US Charger)
3rd May 2006 (Handset and Ancillary Equipment)

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.

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 are presented in the tables below.

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 B, Section 15.107 for Conducted Emissions on the Live and Neutral Lines.

Measurements were made with the EUT in GSM 850.

EUT in Idle Mode on Middle Channel (836.4MHz) – Live Line

Handset with US Charger

Frequency MHz	Quasi-Peak Level dBµV	Quasi-Peak Limit dBµV	Average Level dBµV	Average Limit dBµV
0.175	50.9	64.7	30.2	54.7
0.220	48.9	62.8	28.3	52.8
0.240	52.9	62.1	33.8	52.1
0.270	49.6	62.1	28.3	52.1
0.285	49.5	60.7	29.0	50.7
0.545	44.8	56.0	33.3	46.0

The margin between the specification requirements and all other emissions were 14.0dB or more below the specified Quasi-Peak limit and 12.7dB or more below the Average limit.

Handset with UK Charger

Frequency MHz	Quasi-Peak Level dBµV	Quasi-Peak Limit dBµV	Average Level dBµV	Average Limit dBµV
0.164	56.1	65.0	34.9	55.0
0.170	55.0	64.9	33.5	54.9
0.193	51.4	63.9	34.8	53.9
0.336	45.6	59.1	24.2	49.1
0.433	45.8	57.1	25.5	47.1
0.464	45.8	56.4	25.9	46.4

The margin between the specification requirements and all other emissions were 13.9dB or more below the specified Quasi-Peak limit and 19.7dB or more below the Average limit.

2.2 CONDUCTED EMISSIONS ON POWER PORTS

2.2.6 **Test Results** - Continued

Handset with EU Charger

Frequency MHz	Quasi-Peak Level dBµV	Quasi-Peak Limit dBµV	Average Level dBµV	Average Limit dBµV
0.162	58.3	65.4	41.5	55.4
0.175	55.4	64.8	35.1	54.8
0.252	52.6	64.1	41.7	54.1
0.324	49.4	61.6	31.4	51.6
0.425	48.3	59.6	27.7	49.6
0.496	45.8	58.3	29.9	48.3

The margin between the specification requirements and all other emissions were 10.3dB or more below the specified Quasi-Peak limit and 17.5dB or more below the Average limit.

Handset with AUS Charger

Frequency MHz	Quasi-Peak Level dBµV	Quasi-Peak Limit dBµV	Average Level dBµV	Average Limit dBµV
0.157	59.6	65.7	42.2	55.7
0.166	55.7	65.2	36.0	55.2
0.197	50.6	63.9	37.4	53.9
0.209	54.3	63.2	36.8	53.2
0.256	51.5	61.6	34.2	51.6
0.430	46.0	57.1	27.0	47.1

The margin between the specification requirements and all other emissions were 15.2dB or more below the specified Quasi-Peak limit and 19.7dB or more below the Average limit.

EUT in Idle Mode on Middle Channel (836.4MHz) – Neutral Line

Handset with US Charger

Frequency MHz	Quasi-Peak Level dBµV	Quasi-Peak Limit dBµV	Average Level dBµV	Average Limit dBµV
0.185	55.6	64.3	33.4	54.3
0.230	52.8	62.5	32.0	52.5
0.275	48.3	61.0	28.1	51.0
0.540	43.8	56.0	30.3	46.0
0.590	43.7	56.0	30.2	46.0
1.200	43.3	56.0	28.6	46.0

The margin between the specification requirements and all other emissions were 12.7dB or more below the specified Quasi-peak limit and 17.4dB or more below the specified Average limit.

2.2 CONDUCTED EMISSIONS ON POWER PORTS

2.2.6 **Test Results** - continued

Handset with UK Charger

Frequency MHz	Quasi-Peak Level dBµV	Quasi-Peak Limit dBµV	Average Level dBµV	Average Limit dBµV
0.165	55.4	65.2	36.3	55.2
0.180	53.4	64.5	32.9	54.5
0.189	51.9	64.1	32.4	54.1
0.346	46.3	59.1	24.6	49.1
0.448	47.1	56.9	25.1	46.9
0.464	46.1	56.6	24.7	46.6

The margin between the specification requirements and all other emissions were 12.6dB or more below the specified Quasi-Peak limit and 21.3dB or more below the Average limit.

Handset with EU Charger

Frequency MHz	Quasi-Peak Level dBµV	Quasi-Peak Limit dBµV	Average Level dBµV	Average Limit dBµV
0.153	59.0	65.8	42.7	55.8
0.168	55.7	65.1	34.1	55.1
0.209	53.1	63.2	37.1	53.2
0.334	48.1	59.4	31.4	49.4
0.410	47.7	57.6	28.6	47.6
0.435	47.7	57.2	27.4	47.2

The margin between the specification requirements and all other emissions were 11.3dB or more below the specified Quasi-Peak limit and 19.1dB or more below the Average limit.

Handset with AUS Charger

Frequency MHz	Quasi-Peak Level dBµV	Quasi-Peak Limit dBµV	Average Level dBµV	Average Limit dBµV
0.162	56.7	65.4	38.3	55.4
0.194	52.5	63.9	38.2	53.9
0.308	49.4	60.0	29.8	50.0
0.356	47.9	58.8	28.8	48.8
0.408	46.4	57.7	27.5	47.7
0.459	45.5	56.7	27.4	46.7

The margin between the specification requirements and all other emissions were 11.4dB or more below the specified Quasi-Peak limit and 16.7dB or more below the Average limit.

2.2 CONDUCTED EMISSIONS ON POWER PORTS

2.2.6 **Test Results** - continued

Measurements were made with the EUT in PCS1900

EUT in Idle Mode on Middle Channel (1880.0MHz) – Live Line

Handset with US Charger

Frequency MHz	Quasi-Peak Level dBµV	Quasi-Peak Limit dBµV	Average Level dBµV	Average Limit dBµV
0.170	49.3	65.0	25.2	55.0
0.235	50.3	62.3	21.9	52.3
0.310	44.7	60.0	19.8	50.0
0.380	41.2	58.3	18.9	48.3
0.455	38.0	56.8	17.7	46.8
0.515	37.3	56.0	19.6	46.0

The margin between the specification requirements and all other emissions were 18.8dB or more below the specified Quasi-Peak limit and 26.4dB or more below the Average limit.

Handset with UK Charger

Frequency MHz	Quasi-Peak Level dBµV	Quasi-Peak Limit dBµV	Average Level dBµV	Average Limit dBµV
0.162	55.9	65.4	38.3	55.4
0.174	54.7	64.8	33.5	54.8
0.184	53.1	64.3	32.9	54.3
0.344	45.6	59.1	24.2	49.1
0.451	46.4	56.9	25.1	46.9
0.462	46.1	56.7	25.5	46.7

The margin between the specification requirements and all other emissions were 13.5dB or more below the specified Quasi-Peak limit and 21.6dB or more below the Average limit.

2.2 CONDUCTED EMISSIONS ON POWER PORTS

2.2.6 **Test Results** - Continued

Handset with EU Charger

Frequency MHz	Quasi-Peak Level dBµV	Quasi-Peak Limit dBµV	Average Level dBµV	Average Limit dBµV
0.170	56.3	65.0	34.7	55.0
0.250	52.9	61.8	41.9	51.8
0.267	50.7	61.2	36.3	51.2
0.415	48.3	57.5	27.7	47.5
0.443	48.1	57.0	30.4	47.0
0.484	47.4	56.3	28.3	46.3

The margin between the specification requirements and all other emissions were 10.5dB or more below the specified Quasi-Peak limit and 18.7dB or more below the Average limit.

Handset with AUS Charger

Frequency MHz	Quasi-Peak Level dBµV	Quasi-Peak Limit dBµV	Average Level dBµV	Average Limit dBµV
0.167	52.7	65.1	32.5	55.1
0.183	50.3	64.3	33.1	54.3
0.313	45.9	59.9	28.8	49.9
0.358	44.7	58.8	28.8	48.8
0.435	44.8	57.2	27.0	47.2
0.459	43.7	56.7	26.3	46.7

The margin between the specification requirements and all other emissions were 14.1dB or more below the specified Quasi-Peak limit and 17.8dB or more below the Average limit.

2.2 CONDUCTED EMISSIONS ON POWER PORTS

2.2.6 **Test Results** - Continued

EUT in Idle Mode on Middle Channel (1880.0MHz) – Neutral Line

Measurements were made with the EUT in PCS1900

Handset with US Charger

Frequency MHz	Quasi-Peak Level dBµV	Quasi-Peak Limit dBµV	Average Level dBµV	Average Limit dBµV
0.175	54.0	64.7	24.8	54.7
0.225	49.9	62.6	22.5	52.6
0.450	37.4	56.9	18.1	46.9
0.590	36.8	56.0	16.8	46.0
0.935	36.6	56.0	13.3	46.0
1.905	36.9	56.0	11.5	46.0

The margin between the specification requirements and all other emissions were 19.5dB or more below the specified Quasi-peak limit and 29.2dB or more below the specified Average limit.

Handset with UK Charger

Frequency MHz	Quasi-Peak Level dBµV	Quasi-Peak Limit dBµV	Average Level dBµV	Average Limit dBµV
0.154	56.2	65.8	39.5	55.8
0.169	54.7	65.0	33.5	55.0
0.178	53.6	64.6	33.5	54.6
0.428	46.2	57.3	25.5	47.3
0.443	46.7	57.0	25.1	47.0
0.462	46.4	56.7	25.5	46.7

The margin between the specification requirements and all other emissions were 10.9dB or more below the specified Quasi-Peak limit and 18.9dB or more below the Average limit.

2.2 CONDUCTED EMISSIONS ON POWER PORTS

2.2.6 **Test Results** - Continued

Handset with EU Charger

Frequency MHz	Quasi-Peak Level dBµV	Quasi-Peak Limit dBµV	Average Level dBµV	Average Limit dBµV
0.155	58.9	65.7	42.0	55.7
0.166	56.7	65.2	35.1	55.2
0.175	55.5	64.7	34.77	54.7
0.200	53.6	62.8	37.2	52.8
0.392	48.0	58.0	28.5	48.0
0.410	48.0	57.6	28.6	47.6

The margin between the specification requirements and all other emissions were 10.0dB or more below the specified Quasi-Peak limit and 15.0dB or more below the Average limit.

Handset with AUS Charger

Frequency MHz	Quasi-Peak Level dBµV	Quasi-Peak Limit dBµV	Average Level dBµV	Average Limit dBµV
0.155	56.6	65.7	43.2	55.7
0.172	49.0	64.9	24.7	54.9
0.344	42.9	59.1	28.5	49.1
0.438	43.6	57.1	27.0	47.1
0.464	42.7	56.6	27.4	46.6
0.487	38.3	56.2	13.6	46.2

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

2.3 EFFECTIVE RADIATED POWER (CONDUCTED)

2.3.1 Specification Reference

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

2.3.2 Equipment Under Test

MC2004a Handset

2.3.3 Date of Test

22nd February 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 GMSK modulation scheme. The carrier was modulated by it's normal GMSK modulation and measurements 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 EFFECTIVE RADIATED POWER (CONDUCTED)

2.3.6 Test Results

The EUT met the requirements of 22.913(a) and Industry Canada RSS-132, 4.4.

Maximum Power – GMSK 850 Mode

Frequency MHz	Output Power dBm	Path Loss dB	Result dBm	Result W
824.2	+15.80	+17.0	+32.80	1.91
836.6	+15.98	+17.0	+32.98	1.99
848.8	+15.95	+17.0	+32.95	1.97

Limit for FCC 22.913(a)	<7W or <+38.45dBm
Limit for RSS-132	<6.3W

2.4 MAXIMUM PEAK OUTPUT POWER (EIRP METHOD)

2.4.1 Specification Reference

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

2.4.2 Equipment Under Test

MC2004a Handset

2.4.3 Date of Test

12th May 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 FCC CFR 47: Part 22.913(a).

The EUT contains an integral antenna and therefore the Maximum Peak Output Power was made using the EIRP method.

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 level into the antenna was adjusted until the received level matched that of the previously detected emission.

2.4 MAXIMUM PEAK OUTPUT POWER (EIRP METHOD)

2.4.6 **Test Results** - continued

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 Maximum Peak Output Power.

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

Frequency (MHz)	Result EIRP (dBm)	Result EIRP (mW)
848.8	27.42	552
836.4	28.58	721
824.2	29.28	847
Limit	<7W or <+38.45dBm	

2.5 MODULATION CHARACTERISTICS

2.5.1 Specification Reference

FCC CFR 47: Part 24 Subpart E, Section 2.1047(d) and Industry Canada RSS-132, 4.2

2.5.2 Equipment Under Test

MC2004a Handset

2.5.3 Date of Test

22nd February 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.. The other view shows the active slot(s) over a complete frame.

2.5 MODULATION CHARACTERISTICS

2.5.5 Modulation Description - continued

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.

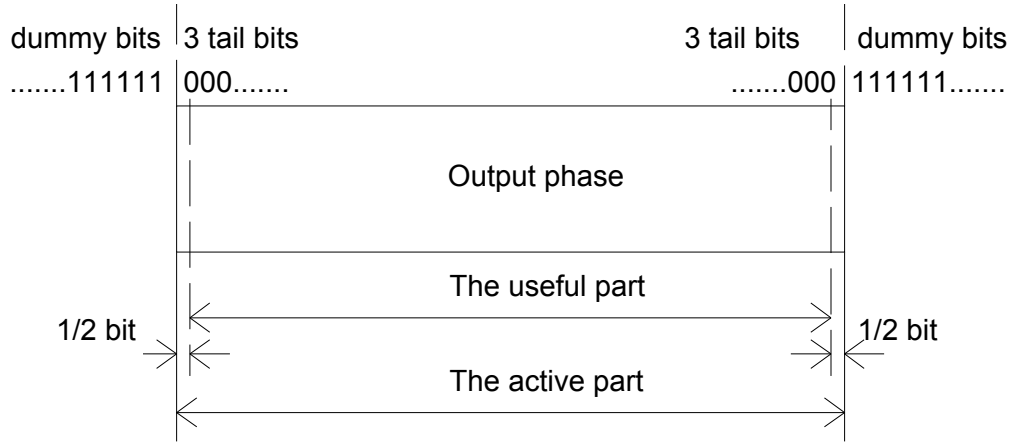


Figure 1: Relation between active part of burst, tail bits and dummy bits. For the normal burst the useful part lasts for 147 modulating bits

Differential encoding

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

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

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

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

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:

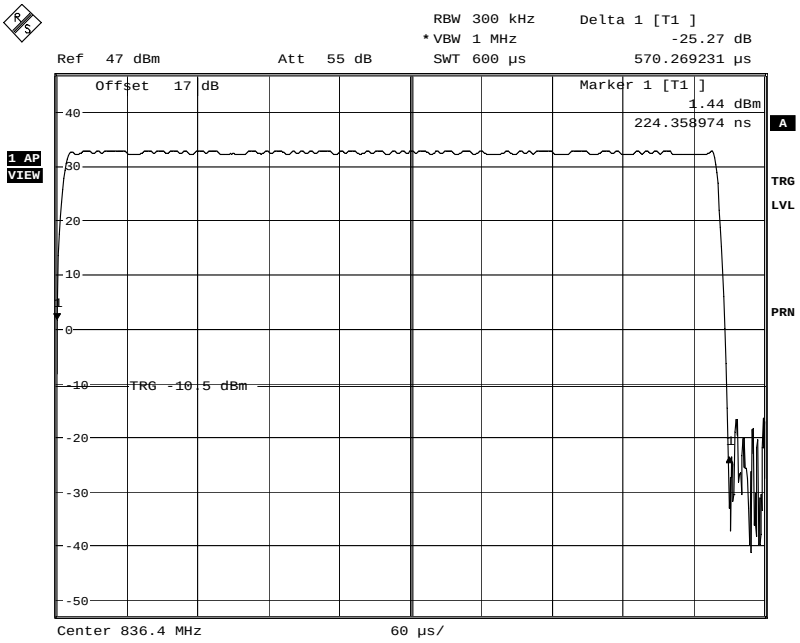
$$x(t') = \sqrt{\frac{2E_c}{T}}\ .\ \cos(2\pi f_0 t' + \varphi(t') + \varphi_0)$$

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.

