
REPORT ON

Limited FCC CFR 47: Parts 15, 22 and 24
and Industry Canada RSS-132 and 133 Testing
of a Novatel Wireless Inc U730
Quad-Band GPRS/EGPRS/UMTS/HSDPA Data Module

COMMERCIAL-IN-CONFIDENCE

FCC ID: NBZNRM-U730

Report No OR614714/01 Issue 2

November 2005



Product Service





Product Service

Competence. Certainty. Quality

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Inc U730 Quad-Band GPRS/EGPRS/UMTS/HSDPA Data Module

FCC ID: NBZNRM-U730

Report No OR614714/01 Issue 2

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DATED

14th November 2005

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;


P Harrison


S Hartley




A Hubbard


R Small

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SECTION 1

REPORT SUMMARY

Limited FCC CFR 47: Parts 15, 22 and 24
and Industry Canada RSS-132 and 133 Testing
of a Novatel Wireless Inc U730
Quad-Band GPRS/EGPRS/UMTS/HSDPA Data Module

1.1 STATUS

| | |
|------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Equipment Under Test | U730 |
| Objective | To undertake measurements to determine the Equipment Under Test's (EUT's) compliance with the specification. |
| Name and Address of Client | Novatel Wireless Inc Suite 200, 6715 - 8th Street N.E. Calgary Alberta T2E 7H7 Canada |
| Type | PC Card Wireless Modem |
| Part Number | 649496 00672 3 |
| Serial Numbers | See Test Result Pages |
| Hardware Version | Rev 1 |
| Software Version | Version 18 |
| Declared Variants | None |
| Test Specification / Issue / Date | FCC CFR 47: Part 15, Subparts B and C, October 2003 FCC CFR 47: Part 22, Subpart H, October 2004 FCC CFR 47: Part 24, Subpart D, October 2004 RSS-132: Issue 1: August 2002 RSS-133: Issue 3: June 2005 |
| Number of Items Tested | One |
| Security Classification of EUT | Commercial-in-Confidence |
| Incoming Release Date | Declaration of Build Status 1 st November 2005 |
| Disposal Reference Number Date | Held pending disposal Not Applicable Not Applicable |
| Start of Test | 3 rd October 2005 |
| Finish of Test | 27 th October 2005 |
| Related Documents | ANSI C63.4 2001 RSS-212, Issue 1, February 1999 SRSP-503 SRSP-510 |

1.2 INTRODUCTION

The information contained within this report is intended to show limited verification of compliance of the Novatel Wireless Inc U730 Quad-Band GPRS/EGPRS/UMTS/HSDPA Data Module to the requirements of FCC Specification Parts 15, 22 and 24 and Industry Canada Radio Specifications RSS-132 and RSS-133.

Testing has been performed under the following site accreditations

FCC Accreditation
90987 Octagon House, Fareham Test Laboratory

Industry Canada Accreditation
IC5208 Octagon House, Fareham Test Laboratory

1.2 INTRODUCTION

1.2.1 Declaration of Build Status

| MAIN EUT | | |
|--------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|---------------------|
| MANUFACTURING DESCRIPTION | PC Card Wireless Modem | |
| MANUFACTURER | Novatel Wireless Technologies Inc | |
| TYPE | QUAD BAND GPRS/EDGE DUAL BAND UMTS/HSDPA | |
| PART NUMBER | 649496 00672 3 | |
| SERIAL NUMBER | See Test pages | |
| HARDWARE VERSION | Rev 1 | |
| SOFTWARE VERSION | Version 18 | |
| TRANSMITTER OPERATING RANGE | 824-849MHz, 1850-1910MHz | |
| RECEIVER OPERATING RANGE | 869-894MHz, 1805-1880MHz | |
| COUNTRY OF ORIGIN | Canada | |
| INTERMEDIATE FREQUENCIES | No IF | |
| ITU DESIGNATION OF EMISSION | GRPS 850: 316KGXW | GRPS 1900: 316KGXW |
| | EDGE 850: 311KG7W | EDGE 1900: 319KG7W |
| | UMTS 850: 4M66F9W | UMTS 1900: 4M66F9W |
| | HSDPA 850: 4M66F9W | HSDPA 1900: 4M66F9W |
| HIGHEST INTERNALLY GENERATED FREQUENCY | 1989.8MHz | |
| OUTPUT POWER (W or dBm) | GPRS.EDGE: +33dBm Max, UMTS/HSDPA: +24dBm Max | |
| FCC ID | NBZNRM-U730 | |
| INDUSTRY CANADA ID | TBD | |
| TECHNICAL DESCRIPTION (a brief description of the intended use and operation) | PC card wireless modem used by laptop computers in order to establish a data connection through cellular networks. | |
| BATTERY/POWER SUPPLY | | |
| MANUFACTURING DESCRIPTION | N/A | |
| MANUFACTURER | N/A | |
| VOLTAGE | N/A | |

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.

Signature

Kevin Goodfellow

Date

1/11/2005

D of B S Serial No

OS614714

1.3 BRIEF SUMMARY OF RESULTS

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

FCC CFR 47: Part 15, Subpart B, RSS-210, RSS-132 and RSS-133

| Test | Spec Clause | | Test Description | Result | Comments |
|------|-------------|----------------------------|-----------------------------|--------|----------|
| | FCC | Industry Canada | | | |
| 2.1 | 15.109 | RSS-132, 6.6 RSS-133, 9 | Spurious Radiated Emissions | Pass | |
| | 15.107 | RSS-210, 6.6 | Conducted Emissions | N/A | |

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

| Test | Spec Clause | | Test Description | Result | Comments |
|------|------------------------------------------------------|-----------------|-----------------------------------------------------|--------|----------|
| | FCC | Industry Canada | | | |
| 2.2 | Part 22 22.913 (a) | RSS-132, 6.4 | Effective Radiated Power - Radiated | Pass | |
| 2.3 | Part 2 2.21047(d) | Not Applicable | Modulation Characteristics | Pass | |
| 2.4 | Part 2 2.1049, Part 22 22.917 (b) | RSS-132, 6.2 | Occupied Bandwidth | Pass | |
| 2.5 | Part 2 2.1051, Part 22 22.905 and 22.917 | RSS-132, 6.5 | Spurious Emissions at Antenna Terminals | Pass | |
| 2.6 | Part 2.1053, Part 22.917 | RSS-132, 6.5 | Radiated Emissions | Pass | |
| 2.7 | Part 2 2.1051, Part 22 22.917(a) | Not Applicable | Conducted Spurious Emissions | Pass | |
| 2.8 | Part 2 2.1055, Part 22 22.355 | RSS-132, 6.3 | Frequency Stability Under Temperature Variations | Pass | |
| 2.9 | Part 2 2.1055, Part 22 22.355 | Not Applicable | Frequency Stability Under Voltage Variations | Pass | |
| 2.10 | Part 2 2.0146 Part 22 22.913 (a) | RSS-132, 4.4 | Maximum Peak Output Power | Pass | |

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 | | | |
| 2.11 | Part 2 2.1046 Part 24 24.232 (b) | RSS-133, 6.2 | Maximum Peak Output Power – Radiated | Pass | |
| 2.12 | Part 2 2.1046 Part 24 24.232 | RSS-133, 6.2 | Maximum Peak Output Power - Conducted | Pass | |
| 2.13 | Part 2 2.1047(d) | Not Applicable | Modulation Characteristics | Pass | |
| 2.14 | Part 2 2.1049, Part 24 24.238 (b) | Not Applicable | Occupied Bandwidth | Pass | |
| 2.15 | Part 2 2.1051, Part 24 24.229 and 24.238 | RSS-133, 6.3 | Spurious Emissions at Antenna Terminals | Pass | |
| 2.16 | Part 2 2.1053, Part 24 24.238 | RSS-133, 6.3 | Radiated Spurious Emissions | Pass | |
| 2.17 | Part 2 2.1051, Part 24 24.238 (a) | Not Applicable | Conducted Spurious Emissions | Pass | |
| 2.18 | Part 2 2.1055, Part 24 24.235 | RSS-133, 7 | Frequency Stability Under Temperature Variations | Pass | |
| 2.19 | Part 2 2.1055, Part 24 24.235 | RSS-133, 7 | Frequency Stability Under Voltage Variations | Pass | |

1.4 PRODUCT INFORMATION

1.4.1 Technical Description

The Equipment Under Test (EUT) was a Novatel Wireless Technologies Inc U730 Quad-Band GPRS/EGPRS/UMTS/HSDPA Data Module.

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/EGSM900 = 32.0dBm
GSM (Class 1) DCS 1800 / PCS 1900 = 29.3dBm
GPRS (Class 10) Class B operation
EGPRS (Class E2) GSM 850/EGSM900 = 26.0dBm
DCS 1800/PCS 1900 = 25.0dBm

1.4.3 Test Configuration

Test Configuration – GPRS 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 – EDGE 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 – UMTS 850 Mode

850MHz transmitting on the following channels and frequencies;

Bottom Channel 128: 826.00MHz
Middle Channel 189: 836.80MHz
Top Channel 251: 847.20MHz

850MHz receiving on the following channels and frequencies;
Middle Channel 189: 836.80MHz

1.4 PRODUCT INFORMATION

1.4.3 Test Configuration – continued

Test Configuration – HSDPA 850 Mode

850MHz transmitting on the following channels and frequencies;
Bottom Channel 128: 826.40MHz
Middle Channel 189: 836.60MHz
Top Channel 251: 846.60MHz
850MHz receiving on the following channels and frequencies;
Middle Channel 189: 836.60MHz

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

Test Configuration – EDGE 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

Test Configuration – UMTS 1900 Mode

1900MHz transmitting on the following channels and frequencies;
Bottom Channel 512: 1852.4MHz
Middle Channel 661: 1880.0MHz
Top Channel 810: 1907.6MHz
1900MHz receiving on the following channels and frequencies;
Middle Channel 661: 1880.0MHz

Test Configuration – HSDPA 1900 Mode

1900MHz transmitting on the following channels and frequencies;
Bottom Channel 512: 1852.4MHz
Middle Channel 661: 1880.0MHz
Top Channel 810: 1907.6MHz
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 U730 Quad-Band GPRS/EGPRS/UMTS/HSDPA Data Module was powered via a laptop at 3.3V or a 3.3V dc power supply.

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 Limited completed the test programme at our Maplewood, Basingstoke Test Laboratory



SECTION 2

TEST RESULTS

Limited FCC CFR 47: Parts 15, 22 and 24
and Industry Canada RSS-132 and 133 Testing
of a Novatel Wireless Inc U730
Quad-Band GPRS/EGPRS/UMTS/HSDPA Data Module

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

U730

2.1.3 Date of Test

13th October 2005

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 – 9GHz 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 – 1GHz).

Measurements were made with the EUT in GSM 850 Idle Mode.
Serial Number 001018-00-0006156-5.

EUT Rx

| Emission Frequency | Polarisation | Height | Azimuth | Field Strength | | Limit | |
|--------------------|--------------|--------|---------|----------------|-----------|--------------|-----------|
| MHz | | cm | degree | dB μ V/m | μ V/m | dB μ V/m | μ V/m |
| 139.40 | Vertical | 100 | 305 | 36.6 | 67.7 | 43.5 | 100.0 |
| 147.48 | Vertical | 100 | 305 | 31.9 | 39.5 | 43.5 | 100.0 |
| 180.76 | Horizontal | 205 | 066 | 39.0 | 89.2 | 43.5 | 100.0 |
| 188.40 | Horizontal | 137 | 215 | 37.0 | 70.6 | 43.5 | 100.0 |
| 232.72 | Horizontal | 130 | 075 | 45.3 | 183.4 | 46.0 | 200.0 |
| 238.72 | Horizontal | 120 | 085 | 44.6 | 169.2 | 46.0 | 200.0 |

Measurements were made with the EUT in GSM 1900 Idle Mode.
Serial Number 001018-00-0006156-5.

EUT Rx

The levels of the six highest emissions measured in accordance with the specification are presented below: -

| Emission Frequency | Polarisation | Height | Azimuth | Field Strength | | Limit | |
|--------------------|--------------|--------|---------|----------------|-----------|--------------|-----------|
| MHz | | cm | degree | dB μ V/m | μ V/m | dB μ V/m | μ V/m |
| 139.40 | Vertical | 100 | 305 | 36.6 | 69.9 | 43.5 | 100.0 |
| 147.48 | Vertical | 100 | 305 | 32.0 | 40.0 | 43.5 | 100.0 |
| 180.76 | Horizontal | 205 | 065 | 39.3 | 92.7 | 43.5 | 100.0 |
| 188.40 | Horizontal | 140 | 215 | 37.2 | 72.4 | 43.5 | 100.0 |
| 232.82 | Horizontal | 130 | 075 | 45.2 | 181.3 | 46.0 | 200.0 |
| 238.72 | Horizontal | 120 | 085 | 44.1 | 161.1 | 46.0 | 200.0 |

2.1 SPURIOUS RADIATED EMISSIONS

2.1.6 Test Results - continued

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 (1GHz – 5GHz).

Measurements were made with the EUT in GSM 850 Mode.
Serial Number 001018-00-0006156-5.

EUT Rx

No emission tables are shown as no emissions were found.

Measurements were made with the EUT in GSM 1900 Mode.
Serial Number 001018-00-0006156-5.

EUT Rx

No emission tables are shown as no emissions were found.

2.2 EFFECTIVE RADIATED POWER (RADIATED)

2.2.1 Specification Reference

FCC CFR 47: Part 22 Subpart H, Section 22.913 and Industry Canada RSS-132, 6.4 (4.4)

2.2.2 Equipment Under Test

U730

2.2.3 Date of Test

8th and 11th October 2005

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.

The EUT has an Integral Antenna, therefore the Maximum Peak Output Power (EIRP) was made using the Radiated 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, whose input signal the antenna was adjusted until the received level matched that of the previously detected emission.

2.2 EFFECTIVE RADIATED POWER (RADIATED)

2.2.6 Test Results

The EUT met the requirements of FCC CFR 47: Part 22 Subpart H, Section 22.913 and Industry Canada RSS-132, 6.4 (4.4) for Effective Radiated Power.

Measurements were made with the EUT in GPRS 850 Mode.
Serial Number 001018-00-0006156-5.

| Frequency MHz | Result ERP dBm | Result ERP mW | FCC Part 22.913 Limit ERP dBm | FCC Part 22.913 Limit ERP mW | RSS-132 Limit ERP dBm | RSS-132 Limit ERP mW |
|------------------|-------------------|------------------|-------------------------------------------|------------------------------------------|-----------------------------|----------------------------|
| 824.13 | 30.43 | 1104 | 38.45 | 7000 | 38.0 | 6300 |
| 836.44 | 30.80 | 1202 | 38.45 | 7000 | 38.0 | 6300 |
| 848.88 | 30.41 | 1099 | 38.45 | 7000 | 38.0 | 6300 |

Measurements were made with the EUT in EDGE 850 Mode.
Serial Number 001018-00-0006156-5.

| Frequency MHz | Result ERP dBm | Result ERP mW | FCC Part 22.913 Limit ERP dBm | FCC Part 22.913 Limit ERP mW | RSS-132 Limit ERP dBm | RSS-132 Limit ERP mW |
|------------------|-------------------|------------------|-------------------------------------------|------------------------------------------|-----------------------------|----------------------------|
| 824.245 | 30.58 | 1143 | 38.45 | 7000 | 38.0 | 6300 |
| 836.295 | 30.72 | 1180 | 38.45 | 7000 | 38.0 | 6300 |
| 848.867 | 30.87 | 1222 | 38.45 | 7000 | 38.0 | 6300 |

Measurements were made with the EUT in UMTS 850 Mode.
Serial Number 001018-00-006341-3.

| Frequency MHz | Result ERP dBm | Result ERP mW | FCC Part 22.913 Limit ERP dBm | FCC Part 22.913 Limit ERP mW | RSS-132 Limit ERP dBm | RSS-132 Limit ERP mW |
|------------------|-------------------|------------------|-------------------------------------------|------------------------------------------|-----------------------------|----------------------------|
| 827.170 | 17.23 | 52.84 | 38.45 | 7000 | 38.0 | 6300 |
| 835.869 | 17.26 | 53.21 | 38.45 | 7000 | 38.0 | 6300 |
| 848.848 | 17.04 | 50.58 | 38.45 | 7000 | 38.0 | 6300 |

2.2 EFFECTIVE RADIATED POWER (RADIATED)

2.2.6 Test Results - continued

Measurements were made with the EUT in HSDPA 850 Mode.
Serial Number 001018-00-006341-3.

The measurements were performed with the EUT lying down and the measuring antenna in a horizontal position, as this was found to be the worst case position.

| Frequency MHz | Result ERP dBm | Result ERP mW | FCC Part 22.913 Limit ERP dBm | FCC Part 22.913 Limit ERP mW | RSS-132 Limit ERP dBm | RSS-132 Limit ERP mW |
|------------------|-------------------|------------------|-------------------------------------------|------------------------------------------|-----------------------------|----------------------------|
| 826.400 | 17.4 | 54.95 | 38.45 | 7000 | 38.0 | 6300 |
| 836.60 | 18.0 | 63.10 | 38.45 | 7000 | 38.0 | 6300 |
| 846.60 | 17.2 | 52.48 | 38.45 | 7000 | 38.0 | 6300 |

2.3 MODULATION CHARACTERISTICS

2.3.1 Specification Reference

FCC CFR 47: Part 24 Subpart E, Section 2.1047(d)

2.3.2 Equipment Under Test

U730

2.3.3 Date of Test

14th October 2005 (GPRS)
17th October 2005 (EDGE)

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

Two views are shown for GPRS and EDGE modes of operation. One view shows the two active slot(s) over a complete screen. The other view shows the active slot(s) over a complete frame.

2.3.6 Modulation Description

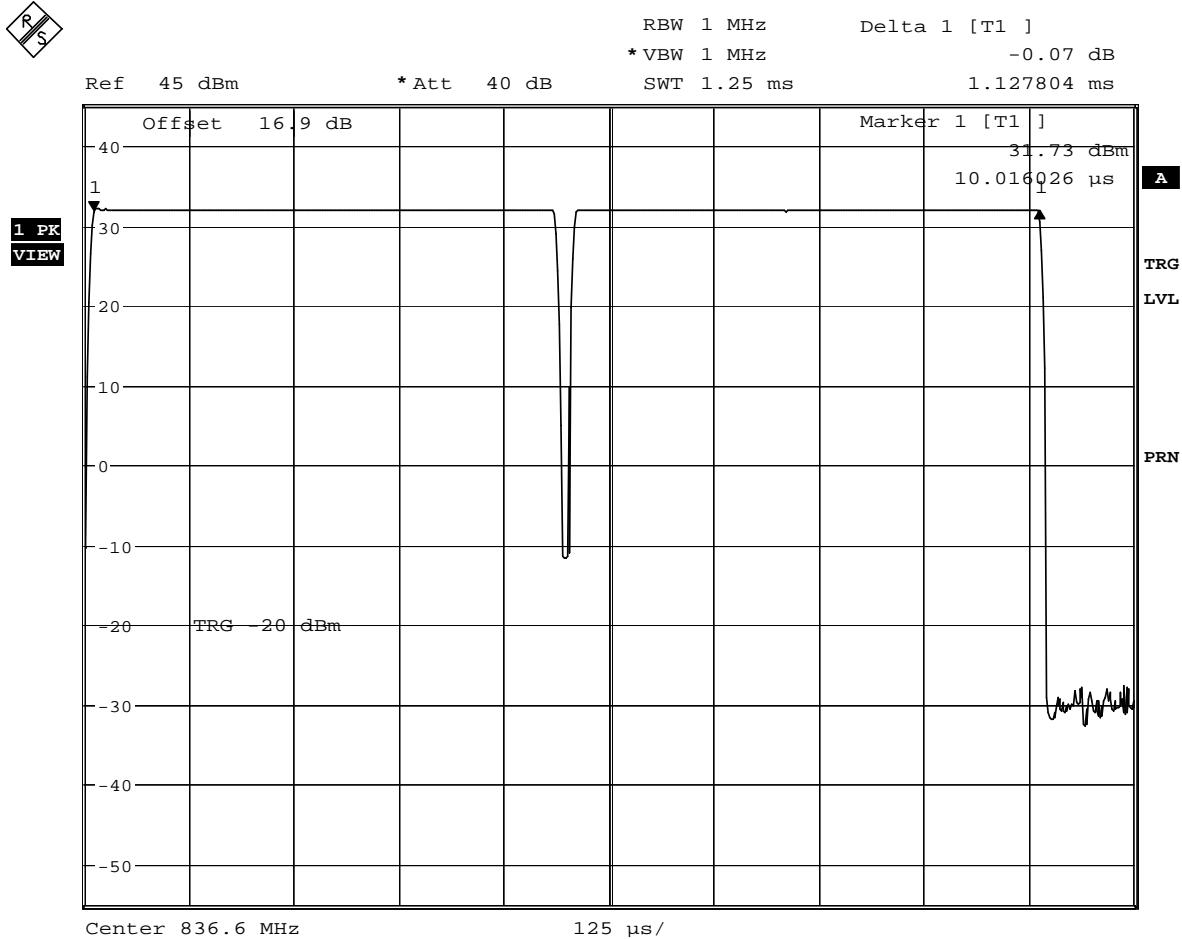
The GSM System uses the modulation system of 0.3 GMSK and 8PSK in a Time Division Duplex. The bandwidth is 200kHz. The Frame of the uplink and downlink if in a single slot is 4.6ms long. There are 8 slots per frame, thus a burst length is 577us, including transients.



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2.3 MODULATION CHARACTERISTICS

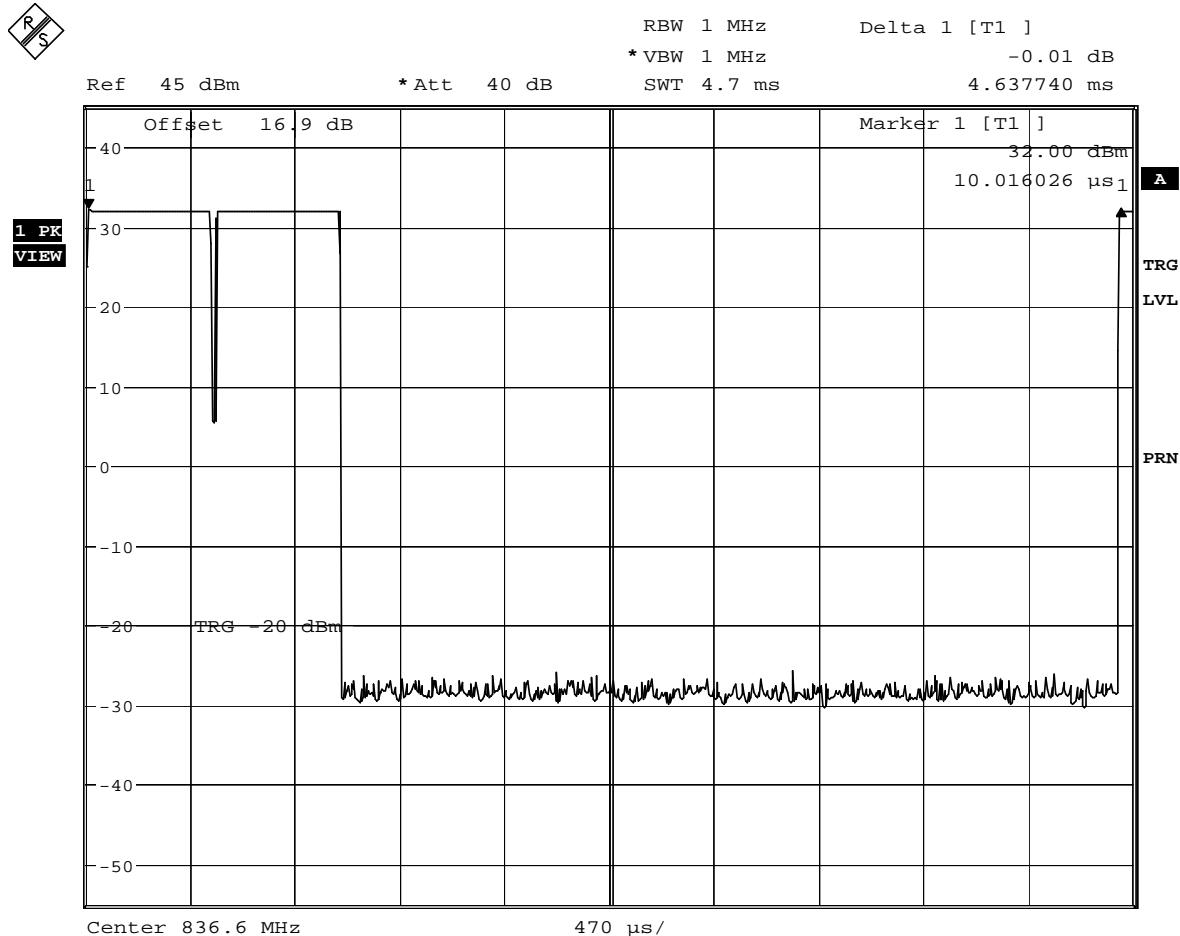
2.3.7 Test Results



Date: 18.OCT.2005 14:17:34
 Serial Number: 001018-00-006341-3
GPRS Mode –View of Two Timeslots Active

2.3 MODULATION CHARACTERISTICS

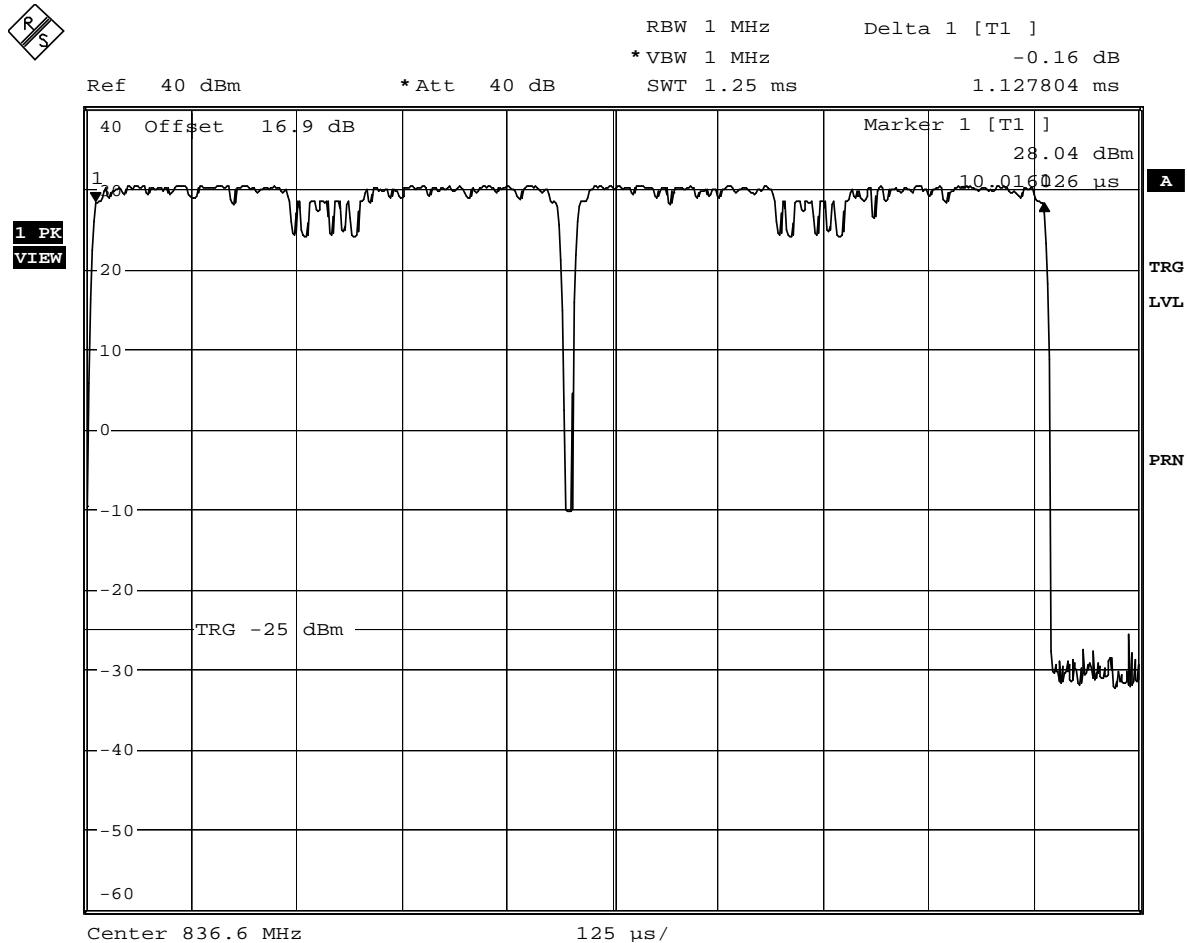
2.3.7 Test Results - continued



Date: 18.OCT.2005 14:18:59
 Serial Number: 001018-00-006341-3
GPRS Mode – View of One Completed Frame

2.3 MODULATION CHARACTERISTICS

2.3.7 Test Results - continued



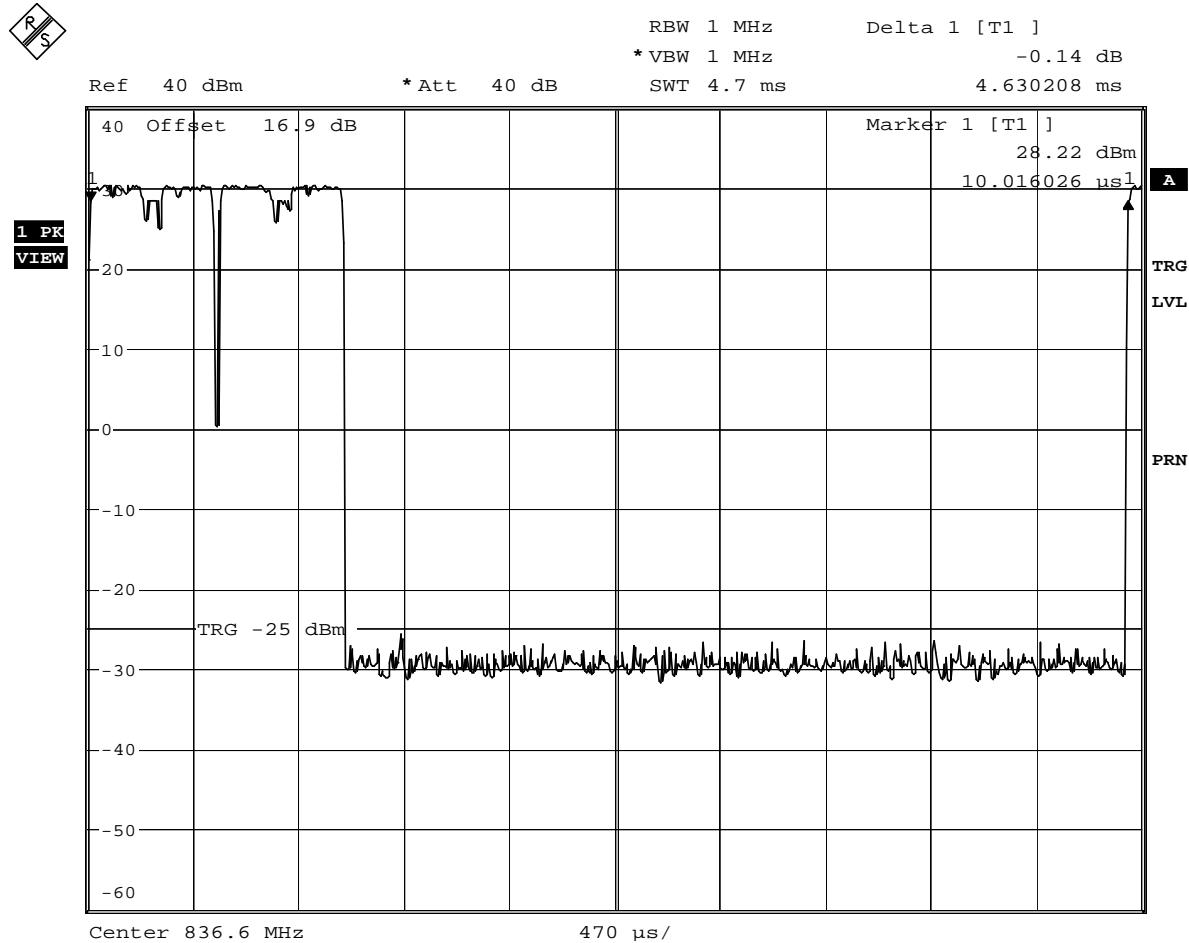
Date: 17.OCT.2005 16:16:17
 Serial Number: 001018-00-006341-3
EDGE Mode – View of Two Timeslots Active



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2.3 MODULATION CHARACTERISTICS

2.3.7 Test Results - continued



Date: 17.OCT.2005 16:17:41
Serial Number: 001018-00-006341-3
EDGE Mode –View of One Complete Frame

2.4 OCCUPIED BANDWIDTH

2.4.1 Specification Reference

FCC CFR 47: Part 22 Subpart H, Section 2.1049(h), 22.917(b) and Industry Canada RSS-132, 6.2

2.4.2 Equipment Under Test

U730

2.4.3 Date of Test

14th October 2005 (GPRS)
17th October 2005 (EDGE)
13th October 2005 (UMTS)
11th October 2005 (HSDPA)

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

GPRS and EDGE Modes

The EUT was transmitting at maximum power. In GPRS mode, TS2 and TS3 were active. In EDGE mode, TS2 and TS3 were 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.

UMTS Mode

The EUT was transmitting at maximum power with QPSK modulation using a resolution bandwidth of 100 kHz and a video bandwidth of 100 kHz, the -26dBc points were established and the emission bandwidth determined.

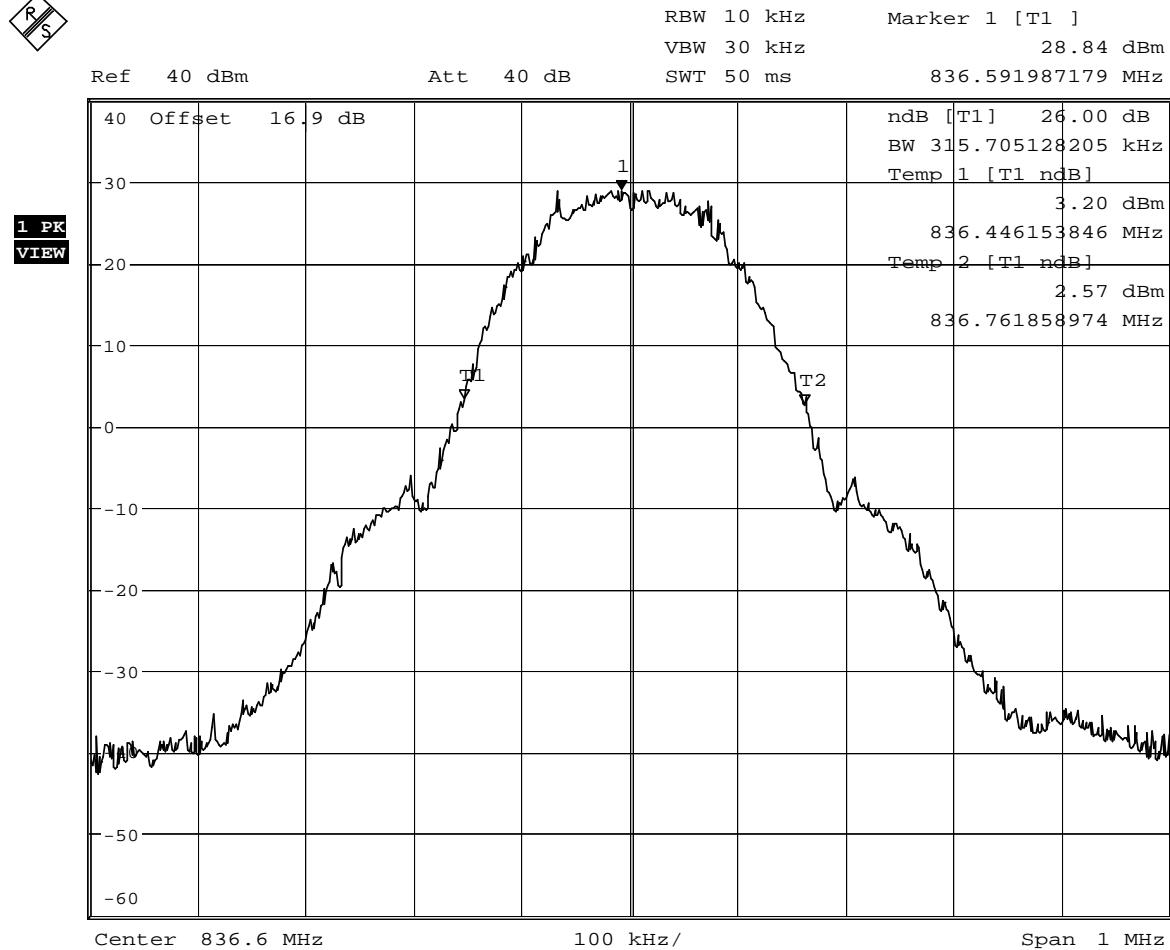
HSDPA Mode

The EUT was transmitting at maximum power with HSDPA (16QAM) modulation, TS2 and TS3 were active. Using a resolution bandwidth of 100 kHz and a video bandwidth of 100 kHz, the -26dBc points were established and the emission bandwidth determined.

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

2.4 OCCUPIED BANDWIDTH

2.4.6 Test Results



Date: 14.OCT.2005 10:06:59

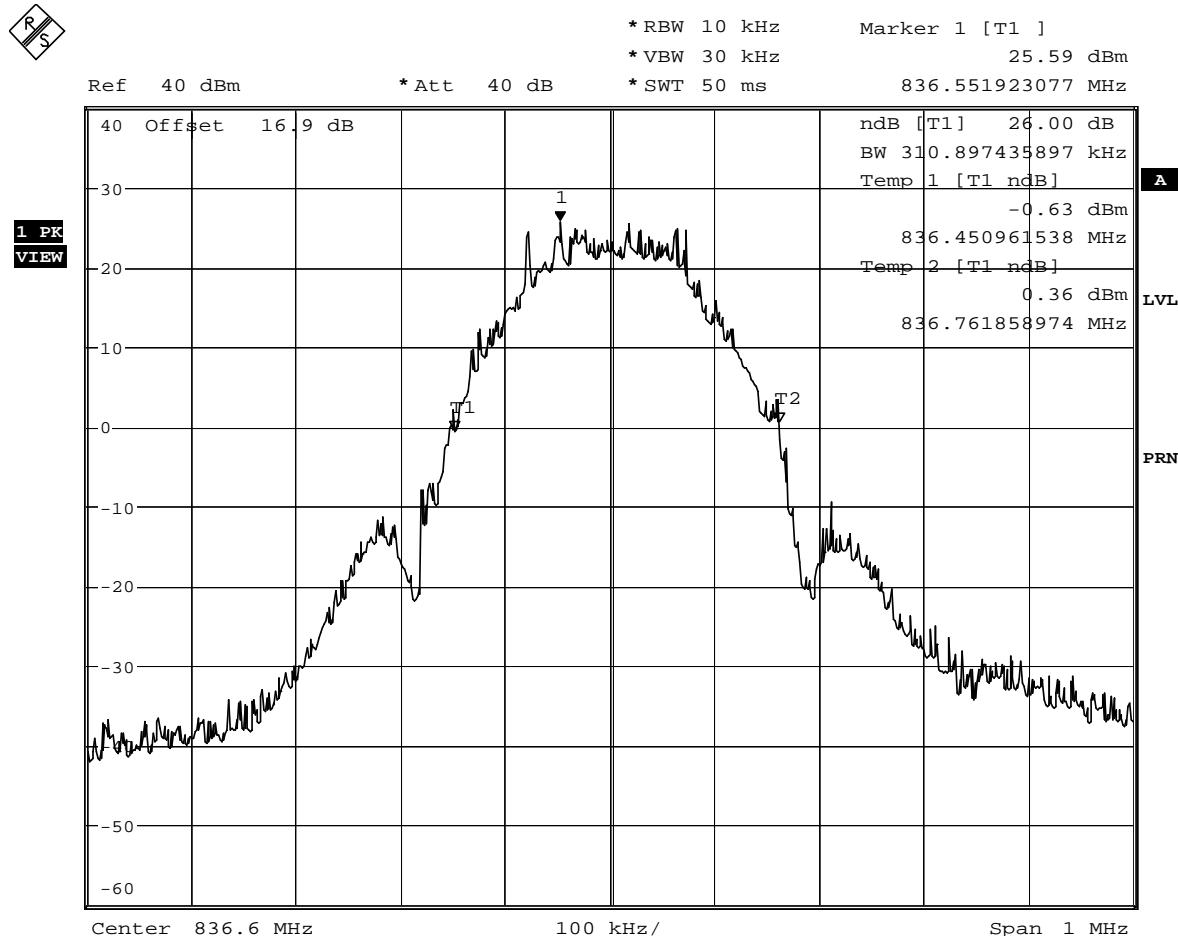
Serial Number: 001018-00-006341-3
Occupied Bandwidth As Defined By The -26dBc Points
Maximum Power – GPRS 850



Product Service

2.4 OCCUPIED BANDWIDTH

2.4.6 Test Results - continued

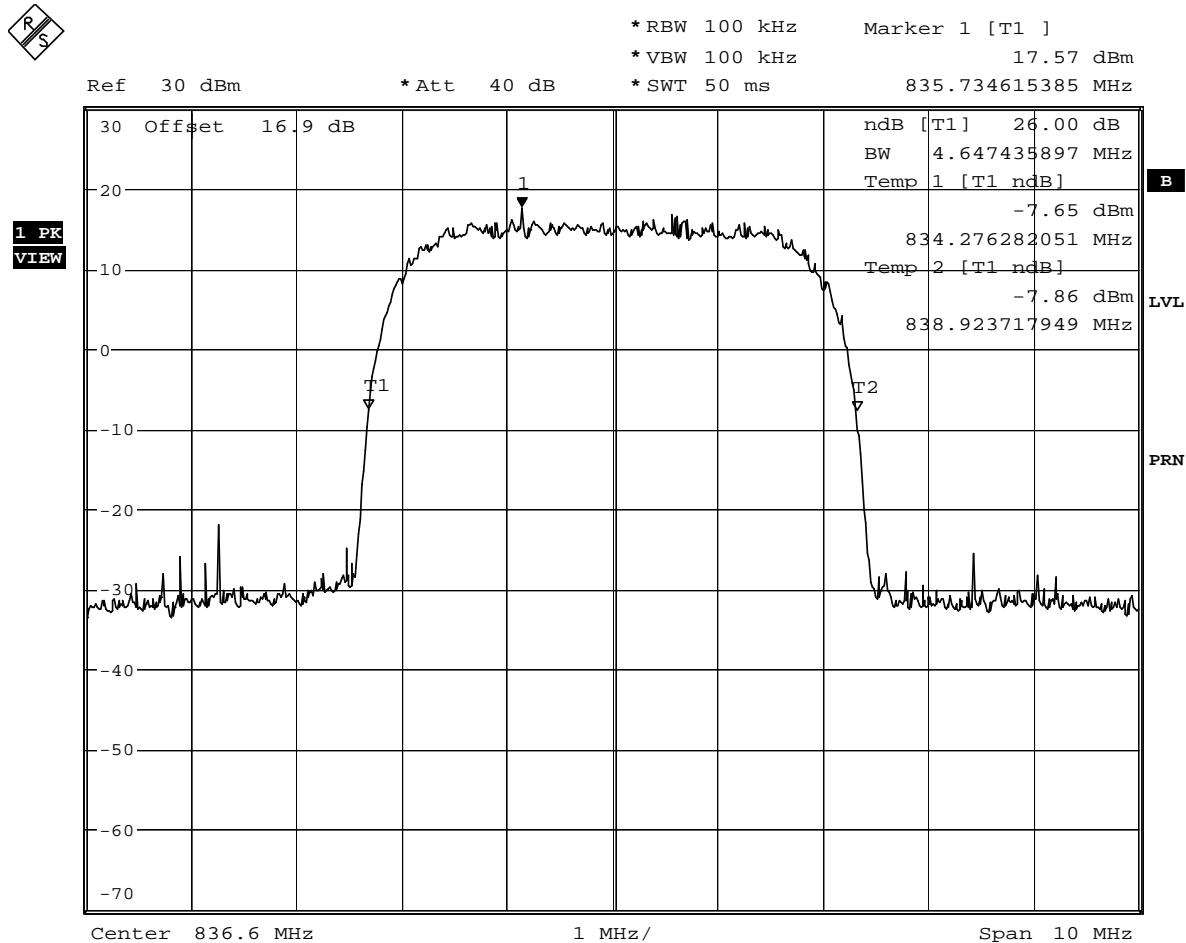


Date: 17.OCT.2005 14:57:46

Serial Number: 001018-00-006341-3
Occupied Bandwidth As Defined By The -26dBc Points
Maximum Power – EDGE 850

2.4 OCCUPIED BANDWIDTH

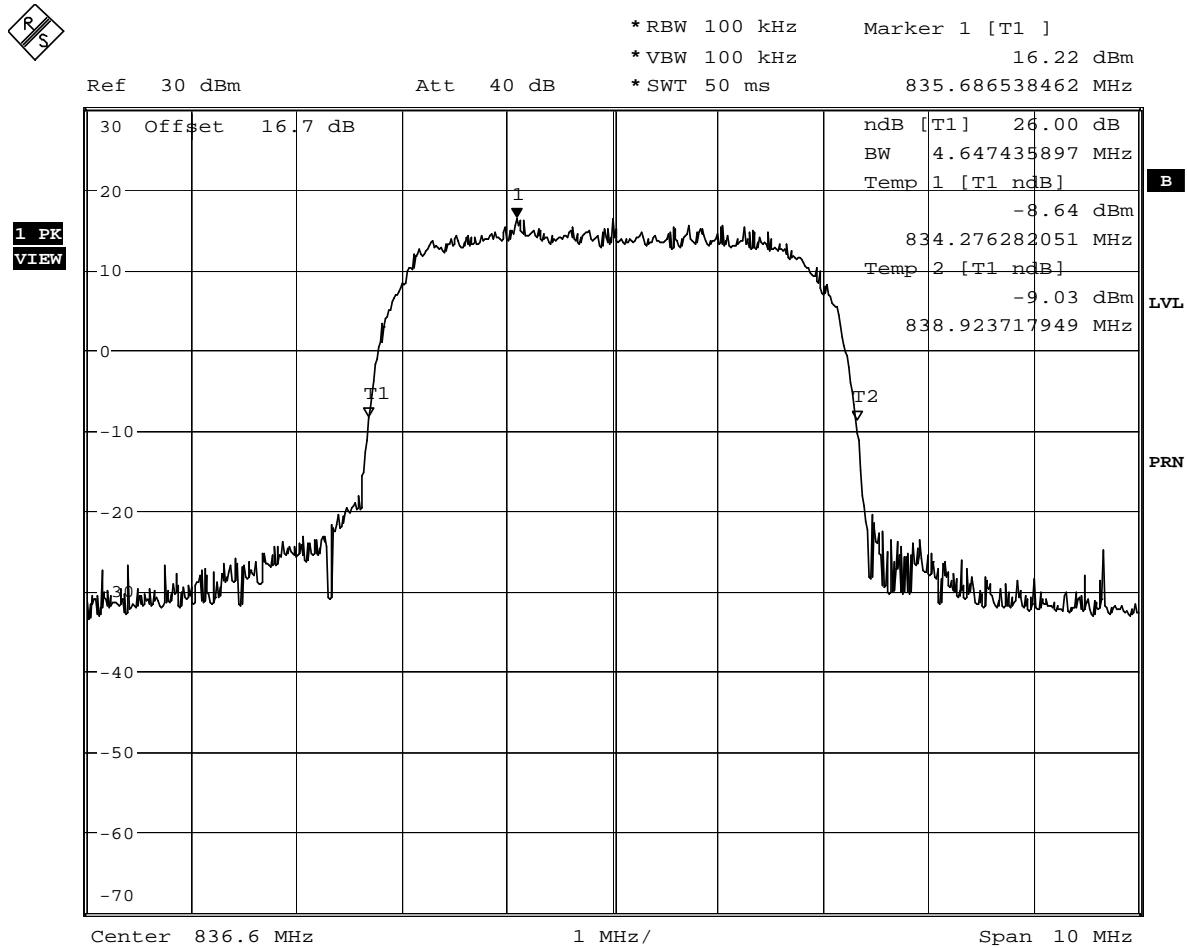
2.4.6 Test Results - continued



Date: 13.OCT.2005 12:03:17
Serial Number: 001018-00-006341-3
Occupied Bandwidth As Defined By The -26dBc Points
Maximum Power – UMTS 850

2.4 OCCUPIED BANDWIDTH

2.4.6 Test Results - continued



Date: 11.OCT.2005 11:09:54

Serial Number: 001018-00-006341-3
Occupied Bandwidth As Defined By The -26dBc Points
Maximum Power – HSDPA 850

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

2.5.1 Specification Reference

FCC CFR 47: Part 22 Subpart H, Section 2.1051, 22.905, 22.917 and
Industry Canada RSS-132, 6.5

2.5.2 Equipment Under Test

U730

2.5.3 Date of Test

14th October 2005 (GPRS)
17th October 2005 (EDGE)
13th October 2005 (UMTS)
11th October 2005 (HSDPA)

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

In accordance with 22.917(b) and 22.905, 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. The 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 10 kHz resolution bandwidth and 30 kHz video bandwidth. The measured path loss was entered as a reference level offset into the Spectrum Analyser.

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

2.5.6 Test Results

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

Measurements were made with the EUT in GPRS 850 Mode.

Serial Number: 001018-00-006341-3

Communication Channel Pair Blocks

| Frequency Block MHz | Lower Block Edge Test Channels/Frequencies | Upper Block Edge Test Channels/Frequencies |
|------------------------|-----------------------------------------------|-----------------------------------------------|
| A 824.0 – 835.0 | Channel : 129 Frequency : 824.4MHz | - |
| B 824.0 – 849.0 | - | Channel : 250 Frequency : 848.6MHz |

Measurements were made with the EUT in EDGE 850 Mode.

Serial Number: 001018-00-006341-3

Communication Channel Pair Blocks

| Frequency Block MHz | Lower Block Edge Test Channels/Frequencies | Upper Block Edge Test Channels/Frequencies |
|------------------------|-----------------------------------------------|-----------------------------------------------|
| A 824.0 – 835.0 | Channel : 129 Frequency : 824.4MHz | - |
| B 846.5 – 849.0 | - | Channel : 250 Frequency : 848.6MHz |

Measurements were made with the EUT in UMTS 850 Mode.

Serial Number: 001018-00-006341-3

Communication Channel Pair Blocks

| Frequency Block MHz | Lower Block Edge Test Channels/Frequencies | Upper Block Edge Test Channels/Frequencies |
|------------------------|-----------------------------------------------|-----------------------------------------------|
| A 824.0 – 835.0 | Channel : 4132 Frequency : 826.4MHz | - |
| B 846.5 – 849.0 | - | Channel : 4233 Frequency : 846.6MHz |

Measurements were made with the EUT in HSDPA 850 Mode.

Serial Number: 001018-00-006341-3

Communication Channel Pair Blocks

| Frequency Block MHz | Lower Block Edge Test Channels/Frequencies | Upper Block Edge Test Channels/Frequencies |
|------------------------|-----------------------------------------------|-----------------------------------------------|
| A 824.0 – 835.0 | Channel : 4132 Frequency : 826.4MHz | - |
| B 846.5 – 849.0 | - | Channel : 4233 Frequency : 846.6MHz |

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

2.5.6 Test Results

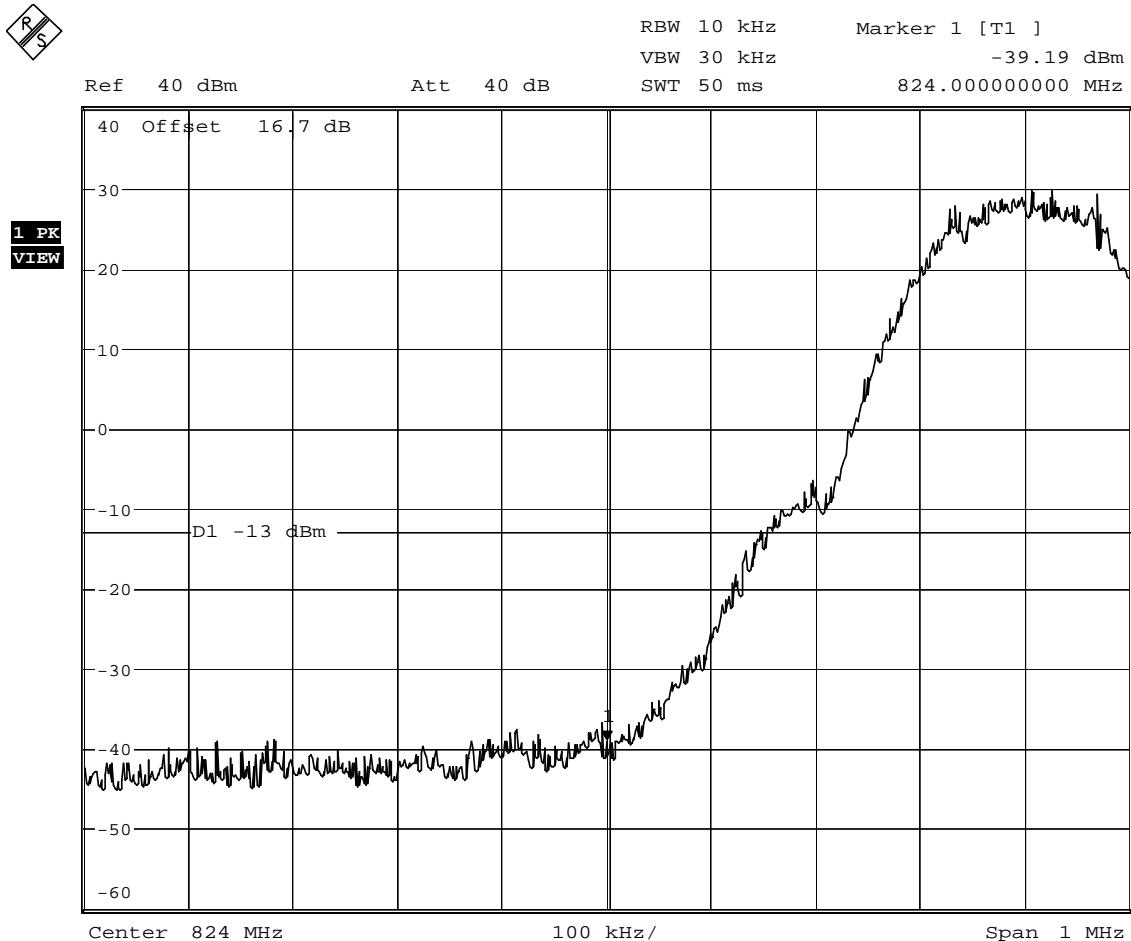
The channels shown in the table above are the minimum and maximum channels that can be used in each block to maintain compliance. Channels used outside of those stated in the table exceed the specification limits, thus they cannot be used.

