Report On

FCC CFR 47 Part 24 and Industry Canada RSS 133 Testing of the
Ericsson (China) Communications Company Ltd
RBS 2409

COMMERCIAL-IN-CONFIDENCE

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Product Service

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REPORT ON

FCC CFR 47 Part 24 and Industry Canada RSS 133 Testing of the Ericsson (China) Communications Company Ltd
RBS 2409

Document 75905046 Report 01 Issue 2

November 2008

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DATED 26 November 2008

This report has been up-issued to Issue 2 to include the Alternative Test Site details.

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: 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);

C Zhang

UKAS TESTING 0141

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Product Service

SECTION 1

REPORT SUMMARY

FCC CFR 47 Part 24 and Industry Canada RSS 133 Testing of the
Ericsson (China) Communications Company Ltd
RBS 2409 1900MHz Base Station

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1.1 INTRODUCTION

The information contained in this report is intended to show verification of the Ericsson (China) Communications Company Ltd RBS 2409 to the requirements of FCC CFR 47 Part 24: 2007 and Industry Canada RSS 133:2008.

Testing was carried out in support of an application for Grant of Equipment Authorisation in the name of Ericsson (China) Communications Company Ltd RBS 2409.

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 (China) Communications Company Ltd
Model Number(s)	RBS 2409
Serial Number(s)	CB 47635657
Software Version	08A_R18E
Hardware Version	R4A
Number of Samples Tested	1
Test Specification/Issue/Date	FCC CFR 47 Part 24: 2007 Industry Canada RSS 133: 2008
Incoming Release Date	Declaration of Build Status 07 November 2008
Order Number Date	4502637840 30 October 2008
Start of Test	03 November 2008
Finish of Test	05 November 2008
Name of Engineer(s)	C Zhang Q Li
Related Document(s)	FCC CFR 47 Part 2:2006 RSS-Gen Issue 2 : 2007 ANSI C63.4: 2003

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1.2 BRIEF SUMMARY OF RESULTS

A brief summary of results in accordance with FCC CFR 47 Part 24: 2007 and Industry Canada RSS 133:2008, is shown below.

Configuration 1 - Base Station							
Section	Spec Clause		Test Description	Mode	Mod State	Result	Comments
	FCC Part 24	Industry Canada RSS 133					
-	24.232(a)	6.4	Effective Isotropically Radiated Power	1930.2 MHz	-	N/T	Not requested by client.
				1960 MHz	-	N/T	
				1989.8 MHz	-	N/T	
2.1	24.232 (a)	6.4	Maximum Peak Output Power - Conducted	1930.2 MHz	0	Pass	-
				1960 MHz	0	Pass	
				1989.8 MHz	0	Pass	
2.2	2.1047 (d)		Modulation Characteristics	1960 MHz	-	N/A	Technical description provided
2.3	2.1049, 24.238(b)	2.3	Occupied Bandwidth	1930.2 MHz	0	Pass	-
				1960 MHz	0	Pass	
				1989.8 MHz	0	Pass	
2.4	2.1051, 24.238(b)	6.5	Spurious Emissions at Antenna Terminals (±1MHz)	1930.2 MHz	0	Pass	-
				1960 MHz	-	N/A	
				1989.8 MHz	0	Pass	
	2.1053, 22.238(a)	6.5	Radiated Spurious Emissions	1930.2 MHz	-	N/T	Not requested by client.
				1960 MHz	-	N/T	
				1989.8 MHz	-	N/T	
2.5	2.1051, 24.238(a)	6.5	Conducted Spurious Emissions	1930.2 MHz	0	Pass	-
				1960 MHz	0	Pass	
				1989.8 MHz	0	Pass	
2.6	2.1055, 24.235	6.3	Frequency Stability Under Temperature Variations	1930.2 MHz	-	N/A	-
				1960 MHz	0	Pass	
				1989.8 MHz	-	N/A	
2.7	2.1055, 24.235	6.3	Frequency Stability Under Voltage Variations	1930.2 MHz	-	N/A	-
				1960 MHz	0	Pass	
				1989.8 MHz	-	N/A	