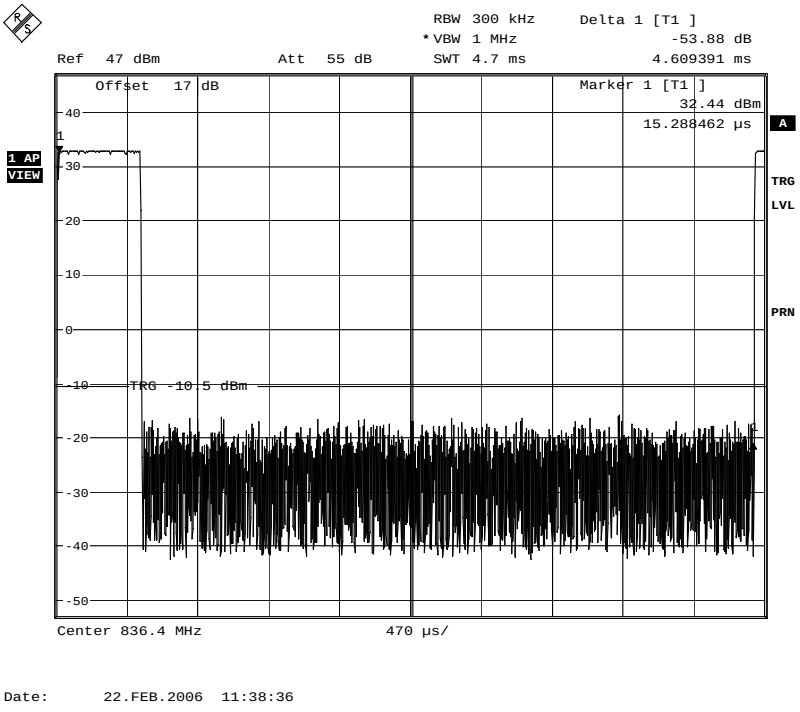
2.5 MODULATION CHARACTERISTICS

2.5.7 Test Results

The EUT met the requirements of FCC CFR 47: Part 24 Subpart E, Section 2.1047(d) and Industry Canada RSS-132, 4.2



GSM Mode. View of TS3



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) and
Industry Canada RSS-132, 4.5

2.6.2 Equipment Under Test

MC2004a Handset

2.6.3 Date of Test

22nd February 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 power control level 5. In GMSK mode, 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.

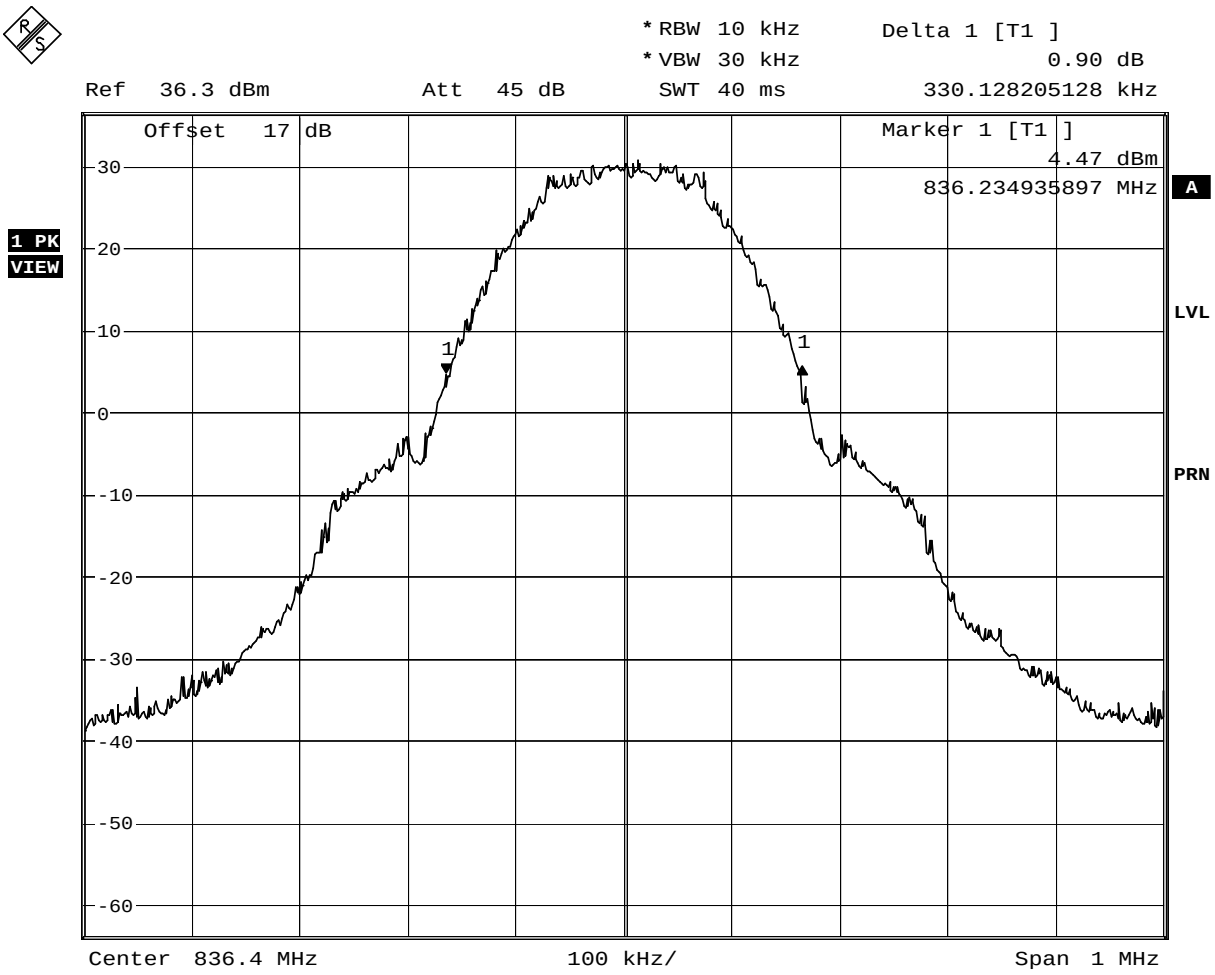
The plot below shows the resultant display from the Spectrum Analyser.

2.6 OCCUPIED BANDWIDTH

2.6.6 Test Results

The EUT met the requirements of FCC CFR 47: Part 22 Subpart H, Section 2.1049(h), 22.917(b) and Industry Canada RSS-132, 4.5

Occupied Bandwidth As Defined By The –26dBc Points



Date: 22.FEB.2006 12:06:08

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 and
Industry Canada RSS-132, 4.5

2.7.2 Equipment Under Test

MC2004a Handset

2.7.3 Date of Test

22nd February 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(b) and 22.905, using a spectrum analyser and attenuator(s), 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 RBW and 30kHz VBW. The measured path loss was entered as a reference level offset into the Spectrum Analyser.

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

2.7.6 Test Results

The EUT met the requirements of FCC CFR 47: Part 22 Subpart H, Section 2.1051, 22.905, 22.917 and Industry Canada RSS-132, 4.5

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 – 849.0	Channel : 129 Frequency : 824.4MHz	Channel : 250 Frequency : 848.6MHz

Limit	≤-13dBm at Block Edge

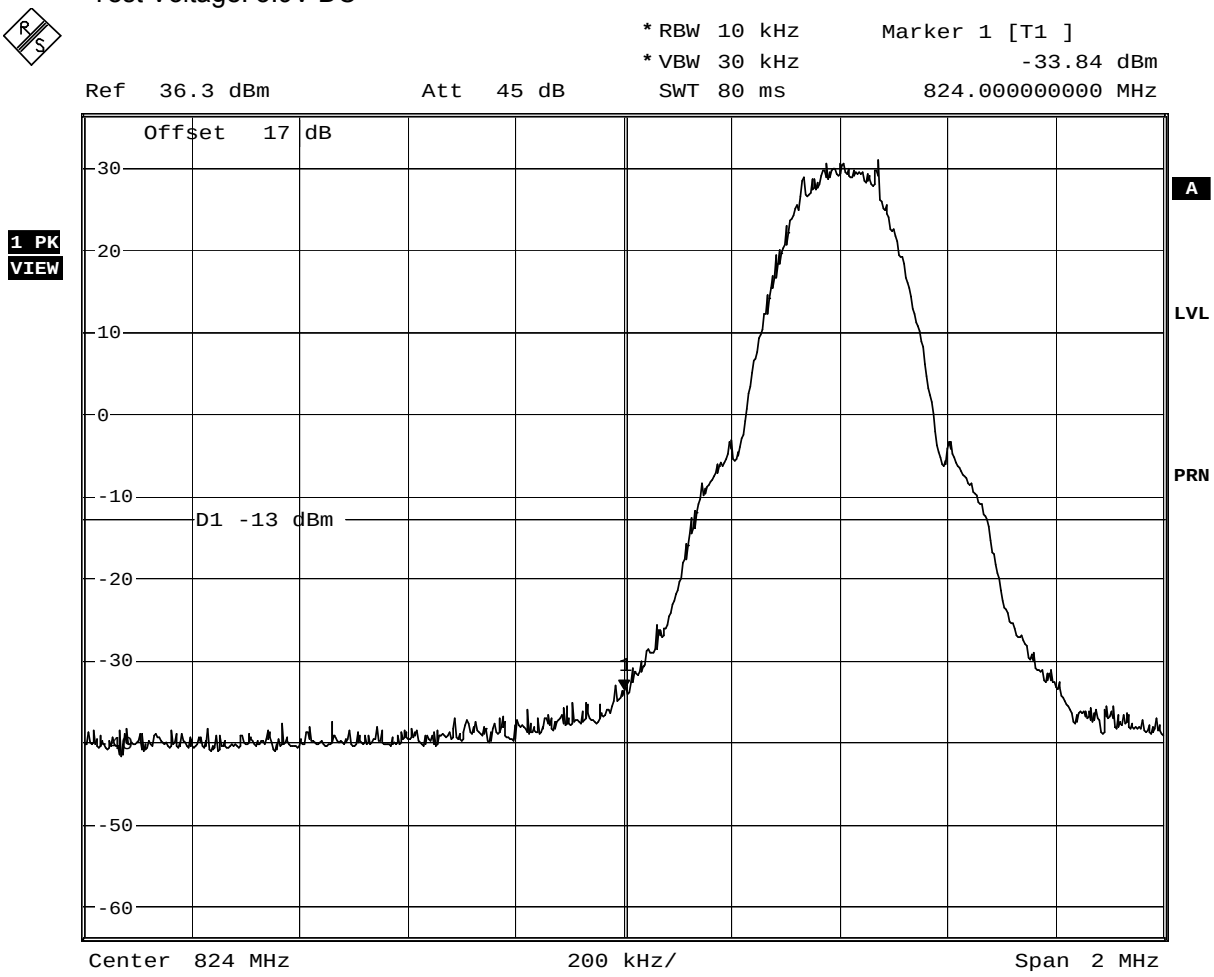
The measurement plots are shown on the following pages.

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, (824.4MHz)

Test Voltage: 3.9V DC



Date: 22.FEB.2006 12:18:57

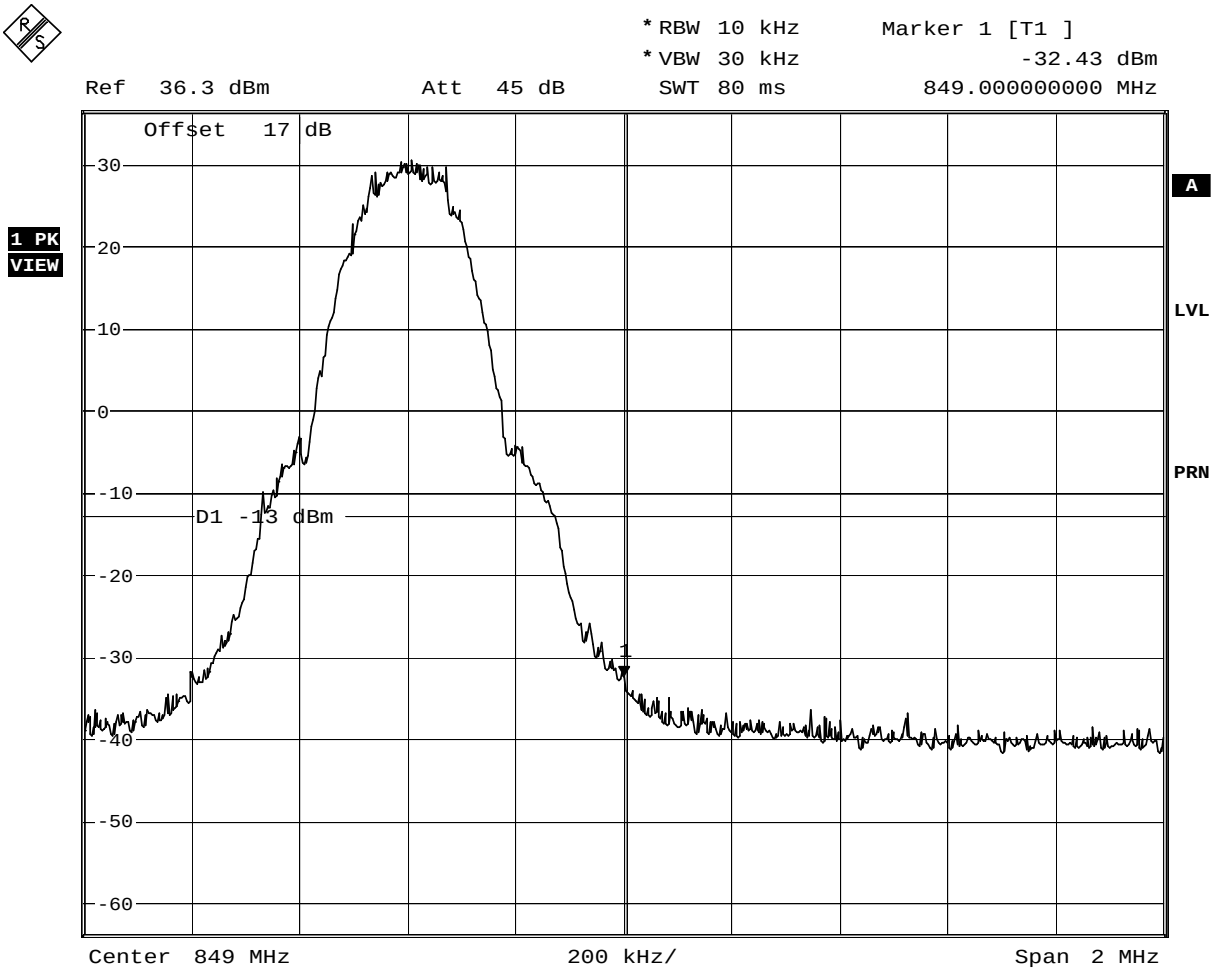
Block A
GMSK Modulation
824.0 – 849.0MHz

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)

Test Voltage: 3.9V DC



Date: 22.FEB.2006 12:21:21

Block A
GMSK Modulation
824.0 – 849.0MHz

2.8 RADIATED SPURIOUS EMISSIONS

2.8.1 Equipment Reference

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

2.8.2 Equipment Under Test

MC2004a Handset

2.8.3 Date of Test

3rd March 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 emissions were detected. Therefore no table of results is presented.

EUT Transmitting on Middle Channel (836.40MHz)

No emissions were detected. Therefore no table of results is presented.

EUT Transmitting on Top Channel (848.80MHz)

No emissions were detected. Therefore no table of results is presented.

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)

No emissions were detected. Therefore no table of results is presented.

EUT Transmitting on Middle Channel (836.40MHz)

No emissions were detected. Therefore no table of results is presented.

EUT Transmitting on Top Channel (848.80MHz)

No emissions were detected. Therefore no table of results is presented.

