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Report On

FCC and Industry Canada Testing of the
Ericsson AB
RRUS 01 B2 / KRC 118 74/1

COMMERCIAL-IN-CONFIDENCE

FCC ID: TA8AKRC11874-1
IC ID: 287AB-AS118741

Document 75913022 Report 02 Issue 1

March 2011



Product Service

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COMMERCIAL-IN-CONFIDENCE

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FCC and Industry Canada Testing of the
Ericsson AB
RRUS 01 B2 / KRC 118 74/1

Document 75913022 Report 02 Issue 1

March 2011

PREPARED FOR

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PREPARED BY

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Test Engineer

APPROVED BY

M J Hardy
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DATED

16 March 2011

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 compliance with FCC CFR 47: Part 24 and Industry Canada RSS-133. The sample tested was found to comply with the requirements defined in the applied rules.

Test Engineer(s):

X Zhang
X Zhang

C Zhang
C Zhang





CONTENTS

| Section | Page No |
|---|----------------|
| 1 REPORT SUMMARY | 3 |
| 1.1 Introduction | 4 |
| 1.2 Brief Summary of Results | 5 |
| 1.3 Declaration of Build Status | 9 |
| 1.4 Product Information | 10 |
| 1.5 Test Conditions | 15 |
| 1.6 Deviations From the Standard | 15 |
| 1.7 Modification Record | 15 |
| 1.8 Alternative Test Site | 15 |
| 2 TEST DETAILS | 16 |
| 2.1 Maximum Peak Output Power - Conducted | 17 |
| 2.2 Peak – Average Ratio | 20 |
| 2.3 Occupied Bandwidth | 24 |
| 2.4 Spurious Emissions at Antenna Terminals ($\pm 1\text{MHz}$) | 27 |
| 2.5 Radiated Spurious Emissions | 33 |
| 2.6 Conducted Spurious Emissions | 38 |
| 3 TEST EQUIPMENT USED | 46 |
| 3.1 Test Equipment Used | 47 |
| 3.2 Measurement Uncertainty | 48 |
| 4 ACCREDITATION, DISCLAIMERS AND COPYRIGHT | 49 |
| 4.1 Accreditation, Disclaimers and Copyright | 50 |



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SECTION 1

REPORT SUMMARY

Limited FCC and Industry Canada Testing of the
Ericsson AB
RRUS 01 B2 / KRC 118 74/1



1.1 INTRODUCTION

The information contained in this report is intended to show verification of the Ericsson AB RRUS 01 B2 / KRC 118 74/1 to the requirements of FCC CFR 47 Part 24 and Industry Canada RSS-133.

Testing was carried out in support of a C2PC application for Grant of RRUS 01 B2 / KRC 118 74/1 for the hardware update.

| | |
|-------------------------------|---|
| Objective | To perform FCC and Industry Canada Testing to determine the Equipment Under Test's (EUT's) compliance with the Test Specification, for the series of tests carried out. |
| Manufacturer | Ericsson AB |
| Product Name | RRUS 01 B2 |
| Part Number | KRC 118 74/1 |
| IC Model Name | AS118741 |
| Serial Number(s) | CB4G624460 |
| Software Version | CXP1040007_04R29E |
| Hardware Version | R1C |
| Number of Samples Tested | 1 |
| Test Specification/Issue/Date | FCC CFR 47 Part 24: 2010 Industry Canada RSS-133: 2009 |
| Incoming Release Date | Declaration of Build Status 23 February 2011 |
| Order Number | PTP |
| Date | 27 February 2011 |
| Start of Test | 28 February 2011 |
| Finish of Test | 07 March 2011 |
| Name of Engineer(s) | X Zhang C Zhang |
| Related Document(s) | ANSI C63.4: 2009 FCC CFR 47 Part 2: 2009 Industry Canada RSS-GEN Issue 3: 2010 |



1.2 BRIEF SUMMARY OF RESULTS

A brief summary of results in accordance with FCC CFR 47 Part 24 and Industry Canada RSS-133, is shown below.

| Configuration 1 – Base Station | | | | | | | |
|--------------------------------|--------------------|---------------------|---------------------------------------|---|-----------|--------|----------------------|
| Section | Spec Clause | | Test Description | Mode | Mod State | Result | Comments |
| | FCC Part 2 and 24 | RSS-133 and RSS-GEN | | | | | |
| | 24.232 (a) | 6.4 | Effective Radiated Power | 1930.2MHz | | N/A | No integral antenna. |
| | | | | 1960.0MHz | | N/A | |
| | | | | 1989.8MHz | | N/A | |
| | | | | 1930.2MHz + 1945.0MHz | | N/A | |
| | | | | 1960.0MHz + 1974.8MHz | | N/A | |
| | | | | 1975.0MHz + 1989.8MHz | | N/A | |
| | | | | 1930.2MHz + 1935.0MHz + 1940.0MHz + 1944.8MHz | | N/A | |
| | | | | 1955.2MHz + 1960.0MHz + 1965.0MHz + 1969.8MHz | | N/A | |
| | | | | 1975.2MHz + 1980.0MHz + 1985.0MHz + 1989.8MHz | | N/A | |
| | | | | 1930.2MHz | | N/A | |
| 2.1 | 2.1046, 24.232 (a) | 6.4 | Maximum Peak Output Power - Conducted | 1960.0MHz | 0 | Pass | - |
| | | | | 1989.8MHz | | N/A | |
| | | | | 1930.2MHz + 1945.0MHz | | N/A | |
| | | | | 1960.0MHz + 1974.8MHz | | N/A | |
| | | | | 1975.0MHz + 1989.8MHz | | N/A | |
| | | | | 1930.2MHz + 1935.0MHz + 1940.0MHz + 1944.8MHz | | N/A | |
| | | | | 1955.2MHz + 1960.0MHz + 1965.0MHz + 1969.8MHz | 0 | Pass | |
| | | | | 1975.2MHz + 1980.0MHz + 1985.0MHz + 1989.8MHz | | N/A | |
| | | | | 1930.2MHz | | N/A | - |
| | | | | 1960.0MHz | 0 | Pass | |
| 2.2 | 24.232 (d) | - | Peak – Average Ratio | 1989.8MHz | | N/A | |
| | | | | 1930.2MHz + 1945.0MHz | | N/A | |
| | | | | 1960.0MHz + 1974.8MHz | | N/A | |
| | | | | 1975.0MHz + 1989.8MHz | | N/A | |
| | | | | 1930.2MHz + 1935.0MHz + 1940.0MHz + 1944.8MHz | | N/A | |
| | | | | 1955.2MHz + 1960.0MHz + 1965.0MHz + 1969.8MHz | 0 | Pass | |
| | | | | 1975.2MHz + 1980.0MHz + 1985.0MHz + 1989.8MHz | | N/A | |



| Configuration 1 – Base Station | | | | | | | |
|--------------------------------|--------------------|----------------------------|---|---|-----------|--------|--|
| Section | Spec Clause | | Test Description | Mode | Mod State | Result | Comments |
| | FCC Part 2 and 24 | RSS-133 and RSS-GEN | | | | | |
| 2.1047 (d) | 6.2 | Modulation Characteristics | | 1930.2MHz | | N/A | Not tested ¹ |
| | | | | 1960.0MHz | | N/A | |
| | | | | 1989.8MHz | | N/A | |
| | | | | 1930.2MHz + 1945.0MHz | | N/A | |
| | | | | 1960.0MHz + 1974.8MHz | | N/A | |
| | | | | 1975.0MHz + 1989.8MHz | | N/A | |
| | | | | 1930.2MHz + 1935.0MHz + 1940.0MHz + 1944.8MHz | | N/A | |
| | | | | 1955.2MHz + 1960.0MHz + 1965.0MHz + 1969.8MHz | | N/A | |
| | | | | 1975.2MHz + 1980.0MHz + 1985.0MHz + 1989.8MHz | | N/A | |
| | | | | 1930.2MHz | | N/A | |
| 2.3 | 2.1049, 24.238 (b) | RSS-Gen 4.6.1 | Occupied Bandwidth | 1960.0MHz | 0 | Pass | - |
| | | | | 1989.8MHz | | N/A | |
| | | | | 1930.2MHz + 1945.0MHz | | N/A | |
| | | | | 1960.0MHz + 1974.8MHz | | N/A | |
| | | | | 1975.0MHz + 1989.8MHz | | N/A | |
| | | | | 1930.2MHz + 1935.0MHz + 1940.0MHz + 1944.8MHz | | N/A | |
| | | | | 1955.2MHz + 1960.0MHz + 1965.0MHz + 1969.8MHz | | N/A | |
| | | | | 1975.2MHz + 1980.0MHz + 1985.0MHz + 1989.8MHz | | N/A | |
| | | | | 1930.4MHz | 0 | Pass | |
| 2.4 | 2.1051, 24.238 (b) | 6.5 | Spurious Emissions at Antenna Terminals ($\pm 1\text{MHz}$) | 1960.0MHz | | N/A | The channel adjacent to the lower and higher band-edge cannot be used. The lowest usable channel is 513(1930.4MHz), the highest usable channel is 809(1989.6MHz) |
| | | | | 1989.6MHz | 0 | Pass | |
| | | | | 1930.4MHz + 1930.8MHz | | N/A | |
| | | | | 1960.0MHz + 1974.8MHz | | N/A | |
| | | | | 1989.2MHz + 1989.6MHz | | N/A | |
| | | | | 1930.4MHz + 1930.8MHz + 1931.2MHz + 1931.6MHz | | N/A | |
| | | | | 1955.2MHz + 1960.0MHz + 1965.0MHz + 1969.8MHz | | N/A | |
| | | | | 1988.4MHz + 1988.8MHz + 1989.2MHz + 1989.6MHz | | N/A | |



| Configuration 1 – Base Station | | | | | | | |
|--------------------------------|-----------------------|---------------------|--|---|-----------|--------|-------------------------|
| Section | Spec Clause | | Test Description | Mode | Mod State | Result | Comments |
| | FCC Part 2 and 24 | RSS-133 and RSS-GEN | | | | | |
| 2.5 | 2.1053, 24.238 (a) | 6.5 | Radiated Spurious Emissions | 1930.2MHz | | N/A | - |
| | | | | 1960.0MHz | 0 | Pass | |
| | | | | 1989.8MHz | | N/A | |
| | | | | 1930.2MHz + 1945.0MHz | 0 | Pass | |
| | | | | 1960.0MHz + 1974.8MHz | | N/A | |
| | | | | 1975.0MHz + 1989.8MHz | | N/A | |
| | | | | 1930.2MHz + 1935.0MHz + 1940.0MHz + 1944.8MHz | | N/A | |
| | | | | 1955.2MHz + 1960.0MHz + 1965.0MHz + 1969.8MHz | | N/A | |
| | | | | 1975.2MHz + 1980.0MHz + 1985.0MHz + 1989.8MHz | | N/A | |
| 2.6 | 2.1051, 24.238 (a) | 6.5 | Conducted Spurious Emissions | 1930.2MHz | | N/A | - |
| | | | | 1960.0MHz | 0 | Pass | |
| | | | | 1989.8MHz | | N/A | |
| | | | | 1930.2MHz + 1945.0MHz | 0 | Pass | |
| | | | | 1960.0MHz + 1974.8MHz | | N/A | |
| | | | | 1975.0MHz + 1989.8MHz | | N/A | |
| | | | | 1930.2MHz + 1935.0MHz + 1940.0MHz + 1944.8MHz | | N/A | |
| | | | | 1955.2MHz + 1960.0MHz + 1965.0MHz + 1969.8MHz | | N/A | |
| | | | | 1975.2MHz + 1980.0MHz + 1985.0MHz + 1989.8MHz | | N/A | |
| | 2.1055, 24.235 | 6.3 | Frequency Stability Under Temperature Variations | 1930.2MHz | | N/A | Not tested ¹ |
| | | | | 1960.0MHz | | N/A | |
| | | | | 1989.8MHz | | N/A | |
| | | | | 1930.2MHz + 1945.0MHz | | N/A | |
| | | | | 1960.0MHz + 1974.8MHz | | N/A | |
| | | | | 1975.0MHz + 1989.8MHz | | N/A | |
| | | | | 1930.2MHz + 1935.0MHz + 1940.0MHz + 1944.8MHz | | N/A | |
| | | | | 1955.2MHz + 1960.0MHz + 1965.0MHz + 1969.8MHz | | N/A | |
| | | | | 1975.2MHz + 1980.0MHz + 1985.0MHz + 1989.8MHz | | N/A | |