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.

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

2.5.6 Test Results - continued



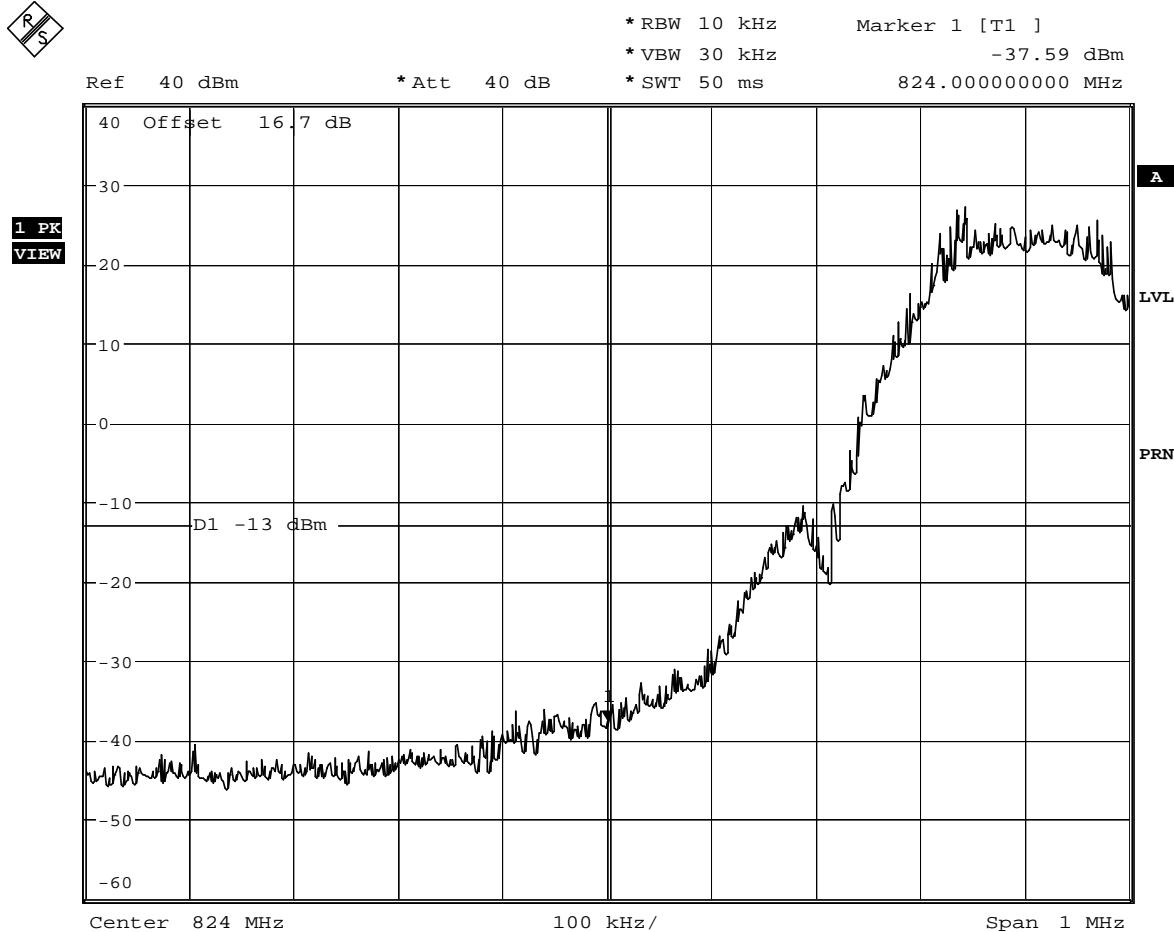
Date: 14.OCT.2005 10:17:01

Block Edge Measurement with EUT Transmitting on Full Power On
Channel 129, (824.40MHz) GPRS Modulation

Block A
824.0 – 835.0MHz

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

2.5.6 Test Results - continued



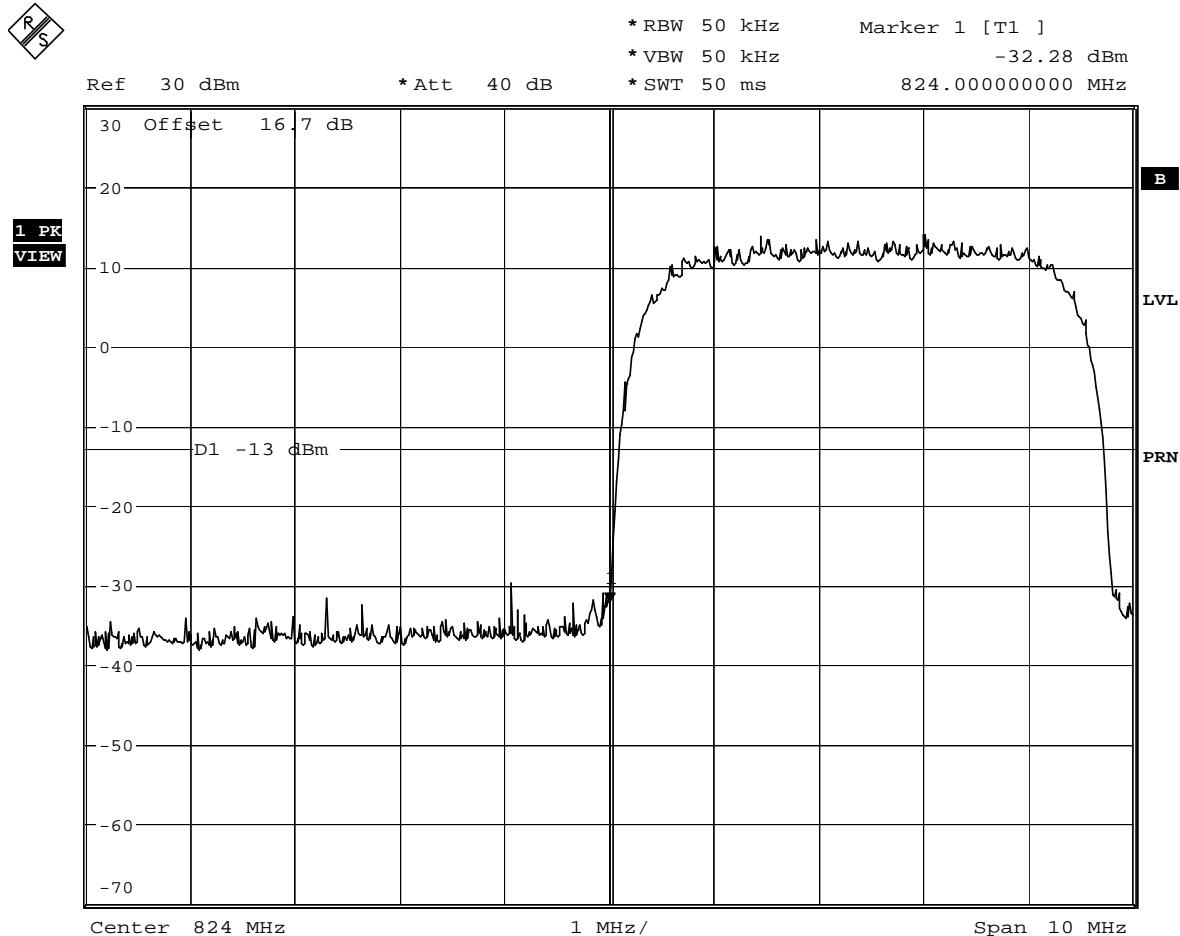
Date: 17.OCT.2005 15:04:27

Block Edge Measurement With EUT Transmitting on Full Power On
Channel 129, (824.40MHz) EDGE Modulation

Block A
824.0 – 835.0MHz

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

2.5.6 Test Results - continued



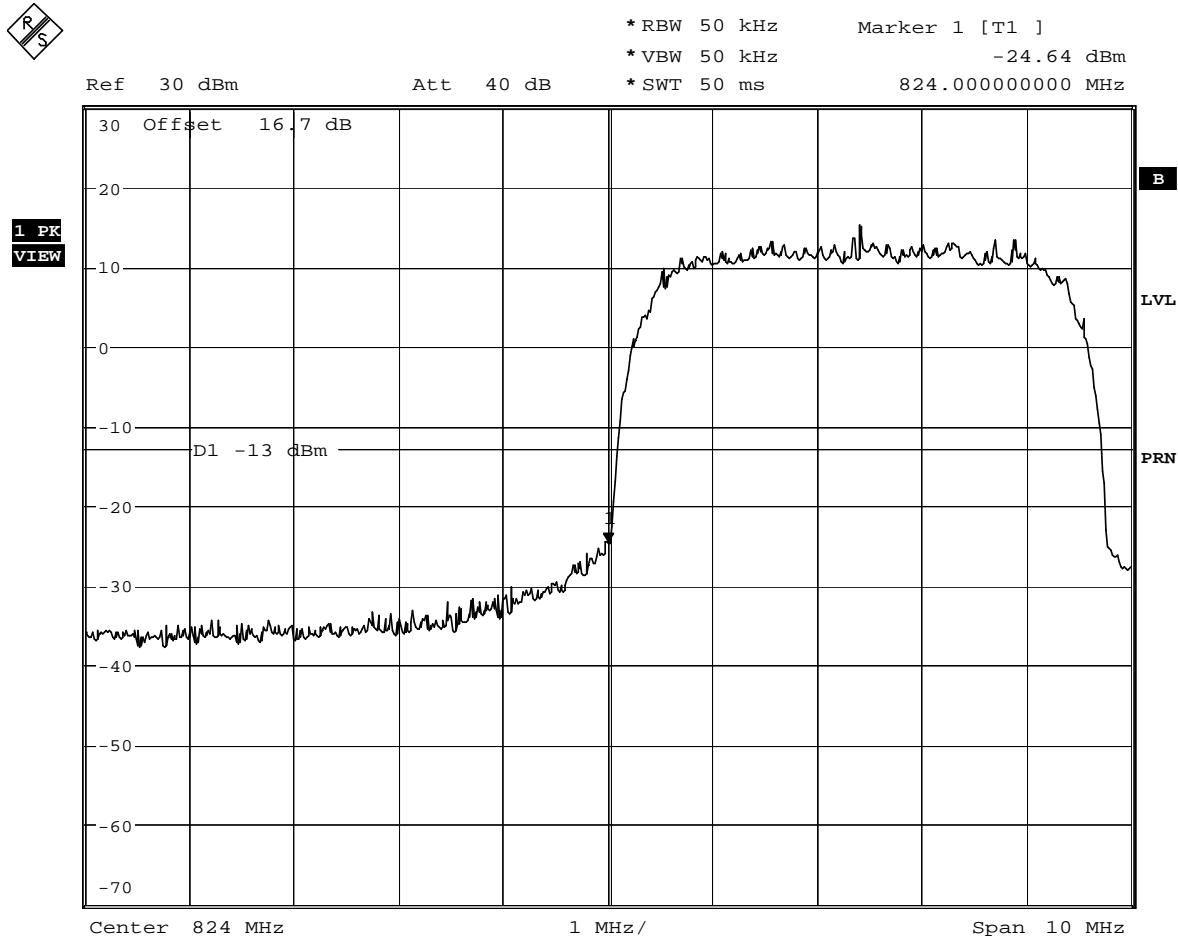
Date: 13.OCT.2005 12:25:54

Block Edge Measurement With EUT Transmitting on Full Power On
Channel 4132, (826.4MHz) UMTS Modulation

Block A
824.0 – 835.0MHz

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

2.5.6 Test Results - continued



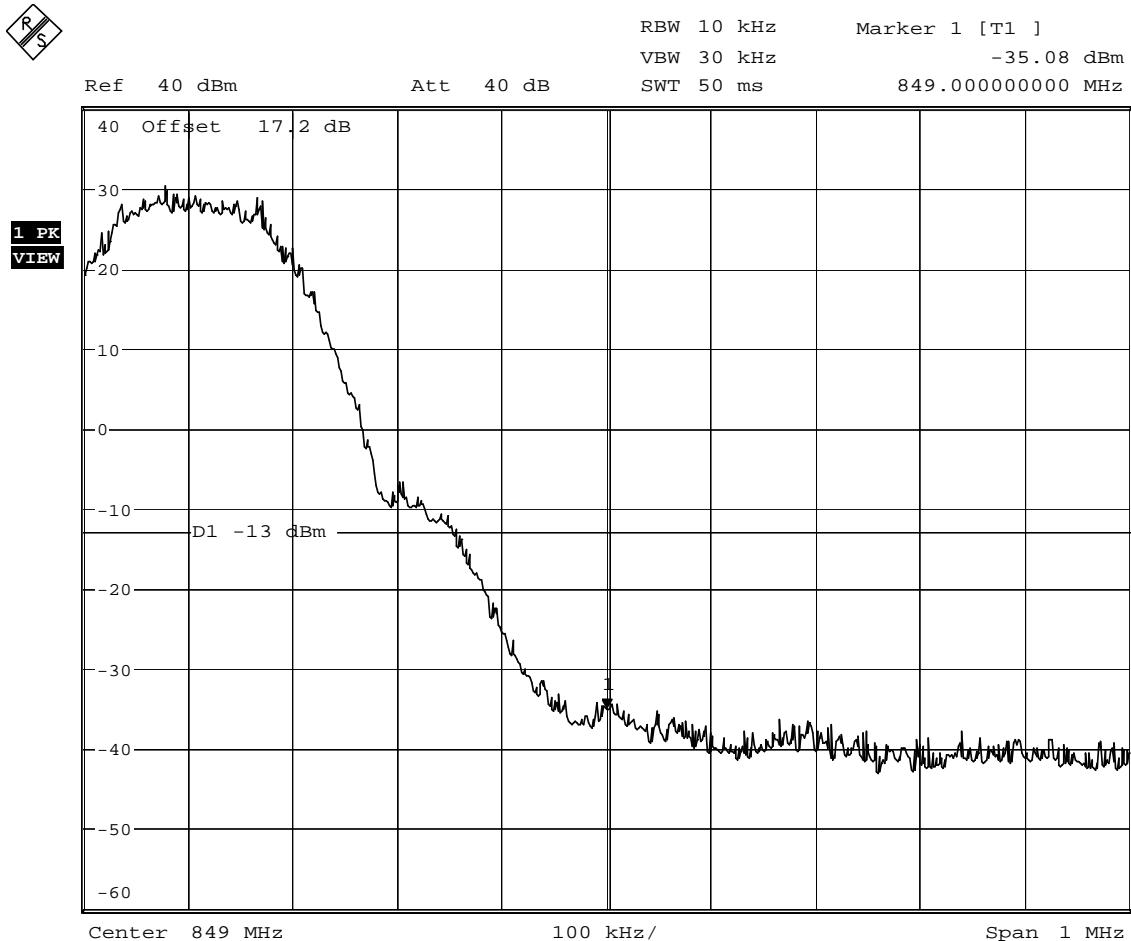
Date: 11.OCT.2005 11:51:12

Block Edge Measurement With EUT Transmitting on Full Power On
Channel 4132, (826.4MHz) UMTS Modulation

Block A
824.0 – 835.0MHz

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

2.5.6 Test Results - continued



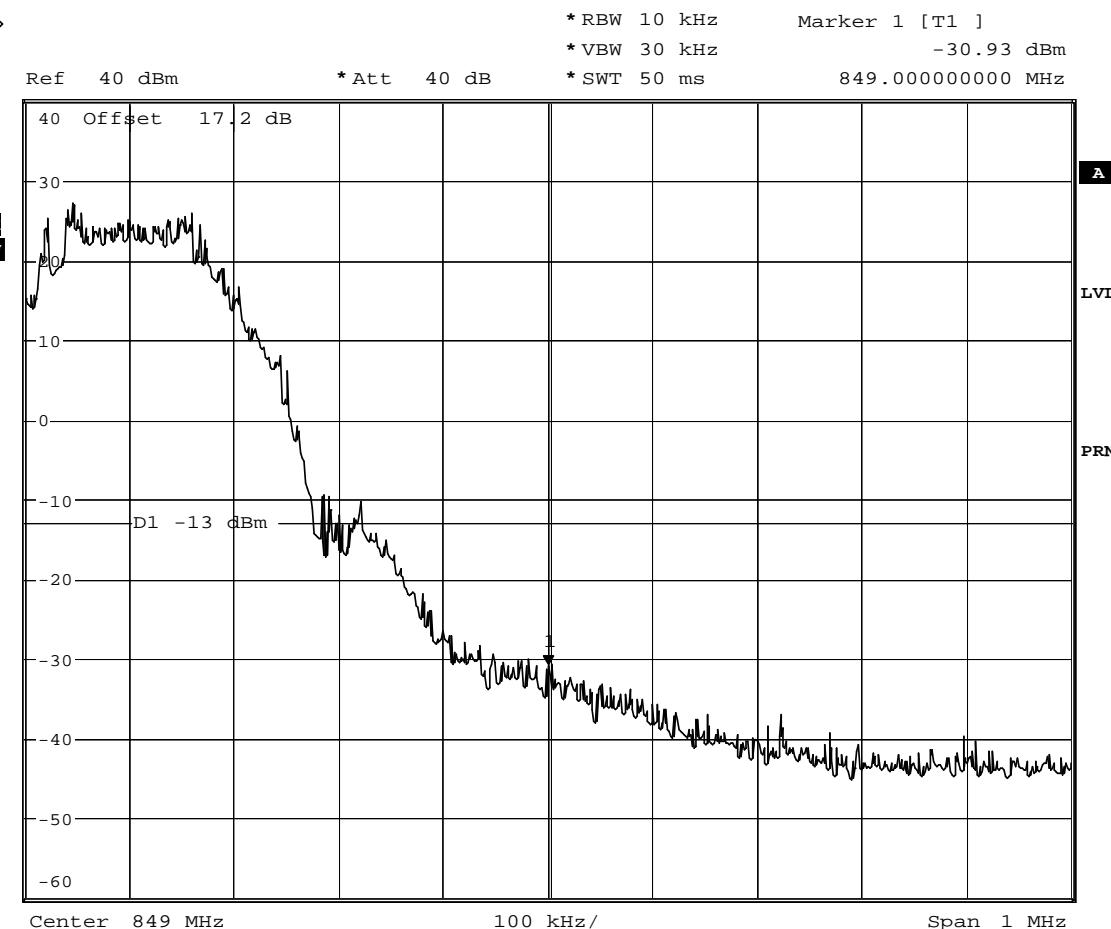
Date: 14.OCT.2005 10:18:39

Block Edge Measurement With EUT Transmitting on Full Power On
Channel 250, (848.6MHz) GPRS Modulation

Block B
846.5 – 849.0MHz

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

2.5.6 Test Results - continued



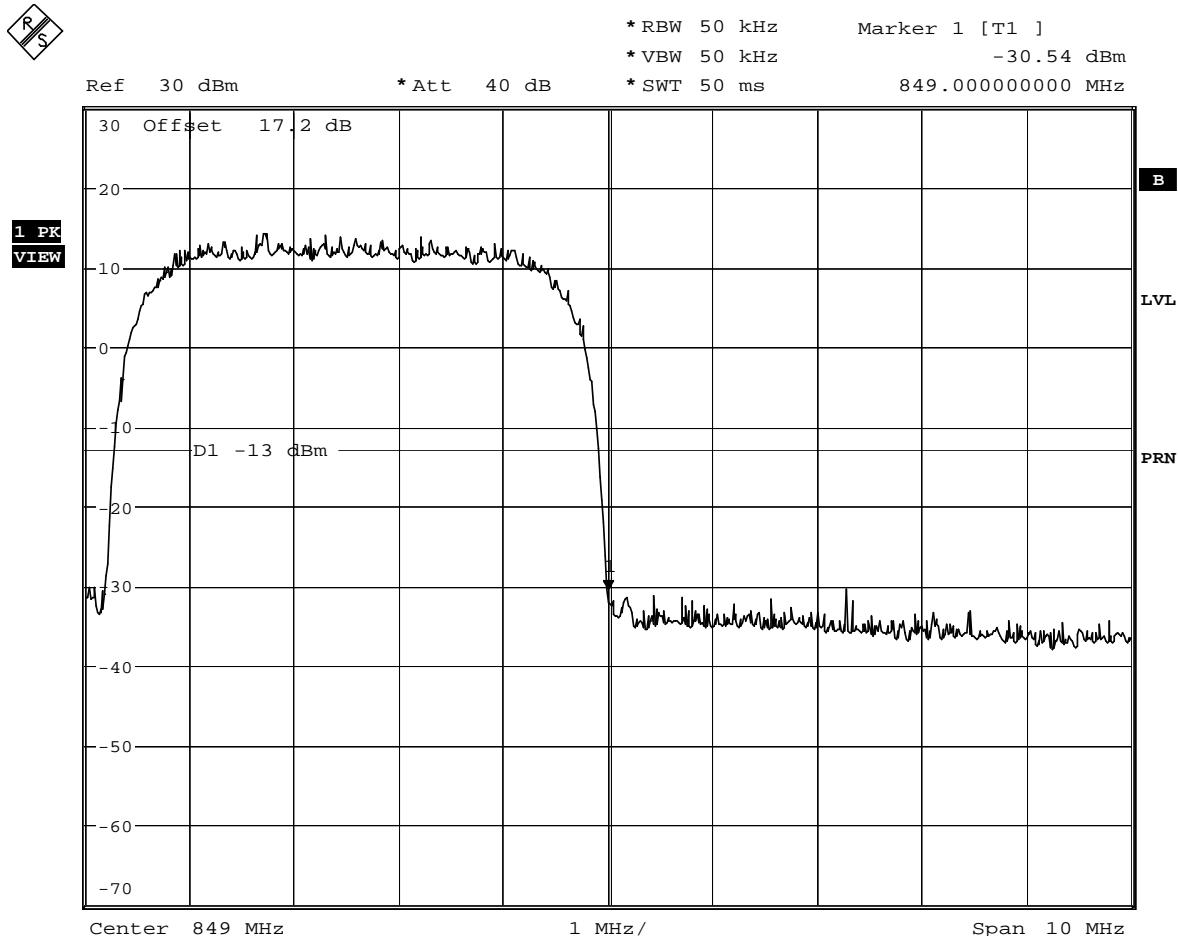
Date: 17.OCT.2005 15:07:52

Block Edge Measurement With EUT Transmitting on Full Power On
Channel 250, (848.6MHz) EDGE Modulation

Block B
846.5 – 849.0MHz

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

2.5.6 Test Results - continued



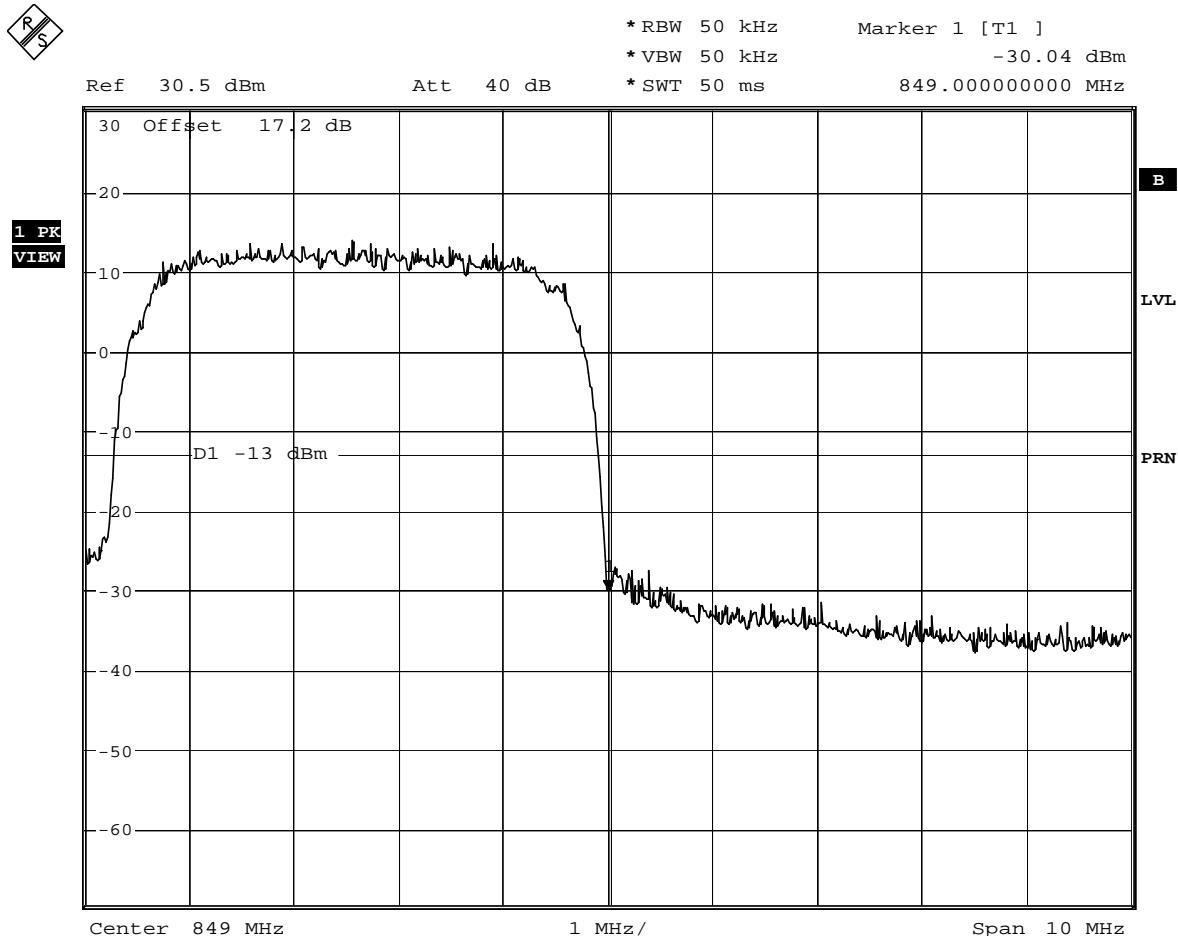
Date: 13.OCT.2005 12:28:13

Block Edge Measurement With EUT Transmitting on Full Power On
Channel 4132, (826.4MHz) UMTS Modulation

Block B
846.5 – 849.0MHz

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

2.5.6 Test Results - continued



Date: 11.OCT.2005 11:57:27

Block Edge Measurement With EUT Transmitting on Full Power On
Channel 4233, (846.6MHz) HSDPA Modulation

Block B
846.5 – 849.0MHz

2.6 RADIATED EMISSIONS

2.6.1 Equipment Reference

FCC CFR 47: Part 22 Subpart H, Section 22.917 and Industry Canada RSS-132, 6.5

2.6.2 Equipment Under Test

U730

2.6.3 Date of Test

10th October 2005 (EDGE, UMTS and HSDPA)
11th October 2005 and 4th November 2005 (GPRS)

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

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 – 9GHz were then formally measured using a Peak Detector.

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

The test limit is derived from the carrier power in accordance with the specification. (The power of any emission outside of the authorised operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10\log(P)$ dB).

2.6 RADIATED EMISSIONS

2.6.6 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, 6.5 for Radiated Emissions (30MHz – 1GHz).

Measurements were made with the EUT in GPRS 850 Mode.
Serial Number 001018-00-006341-3.

EUT Transmitting on Bottom Channel (824.13MHz)

| Frequency | Antenna Polarisation | Height | Azimuth | Peak Result | Peak Limit |
|-----------|----------------------|--------|---------|--------------|--------------|
| MHz | | cm | degree | dB μ V/m | dB μ V/m |
| 180.76 | Horizontal | 100 | 090 | 45.4 | 90.1 |
| 239.12 | Horizontal | 100 | 090 | 50.4 | 90.1 |

EUT Transmitting on Middle Channel (836.44MHz)

| Frequency | Antenna Polarisation | Height | Azimuth | Peak Result | Peak Limit |
|-----------|----------------------|--------|---------|--------------|--------------|
| MHz | | cm | degree | dB μ V/m | dB μ V/m |
| 182.44 | Horizontal | 100 | 090 | 46.5 | 89.5 |
| 239.122 | Horizontal | 100 | 090 | 53.2 | 89.5 |

EUT Transmitting on Top Channel (848.88MHz)

| Frequency | Antenna Polarisation | Height | Azimuth | Peak Result | Peak Limit |
|-----------|----------------------|--------|---------|--------------|--------------|
| MHz | | cm | degree | dB μ V/m | dB μ V/m |
| 180.20 | Horizontal | 100 | 090 | 46.7 | 90.3 |
| 239.67 | Horizontal | 100 | 090 | 53.6 | 90.3 |

2.6 RADIATED EMISSIONS

2.6.6 Test Results - continued

30MHz – 1GHz Frequency Range

Measurements were made with the EUT in EDGE 850 Mode.
Serial Number 001018-00-006341-3.

EUT Transmitting on Bottom Channel (824.245MHz)

| Frequency | Antenna Polarisation | Height | Azimuth | Peak Result | Peak Limit |
|-----------|----------------------|--------|---------|--------------|--------------|
| MHz | | cm | degree | dB μ V/m | dB μ V/m |
| 187.67 | Vertical | 100 | 270 | 47.0 | 90.1 |
| 240.30 | Vertical | 194 | 034 | 50.0 | 90.1 |

EUT Transmitting on Middle Channel (836.295MHz)

| Frequency | Antenna Polarisation | Height | Azimuth | Peak Result | Peak Limit |
|-----------|----------------------|--------|---------|--------------|--------------|
| MHz | | cm | degree | dB μ V/m | dB μ V/m |
| 180.68 | Vertical | 100 | 270 | 48.2 | 90.5 |
| 240.30 | Vertical | 181 | 035 | 49.6 | 90.5 |

EUT Transmitting on Top Channel (848.867MHz)

| Frequency | Antenna Polarisation | Height | Azimuth | Peak Result | Peak Limit |
|-----------|----------------------|--------|---------|--------------|--------------|
| MHz | | cm | degree | dB μ V/m | dB μ V/m |
| 187.11 | Vertical | 100 | 272 | 47.1 | 90.3 |
| 240.85 | Vertical | 193 | 035 | 49.8 | 90.3 |

2.6 RADIATED EMISSIONS

2.6.6 Test Results - continued

30MHz – 1GHz Frequency Range

Measurements were made with the EUT in UMTS 850 Mode.
Serial Number: 001018-00-006341-3

EUT Transmitting on Bottom Channel (826.00MHz)

No emissions were detected within 35dB of the limit. Therefore, no formal measurements were made.

EUT Transmitting on Middle Channel (836.80MHz)

No emissions were detected within 35dB of the limit. Therefore, no formal measurements were made.

EUT Transmitting on Top Channel (847.20MHz)

No emissions were detected within 35dB of the limit. Therefore, no formal measurements were made.

2.6 RADIATED EMISSIONS

2.6.6 Test Results - continued

30MHz – 1GHz Frequency Range

Measurements were made with the EUT in HSDPA 850 Mode.
Serial Number/; 001018-00-006341-3

EUT Transmitting on Bottom Channel (826.40MHz)

No emissions emanating from the EUT were observed. Therefore, no table of results is presented.

EUT Transmitting on Middle Channel (836.60MHz)

No emissions emanating from the EUT were observed. Therefore, no table of results is presented.

EUT Transmitting on Top Channel (846.60MHz)

No emissions emanating from the EUT were observed. Therefore, no table of results is presented.

2.6 RADIATED EMISSIONS

2.6.6 Test Results - continued

1GHz – 9GHz 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, 6.5 for Radiated Emissions (1GHz – 9GHz).

Measurements were made with the EUT in GPRS 850 Mode
Serial Number: 001018-00-006341-3

EUT Transmitting on Bottom Channel (824.13MHz)

No emissions emanating from the EUT were observed. Therefore, no table of results is presented.

EUT Transmitting on Middle Channel (836.44MHz)

No emissions emanating from the EUT were observed. Therefore, no table of results is presented.

EUT Transmitting on Top Channel (848.88MHz)

No emissions emanating from the EUT were observed. Therefore, no table of results is presented.

Measurements were made with the EUT in EDGE 850 Mode.
Serial Number: 001018-00-006341-3

EUT Transmitting on Bottom Channel (824.245MHz)

No emissions emanating from the EUT were observed. Therefore, no table of results is presented.

EUT Transmitting on Middle Channel (836.295MHz)

No emissions emanating from the EUT were observed. Therefore, no table of results is presented.

EUT Transmitting on Top Channel (848.867MHz)

No emissions emanating from the EUT were observed. Therefore, no table of results is presented.

2.6 RADIATED EMISSIONS

2.6.6 Test Results - continued

1GHz – 9GHz Frequency Range

Measurements were made with the EUT in UMTS 850 Mode.
Serial Number 001018-00-006341-3.

EUT Transmitting on Bottom Channel (826.00MHz)

| Frequency | Antenna Polarisation | Height | Azimuth | Peak Result | Peak Limit |
|-----------|----------------------|--------|---------|-------------|------------|
| GHz | | cm | degree | dBm | dBm |
| 1.005 | Vertical | 100 | 000 | -54.4 | -13.0 |
| 1.500 | Vertical | 100 | 000 | -46.4 | -13.0 |
| 1.995 | Vertical | 100 | 000 | -40.3 | -13.0 |

EUT Transmitting on Middle Channel (836.80MHz)

No emissions emanating from the EUT were observed. Therefore, no table of results is presented.

EUT Transmitting on Top Channel (847.20MHz)

| Frequency | Antenna Polarisation | Height | Azimuth | Peak Result | Peak Limit |
|-----------|----------------------|--------|---------|-------------|------------|
| GHz | | cm | degree | dBm | dBm |
| 2.537 | Vertical | 100 | 056 | -42.6 | -13.0 |
| 5.000 | Vertical | 100 | 000 | -55.1 | -13.0 |
| 7.995 | Vertical | 100 | 000 | -53.5 | -13.0 |
| 8.005 | Vertical | 100 | 000 | -52.7 | -13.0 |
| 8.995 | Vertical | 100 | 000 | -54.5 | -13.0 |

2.6 RADIATED EMISSIONS

2.6.6 Test Results - continued

1GHz – 9GHz Frequency Range

Measurements were made with the EUT in HSDPA 850 Mode
Serial Number: 001018-00-006341-3

EUT Transmitting on Bottom Channel (826.4MHz)

| Frequency | Antenna Polarisation | Height | Azimuth | Peak Result | Peak Limit |
|-----------|----------------------|--------|---------|-------------|------------|
| GHz | | cm | degree | dBm | dBm |
| 1.655 | Horizontal | 100 | 266 | -28.2 | -13.0 |
| 2.482 | Horizontal | 100 | 109 | -49.8 | -13.0 |

EUT Transmitting on Middle Channel (836.6MHz)

| Frequency | Antenna Polarisation | Height | Azimuth | Peak Result | Peak Limit |
|-----------|----------------------|--------|---------|-------------|------------|
| GHz | | cm | degree | dBm | dBm |
| 1.671 | Horizontal | 100 | 263 | -28.7 | -13.0 |
| 2.509 | Vertical | 100 | 287 | -42.7 | -13.0 |

EUT Transmitting on Top Channel (846.6MHz)

| Frequency | Antenna Polarisation | Height | Azimuth | Peak Result | Peak Limit |
|-----------|----------------------|--------|---------|-------------|------------|
| GHz | | cm | degree | dBm | dBm |
| 1.691 | Horizontal | 100 | 266 | -27.3 | -13.0 |
| 2.537 | Horizontal | 100 | 087 | -48.2 | -13.0 |

2.7 CONDUCTED SPURIOUS EMISSIONS

2.7.1 Specification Reference

FCC CFR 47: Part 22 Subpart H, Section 2.1051, 22.917 (a)

2.7.2 Equipment Under Test

U730

2.7.3 Date of Test

14th October 2005 (GPRS)
17th October 2005 (EDGE)
13th October 2005 (UMTS)
12th October 2005 (HSDPA)

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 Part 2.1051, 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 timeslots 2 and 3 for GPRS and EDGE. The EUT was set to full power for UMTS (QPSK) and HSDPA (16QAM). The EUT was tested on Bottom, Middle and Top channels on maximum power. 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, an attenuator was used. For measuring the range 1.5GHz to 9GHz, an attenuator and 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.

2.7 CONDUCTED SPURIOUS EMISSIONS

2.7.6 Test Results

See test plots.

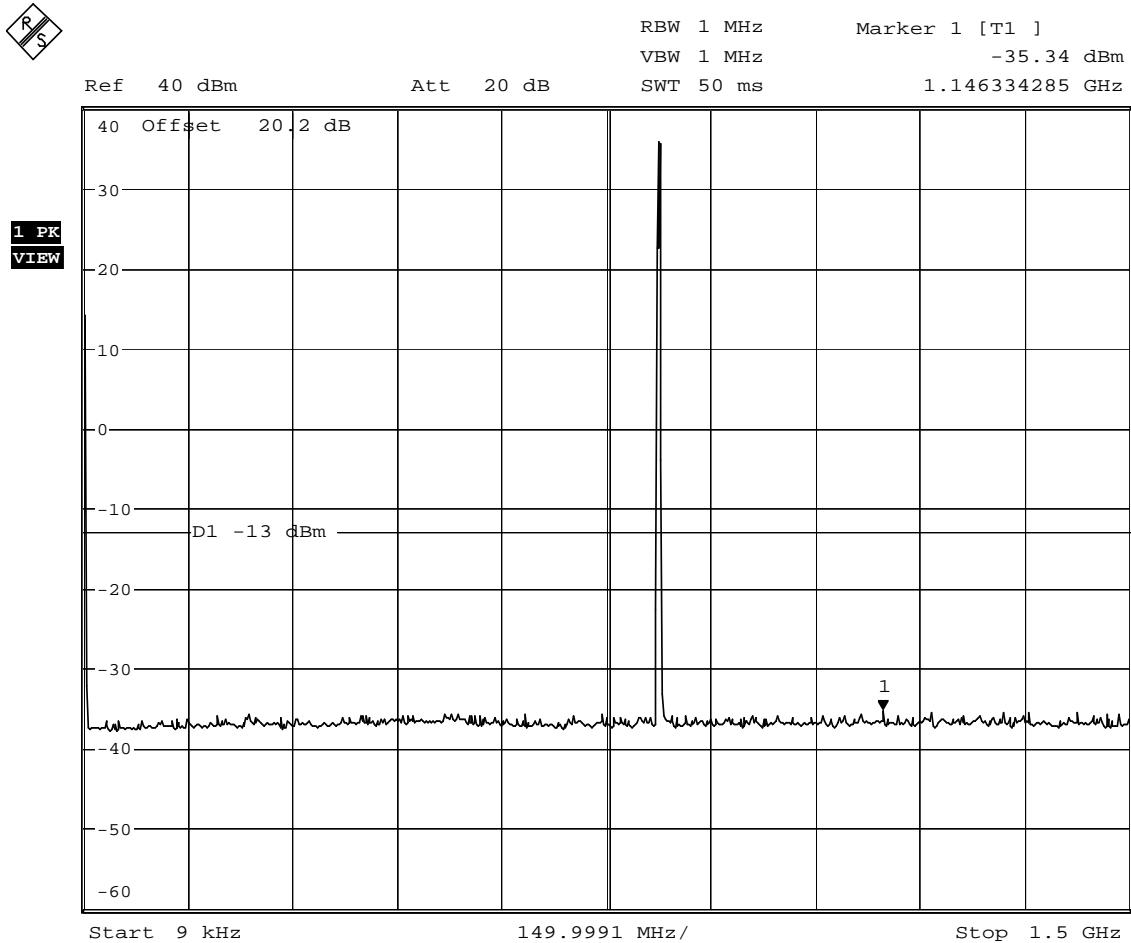
Remarks

The EUT passed the requirements laid out in 22.917(a).

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

2.7 CONDUCTED SPURIOUS EMISSIONS

2.7.6 Test Results

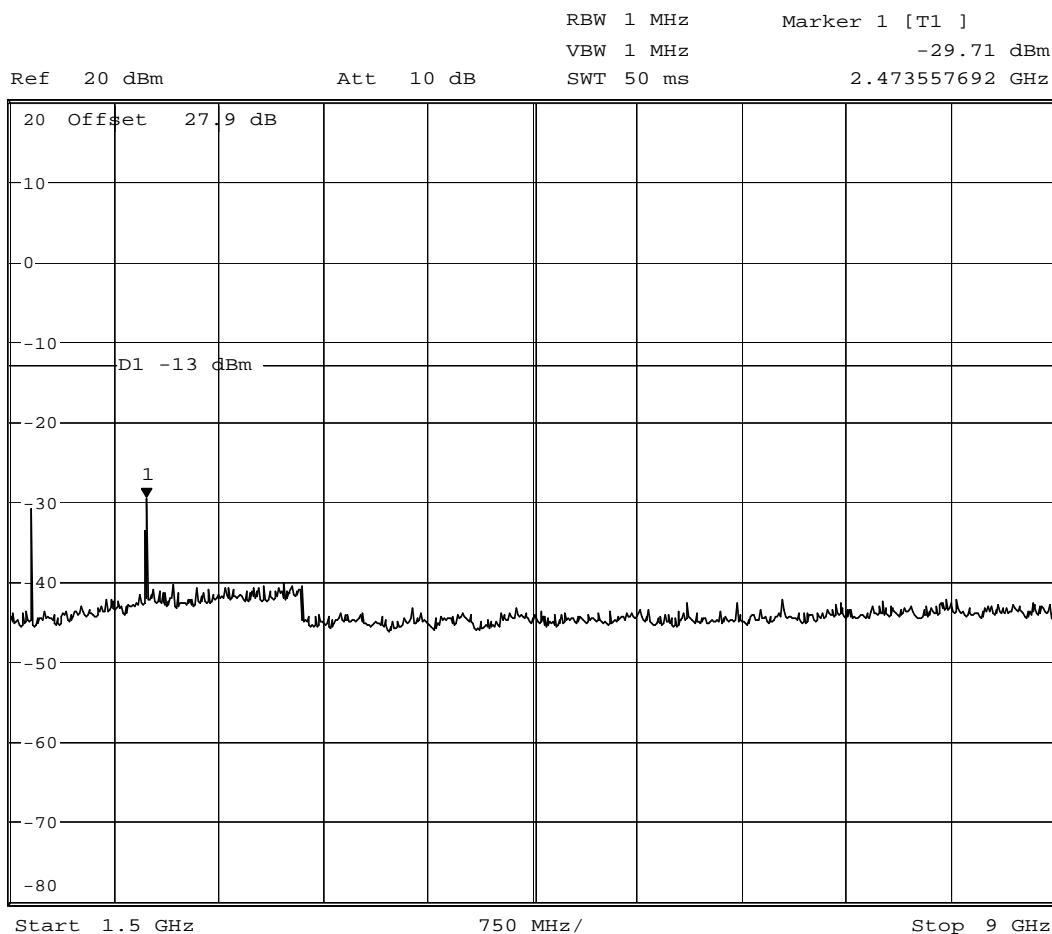


Date: 14.OCT.2005 10:54:49

Serial Number: 001018-00-006341-3
Spurious Emissions (9kHz – 4.0GHz)
Channel 128, (824.2MHz) – Maximum Power – GPRS 850 Mode
3.3 V SUPPLY

2.7 CONDUCTED SPURIOUS EMISSIONS

2.7.6 Test Results - continued

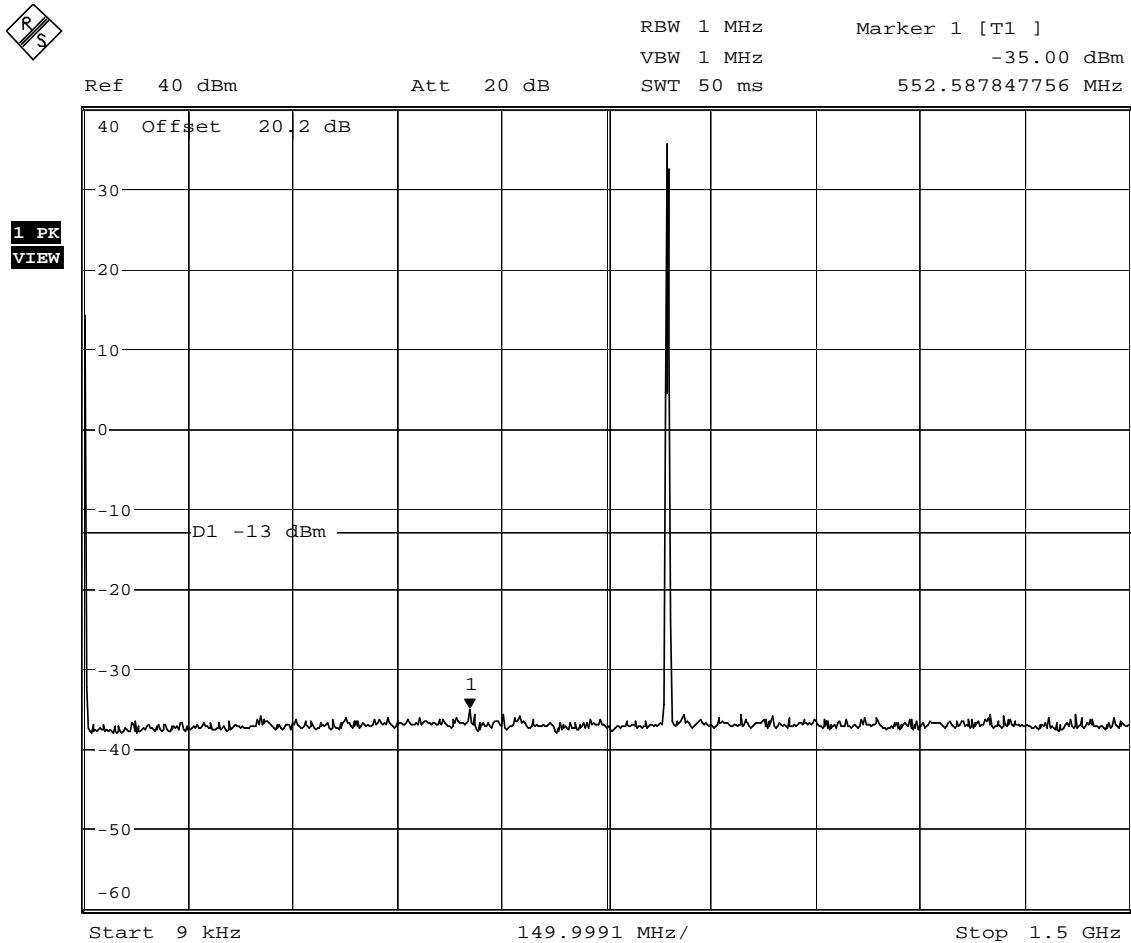


Date: 14.OCT.2005 11:08:04

Serial Number: 001018-00-006341-3
Spurious Emissions (1.5GHz – 9GHz)
Channel 128 (824.2MHz) - Maximum Power – GPRS 850 Mode
3.3 V SUPPLY

2.7 CONDUCTED SPURIOUS EMISSIONS

2.7.6 Test Results - continued

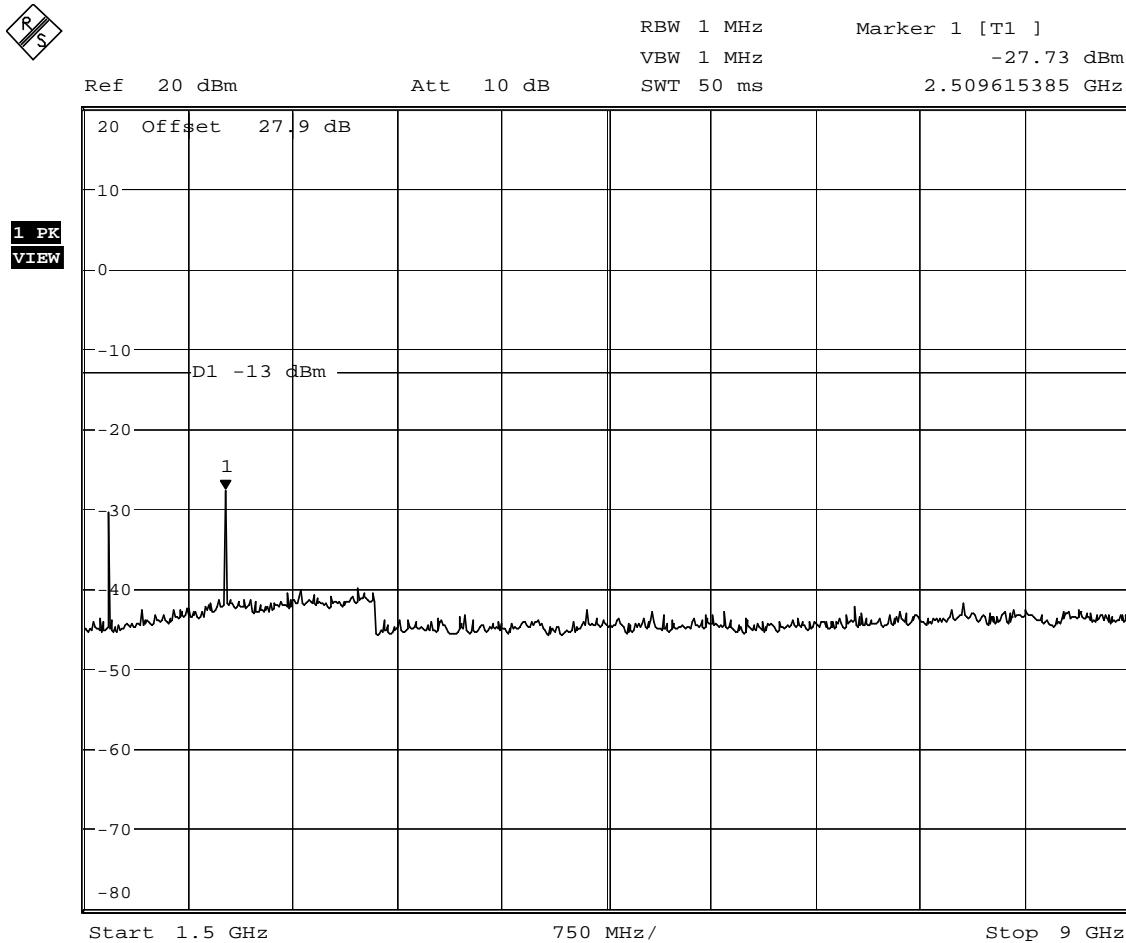


Date: 14.OCT.2005 10:57:05

Serial Number: 001018-00-006341-3
Spurious Emissions (9kHz – 1.5GHz)
Channel 190 (836.6MHz) - Maximum Power - GPRS 850 Mode
3.3 V SUPPLY