2.9 CONDUCTED SPURIOUS EMISSIONS

2.9.1 Specification Reference

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

2.9.2 Equipment Under Test

MC2004a Handset

2.9.3 Date of Test

22nd February 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 on power level 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, on maximum power, a 10dB attenuator was used. For measuring the range 1.5GHz to 9GHz, attenuators and a 1.5GHz high pass filter were used. This was to reduce saturation effects in the spectrum analyser.

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

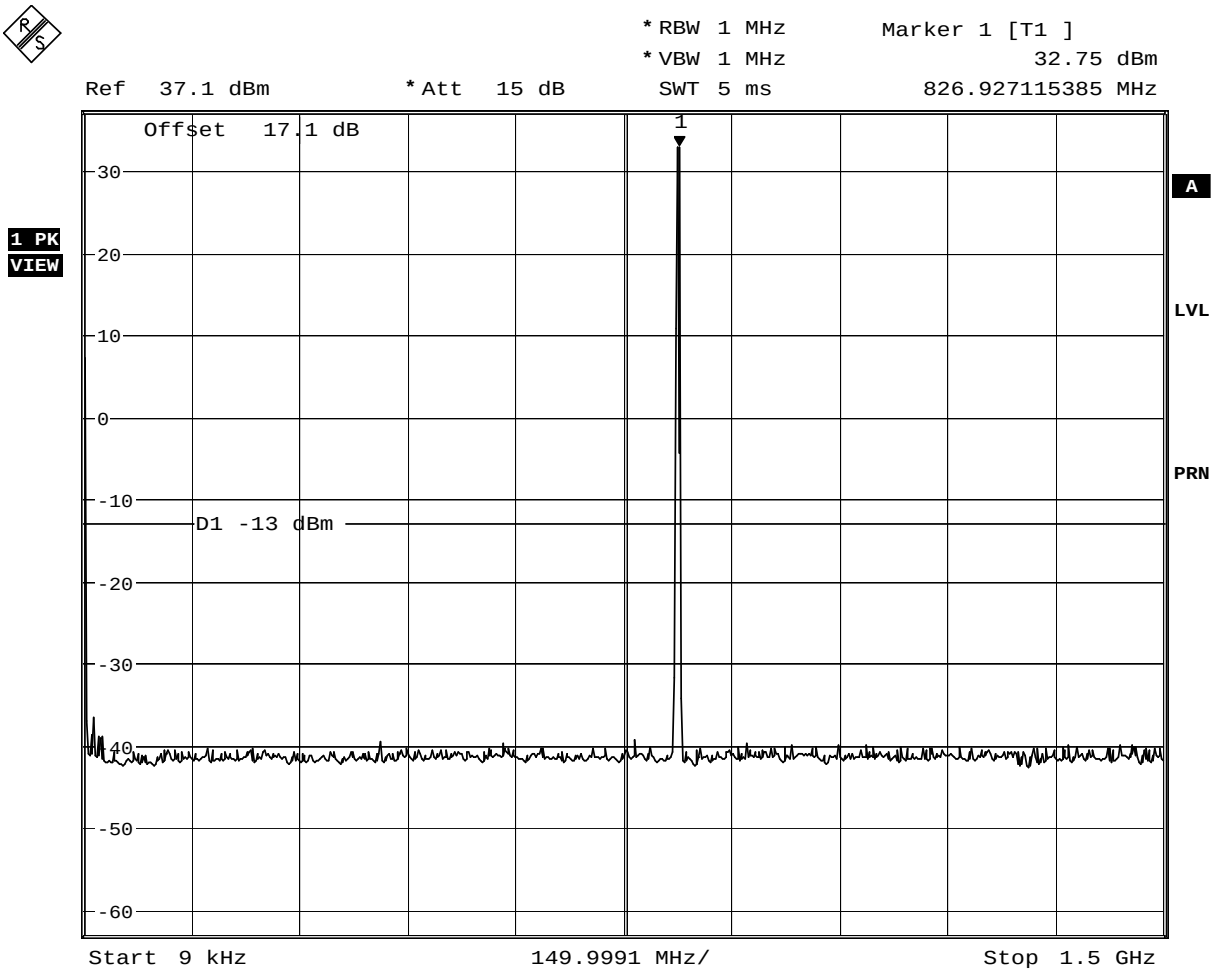
The EUT met the requirements of FCC CFR 47: Part 22 Subpart H, Section 2.1051, 22.917 (a) and Industry Canada RSS-132, 4.5

See test plots.

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

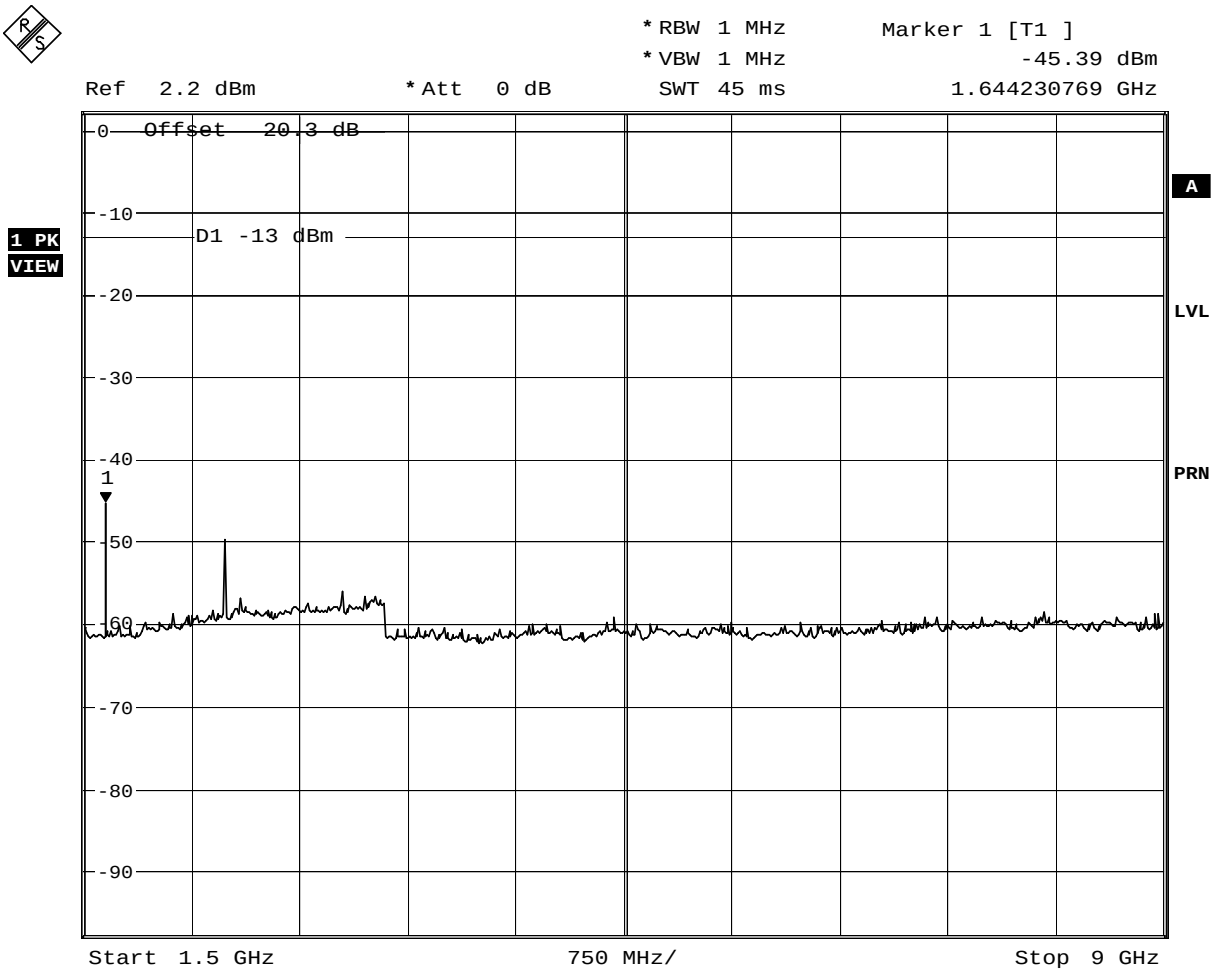


Date: 22.FEB.2006 14:56:24

Spurious Emissions (9kHz – 1.5GHz)
Channel 128, (824.2MHz) –Power Level 5 – GSM 850 Mode
3.9 V SUPPLY

2.9 CONDUCTED SPURIOUS EMISSIONS

2.9.6 **Test Results** - continued

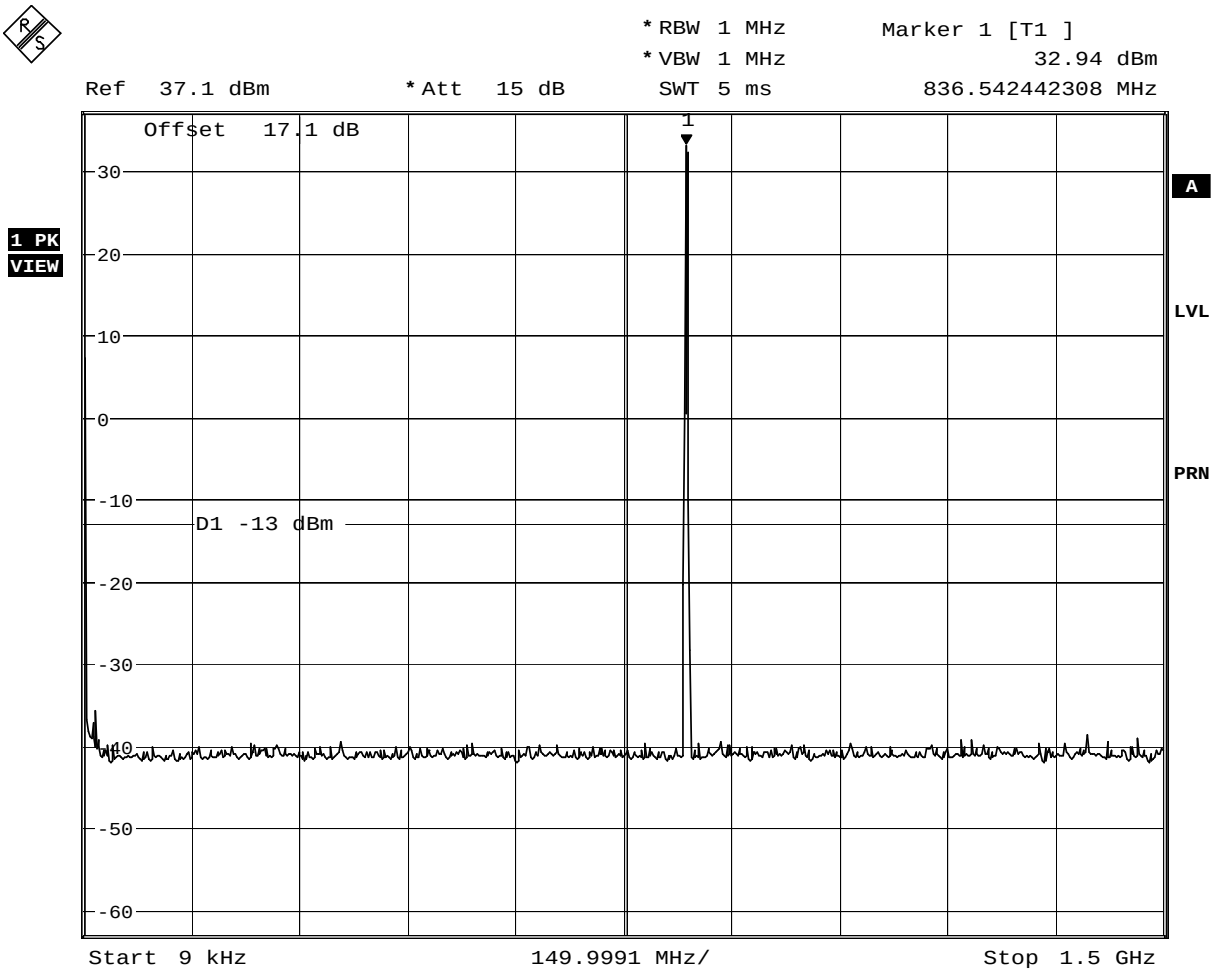


Date: 22.FEB.2006 14:47:53

Spurious Emissions (1.5GHz – 9GHz)
Channel 128 (824.2MHz) - Power Level 5- GSM 850 Mode
3.9 V SUPPLY

2.9 CONDUCTED SPURIOUS EMISSIONS

2.9.6 **Test Results** - continued

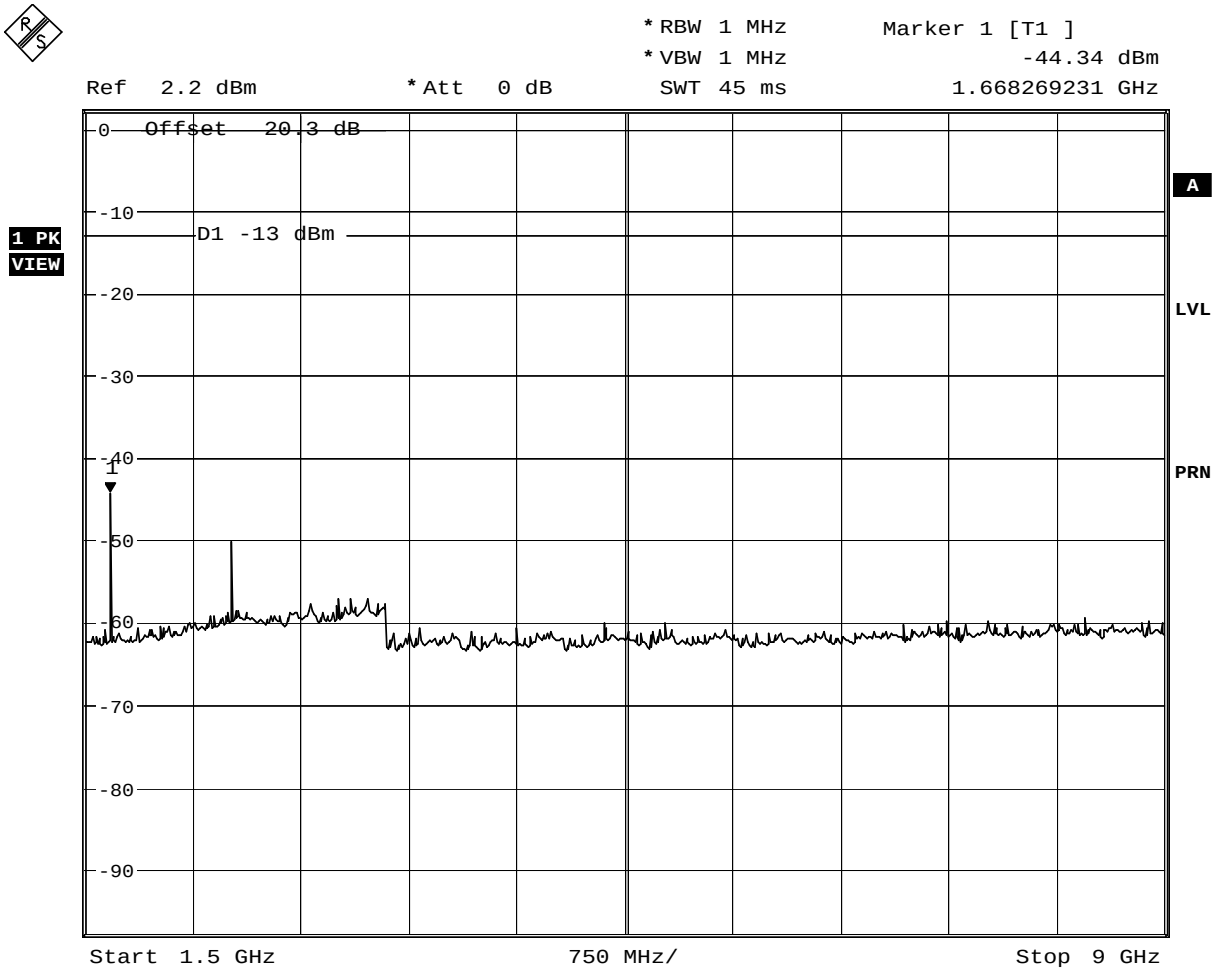


Date: 22.FEB.2006 14:57:39

Spurious Emissions (9kHz – 1.5GHz)
Channel 190 (836.6MHz) - Power Level 5 - GSM 850 Mode
3.9 V SUPPLY