| Configuration 1 – Base Station | | | | | | | |
|--------------------------------|-------------------|--|------------------|---|-----------|--------|-------------------------|
| Section | Spec Clause | | Test Description | Mode | Mod State | Result | Comments |
| | FCC Part 2 and 24 | RSS-133 and RSS-GEN | | | | | |
| 2.1055, 24.235 | 6.3 | Frequency Stability Under Voltage Variations | | 1930.2MHz | | N/A | Not tested ¹ |
| | | | | 1960.0MHz | | N/A | |
| | | | | 1989.8MHz | | N/A | |
| | | | | 1930.2MHz + 1945.0MHz | | N/A | |
| | | | | 1960.0MHz + 1974.8MHz | | N/A | |
| | | | | 1975.0MHz + 1989.8MHz | | N/A | |
| | | | | 1930.2MHz + 1935.0MHz + 1940.0MHz + 1944.8MHz | | N/A | |
| | | | | 1955.2MHz + 1960.0MHz + 1965.0MHz + 1969.8MHz | | N/A | |
| | | | | 1975.2MHz + 1980.0MHz + 1985.0MHz + 1989.8MHz | | N/A | |
| | | | | | | | |
| - | 6.6 | Receiver Spurious Emissions | | 1930.2MHz | | N/A | Not tested ¹ |
| | | | | 1960.0MHz | | N/A | |
| | | | | 1989.8MHz | | N/A | |
| | | | | 1930.2MHz + 1945.0MHz | | N/A | |
| | | | | 1960.0MHz + 1974.8MHz | | N/A | |
| | | | | 1975.0MHz + 1989.8MHz | | N/A | |
| | | | | 1930.2MHz + 1935.0MHz + 1940.0MHz + 1944.8MHz | | N/A | |
| | | | | 1955.2MHz + 1960.0MHz + 1965.0MHz + 1969.8MHz | | N/A | |
| | | | | 1975.2MHz + 1980.0MHz + 1985.0MHz + 1989.8MHz | | N/A | |

N/A – Not Applicable

Note¹ – Limited testing has been performed as this report is to be used as justification for Class II Permissive Change. See section 1.6.



1.3 DECLARATION OF BUILD STATUS

| MAIN EUT | |
|--|---|
| MANUFACTURING DESCRIPTION | Radio Equipment |
| MANUFACTURER | Ericsson AB |
| PRODUCT NAME | RRUS 01 B2 |
| PART NUMBER | KRC 118 74/1 |
| IC Model Name | AS118741 |
| SERIAL NUMBER | CB4G624460 |
| HARDWARE VERSION | R1C |
| SOFTWARE VERSION | CXP1040007_04R29E |
| TRANSMITTER OPERATING RANGE | TX: 1930.4MHz - 1989.6MHz RX: 1850.4MHz - 1909.6MHz |
| MODULATIONS | GMSK, 8-PSK |
| INTERMEDIATE FREQUENCIES | -- |
| ITU DESIGNATION OF EMISSION | 250KGXW 250KG7W |
| OUTPUT POWER (RMS) (W or dBm) | Single Carrier: 1 x 47.8dBm (1 x 60W) Multi Carrier (x 2): 2 x 44.8dBm (2 x 30W) Multi Carrier (x 4): 4 x 41.8dBm (4 x 15W) |
| FCC ID | TA8AKRC11874-1 |
| IC ID | 287AB-AS118741 |
| TECHNICAL DESCRIPTION (a brief description of the intended use and operation) | The equipment is the Radio Part of GSM Base Station. |

Signature

Date

24 February 2011

D of B S Serial No

75913022/01

No responsibility will be accepted by TÜV SÜD Product Service Limited as to the accuracy of the information declared in this document by the manufacturer.



1.4 PRODUCT INFORMATION

1.4.1 Technical Description

The Equipment Under Test (EUT) RRUS 01 B2 / KRC 118 74/1 is an Ericsson AB Radio Equipment working in the public mobile service 1900MHz band which provides communication connections to GSM1900 network. The RRUS 01 B2 / KRC 118 74/1 operates from a -48V DC volt supply.

The Equipment Under Test (EUT) is shown in the photograph below. A full technical description can be found in the Manufacturer's documentation.



Equipment Under Test

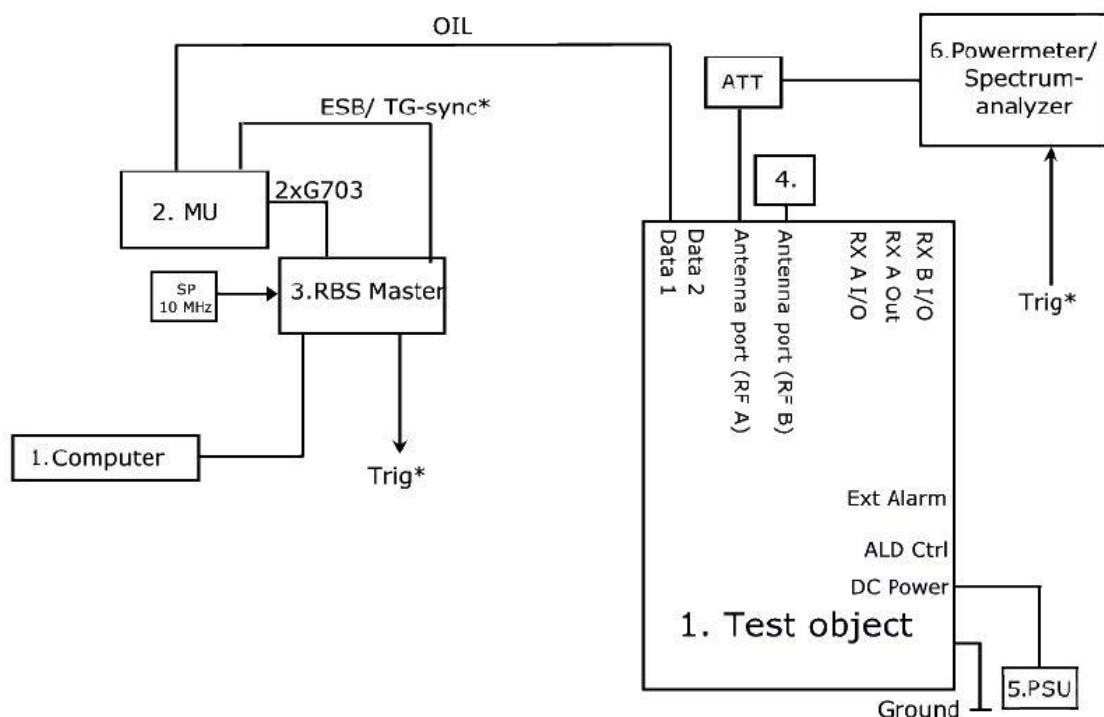


1.4.2 Test Configuration

Configuration 1: Base Station

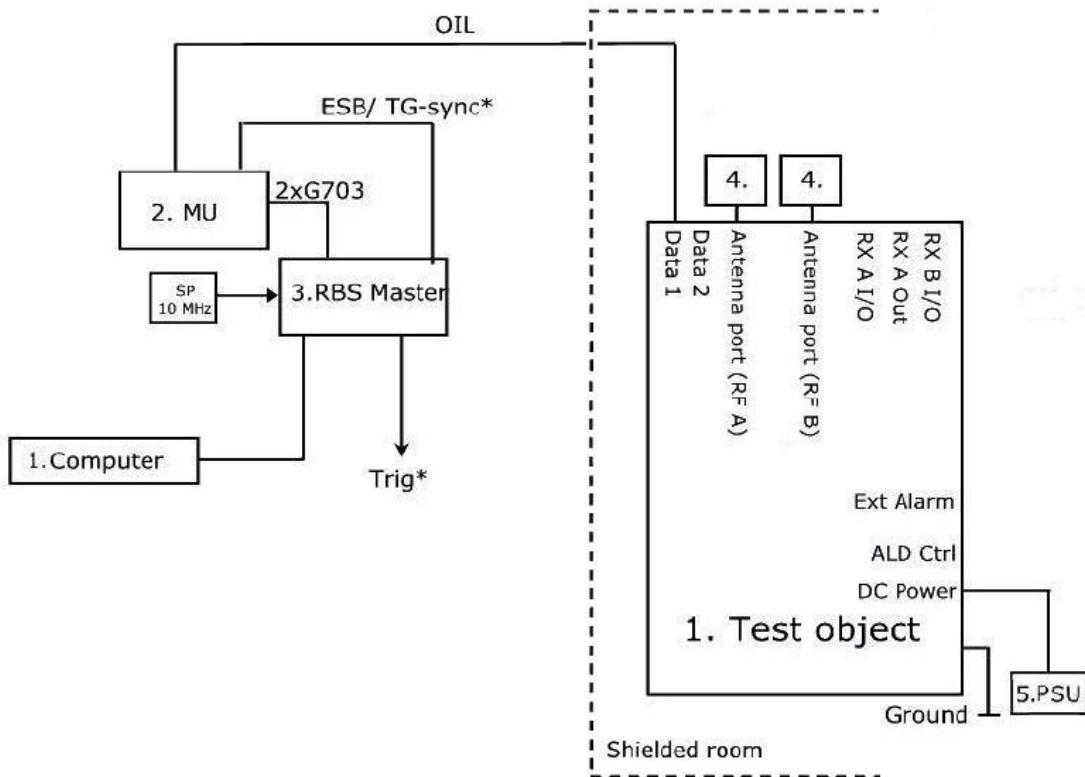
The EUT was configured in accordance with FCC CFR 47 Part 24 and Industry Canada RSS-133.

The RRUS 01 B2 / KRC 118 74/1 supports both GMSK and 8-PSK modulations at 1900MHz. The unit includes a Tx / Rx port and a RX port. It can be configured to transmit with 1900MHz single or multi carrier at the RF output connector. All Tx Testing was performed on the combined Tx / Rx output connector ANT A of the EUT, with RX antenna port ANT B terminated. The complete testing was performed with the test object transmitting pseudorandom data in all timeslots at maximum RF power and both modulations GMSK and 8-PSK were tested unless otherwise stated. The EUT was powered by a -48V DC Power supply.