N/A – Not Applicable
N/T – Not Tested

Product Service

1.3 DECLARATION OF BUILD STATUS

MAIN EUT	
MANUFACTURING DESCRIPTION	Base Station
MANUFACTURER	Ericsson
TYPE	RBS 2409
PART NUMBER	4/HRB 105 14
SERIAL NUMBER	CB 47635657
HARDWARE VERSION	R4A
SOFTWARE VERSION	08A_R18E
TRANSMITTER OPERATING RANGE	1930.2MHz - 1989.8MHz
RECEIVER OPERATING RANGE	1850.2MHz – 1909.8MHz
COUNTRY OF ORIGIN	China
INTERMEDIATE FREQUENCIES	71MHz
ITU DESIGNATION OF EMISSION	250KGXW 250KG7W
HIGHEST INTERNALLY GENERATED FREQUENCY	1989.8MHz
OUTPUT POWER (W or dBm)	23dBm
FCC ID	WODFKRC161175-3
IC ID	287AH-FG1611753
TECHNICAL DESCRIPTION (a brief description of the intended use and operation)	RBS 2409 is GSM PICO base station.
BATTERY/POWER SUPPLY	
MANUFACTURING DESCRIPTION	PSU-AC-41
MANUFACTURER	Ericsson
TYPE	AC Power Supply
PART NUMBER	BML 151 124/1
VOLTAGE	100-240VAC
COUNTRY OF ORIGIN	China

Signature 

Date 07 November 2008

D of B S Serial No 75905046/01

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

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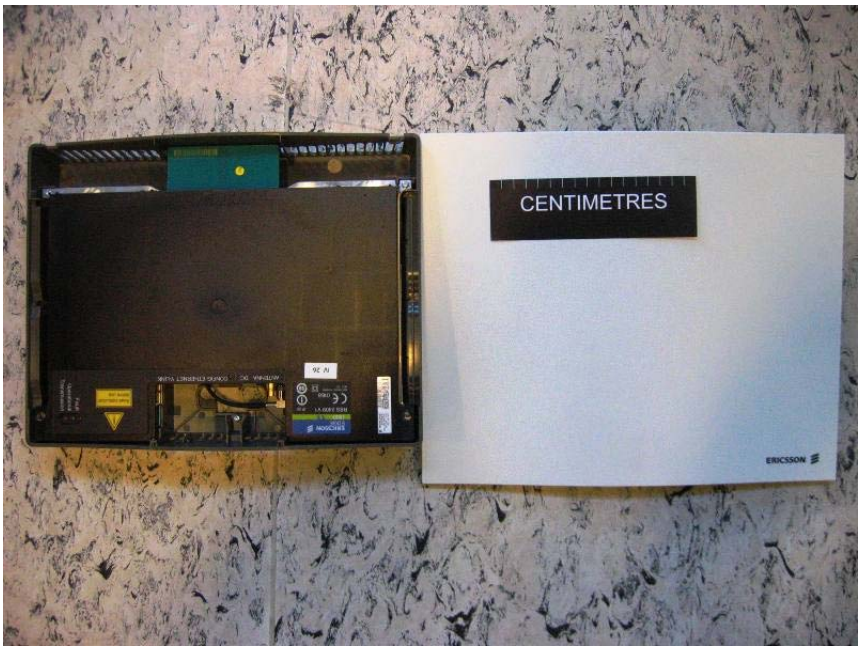
1.4 PRODUCT INFORMATION

1.4.1 Technical Description

The Equipment Under Test (EUT) was an Ericsson (China) Communications Company Ltd RBS 2409 working in the public mobile service 1900MHz band which provides communication connections to GSM1900 network. The RBS 2409 operates from a Power Supply Unit PSU-AC-41 converts the incoming AC power to regulated 12VDC system power.

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



Equipment Under Test

Product Service

1.4.2 Test Configuration

Configuration 1: Radio Equipment

The EUT was configured in accordance with FCC CFR 47 Part 24: 2007 and Industry Canada RSS 133:2008.

The RBS 2409 supports both GMSK and 8PSK modulation at 1900MHz. Testing was performed on one TRX RF output connector. The complete testing was performed with both modulation schemes at maximum RF power unless otherwise stated. The EUT was powered by a Power Supply Unit PSU-AC-41 converts the incoming AC power to regulated 12VDC system power.