2.9 CONDUCTED SPURIOUS EMISSIONS

2.9.6 **Test Results** - continued

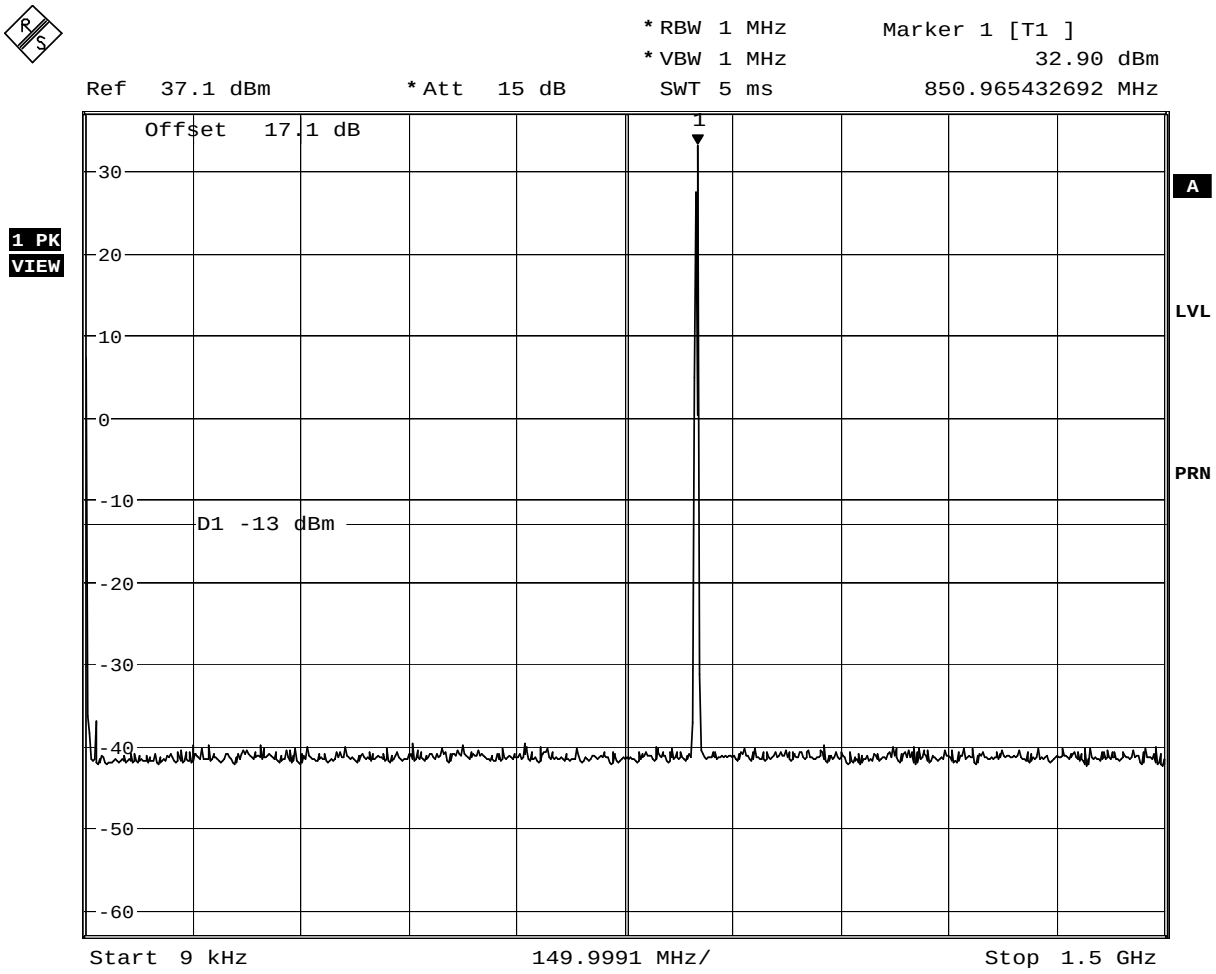


Date: 22.FEB.2006 14:49:32

Spurious Emissions (4GHz - 9GHz)
Channel 190 (836.6MHz) – Power Level 5 - GSM 850 Mode
3.9 V SUPPLY

2.9 CONDUCTED SPURIOUS EMISSIONS

2.9.6 **Test Results** - continued

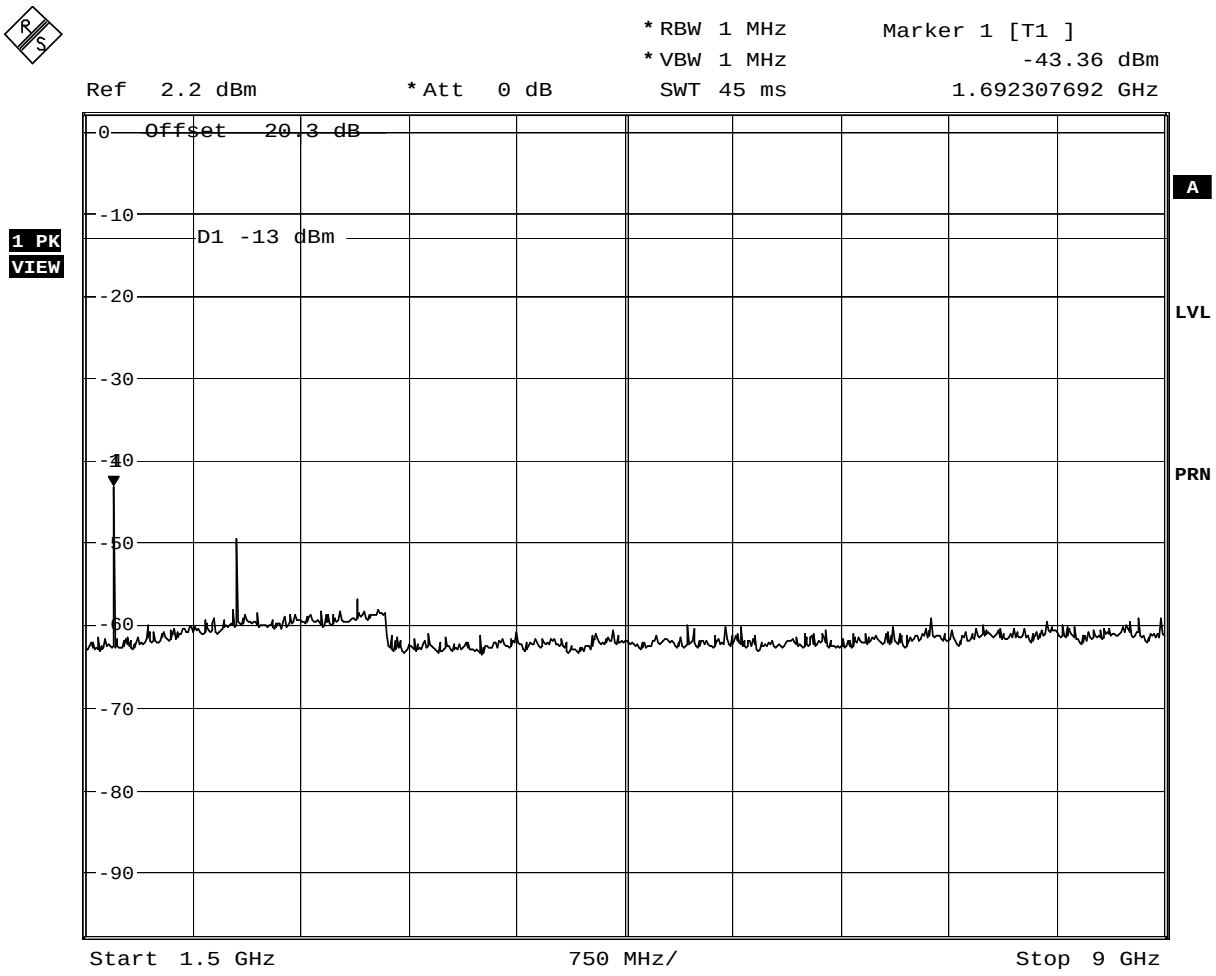


Date: 22.FEB.2006 14:58:27

Spurious Emissions (9kHz – 1.5GHz)
Channel 251 (848.8MHz) - Power Level 5 - GSM 850 Mode
3.9 V SUPPLY

2.9 CONDUCTED SPURIOUS EMISSIONS

2.9.6 **Test Results** - continued



Date: 22.FEB.2006 14:52:23

Spurious Emissions (1.5GHz – 9GHz)
Channel 251 (848.8MHz) - Power Level 5 - 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 and Industry Canada RSS-132, 4.3

2.10.2 Equipment Under Test

MC2004a Handset

2.10.3 Date of Test

22nd February 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

GSM Mode

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.

2.10 FREQUENCY STABILITY UNDER TEMPERATURE VARIATIONS

2.10.6 Test Results

The EUT met the requirements of FCC CFR 47: Part 22 Subpart H, Section 2.1055, 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.

3.9V SUPPLY – GMSK 850 Mode

Temperature Interval ºC	Test Frequency MHz	Deviation Hz	Deviation from +20 ºC Hz	Limit kHz
-30	836.6	*	*	±2.092
-20	836.6	-28	-6	±2.092
-10	836.6	-25	-3	±2.092
0	836.6	-20	+2	±2.092
+10	836.6	-24	-2	±2.092
+20	836.6	-22	0	±2.092
+30	836.6	-22	0	±2.092
+40	836.6	-23	-1	±2.092
+50	836.6	-25	-3	±2.092

* The EUT does not operate at -30°C. Its lowest operating temperature is -25°C with -28Hz deviation from the nominal.

2.11 FREQUENCY STABILITY UNDER VOLTAGE VARIATIONS

2.11.1 Specification Reference

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

2.11.2 Equipment Under Test

MC2004a Handset

2.11.3 Date of Test

22nd February 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

The EUT met the requirements of FCC CFR 47: Part 22 Subpart H, Section 2.1055, 22.355 and Industry Canada RSS-132, 4.3.

3.9V SUPPLY GMSK 850 Mode

DC Voltage V	Test Frequency MHz	Deviation Hz	Deviation Limit kHz
-	836.4	-	± 2.091
3.90	836.4	-22	± 2.091
3.55	836.4	-23	± 2.091

Remarks

EUT complies with CFR 47 Part 22.355 and Industry Canada RSS-132, 4.3. The EUT does not exceed ±2.092kHz at the measured frequency either at nominal or voltage variation.

2.12 MAXIMUM PEAK OUTPUT POWER (EIRP METHOD)

2.12.1 Specification Reference

FCC CFR 47: Part 24 Section 24.238(b) and Industry Canada RSS-133, 4.3 and 6.4

2.12.2 Equipment Under Test

MC2004a Handset

2.12.3 Date of Test

12th May 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 FCC CFR 47: Part 24.232(b).

The EUT contains an integral antenna and therefore the Maximum Peak Output Power was made using the EIRP method.

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 level into the antenna was adjusted until the received level matched that of the previously detected emission.

2.12 MAXIMUM PEAK OUTPUT POWER (EIRP METHOD)

2.12.6 **Test Results** - continued

The EUT met the requirements of FCC CFR 47: Part 24 Section 24.238(b) and Industry Canada RSS-133, 4.3 and 6.4 for Maximum Peak Output Power.

Measurements were made with the EUT in GSM 1900.

Frequency (MHz)	Result EIRP (dBm)	Result EIRP (mW)
1909.8	30.92	1.236
1880.0	32.56	1.803
1850.2	32.37	1.725
Limit	<2W or <+33dBm	

2.13 MAXIMUM PEAK OUTPUT POWER (CONDUCTED)

2.13.1 Specification Reference

FCC CFR 47: Part 24 Subpart E, Section 24.132(b), 2.1046 and
Industry Canada RSS-133, 4.3 and 6.4

2.13.2 Equipment Under Test

MC2004a Handset

2.13.3 Date of Test

22nd February 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.

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

2.13 MAXIMUM PEAK OUTPUT POWER (CONDUCTED)

2.13.6 Test Results

The EUT met the requirements of FCC CFR 47: Part 24 Subpart E, Section 24.132(b), 2.1046 and Industry Canada RSS-133, 4.3 and 6.4

Maximum Power - GMSK

Frequency MHz	Output Power dBm	Path Loss dB	Result dBm	Result mW
1850.2	+12.56	+17.7	+30.26	1.06
1880.0	+12.60	+17.7	+30.30	1.07
1909.8	+12.55	+17.7	+30.25	1.06

Limit	<2W or <+33dBm

Remarks

EUT complies with CFR 47 2.1046 and 24.132(b) and Industry Canada RSS-133, 4.3 and 6.4. The EUT does not exceed 2W or +33dBm at the measured frequencies.

2.14 MODULATION CHARACTERISTICS

2.14.1 Specification Reference

FCC CFR 47: Part 24 Subpart E, Section 2.1047(d) and Industry Canada RSS-133, 6.2

2.14.2 Equipment Under Test

MC2004a Handset

2.14.3 Date of Test

22nd February 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. 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.

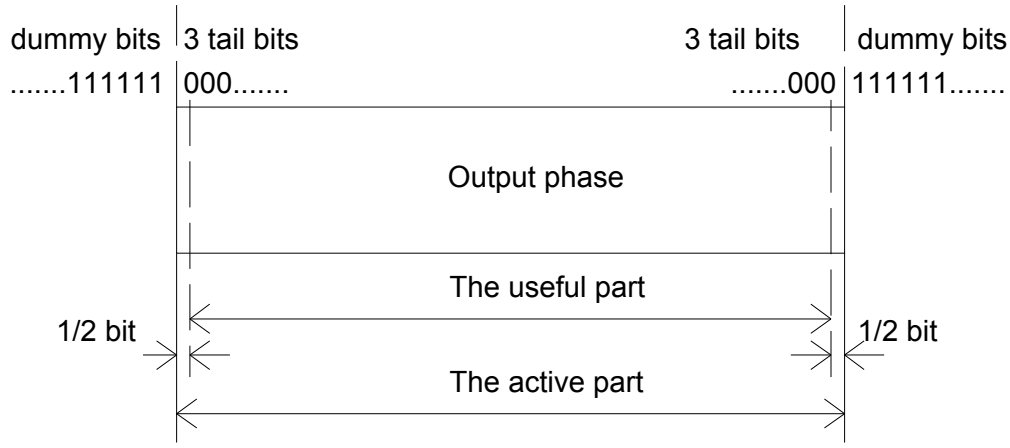


Figure 1: Relation between active part of burst, tail bits and dummy bits. For the normal burst the useful part lasts for 147 modulating bits

Differential encoding

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

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

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

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

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:

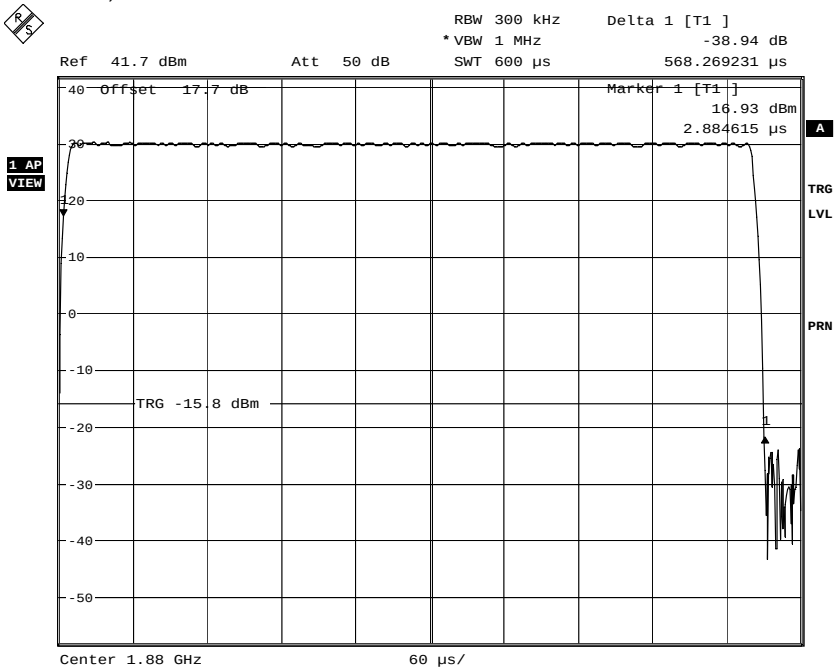
$$x(t') = \sqrt{\frac{2E_c}{T}}\ .\ \cos(2\pi f_0 t' + \varphi(t') + \varphi_0)$$

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.