Test Setup, Conducted Measurement:

| Test Object | Part Number | Version | Serial Number |
|-------------|---------------------------|---------|---------------|
| Radio Part | RRUS 01 B2 / KRC 118 74/1 | R1C | CB4G624460 |

| No. | Auxiliary Equipment | Part Number / Model Type | Version | Serial Number |
|-----|----------------------|--------------------------|---------|---------------|
| 1 | Computer | Sun Blade 1500 | -- | MT50620051 |
| 2 | Main Unit DUG 2001 | KDU 137 569/1 | R2A | C823708841 |
| | Main Unit SUP 6601 | 1/BFL 901 009/1 | R3B | BR80993661 |
| 3 | RBS Master | LPY1071007/3 | R1C | T01E050909 |
| 4 | Load | TF150-3 | -- | 090323089 |
| 5 | Power Supply | N5768A | -- | US10A0157G |
| 6 | Power Meter | Rohde & Schwarz NRP | -- | 102428 |
| | Thermal Power Sensor | Rohde & Schwarz NRP-Z51 | -- | 102126 |
| | Spectrum Analyzer | FSQ26 | -- | 200761 |

Test Setup, Radiated Measurement:


| Test Object | Part Number | Version | Serial Number |
|-------------|---------------------------|---------|---------------|
| Radio Part | RRUS 01 B2 / KRC 118 74/1 | R1C | CB4G624460 |

| No. | Auxiliary Equipment | Part Number / Model Type | Version | Serial Number |
|-----|---------------------|--------------------------|---------|---------------|
| 1 | Computer | Sun Blade 1500 | -- | MT50620051 |
| 2 | Main Unit DUG 2001 | KDU 137 569/1 | R2A | C823708841 |
| | Main Unit SUP 6601 | 1/BFL 901 009/1 | R3B | BR80993661 |
| 3 | RBS Master | LPY1071007/3 | R1C | T01E050909 |
| 4 | Load | TF150-3 | -- | 090323089 |
| | Load | TF100 | -- | 08011701 |
| 5 | Power Supply | DH1716A-10 | -- | 1000303181 |



1.4.3 Modes of Operation

Modes of operation of each EUT during testing were as follows:

Mode 1 - ARFCN 512: 1930.2MHz (Bottom Channel)

Mode 1' - ARFCN 513: 1930.4MHz (B+1 Channel)

Mode 2 - ARFCN 661: 1960.0MHz (Middle Channel)

Mode 3 - ARFCN 810: 1989.8MHz (Top Channel)

Mode 3' - ARFCN 810: 1989.6MHz (T-1 Channel)

Mode 4 - ARFCN 512 + 586: 1930.2MHz + 1945.0MHz (B and B+14.8MHz)

Mode 5 - ARFCN 637 + 661 + 686 + 710:
1955.2MHz + 1960.0MHz + 1965.0MHz + 1969.8MHz (M-4.8MHz, M, M+5.0MHz and M+9.8MHz)

Information on the specific test modes utilised are detailed in the test procedure for each individual test.



1.5 TEST CONDITIONS

For all tests the EUT was set up in accordance with the relevant test standard and to represent typical operating conditions. Tests were applied with the EUT situated in a shielded enclosure, test laboratories or an open test area as appropriate.

The EUT was powered from a -48V DC supply.

1.6 DEVIATIONS FROM THE STANDARD

Full testing has not been carried out in accordance with the specifications because this report is to be used as justification for a Class II Permissive Change to the EUT for the hardware update. This report verifies maintained performance of the EUT for the affected characteristics according to the FCC CFR 47 Part 2.1043 by re-testing the updated equipment as described in section 1.4.2.

1.7 MODIFICATION RECORD

No modifications were made to the EUT during testing.

1.8 ALTERNATIVE TEST SITE

Testing has been performed under the following site registrations:

FCC Accreditation 910917:
The State Radio Monitoring Centre, No.80 Beilishi Road Xicheng District Beijing, China.

Industry Canada Accreditation 7308A:
The State Radio Monitoring Centre, No.80 Beilishi Road Xicheng District Beijing, China.



Product Service

SECTION 2

TEST DETAILS

Limited FCC and Industry Canada Testing of the
Ericsson AB
RRUS 01 B2 / KRC 118 74/1



2.1 MAXIMUM PEAK OUTPUT POWER - CONDUCTED

2.1.1 Specification Reference

FCC CFR 47 Part 2.1046
 FCC CFR 47 Part 24, Clause 24.232 (a)
 Industry Canada RSS-133, Clause 6.4

2.1.2 Equipment Under Test

RRUS 01 B2 / KRC 118 74/1, S/N: CB4G624460

2.1.3 Date of Test and Modification State

28 February 2011 – Modification State 0

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 Method and Operating Modes

The test was applied in accordance with the test method requirements of FCC CFR 47 Part 2 and Part 24 and Industry Canada RSS-133.

Using a power meter and attenuator(s), the output power of the EUT was measured at the antenna terminal. The carrier power was measured with GMSK and 8-PSK using the test model described.

The path loss was measured and entered as a reference level offset.

The test was performed with the EUT in the following configurations and modes of operation:

Configuration 1 - Mode 2
 - Mode 5

2.1.6 Environmental Conditions

28 February 2011

Ambient Temperature 21.0°C

Relative Humidity 30.2%



2.1.7 Test Results

For the period of test the EUT met the requirements of FCC CFR 47 Part 2 and Part 24 and Industry Canada RSS-133 for Maximum Peak Output Power.

The test results are shown below

Single Carrier: Rated output power level at RF A connector: 47.8dBm

Configuration 1 - Mode 2

GMSK

| UARFCN | Frequency (MHz) | Path Loss (dB) | Result (dBm) RMS | Result (W) RMS |
|--------------|-----------------|----------------|---------------------|-------------------|
| 661 (Middle) | 1960.0 | 28.7 | 47.10 | 51.29 |

8-PSK

| UARFCN | Frequency (MHz) | Path Loss (dB) | Result (dBm) RMS | Result (W) RMS |
|--------------|-----------------|----------------|---------------------|-------------------|
| 661 (Middle) | 1960.0 | 28.7 | 47.30 | 53.70 |



Multi Carrier (1x4): Rated output power level at RF A connector: 41.8dBm/carrier

Configuration 1 - Mode 5

GMSK

| UARFCN | Frequency (MHz) | Path Loss (dB) | Result (dBm) RMS | Result (W) RMS |
|--------------|-----------------|----------------|---------------------|-------------------|
| 661 (Middle) | 1960.0 | 28.7 | 41.17 | 13.09 |

8-PSK

| UARFCN | Frequency (MHz) | Path Loss (dB) | Result (dBm) RMS | Result (W) RMS |
|--------------|-----------------|----------------|---------------------|-------------------|
| 661 (Middle) | 1960.0 | 28.7 | 41.03 | 12.68 |

| | |
|-------|------------------|
| Limit | ≤100W or ≤+50dBm |
|-------|------------------|

Remarks

The EUT does not exceed 100W or 50dBm at the measured frequencies.



2.2 PEAK – AVERAGE RATIO

2.2.1 Specification Reference

FCC CFR 47 Part 24, Clause 24.232 (d)

2.2.2 Equipment Under Test

RRUS 01 B2 / KRC 118 74/1, S/N: CB4G624460

2.2.3 Date of Test and Modification State

28 February 2011 – Modification State 0

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 Method and Operating Modes

The test was applied in accordance with the test method requirements of FCC CFR 47 Part 24.

A peak to average ratio measurement is performed at the conducted port of the EUT. The spectrum analyzers Complementary Cumulative Distribution Function (CCDF) measurement profile is used to determine the largest deviation between the average and the peak power of the EUT in given bandwidth. The CCDF curve shows how much time the peak waveform spends at or above a given average power level. The percent of time the signal spends at or above the level defines the probability for that particular power level.

The path loss is measured and entered as a reference level offset.

The test was performed with the EUT in the following configurations and modes of operation:

Configuration 1 - Mode 2
- Mode 5

2.2.6 Environmental Conditions

28 February 2011

Ambient Temperature 21.0°C

Relative Humidity 30.2%



2.2.7 Test Results

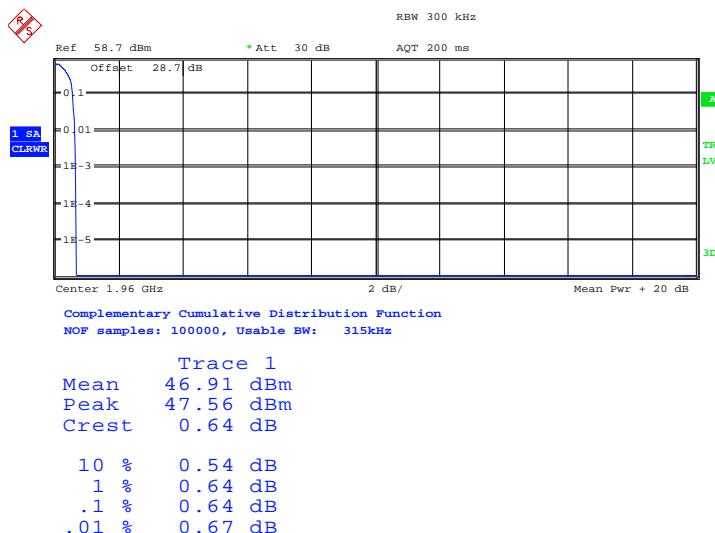
For the period of test the EUT met the requirements of FCC CFR 47 Part 24 Peak – Average Ratio.

The test results are shown below.