2.7 CONDUCTED SPURIOUS EMISSIONS

2.7.6 Test Results - continued



Date: 14.OCT.2005 11:07:04

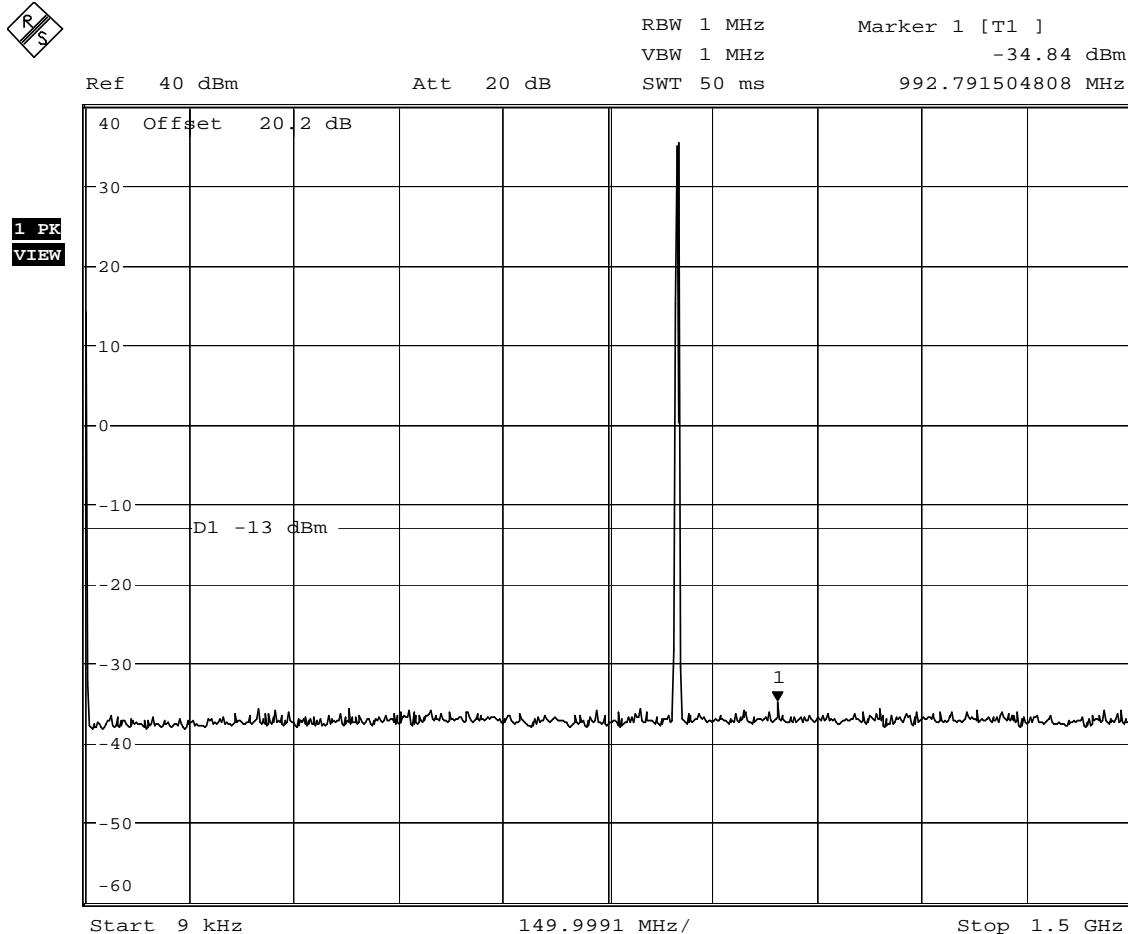
Serial Number: 001018-00-006341-3
Spurious Emissions (1.5GHz - 9GHz)
Channel 190 (836.6MHz) - Maximum Power - GPRS 850 Mode
3.3 V SUPPLY



Product Service

2.7 CONDUCTED SPURIOUS EMISSIONS

2.7.6 Test Results - continued

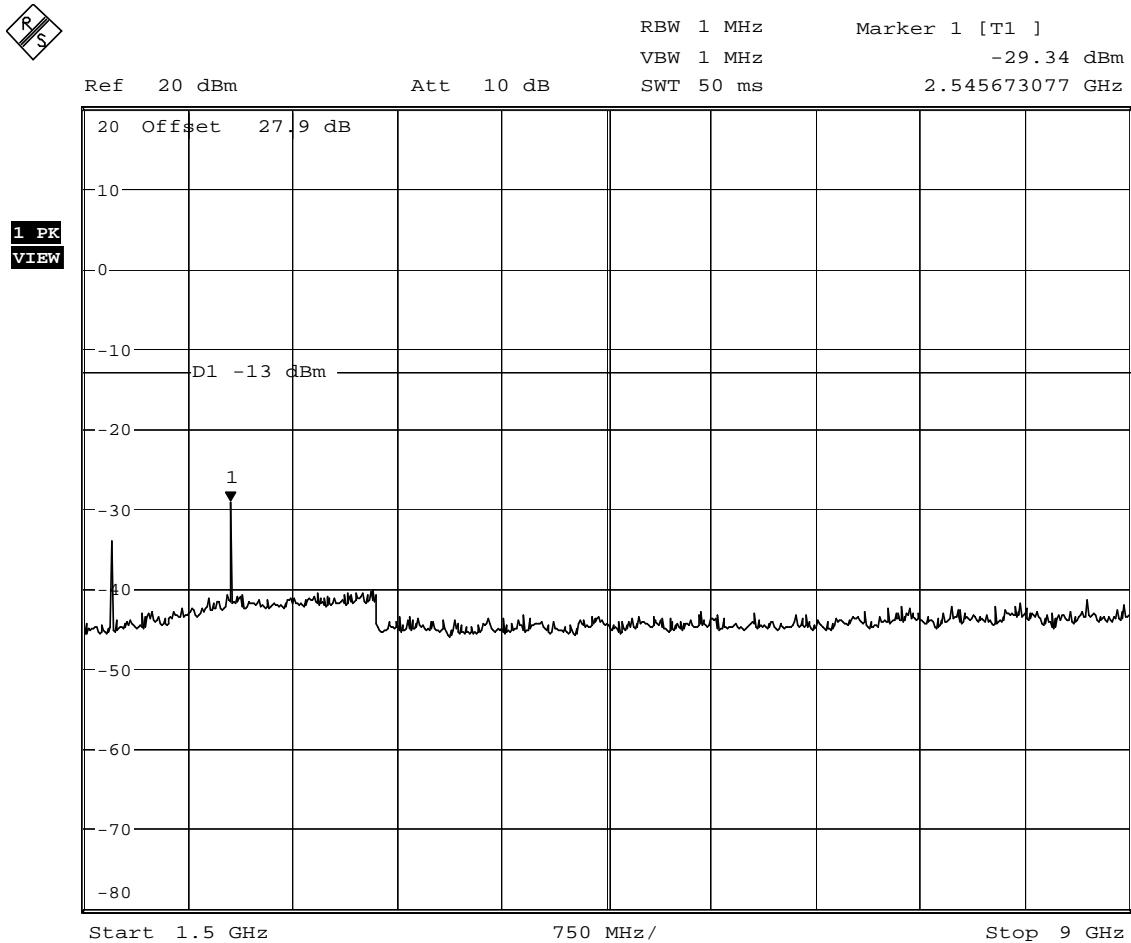


Date: 14.OCT.2005 10:58:56

Serial Number: 001018-00-006341-3
Spurious Emissions (9kHz – 1.5GHz)
Channel 251 (848.8MHz) - Maximum Power - GPRS 850 Mode
3.3 V SUPPLY

2.7 CONDUCTED SPURIOUS EMISSIONS

2.7.6 Test Results - continued

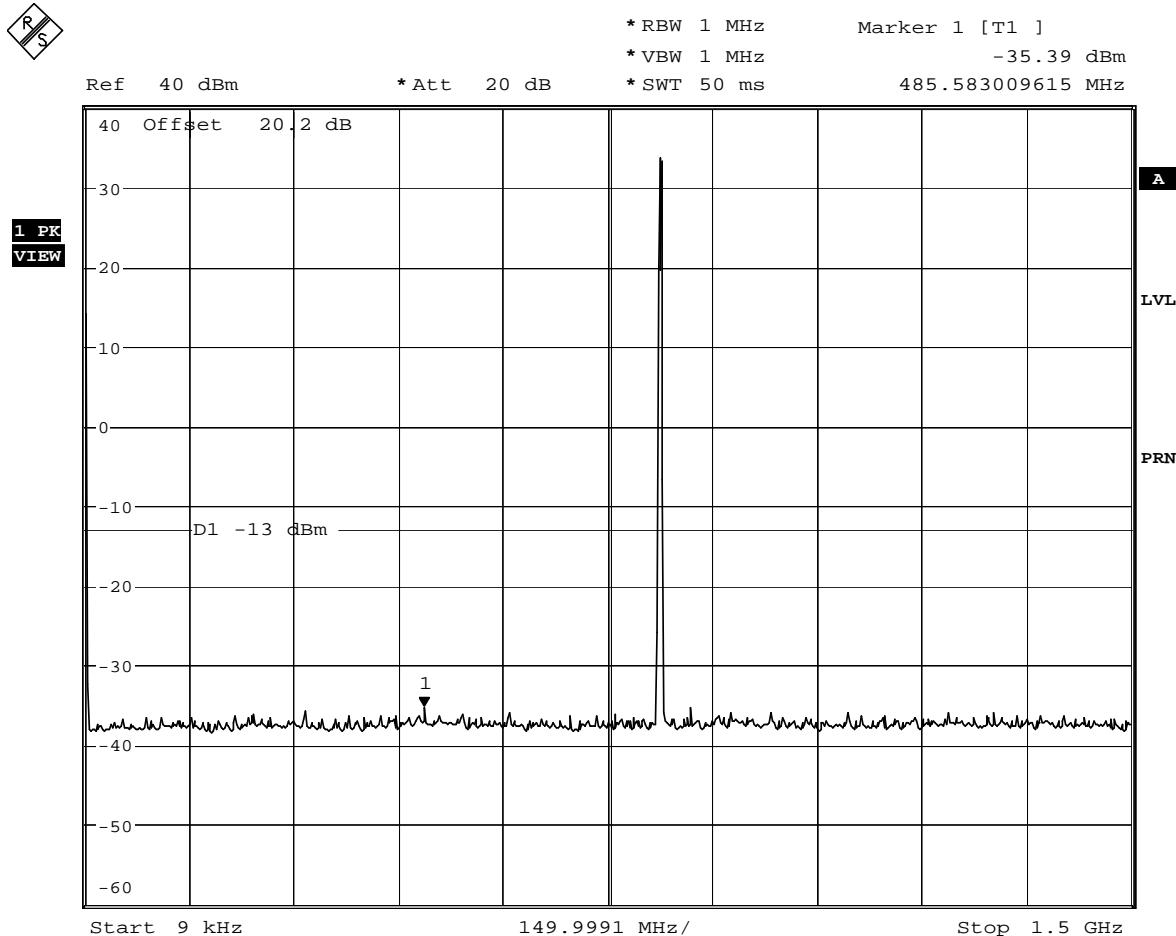


Date: 14.OCT.2005 11:03:49

Serial Number: 001018-00-006341-3
Spurious Emissions (1.5GHz – 9GHz)
Channel 251 (848.8MHz) - Maximum Power - GPRS 850 Mode
3.3 V SUPPLY

2.7 CONDUCTED SPURIOUS EMISSIONS

2.7.6 Test Results - continued

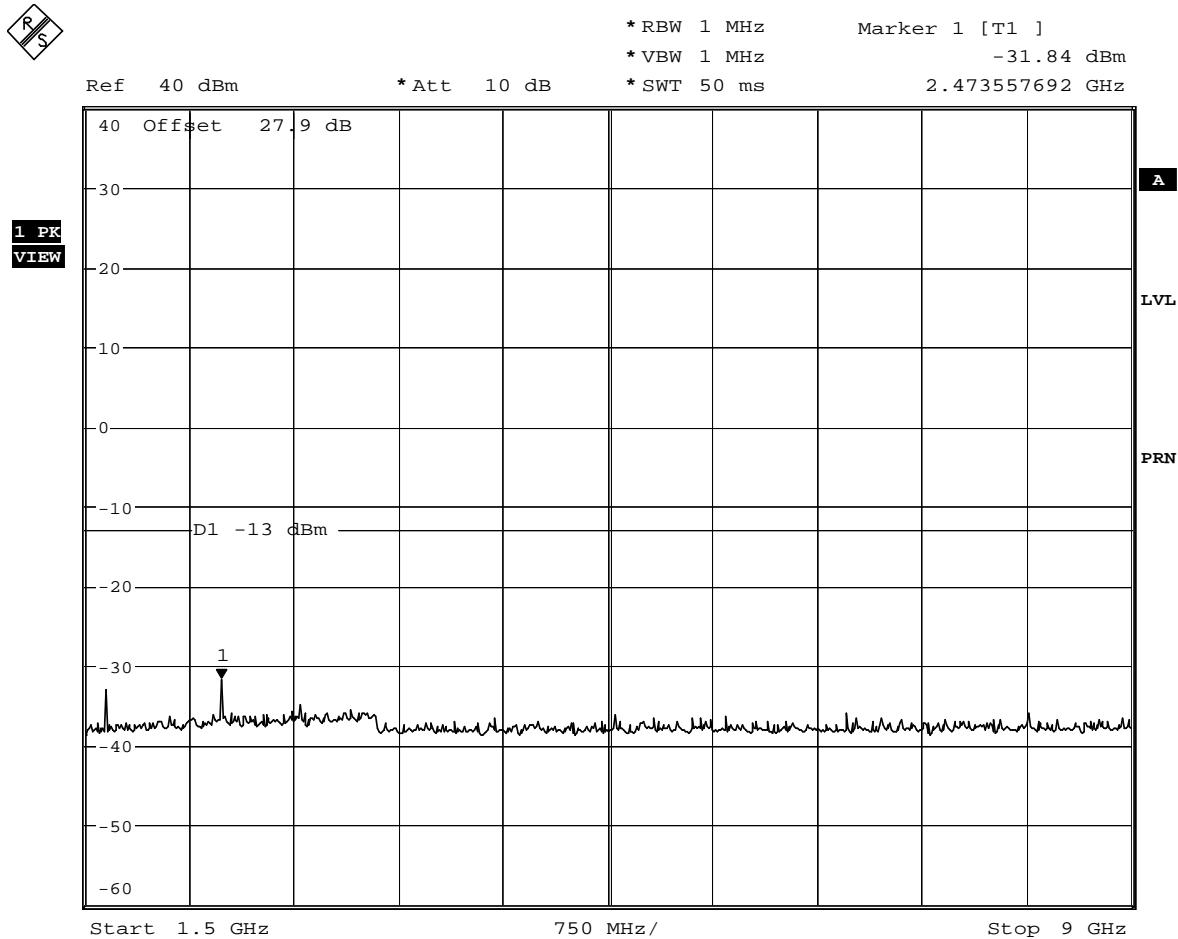


Date: 17.OCT.2005 15:53:11

Serial Number: 001018-00-006341-3
Spurious Emissions (9kHz – 1.5GHz)
Channel 128 (824.2MHz) - Maximum Power - EDGE 850 Mode
3.3 V SUPPLY

2.7 CONDUCTED SPURIOUS EMISSIONS

2.7.6 Test Results - continued



Date: 17.OCT.2005 16:07:04

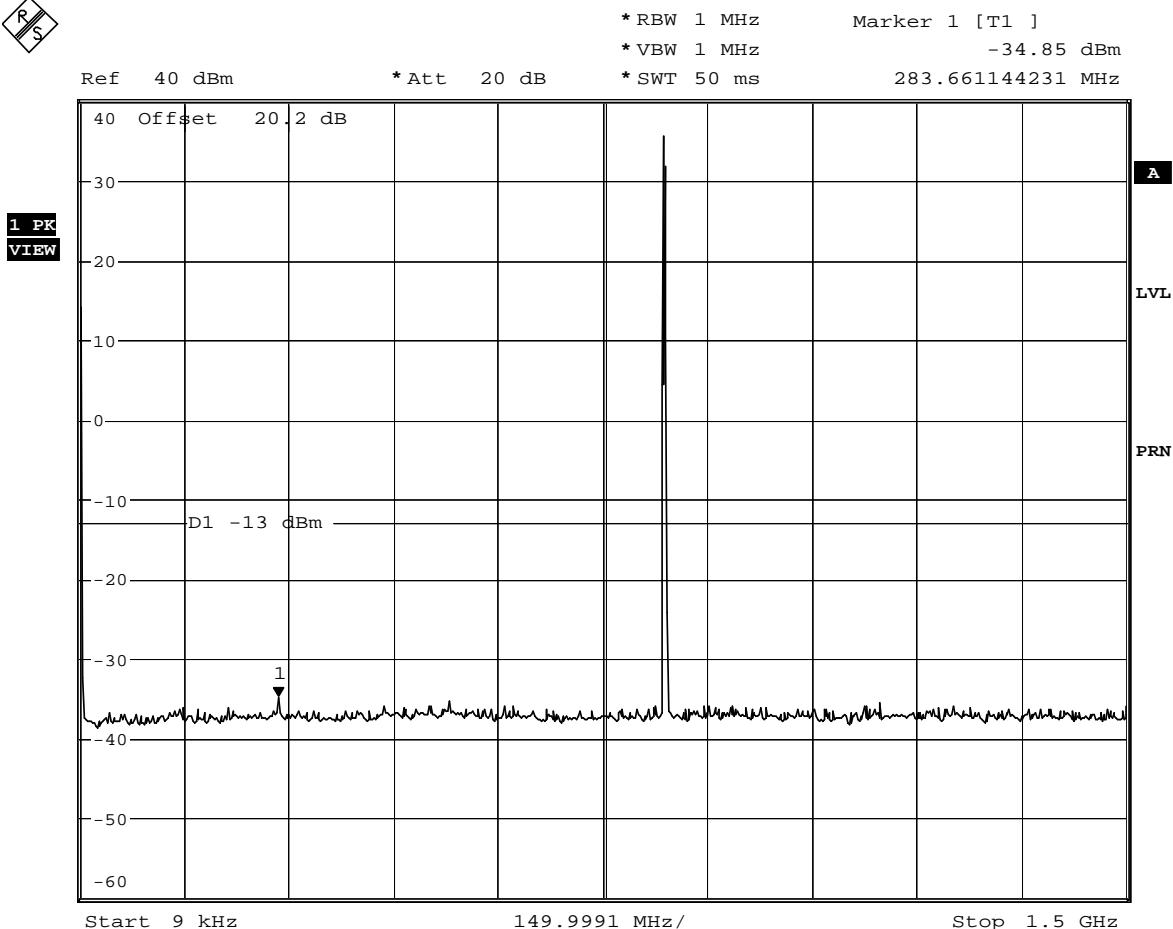
Serial Number: 001018-00-006341-3
Spurious Emissions (1.5GHz – 9GHz)
Channel 128 (824.2MHz) - Maximum Power - EDGE 850 Mode
3.9 V SUPPLY



Product Service

2.7 CONDUCTED SPURIOUS EMISSIONS

2.7.6 Test Results - continued

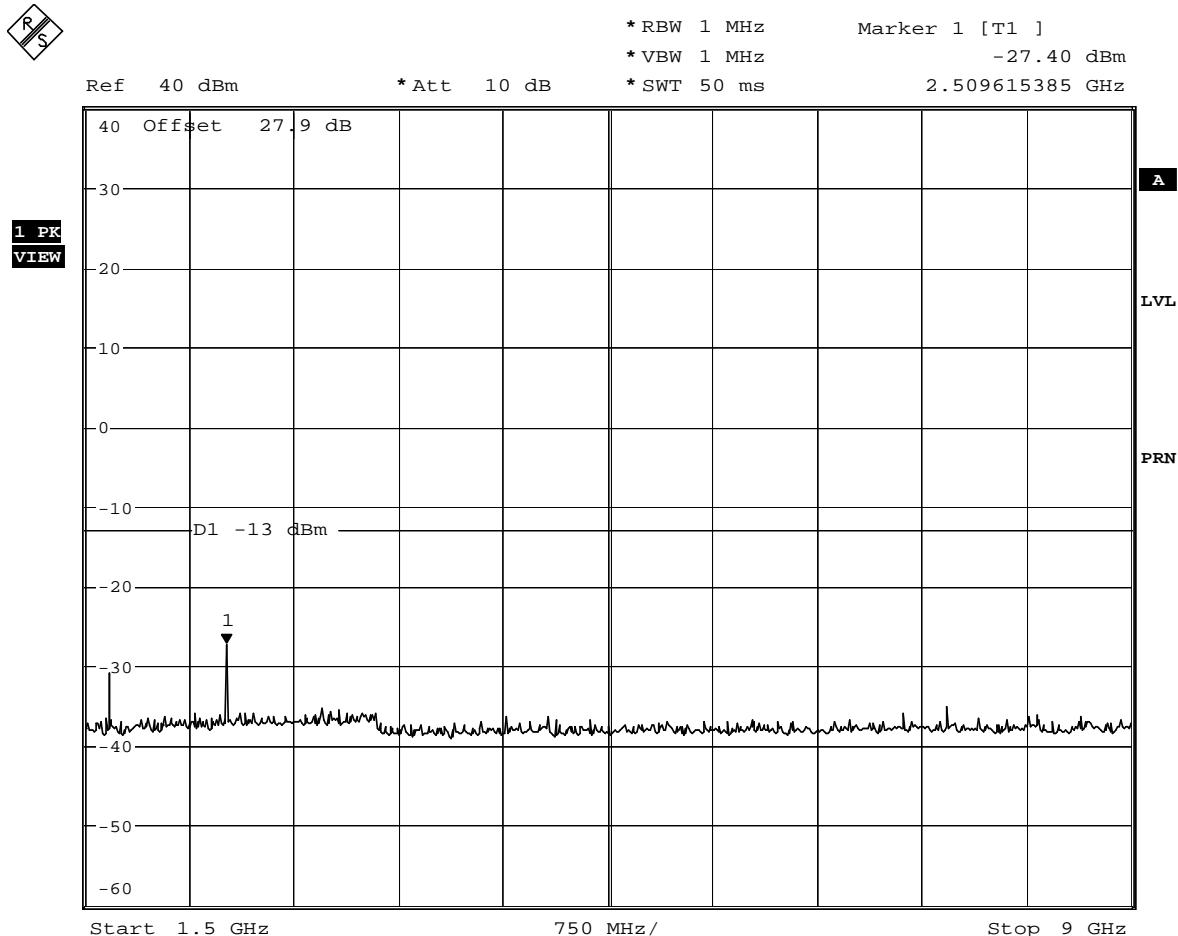


Date: 17.OCT.2005 15:55:20

Serial Number: 001018-00-006341-3
Spurious Emissions (9kHz – 1.5GHz)
Channel 189 (836.4MHz) - Maximum Power - EDGE 850 Mode
3.3 V SUPPLY

2.7 CONDUCTED SPURIOUS EMISSIONS

2.7.6 Test Results - continued



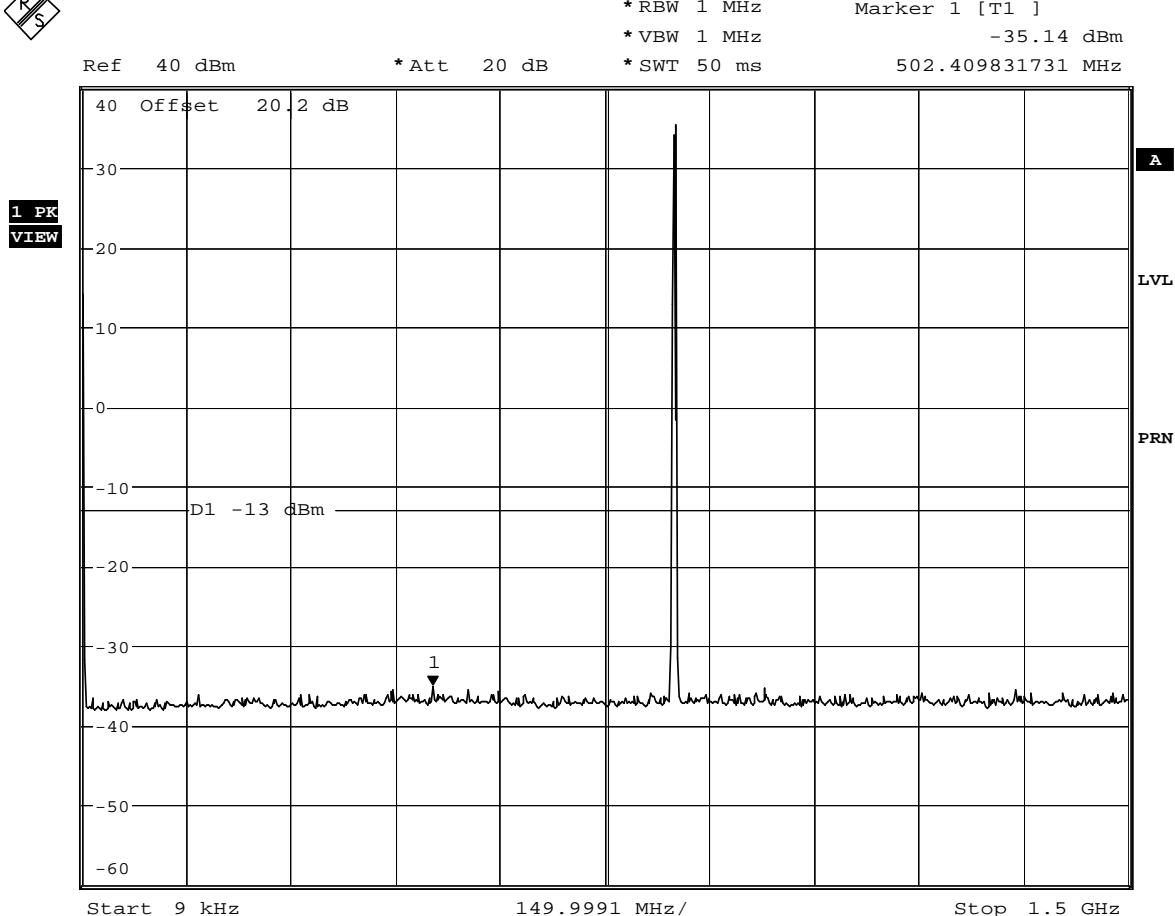
Date: 17.OCT.2005 16:06:04

Serial Number:001018-00-006341-3
Spurious Emissions (1.5GHz – 9GHz)
Channel 189 (836.4MHz) - Maximum Power - EDGE 850 Mode
3.3 V SUPPLY



2.7 CONDUCTED SPURIOUS EMISSIONS

2.7.6 Test Results - continued

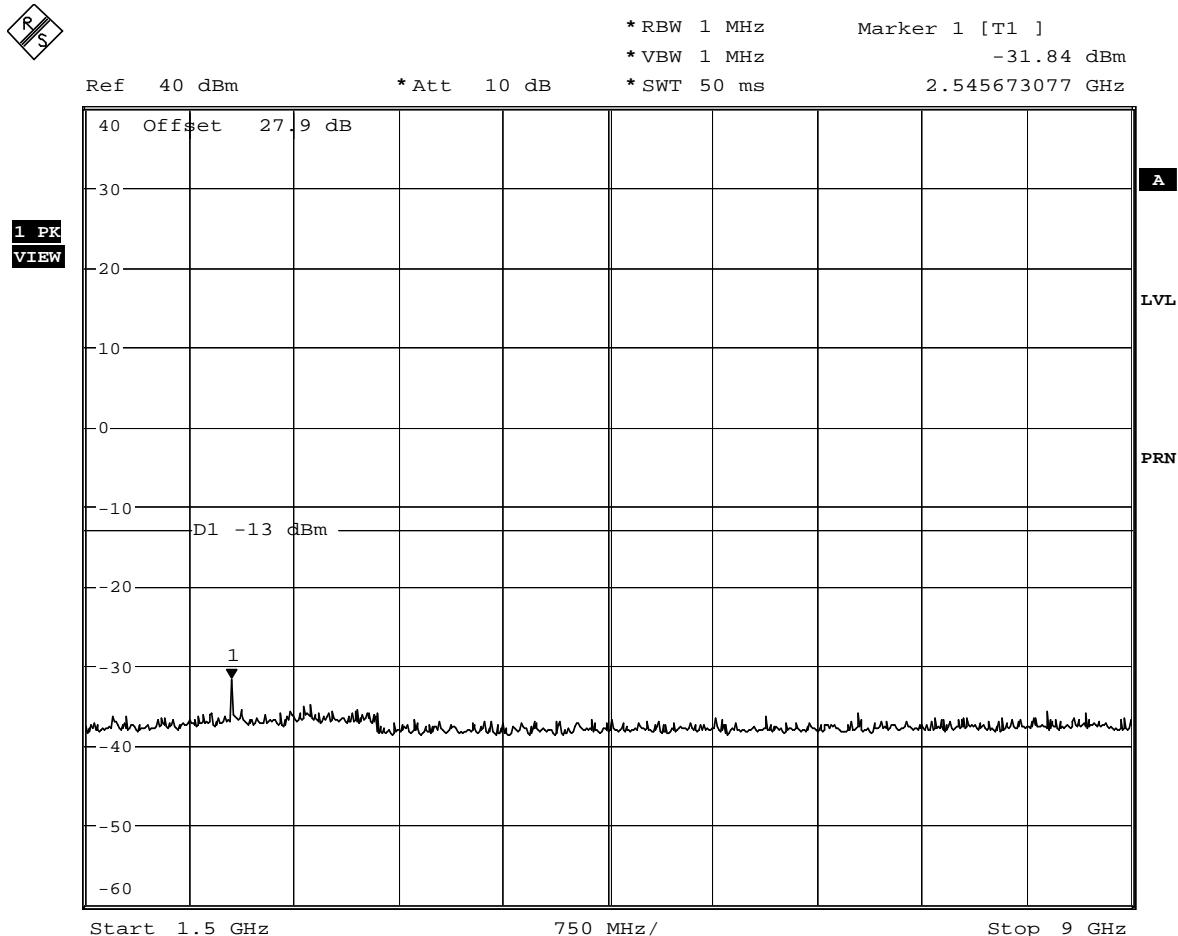


Date: 17.OCT.2005 15:58:34

Serial Number: 001018-00-006341-3
Spurious Emissions (9kHz – 1.5GHz)
Channel 251 (848.8MHz) - Maximum Power - EDGE 850 Mode
3.3 V SUPPLY

2.7 CONDUCTED SPURIOUS EMISSIONS

2.7.6 Test Results - continued

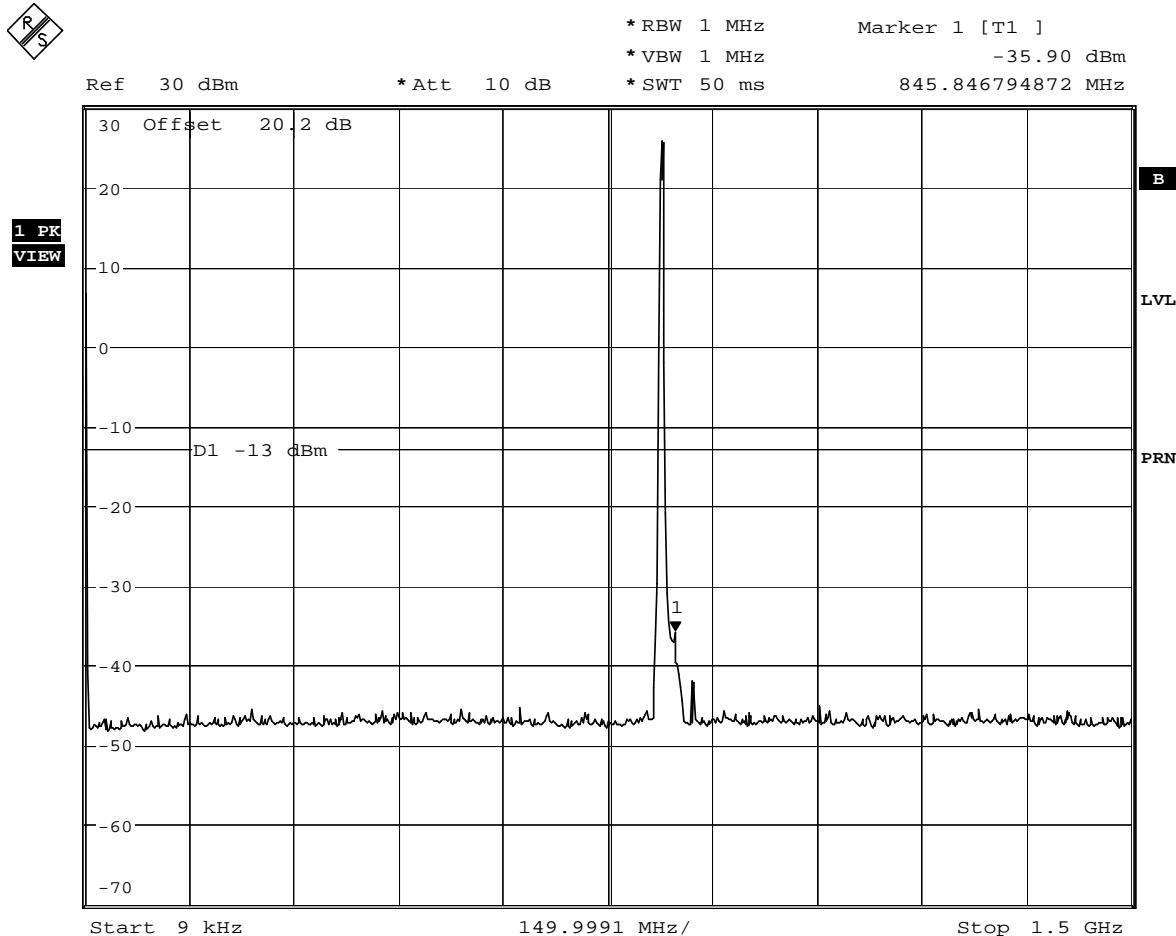


Date: 17.OCT.2005 16:04:26

Serial Number: 001018-00-006341-3
Spurious Emissions (1.5GHz – 9GHz)
Channel 251 (848.8MHz) - Maximum Power - EDGE 850 Mode
3.3 V SUPPLY

2.7 CONDUCTED SPURIOUS EMISSIONS

2.7.6 Test Results - continued

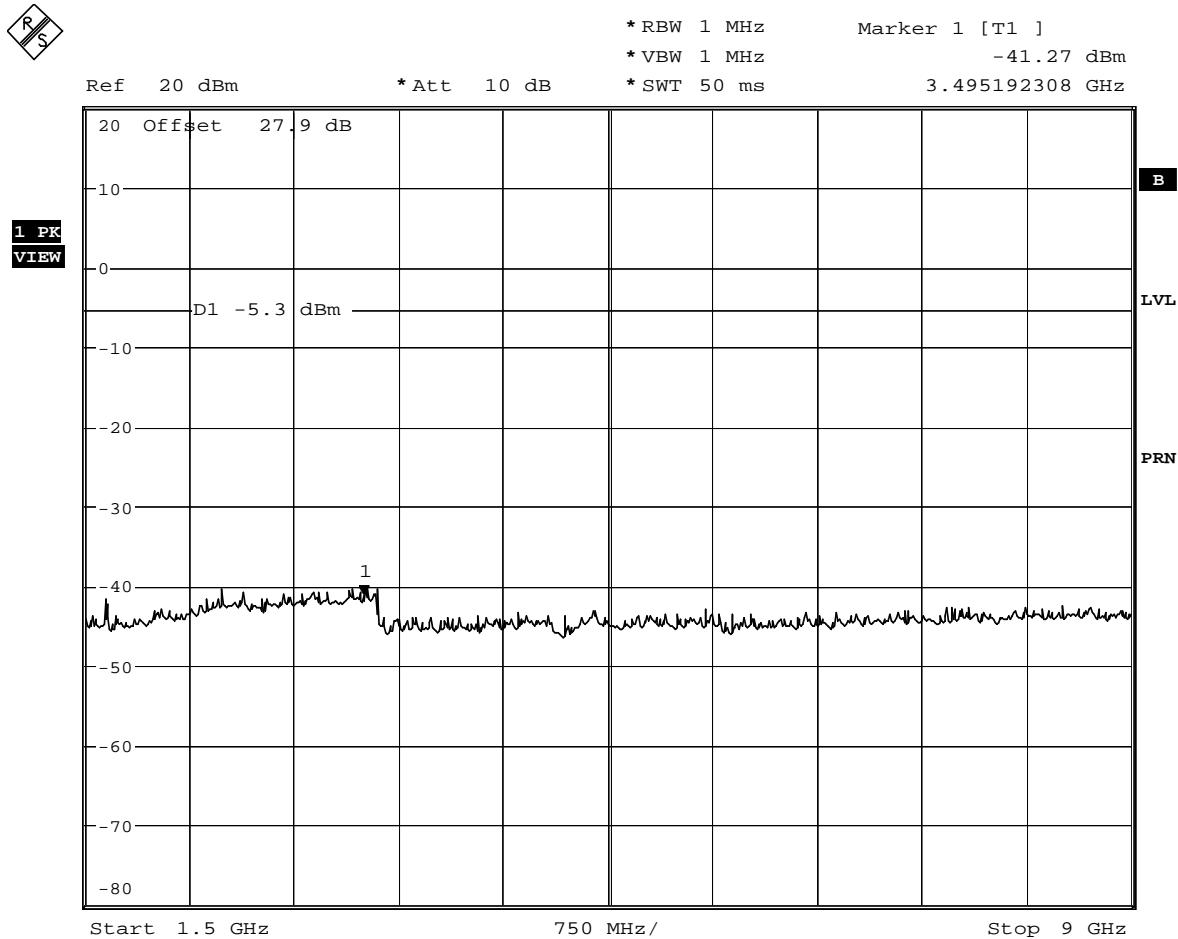


Date: 13.OCT.2005 13:25:17

Serial Number: 001018-00-006341-3
Spurious Emissions (9kHz – 1.5GHz)
Channel 4132 (826.4MHz) - Maximum Power - UMTS 850 Mode
3.3 V SUPPLY

2.7 CONDUCTED SPURIOUS EMISSIONS

2.7.6 Test Results - continued

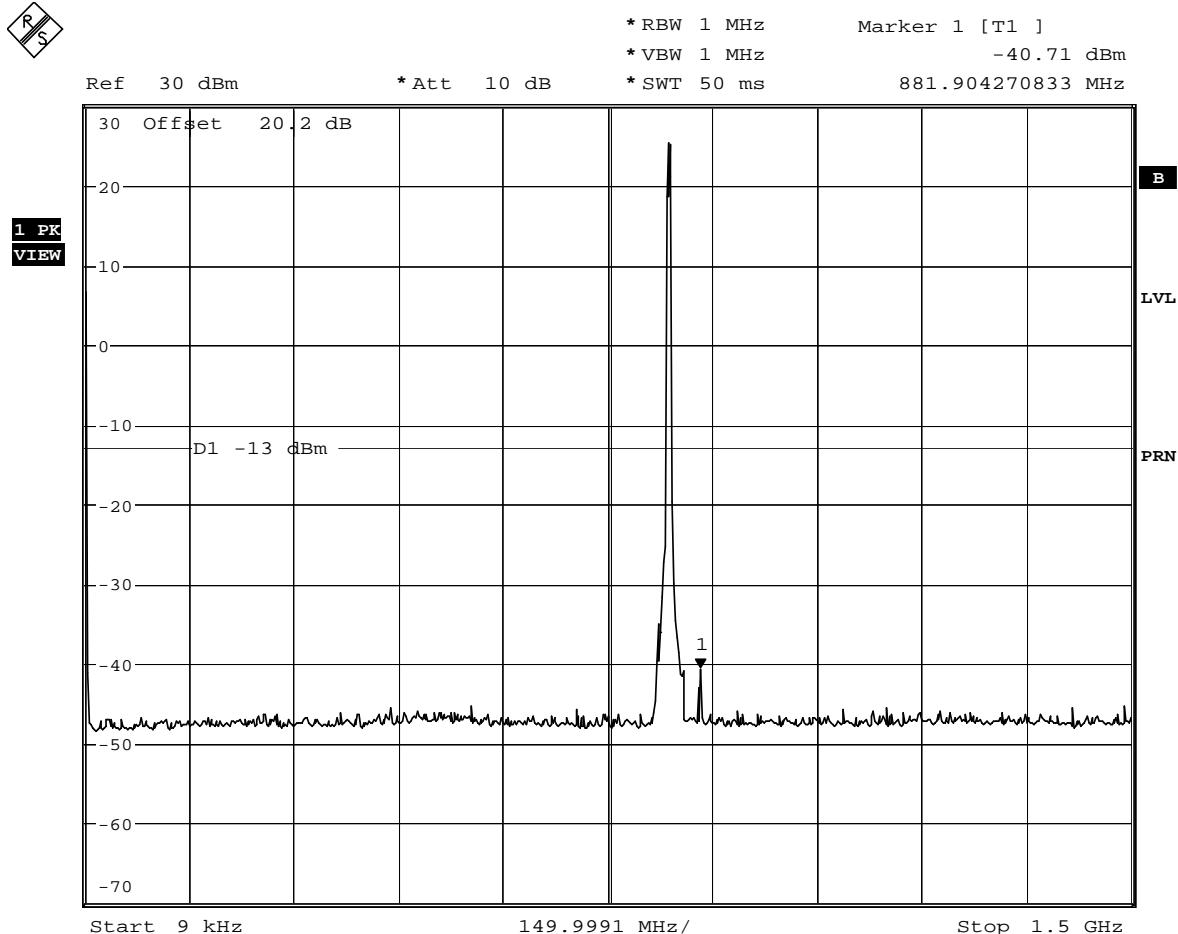


Date: 13.OCT.2005 13:40:13

Serial Number: 001018-00-006341-3
Spurious Emissions (1.5GHz – 9GHz)
Channel 4132 (826.4MHz) - Maximum Power - UMTS 850 Mode
3.3 V SUPPLY

2.7 CONDUCTED SPURIOUS EMISSIONS

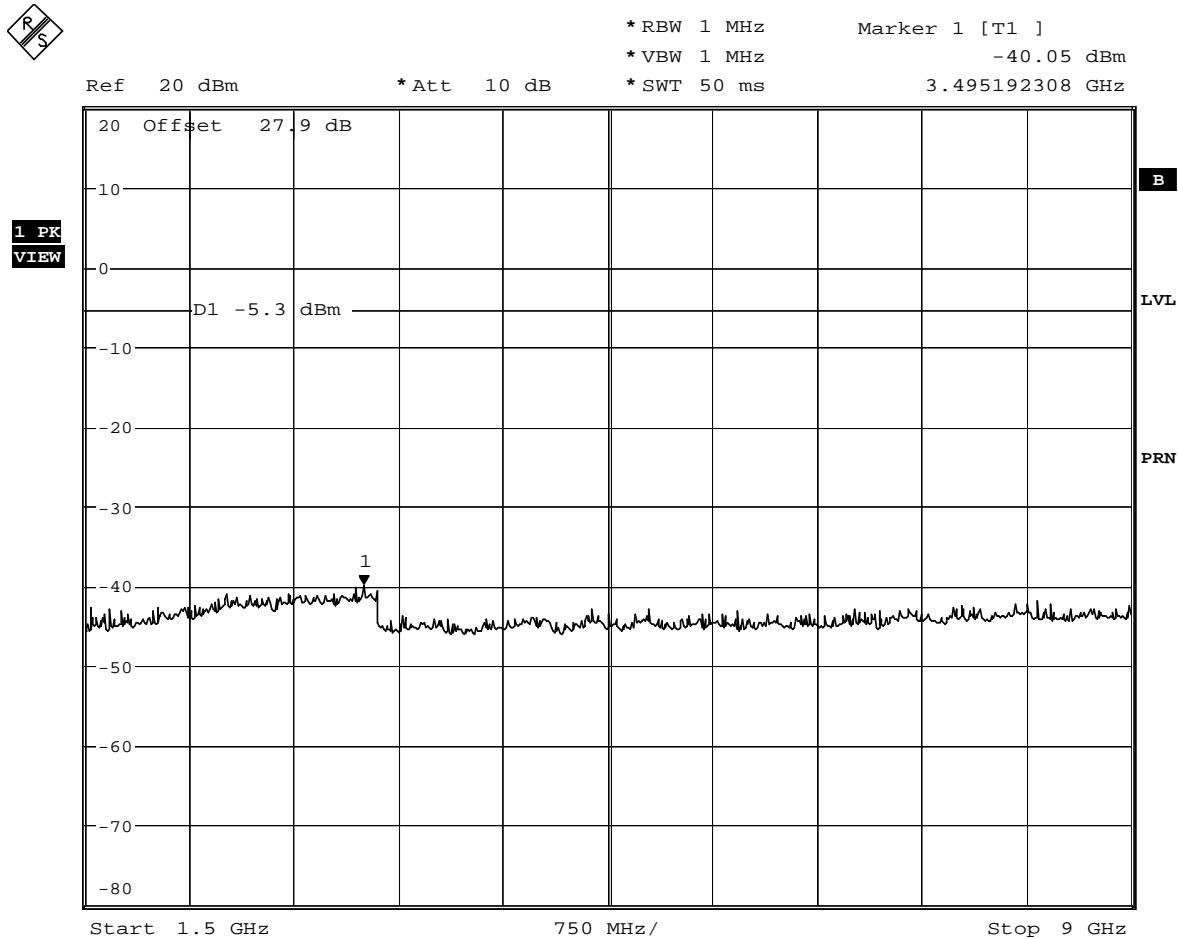
2.7.6 Test Results - continued



Date: 13.OCT.2005 13:26:59
 Serial Number: 001018-00-006341-3
Spurious Emissions (9kHz – 1.5GHz)
Channel 4183 (836.6MHz) - Maximum Power - UMTS 850 Mode
3.3 V SUPPLY

2.7 CONDUCTED SPURIOUS EMISSIONS

2.7.6 Test Results - continued

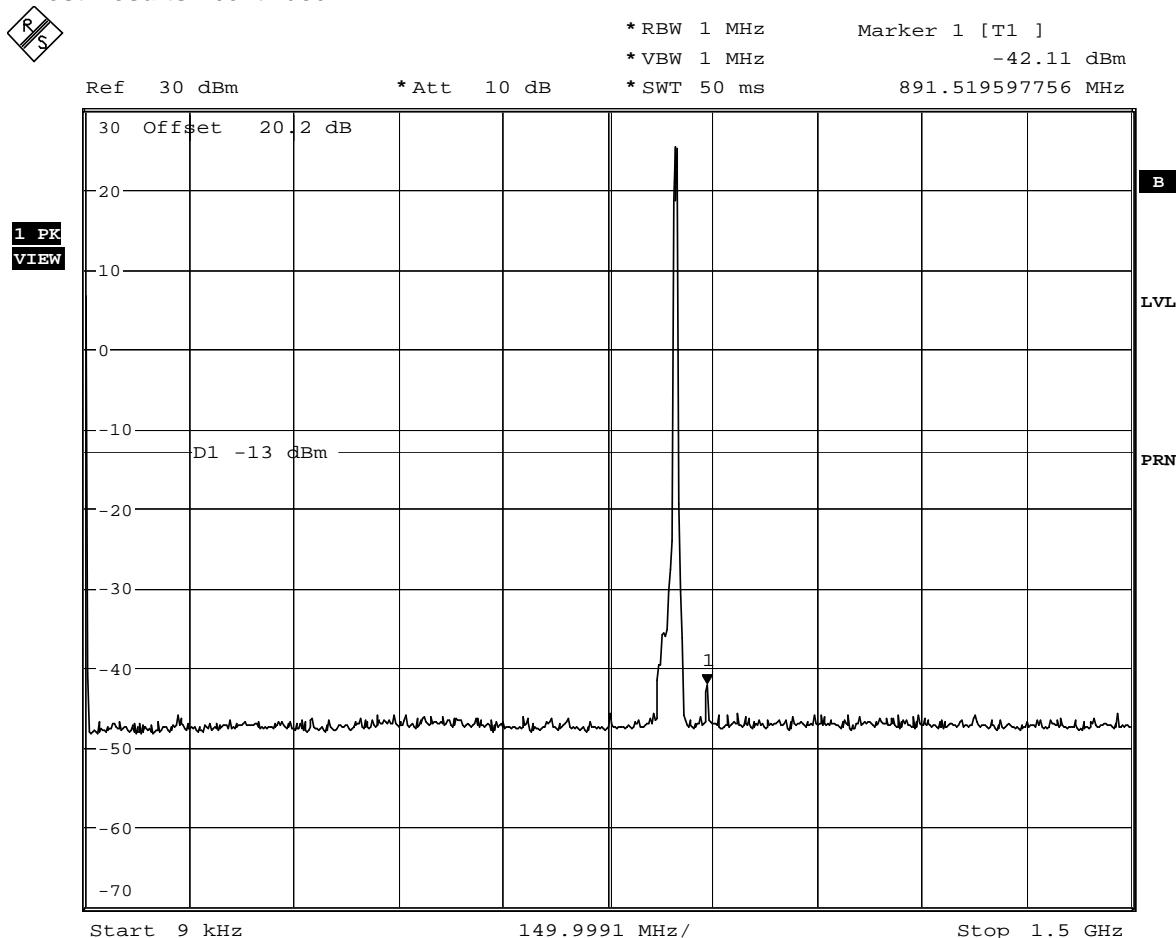


Date: 13.OCT.2005 13:39:23

Serial Number: 001018-00-006341-3
Spurious Emissions (1.5GHz - 9GHz)
Channel 4183 (836.6MHz) - Maximum Power - UMTS 850 Mode
3.3 V SUPPLY

2.7 CONDUCTED SPURIOUS EMISSIONS

2.7.6 Test Results - continued



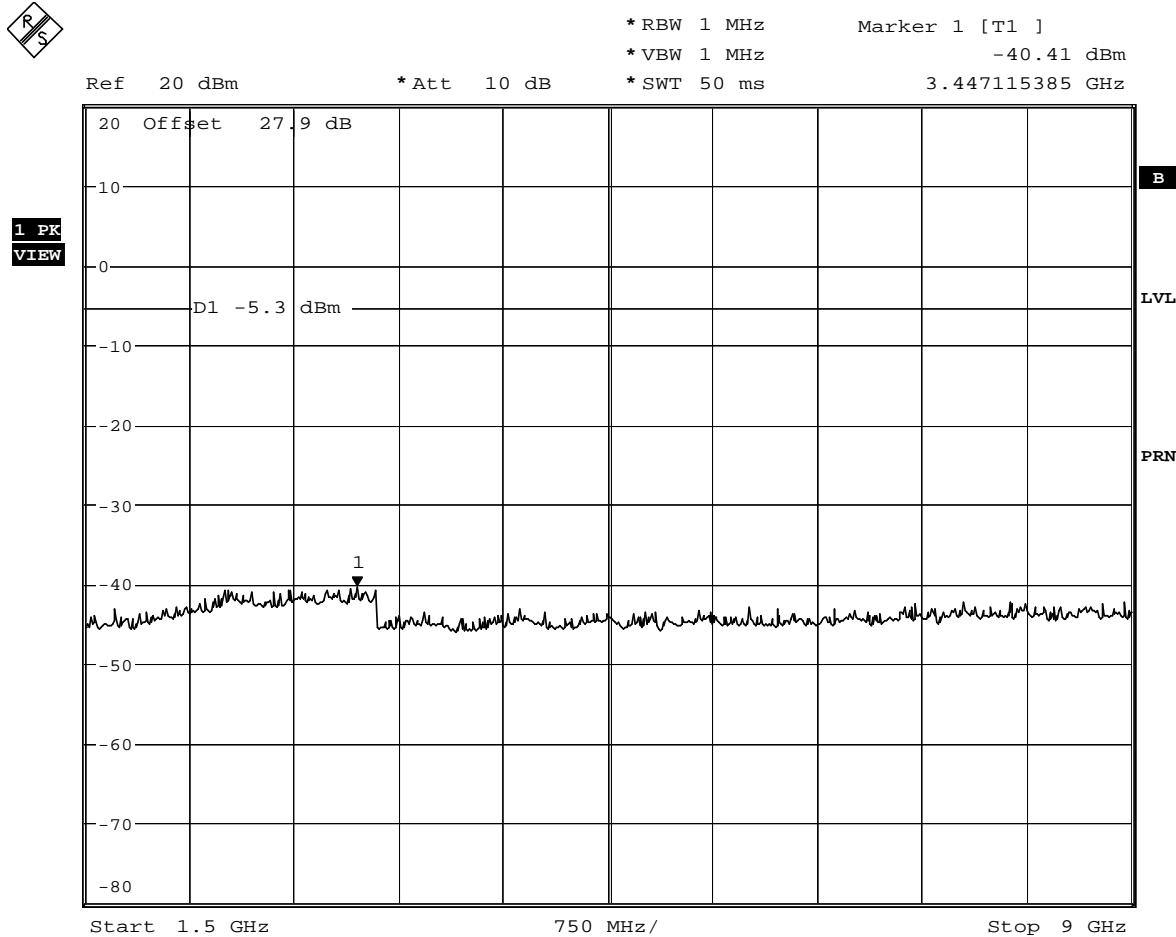
Date: 13.OCT.2005 13:30:29
 Serial Number: 001018-00-006341-3
Spurious Emissions (9kHz – 1.5GHz)
Channel 4233 (846.6MHz) - Maximum Power - UMTS 850 Mode
3.3 V SUPPLY