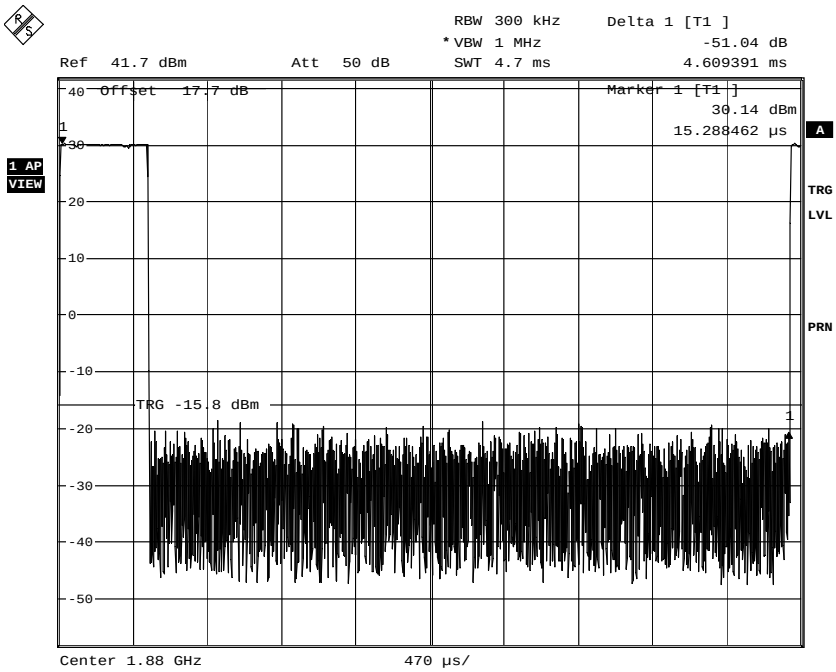
2.14 MODULATION CHARACTERISTICS

2.14.6 Test Results

The EUT met the requirements of FCC CFR 47: Part 24 Subpart E, Section 2.1047(d) and Industry Canada RSS-133, 6.2



GSM Mode. View of TS3



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 and Industry Canada RSS-133, 2.6, 6.5 and RSS-Gen 4.4

2.15.2 Equipment Under Test

MC2004a Handset

2.15.3 Date of Test

22nd February 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 and measurements were made on Timeslot 3.

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

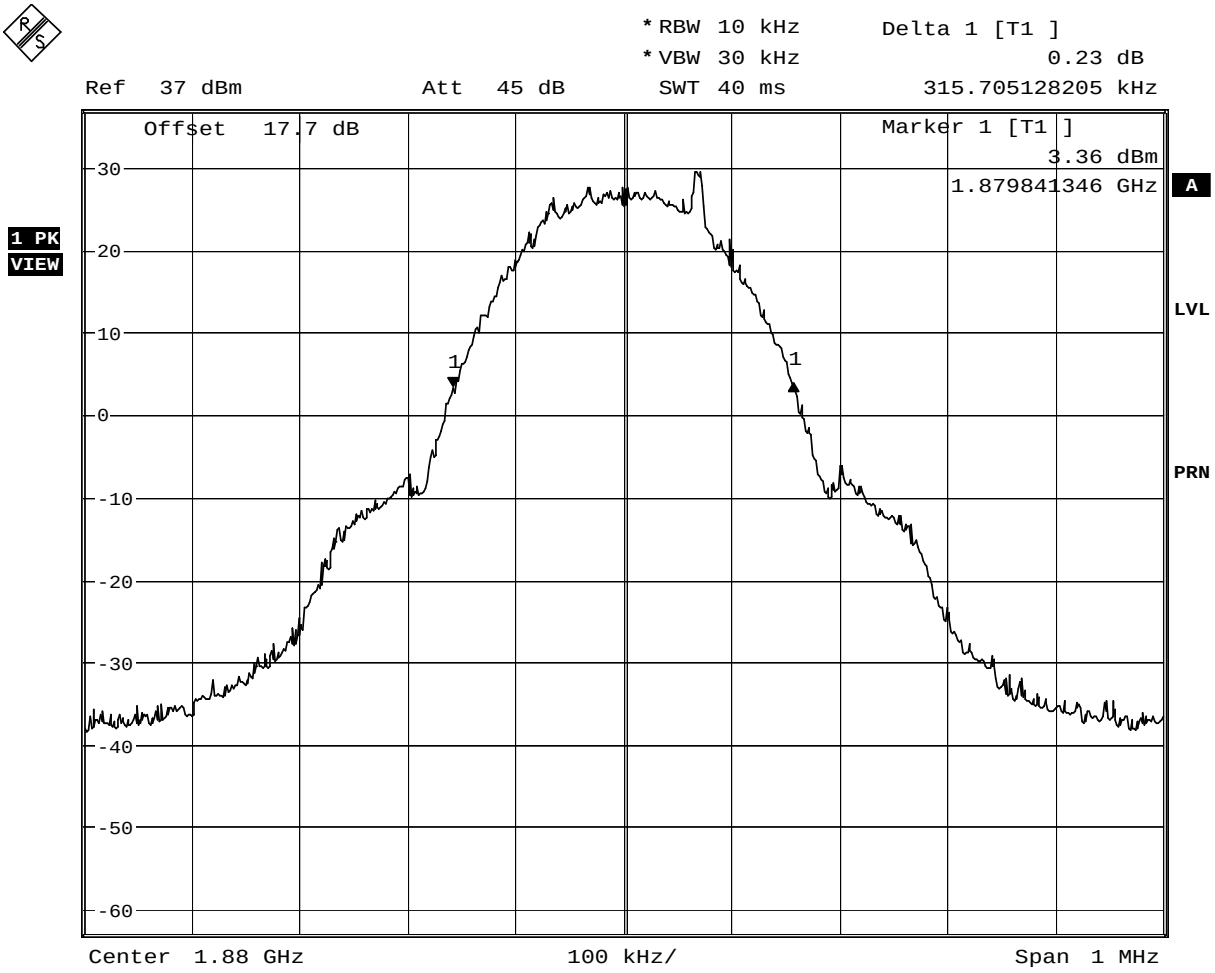
The plots below show the resultant display from the Spectrum Analyser.

2.15 OCCUPIED BANDWIDTH

2.15.6 Test Results

The EUT met the requirements of FCC CFR 47: Part 24 Subpart E, Section 24.238(b), 2.1049 and Industry Canada RSS-133, 2.6, 6.5 and RSS-Gen 4.4

Occupied Bandwidth As Defined By The - 26dBc Points



Date: 22.FEB.2006 11:59:13

Power Control Level 0 – GMSK

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 and 6.5

2.16.2 Equipment Under Test

MC2004a Handset

2.16.3 Date of Test

22nd February 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 and 24.229, using a spectrum analyser and attenuator(s), the emissions were measured between the block edge frequency up to 1MHz away to ensure compliance with the 14 + 10 log P limit.

Measurements were performed using a peak detector with the trace display set to Max Hold. A RBW of at lease 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

The EUT met the requirements of FCC CFR 47: Part 24 Subpart E, Section 24.229, 24.238, 2.1051 and Industry Canada RSS-133, 4.4 and 6.5

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

Frequency Block MHz	Lower Block Edge Test Channels/Frequencies	Upper Block Edge Test Channels/Frequencies
A	Channel : 513 Frequency : 1850.4 MHz	-
C	-	Channel : 809 Frequency : 1909.6 MHz

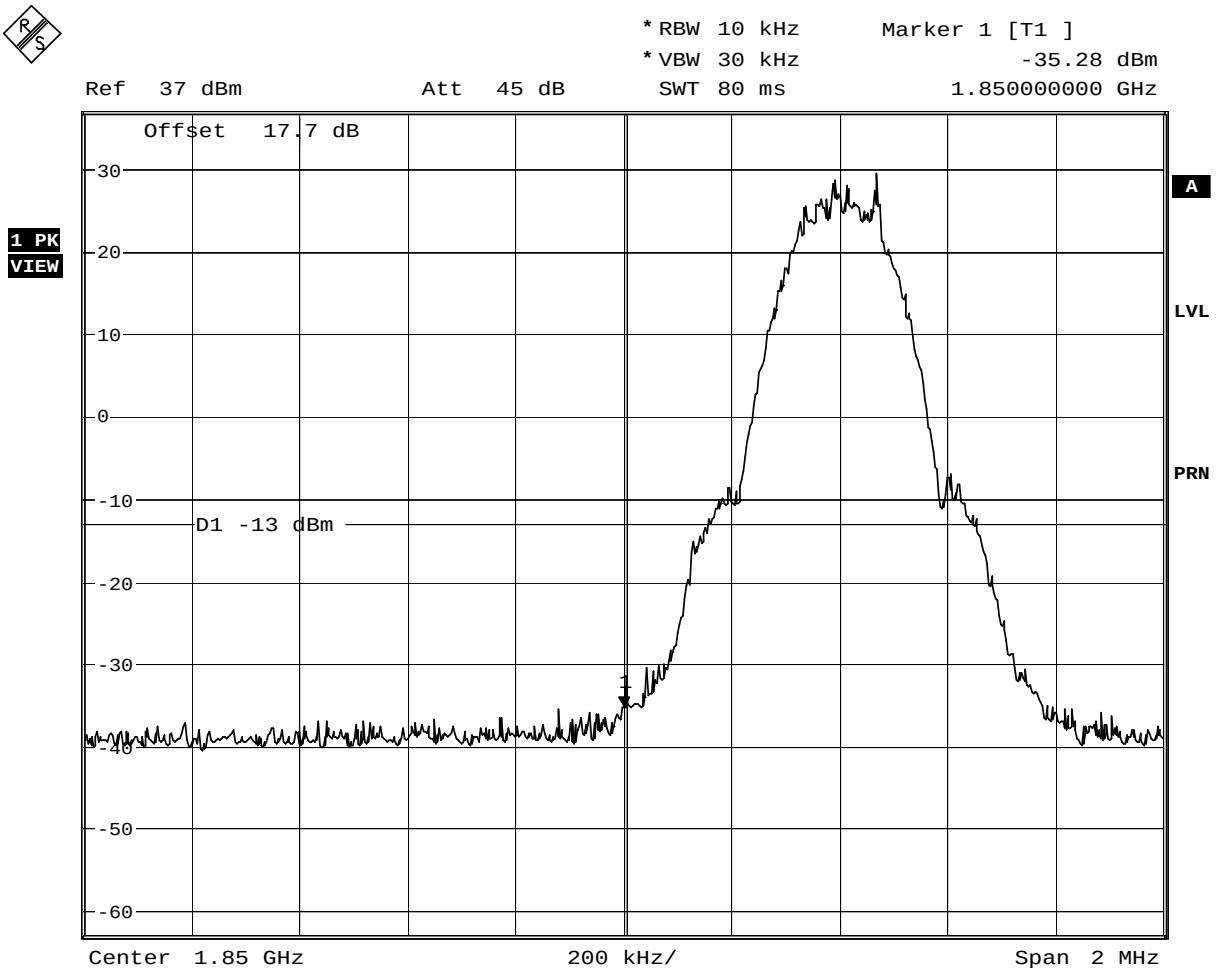
Limit	≤-13dBm at Block Edge

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 power control level 0 on Channel 513, (1850.4MHz)



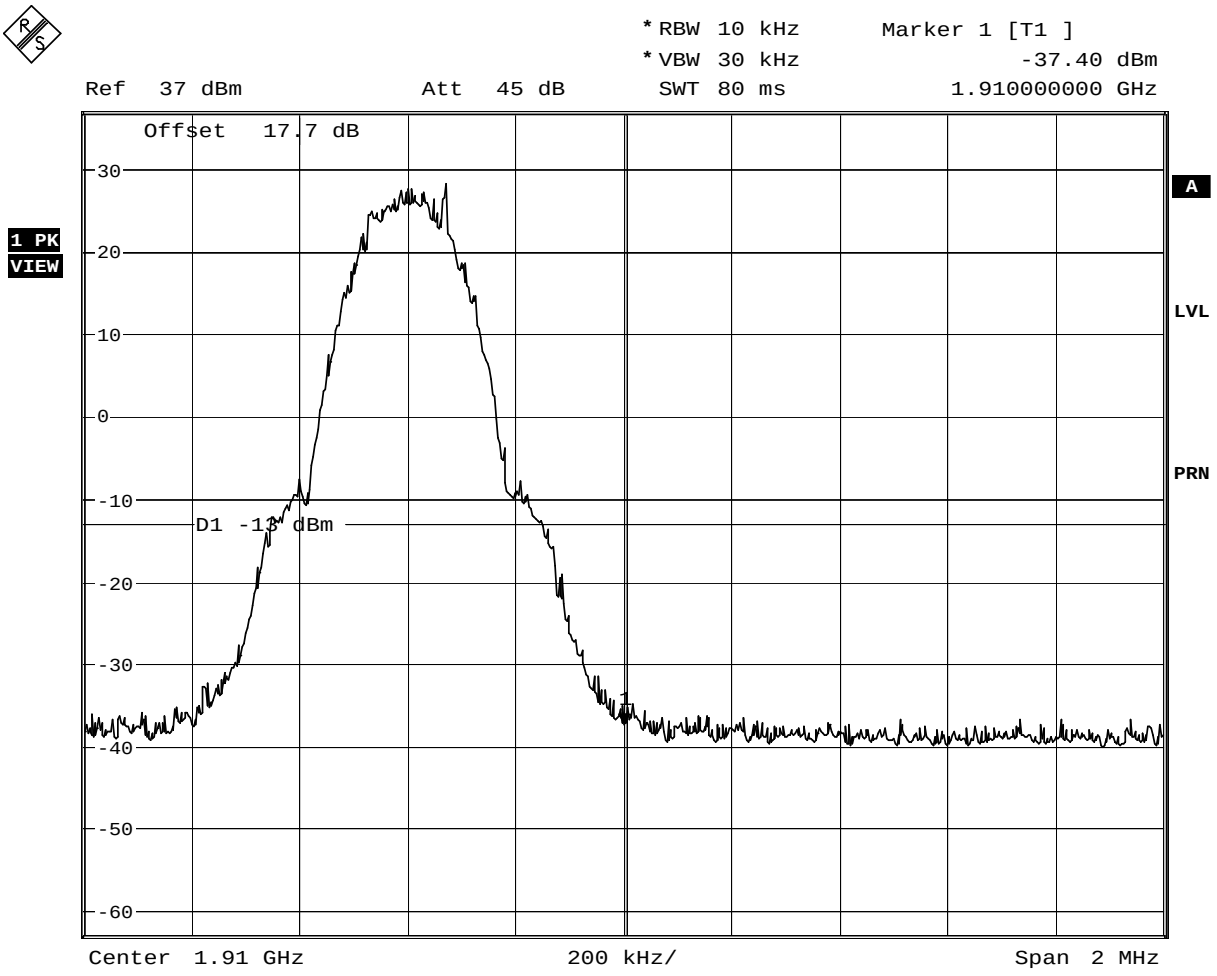
Date: 22.FEB.2006 12:25:12

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 power control level 0 on Channel 809 (1909.6MHz)



Date: 22.FEB.2006 12:28:30

Block A
GMSK Modulation

2.17 RADIATED SPURIOUS EMISSIONS

2.17.1 Specification Reference

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

2.17.2 Equipment Under Test

MC2004a Handset

2.17.3 Date of Test

3rd March 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.