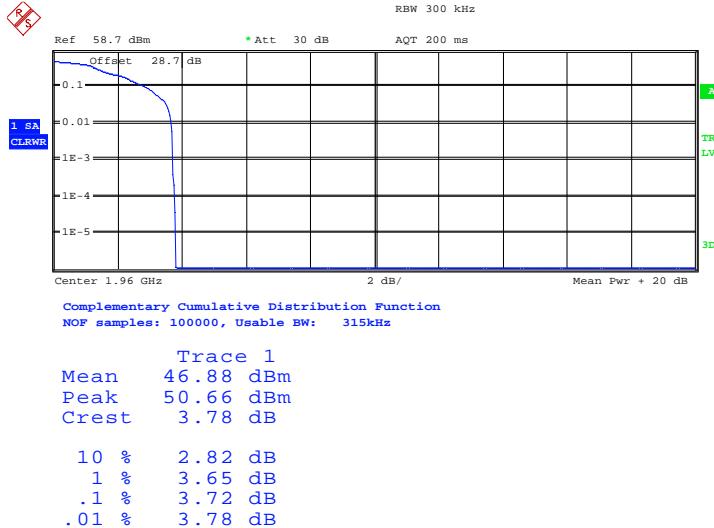
Single Carrier

Configuration 1 - Mode 2

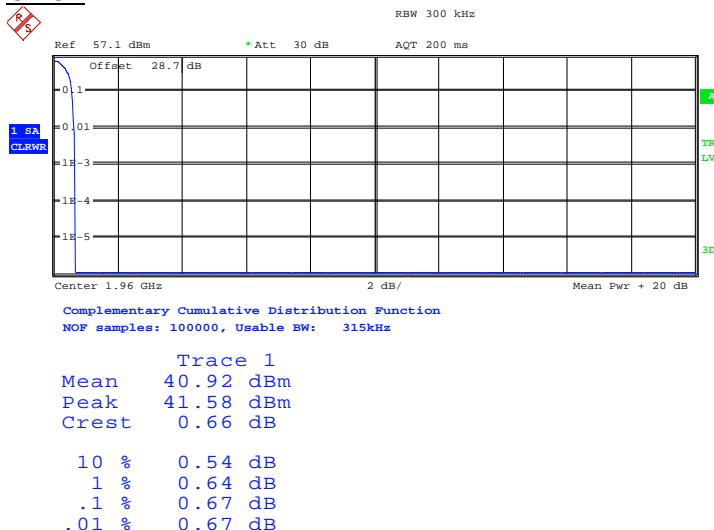
GMSK



Date: 28.FEB.2011 04:48:46

8-PSK

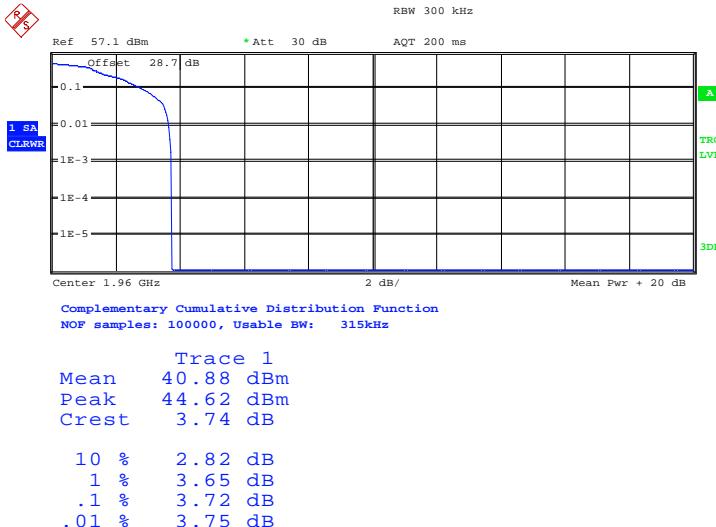
Date: 28.FEB.2011 04:47:54

Multi Carrier (1x4)Configuration 1 - Mode 5GMSK

Date: 28.FEB.2011 04:38:15



Product Service

8-PSK

Date: 28.FEB.2011 04:42:35

| | |
|-------|------|
| Limit | 13dB |
|-------|------|

Remarks

The Peak – Average ratio does not exceed 13dB at the measured frequencies.



2.3 OCCUPIED BANDWIDTH

2.3.1 Specification Reference

FCC CFR 47 Part 2, Clause 2.1049 (h)
 FCC CFR 47 Part 24, Clause 24.238 (b)
 Industry Canada RSS-GEN, Clause 4.6.1

2.3.2 Equipment Under Test

RRUS 01 B2 / KRC 118 74/1, S/N: CB4G624460

2.3.3 Date of Test and Modification State

28 February 2011 – Modification State 0

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 Method and Operating Modes

The test was applied in accordance with the test method requirements of FCC CFR 47 Part 2 and Part 24 and Industry Canada RSS-GEN.

The EUT was transmitting at maximum power, modulated with all timeslots active. Using a resolution bandwidth of 3kHz and a video bandwidth of 30kHz. The occupied bandwidth, that is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission. The -26dBc points were also established and the emission bandwidth determined.

The test was performed with the EUT in the following configurations and modes of operation:

Configuration 1 - Mode 2

2.3.6 Environmental Conditions

| | |
|---------------------|------------------|
| | 28 February 2011 |
| Ambient Temperature | 21.0°C |
| Relative Humidity | 30.2% |



2.3.7 Test Results

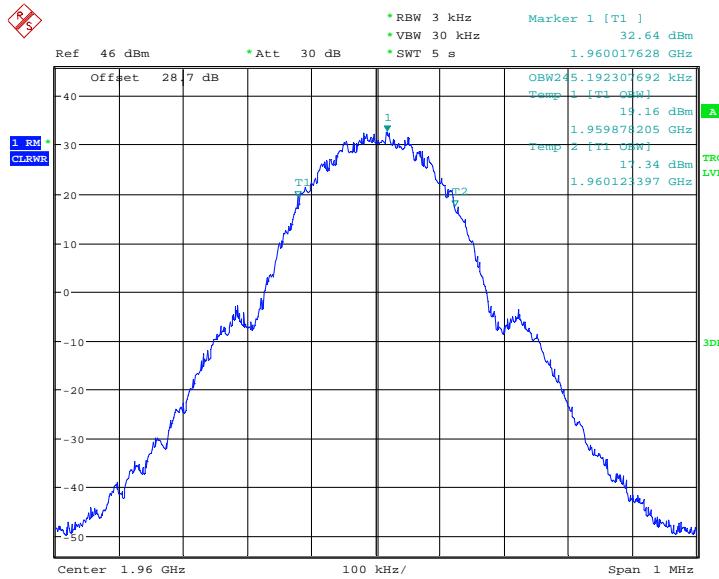
For the period of test the EUT met the requirements of FCC CFR 47 Part 2 and Part 24 and Industry Canada RSS-GEN for Occupied Bandwidth.

The test results are shown below

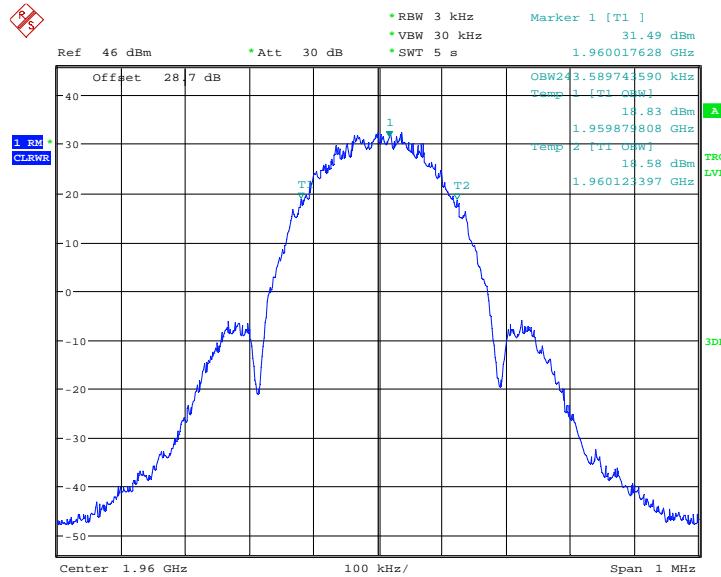
Single Carrier

Configuration 1 - Mode 2

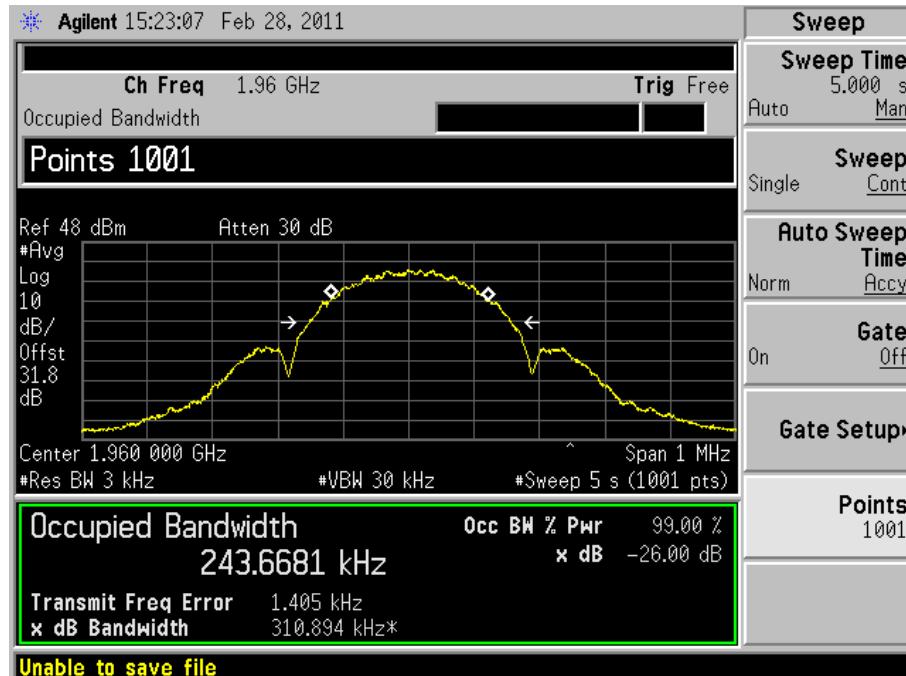
GMSK



Date: 28.FEB.2011 04:56:11

8-PSK

Date: 28.FEB.2011 04:58:38

-26dBc Bandwidth



2.4 SPURIOUS EMISSIONS AT ANTENNA TERMINALS ($\pm 1\text{MHz}$)

2.4.1 Specification Reference

FCC CFR 47 Part 2, Clause 2.1051
 FCC CFR 47 Part 24, Clause 24.238 (a)
 Industry Canada RSS-133 Clause 6.5

2.4.2 Equipment Under Test

RRUS 01 B2 / KRC 118 74/1, S/N: CB4G624460

2.4.3 Date of Test and Modification State

28 February 2011 – Modification State 0

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 Method and Operating Modes

The test was applied in accordance with the test method requirements of FCC CFR 47 Part 2 and Part 24 and Industry Canada RSS-133.

In accordance with 24.238(b), at least 1% of the 26dB bandwidth was used for the resolution bandwidth up to 1 MHz away from the block edge. A resolution bandwidth of 50kHz was used between 1MHz to 5MHz away from the band edge. As the FCC rules specify a RBW of 1MHz for measurements of emissions > 1MHz away from the band edges, the limit was adjusted with -13dB to -26dBm to compensate for the reduced measurement bandwidth. Spectrum analyser detector was set as RMS.

The path loss measured and entered as a reference level offset.

The EUT was tested at its maximum power level with all timeslots active.

The test was performed with the EUT in the following configurations and modes of operation:

Configuration 1 - Mode 1
 - Mode 3

2.4.6 Environmental Conditions

28 February 2011

Ambient Temperature 21.0°C

Relative Humidity 30.2%



2.4.7 Test Results

For the period of test the EUT met the requirements of FCC CFR 47 Part 2 and Part 24 and Industry Canada RSS-133 for Spurious Emissions Antenna Terminals ($\pm 1\text{MHz}$)

Below are the Frequencies the EUT was tested against along with the tested channels.

Remark:

The channel adjacent to the lower and higher band-edge cannot be used. The lowest usable channel is 513 (1930.4MHz), the highest usable channel is 809 (1989.6MHz)

Single Carrier

Configuration 1 - Mode 1' and 3'

GMSK and 8-PSK

| Band Edge Frequency | Edge Test with GMSK modulation Channel No./Frequencies | Edge Test with 8-PSK modulation Channel No./Frequencies |
|---------------------|---|--|
| Bottom 1930 MHz | Channel: 513 Frequency: 1930.4 MHz | Channel: 513 Frequency: 1930.4 MHz |
| Top 1990 MHz | Channel: 809 Frequency: 1989.6 MHz | Channel: 809 Frequency: 1989.6 MHz |

The channels shown in the table above are the minimum and maximum channels that can be used in the authorised frequency ranges to maintain compliance. Channels used outside of those stated and power levels used beyond 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.