1.4.3 Modes of Operation

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

Mode 1 - 1930.2 MHz (Bottom Channel)

Mode 2 - 1960 MHz (Middle Channel)

Mode 3 - 1989.8 MHz (Top Channel)

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

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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 Power Supply Unit PSU-AC-41 converts the incoming AC power to regulated 12VDC system power.

1.6 DEVIATIONS FROM THE STANDARD

No deviations from the applicable test standards or test plan were made during testing.

According to the declaration from manufacturer, the Radio Equipment(RE) with a thermal sensor that will shut down the exciter power amplifier in the RE in a controlled way at temperatures below - 10º C and above + 55º C, therefore frequency stability was not tested to the specified minimum temperature of - 30º C.

1.7 MODIFICATION RECORD

No modifications were made to the EUT during testing.

Modification State 0 – EUT as supplied

1.8 ALTERNATIVE TEST SITE

Under our UKAS Accreditation, TÜV Product Service Ltd conducted this testing at:

Ericsson Tower, No.5 Lize East Street Chaoyang District, Beijing 100102 China

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SECTION 2

TEST DETAILS

FCC CFR 47 Part 24 and Industry Canada RSS 133 Testing of the
Ericsson (China) Communications Company Ltd
RBS 2409 1900MHz Base Station

2.1 MAXIMUM PEAK OUTPUT POWER - CONDUCTED

2.1.1 Specification Reference

FCC CFR 47 Part 24: 2007, Clause 24.232(a) and Industry Canada RSS 133:2008 Clause 6.4

2.1.2 Equipment Under Test

RBS 2409, S/N: CB 47635657

2.1.3 Date of Test and Modification State

03 November 2008 – 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 24: 2007 and Industry Canada RSS 133:2008.

Using a spectrum analyzer, the output power of the EUT was measured at the antenna terminals. The EUT supports GMSK and 8PSK modulation schemes. The carrier power was measured with both modulations and all of the timeslots working.

The spectrum analyzer RBW and VBW were set to 1MHz and the path loss 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 1
- Mode 2
- Mode 3

2.1.6 Environmental Conditions

	03 November 2008
Ambient Temperature	27.1°C
Relative Humidity	36.3%

Product Service

2.1.7 Test Results

For the period of test the EUT met the requirements of FCC CFR 47 Part 24: 2007 and Industry Canada RSS 133:2008 for Maximum Peak Output Power - Conducted.

The test results are shown below.

Configuration 1 - Mode 1

Power at external antenna connector

	Frequency (MHz)	Path Loss (dB)	Result (dBm)	Result (W)
GMSK	1930.2	0.63	23.84	0.242
8PSK	1930.2	0.63	26.97	0.498

Configuration 1 - Mode 2

Power from external antenna connector

	Frequency (MHz)	Path Loss (dB)	Result (dBm)	Result (W)
GMSK	1960	0.63	23.83	0.242
8PSK	1960	0.63	27.07	0.509

Configuration 1 - Mode 3

Power from external antenna connector

	Frequency (MHz)	Path Loss (dB)	Result (dBm)	Result (W)
GMSK	1989.8	0.63	23.87	0.244
8PSK	1989.8	0.63	27.05	0.507

Limit	≤100W or <+50dBm

Remarks

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

2.2 MODULATION CHARACTERISTICS

2.2.1 Specification Reference

FCC CFR 47 Part 24: 2007, Clause 2.1047(d)

2.2.2 Equipment Under Test

No testing performed.

2.2.3 Modulation Description

The modulation scheme used in GSM is called Gaussian Minimum Shift Keying (GMSK). GMSK facilitates the use of narrow bandwidth and allows for both coherent and non coherent detection capabilities. It is a scheme in which the transitions from One to Zero or Zero to One do not occur quickly, but over a period of time. If pulses are transmitted quickly harmonics are transmitted. The power spectrum for a square wave is rich in harmonics, and the power within the side lobes is wasted, and can be a cause of potential interference.