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 and 6.5 for Radiated Emissions (30MHz – 1GHz).

Measurements were made with the EUT in GPRS 1900 Mode

EUT Transmitting on Bottom Channel (1850.2MHz)

No emissions were detected. Therefore no table of results is presented.

EUT Transmitting on Middle Channel (1880.0MHz)

No emissions were detected. Therefore no table of results is presented.

EUT Transmitting on Top Channel (1909.8MHz)

No emissions were detected. Therefore no table of results is presented.

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 and 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
3700.0	Horizontal	100	191	-29.5	-13.0
5550.0	Vertical	100	036	-40.1	-13.0

EUT Transmitting on Middle Channel (1880.0MHz)

Frequency	Antenna Polarisation	Height	Azimuth	Peak Result	Peak Limit
MHz		cm	degree	dBm	dBm
3740.0	Vertical	120	160	-30.5	-13.0
5609.0	Vertical	100	180	-39.6	-13.0

EUT Transmitting on Top Channel (1909.8MHz)

Frequency	Antenna Polarisation	Height	Azimuth	Peak Result	Peak Limit
MHz		cm	degree	dBm	dBm
3819.0	Horizontal	100	189	-39.9	-13.0
5729.0	Horizontal	100	211	-40.3	-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 and
Industry Canada RSS-133, 4.4 and 6.5

2.18.2 Equipment Under Test

MC2004a Handset

2.18.3 Date of Test

22nd February 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. 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.

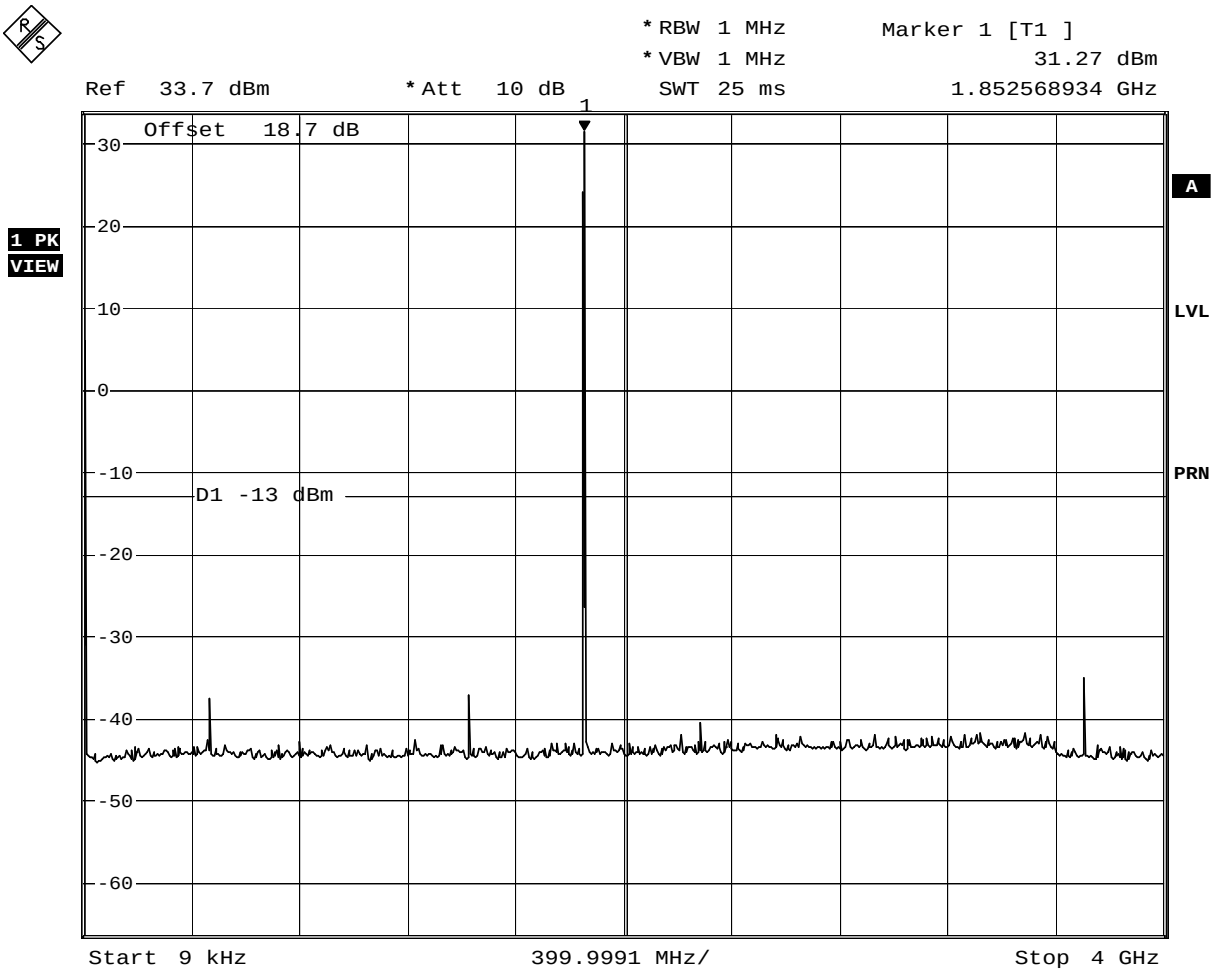
The maximum path loss across the measurement band was used as the reference level offset to ensure worst case

2.18.6 Test Results

The EUT passed the requirements laid out in 24.238. 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