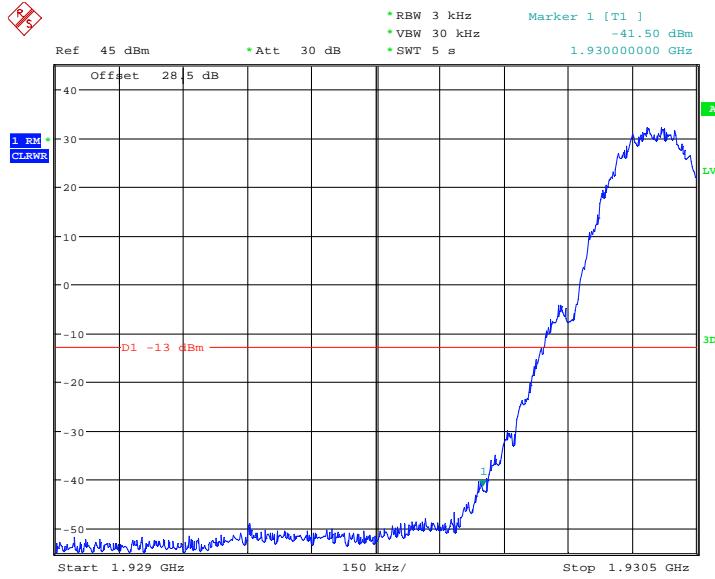


The test results are shown below

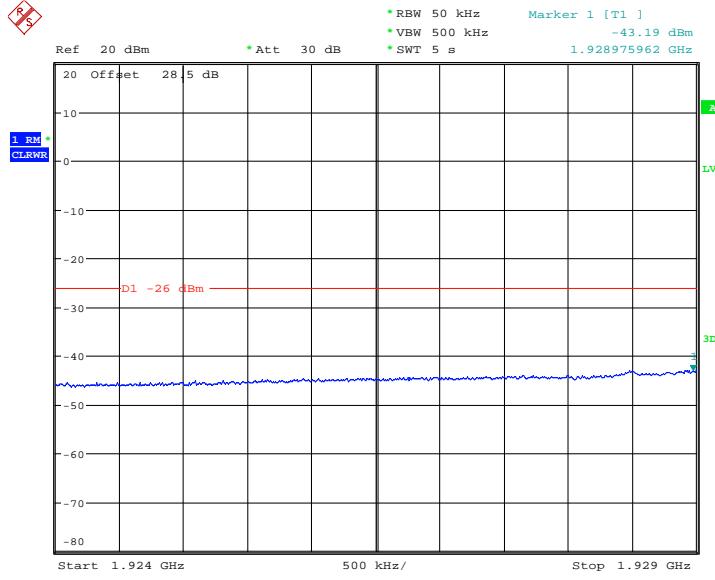
Single Carrier

Configuration 1 - Mode 1

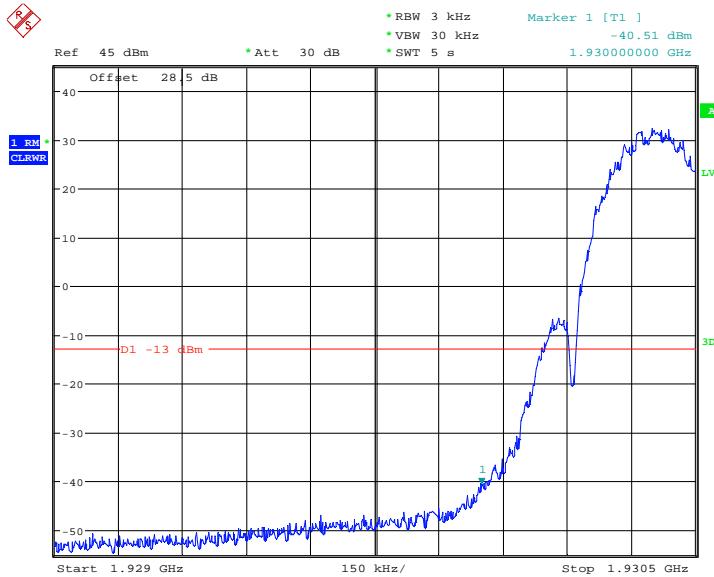
GMSK



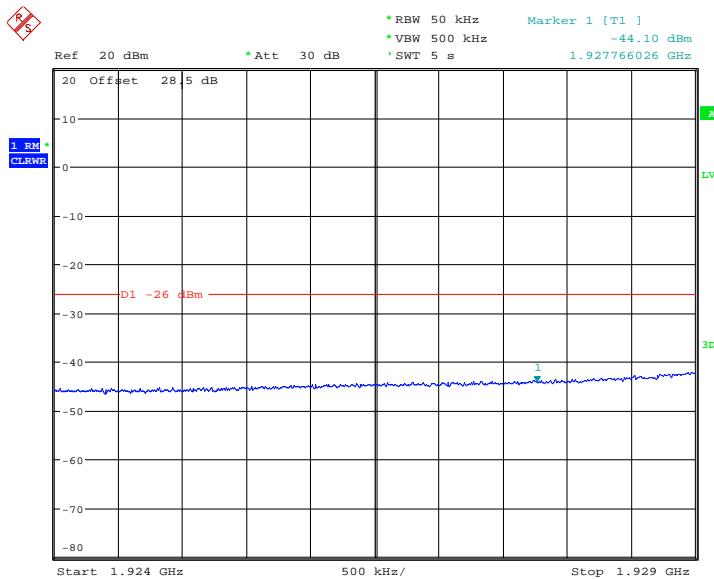
Date: 28.FEB.2011 05:21:16



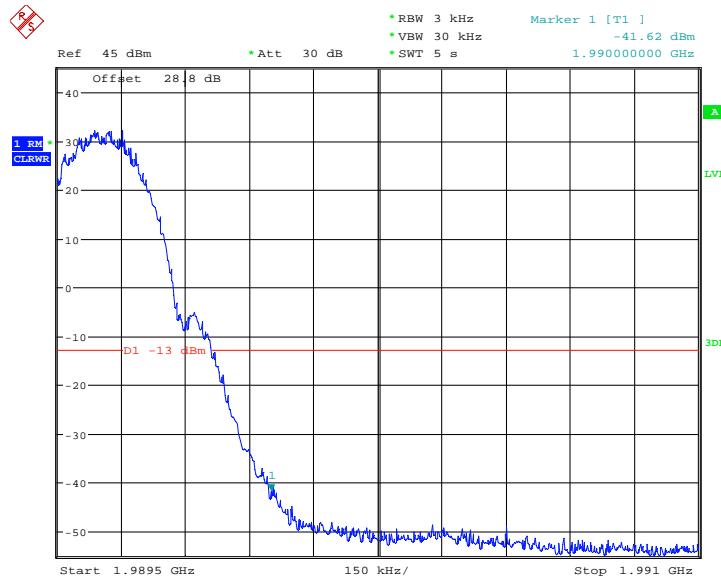
Date: 28.FEB.2011 05:22:56

8-PSK

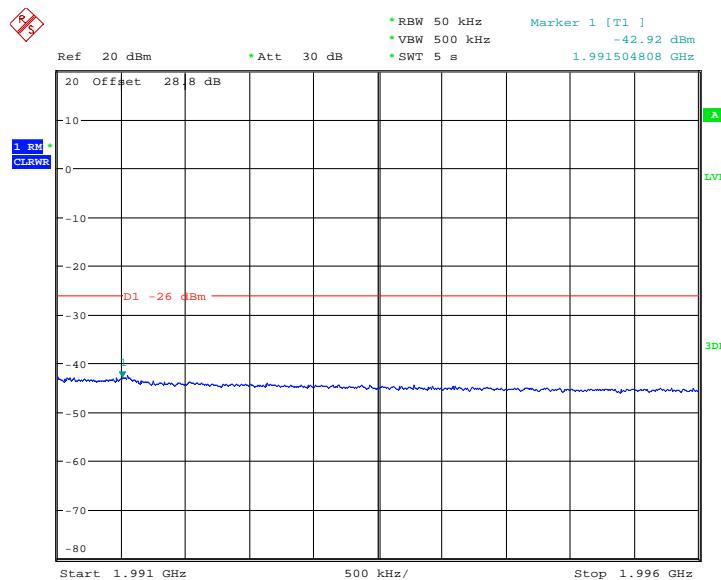
Date: 28.FEB.2011 05:20:27



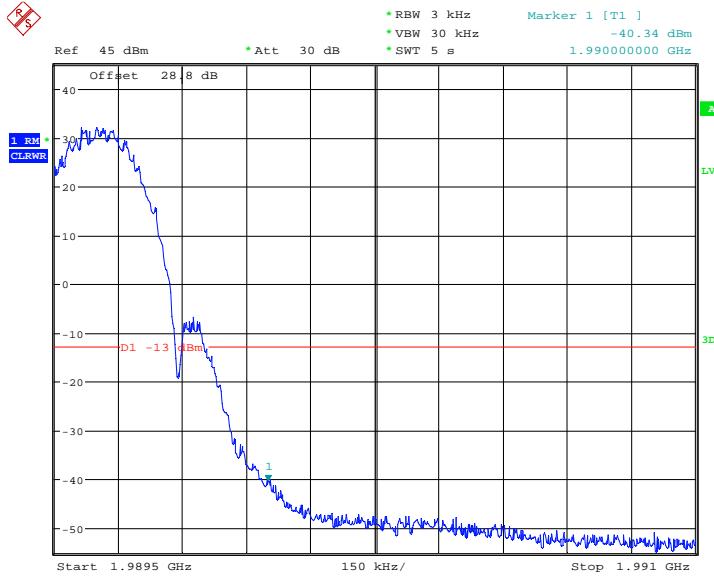
Date: 28.FEB.2011 05:18:17

Configuration 1 - Mode 3GMSK

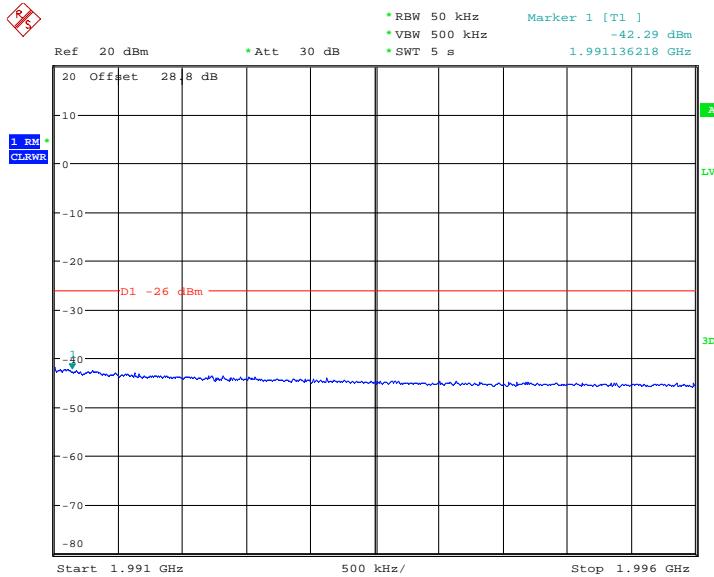
Date: 28.FEB.2011 05:38:11



Date: 28.FEB.2011 05:37:14

8-PSK

Date: 28.FEB.2011 05:35:46



Date: 28.FEB.2011 05:36:30

Limit

The power of any emission outside the frequency band shall be attenuated below the transmitter power (P) by at least $43 + 10\log P$ dB.



2.5 RADIATED SPURIOUS EMISSIONS

2.5.1 Specification Reference

FCC CFR 47 Part 2, Clause 2.1053
 FCC CFR 47 Part 24, 24.238 (a)
 Industry Canada RSS-133, Clause 6.5

2.5.2 Equipment Under Test

RRUS 01 B2 / KRC 118 74/1, S/N: CB4G624460

2.5.3 Date of Test and Modification State

07 March 2011 – Modification State 0

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 Method and Operating Modes

The test was applied in accordance with the test method requirements of FCC CFR 47 Part 2 and Part 24 and Industry Canada RSS-133.

All measurements were performed with the test object configured for maximum transmitter output power at Tx / Rx output port. The modulation 8-PSK was found to be representative for worst case setting for the radiated measurements and was used for the measurements.