Product Service

2.7 CONDUCTED SPURIOUS EMISSIONS

2.7.6 Test Results - continued



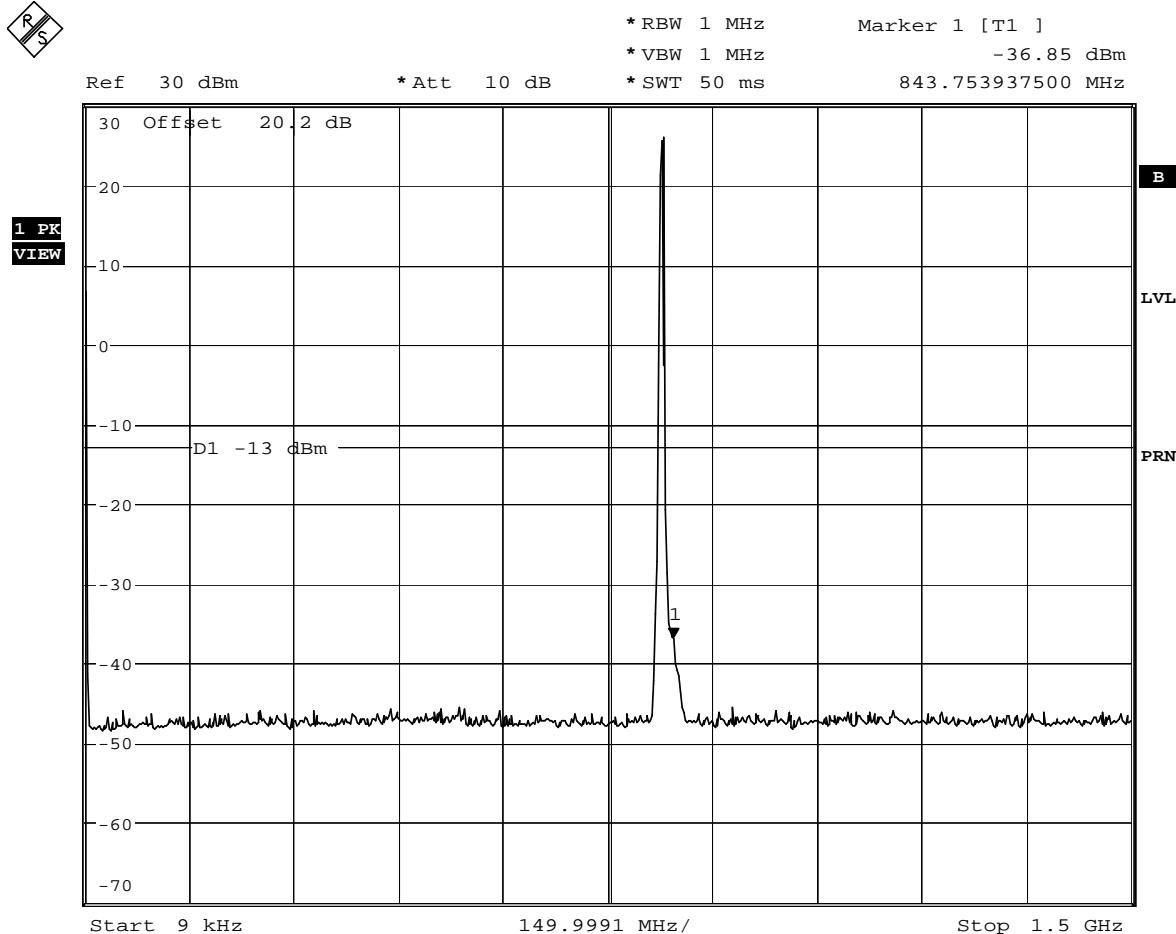
Date: 13.OCT.2005 13:38:32
 Serial Number: 001018-00-006341-3
Spurious Emissions (1.5GHz – 9GHz)
Channel 4233 (846.6MHz) - Maximum Power - UMTS 850 Mode
3.3 V SUPPLY



Product Service

2.7 CONDUCTED SPURIOUS EMISSIONS

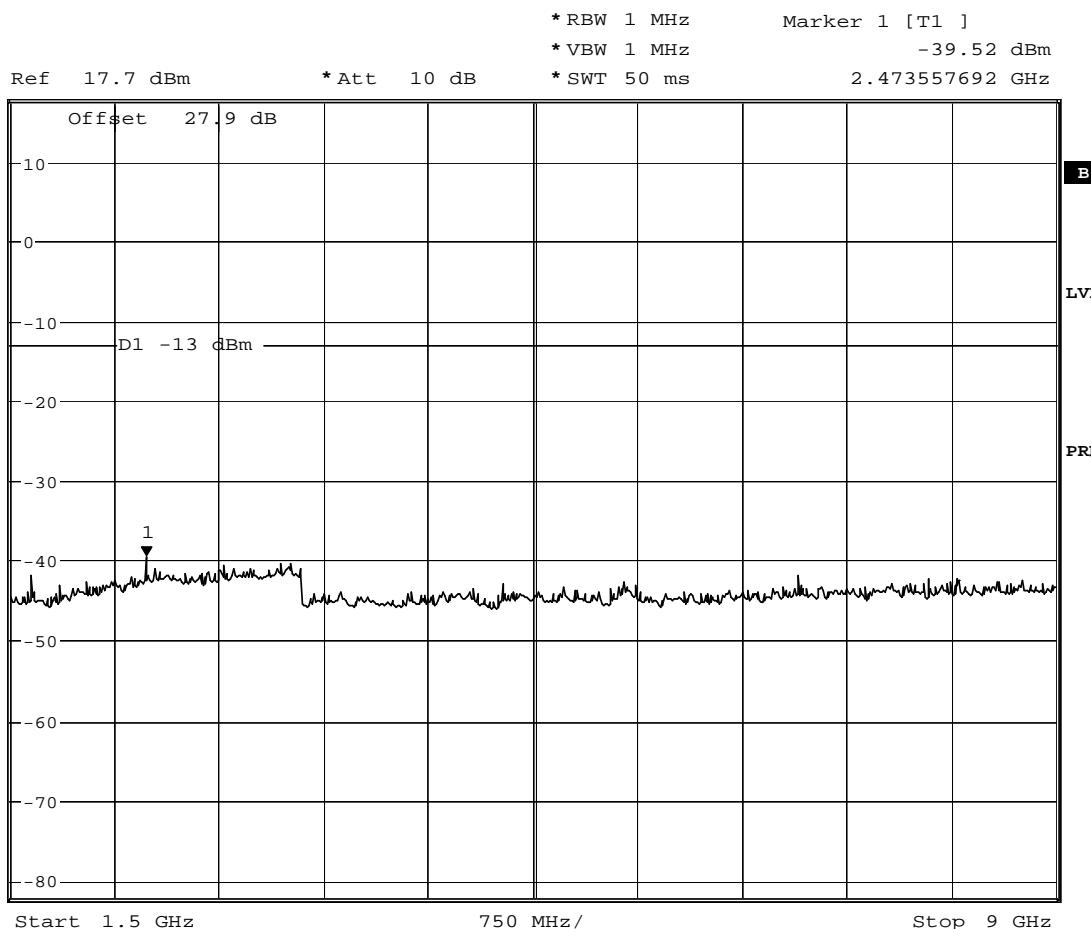
2.7.6 Test Results - continued



Date: 12.OCT.2005 12:00:17
Serial Number: 001018-00-006341-3
Spurious Emissions (9kHz – 1.5GHz)
Channel 4132 (826.4MHz) - Maximum Power - HSDPA 850 Mode
3.3 V SUPPLY

2.7 CONDUCTED SPURIOUS EMISSIONS

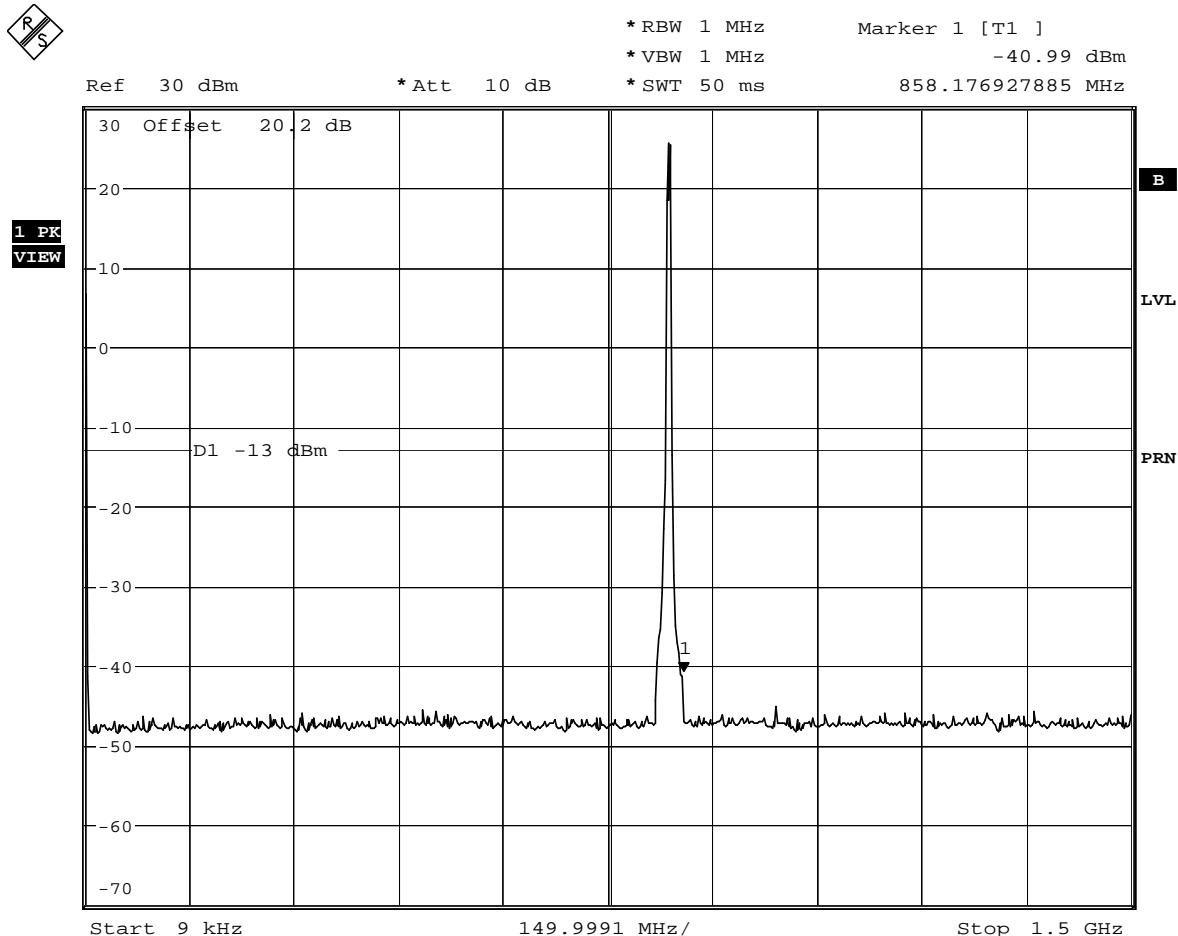
2.7.6 Test Results - continued



Date: 12.OCT.2005 11:48:57
 Serial Number: 001018-00-006341-3
Spurious Emissions (1.5GHz – 9GHz)
Channel 4132 (826.4MHz) - Maximum Power - HSDPA 850 Mode
3.3 V SUPPLY

2.7 CONDUCTED SPURIOUS EMISSIONS

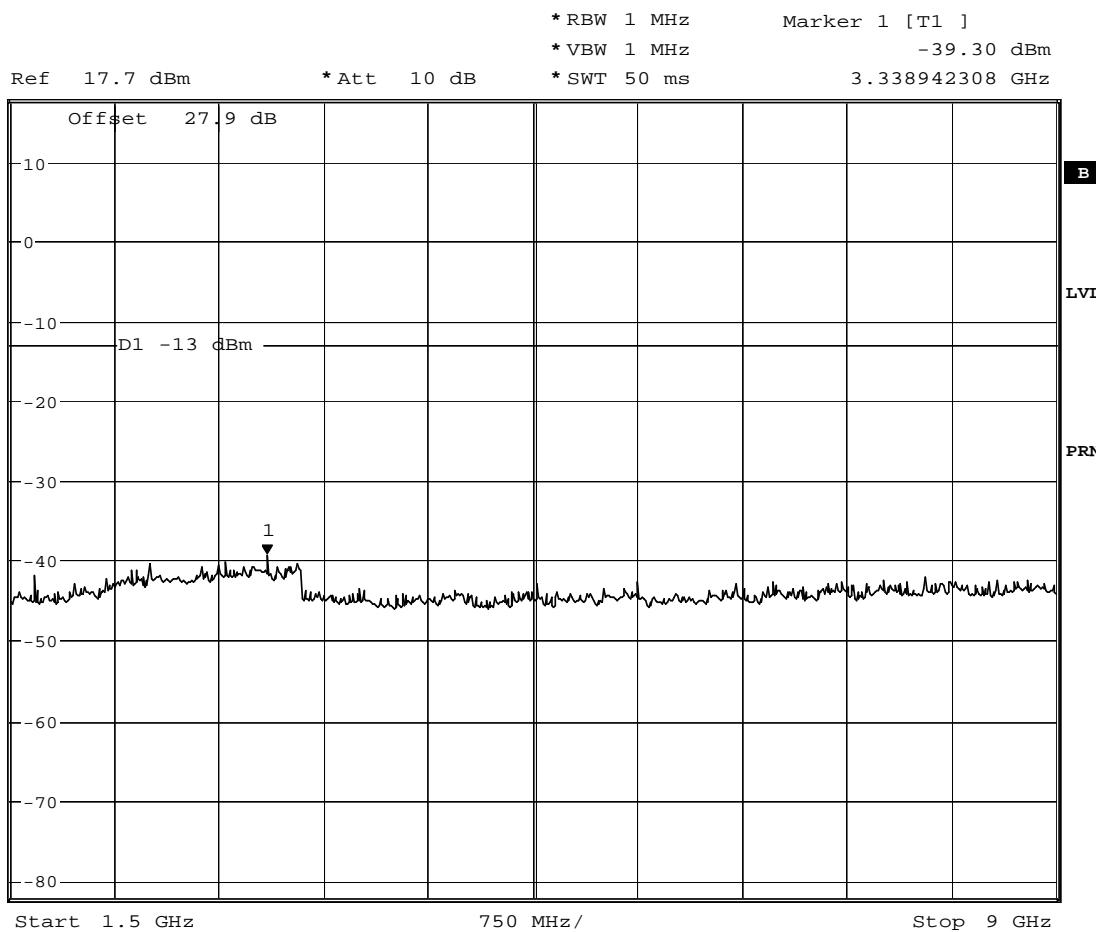
2.7.6 Test Results - continued



Date: 12.OCT.2005 11:58:47
 Serial Number: 001018-00-006341-3
Spurious Emissions (9kHz – 1.5GHz)
Channel 4183 (836.6MHz) - Maximum Power - HSDPA 850 Mode
3.3 V SUPPLY

2.7 CONDUCTED SPURIOUS EMISSIONS

2.7.6 Test Results - continued

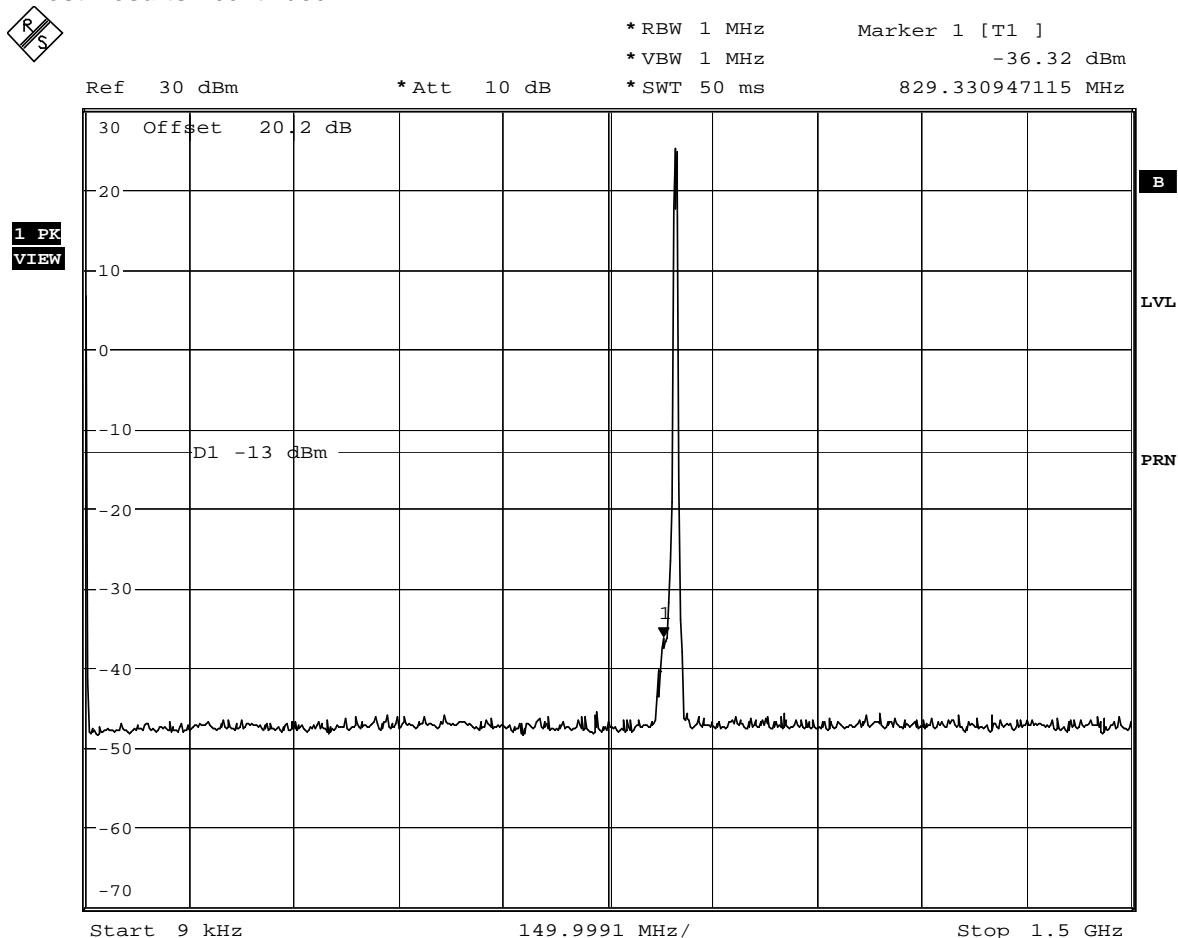


Date: 12.OCT.2005 11:51:27

Serial Number: 001018-00-006341-3
Spurious Emissions (1.5GHz - 9GHz)
Channel 4183 (836.6MHz) - Maximum Power - HSDPA 850 Mode
3.3 V SUPPLY

2.7 CONDUCTED SPURIOUS EMISSIONS

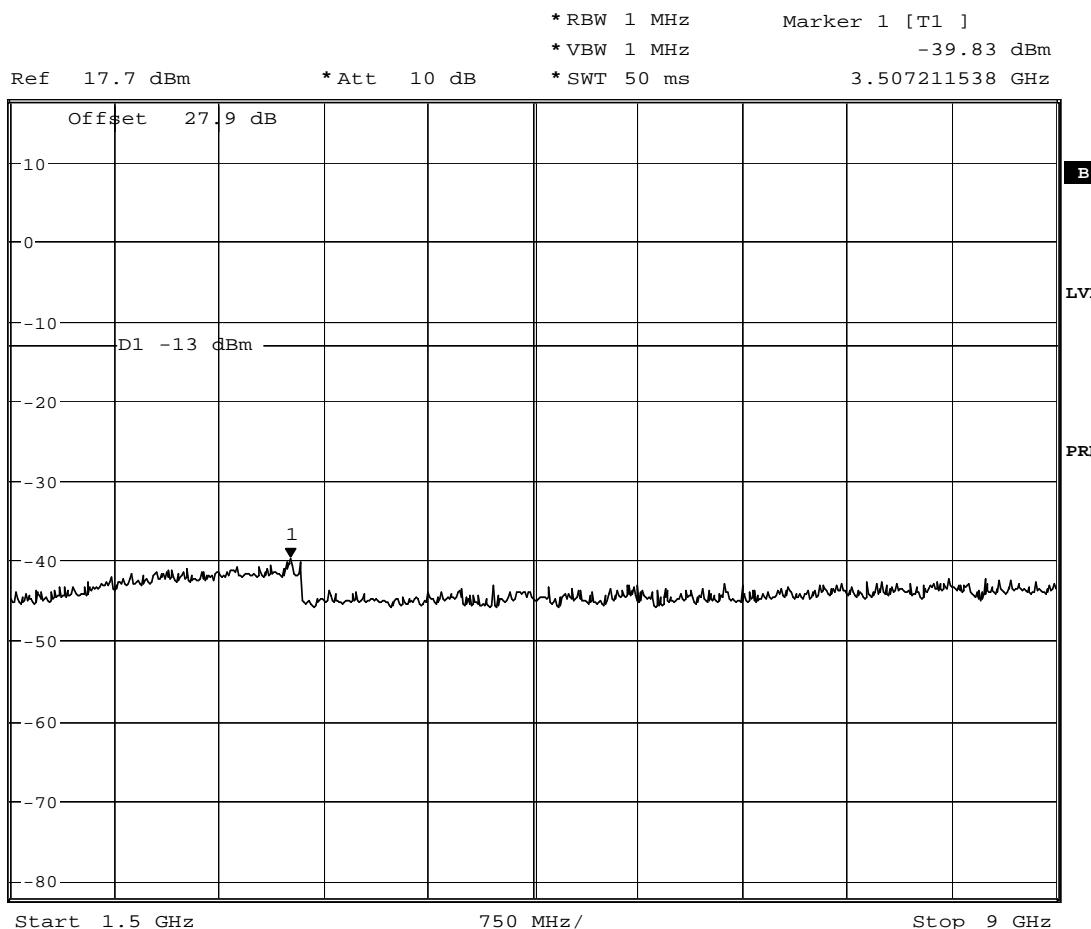
2.7.6 Test Results - continued



Date: 12.OCT.2005 11:57:33
 Serial Number: 001018-00-006341-3
Spurious Emissions (9kHz – 1.5GHz)
Channel 4233 (846.6MHz) - Maximum Power - HSDPA 850 Mode
3.3 V SUPPLY

2.7 CONDUCTED SPURIOUS EMISSIONS

2.7.6 Test Results - continued



Date: 12.OCT.2005 11:53:17
 Serial Number: 001018-00-006341-3
Spurious Emissions (1.5GHz – 9GHz)
Channel 4233 (846.6MHz) - Maximum Power - HSDPA 850 Mode
3.3 V SUPPLY

2.8 FREQUENCY STABILITY UNDER TEMPERATURE VARIATIONS

2.8.1 Specification Reference

FCC CFR 47: Part 22 Subpart H, Section 2.1055, 22.355 and Industry Canada RSS-132, 6.3

2.8.2 Equipment Under Test

U730

2.8.3 Date of Test

19th October 2005 (GPRS, EDGE, UMTS and HSDPA)

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

The EUT was set to transmit on maximum power with timeslots 2 and 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 -30°C and +50°C in 10° steps as per 2.1055.

Measurements were conducted with the EUT in GPRS, EDGE, UMTS and HSDPA modes of operation.

2.8 FREQUENCY STABILITY UNDER TEMPERATURE VARIATIONS

2.8.6 Test Results

| Temperature Interval °C | Test Frequency MHz | Deviation Hz | Limit kHz |
|----------------------------|-----------------------|-----------------|-------------------|
| -30 | 836.6 | -29 | ±2.5ppm or ±2.091 |
| -20 | 836.6 | +20 | ±2.5ppm or ±2.091 |
| -10 | 836.6 | +18 | ±2.5ppm or ±2.091 |
| 0 | 836.6 | +14 | ±2.5ppm or ±2.091 |
| +10 | 836.6 | +15 | ±2.5ppm or ±2.091 |
| +20 | 836.6 | -8 | ±2.5ppm or ±2.091 |
| +30 | 836.6 | +22 | ±2.5ppm or ±2.091 |
| +40 | 836.6 | +23 | ±2.5ppm or ±2.091 |
| +50 | 836.6 | -18 | ±2.5ppm or ±2.091 |

Serial Number: 001018-00-0363441
3.3V SUPPLY – GPRS 850 Mode

| Temperature Interval °C | Test Frequency MHz | Deviation Hz | Limit kHz |
|----------------------------|-----------------------|-----------------|-------------------|
| -30 | 836.6 | -45 | ±2.5ppm or ±2.091 |
| -20 | 836.6 | -23 | ±2.5ppm or ±2.091 |
| -10 | 836.6 | +28 | ±2.5ppm or ±2.091 |
| 0 | 836.6 | +37 | ±2.5ppm or ±2.091 |
| +10 | 836.6 | +38 | ±2.5ppm or ±2.091 |
| +20 | 836.6 | +16 | ±2.5ppm or ±2.091 |
| +30 | 836.6 | +33 | ±2.5ppm or ±2.091 |
| +40 | 836.6 | +40 | ±2.5ppm or ±2.091 |
| +50 | 836.6 | -36 | ±2.5ppm or ±2.091 |

Serial Number: 001018-00-0363441
3.3V SUPPLY – EDGE 850 Mode

| Temperature Interval °C | Test Frequency MHz | Deviation Hz | Limit kHz |
|----------------------------|-----------------------|-----------------|-------------------|
| -30 | 836.6 | +28 | ±2.5ppm or ±2.091 |
| -20 | 836.6 | -16 | ±2.5ppm or ±2.091 |
| -10 | 836.6 | -18 | ±2.5ppm or ±2.091 |
| 0 | 836.6 | -23 | ±2.5ppm or ±2.091 |
| +10 | 836.6 | +33 | ±2.5ppm or ±2.091 |
| +20 | 836.6 | -17 | ±2.5ppm or ±2.091 |
| +30 | 836.6 | -18 | ±2.5ppm or ±2.091 |
| +40 | 836.6 | -18 | ±2.5ppm or ±2.091 |
| +50 | 836.6 | -17 | ±2.5ppm or ±2.091 |

Serial Number: 001018-00-0363441
3.3V SUPPLY – UMTS 850 Mode

2.8 FREQUENCY STABILITY UNDER TEMPERATURE VARIATIONS**2.8.6 Test Results - continued**

| Temperature Interval °C | Test Frequency MHz | Deviation Hz | Limit kHz |
|----------------------------|-----------------------|-----------------|-------------------|
| -30 | 836.6 | -35 | ±2.5ppm or ±2.091 |
| -20 | 836.6 | -24 | ±2.5ppm or ±2.091 |
| -10 | 836.6 | -19 | ±2.5ppm or ±2.091 |
| 0 | 836.6 | -22 | ±2.5ppm or ±2.091 |
| +10 | 836.6 | -23 | ±2.5ppm or ±2.091 |
| +20 | 836.6 | -23 | ±2.5ppm or ±2.091 |
| +30 | 836.6 | -19 | ±2.5ppm or ±2.091 |
| +40 | 836.6 | -19 | ±2.5ppm or ±2.091 |
| +50 | 836.6 | -18 | ±2.5ppm or ±2.091 |

Serial Number: 001018-00-0363441
3.3V SUPPLY – HSDPA 850 Mode

Remarks

EUT complies with CFR 47 Part 22.355 and Industry Canada RSS-132, 6.3. The frequency stability of the EUT is sufficient to keep it within the authorised frequency blocks at any temperature interval across the measured range.

2.9 FREQUENCY STABILITY UNDER VOLTAGE VARIATIONS

2.9.1 Specification Reference

FCC CFR 47: Part 22 Subpart H, Section 2.1055, 22.355

2.9.2 Equipment Under Test

U730

2.9.3 Date of Test

17th October 2005 (GPRS, EDGE, UMTS and HSDPA)

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

GPRS

The EUT was set to transmit on maximum power. A Digital Communication Analyser, (CMU200), was used to measure the frequency error. The maximum result was taken over 200 bursts. Measurements were conducted with the EUT in GPRS mode of operation. The voltage to the EUT was varied as shown in the table of results.

EDGE

The EUT was set to transmit on maximum power. A Digital Communication Analyser, (CMU200), was used to measure the frequency error. The maximum result was taken over 200 bursts. Measurements were conducted with the EUT in EDGE mode of operation. The voltage to the EUT was varied as shown in the table of results.

UMTS

The EUT was set to transmit on maximum power. A Digital Communication Analyser, (CMU200), was used to measure the frequency error. The maximum result was taken over 200 bursts. Measurements were conducted with the EUT in QPSK mode of operation. The voltage to the EUT was varied as shown in the table of results at a temperature of 18°C.

HSDPA

The EUT was set to transmit on maximum power. A Digital Communication Analyser, (CMU200), was used to measure the frequency error. The maximum result was taken over 200 bursts. Measurements were conducted with the EUT in HSDPA mode of operation. The voltage to the EUT was varied as shown in the table of results.

2.9 FREQUENCY STABILITY UNDER VOLTAGE VARIATIONS**2.9.6 Test Results**

| DC Voltage V | Test Frequency MHz | Deviation Hz | Deviation Limit kHz |
|-----------------|-----------------------|-----------------|------------------------------------|
| 3.795 | 836.4 | +27 | $\pm 2.5\text{ppm}$ or ± 2.091 |
| 3.300 | 836.4 | -9 | $\pm 2.5\text{ppm}$ or ± 2.091 |
| 2.805 | 836.4 | -9 | $\pm 2.5\text{ppm}$ or ± 2.091 |

Serial Number: 001018-00-006341-3
3.3V SUPPLY - GPRS 850 Mode

| DC Voltage V | Test Frequency MHz | Deviation Hz | Deviation Limit kHz |
|-----------------|-----------------------|-----------------|------------------------------------|
| 3.795 | 836.6 | -40 | $\pm 2.5\text{ppm}$ or ± 2.091 |
| 3.300 | 836.6 | -44 | $\pm 2.5\text{ppm}$ or ± 2.091 |
| 2.805 | 836.6 | -36 | $\pm 2.5\text{ppm}$ or ± 2.091 |

Serial Number: 001018-00-006341-3
3.3V SUPPLY - EDGE 850 Mode

| DC Voltage V | Test Frequency MHz | Deviation Hz | Deviation Limit kHz |
|-----------------|-----------------------|-----------------|------------------------------------|
| 3.795 | 836.6 | -56 | $\pm 2.5\text{ppm}$ or ± 2.091 |
| 3.300 | 836.6 | -40 | $\pm 2.5\text{ppm}$ or ± 2.091 |
| 2.805 | 836.6 | -43 | $\pm 2.5\text{ppm}$ or ± 2.091 |

Serial Number: 001018-00-006341-3
3.3V SUPPLY - UMTS 850 Mode

| DC Voltage V | Test Frequency MHz | Deviation Hz | Deviation Limit kHz |
|-----------------|-----------------------|-----------------|------------------------------------|
| 3.795 | 836.6 | -22 | $\pm 2.5\text{ppm}$ or ± 2.091 |
| 3.300 | 836.6 | -23 | $\pm 2.5\text{ppm}$ or ± 2.091 |
| 2.805 | 836.6 | -20 | $\pm 2.5\text{ppm}$ or ± 2.091 |

Serial Number: 001018-00-006341-3
3.3V SUPPLY - HSDPA 850 Mode

Remarks

EUT complies with CFR 47 Part 22.355. The EUT does not exceed $\pm 2.092\text{kHz}$ at the measured frequency either at nominal or voltage variation.

2.10 MAXIMUM PEAK OUTPUT POWER

2.10.1 Specification Reference

FCC CFR 47: Part 22 Subpart H, Section 22.913 (a), 2.1046 and Industry Canada RSS-132, 4.4

2.10.2 Equipment Under Test

U730

2.10.3 Date of Test

21st October 2005

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

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 maximum power with timeslots 2 and 3 active for GPRS, EDGE., UMTS and HSDPA.

The spectrum analyser RBW and VBW were set to 1MHz for GRPS and EDGE modes and 3MHz for UMTS and HSDPA Modes. The path loss was measured and entered as a reference level offset.

2.10 MAXIMUM PEAK OUTPUT POWER (CONDUCTED)**2.10.6 Test Results**

Maximum Power -GPRS

Serial Number: 001018-00-036344-1

| Frequency MHz | Result dBm | Result mW |
|---------------|---------------|--------------|
| 824.2 | 31.90 | 1549 |
| 836.6 | 31.72 | 1486 |
| 848.8 | 31.76 | 1499 |

Maximum Power - EDGE

Serial Number: 001018-00-036344-1

| Frequency MHz | Result dBm | Result mW |
|---------------|---------------|--------------|
| 824.2 | 30.17 | 1175 |
| 836.6 | 30.00 | 1000 |
| 848.8 | 29.99 | 998 |

Maximum Power - UMTS

Serial Number: 001018-00-036344-1

| Frequency MHz | Result dBm | Result mW |
|---------------|---------------|--------------|
| 824.2 | 22.38 | 173 |
| 836.6 | 22.15 | 164 |
| 848.8 | 22.37 | 173 |

Maximum Power - HSDPA

Serial Number: 001018-00-036344-1

| Frequency MHz | Result dBm | Result mW |
|---------------|---------------|--------------|
| 824.2 | 22.51 | 178 |
| 836.6 | 22.54 | 179 |
| 848.8 | 22.36 | 172 |

| | |
|-------|-------------------|
| Limit | <7W or <+38.45dBm |
|-------|-------------------|

Remarks

EUT complies with CFR 47 2.1046 and 24.132(b) and Industry Canada RSS-133, 6.2. The EUT does not exceed 2W or +33dBm at the measured frequencies.

2.11 MAXIMUM PEAK OUTPUT POWER (RADIATED)

2.11.1 Specification Reference

FCC CFR 47: Part 24 Subpart E, Section 24.232 and Industry Canada RSS-133, 6.2

2.11.2 Equipment Under Test

U730

2.11.3 Date of Test

8th October 2005 (HSDPA)
12th October 2005 (GPRS, EDGE)
25th October 2005 (UMTS)

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

Test Performed in accordance with ANSI C63.4.

The EUT has an Integral Antenna, therefore the Maximum Peak Output Power (EIRP) was made using the Radiated 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, and the measuring antenna height searched (1m – 4m) until the highest power level was observed in both horizontal and vertical polarisation. The device was then replaced with a substitution antenna, whose input signal to the antenna was adjusted until the received level matched that of the previously detected emission.

2.11 MAXIMUM PEAK OUTPUT POWER (RADIATED)**2.11.6 Test Results**

The EUT met the requirements of FCC Part 24, Section 24.232, and Industry Canada RSS-133, 6.2 Power and Antenna Height Limits.

Measurements were made with the EUT in PCS 1900 Mode
Serial Number: 001018-00-0006156-5

| Frequency MHz | Result EIRP dBm | EIRP Limit dBm | Result EIRP mW | EIRP Limit mW |
|------------------|--------------------|-------------------|-------------------|------------------|
| 1850.2 | 27.12 | 33.0 | 515 | 1995 |
| 1880.0 | 27.11 | 33.0 | 514 | 1995 |
| 1909.8 | 28.14 | 33.0 | 652 | 1995 |

Measurements were made with the EUT in EDGE 1900 Mode
Serial Number: 001018-00-0006156-5

| Frequency MHz | Result EIRP dBm | EIRP Limit dBm | Result EIRP mW | EIRP Limit mW |
|------------------|--------------------|-------------------|-------------------|------------------|
| 1850.2 | 27.12 | 33.0 | 515 | 1995 |
| 1880.0 | 27.48 | 33.0 | 560 | 1995 |
| 1909.7 | 28.59 | 33.0 | 723 | 1995 |

Measurements were made with the EUT in UMTS 1900 Mode
Serial Number: 001018-00-0006156-5

| Frequency MHz | Result EIRP dBm | EIRP Limit dBm | Result EIRP mW | EIRP Limit mW |
|------------------|--------------------|-------------------|-------------------|------------------|
| 1853.17 | 20.43 | 33.0 | 110 | 1995 |
| 1880.70 | 20.32 | 33.0 | 108 | 1995 |
| 1906.52 | 22.70 | 33.0 | 186 | 1995 |

Measurements were made with the EUT in HSDPA 1900 Mode
Serial Number: 001018-00-006341-3

| Frequency MHz | Result EIRP dBm | EIRP Limit dBm | Result EIRP mW | EIRP Limit mW |
|------------------|--------------------|-------------------|-------------------|------------------|
| 1852.5 | 22.8 | 33.0 | 191 | 1995 |
| 1880.0 | 22.6 | 33.0 | 182 | 1995 |
| 1909.7 | 24.2 | 33.0 | 263 | 1995 |

2.12 MAXIMUM PEAK OUTPUT POWER (CONDUCTED)

2.12.1 Specification Reference

FCC CFR 47: Part 24 Subpart E, Section 24.232, 2.1046 and Industry Canada RSS-133, 6.2

2.12.2 Equipment Under Test

U730

2.12.3 Date of Test

21st October 2005

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

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 maximum power with timeslots 2 and 3 active for GPRS, EDGE., UMTS and HSDPA.

The spectrum analyser RBW and VBW were set to 1MHz for GRPS and EDGE modes and 3MHz for UMTS and HSDPA Modes. The path loss was measured and entered as a reference level offset.

2.12 MAXIMUM PEAK OUTPUT POWER (CONDUCTED)**2.12.6 Test Results**

Maximum Power -GPRS

Serial Number: 001018-00-036344-1

| Frequency MHz | Result dBm | Result mW |
|---------------|------------|-----------|
| 1850.2 | 28.73 | 746 |
| 1880.0 | 28.99 | 792 |
| 1909.8 | 28.99 | 792 |

Maximum Power - EDGE

Serial Number: 001018-00-036344-1

| Frequency MHz | Result dBm | Result mW |
|---------------|------------|-----------|
| 1850.2 | 28.88 | 773 |
| 1880.0 | 29.17 | 826 |
| 1909.8 | 29.14 | 820 |

Maximum Power - UMTS

Serial Number: 001018-00-036344-1

| Frequency MHz | Result dBm | Result mW |
|---------------|------------|-----------|
| 1824.4 | 22.79 | 190 |
| 1880.0 | 22.90 | 195 |
| 1907.6 | 22.50 | 178 |

Maximum Power - HSDPA

Serial Number: 001018-00-036344-1

| Frequency MHz | Result dBm | Result mW |
|---------------|------------|-----------|
| 1824.4 | 22.92 | 196 |
| 1880.0 | 22.87 | 194 |
| 1907.6 | 23.12 | 205 |

| | |
|-------|-------------------|
| Limit | <7W or <+38.45dBm |
|-------|-------------------|

Remarks

EUT complies with CFR 47 2.1046 and 24.132(b) and Industry Canada RSS-133, 6.2. The EUT does not exceed 2W or +33dBm at the measured frequencies.

2.13 MODULATION CHARACTERISTICS

2.13.1 Specification Reference

FCC CFR 47: Part 24 Subpart E, Section 2.1047(d)

2.13.2 Equipment Under Test

U730

2.11.3 Date of Test

14th October 2005 (GPRS)
17th October 2005 (EDGE)

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

Two views are shown for GPRS and EDGE modes 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.

2.13 MODULATION CHARACTERISTICS

2.13.5 Modulation Description

Modulation format for GMSK

Modulating symbol rate

The modulating symbol rate is $1/T = 1625/6$ 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 ($d_i = 1$) 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 ($d_i = 1$) 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.

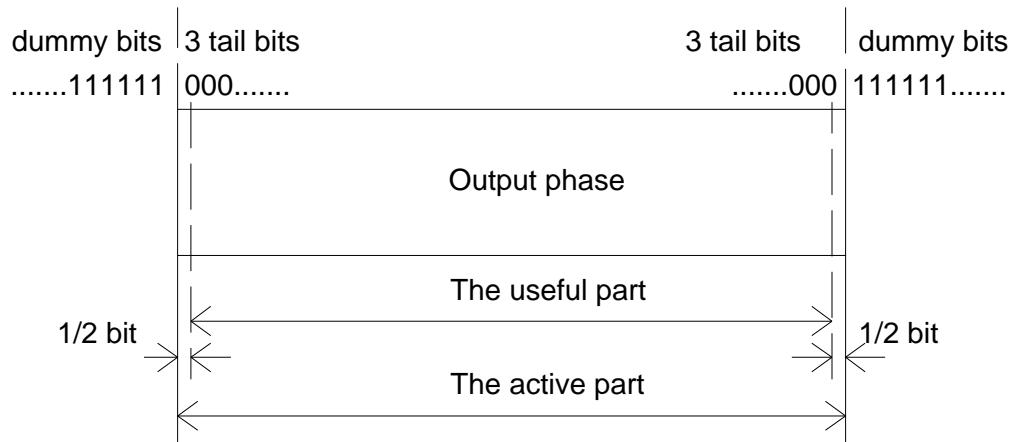


Figure 1: Relation between active part of burst, tail bits and dummy bits. For the normal burst the useful part lasts for 147 modulating bits

Differential encoding

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

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

where \oplus denotes modulo 2 addition.

The modulating data value α_i input to the modulator is:

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

2.13 MODULATION CHARACTERISTICS

2.13.5 Modulation Description - continued

Filtering

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

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

where the function $\text{rect}(x)$ is defined by:

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

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

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

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

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

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:

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

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.

2.13 MODULATION CHARACTERISTICS

2.13.5 Modulation Description - continued

Modulation format for 8PSK

Modulating symbol rate

The modulating symbol rate is $1/T = 1625/6$ ksym/s (i.e. approximately 270.833 ksym/s), which corresponds to $3*1625/6$ kbit/s (i.e. 812.5 kbit/s). T is the symbol period.

Symbol mapping

The modulating bits are Gray mapped in groups of three to 8PSK symbols by the rule

$$s_i = e^{j2\pi l/8}$$

where l is given by table 1.

Table 1: Mapping between modulating bits and the 8PSK symbol parameter l .

| Modulating bits $d_{3i}, d_{3i+1}, d_{3i+2}$ | Symbol parameter l |
|-------------------------------------------------|----------------------|
| (1,1,1) | 0 |
| (0,1,1) | 1 |
| (0,1,0) | 2 |
| (0,0,0) | 3 |
| (0,0,1) | 4 |
| (1,0,1) | 5 |
| (1,0,0) | 6 |
| (1,1,0) | 7 |

This is illustrated in figure 2.

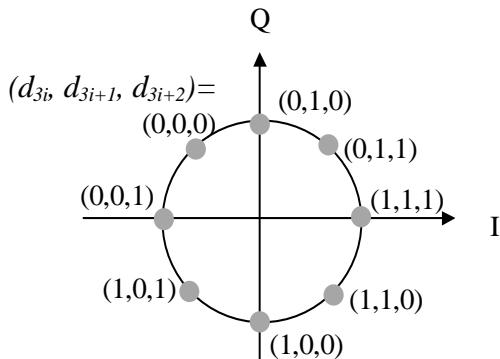


Figure 2: Symbol mapping of modulating bits into 8PSK symbols.

2.13 MODULATION CHARACTERISTICS

2.13.5 Modulation Description - continued

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 state of the modulator is undefined. Also after the last bit of the burst, the state of the modulator is undefined. The tail bits (see 3GPP TS 45.002) define the start and the stop of the active and the useful part of the burst as illustrated in figure 3. Nothing is specified about the actual phase of the modulator output signal outside the useful part of the burst.

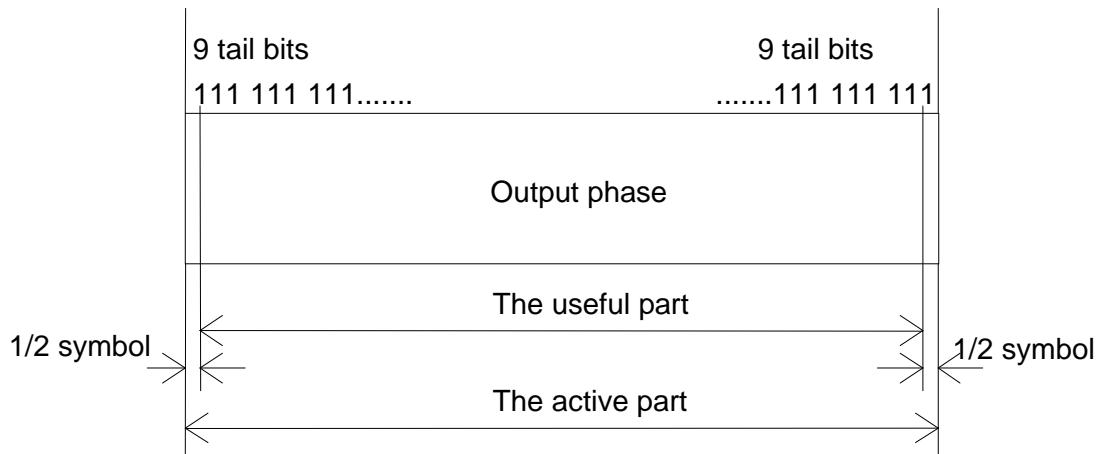


Figure 3: Relation between active part of burst and tail bits. For the normal burst the useful part lasts for 147 modulating symbols

Symbol rotation

The 8PSK symbols are continuously rotated with $3\pi/8$ radians per symbol before pulse shaping. The rotated symbols are defined as

$$\hat{s}_i = s_i \cdot e^{ji3\pi/8}$$

2.13 MODULATION CHARACTERISTICS

2.13.5 Modulation Description - continued

Pulse shaping

The modulating 8PSK symbols \hat{s}_i as represented by Dirac pulses excite a linear pulse shaping filter. This filter is a linearised GMSK pulse, i.e. the main component in a Laurant decomposition of the GMSK modulation. The impulse response is defined by:

$$c_0(t) = \begin{cases} \prod_{i=0}^3 S(t + iT), & \text{for } 0 \leq t \leq 5T \\ 0, & \text{else} \end{cases}$$

where

$$S(t) = \begin{cases} \sin(\pi \int_0^t g(t') dt'), & \text{for } 0 \leq t \leq 4T \\ \sin(\frac{\pi}{2} - \pi \int_0^{t-4T} g(t') dt'), & \text{for } 4T < t \leq 8T \\ 0, & \text{else} \end{cases}$$

$$g(t) = \frac{1}{2T} \left(Q(2\pi \cdot 0.3 \frac{t-5T/2}{T\sqrt{\log_e(2)}}) - Q(2\pi \cdot 0.3 \frac{t-3T/2}{T\sqrt{\log_e(2)}}) \right)$$

and

$$Q(t) = \frac{1}{\sqrt{2\pi}} \int_t^{\infty} e^{-\frac{\tau^2}{2}} d\tau.$$

The base band signal is

$$y(t') = \sum_i \hat{s}_i \cdot c_0(t' - iT + 2T)$$

The time reference $t' = 0$ is the start of the active part of the burst as shown in figure 3. This is also the start of the symbol period of symbol number 0 (containing the first tail bit) as defined in 3GPP TS 45.002 [2].