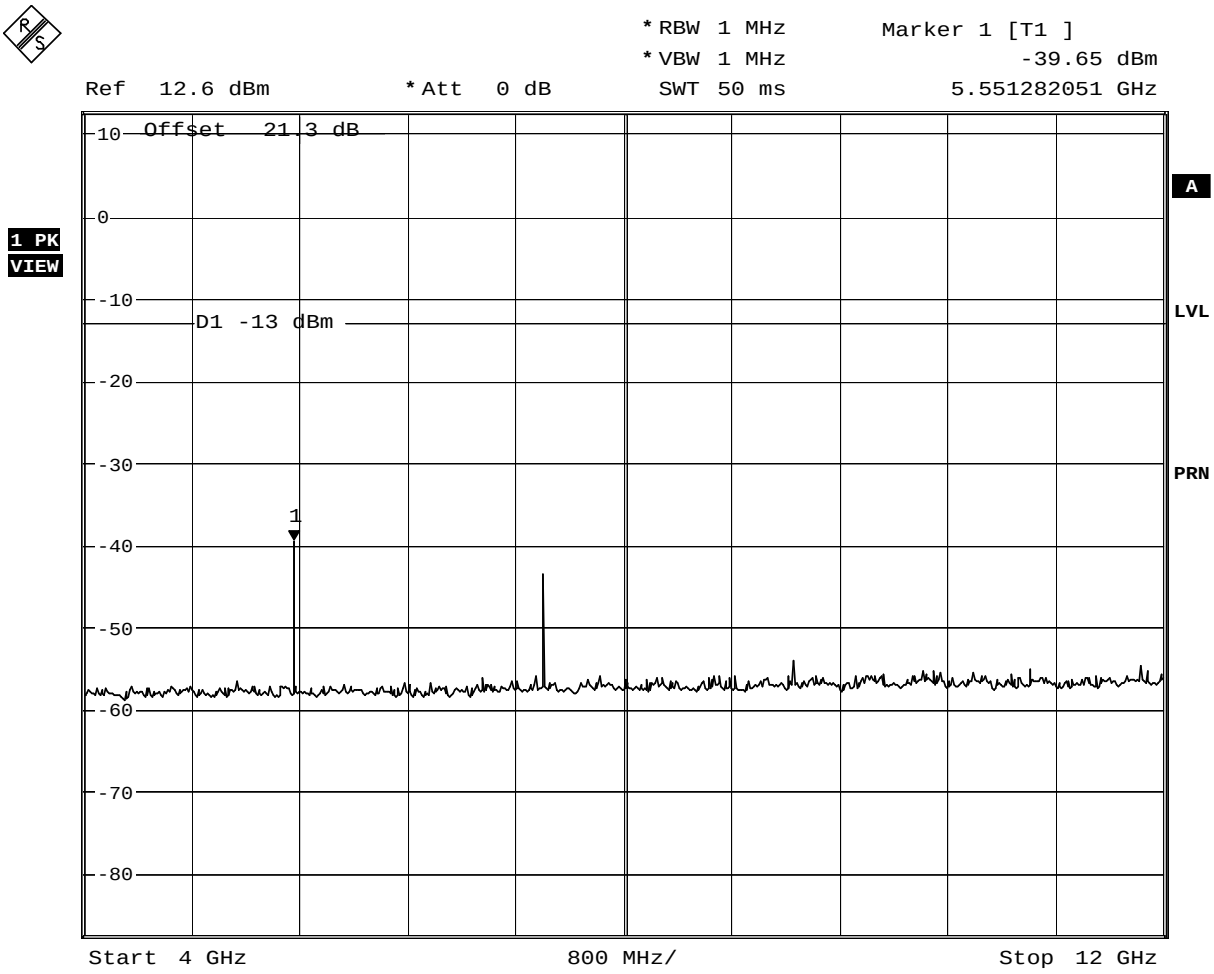


Date: 22.FEB.2006 15:03:33

Spurious Emissions (9kHz – 4GHz)
Channel 512 (1850.2MHz) – Power Control Level 0

2.18 CONDUCTED SPURIOUS EMISSIONS

2.18.6 **Test Results** - continued

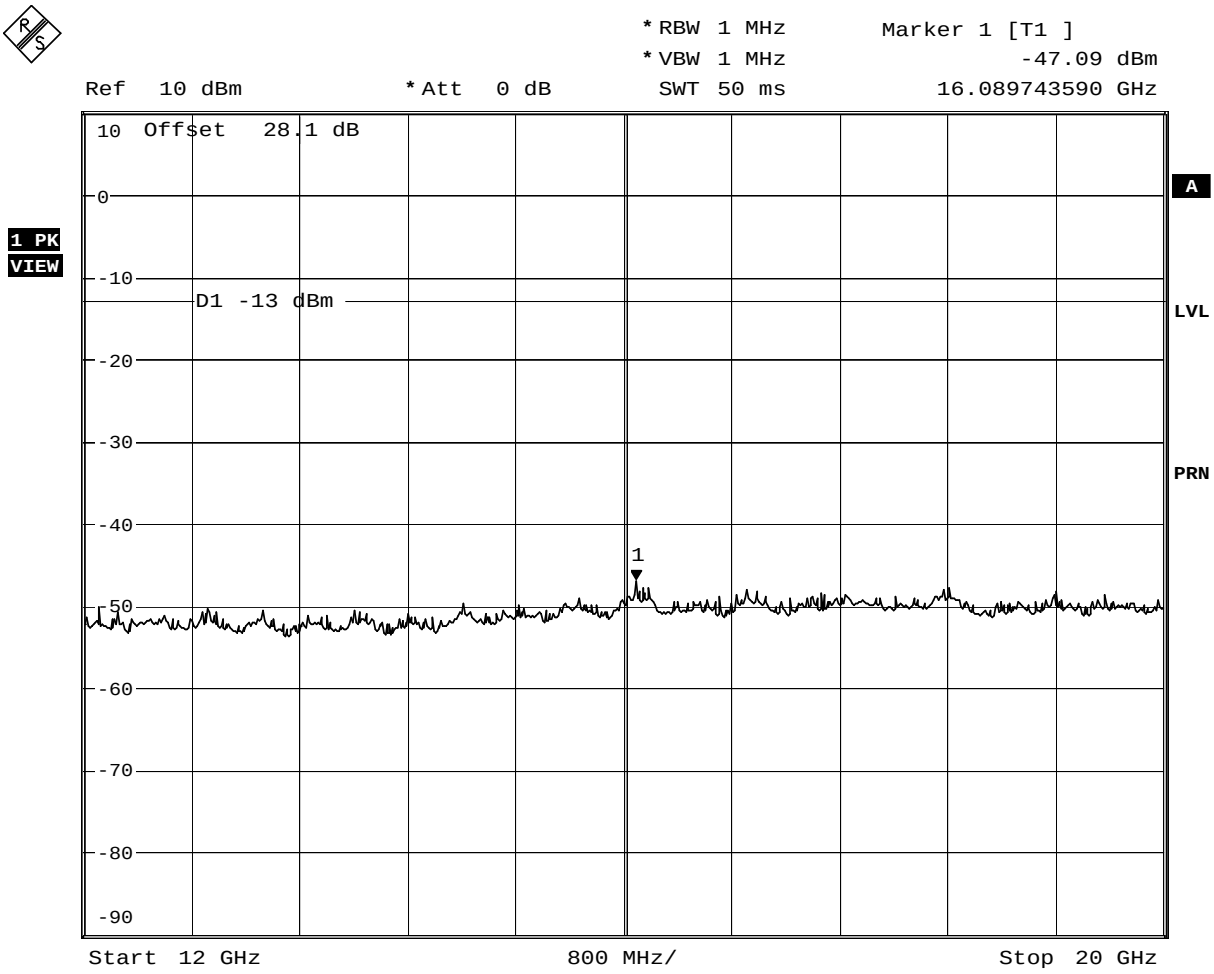


Date: 22.FEB.2006 13:24:47

Spurious Emissions (4GHz-12GHz)
Channel 512 (1850.2MHz) – Power Control Level 0

2.18 CONDUCTED SPURIOUS EMISSIONS

2.18.6 **Test Results** - continued

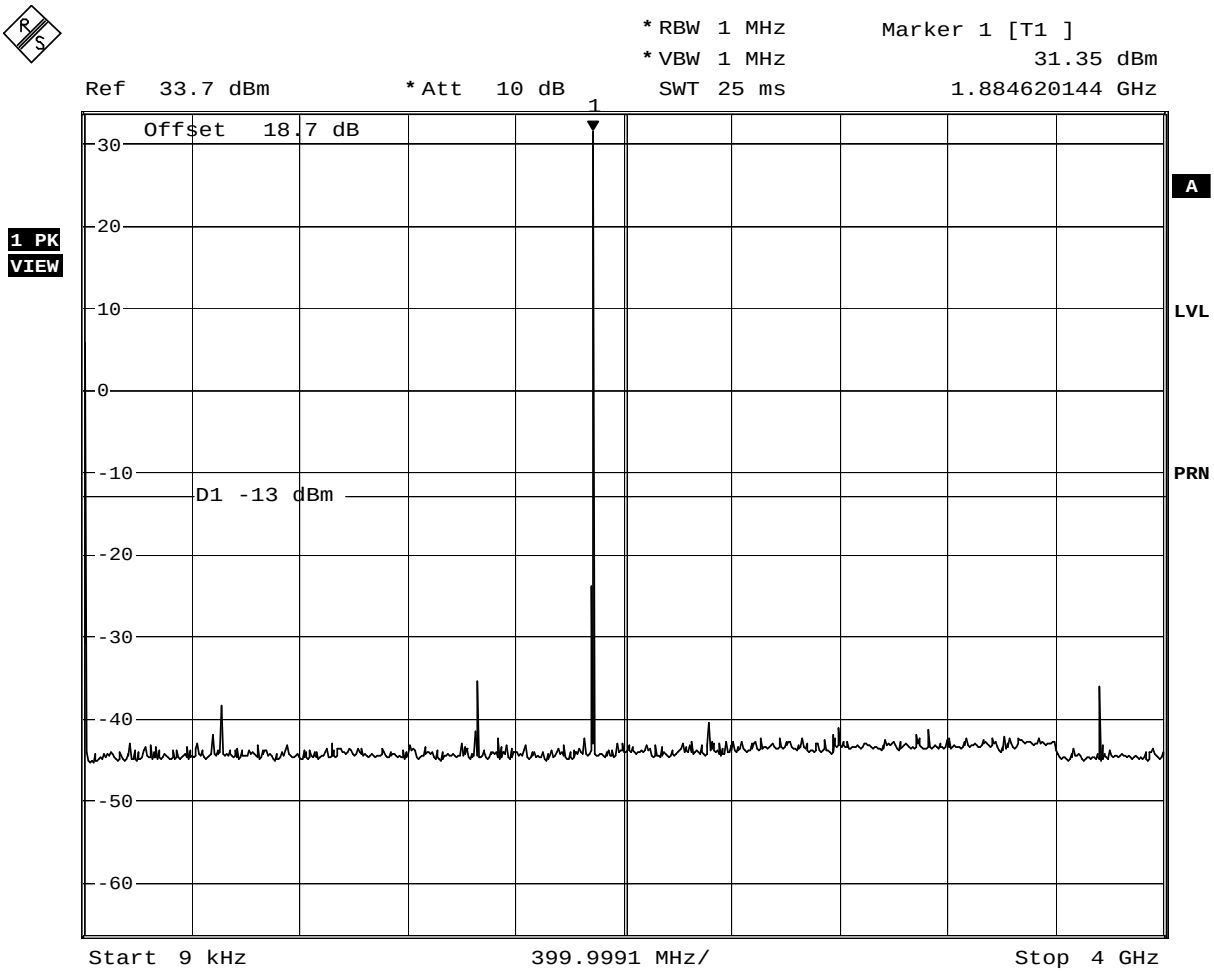


Date: 22.FEB.2006 13:28:57

Spurious Emissions (12GHz-20GHz)
Channel 512 (1850.2MHz) – Power Control Level 0

2.18 CONDUCTED SPURIOUS EMISSIONS

2.18.6 **Test Results** - continued

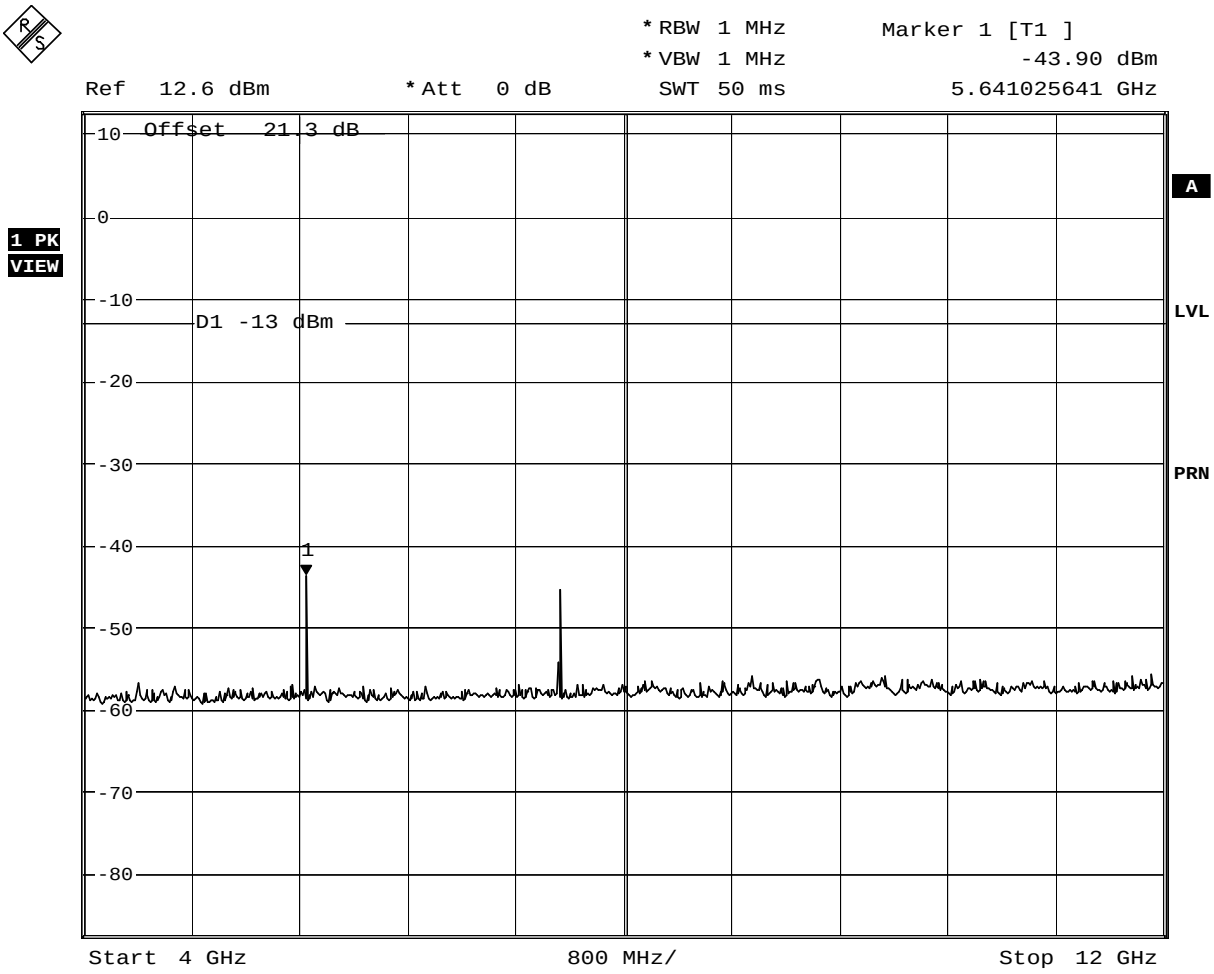


Date: 22.FEB.2006 15:04:46

Spurious Emissions (9kHz-4GHz)
Channel 661 (1880.0MHz) – Power Control Level 0

2.18 CONDUCTED SPURIOUS EMISSIONS

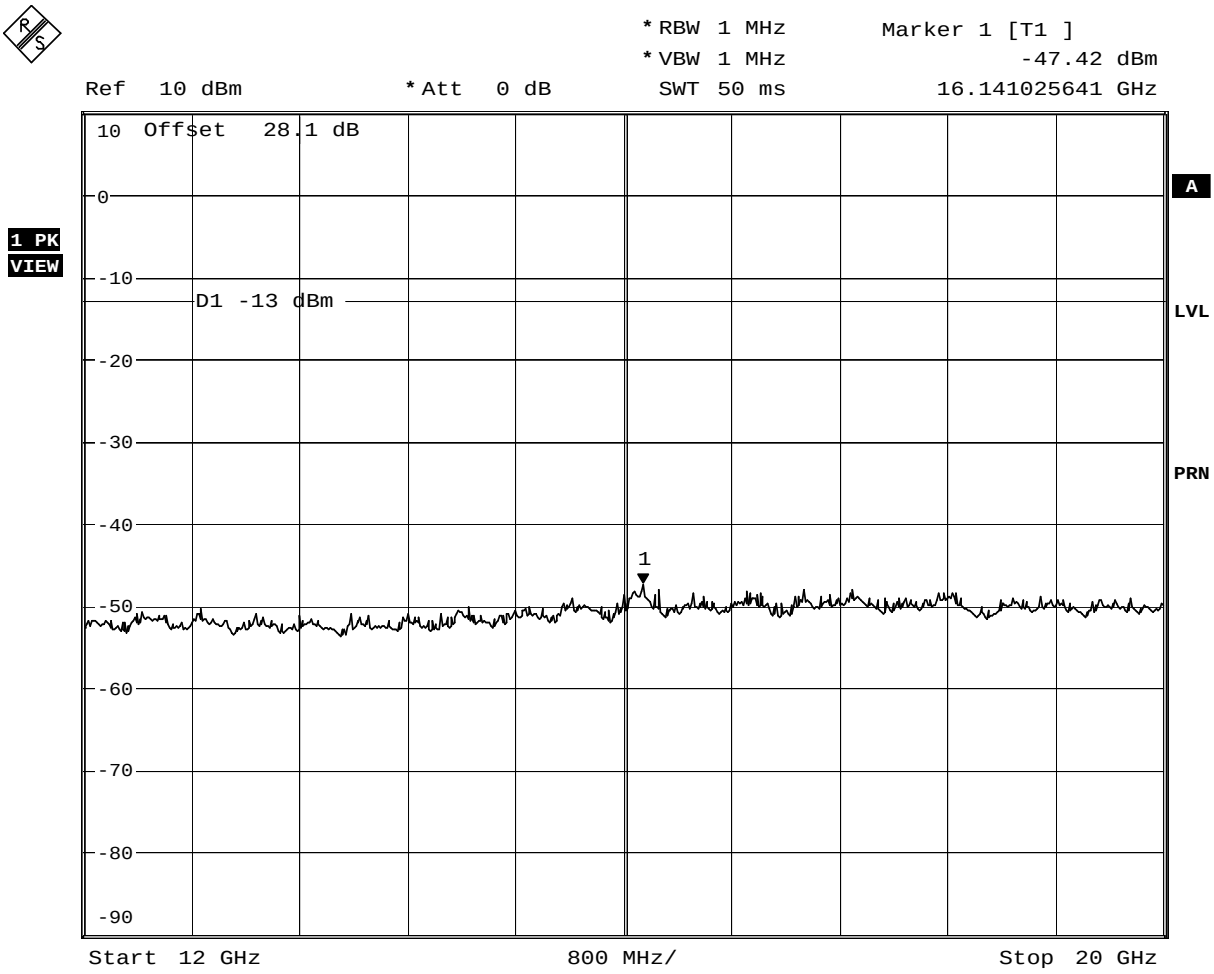
2.18.6 **Test Results** - continued



Spurious Emissions (4GHz-12GHz)
Channel 661 (1880.0MHz) – Power Control Level 0

2.18 CONDUCTED SPURIOUS EMISSIONS

2.18.6 **Test Results** - continued

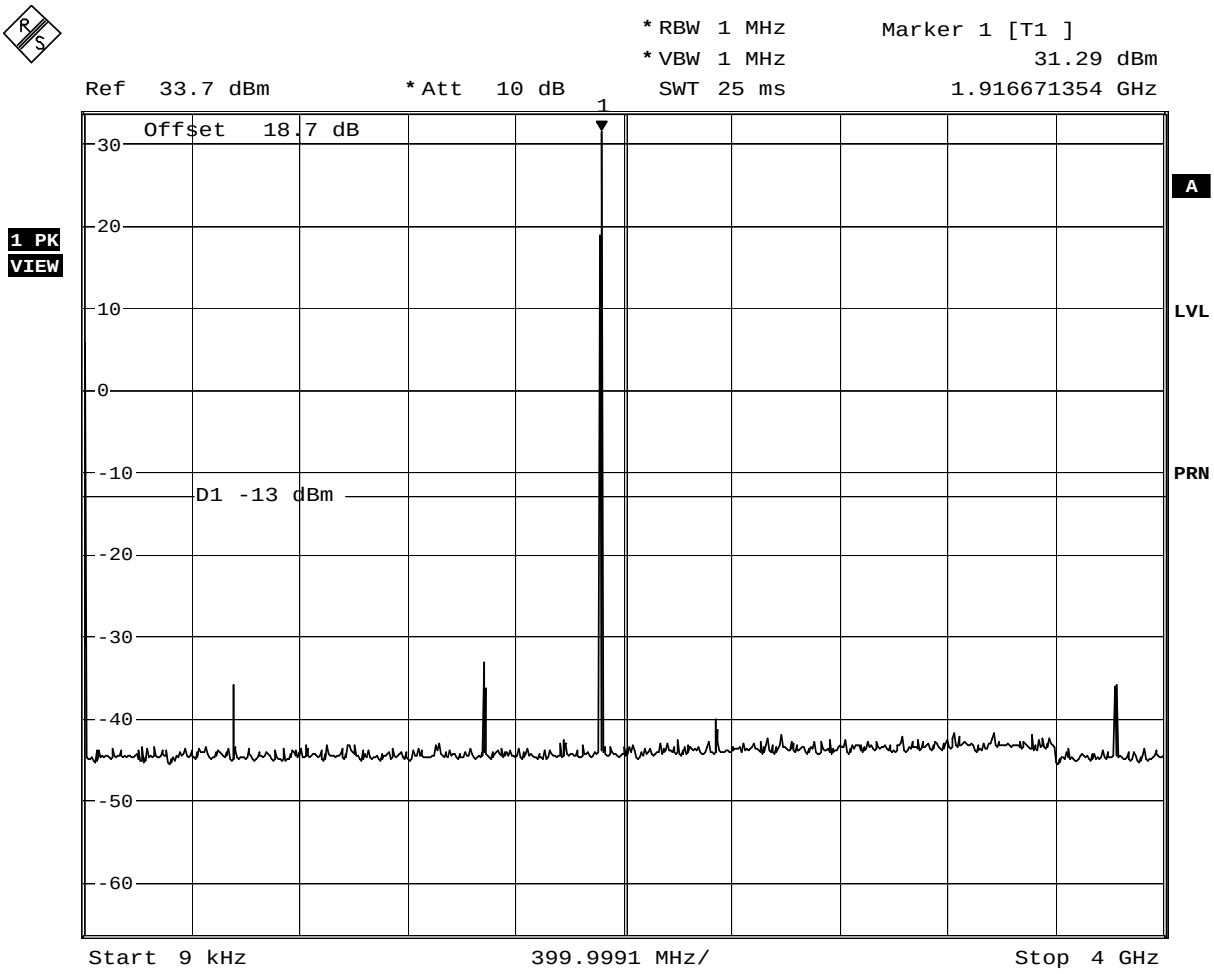


Date: 22.FEB.2006 13:30:05

Spurious Emissions (12GHz-20GHz)
Channel 661 (1880.0MHz) – Power Control Level 0

2.18 CONDUCTED SPURIOUS EMISSIONS

2.18.6 **Test Results** - continued

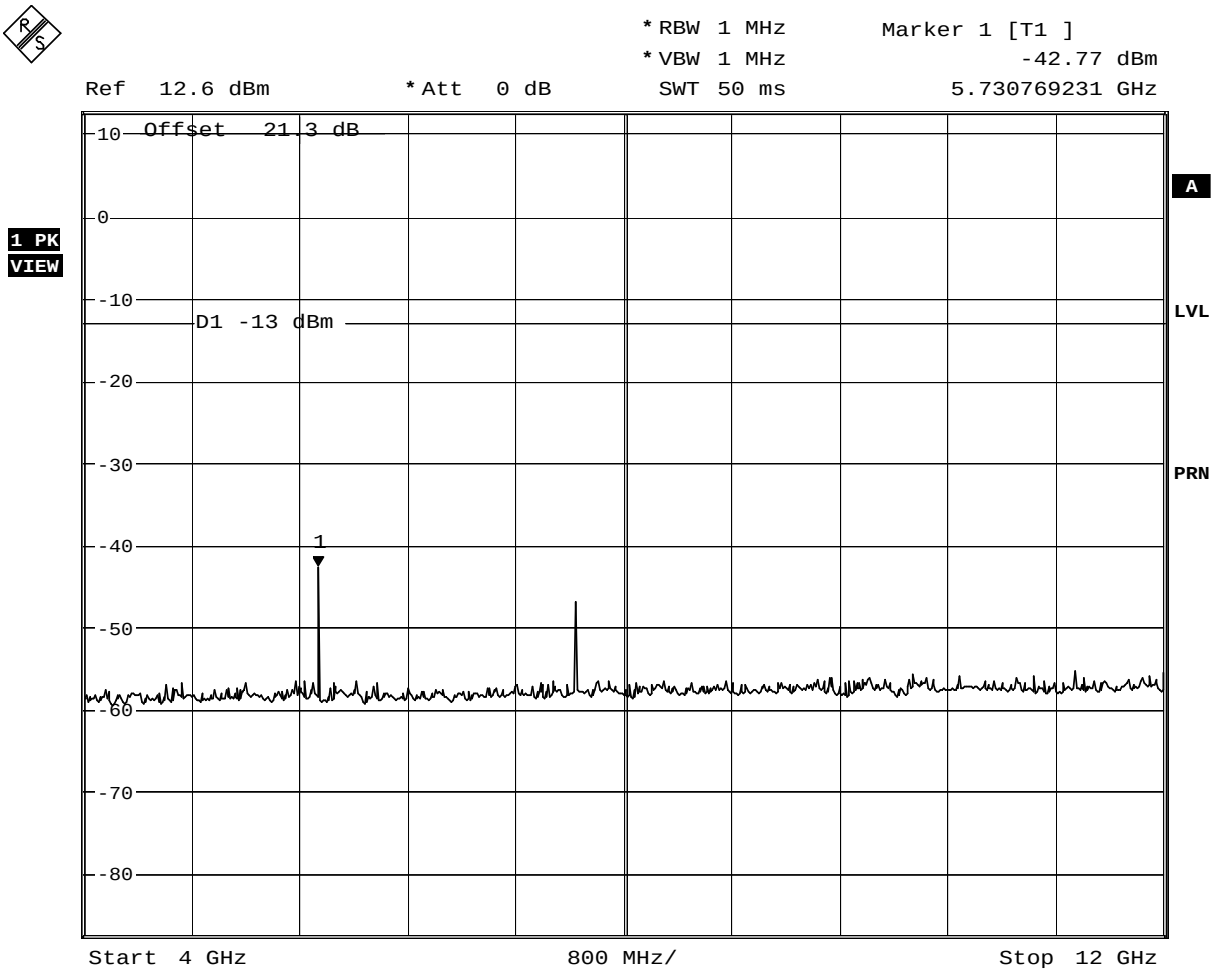


Date: 22.FEB.2006 15:05:46

Spurious Emissions (9kHz-4GHz)
Channel 810 (1909.8MHz) – Power Control Level 0

2.18 CONDUCTED SPURIOUS EMISSIONS

2.18.6 **Test Results** - continued

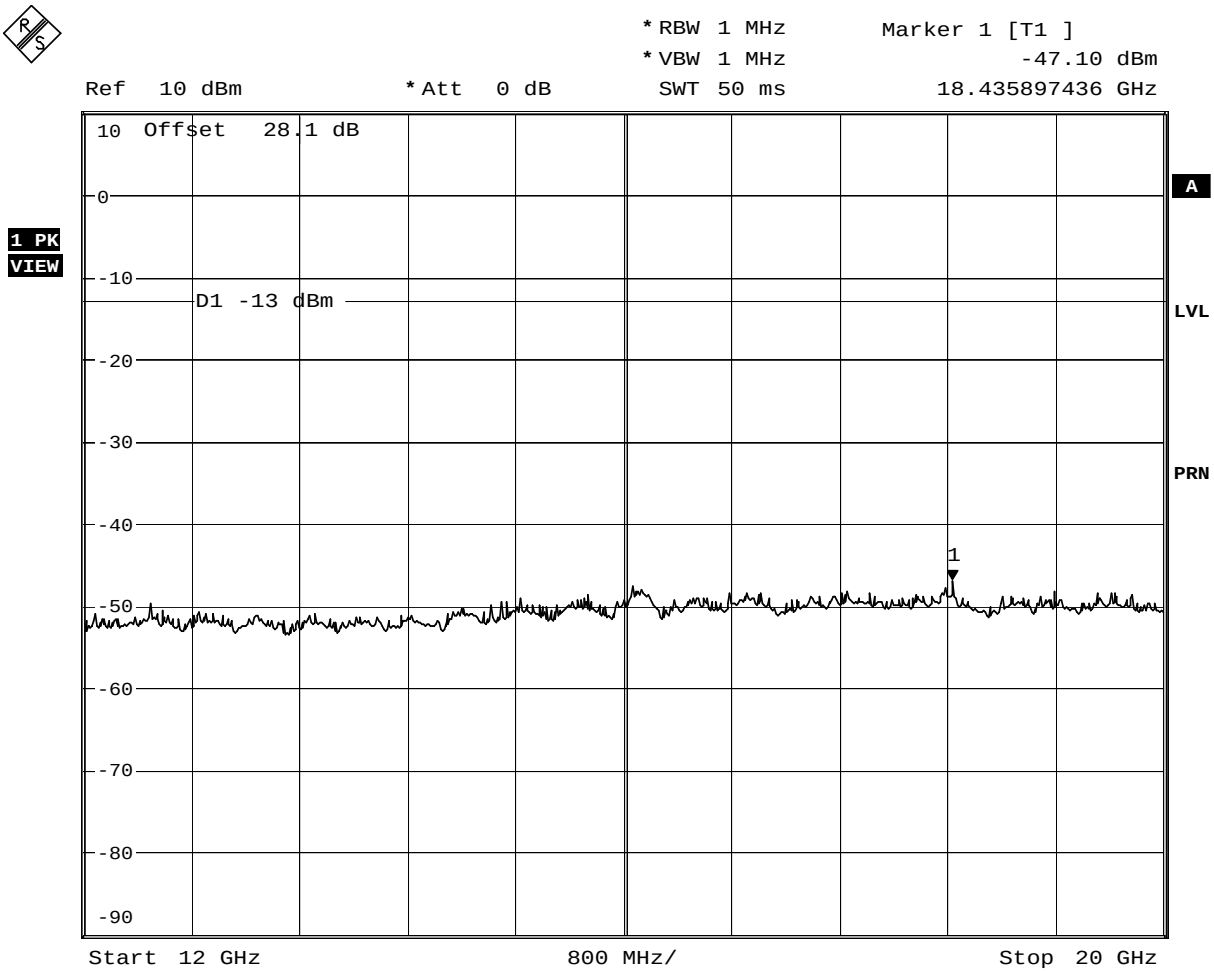


Date: 22.FEB.2006 13:27:00

Spurious Emissions (4GHz-12GHz)
Channel 810 (1909.8MHz) – Power Control Level 0

2.18 CONDUCTED SPURIOUS EMISSIONS

2.18.6 **Test Results** - continued



Date: 22.FEB.2006 13:31:21

Spurious Emissions (12GHz-20GHz)
Channel 810 (1909.8MHz) – Power Control Level 0

2.19 FREQUENCY STABILITY UNDER TEMPERATURE VARIATIONS

2.19.1 Specification Reference

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

2.19.2 Equipment Under Test

MC2004a Handset

2.19.3 Date of Test

22nd February 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 measurements performed on Timeslot 3. 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.

2.19.6 Test Results

The EUT met the requirements of FCC CFR 47: Part 24 Subpart E, Section 24.235, 2.1055 and RSS-133, 4.2 and 6.3

Temperature Interval ºC	Test Frequency GHz	Deviation Hz	Deviation from +20°C Hz	Limit kHz
- 30	1.88	*	*	See Note 1
- 20	1.88	+25	+47	See Note 1
- 10	1.88	+22	+44	See Note 1
0	1.88	+25	+47	See Note 1
+ 10	1.88	+23	+45	See Note 1
+ 20	1.88	-22	0	See Note 1
+ 30	1.88	-30	-8	See Note 1
+ 40	1.88	-33	-11	See Note 1
+ 50	1.88	-35	-13	See Note 1

* The EUT does not operate at -30°C. Its lowest operating temperature is -25°C with -28Hz deviation from the nominal.

Note 1 The fundamental must remain within the authorized frequency block.

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 and
Industry Canada RSS-133, 4.2 and 6.3

2.20.2 Equipment Under Test

MC2004a Handset

2.20.3 Date of Test

22nd February 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

The EUT was set to transmit on power control level 0 with measurements performed on Timeslot 3. 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 set to +20°C. The voltage was varied as described in the results table.

2.20.6 Test Results

The EUT met the requirements of FCC CFR 47: Part 24 Subpart E, Section 24.135(a), 2.1055 and Industry Canada RSS-133, 4.2 and 6.3

DC Voltage V	Test Frequency GHz	Deviation Hz	Deviation Limit kHz
-	1.88	-	See Note 1 Below
3.90	1.88	-22	See Note 1 Below
3.55	1.88	-20	See Note 1 Below

Note 1 The fundamental must remain within the authorized frequency block.

Product Service

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 2.7 and 2.16 Radio (Tx) - Block Edge				
Radiocommunications Tester	Rohde & Schwarz	CMU 200	39	07/07/2006
Dual Power Supply Unit	Hewlett Packard	6253A	84	O/P MON
Power Divider	Weinschel	1506A	601	O/P MON
Signal Generator	Rohde & Schwarz	SMR 40	1002	22/11/2006
SMA-SMA Cable (2m)	Reynolds	262-0248-2000	2399	21/07/2006
SMA-SMA Cable (1m)	Reynolds	262-0248-1000	2407	21/07/2006
Multimeter	Iso-tech	Iso Tech IDM101	2424	10/08/2006
Spectrum Analyser	Rohde & Schwarz	FSU26	2747	03/02/2007
Hygrometer	Rotronic	I-1000	2891	20/12/2006
Attenuator dc - 18GHz	Suhner	6810.17.B	2966	01/02/2007
20dB/2W Attenuator: dc - 12.4GHz	Weinschel	1	3032	21/12/2006
Sections 2.9 and 2.18 Radio (Tx) - Conducted Spurious Emissions				
Radiocommunications Tester	Rohde & Schwarz	CMU 200	39	07/07/2006
Dual Power Supply Unit	Hewlett Packard	6253A	84	O/P MON
Filter (High Pass, 4GHz)	Sematron	F-100-4000-5-R	564	O/P MON
Power Divider	Weinschel	1506A	601	O/P MON