A preliminary profile of the Spurious Radiated Emissions was obtained by operating the EUT on a remotely controlled turntable within the chamber. Measurements of emissions from the EUT were obtained with the Measurement Antenna in both Horizontal and Vertical Polarisations.

Emissions identified within the range 30MHz – 25GHz were then formally measured using a Peak detector as the worst case.

In the frequency Range 30MHz – 25GHz, the measurement was performed with a resolution bandwidth of 1MHz.

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

The limits for Spurious Emissions have been calculated, as shown below using the following formula:

Field Strength of Carrier - (43 + 10Log (P)) dB

Where:

Field Strength is measured in dB μ V/m
 P is measured Transmitter Power in Watts



Determination of Spurious Emission Limit

As the EUT does not have an integral antenna, the field strength of the carrier has been calculated assuming that the power is to be fed to a half-wave tuned dipoles as per 2.1053 (a).

$$E_{(V/m)} = (30 \times G_i \times P_o)^{0.5} / d$$

Where G_i is the antenna gain of ideal half-wave dipoles,
 P_o is the power out of the transceiver in W,
 d is the measurement distance in meter.

Therefore at 3m measurement distance the field strength using the lowest transceiver output power would be:

$$E_{(V/m)} = (30 \times 1.64 \times 60.12)^{0.5} / 3 = 18.129V/m = 145.2dB\mu V/m$$

As per 24.238(a) the spurious emission must be attenuated by $43 + 10\log(P_o)$ dB this gives:

$$43 + 10\log(60.12) = 60.8dB$$

Therefore the limit at 3m measurement distance is:

$$145.2 - 60.8 = 84.4dB\mu V/m$$

This limit has been used to determine Pass or Fail for the harmonics measured and detailed in the following results.

The test was performed with the EUT in the following configurations and modes of operation:

Configuration 1 - Mode 2
 - Mode 4

2.5.6 Environmental Conditions

07 March 2011

Ambient Temperature 21.0°C

Relative Humidity 31.5%



2.5.7 Test Results

For the period of test the EUT met the requirements of FCC CFR 47 Part 2 & Part 24 and Industry Canada RSS-133 for Radiated Spurious Emissions.

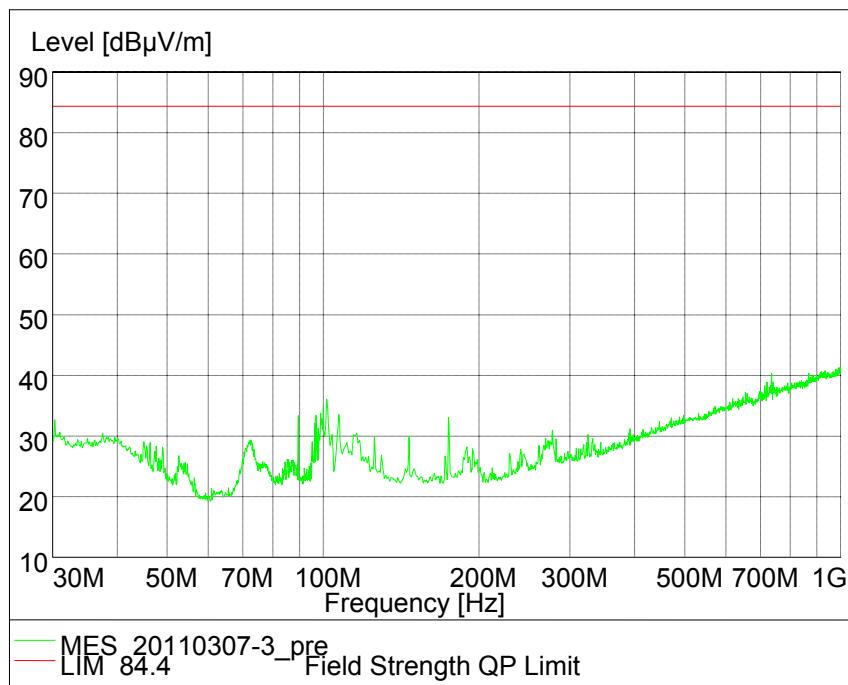
The test results are shown below

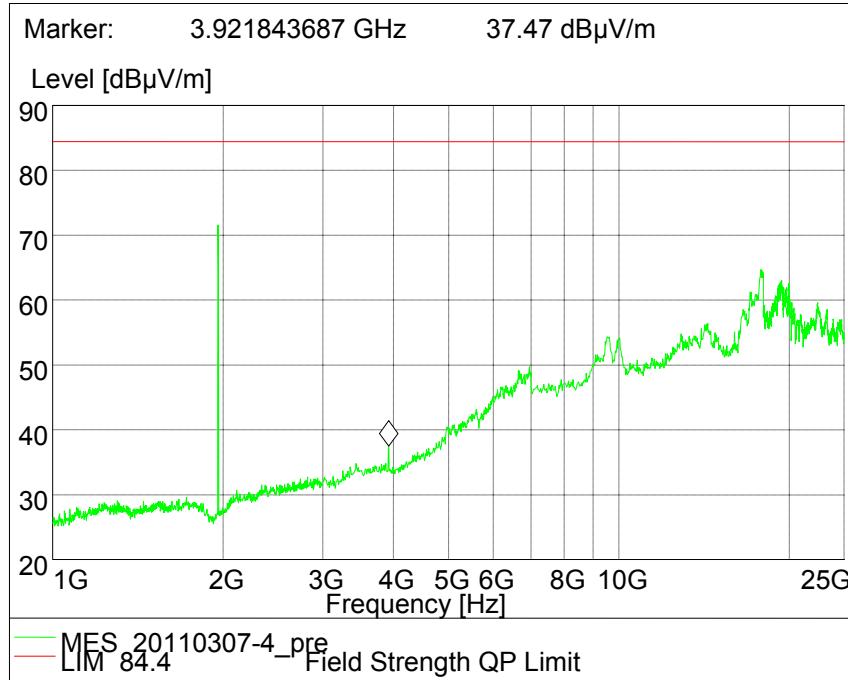
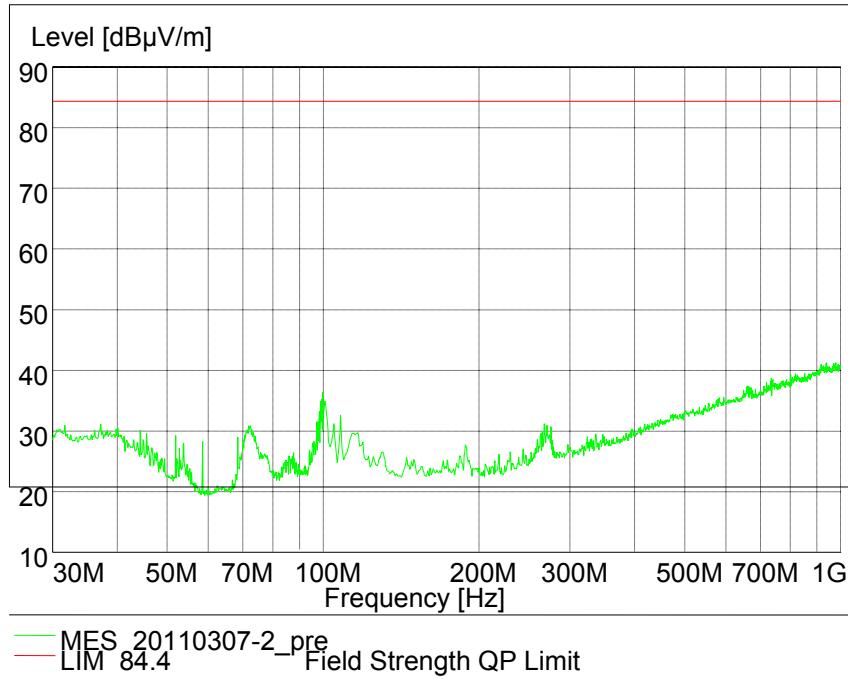
Single Carrier

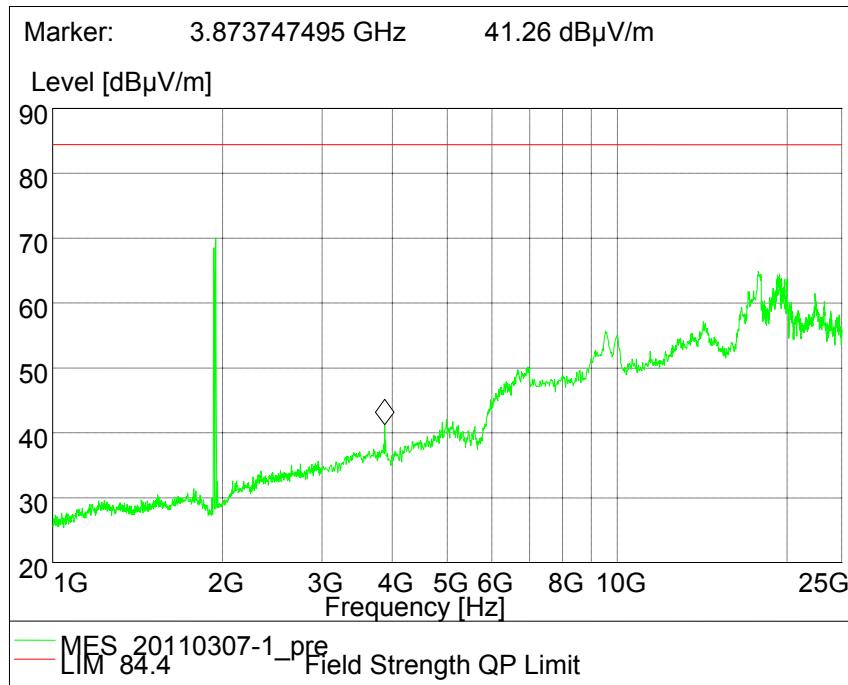
Configuration 1 - Mode 2

8-PSK

30MHz – 1GHz



1GHz – 25GHz**Multi Carrier (1x2)**Configuration 1 - Mode 48-PSK30MHz – 1GHz

1GHz – 25GHz

| | |
|-------|---------------------------|
| Limit | -13dBm / 84.4dB μ V/m |
|-------|---------------------------|

Remarks

The EUT does not exceed -13dBm / 84.4dB μ V/m at the measured frequencies.



2.6 CONDUCTED SPURIOUS EMISSIONS

2.6.1 Specification Reference

FCC CFR 47 Part 2, Clause 2.1051
 FCC CFR 47 Part 24, 24.238 (a)
 Industry Canada RSS-133, Clause 6.5

2.6.2 Equipment Under Test

RRUS 01 B2 / KRC 118 74/1, S/N: CB4G624460

2.6.3 Date of Test and Modification State

28 February 2011 – Modification State 0

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 Method and Operating Modes

The test was applied in accordance with the test method requirements of FCC CFR 47 Part 2 and Part 24 and Industry Canada RSS-133.

In accordance with Part 2.1051, the spurious emissions from the antenna terminal were measured. The transmitter output power was attenuated using an attenuator and the frequency spectrum investigated from 9kHz to 25GHz. The EUT was set to transmit on maximum power. The EUT was tested on with GMSK and 8-PSK modulation types. The resolution was set to 1MHz for 9kHz to 25GHz thus meeting the requirements of Part 24.238(b). The spectrum analyser detector was set to peak and trace was kept on Max Hold.

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

In addition, measurements were made up to the 10th harmonic of the highest internal frequency.