Modulation

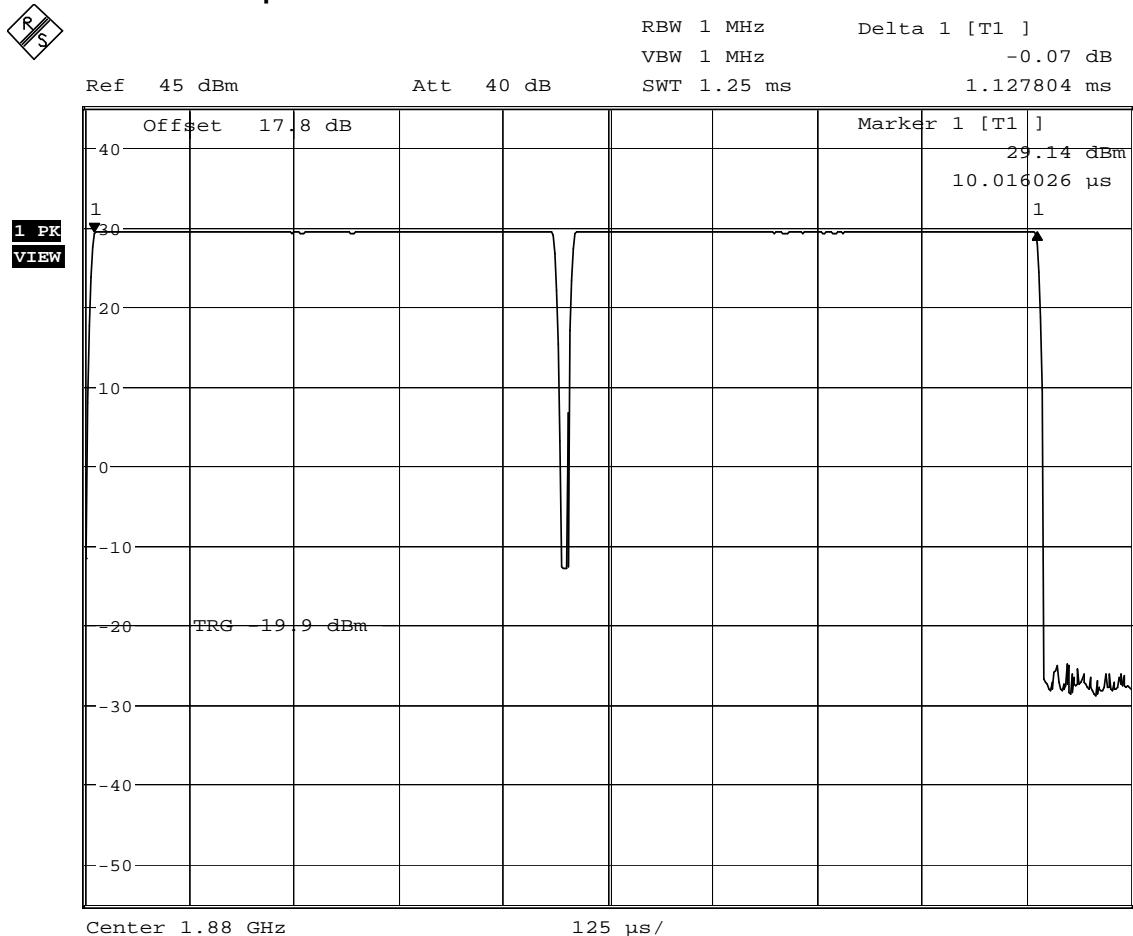
The modulated RF carrier during the useful part of the burst is therefore:

$$x(t') = \sqrt{\frac{2E_s}{T}} \operatorname{Re} \left[y(t') \cdot e^{j(2\pi f_0 t' + \varphi_0)} \right]$$

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

2.13 MODULATION CHARACTERISTICS

2.13.5 Modulation Description - continued

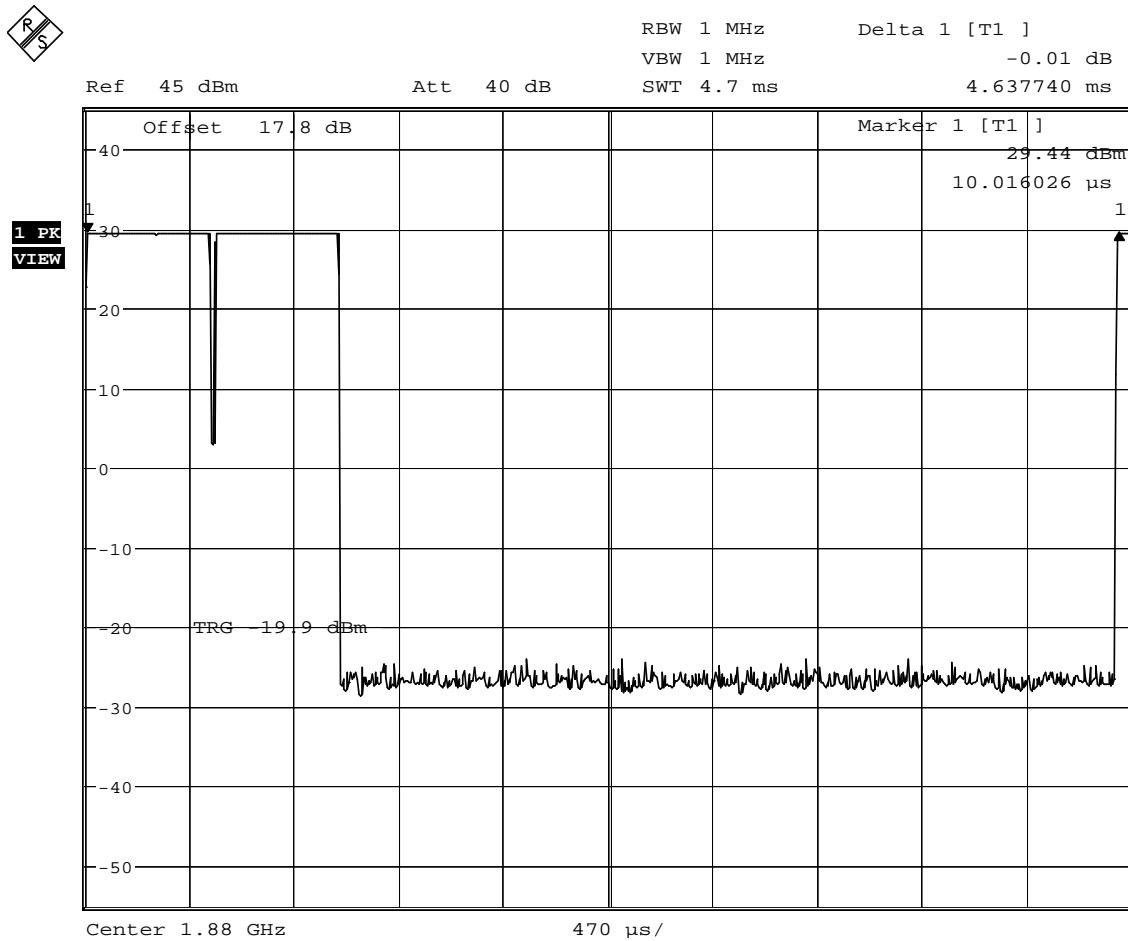


Date: 14.OCT.2005 12:41:33

Serial Number: 00108-00-006341-3
GPRS Mode – View of Two Timeslots Active

2.13 MODULATION CHARACTERISTICS

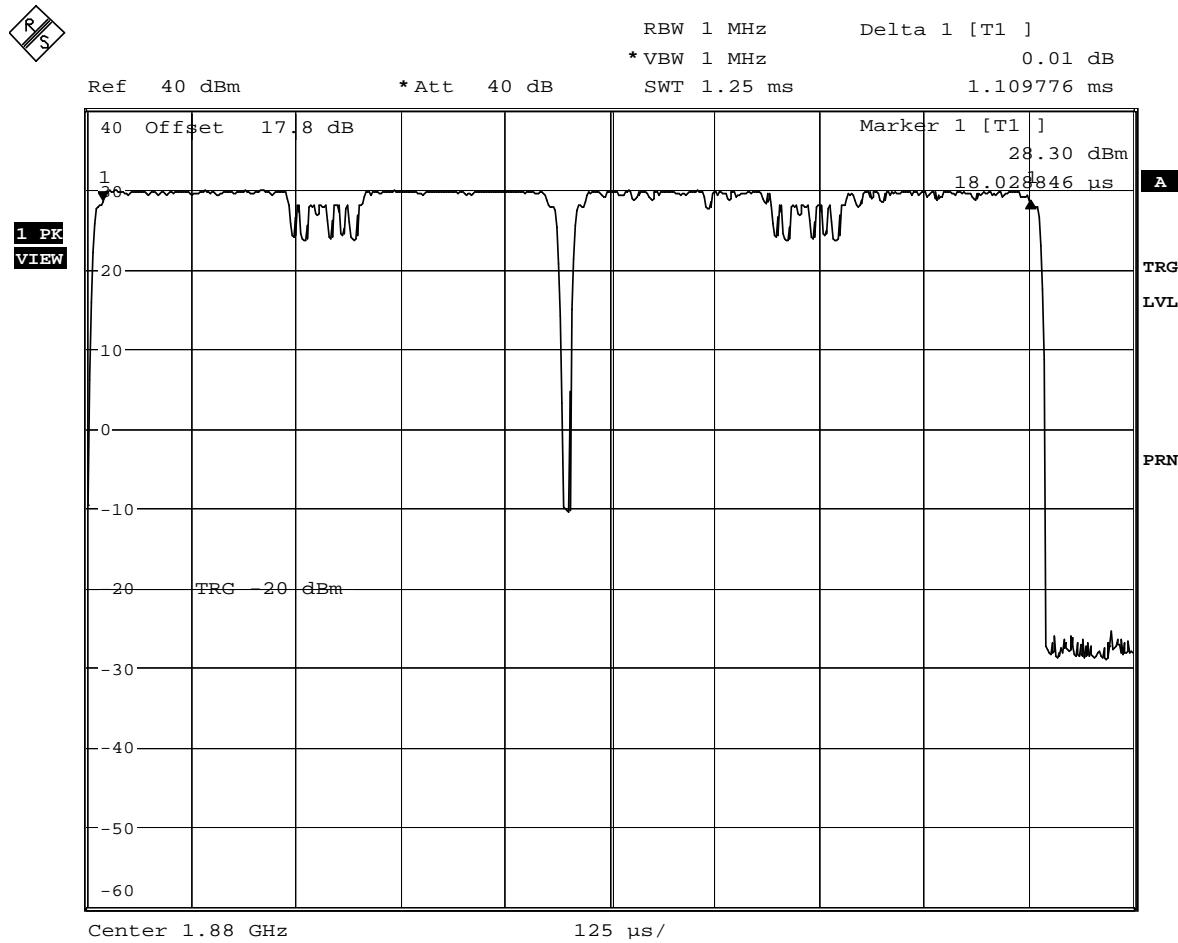
2.13.5 Modulation Description - continued



Date: 14.OCT.2005 12:40:23
Serial Number: 00108-00-006341-3
GPRS Mode – View of One Complete Frame

2.13 MODULATION CHARACTERISTICS

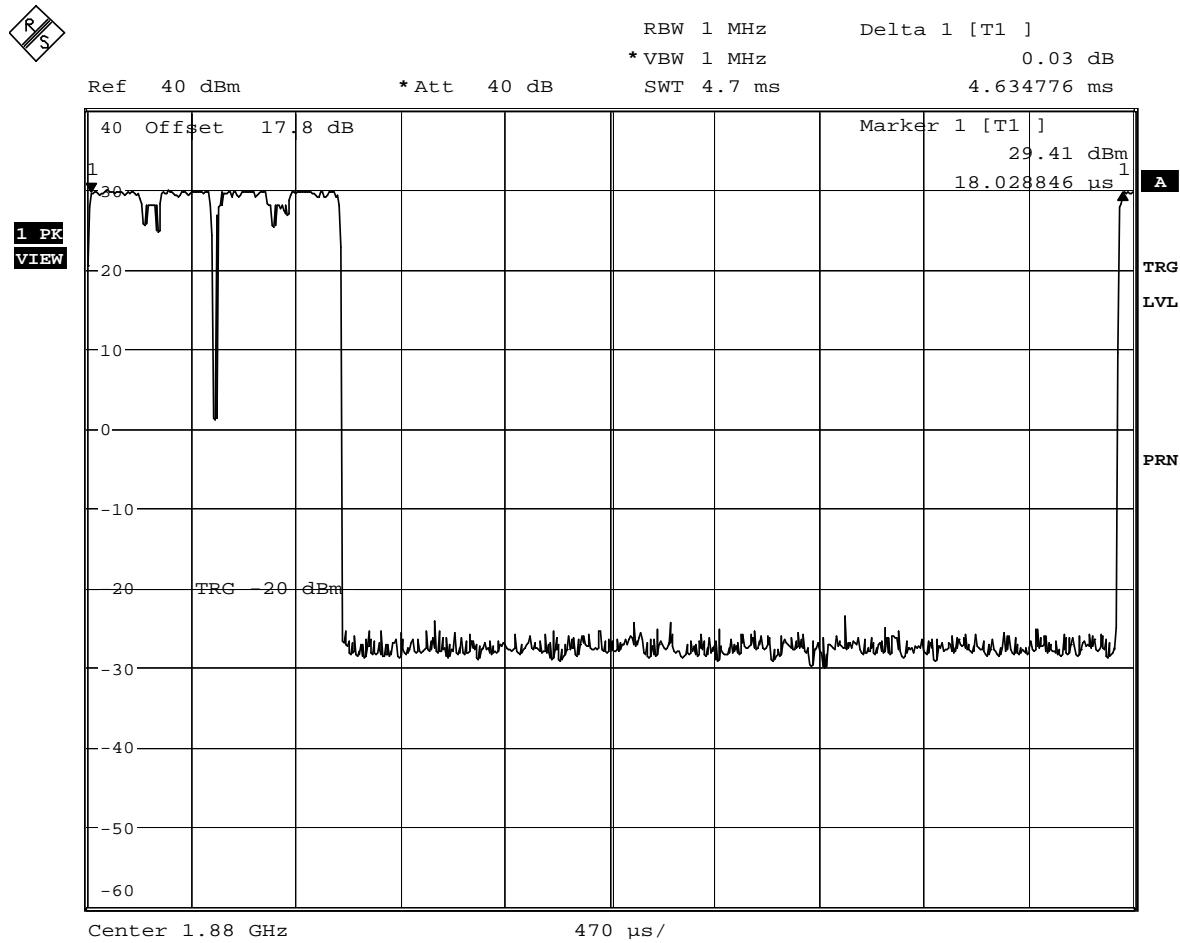
2.13.5 Modulation Description - continued



Date: 17.OCT.2005 17:16:53
 Serial Number: 00108-00-006341-3
EDGE Mode – View of Two Timeslots Active

2.13 MODULATION CHARACTERISTICS

2.13.5 Modulation Description - continued



Date: 17.OCT.2005 17:18:17
 Serial Number: 00108-00-006341-3
EDGE Mode – View of One Complete Frame

2.14 OCCUPIED BANDWIDTH**2.14.1 Specification Reference**

FCC CFR 47: Part 24 Subpart E, Section 24.238(b), 2.1049

2.14.2 Equipment Under Test

U730

2.14.3 Date of Test

11th October 2005 (HSDPA)
13th October 2005 (UMTS)
14th October 2005 (GPRS)
17th October 2005 (EDGE)

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

For GRPS and EDGE modes of operation a resolution bandwidth of 10kHz and a video bandwidth of 30kHz were used. The -26dBc points were established and the emission bandwidth recorded.

For UMTS and HSDPA modes of operation, a resolution and video bandwidth of 100kHz was used. The -26dBc points were established and the emission bandwidth recorded.

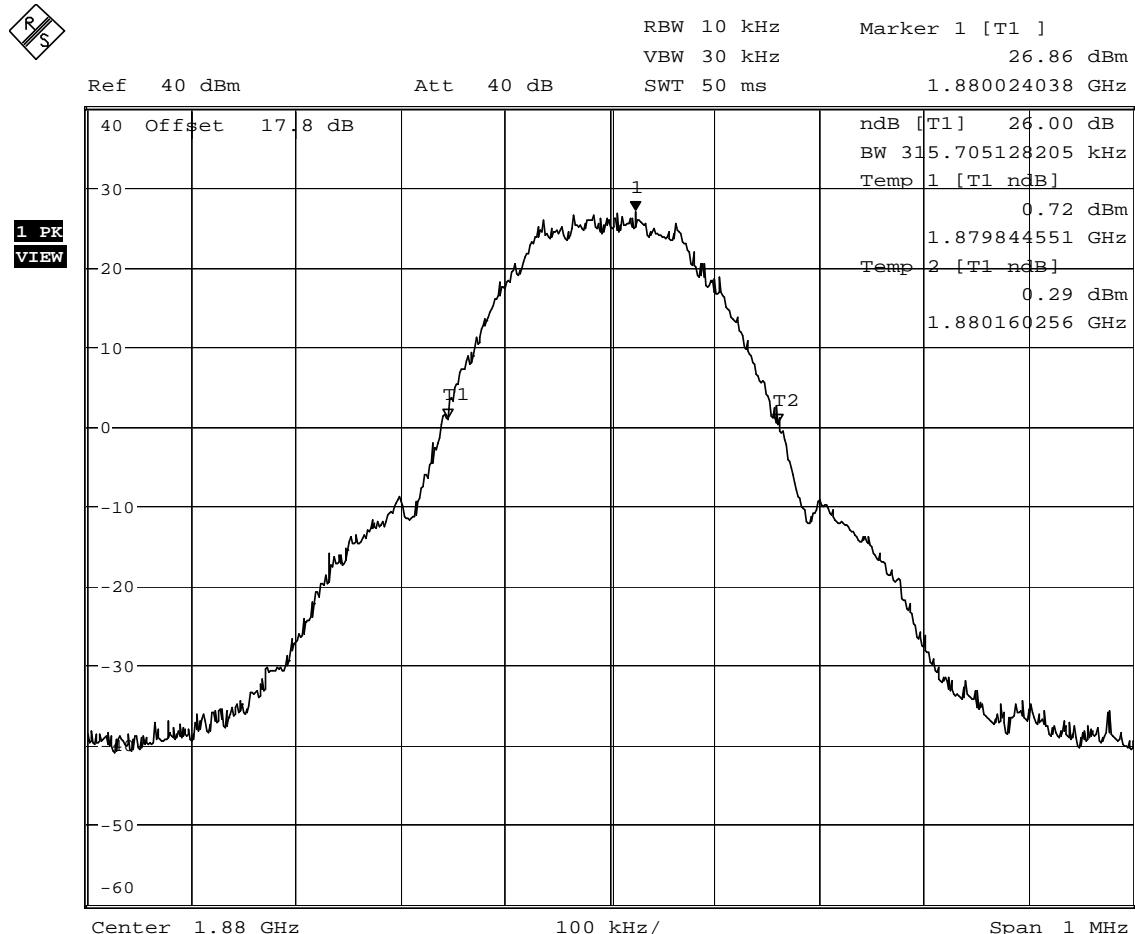
The resultant plots are shown overleaf with a summary table of results below.

| Frequency (MHz) | Modulation | 26dB Bandwidth (kHz) |
|-----------------|------------|----------------------|
| 836.6 | GPRS | 315.705 |
| 836.6 | EDGE | 318.910 |
| 1880.0 | UMTS | 4663.461 |
| 1880.0 | HSDPA | 4647.435 |

2.14 OCCUPIED BANDWIDTH

2.14.6 Test Results

Occupied Bandwidth As Defined By The – 26dBc Points

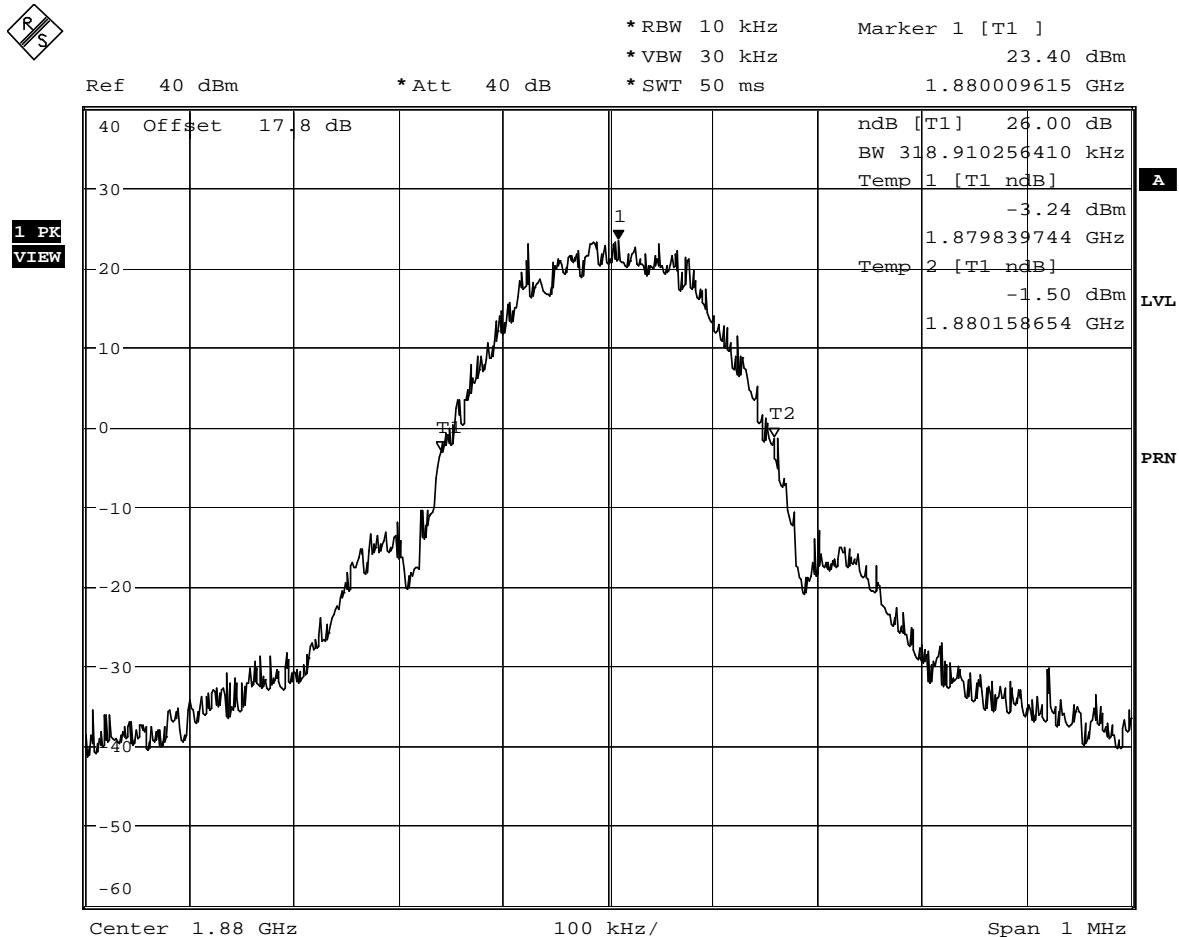


Date: 14.OCT.2005 12:52:27
Serial Number: 00108-00-006341-3
Maximum Power – GPRS Mode

2.14 OCCUPIED BANDWIDTH

2.14.6 Test Results - continued

Occupied Bandwidth As Defined By The - 26dBc Points

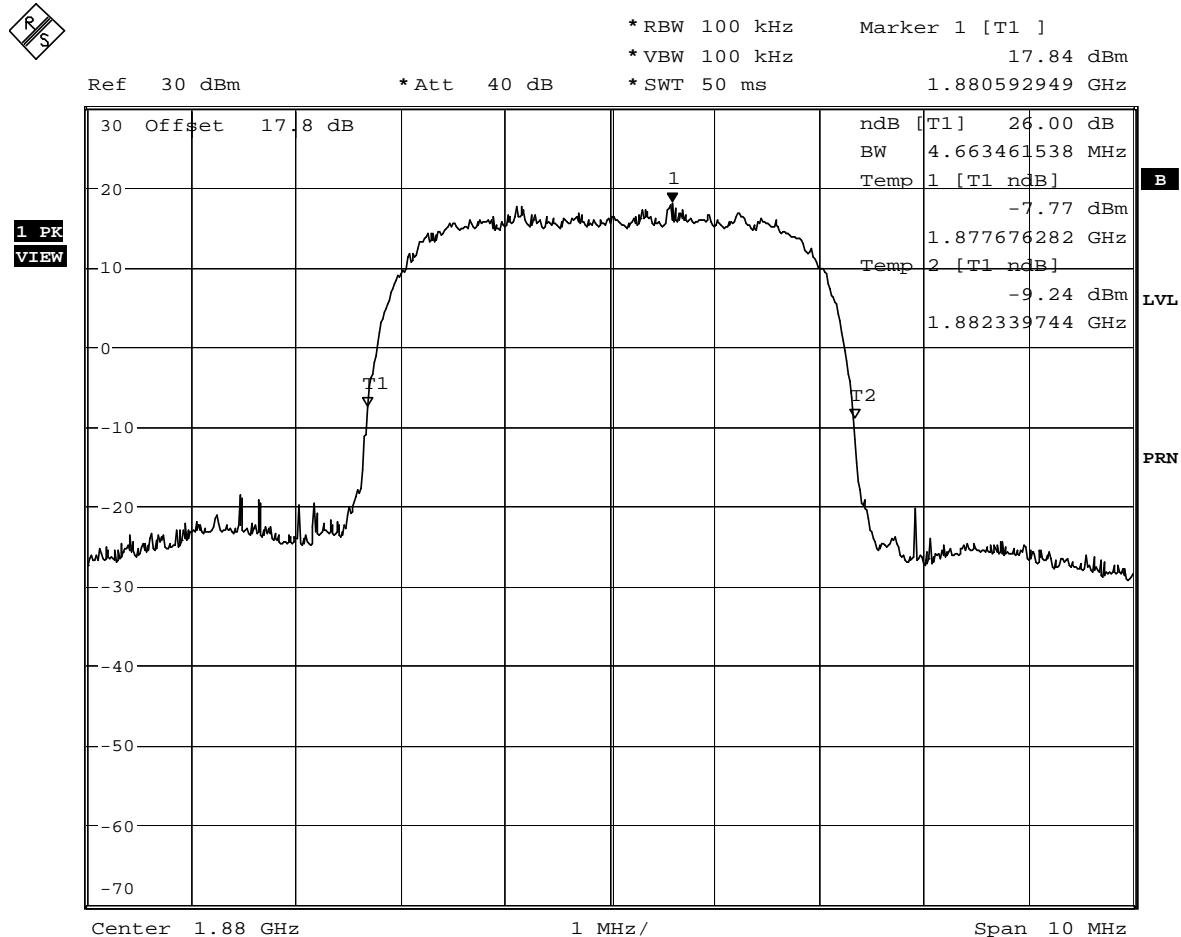


Date: 17.OCT.2005 16:58:52
Serial Number: 00108-00-006341-3
Maximum Power – EDGE

2.14 OCCUPIED BANDWIDTH

2.14.6 Test Results - continued

Occupied Bandwidth As Defined By The - 26dBc Points

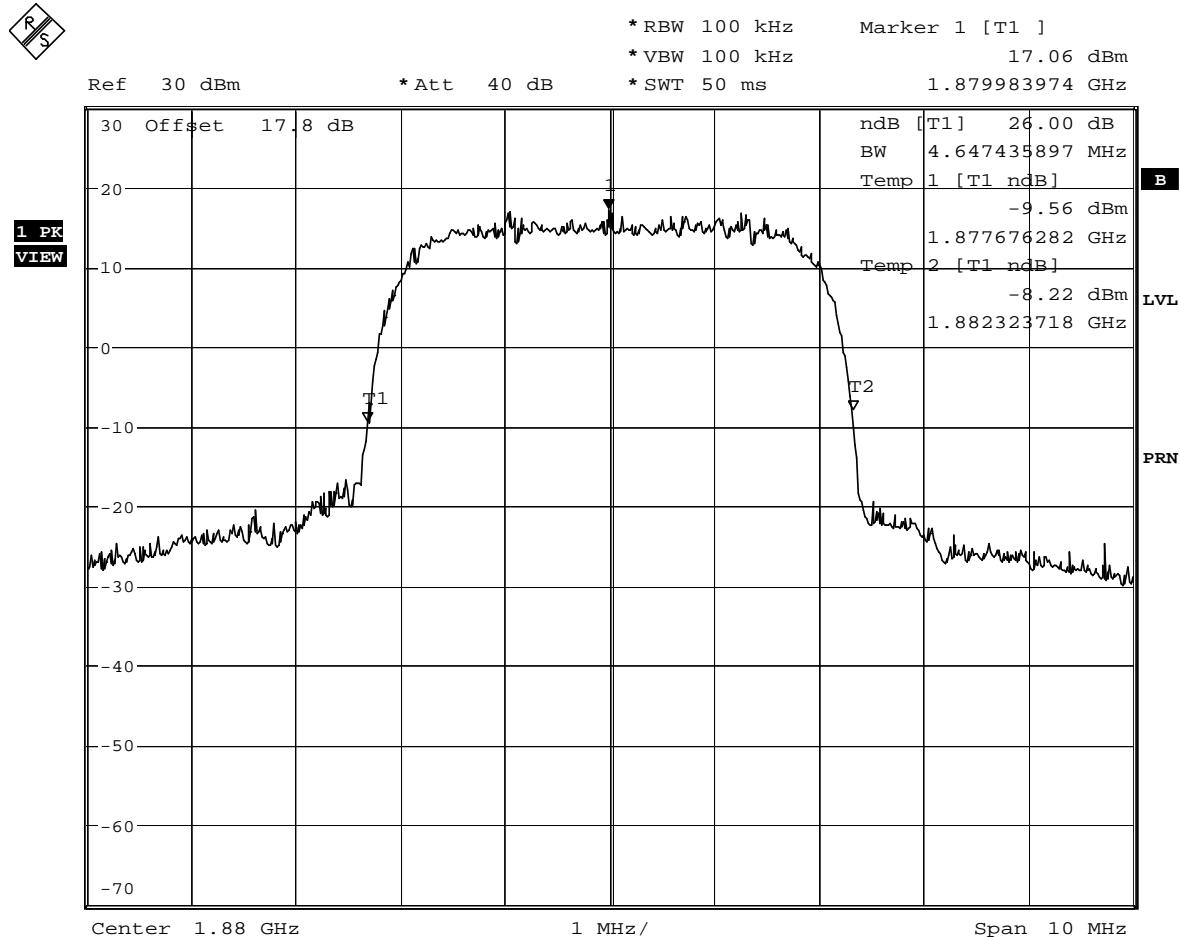


Date: 13.OCT.2005 11:07:13
Serial Number: 00108-00-006341-3
Maximum Power – UMTS

2.14 OCCUPIED BANDWIDTH

2.14.6 Test Results - continued

Occupied Bandwidth As Defined By The - 26dBc Points



Date: 11.OCT.2005 13:57:17
 Serial Number: 00108-00-006341-3
Maximum Power – HSDPA

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

2.15.1 Specification Reference

FCC CFR 47: Part 24 Subpart E, Section 24.229, 24.238, 2.1051 and
Industry Canada RSS-133, 6.3

2.15.2 Equipment Under Test

U730

2.15.3 Date of Test

11th October 2005 (HSDPA)
13th October 2005 (UMTS)
14th October 2005 (GPRS)
17th October 2005 (EDGE)

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

In accordance with Part 24.238, at least 1% of the 26dB bandwidth was used for the resolution and video bandwidths up to 1MHz away from the Block Edge. At greater than 1MHz, the resolution and video bandwidths were increased to 1MHz.

The reference power and path losses of all channels used for testing in each frequency block were measured. It was found that there was <0.6dB variation in all channels, thus the worst case reference level offset was used throughout. Having entered the reference level offset, the limit line was displayed, showing the -13dBm , $(43+10\log P)$, limit.

The EUT was tested at it's maximum power level and in GPRS, EDGE, UMTS and HSDPA modes of operation.

2.15 SPURIOUS EMISSIONS AT ANTENNA TERMINALS (+/-1MHz)**2.15.6 Test Results**

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

Measurements were made with the EUT in GPRS 1900 Mode

| 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 |

Measurements were made with the EUT in EDGE 1900 Mode

| Frequency Block MHz | Lower Block Edge Test Channels/Frequencies | Upper Block Edge Test Channels/Frequencies |
|------------------------|-----------------------------------------------|-----------------------------------------------|
| A | Channel : 512 Frequency : 1850.2 MHz | - |
| C | - | Channel : 809 Frequency : 1909.6 MHz |

Measurements were made with the EUT in UMTS 1900 Mode

| Frequency Block MHz | Lower Block Edge Test Channels/Frequencies | Upper Block Edge Test Channels/Frequencies |
|------------------------|-----------------------------------------------|-----------------------------------------------|
| A | Channel : 9262 Frequency : 1852.4 MHz | - |
| C | - | Channel : 9538 Frequency : 1907.6 MHz |

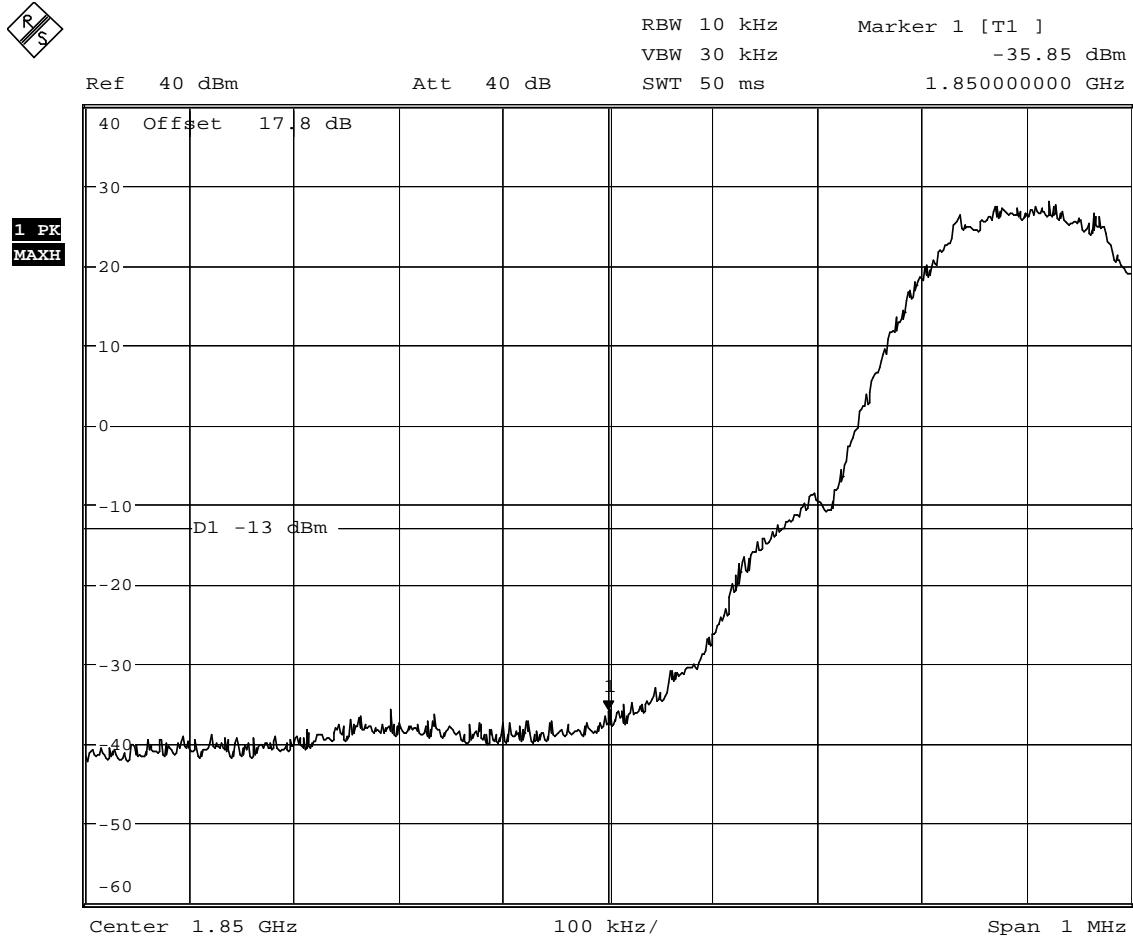
Measurements were made with the EUT in HSDPA 1900 Mode

| Frequency Block MHz | Lower Block Edge Test Channels/Frequencies | Upper Block Edge Test Channels/Frequencies |
|------------------------|-----------------------------------------------|-----------------------------------------------|
| A | Channel : 9262 Frequency : 1852.4 MHz | - |
| C | - | Channel : 9538 Frequency : 1907.6 MHz |

The measurement plots are shown on the following pages.

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

2.15.6 Test Results - continued



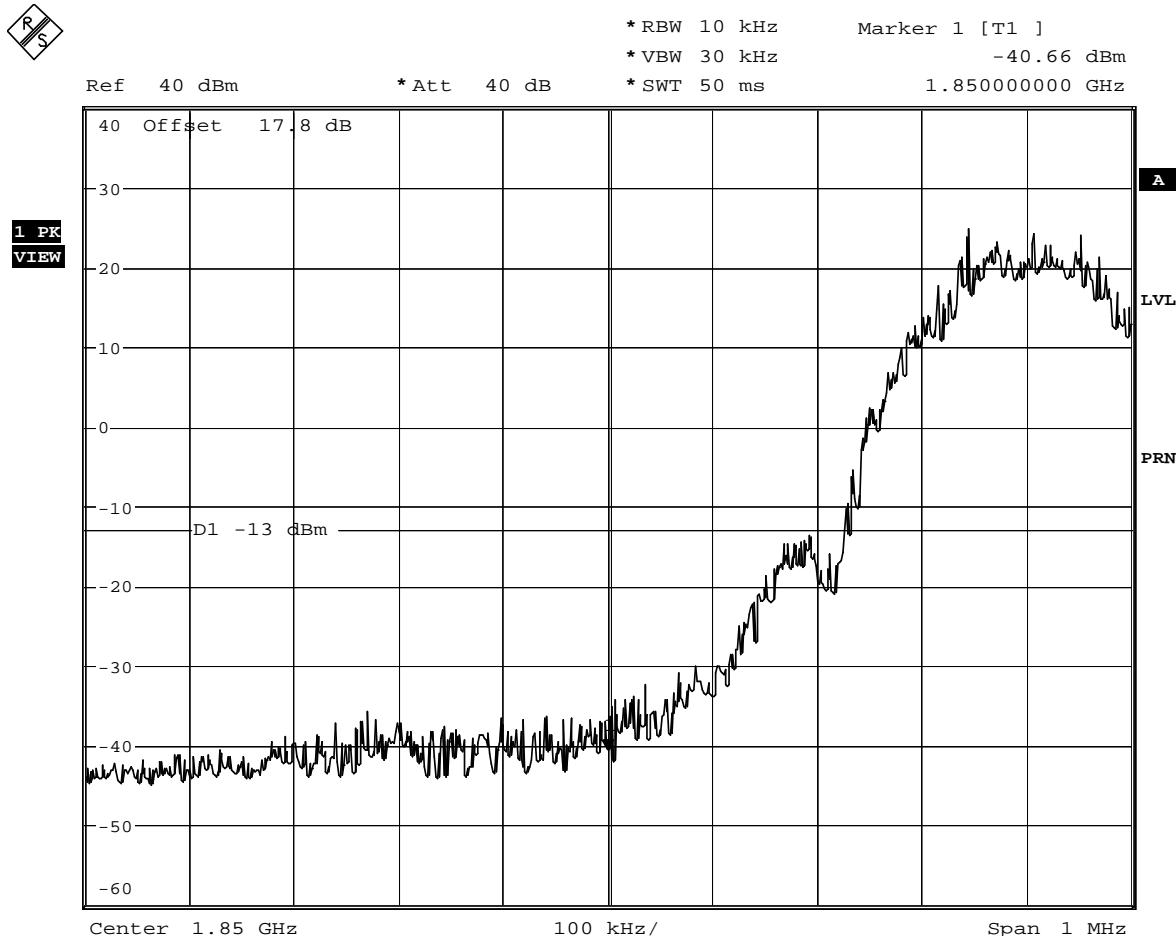
Date: 14.OCT.2005 13:02:52

Serial Number: 00108-00-006341-3
GPRS - Block Edge Measurement with EUT Transmitting on full power on
Channel 513, (1850.4MHz)

Block A

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

2.15.6 Test Results - continued



Date: 17.OCT.2005 17:05:13

Serial Number: 00108-00-006341-3

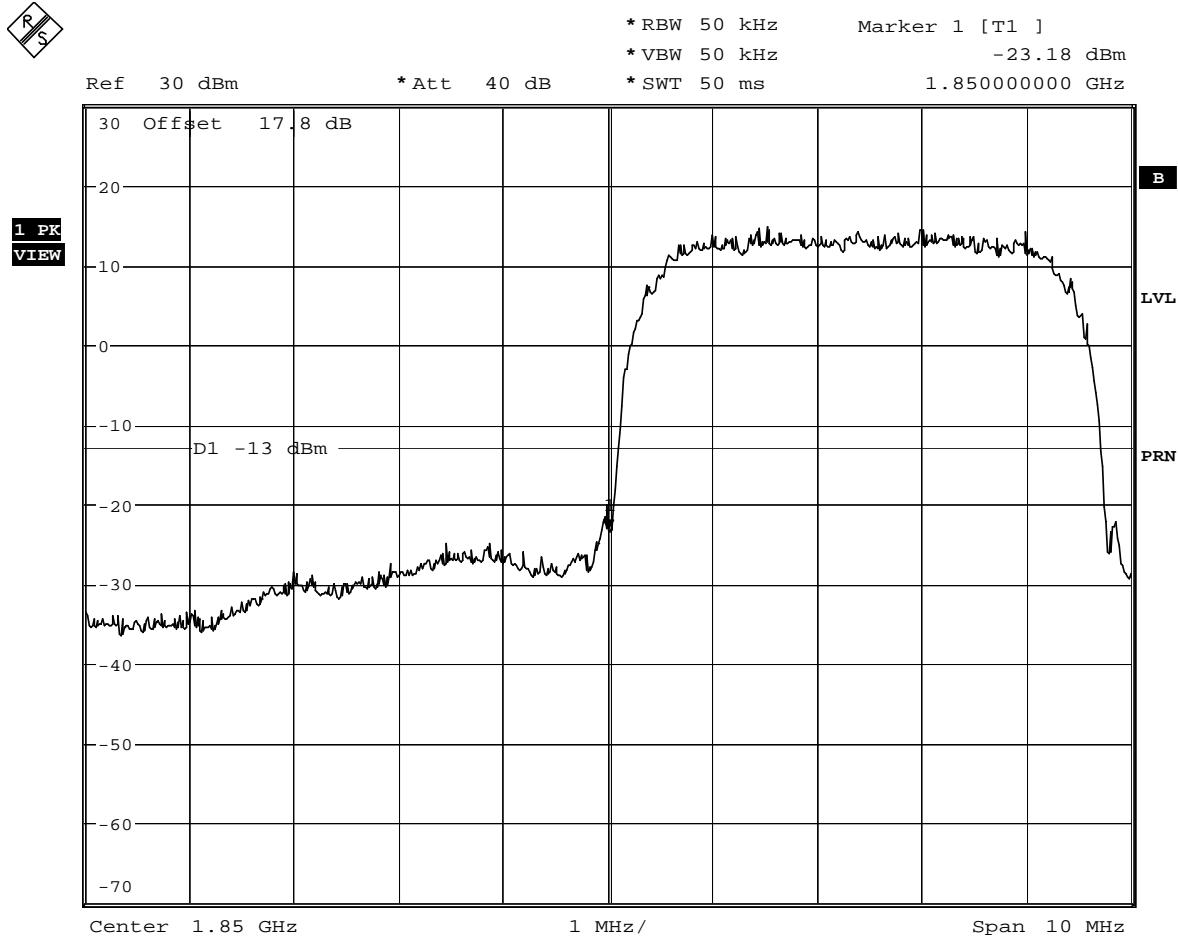
EDGE - Block Edge Measurement with EUT Transmitting on full power on

Channel 512 (1850.2MHz)

Block A

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

2.15.6 Test Results - continued

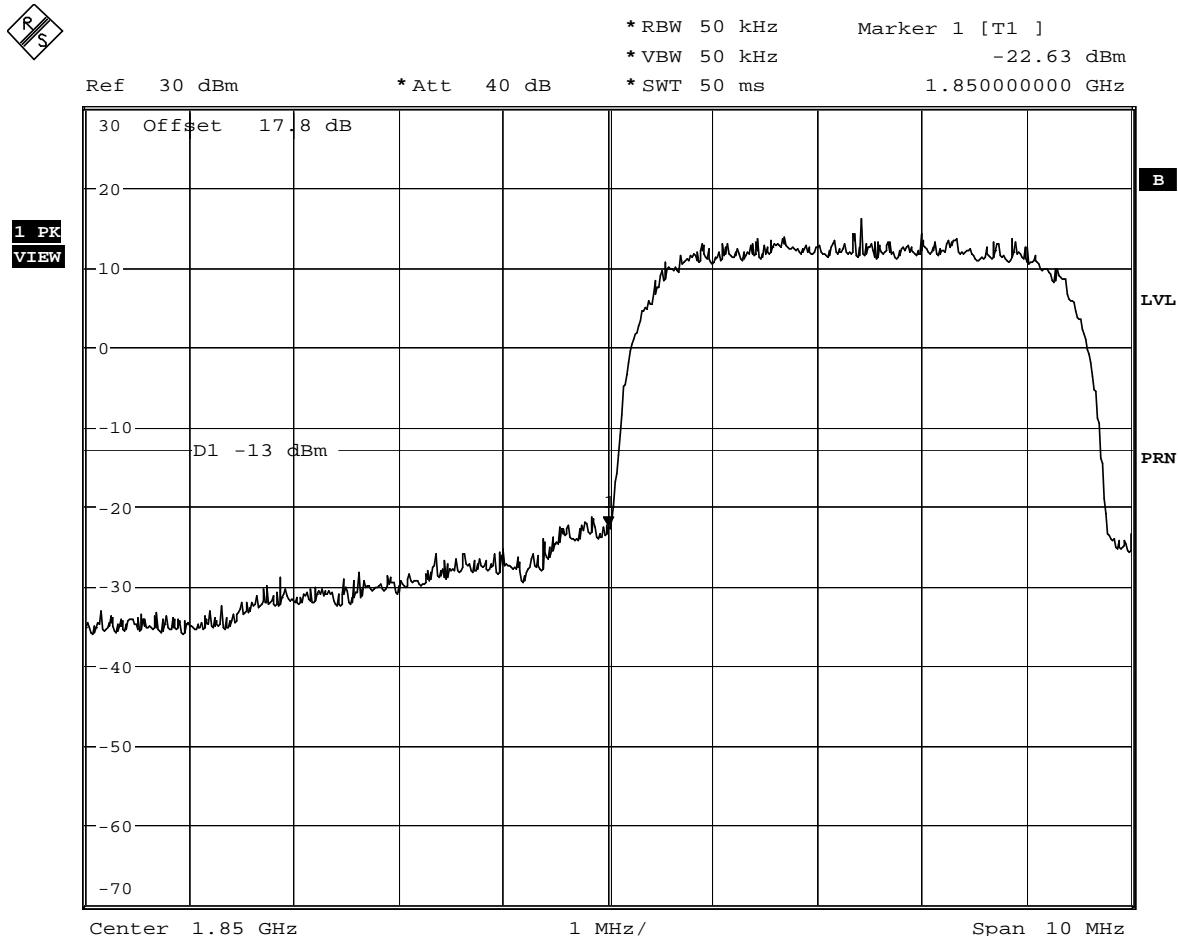


Date: 13.OCT.2005 10:55:28
 Serial Number: 00108-00-006341-3
UMTS - Block Edge Measurement with EUT Transmitting on full power on
Channel 9262, (1852.4MHz)

Block A

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

2.15.6 Test Results - continued

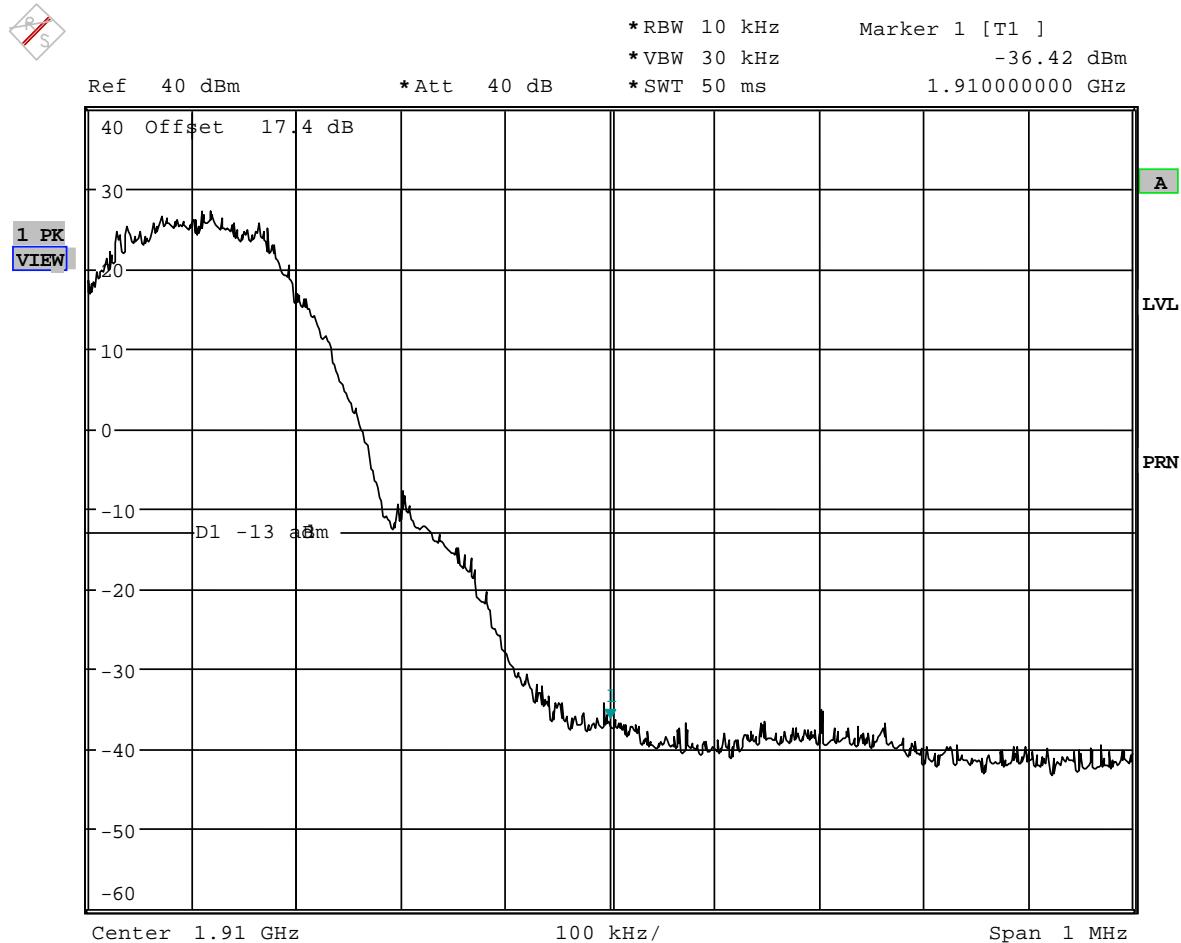


Date: 11.OCT.2005 14:29:21
 Serial Number: 00108-00-006341-3
HSDPA - Block Edge Measurement with EUT Transmitting on full power on
Channel 9262, (1852.4MHz)

Block A

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

2.15.6 Test Results - continued



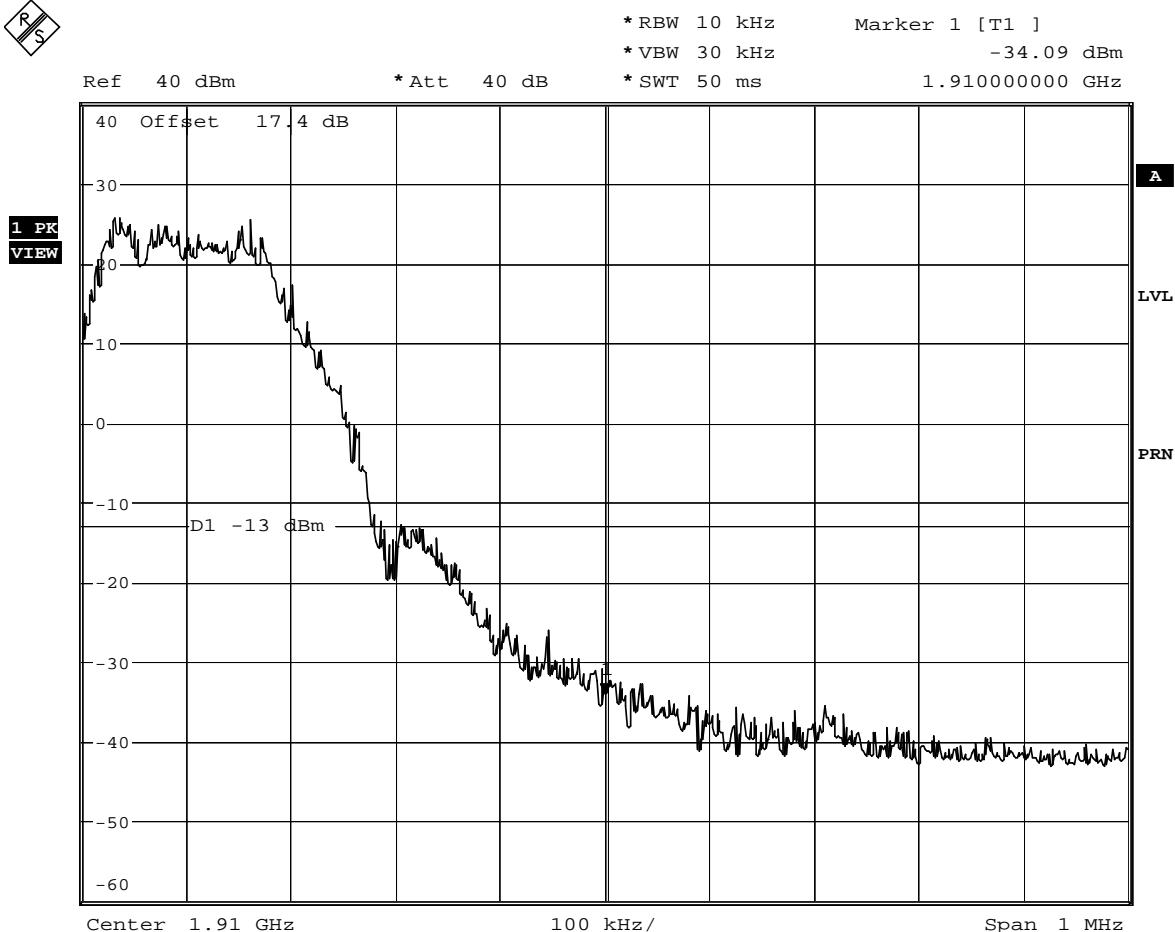
Date: 14.OCT.2005 13:05:16

Serial Number: 00108-00-006341-3
GPRS - Block Edge Measurement with EUT Transmitting on full power on
Channel 809, (1909.6MHz)

Block C

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

2.15.6 Test Results - continued



Date: 17.OCT.2005 17:10:15

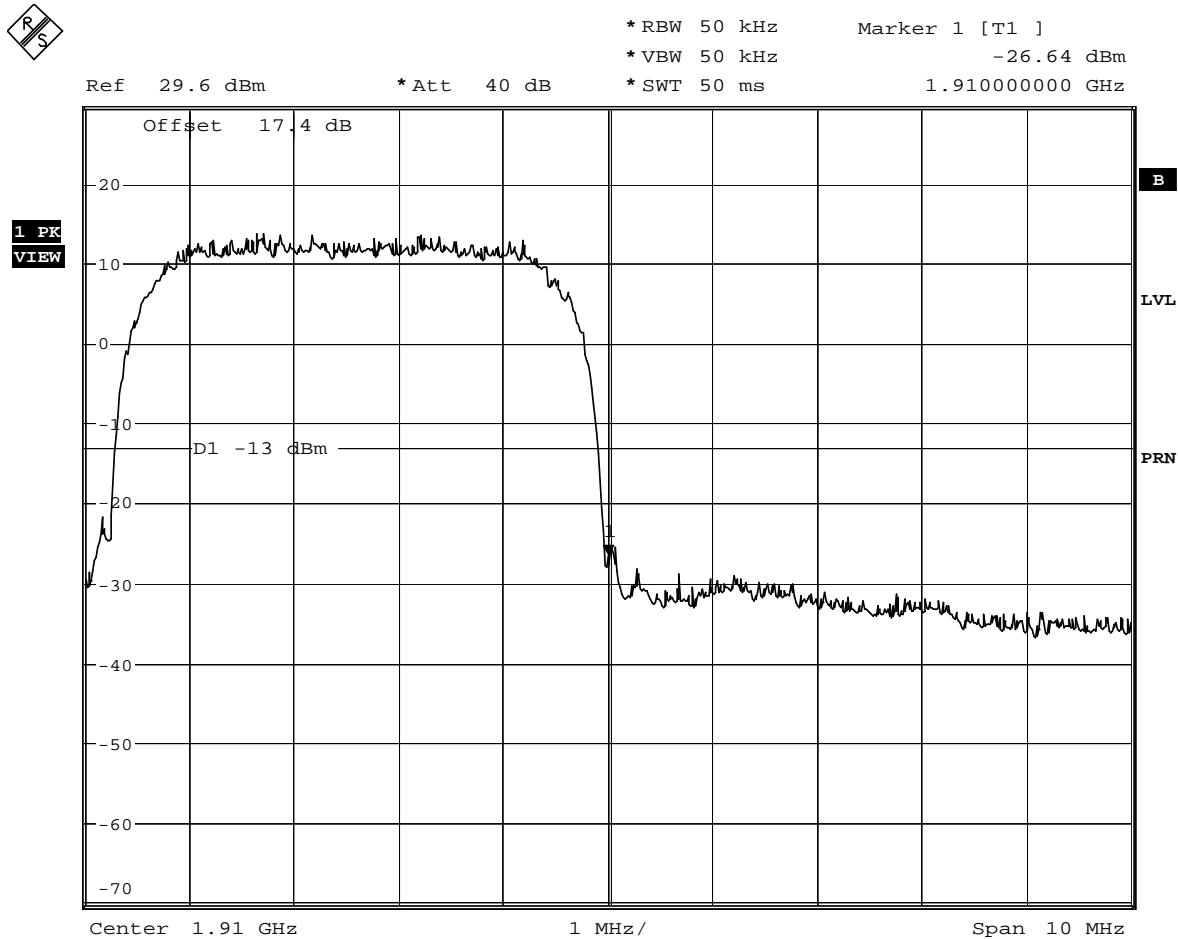
Serial Number: 00108-00-006341-3

EDGE - Block Edge Measurement with EUT Transmitting on full power on
Channel 809, (1909.6MHz)

Block C

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

2.15.6 Test Results - continued



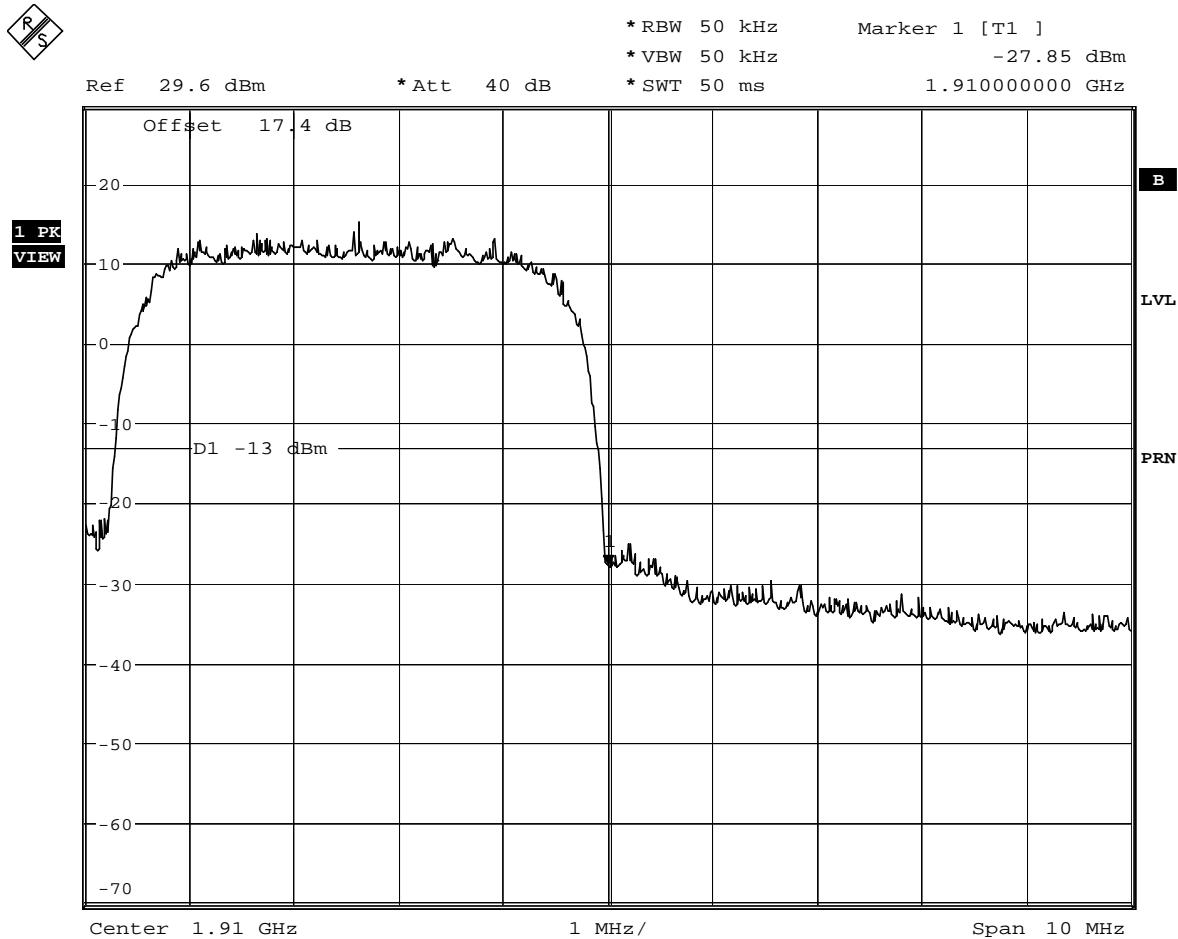
Date: 13.OCT.2005 10:59:27

Serial Number: 00108-00-006341-3
UMTS - Block Edge Measurement with EUT Transmitting on full power on
Channel 9538, (1907.6MHz)

Block C

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

2.15.6 Test Results - continued



Date: 11.OCT.2005 14:31:32

Serial Number: 00108-00-006341-3
HSDPA - Block Edge Measurement with EUT Transmitting on full power on
Channel 9538, (1907.6MHz)

Block CB

2.16 RADIATED EMISSIONS

2.16.1 Specification Reference

FCC CFR 47: Part 24 Subpart E, Section 24.238 and Industry Canada RSS-133, 6.3

2.16.2 Equipment Under Test

U730

2.16.3 Date of Test

9th October 2005 (HSDPA)
12th October 2005 (GPRS)
10th October 2005 (EDGE)
11th and 12th October 2005 (UMTS)

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

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 – 9GHz were then formally measured using a Peak Detector.