A method to reduce the harmonics is to round off the edges of the pulses thus lowering the spectral components of the signal. In GSM this is done by using a Gaussian pre-filter which typically has a bandwidth of 81.25kHz. The output from the Gaussian filter then phase modulates the carrier. As there are no dramatic phase transitions of the carrier this gives a constant envelope and low spectral component output from the transmitter.

The spectral efficiency is calculated by

bit rate / Channel bandwidth = 270.83333 kbit/s / 200 kHz = 1.354 bit/s/Hz.

The bandwidth product BT = Bandwidth x bit duration = 81.25 kHz x 3.6923 micros = 0.3

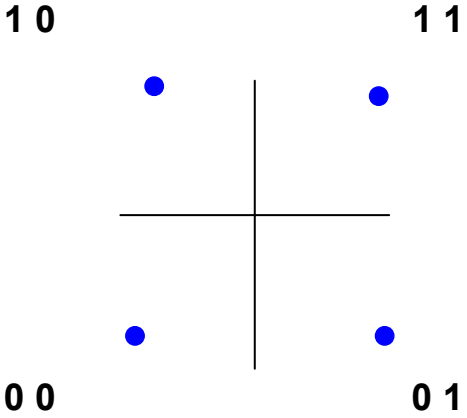
GMSK and 8PSK overview.

The modulation schemes used for the EUT are GMSK and 8PSK. The 8PSK modulation scheme is EDGE (Enhanced Date Rates for GSM Evolution).

A brief overview of how GMSK and 8PSK works is shown below.

GMSK (Gaussian Minimum Shift Keying)

The fundamental principal behind GMSK is Phase shift keying. This splits a data stream into a series of 2-digit phase shifts, using the following phase shifts to represent data pairs.



Therefore for the BIT sequence 0 0 1 1 1 0 0 1 The corresponding phase shift will be used

BIT SEQUENCE	0 0	1 1	1 0	01
PHASE	225º	45º	135º	315º

This is called QPSK (Quadratic Phase Shift Keying)

<u>However</u>

There is a problem with QPSK: transition from e.g. 00 to 11 gives phase shift of 180° (π radians). This has the effect of inverting the carrier waveform and this can lead to detection errors at the receiver.

Solution: restrict phase changes to ± 90°

1. Split bitstream into 2 streams e.g.

	0 0		1 1		0 1		1 0	
I Stream	0		1		0		1	
Q stream		0		1		1		0

2. Modulate each stream with PSK (1 = 90° or π/2, 0 = -90° or - π/2 phase shift)

I Stream	0		1		0		1	
	-π/2		-π/2		-π/2		π/2	
Q stream		0		1		1		0
		-π/2		π/2		π/2		-π/2

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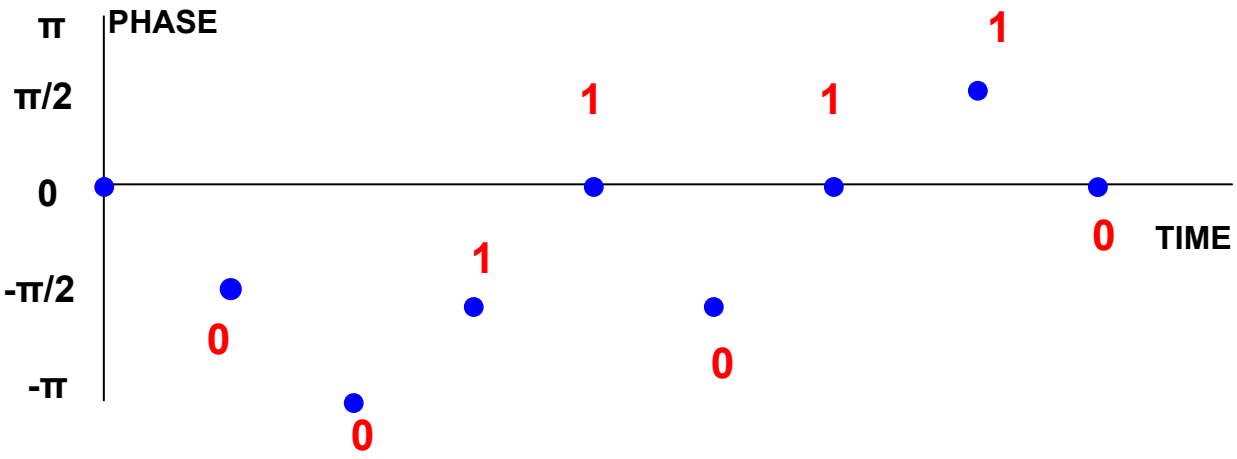
3. Combine (add) the two PSK signals:

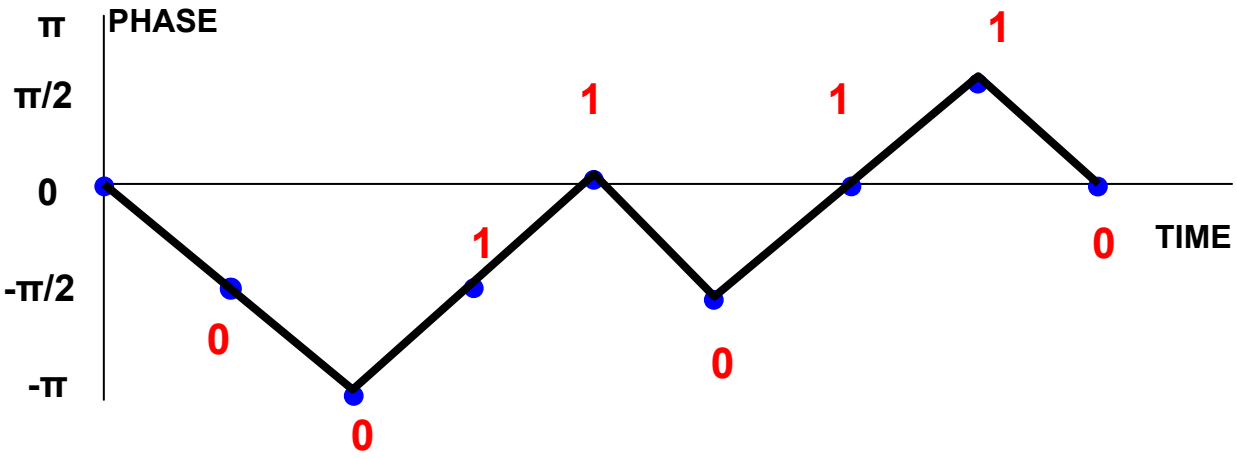
Combined Phase	-π/2	-π	-π/2	0	-π/2	0	π/2	0

Result: offset - QPSK, phase change is restricted to ± π/2 radians:



It would be preferable to have "gradual" changes in place between each pair of bits (Continuous-phase modulation). Replacing each “rectangular” shaped pulse (for 1 or 0) with a sinusoidal pulse can do this:

Result: Minimum Shift Keying (MSK):



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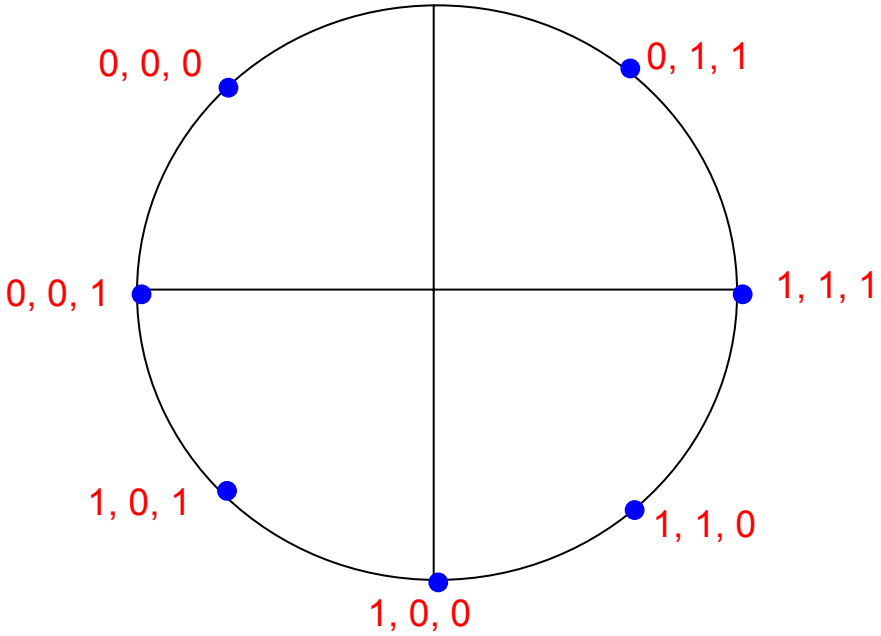
Gaussian Minimum Shift Keying