The test was performed with the EUT in the following configurations and modes of operation:

Configuration 1 - Mode 2
 - Mode 4

2.6.6 Environmental Conditions

28 February 2011

Ambient Temperature 21.0°C

Relative Humidity 30.2%



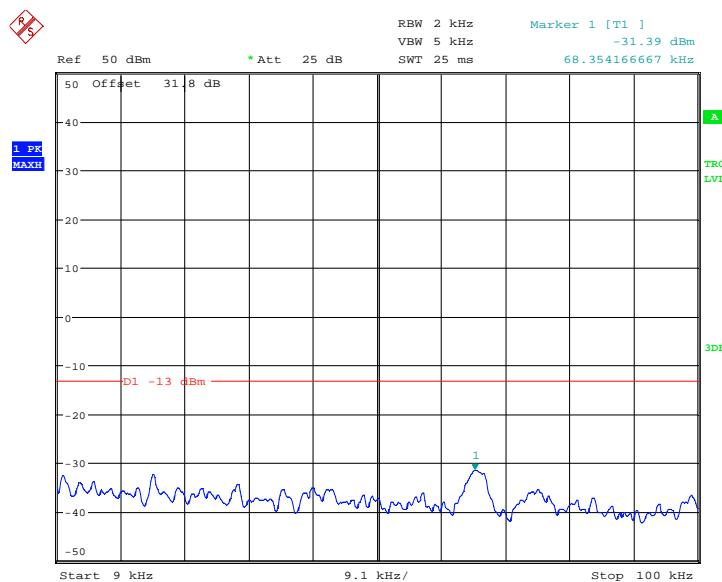
2.6.7 Test Results

For the period of test the EUT met the requirements of FCC CFR 47 Part 2 and Part 24 and Industry Canada RSS-133 for Conducted Spurious Emissions.

The test results are shown below

Remark:

The emissions at 9kHz on the plots was not generated by the test object. A complementary measurement with a smaller Span showed that it was related to the LO feedthrough.



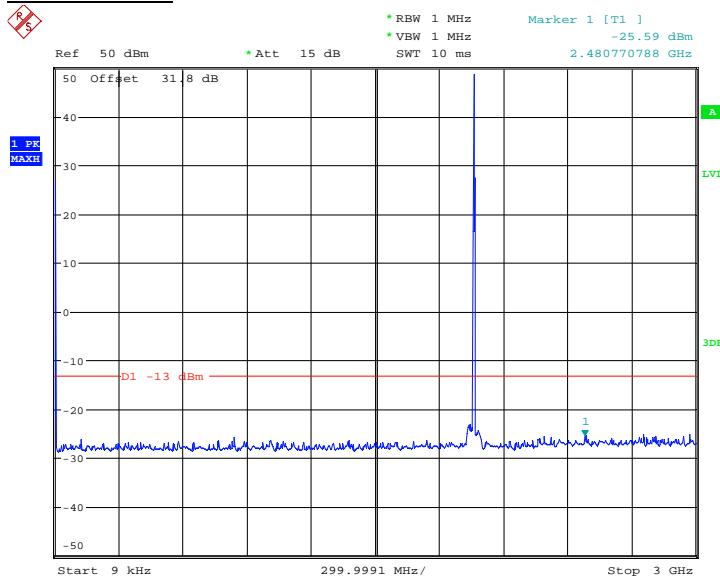


Single Carrier

Configuration - Mode 2

GMSK

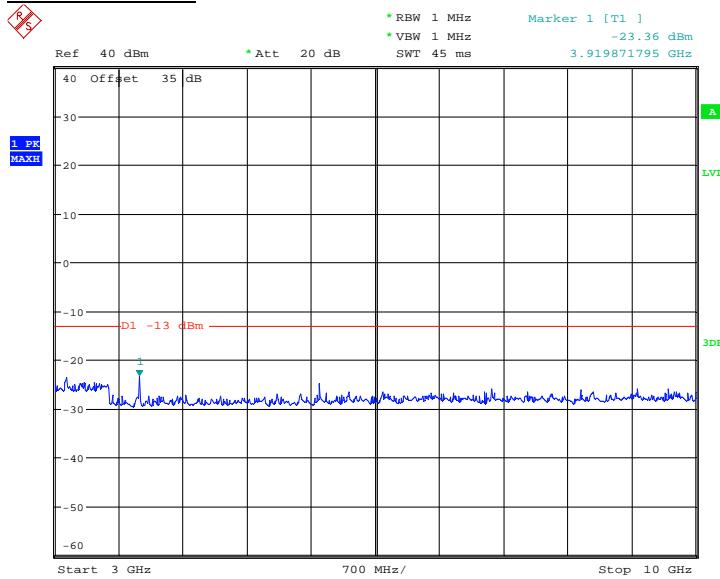
9kHz to 3GHz



Date: 28.FEB.2011 08:21:48

Note: The emission beyond the limit is the operating frequency.

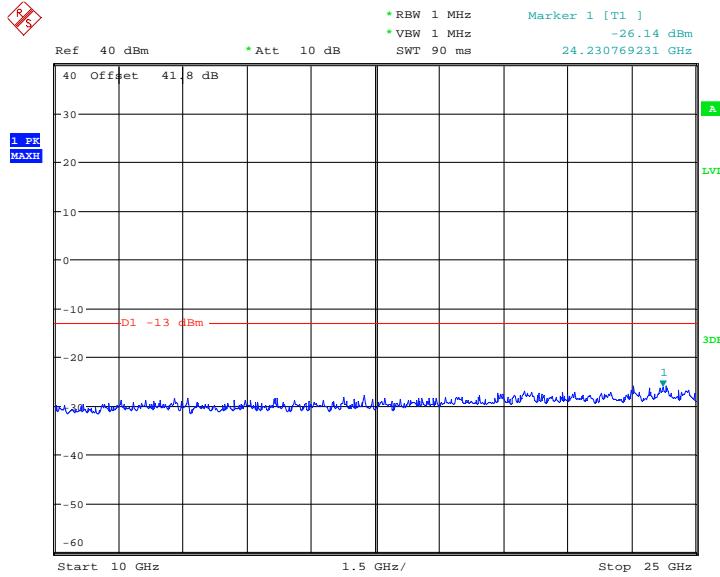
3GHz to 10GHz



Date: 28.FEB.2011 08:23:08



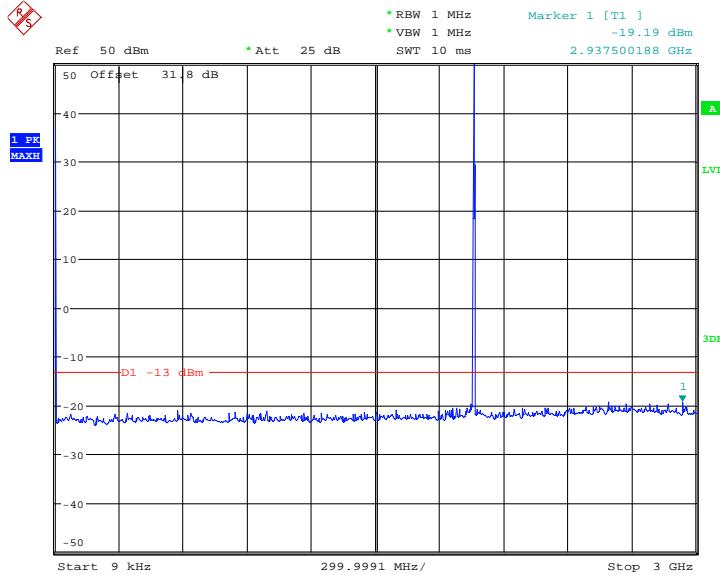
10GHz to 25GHz



Date: 28.FEB.2011 08:24:05

8-PSK

9kHz to 3GHz

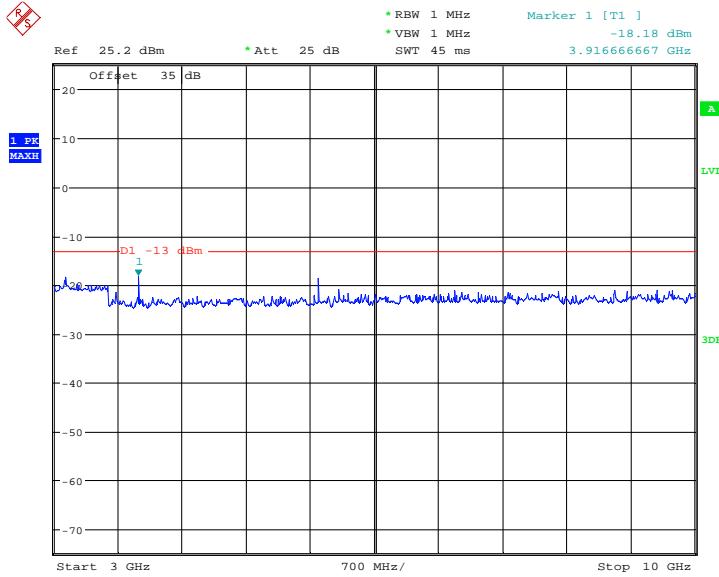


Date: 28.FEB.2011 08:01:40

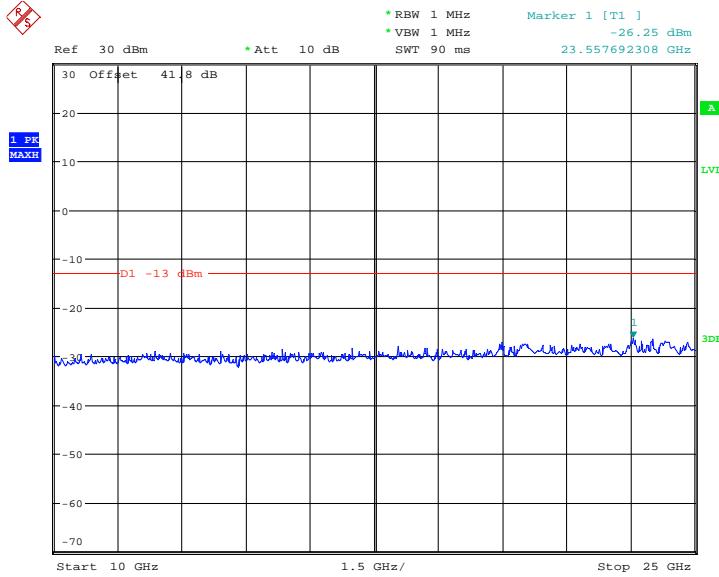
Note: The emission beyond the limit is the operating frequency.