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

The test limit is derived from the carrier power in accordance with the specification. (The power of any emission outside of the authorised operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10\log(P)$ dB).

2.16 RADIATED EMISSIONS**2.16.6 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, 6.3 for Radiated Emissions (30MHz – 1GHz).

Measurements were made with the EUT in GPRS 1900 Mode.

Serial Number: 00108-00-0006156-5

EUT Transmitting on Bottom Channel (824.13MHz)

| Frequency | Antenna Polarisation | Height | Azimuth | Peak Result | Peak Limit |
|-----------|----------------------|--------|---------|--------------|--------------|
| MHz | | cm | degree | dB μ V/m | dB μ V/m |
| 181.57 | Horizontal | 100 | 087 | 46.0 | 83.3 |
| 238.87 | Horizontal | 100 | 090 | 52.0 | 83.3 |

EUT Transmitting on Middle Channel (836.44MHz)

| Frequency | Antenna Polarisation | Height | Azimuth | Peak Result | Peak Limit |
|-----------|----------------------|--------|---------|--------------|--------------|
| MHz | | cm | degree | dB μ V/m | dB μ V/m |
| 181.76 | Horizontal | 100 | 090 | 45.9 | 83.1 |
| 232.52 | Horizontal | 100 | 090 | 51.3 | 83.1 |

EUT Transmitting on Top Channel (848.88MHz)

| Frequency | Antenna Polarisation | Height | Azimuth | Peak Result | Peak Limit |
|-----------|----------------------|--------|---------|--------------|--------------|
| MHz | | cm | degree | dB μ V/m | dB μ V/m |
| 180.60 | Horizontal | 100 | 090 | 45.5 | 82.4 |
| 239.44 | Horizontal | 100 | 090 | 51.8 | 82.4 |

2.16 RADIATED EMISSIONS**2.16.6 Test Results - continued**

Measurements were made with the EUT in EDGE 1900 Mode
Serial Number: 00108-00-0006156-5

EUT Transmitting on Bottom Channel (824.245MHz)

| Frequency | Antenna Polarisation | Height | Azimuth | Peak Result | Peak Limit |
|-----------|----------------------|--------|---------|--------------|--------------|
| MHz | | cm | degree | dB μ V/m | dB μ V/m |
| 187.67 | Vertical | 100 | 270 | 47.0 | 83.3 |
| 232.67 | Vertical | 160 | 000 | 49.6 | 83.3 |

EUT Transmitting on Middle Channel (836.295MHz)

| Frequency | Antenna Polarisation | Height | Azimuth | Peak Result | Peak Limit |
|-----------|----------------------|--------|---------|--------------|--------------|
| MHz | | cm | degree | dB μ V/m | dB μ V/m |
| 187.67 | Vertical | 100 | 270 | 46.5 | 83.3 |
| 240.30 | Vertical | 200 | 035 | 48.6 | 83.3 |

EUT Transmitting on Top Channel (848.867MHz)

| Frequency | Antenna Polarisation | Height | Azimuth | Peak Result | Peak Limit |
|-----------|----------------------|--------|---------|--------------|--------------|
| MHz | | cm | degree | dB μ V/m | dB μ V/m |
| 173.68 | Vertical | 100 | 273 | 47.1 | 82.4 |
| 240.30 | Vertical | 164 | 030 | 48.3 | 82.4 |



2.16 RADIATED EMISSIONS

2.16.6 Test Results - continued

Measurements were made with the EUT in UMTS 1900 Mode
Serial Number: 00108-00-006156-05

EUT Transmitting on Bottom Channel (1852.4)

No emissions were detected within 35dB of the limit. Therefore, no formal measurements were made.

EUT Transmitting on Middle Channel (1880.0MHz)

No emissions were detected within 35dB of the limit. Therefore, no formal measurements were made.

EUT Transmitting on Top Channel (1907.6)

No emissions were detected within 35dB of the limit. Therefore, no formal measurements were made.

2.16 RADIATED EMISSIONS

2.16.6 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, 6.3 for Radiated Emissions (30MHz – 1GHz).

Measurements were made with the EUT in HSDPA 1900 Mode
Serial Number: 00108-00-006341-3

EUT Transmitting on Bottom Channel (1852.5MHz)

No emissions emanating from the EUT were observed. Therefore, no table of results is presented.

EUT Transmitting on Middle Channel (1880.0MHz)

No emissions emanating from the EUT were observed. Therefore, no table of results is presented.

EUT Transmitting on Top Channel (1907.6MHz)

No emissions emanating from the EUT were observed. Therefore, no table of results is presented.

2.16 RADIATED EMISSIONS

2.16.6 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, 6.3 for Radiated Emissions (1GHz - 20GHz).

Measurements were made with the EUT in GPRS 1900 Mode
Serial Number: 00108-00-0006156-5

EUT Transmitting on Bottom Channel (1850.2MHz)

No emissions emanating from the EUT were observed. Therefore, no table of results is presented.

EUT Transmitting on Middle Channel (1880.0MHz)

No emissions emanating from the EUT were observed. Therefore, no table of results is presented.

EUT Transmitting on Top Channel (1909.8MHz)

No emissions emanating from the EUT were observed. Therefore, no table of results is presented.

2.16 RADIATED EMISSIONS

2.16.6 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, 6.3 for Radiated Emissions (1GHz - 20GHz).

Measurements were made with the EUT in EDGE 1900 Mode
Serial Number: 00108-00-0006156-5

EUT Transmitting on Bottom Channel (1850.2MHz)

No emissions emanating from the EUT were observed. Therefore, no table of results is presented.

EUT Transmitting on Middle Channel (1880.0MHz)

No emissions emanating from the EUT were observed. Therefore, no table of results is presented.

EUT Transmitting on Top Channel (1909.7MHz)

No emissions emanating from the EUT were observed. Therefore, no table of results is presented.

2.16 RADIATED EMISSIONS

2.16.6 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, 6.3 for Radiated Emissions (1GHz - 20GHz).

Measurements were made with the EUT in UMTS 1900 Mode
Serial Number: 00108-00-006341-3

EUT Transmitting on Bottom Channel (1852.0MHz)

No emissions emanating from the EUT were observed. Therefore, no table of results is presented.

EUT Transmitting on Middle Channel (1880.0MHz)

No emissions emanating from the EUT were observed. Therefore, no table of results is presented.

EUT Transmitting on Top Channel (1907.0MHz)

No emissions emanating from the EUT were observed. Therefore, no table of results is presented.

2.16 RADIATED EMISSIONS

2.16.6 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, 6.3 for Radiated Emissions (1GHz - 20GHz).

Measurements were made with the EUT in HSDPA 1900 Mode
Serial Number: 00108-00-006341-3

EUT Transmitting on Bottom Channel (1852.0MHz)

No emissions emanating from the EUT were observed. Therefore, no table of results is presented.

EUT Transmitting on Middle Channel (1880.0MHz)

No emissions emanating from the EUT were observed. Therefore, no table of results is presented.

EUT Transmitting on Top Channel (1907.6MHz)

No emissions emanating from the EUT were observed. Therefore, no table of results is presented.

2.17 CONDUCTED SPURIOUS EMISSIONS

2.17.1 Specification Reference

FCC CFR 47: Part 24 Subpart E, Section 24.238(a), 2.1051

2.17.2 Equipment Under Test

U730

2.17.3 Date of Test

11th October 2005 (HSDPA)
13th October 2005 (UMTS)
17th October 2005 (GPRS)
18th October 2005 (EDGE)

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

In accordance with Part 2.1051, 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 full power with timeslots 2 and 3 active in GPRS and EDGE modes. The EUT was transmitting on full power for UMTS and HSDPA Modes. 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 peak and the trace 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 high pass filter were used.

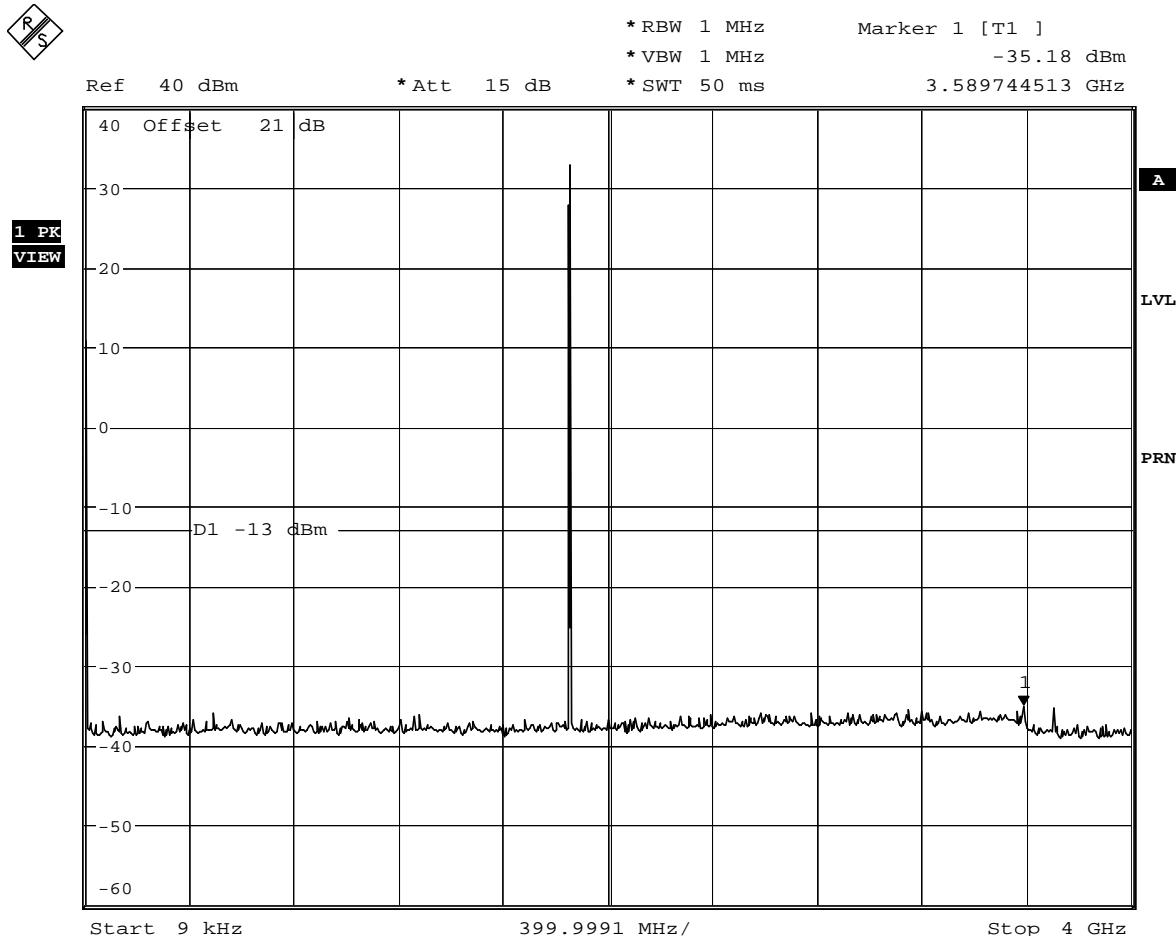
The maximum path loss across the measurement band was used as the reference level offset to ensure worst case

2.17.6 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.

2.17 CONDUCTED SPURIOUS EMISSIONS

2.17.6 Test Results - continued

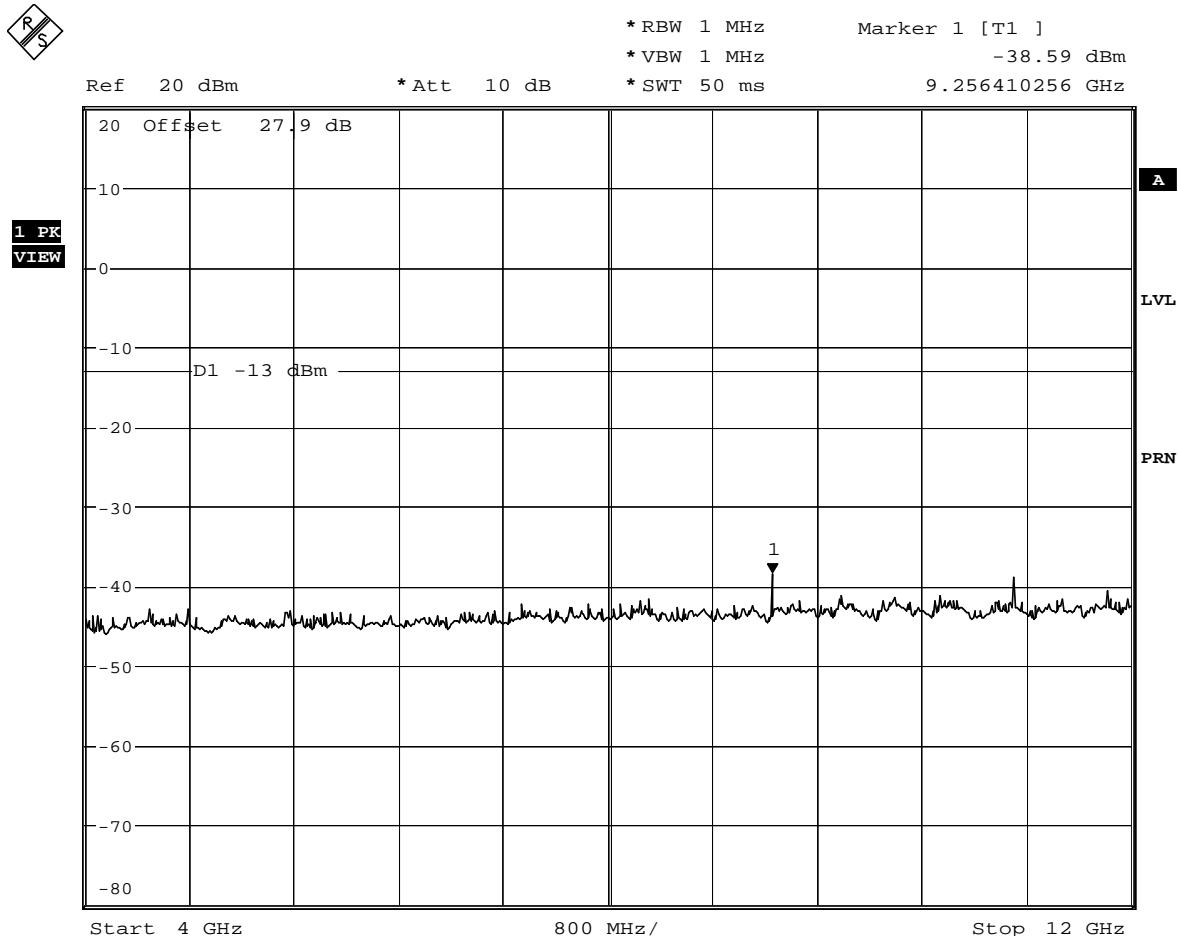


Date: 17.OCT.2005 11:10:23

Serial Number: 00108-00-006341-3
GPRS - Spurious Emissions (9kHz – 4GHz)
Channel 512 (1850.2MHz) - Maximum Power

2.17 CONDUCTED SPURIOUS EMISSIONS

2.17.6 Test Results - continued



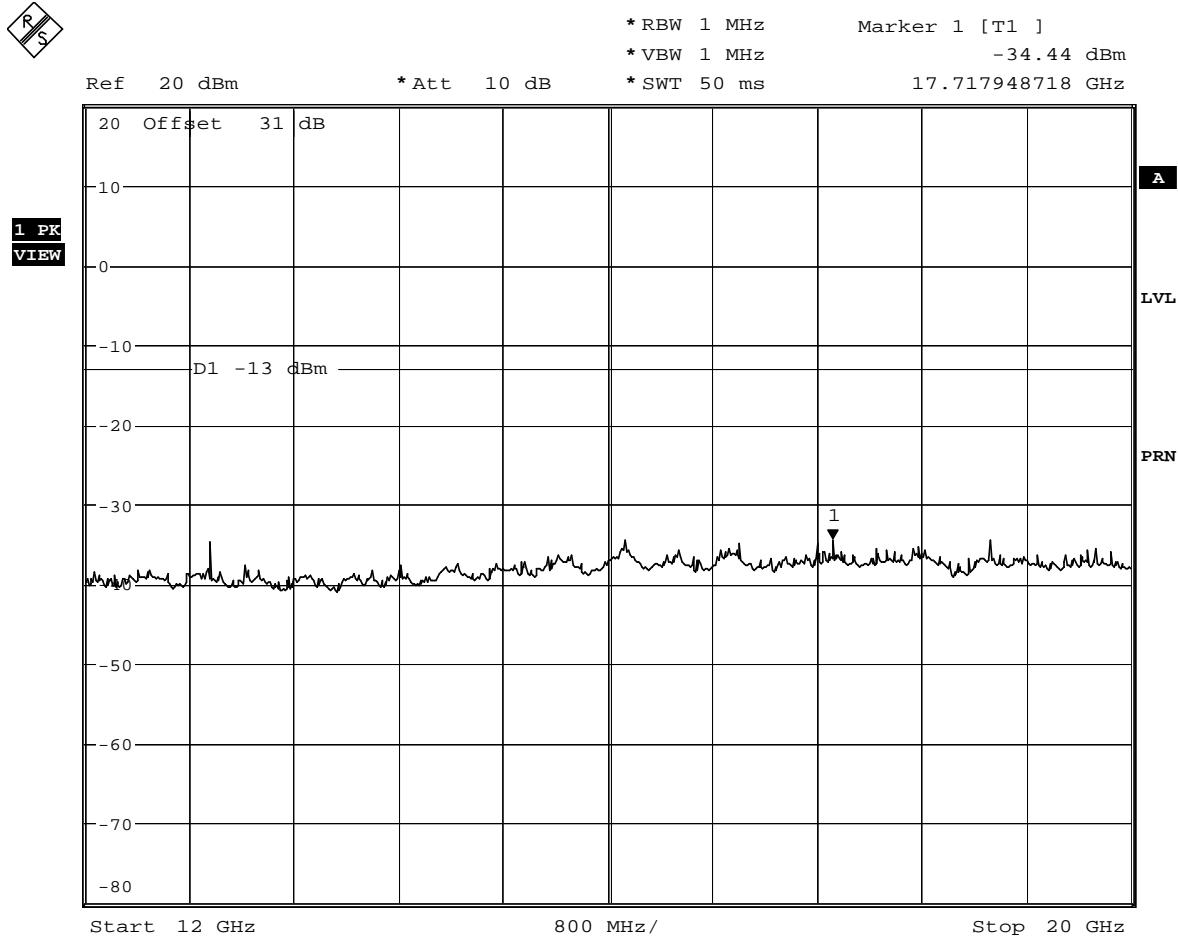
Date: 17.OCT.2005 11:22:55
 Serial Number: 00108-00-006341-3
GPRS - Spurious Emissions (4GHz – 12GHz)
Channel 512 (1850.2MHz) - Maximum Power



Product Service

2.17 CONDUCTED SPURIOUS EMISSIONS

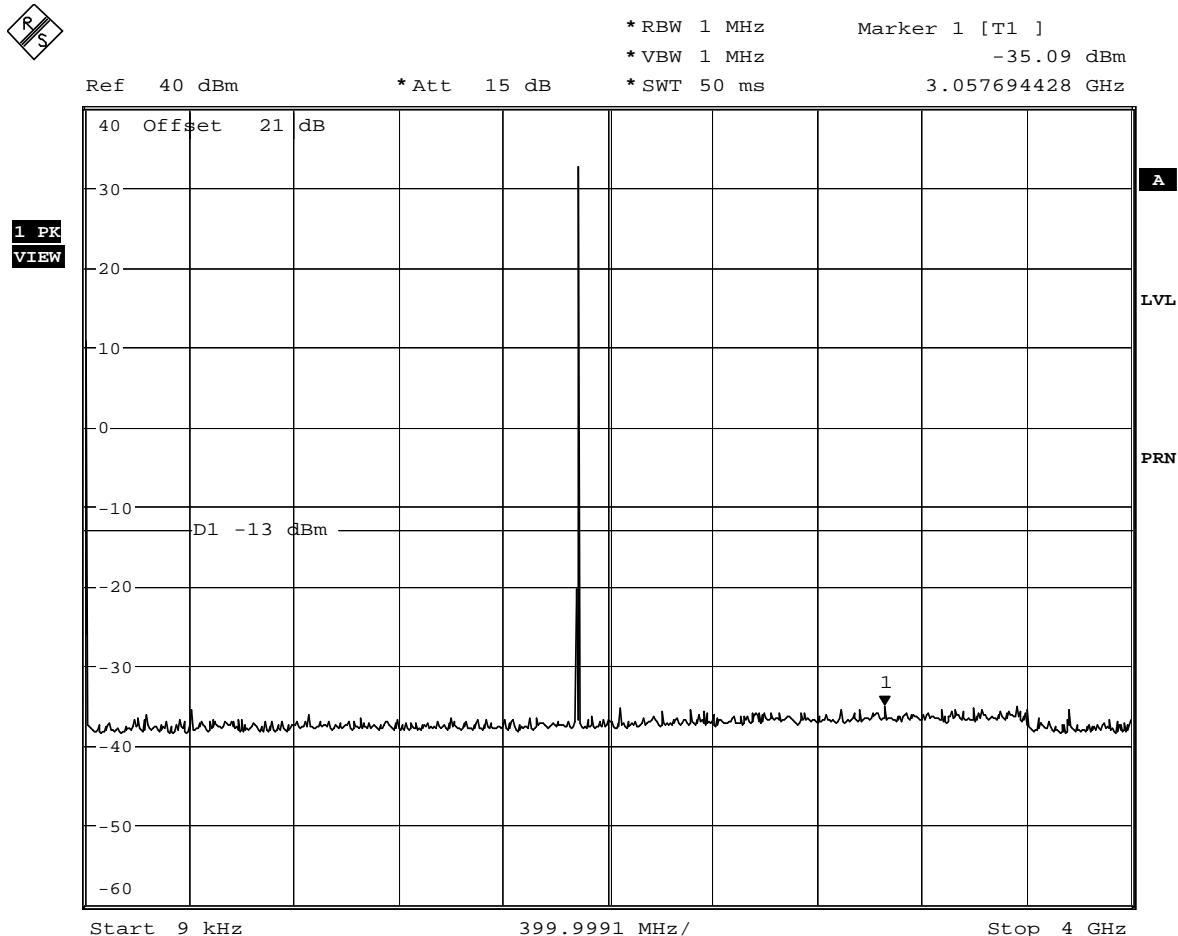
2.17.6 Test Results - continued



Date: 17.OCT.2005 11:25:35
 Serial Number: 00108-00-006341-3
GPRS - Spurious Emissions (12GHz – 20GHz)
Channel 512 (1850.2MHz) - Maximum Power

2.17 CONDUCTED SPURIOUS EMISSIONS

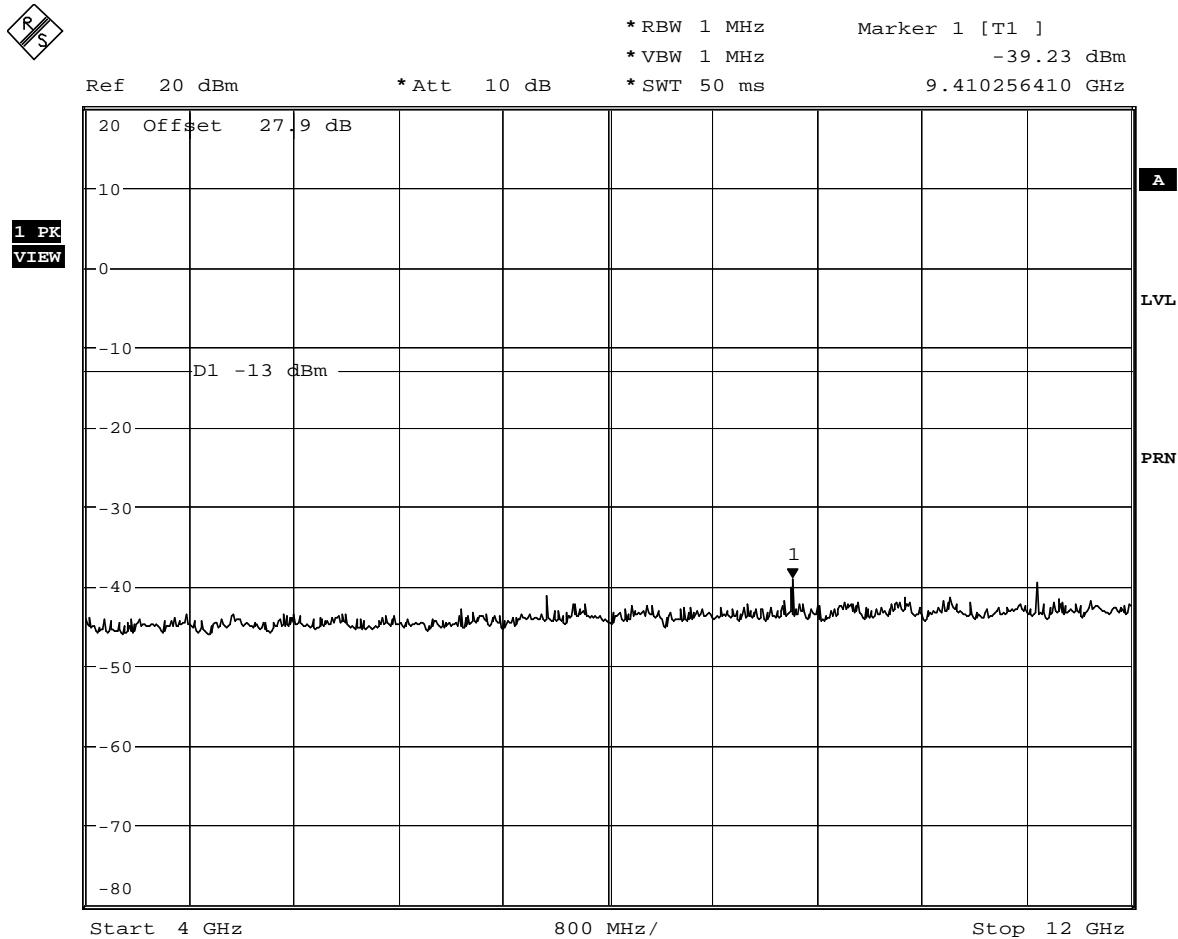
2.17.6 Test Results - continued



Date: 17.OCT.2005 11:08:14
 Serial Number: 00108-00-006341-3
GPRS - Spurious Emissions (9kHz – 4GHz)
Channel 661 (1880.0MHz) - Maximum Power

2.17 CONDUCTED SPURIOUS EMISSIONS

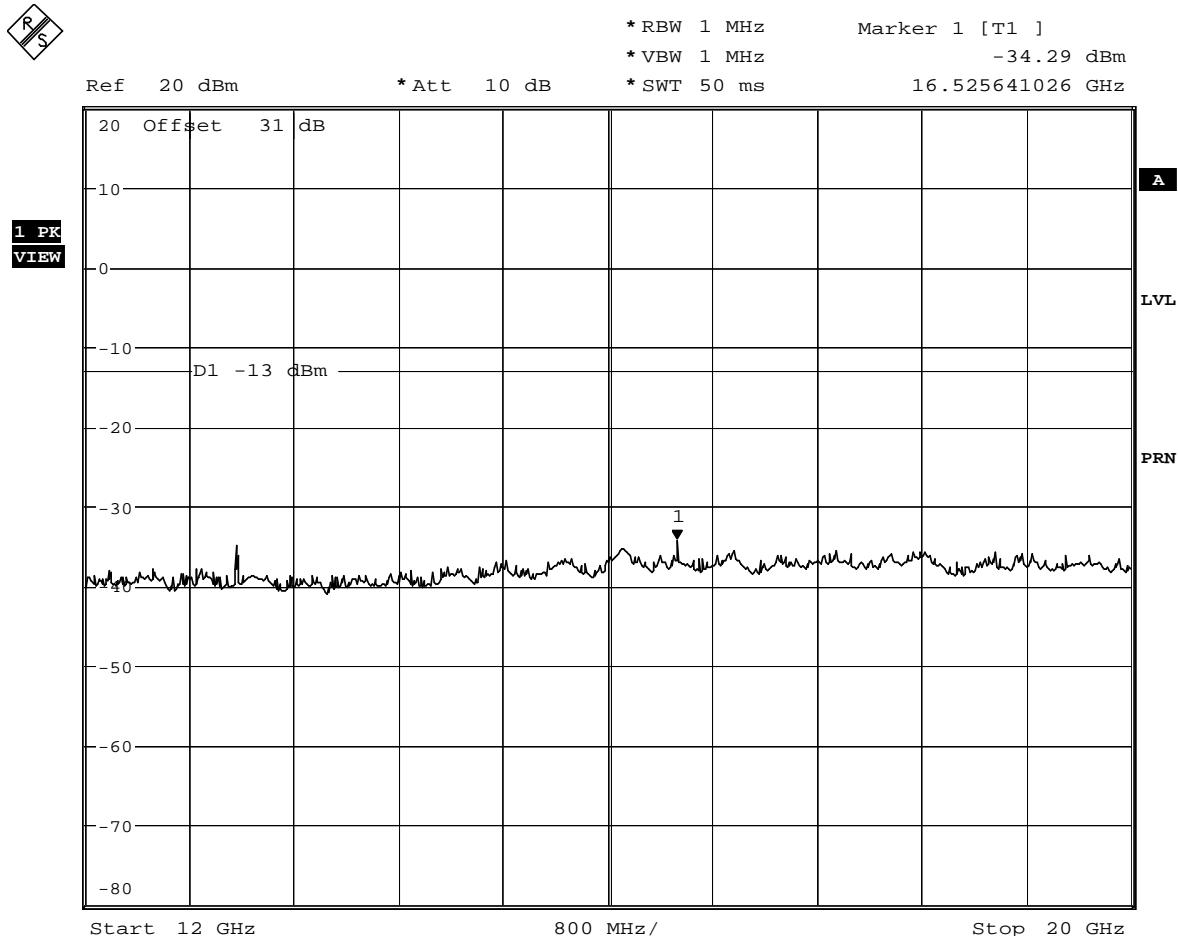
2.17.6 Test Results - continued



Date: 17.OCT.2005 11:21:30
 Serial Number: 00108-00-006341-3
GPRS - Spurious Emissions (4GHz – 12GHz)
Channel 661 (1880.0MHz) - Maximum Power

2.17 CONDUCTED SPURIOUS EMISSIONS

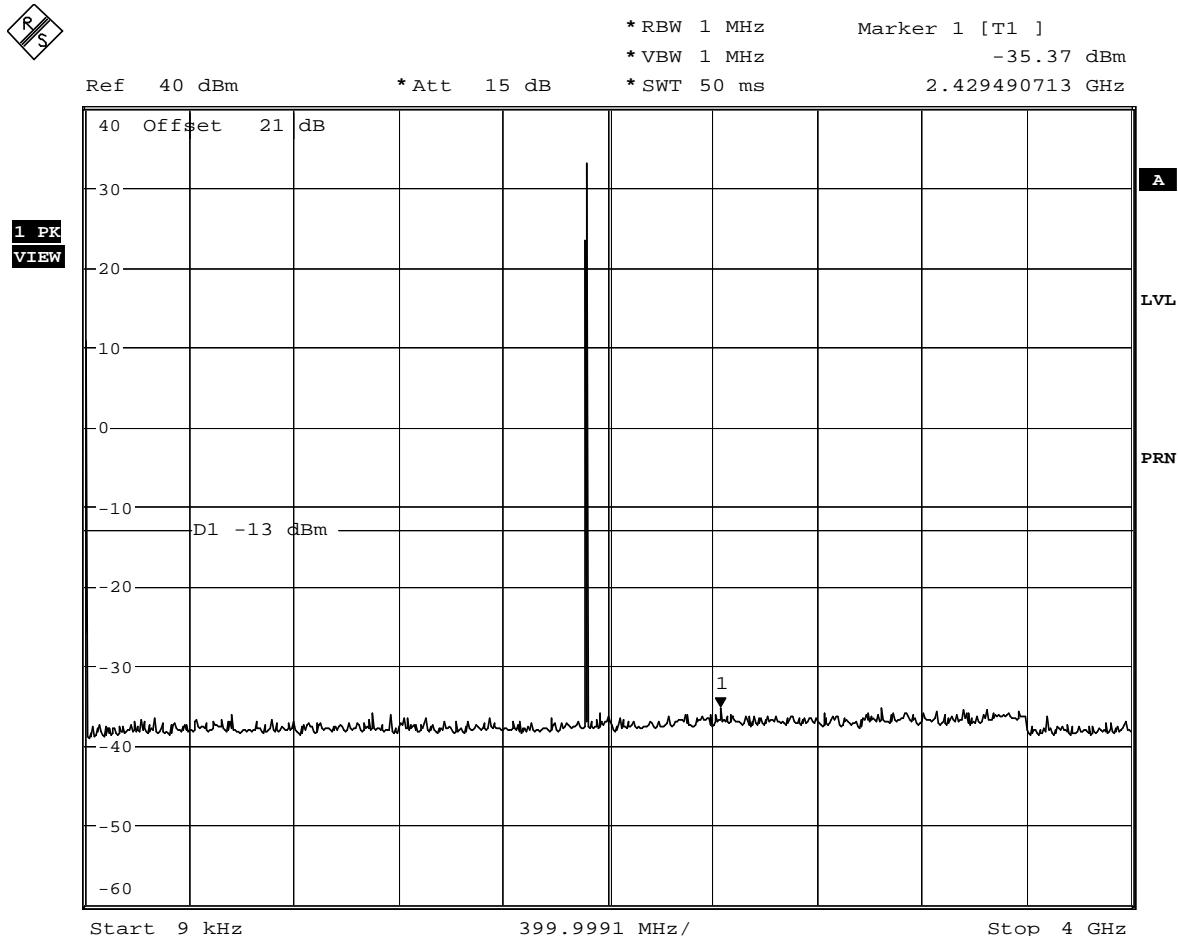
2.17.6 Test Results - continued



Date: 17.OCT.2005 11:33:16
 Serial Number: 00108-00-006341-3
GPRS - Spurious Emissions (12GHz – 20GHz)
Channel 661 (1880.0MHz) - Maximum Power

2.17 CONDUCTED SPURIOUS EMISSIONS

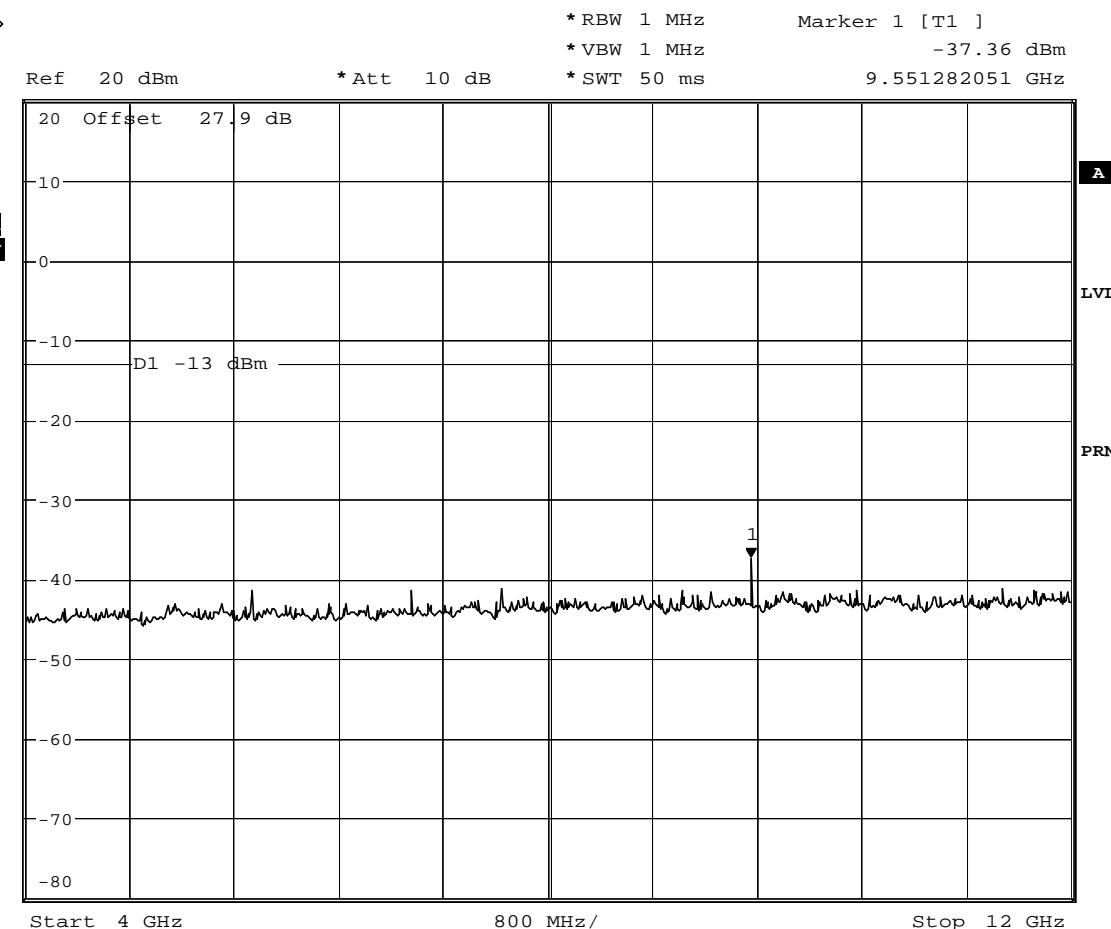
2.17.6 Test Results - continued



Date: 17.OCT.2005 11:12:24
 Serial Number: 00108-00-006341-3
GPRS - Spurious Emissions (9kHz – 4GHz)
Channel 810 (1909.8MHz) - Maximum Power

2.17 CONDUCTED SPURIOUS EMISSIONS

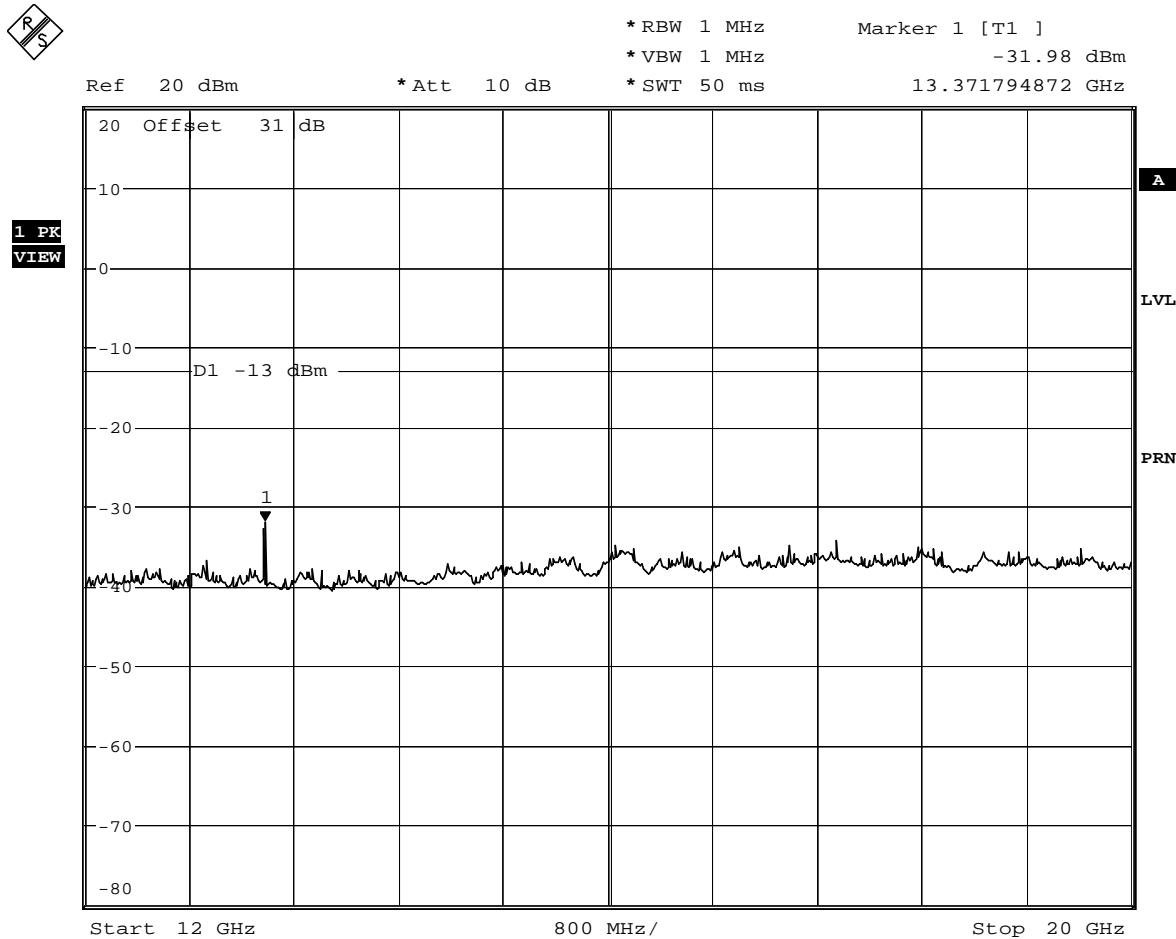
2.17.6 Test Results - continued



Date: 17.OCT.2005 11:20:39
 Serial Number: 00108-00-006341-3
GPRS - Spurious Emissions (4GHz – 12GHz)
Channel 810 (1909.8MHz) - Maximum Power

2.17 CONDUCTED SPURIOUS EMISSIONS

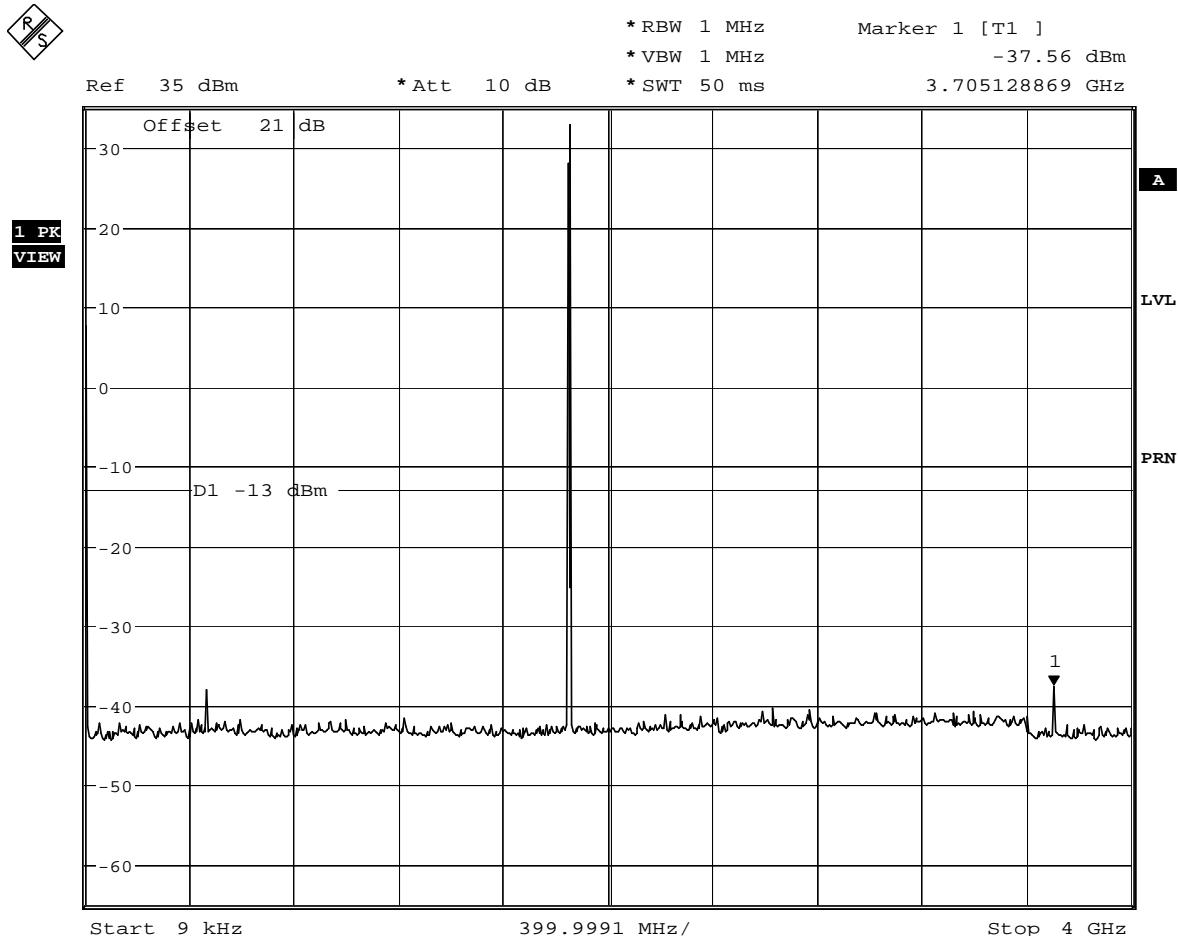
2.17.6 Test Results - continued



Date: 17.OCT.2005 11:34:19
 Serial Number: 00108-00-006341-3
GPRS - Spurious Emissions (12GHz – 20GHz)
Channel 810 (1909.8MHz) - Maximum Power

2.17 CONDUCTED SPURIOUS EMISSIONS

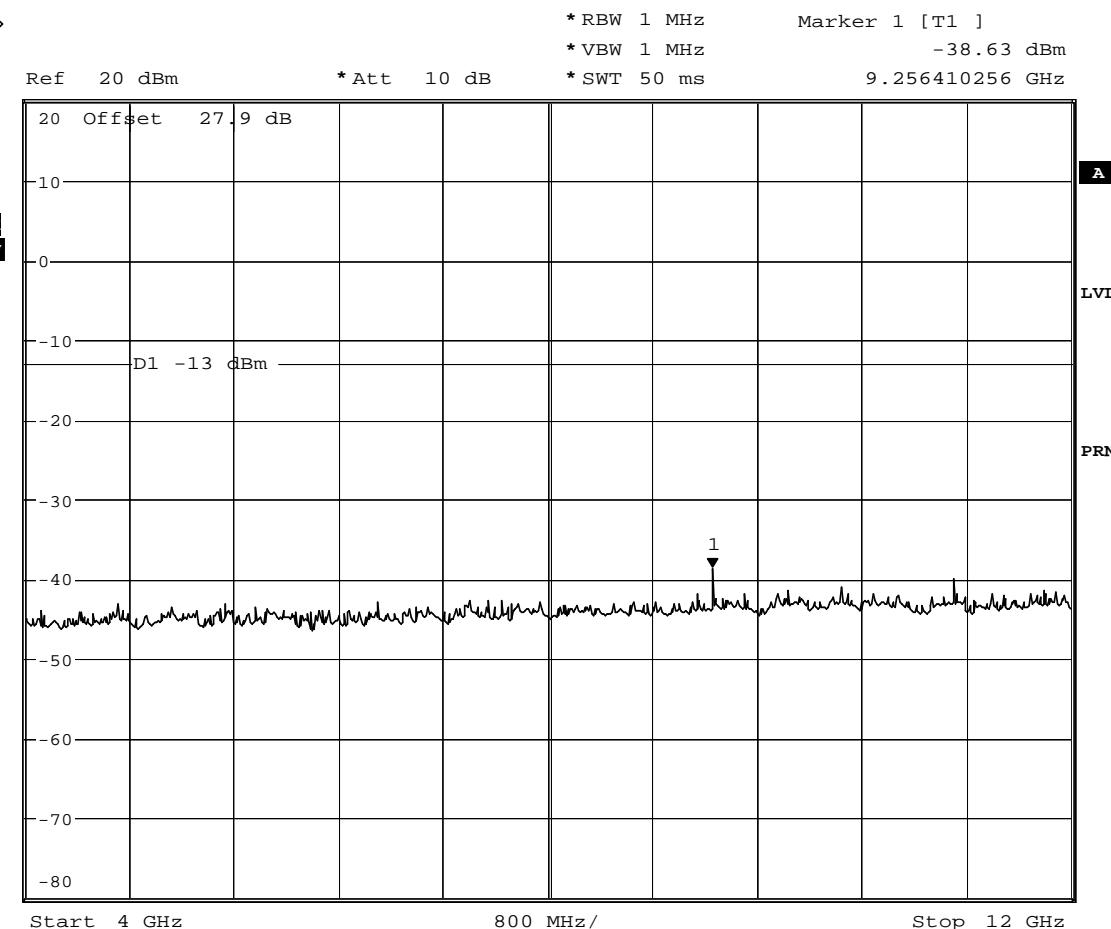
2.17.6 Test Results - continued



Date: 18.OCT.2005 11:52:08
Serial Number: 00108-00-006341-3
EDGE - Spurious Emissions (9kHz – 4GHz)
Channel 512 (1850.2MHz) - Maximum Power