Signal Generator	Rohde & Schwarz	SMR 40	1002	22/11/2006
SMA-SMA Cable (2m)	Reynolds	262-0248-2000	2399	21/07/2006
SMA-SMA Cable (1m)	Reynolds	262-0248-1000	2407	21/07/2006
Multimeter	Iso-tech	Iso Tech IDM101	2424	10/08/2006
Spectrum Analyser	Rohde & Schwarz	FSU26	2747	03/02/2007
FILTER HI PASS 71500	RLC Electronics	RLC-F100-1500-S-R	2843	16/05/2006
Hygrometer	Rotronic	I-1000	2891	20/12/2006
Attenuator dc - 18GHz	Suhner	6810.17.B	2966	01/02/2007
20dB/2W Attenuator: dc - 12.4GHz	Weinschel	1	3032	21/12/2006

3.1 TEST EQUIPMENT

Instrument	Manufacturer	Type No	TE Number	Calibration Due
Sections 2.10, 2.11, 2.19 and 2.20 Radio (Tx) - Frequency Characteristics				
Radiocommunications Tester	Rohde & Schwarz	CMU 200	39	07/07/2006
Dual Power Supply Unit	Hewlett Packard	6253A	84	O/P MON
Digital Temperature Indicator	Fluke	51	412	21/09/2006
Temperature Chamber	Montford	2F3	467	O/P MON
SMA-SMA Cable (2m)	Reynolds	262-0248-2000	2399	21/07/2006
Multimeter	Iso-tech	Iso Tech IDM101	2424	10/08/2006
Hygrometer	Rotronic	I-1000	2891	20/12/2006
Sections 2.5 and 2.14 Radio (Tx) - Modulation Characteristics				
Radiocommunications Tester	Rohde & Schwarz	CMU 200	39	07/07/2006
Dual Power Supply Unit	Hewlett Packard	6253A	84	O/P MON
Power Divider	Weinschel	1506A	601	O/P MON
Signal Generator	Rohde & Schwarz	SMR 40	1002	22/11/2006
SMA-SMA Cable (2m)	Reynolds	262-0248-2000	2399	21/07/2006
SMA-SMA Cable (1m)	Reynolds	262-0248-1000	2407	21/07/2006
Multimeter	Iso-tech	Iso Tech IDM101	2424	10/08/2006
Spectrum Analyser	Rohde & Schwarz	FSU26	2747	03/02/2007
Hygrometer	Rotronic	I-1000	2891	20/12/2006
Attenuator dc - 18GHz	Suhner	6810.17.B	2966	01/02/2007
20dB/2W Attenuator: dc - 12.4GHz	Weinschel	1	3032	21/12/2006

3.1 TEST EQUIPMENT

Instrument	Manufacturer	Type No	TE Number	Calibration Due
Sections 2.6 and 2.15 Radio (Tx) - Occupied Bandwidth				
Radiocommunications Tester	Rohde & Schwarz	CMU 200	39	07/07/2006
Dual Power Supply Unit	Hewlett Packard	6253A	84	O/P MON
Power Divider	Weinschel	1506A	601	O/P MON
Signal Generator	Rohde & Schwarz	SMR 40	1002	22/11/2006
SMA-SMA Cable (2m)	Reynolds	262-0248-2000	2399	21/07/2006
SMA-SMA Cable (1m)	Reynolds	262-0248-1000	2407	21/07/2006
Spectrum Analyser	Rohde & Schwarz	FSU26	2747	03/02/2007
Hygrometer	Rotronic	I-1000	2891	20/12/2006
Attenuator dc - 18GHz	Suhner	6810.17.B	2966	01/02/2007
20dB/2W Attenuator: dc - 12.4GHz	Weinschel	1	3032	21/12/2006
Sections 2.3 and 2.13 Radio (Tx) - Power Characteristics				
Radio communications Tester	Rohde & Schwarz	CMU 200	39	07/07/2006
Dual Power Supply Unit	Hewlett Packard	6253A	84	O/P MON
Power Divider	Weinschel	1506A	601	O/P MON
Signal Generator	Rohde & Schwarz	SMR 40	1002	22/11/2006
SMA-SMA Cable (2m)	Reynolds	262-0248-2000	2399	21/07/2006
SMA-SMA Cable (1m)	Reynolds	262-0248-1000	2407	21/07/2006
Multimeter	Iso-tech	Iso Tech IDM101	2424	10/08/2006
Spectrum Analyser	Rohde & Schwarz	FSU26	2747	03/02/2007
Attenuator dc - 18GHz	Suhner	6810.17.B	2966	01/02/2007
20dB/2W Attenuator: dc - 12.4GHz	Weinschel	1	3032	21/12/2006

3.1 TEST EQUIPMENT

Instrument	Manufacturer	Type No	TE Number	Calibration Due
Section 2.2 EMC - Conducted Emissions				
Receiver	Rohde & Schwarz	ESPC	1536	O/P MON
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	1537	O/P MON
Two-line V Network	Rohde & Schwarz	ESH3-Z5	1538	16/03/2006
15m N-N RF Cable	Rosenberger	FA210A-150M	2027	11/04/2006
Sections 2.1, 2.4, 2.8, 2.12 and 2.17 EMC - Radiated Emissions				
EMI Test Receiver	Rohde & Schwarz	ESI26	1505	O/P MON
Bilog Antenna	Chase	CBL6111B	1508	16/04/2006
DRG Antenna	EMCO	3115	1509	O/P MON
DRG Antenna	EMCO	3115	1510	O/P MON
DRG Antenna	Q-Par Angus Ltd	QSH 180K	1511	24/06/2005
Pre Amplifier	Phase One	PS04-0085	1532	13/07/2006
Pre-Amplifier	Phase One	PS04-0086	1533	13/07/2006
Pre Amplifier	Phase One	PSO4-0087	1534	12/07/2006
3m N-N RF Cable	Rosenberger	3899	1871	11/04/2006
15m N-N RF Cable	Rosenberger	FA210A-150M	2026	11/04/2006
3GHz High Pass Filter	Sematron	E100-3000-5-R	2244	O/P MON
Signal Generator	Rohde & Schwarz	SMY 02	2949	07/11/2006

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*

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

* In accordance with CISPR 16-4
† In accordance with UKAS Lab 34

Product Service

SECTION 4

PHOTOGRAPHS OF EQUIPMENT

4.1 PHOTOGRAPHS OF EQUIPMENT

MC2004a Front View

MC2004a Front View

4.1 PHOTOGRAPHS OF EQUIPMENT

MC2004a – Rear View

MC2004a with AC Charger (US)

4.1 PHOTOGRAPHS OF EQUIPMENT

MC2004a – Rear – Cover removed

MC2004a – Battery Pack

4.1 PHOTOGRAPHS OF EQUIPMENT

AC Charger (UK)

AC Charger (US)

4.1 PHOTOGRAPHS OF EQUIPMENT

AC Charger (AUS)

AC Charger (CE)

4.1 PHOTOGRAPHS OF EQUIPMENT

Cigar Adapter

Data Cable

4.1 PHOTOGRAPHS OF EQUIPMENT

Mono Headset

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).