Product Service

3GHz to 10GHz

Date: 28.FEB.2011 07:58:57

10GHz to 25GHz

Date: 28.FEB.2011 08:00:19

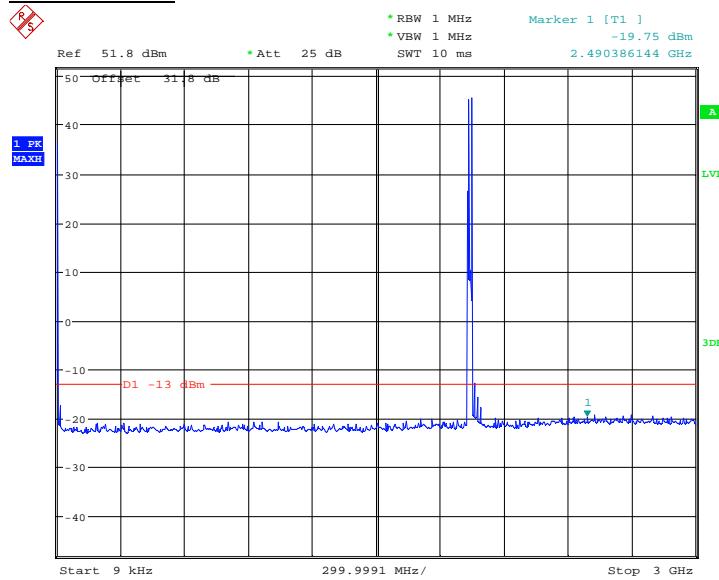


Multi Carrier (1x2)

Configuration 1 - Mode 4

GMSK

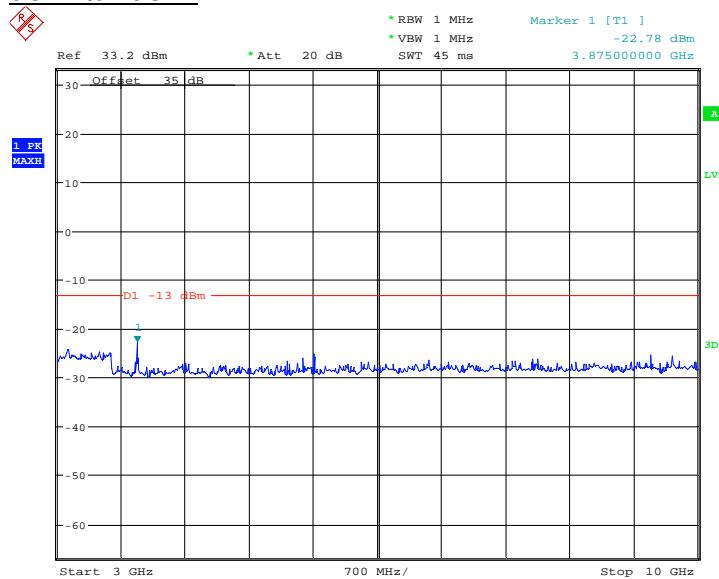
9kHz to 3GHz



Date: 28.FEB.2011 08:29:50

Note: The emissions beyond the limit are the operating frequencies.

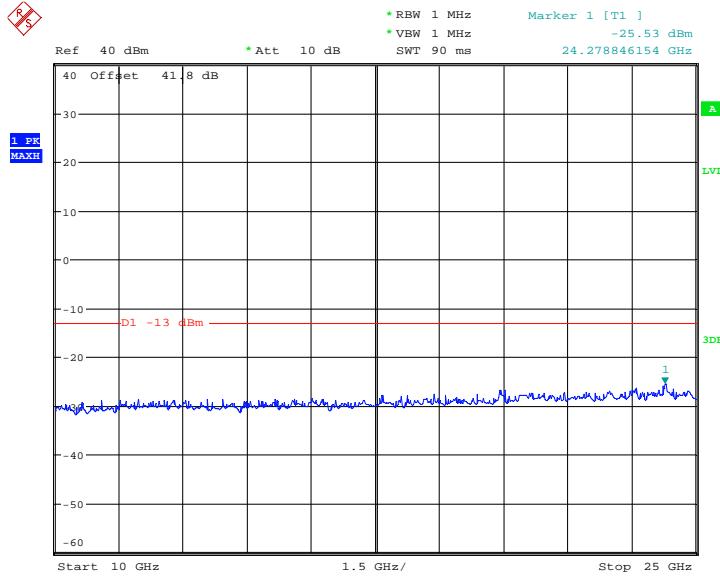
3GHz to 10GHz



Date: 28.FEB.2011 08:27:28



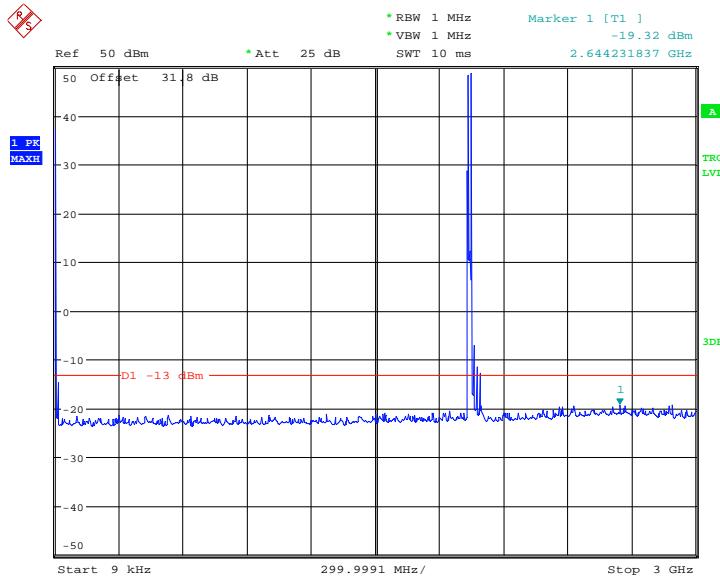
10GHz to 25GHz



Date: 28.FEB.2011 08:25:54

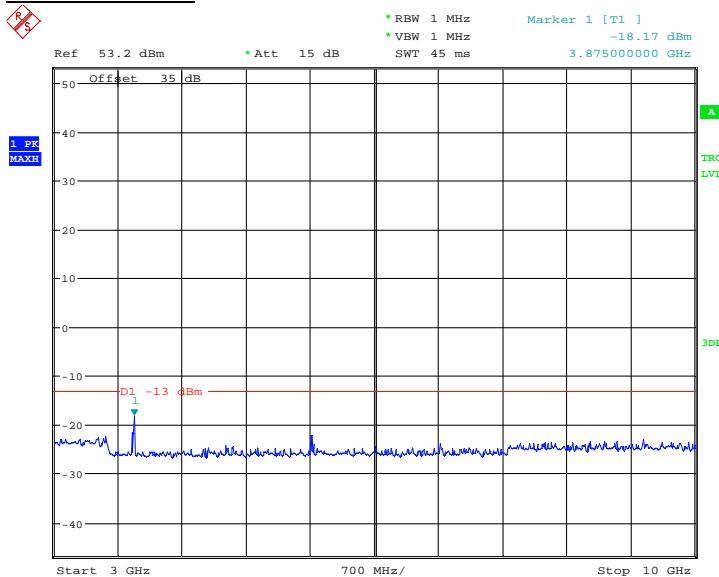
8-PSK

9kHz to 3GHz

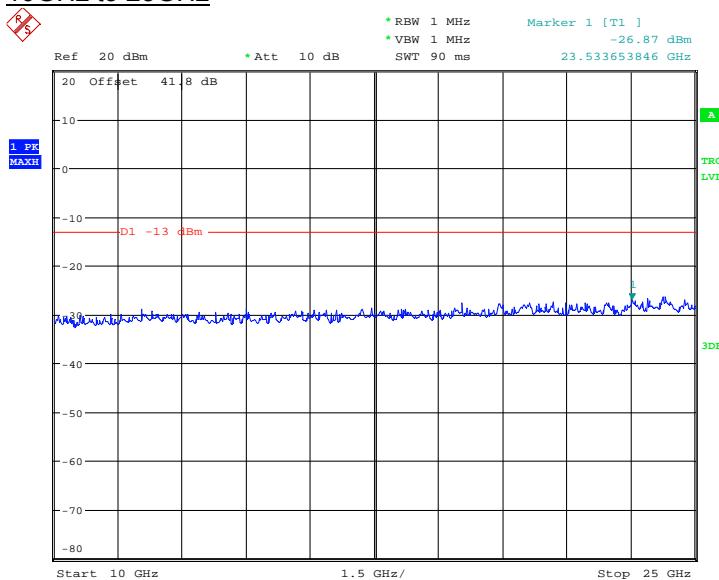


Date: 28.FEB.2011 08:38:33

Note: The emissions beyond the limit are the operating frequencies.

3GHz to 10GHz

Date: 28.FEB.2011 08:39:39

10GHz to 25GHz

Date: 28.FEB.2011 08:40:37

| | |
|-------|--------|
| Limit | -13dBm |
|-------|--------|

Remarks

The EUT does not exceed -13dBm at the frequency range of 9kHz to 25GHz.



Product Service

SECTION 3

TEST EQUIPMENT USED



3.1 TEST EQUIPMENT USED

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

| Instrument | Manufacturer | Type No. | Serial No. | Calibration Due |
|--|----------------------|---------------------|-----------------|-----------------|
| Section 2.1, 2.2, 2.3, 2.4 and 2.6 – Maximum Conducted Output Power, Peak – Average Ratio, Occupied Bandwidth, Spurious Emissions at Antenna Terminals ($\pm 1\text{MHz}$) and Conducted Spurious Emissions. | | | | |
| Spectrum Analyser | Rohde & Schwarz | FSQ26 | 200761 | 24-Aug-2011 |
| Spectrum Analyser | Agilent | E4440A | MY46186610 | 24-Aug-2011 |
| Power Metre | Rohde & Schwarz | NRP | 102428 | 24-Aug-2011 |
| Thermal Power Sensor | Rohde & Schwarz | NRP-Z51 | 102126 | 24-Aug-2011 |
| Network Analyzer | Agilent | 8720D | US38431317 | 24-Aug-2011 |
| 20dB Attenuator | Aeroflex / Weinschel | 48-20-33-LIM | BZ8401 | O/P MON |
| 10dB Attenuator | Weinschel Corp | 48-10-34 | BC2559 | O/P MON |
| Load | Shanghai Huaxiang | TFE5-3 | 090323089 | O/P MON |
| RF Box | TOPYOUNG | TX-MU | BAMS-1000785455 | O/P MON |
| RF Box | TOPYOUNG | TX-FU 1900 | BAMS-1000785456 | 03-Jan-2012 |
| Power Supply | Agilent | N5768A | US10A0157G | 16-Dec-2011 |
| Digital Multi-meter | FLUKE | 179 | 91820401 | 24-Aug-2011 |
| Thermo-hygrometer | AZ Instruments | 8705 | 9151655 | 24-Aug-2011 |
| Section 2.5 – Radiated Spurious Emissions | | | | |
| Load | Shanghai Huaxiang | TFE5-3 | 090323089 | O/P MON |
| Load | Shanghai Huaxiang | TF100 | 08011701 | O/P MON |
| EMI Receiver | Rohde & Schwarz | ESI 40 | 100015 | 19-Aug-2011 |
| Ultra log test antenna | Rohde & Schwarz | HL 562 | 100167 | 19-Aug-2011 |
| Double-Ridged Waveguide Horn Antenna | Rohde & Schwarz | HF 906 | 100029 | 19-Aug-2011 |
| Antenna master | Frankonia | MA 260 | - | 19-Aug-2011 |
| Relay Switch Unit | Rohde & Schwarz | 331.1601.31 | 338965002 | N/A |
| Semi Anechoic Chamber | Frankonia | 23.18m×16.88m×9.60m | - | 19-Aug-2011 |
| Power Supply | Dahua | DH1716A-10 | 1000303181 | O/P MON |
| Digital Multimeter | FLUKE | 179 | 91820401 | 03-Jan-2012 |

N/A – Not Applicable

O/P MON - Output monitored with calibration equipment



3.2 MEASUREMENT UNCERTAINTY

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

| Test Discipline | Frequency / Parameter | MU |
|---|--------------------------|---------------------|
| Conducted Maximum Peak Output Power | 30MHz to 10GHz Amplitude | 0.5dB* |
| Conducted Emissions | 30MHz to 40GHz Amplitude | 3.0dB* |
| Frequency Stability | 30MHz to 2GHz Amplitude | $<1 \times 10^{-7}$ |
| 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



Product Service

SECTION 4

ACCREDITATION, DISCLAIMERS AND COPYRIGHT



Product Service

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.

Results of tests not covered by our UKAS Accreditation Schedule are marked NUA
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