2.17 CONDUCTED SPURIOUS EMISSIONS

2.17.6 Test Results - continued

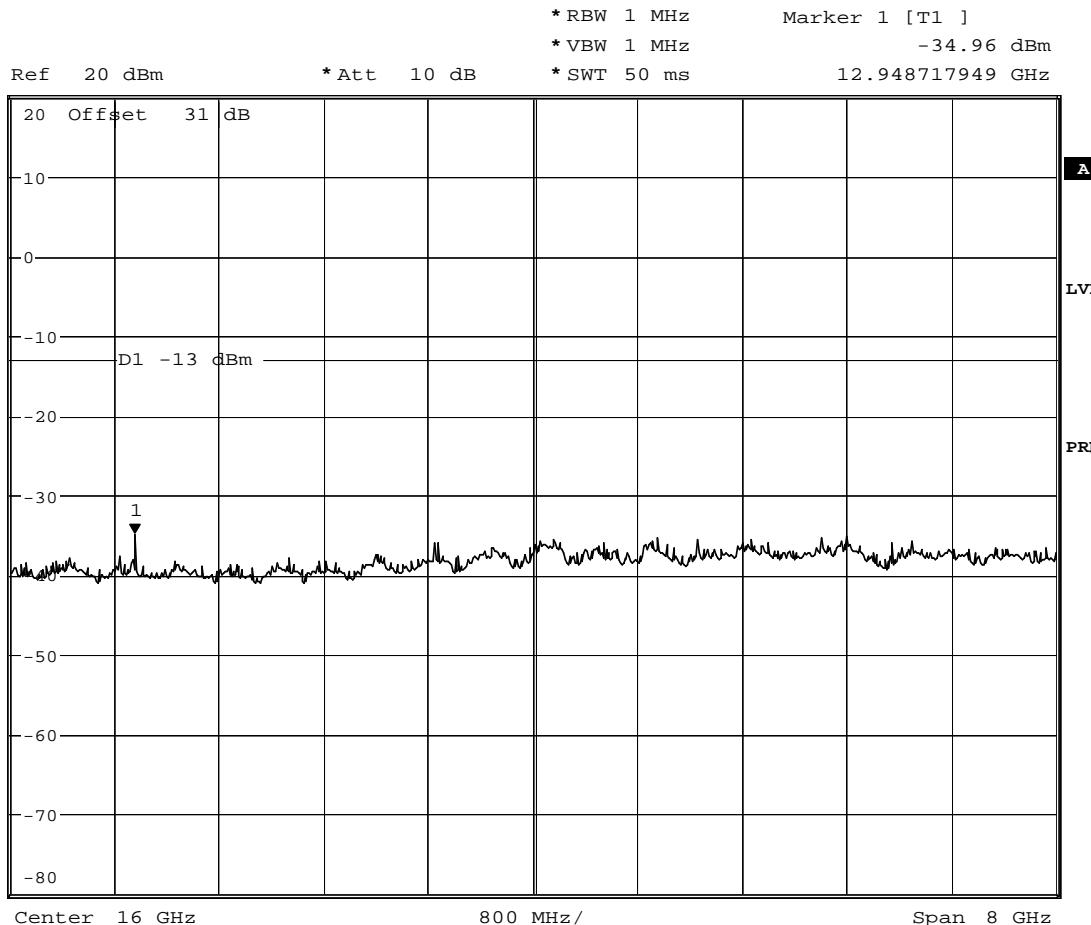


Date: 18.OCT.2005 12:07:05
 Serial Number: 00108-00-006341-3
EDGE - Spurious Emissions (4GHz – 12GHz)
Channel 512 (1850.2MHz) - Maximum Power



2.17 CONDUCTED SPURIOUS EMISSIONS

2.17.6 Test Results - continued



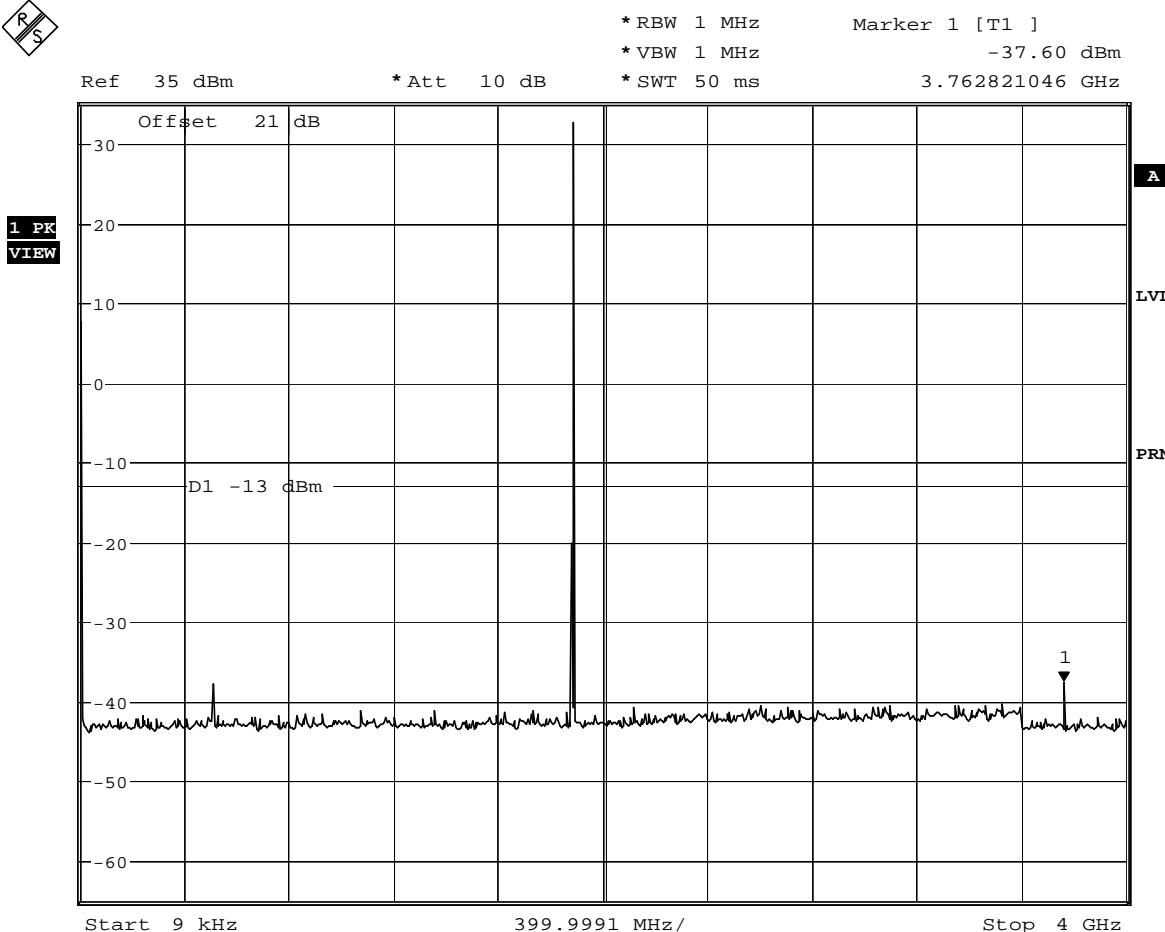
Date: 18.OCT.2005 12:10:16
 Serial Number: 00108-00-006341-3
EDGE - Spurious Emissions (12GHz – 20GHz)
Channel 512 (1850.2MHz) - Maximum Power



Product Service

2.17 CONDUCTED SPURIOUS EMISSIONS

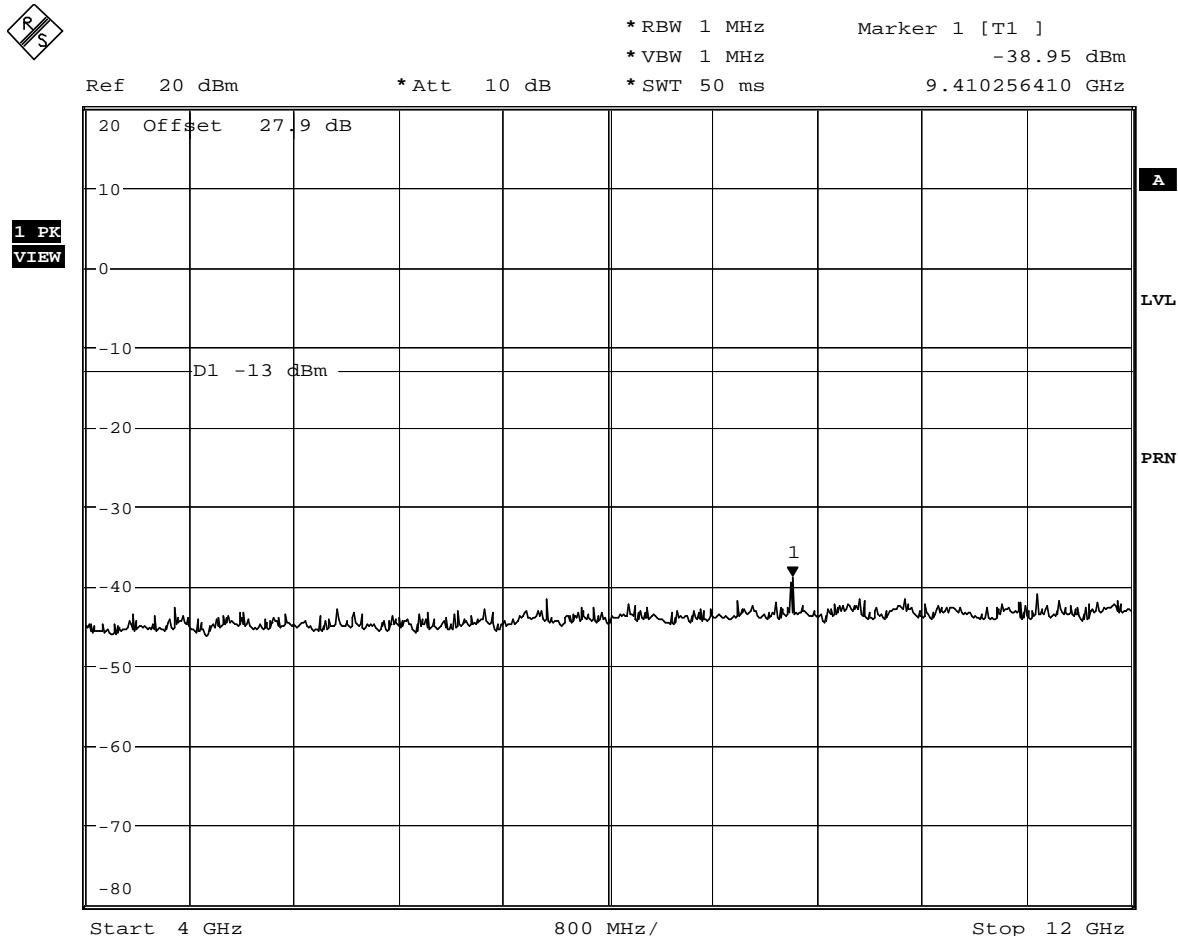
2.17.6 Test Results - continued



Date: 18.OCT.2005 11:53:34
 Serial Number: 00108-00-006341-3
EDGE - Spurious Emissions (9kHz - 4GHz)
Channel 661 (1880.0MHz) - Maximum Power

2.17 CONDUCTED SPURIOUS EMISSIONS

2.17.6 Test Results - continued



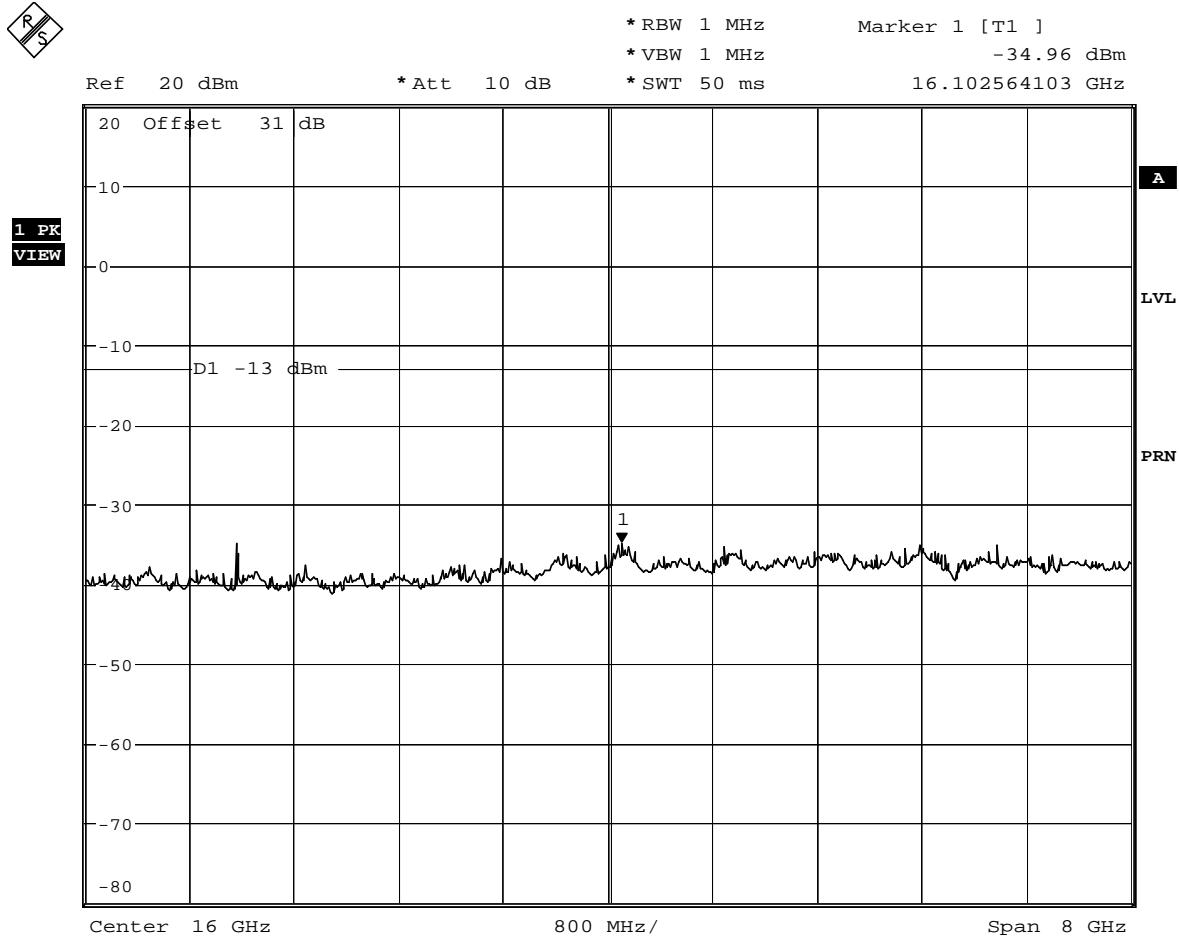
Date: 18.OCT.2005 12:06:12
 Serial Number: 00108-00-006341-3
EDGE - Spurious Emissions (4GHz – 12GHz)
Channel 661 (1880.0MHz) - Maximum Power



Product Service

2.17 CONDUCTED SPURIOUS EMISSIONS

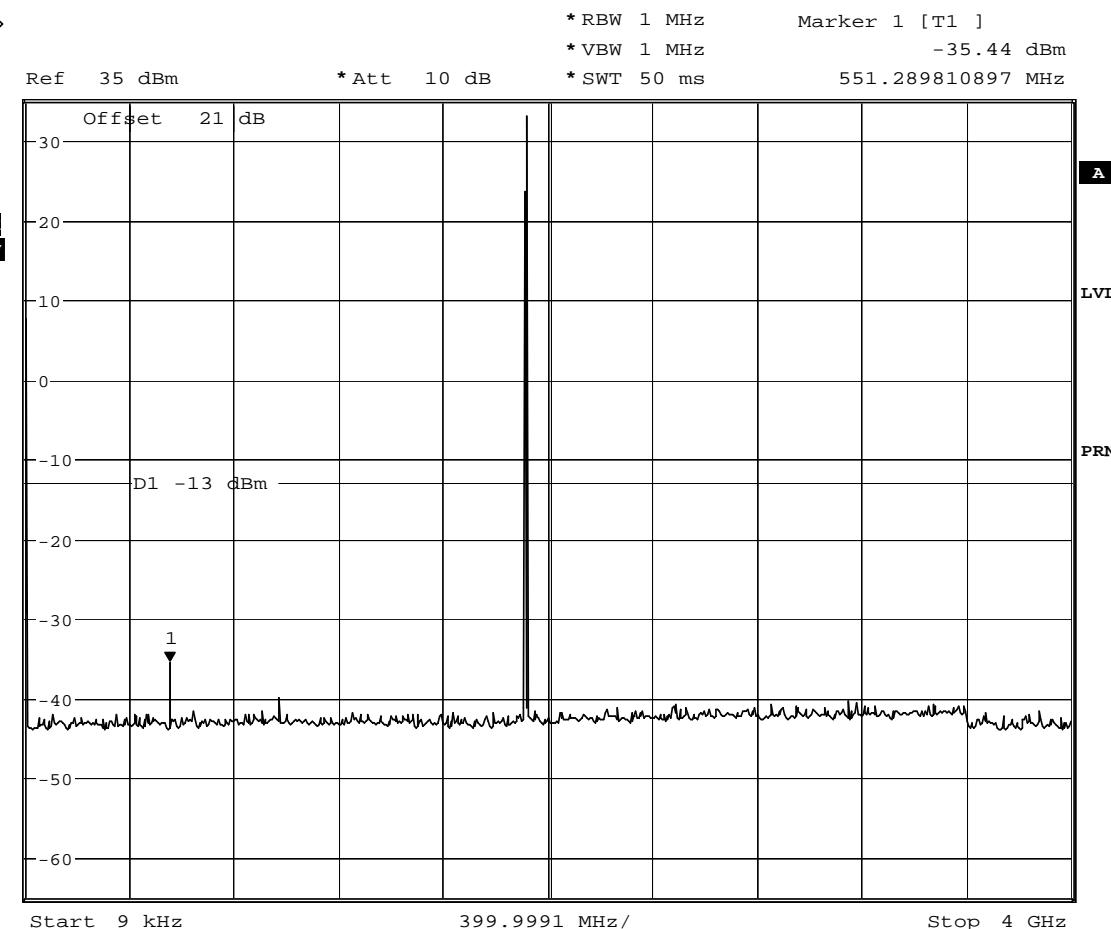
2.17.6 Test Results - continued



Date: 18.OCT.2005 12:11:01
 Serial Number: 00108-00-006341-3
EDGE - Spurious Emissions (12GHz – 20GHz)
Channel 661 (1880.0MHz) - Maximum Power

2.17 CONDUCTED SPURIOUS EMISSIONS

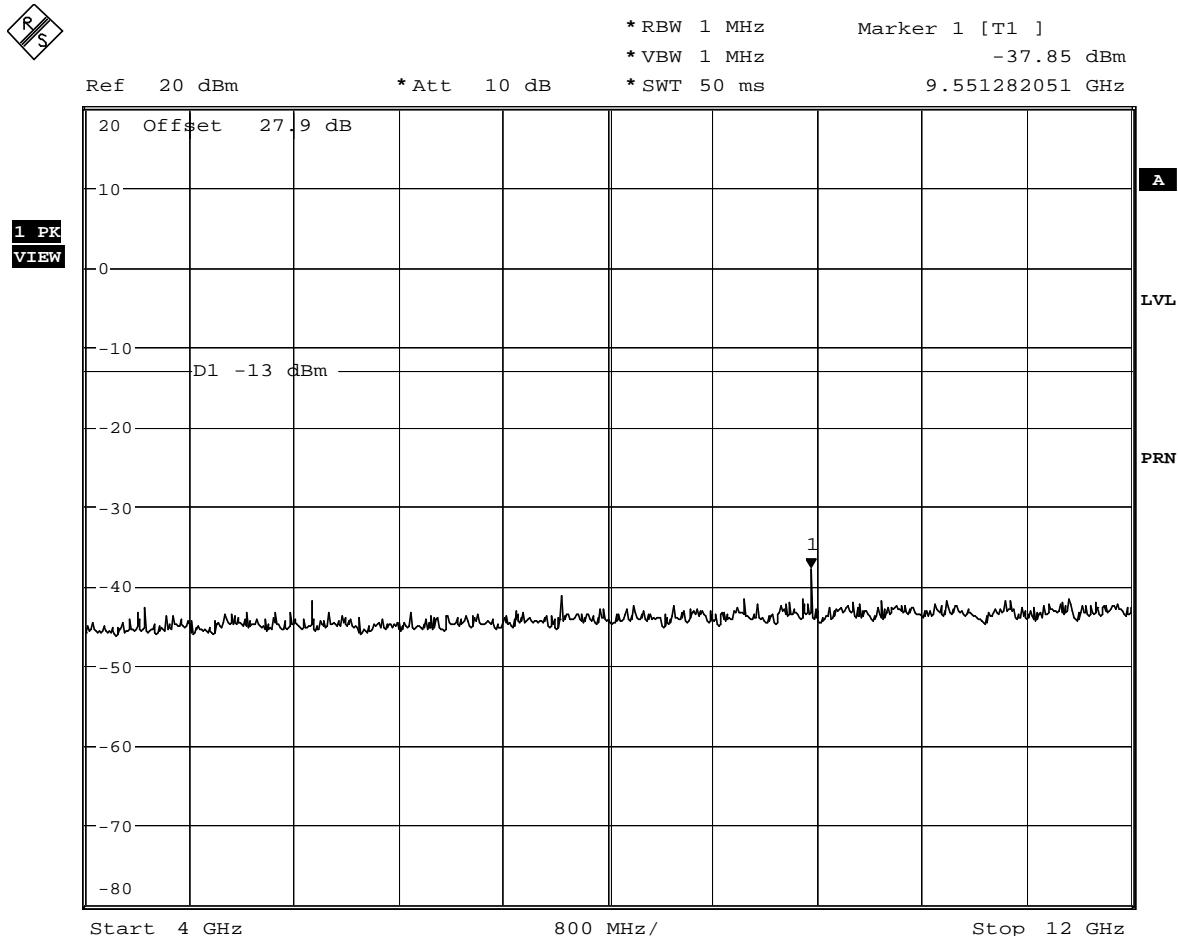
2.17.6 Test Results - continued



Date: 18.OCT.2005 11:55:25
 Serial Number: 00108-00-006341-3
EDGE - Spurious Emissions (9kHz – 4GHz)
Channel 810 (1909.8MHz) - Maximum Power

2.17 CONDUCTED SPURIOUS EMISSIONS

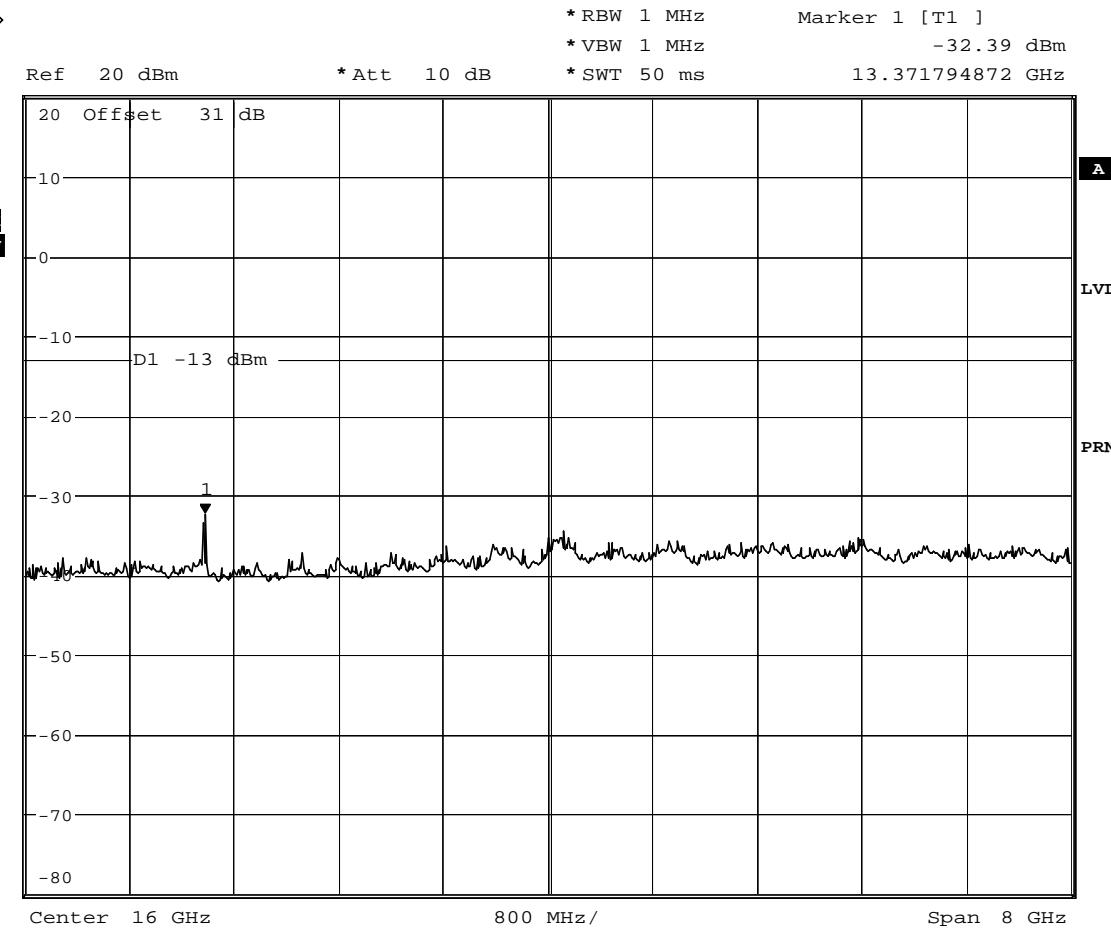
2.17.6 Test Results - continued



Date: 18.OCT.2005 12:05:31
 Serial Number: 00108-00-006341-3
EDGE - Spurious Emissions (4GHz – 12GHz)
Channel 810 (1909.8MHz) - Maximum Power

2.17 CONDUCTED SPURIOUS EMISSIONS

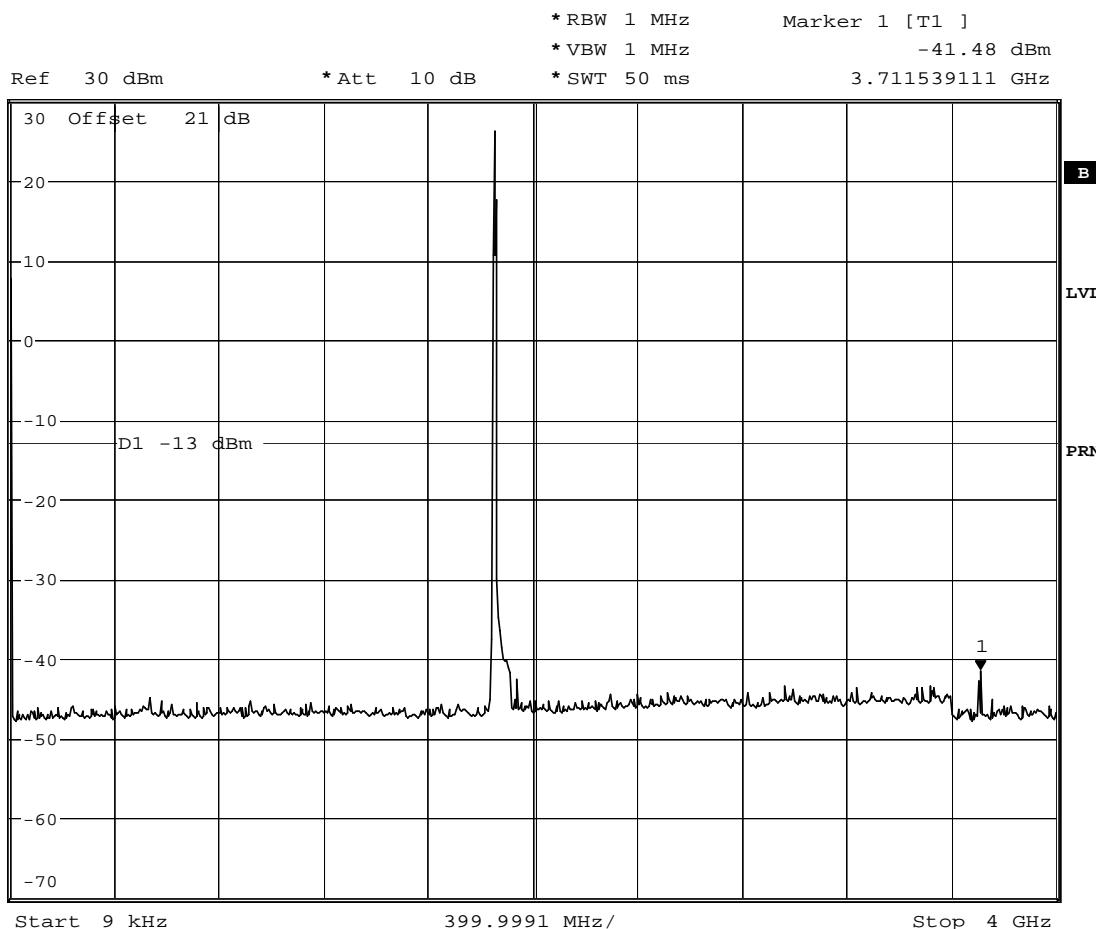
2.17.6 Test Results - continued



Date: 18.OCT.2005 12:11:53
 Serial Number: 00108-00-006341-3
EDGE - Spurious Emissions (12GHz – 20GHz)
Channel 810 (1909.8MHz) - Maximum Power

2.17 CONDUCTED SPURIOUS EMISSIONS

2.17.6 Test Results - continued



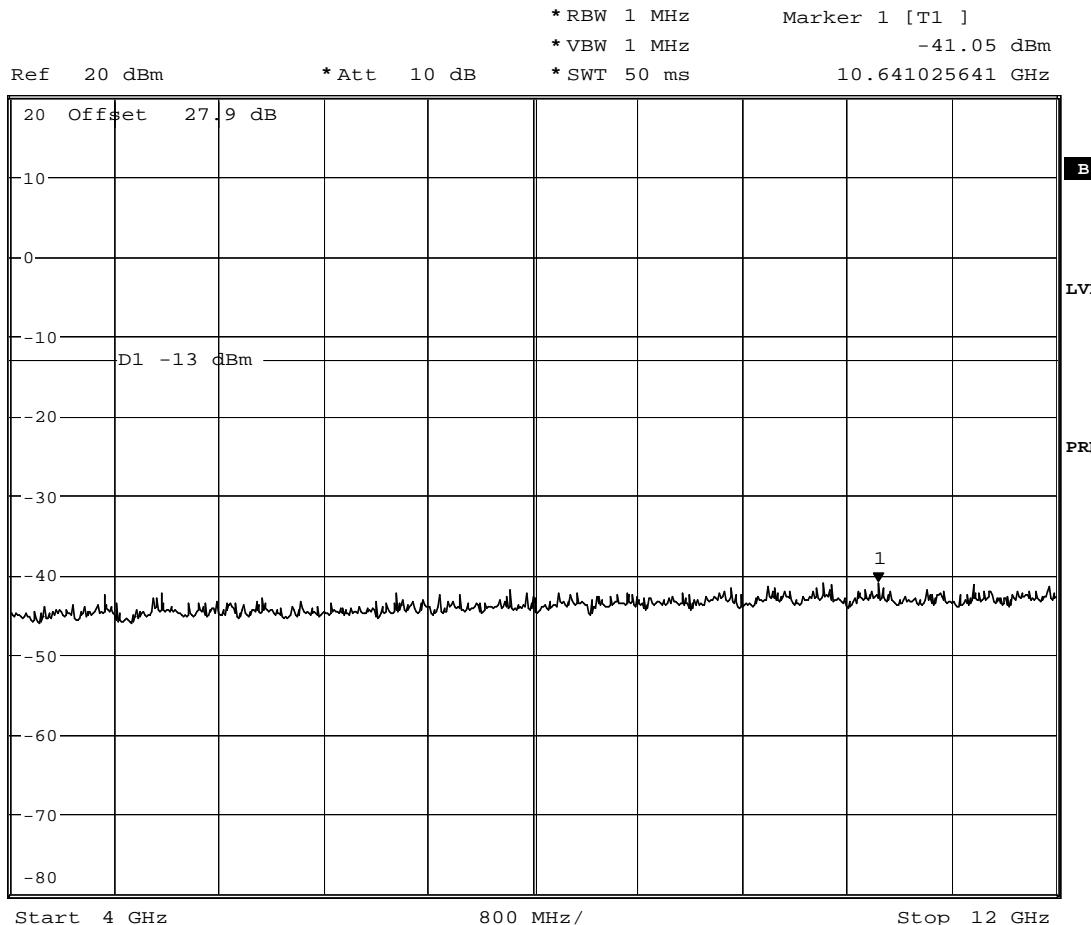
Date: 13.OCT.2005 14:26:54
 Serial Number: 00108-00-006341-3
UMTS - Spurious Emissions (9kHz – 4GHz)
Channel 9262 (1852.4MHz) - Maximum Power



Product Service

2.17 CONDUCTED SPURIOUS EMISSIONS

2.17.6 Test Results - continued



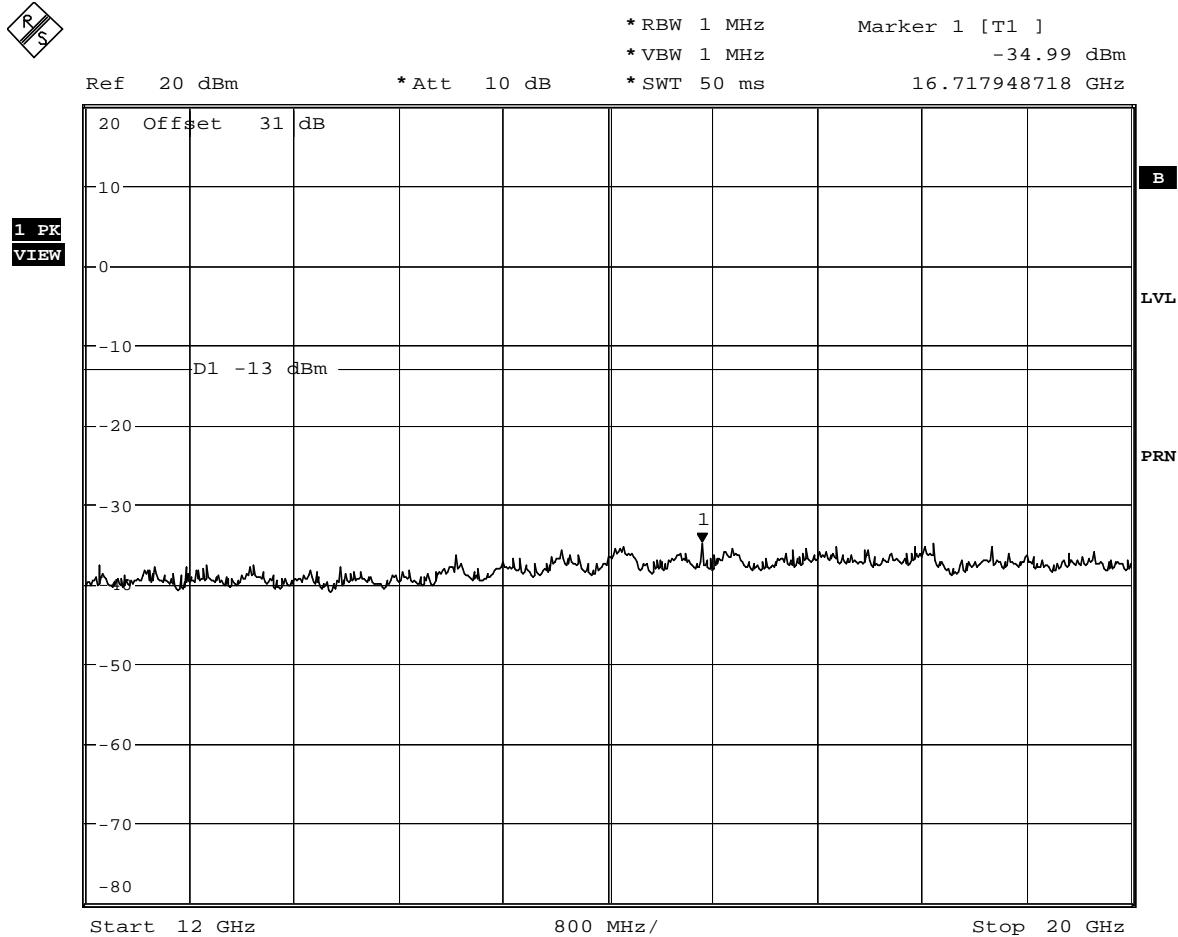
Date: 13.OCT.2005 14:13:53
 Serial Number: 00108-00-006341-3
UMTS - Spurious Emissions (4GHz – 12GHz)
Channel 9262 (1852.4MHz) - Maximum Power



Product Service

2.17 CONDUCTED SPURIOUS EMISSIONS

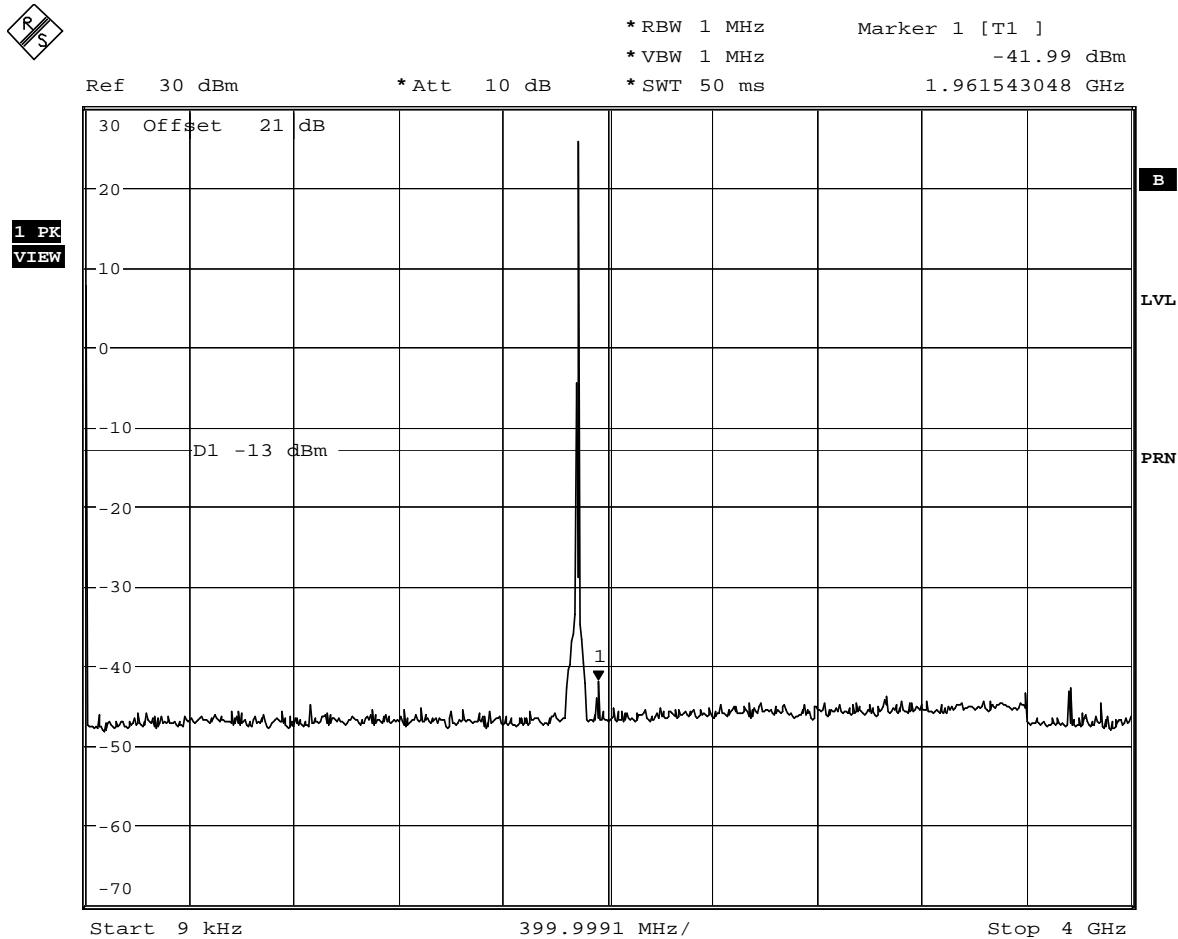
2.17.6 Test Results - continued



Date: 13.OCT.2005 14:22:43
 Serial Number: 00108-00-006341-3
UMTS - Spurious Emissions (12GHz – 20GHz)
Channel 9262 (1852.4MHz) - Maximum Power

2.17 CONDUCTED SPURIOUS EMISSIONS

2.17.6 Test Results - continued

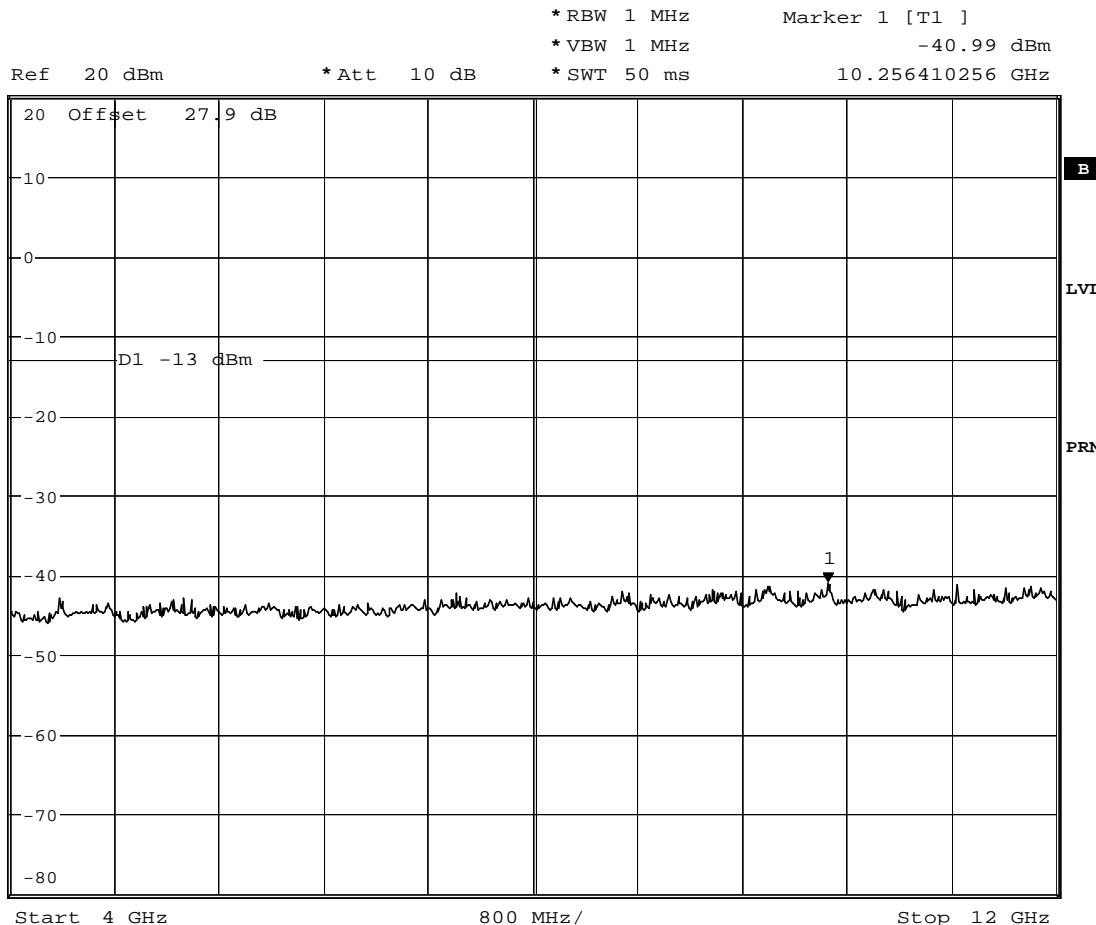


Date: 13.OCT.2005 14:28:05
 Serial Number: 00108-00-006341-3
UMTS - Spurious Emissions (9kHz - 4GHz)
Channel 9400 (1880.0MHz) - Maximum Power



2.17 CONDUCTED SPURIOUS EMISSIONS

2.17.6 Test Results - continued

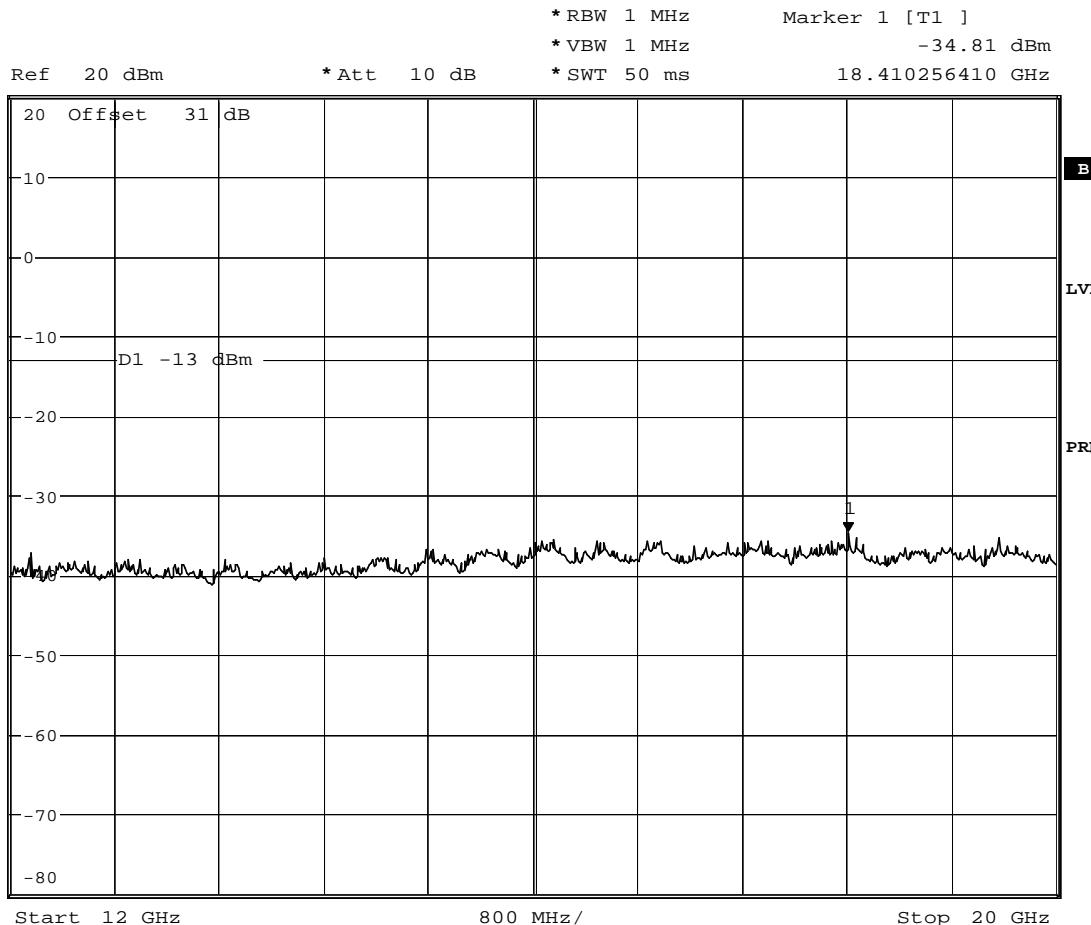


Date: 13.OCT.2005 14:15:09
 Serial Number: 00108-00-006341-3
UMTS - Spurious Emissions (4GHz – 12GHz)
Channel 9400 (1880.0MHz) - Maximum Power



2.17 CONDUCTED SPURIOUS EMISSIONS

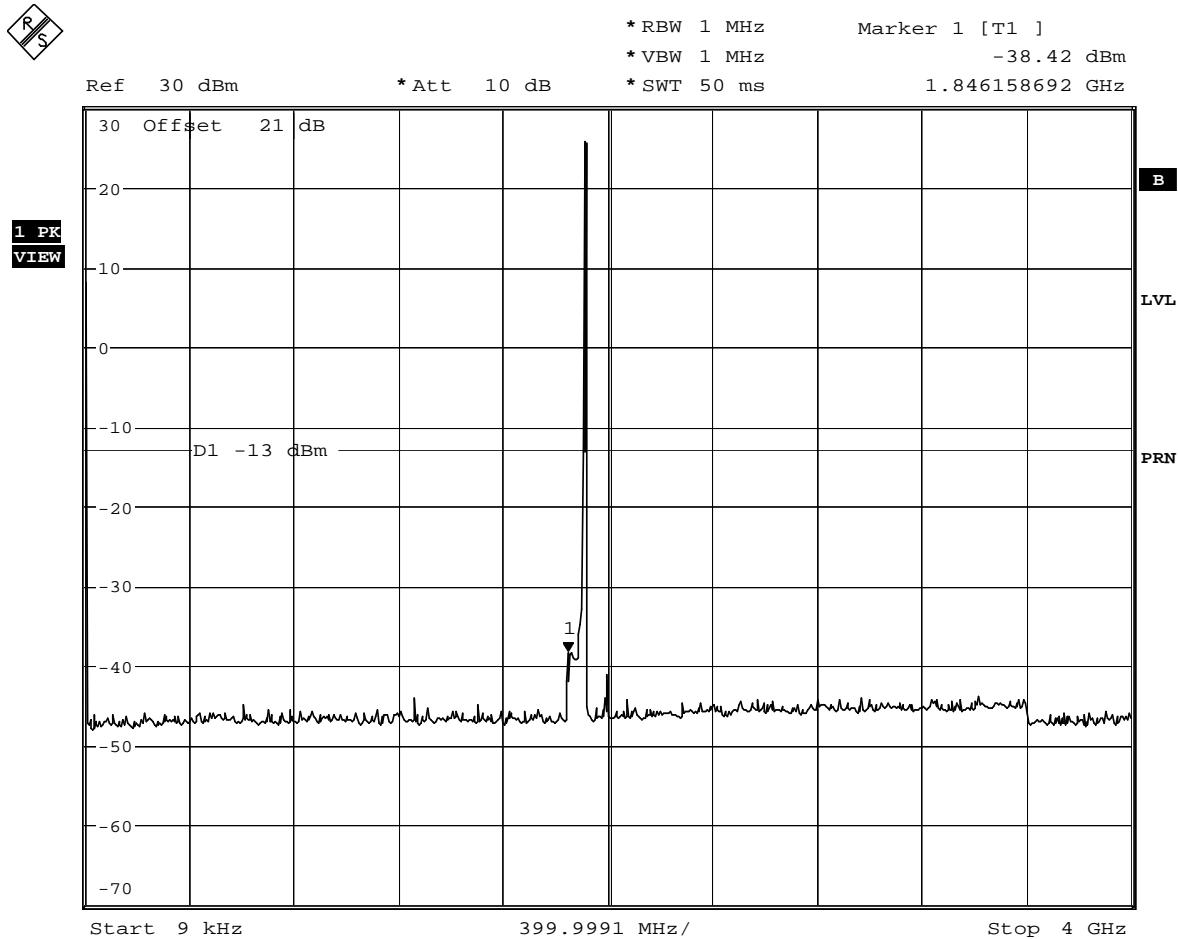
2.17.6 Test Results - continued



Date: 13.OCT.2005 14:21:52
 Serial Number: 00108-00-006341-3
UMTS - Spurious Emissions (12GHz – 20GHz)
Channel 9400 (1880.0MHz) - Maximum Power

2.17 CONDUCTED SPURIOUS EMISSIONS

2.17.6 Test Results - continued



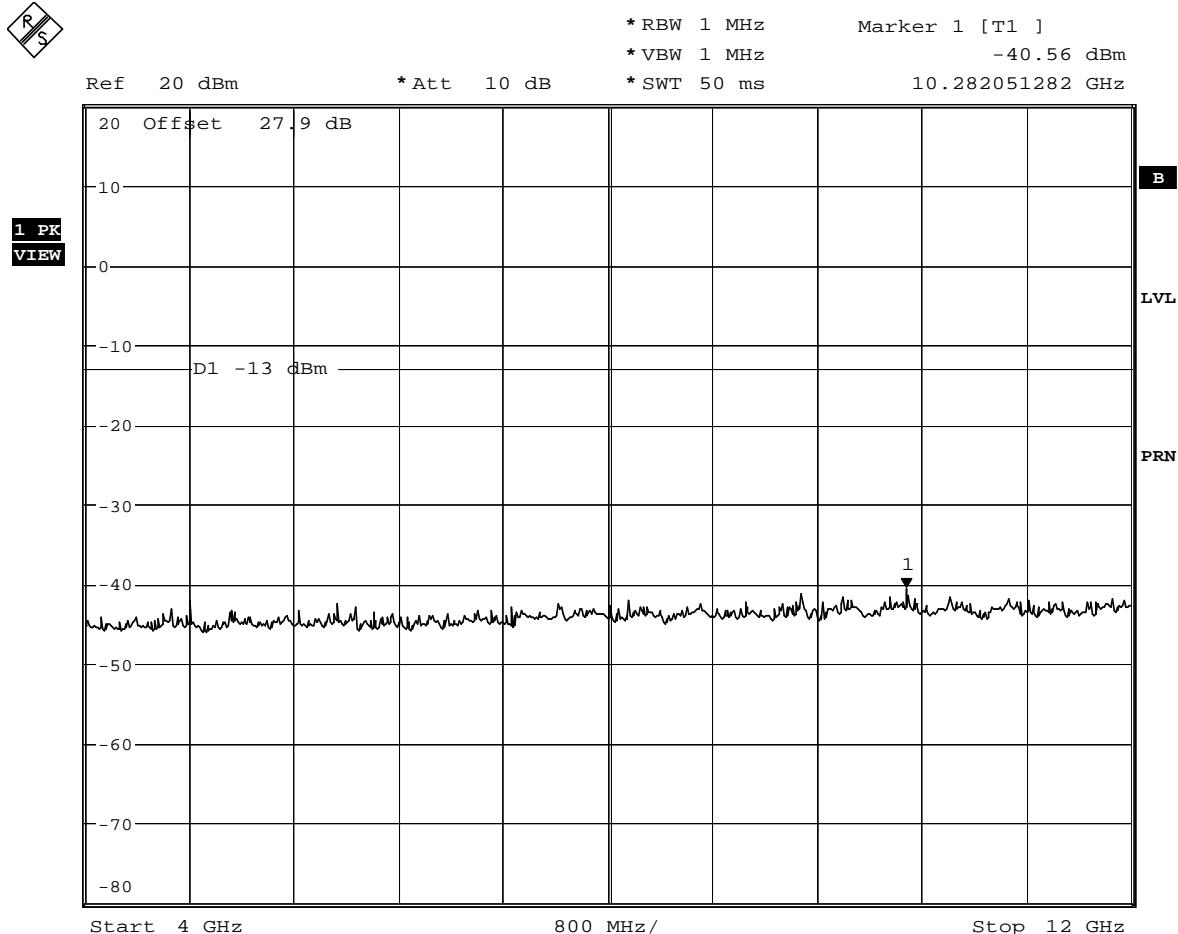
Date: 13.OCT.2005 14:29:44
 Serial Number: 00108-00-006341-3
UMTS - Spurious Emissions (9kHz - 4GHz)
Channel 9538 (1907.6MHz) - Maximum Power



Product Service

2.17 CONDUCTED SPURIOUS EMISSIONS

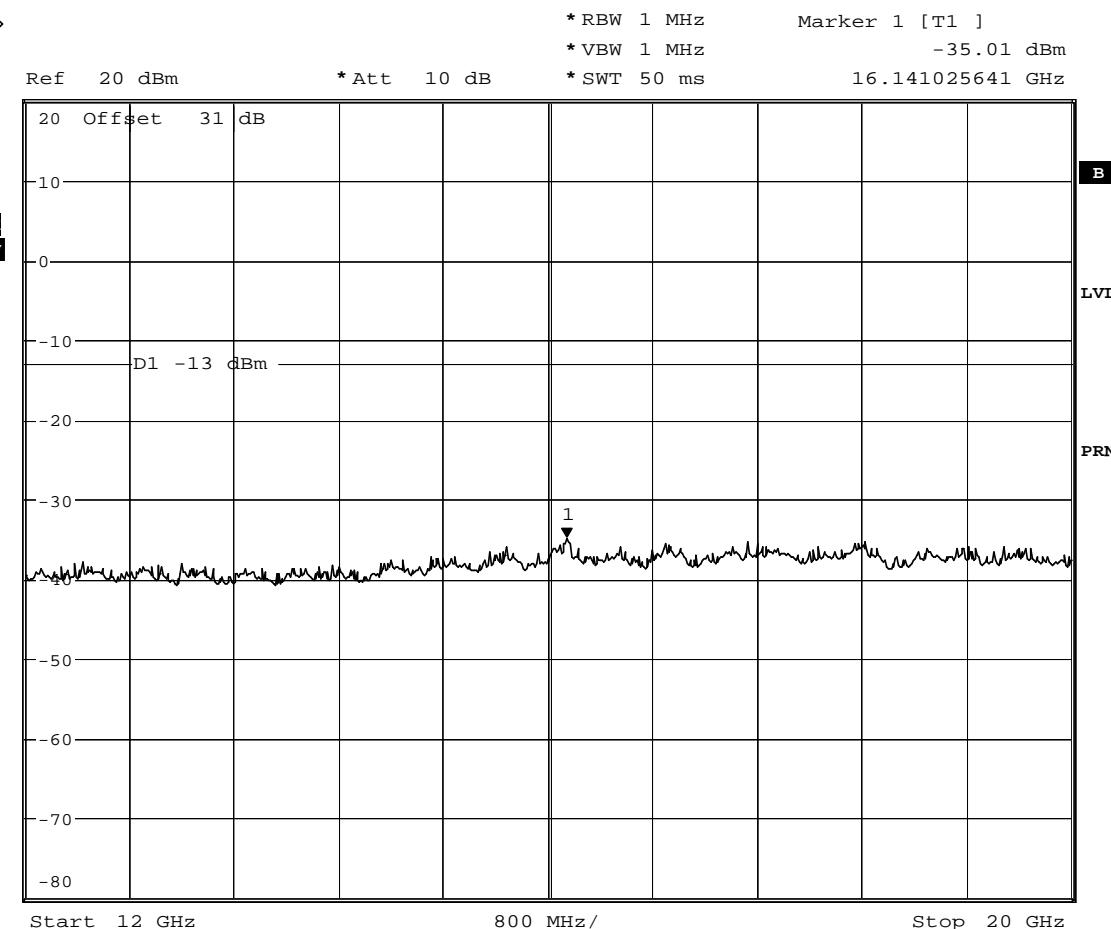
2.17.6 Test Results - continued



Date: 13.OCT.2005 14:15:59
 Serial Number: 00108-00-006341-3
UMTS - Spurious Emissions (4GHz – 12GHz)
Channel 9538 (1907.6MHz) - Maximum Power

2.17 CONDUCTED SPURIOUS EMISSIONS

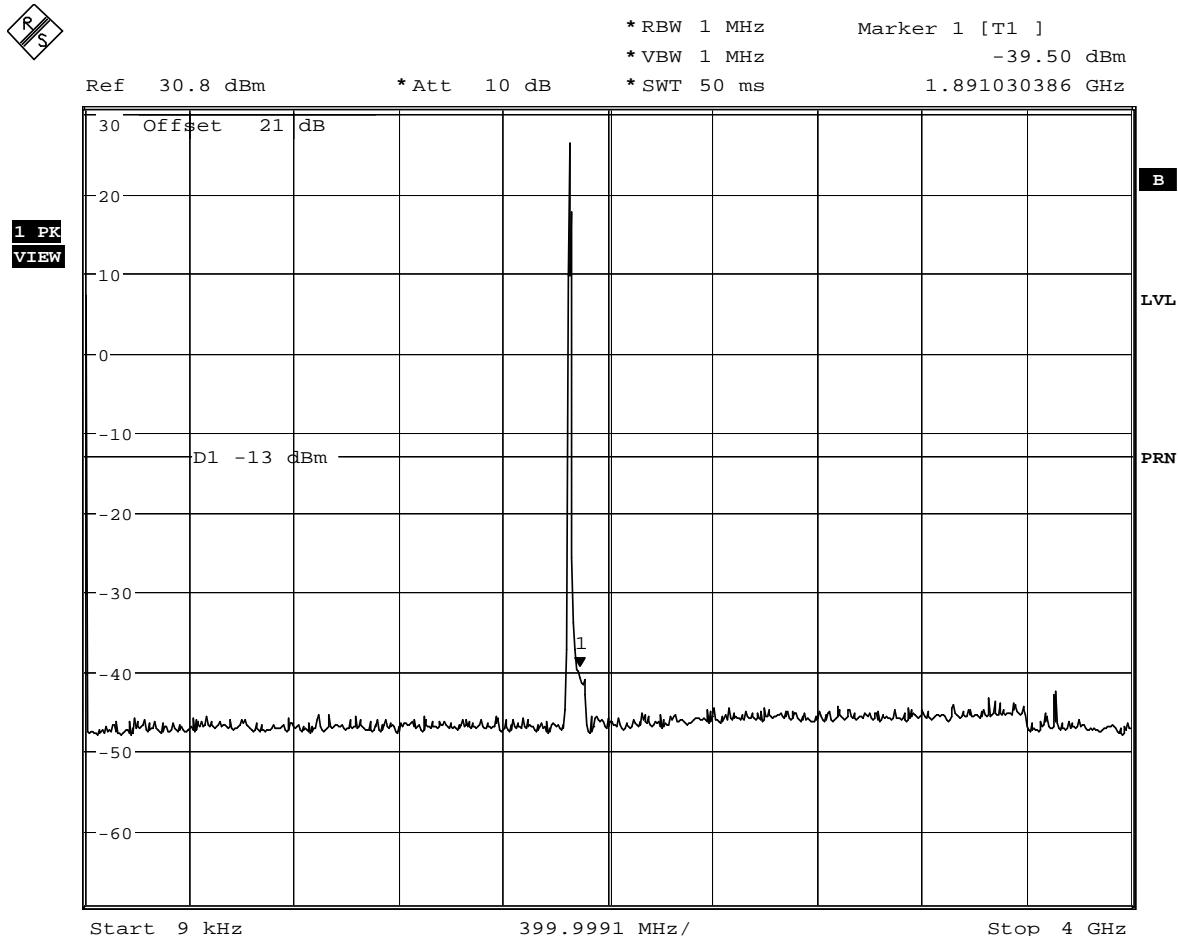
2.17.6 Test Results - continued



Date: 13.OCT.2005 14:20:59
 Serial Number: 00108-00-006341-3
UMTS - Spurious Emissions (12GHz – 20GHz)
Channel 9538 (1907.6MHz) - Maximum Power

2.17 CONDUCTED SPURIOUS EMISSIONS

2.17.6 Test Results - continued



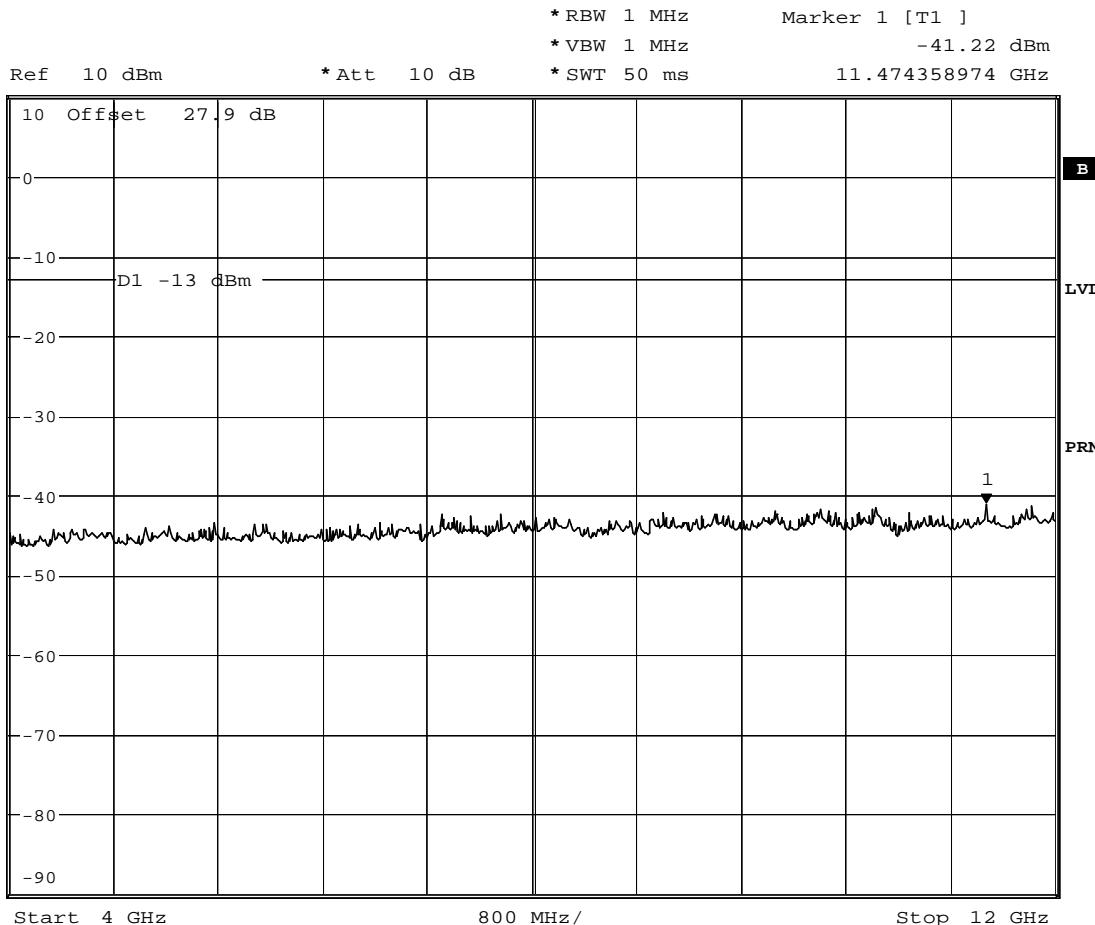
Date: 12.OCT.2005 12:13:58
Serial Number: 00108-00-006341-3
HSDPA - Spurious Emissions (9kHz - 4GHz)
Channel 9262 (1852.4MHz) - Maximum Power



Product Service

2.17 CONDUCTED SPURIOUS EMISSIONS

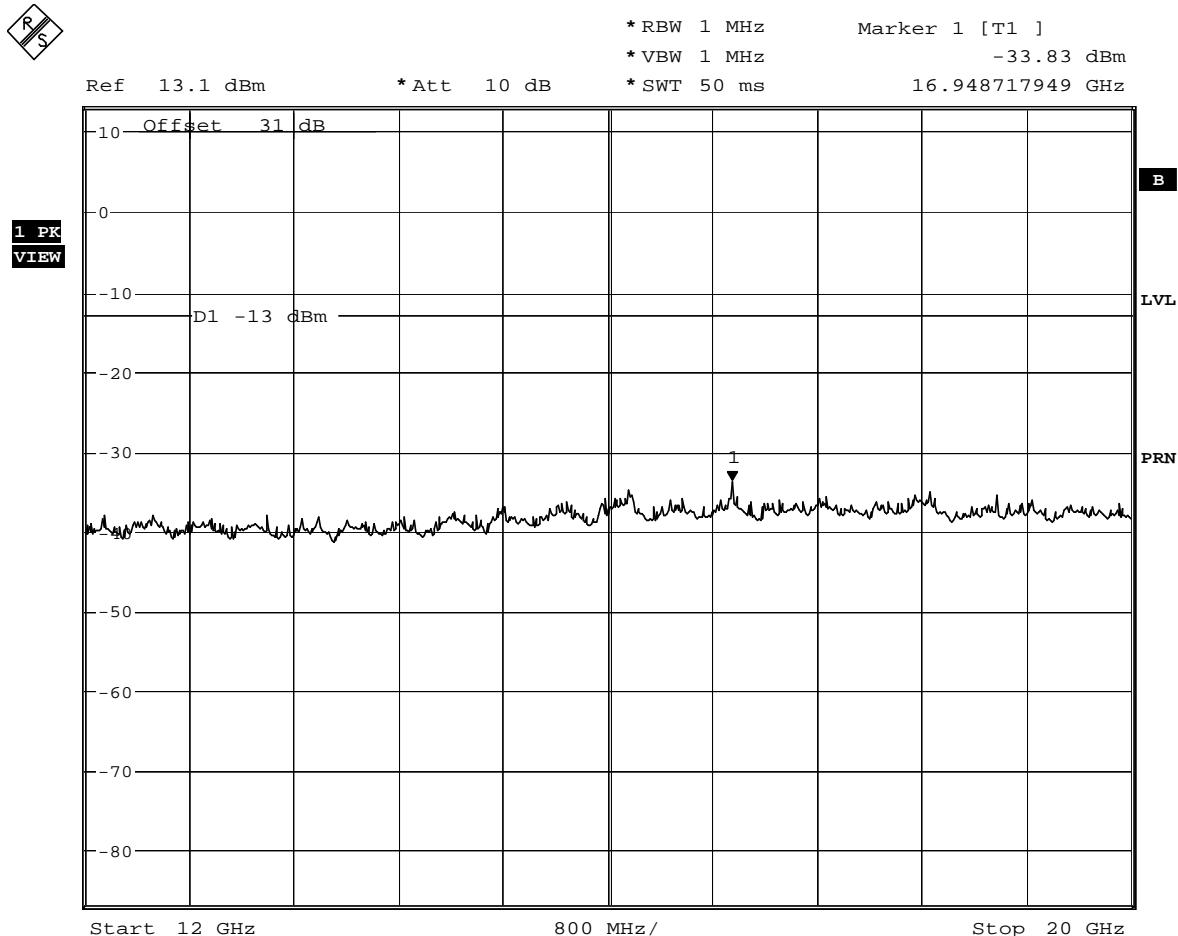
2.17.6 Test Results - continued



Date: 12.OCT.2005 12:22:13
 Serial Number: 00108-00-006341-3
HSDPA - Spurious Emissions (4GHz – 12GHz)
Channel 9262 (1852.4MHz) - Maximum Power

2.17 CONDUCTED SPURIOUS EMISSIONS

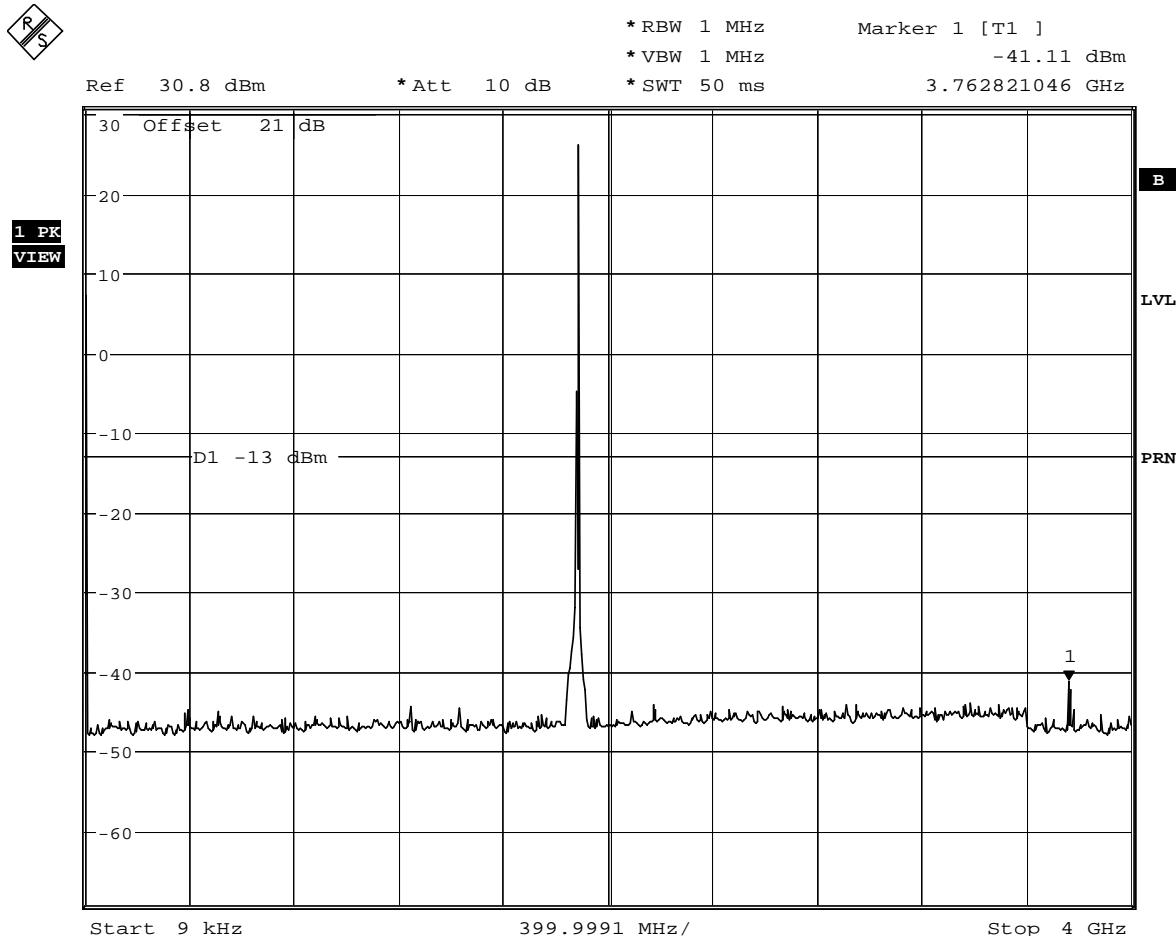
2.17.6 Test Results - continued



Date: 12.OCT.2005 12:25:18
 Serial Number: 00108-00-006341-3
HSDPA - Spurious Emissions (12GHz – 20GHz)
Channel 9262 (1852.4MHz) - Maximum Power

2.17 CONDUCTED SPURIOUS EMISSIONS

2.17.6 Test Results - continued



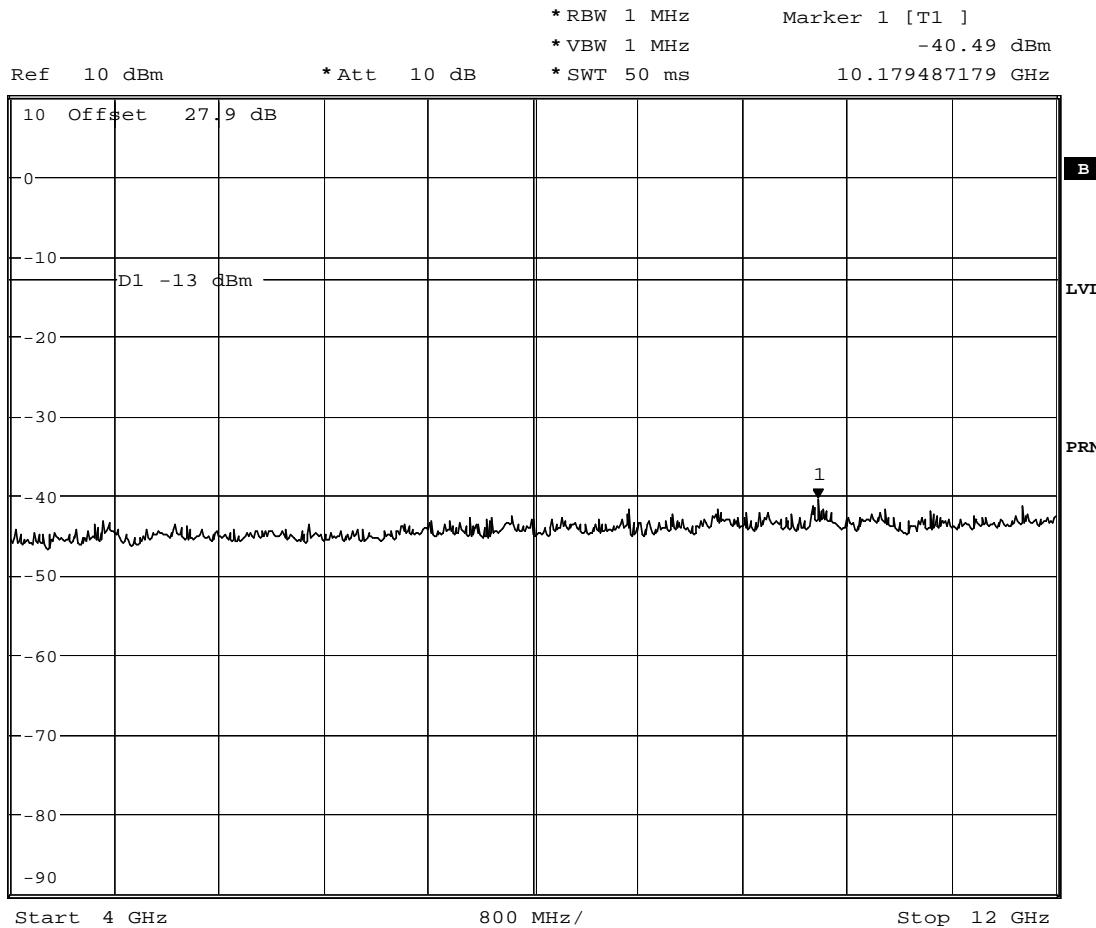
Date: 12.OCT.2005 12:15:35
Serial Number: 00108-00-006341-3
HSDPA - Spurious Emissions (9kHz - 4GHz)
Channel 9400 (1880.0MHz) - Maximum Power



Product Service

2.17 CONDUCTED SPURIOUS EMISSIONS

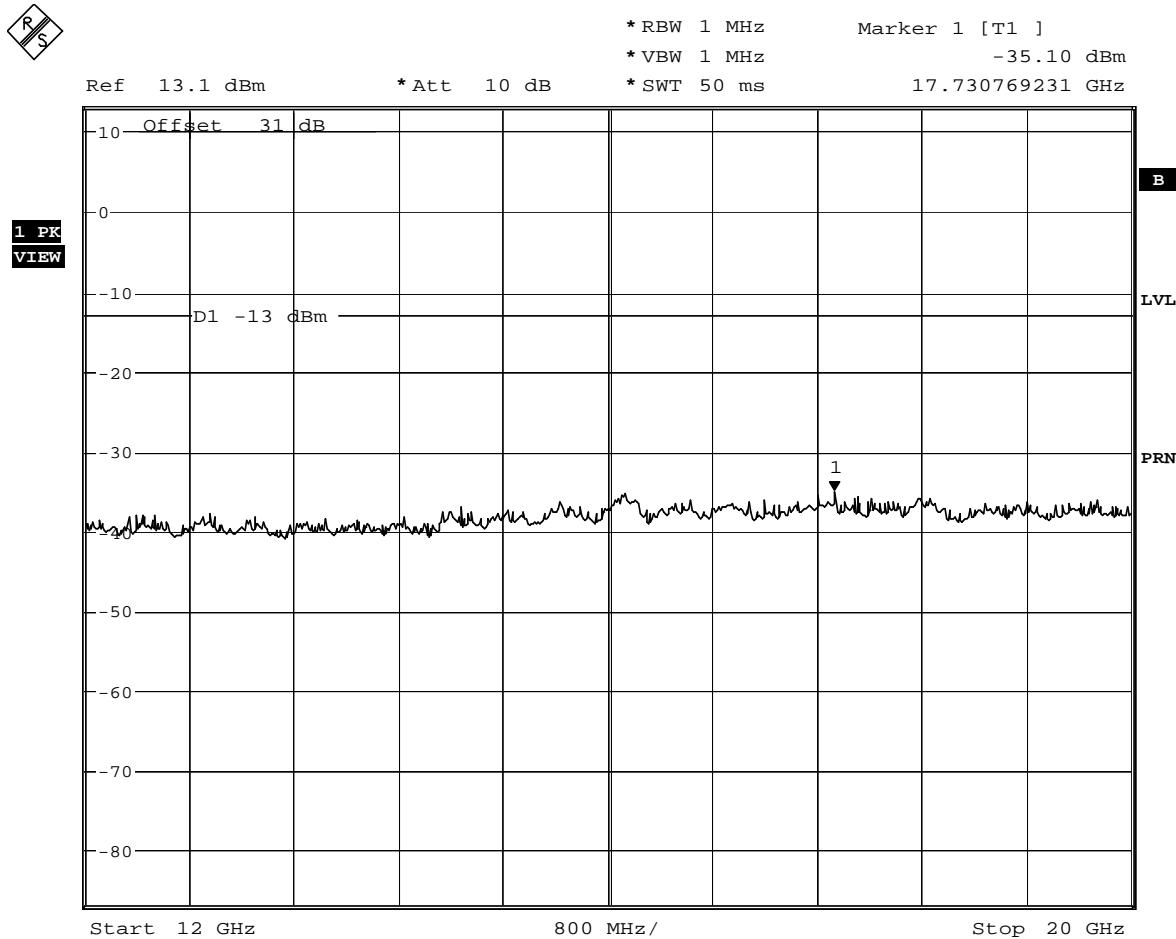
2.17.6 Test Results - continued



Date: 12.OCT.2005 12:21:11
 Serial Number: 00108-00-006341-3
HSDPA - Spurious Emissions (4GHz - 12GHz)
Channel 9400 (1880.0MHz) - Maximum Power

2.17 CONDUCTED SPURIOUS EMISSIONS

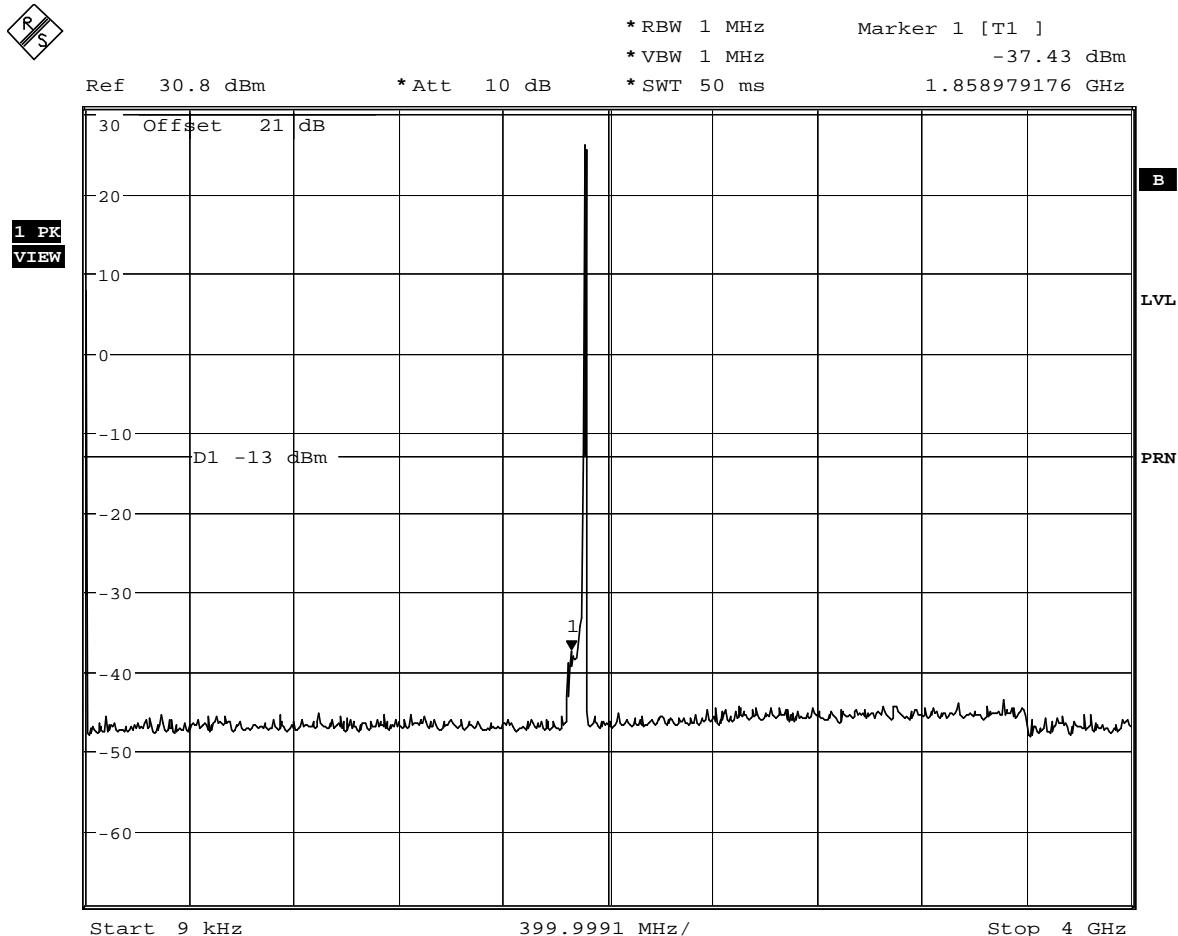
2.17.6 Test Results - continued



Date: 12.OCT.2005 12:26:35
 Serial Number: 00108-00-006341-3
HSDPA - Spurious Emissions (12GHz – 20GHz)
Channel 9400 (1880.0MHz) - Maximum Power

2.17 CONDUCTED SPURIOUS EMISSIONS

2.17.6 Test Results - continued



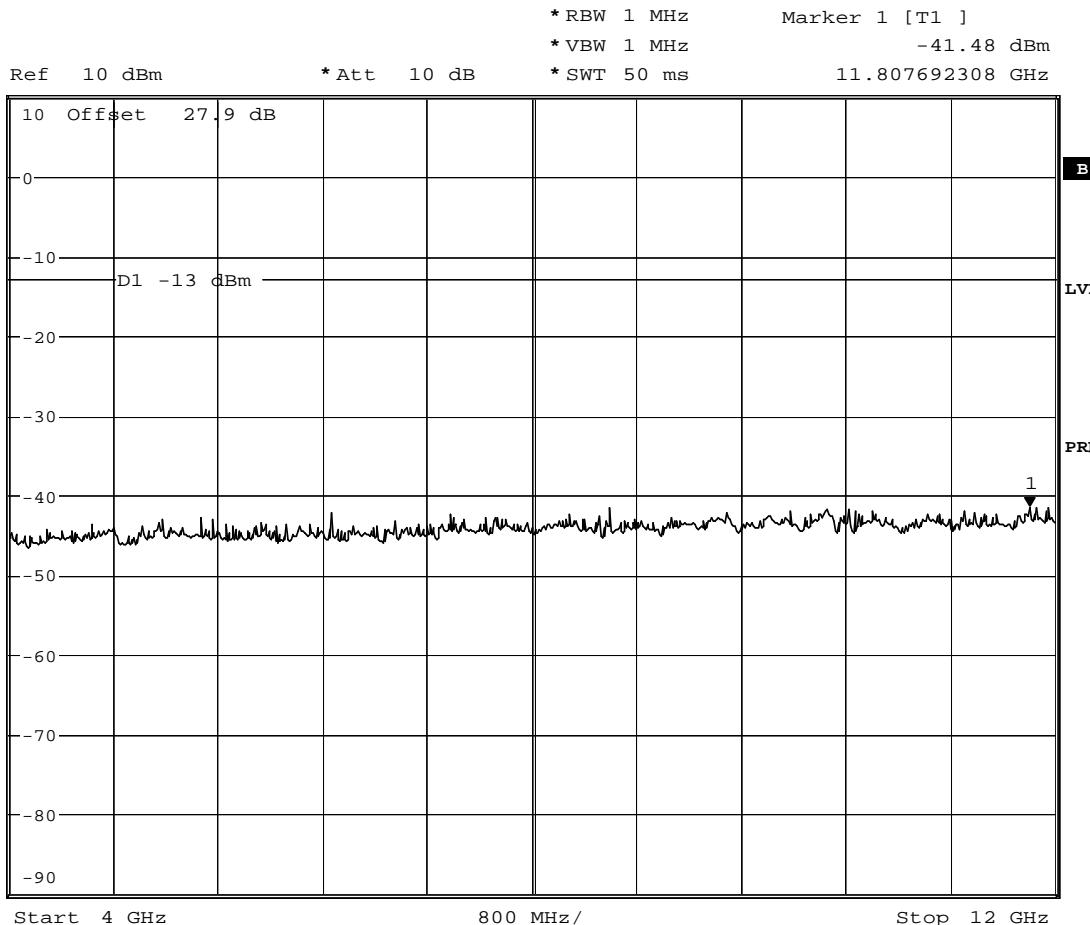
Date: 12.OCT.2005 12:16:36
 Serial Number: 00108-00-006341-3
HSDPA - Spurious Emissions (9kHz - 4GHz)
Channel 9538 (1907.6MHz) - Maximum Power



Product Service

2.17 CONDUCTED SPURIOUS EMISSIONS

2.17.6 Test Results - continued



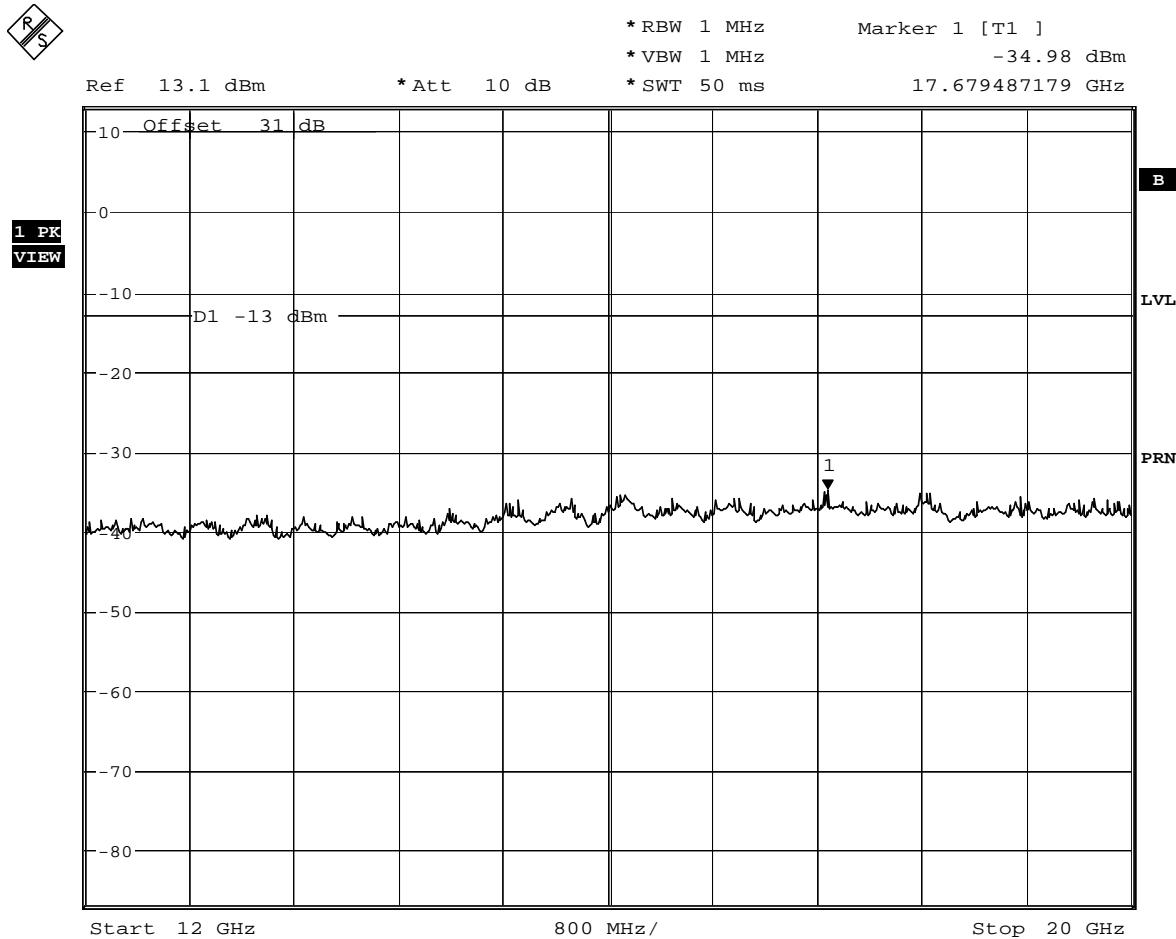
Date: 12.OCT.2005 12:20:08
 Serial Number: 00108-00-006341-3
HSDPA - Spurious Emissions (4GHz - 12GHz)
Channel 9538 (1907.6MHz) - Maximum Power



Product Service

2.17 CONDUCTED SPURIOUS EMISSIONS

2.17.6 Test Results - continued



Date: 12.OCT.2005 12:27:28

Serial Number: 00108-00-006341-3
HSDPA - Spurious Emissions (12GHz – 20GHz)
Channel 9538 (1907.6MHz) - Maximum Power

2.18 FREQUENCY STABILITY UNDER TEMPERATURE VARIATIONS

2.18.1 Specification Reference

FCC CFR 47: Part 24 Subpart E, Section 24.235, 2.1055 and RSS-133, 7

2.18.2 Equipment Under Test

U730

2.18.3 Date of Test

19th October 2005 (GPRS, EDGE, UMTS and HSDPA)

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

The EUT was set to transmit on maximum power. 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 -30°C and +50°C in 10° steps as per 2.1055. Measurements were conducted with the EUT in GPRS, EDGE, UMTS and HSDPA modes of operation.

2.18 FREQUENCY STABILITY UNDER TEMPERATURE VARIATIONS**2.18.6 Test Results**

| Temperature Interval °C | Test Frequency GHz | Deviation Hz | Limit kHz |
|----------------------------|-----------------------|-----------------|--------------|
| - 30 | 1.880 | -18 | See Below |
| - 20 | 1.880 | +34 | See Below |
| - 10 | 1.880 | +30 | See Below |
| 0 | 1.880 | +50 | See Below |
| + 10 | 1.880 | +40 | See Below |
| + 20 | 1.880 | +24 | See Below |
| + 30 | 1.880 | +30 | See Below |
| + 40 | 1.880 | +15 | See Below |
| + 50 | 1.880 | -51 | See Below |

Serial Number: 00108-00-0363441
3.3V SUPPLY – PCS1900 Mode GPRS Modulation

| Temperature Interval °C | Test Frequency GHz | Deviation Hz | Limit kHz |
|----------------------------|-----------------------|-----------------|--------------|
| - 30 | 1.880 | -42 | See Below |
| - 20 | 1.880 | +45 | See Below |
| - 10 | 1.880 | +44 | See Below |
| 0 | 1.880 | +48 | See Below |
| + 10 | 1.880 | +49 | See Below |
| + 20 | 1.880 | +38 | See Below |
| + 30 | 1.880 | +44 | See Below |
| + 40 | 1.880 | -20 | See Below |
| + 50 | 1.880 | -26 | See Below |

Serial Number: 00108-00-0363441
3.3V SUPPLY – PCS1900 Mode EDGE Modulation

| Temperature Interval °C | Test Frequency GHz | Deviation Hz | Limit kHz |
|----------------------------|-----------------------|-----------------|--------------|
| - 30 | 1.880 | -15 | See Below |
| - 20 | 1.880 | -34 | See Below |
| - 10 | 1.880 | -27 | See Below |
| 0 | 1.880 | -30 | See Below |
| + 10 | 1.880 | -35 | See Below |
| + 20 | 1.880 | -31 | See Below |
| + 30 | 1.880 | -33 | See Below |
| + 40 | 1.880 | -29 | See Below |
| + 50 | 1.880 | -38 | See Below |

Serial Number: 00108-00-0363441
3.3V SUPPLY – UMTS Band II QPSK Modulation

2.18 FREQUENCY STABILITY UNDER TEMPERATURE VARIATIONS

2.18.6 Test Results

| Temperature Interval °C | Test Frequency GHz | Deviation Hz | Limit kHz |
|----------------------------|-----------------------|-----------------|--------------|
| - 30 | 1.880 | -26 | See Below |
| - 20 | 1.880 | -28 | See Below |
| - 10 | 1.880 | -27 | See Below |
| 0 | 1.880 | -28 | See Below |
| + 10 | 1.880 | -36 | See Below |
| + 20 | 1.880 | -31 | See Below |
| + 30 | 1.880 | -28 | See Below |
| + 40 | 1.880 | -35 | See Below |
| + 50 | 1.880 | -36 | See Below |

Serial Number: 00108-00-0363441
3.3V SUPPLY – UMTS Band II HSDPA Modulation

| | |
|-------|-----------------|
| Limit | 0.0001% or 1ppm |
|-------|-----------------|

Remarks

EUT complies with CFR 47 Part 24.135(a) and Industry Canada RSS-133,7. The EUT remains within the authorized frequency block over the entire temperature range.

2.19 FREQUENCY STABILITY UNDER VOLTAGE VARIATIONS

2.19.1 Specification Reference

FCC CFR 47: Part 24 Subpart E, Section 24.135(a), 2.1055 and Industry Canada RSS-133, 7

2.19.2 Equipment Under Test

U730

2.19.3 Date of Test

13th October 2005 (UMTS and HSDPA)
17th October 2005 (GPRS)
18th October 2005 (EDGE)

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

GPRS

The EUT was set to transmit on maximum power. A Digital Communications Analyser, (CMU200), was used to measure the Frequency Error. The maximum result of measurements made over 200 bursts was recorded. The voltage was varied as described in the results table.

EDGE

The EUT was set to transmit on maximum. A Digital Communications Analyser, (CMU200), was used to measure the Frequency Error. The maximum result of measurements made over 200 bursts was recorded. The voltage was varied as described in the results table.

UMTS

The EUT was set to transmit on maximum power. A Digital Communications Analyser, (CMU200), was used to measure the Frequency Error. The maximum result of measurements made over 200 bursts was recorded. The voltage was varied as described in the results table.

HSDPA

The EUT was set to transmit on maximum power. A Digital Communications Analyser, (CMU200), was used to measure the Frequency Error. The maximum result of measurements made over 200 bursts was recorded. The voltage was varied as described in the results table.

2.19 FREQUENCY STABILITY UNDER VOLTAGE VARIATIONS**2.19.6 Test Results - continued**

| DC Voltage V | Test Frequency GHz | Deviation Hz | Deviation Limit kHz |
|-----------------|-----------------------|-----------------|------------------------|
| 3.795 | 1.880 | +34 | * see limit below |
| 3.300 | 1.880 | +25 | * see limit below |
| 2.805 | 1.880 | +43 | * see limit below |

3.3V SUPPLY – PCS 1900 Mode GPRS Modulation

| DC Voltage V | Test Frequency GHz | Deviation Hz | Deviation Limit kHz |
|-----------------|-----------------------|-----------------|------------------------|
| 3.795 | 1.880 | +28 | * see limit below |
| 3.300 | 1.880 | +32 | * see limit below |
| 2.805 | 1.880 | +34 | * see limit below |

3.3V SUPPLY PCS 1900 Mode EDGE Modulation

| DC Voltage V | Test Frequency GHz | Deviation Hz | Deviation Limit kHz |
|-----------------|-----------------------|-----------------|------------------------|
| 2.795 | 1.880 | +90 | * see limit below |
| 3.300 | 1.880 | -86 | * see limit below |
| 2.805 | 1.880 | -90 | * see limit below |

3.3V SUPPLY – UMTS Band II Mode QPSK Modulation

| DC Voltage V | Test Frequency GHz | Deviation Hz | Deviation Limit kHz |
|-----------------|-----------------------|-----------------|------------------------|
| 3.795 | 1.880 | -32 | * see limit below |
| 3.300 | 1.880 | -31 | * see limit below |
| 2.805 | 1.880 | -33 | * see limit below |

3.3V SUPPLY – UMTS Band II Mode HSDPA Modulation

| | |
|-------|-----------------|
| Limit | 0.0001% or 1ppm |
|-------|-----------------|

Remarks

EUT complies with CFR 47 Part 24.135(a). The EUT remains within the authorised frequency block over the test voltage range.



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 |
|-----------------------------------|-------------------|----------------------|-----------|-----------------|
| EMC Maximum Output Power | | | | |
| Emi Receiver | Rohde & Schwarz | ESIB 40 | 2941 | 11/08/2006 |
| Peak Power Ana | Hewlett Packard | 8990A | 107 | 12/10/2006 |
| Turntable/Mast Controller | EMCO | 2090 | 1607 | TU |
| Mast Controller | Unknown | CO 1000 | 1606 | TU |
| Screened Room 5 | Rainford | Rainford | 1545 | 01/03/2008 |
| Emco 3115 Drg Ant | EMCO | 3115 | 235 | 01/07/2006 |
| Emco Drg Horn Ant | EMCO | 3115 | 234 | 01/07/2006 |
| Wideband Generator | Rohde & Schwarz | SWM 02 | 62 | 15/01/2006 |
| EMC Radiated Emissions | | | | |
| Emi Receiver | Rohde & Schwarz | ESIB 40 | 2941 | 11/08/2006 |
| Bilog Antenna | Schaffner | CBL6143 | 287 | 12/11/2005 |
| Hi Pass Filter | Sematron | RLC-F100-1500-S-R | 2843 | 16/05/2006 |
| Dual PSU | Thurlby | PL320 | 288 | TU |
| Low Noise Amplifier | Miteq Corp | AMF-3d-001080-18-13P | 231 | TU |
| Spectrum Analyser | Hewlett Packard | 8542E | 18 | 08/01/2006 |
| Wideband Generator | Rohde & Schwarz | SWM 02 | 62 | 15/01/2006 |
| Double Ridge Guide Antenna | EMCO | 3115 | 235 | 01/07/2006 |
| Mast Controller | Unknown | CO 1000 | 1606 | TU |
| Screened Room 5 | Rainford | Rainford | 1545 | 01/03/2008 |
| Turntable/Mast Controller | EMCO | 2090 | 1607 | TU |
| Double Ridge Guide Antenna | EMCO | 3115 | 234 | 01/07/2006 |
| Mast Controller | Unknown | CO 1000 | 1606 | TU |
| Turntable/Mast Controller | EMCO | 2090 | 1607 | TU |
| Screened Room 5 | Rainford | Rainford | 1545 | 01/03/2008 |
| High Pass Filter | RLC Electronics | F-100-3000-5-R | 563 | TU |
| Bilog Antenna | Schaffner | CBL6143 | 287 | 12/11/2005 |
| Radio Communication Tester | Rohde & Schwarz | CMU 200 | 39 | 07/07/2006 |
| Spectrum Analyser | Hewlett Packard | 8542E | 18 | 08/01/2006 |
| Radio - Spurious Emissions | | | | |
| Signal Gen | Rohde & Schwarz | SMY01 | 49 | 08/06/2006 |
| Attenuated 10dB | Texscan | HFP-50N | 468 | 11/07/2006 |
| Power Splitter | Weinschel | 1506A | 605 | 06/08/2006 |
| Signal Generator | Rohde & Schwarz | SMR 40 | 1002 | 25/10/2005 |
| Hi Pass Filter | RLC Electronics | F-100-4000-5-R | 2199 | 16/05/2006 |
| Spectrum Analyser | Rohde & Schwarz | FSU26 | 2747 | 16/12/2005 |
| Filter | Daden Anthony Ass | MH-1500-7SS | 2778 | 15/10/2005 * |

* - This equipment was used only for UMTS/HSDPA testing.

3.1 TEST EQUIPMENT

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

| Instrument | Manufacturer | Type No | TE Number | Calibration Due |
|---------------------------------------------------------|-----------------|---------|-----------|-----------------|
| Radio (Transmitting) - Frequency Characteristics | | | | |
| DC Power Supply Unit | Hewlett Packard | 6253A | 441 | TU |
| Spectrum Analyser | Rohde & Schwarz | FSU26 | 2747 | 16/12/2005 |
| Signal Generator | Rohde & Schwarz | SMR 40 | 1002 | 25/10/2005 |
| Attenuator 10dB | Texscan | HFP-50N | 468 | 11/07/2006 |
| Signal Gen | Rohde & Schwarz | SMY01 | 49 | 08/06/2006 |
| Power Splitter | Weinschel | 1506A | 605 | 06/08/2006 |
| Radio (Transmitting) - Occupied Bandwidth | | | | |
| Attenuator 10dB | Texscan | HFP-50N | 468 | 11/07/2006 |
| Power Splitter | Weinschel | 1506A | 605 | 06/08/2006 |
| Signal Generator | Rohde & Schwarz | SMR 40 | 1002 | 25/10/2005 |
| Spectrum Analyser | Rohde & Schwarz | FSU26 | 2747 | 16/12/2005 |
| Signal Gen | Rohde & Schwarz | SMY01 | 49 | 08/06/2006 |
| Radio (Transmitting) - Power Characteristics | | | | |
| Spectrum Analyser | Rohde & Schwarz | FSU26 | 2747 | 16/12/2005 |
| Signal Gen | Rohde & Schwarz | SMY01 | 49 | 08/06/2006 |
| Attenuator 10dB | Texscan | HFP-50N | 468 | 11/07/2006 |
| Signal Generator | Rohde & Schwarz | SMR 40 | 1002 | 25/10/2005 |
| Power Splitter | Weinschel | 1506A | 605 | 06/08/2006 |

3.1 TEST EQUIPMENT

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

| Instrument | Manufacturer | Type No | TE Number | Calibration Due |
|---------------------------------|-----------------|----------------------|-----------|-----------------|
| EMC Maximum Output Power | | | | |
| Attenuator 10dB | Marconi | 6534/3 | 1048 | TU |
| Bilog Antenna | Schaffner | CBL6143 | 287 | 12/11/2005 |
| Bilog Antenna | Schaffner | CBL 6143 | 316 | TU |
| Screened Room 5 | Rainford | Rainford | 1545 | 01/03/2008 |
| Mast Controller | Unknown | CO 1000 | 1606 | TU |
| Turntable/Mast Controller | EMCO | 2090 | 1607 | TU |
| Test Receiver | Rohde & Schwarz | ESIB26 | 2085 | 26/09/2006 |
| Wideband Generator | Rohde & Schwarz | SWM 02 | 62 | 15/01/2006 |
| EMC Radiated Emissions | | | | |
| Double Ridge Guide Antenna | EMCO | 3115 | 235 | 01/07/2006 |
| Mast Controller | Unknown | CO 1000 | 1606 | TU |
| Turntable/Mast Controller | EMCO | 2090 | 1607 | TU |
| Test Receiver | Rohde & Schwarz | ESIB26 | 2085 | 26/09/2006 |
| Bilog Antenna | Schaffner | CBL6143 | 287 | 12/11/2005 |
| Turntable/Mast Controller | EMCO | 2090 | 1607 | TU |
| Mast Controller | Unknown | CO 1000 | 1606 | TU |
| Screened Room 5 | Rainford | Rainford | 1545 | 01/03/2008 |
| Double Ridge Guide Antenna | EMCO | 3115 | 234 | 01/07/2006 |
| Test Receiver | Rohde & Schwarz | ESIB26 | 2085 | 26/09/2006 |
| Low Noise Amplifier | Miteq Corp | AMF-3d-001080-18-13P | 231 | TU |
| Wideband Generator | Rohde & Schwarz | SWM 02 | 62 | 15/01/2006 |
| Hi Pass Filter | Sematron | RLC-F100-1500-S-R | 2843 | 16/05/2006 |
| Double Ridge Guide Antenna | EMCO | 3115 | 235 | 01/07/2006 |
| Mast Controller | Unknown | CO 1000 | 1606 | TU |
| Turntable/Mast Controller | EMCO | 2090 | 1607 | TU |
| Screened Room 5 | Rainford | Rainford | 1545 | 01/03/2008 |

TU Traceability Unscheduled

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



SECTION 4

ACCREDITATION, DISCLAIMERS AND COPYRIGHT

4.1 ACCREDITATION, DISCLAIMERS AND COPYRIGHT



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.

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