MSK has high sidebands relative to the main lobes in the frequency domain - this can lead to interference with adjacent signals.

If the rectangular pulses corresponding to the bitstream are filtering using a Gaussian-shaped impulse response filter, we get Gaussian MSK (GMSK) - this has low sidelobes compared to MSK.

8-SK (8-Phase Shift Keying)

8PSK uses the same basic principle of phase shift modulation. The only difference being the increased number of vectors.



2.3 OCCUPIED BANDWIDTH

2.3.1 Specification Reference

FCC CFR 47 Part 24: 2007, Clause 2.1049(h), 24.238(b) and Industry Canada RSS 133:2008 Clause 2.3

2.3.2 Equipment Under Test

RBS 2409, S/N: CB 47635657

2.3.3 Date of Test and Modification State

03 November 2008 – 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 24: 2007 and Industry Canada RSS 133:2008.

The EUT was transmitting at maximum power, modulated with all timeslots active. Using a resolution bandwidth of 10 kHz and a video bandwidth of 100 kHz. 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 1
- Mode 2
- Mode 3

2.3.6 Environmental Conditions

	03 November 2008
Ambient Temperature	27.7°C
Relative Humidity	33.5%

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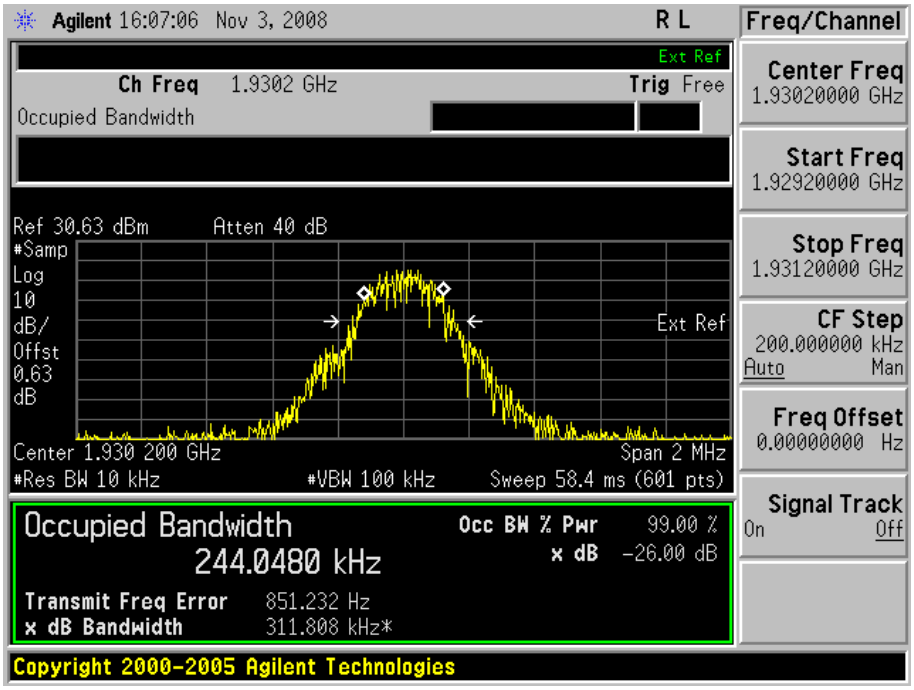
2.3.7 Test Results

For the period of test the EUT met the requirements of FCC CFR 47 Part 24: 2007 and Industry Canada RSS 133:2008 for Occupied Bandwidth.

The test results are shown below.

Configuration 1 - Mode 1

GMSK - Maximum Power



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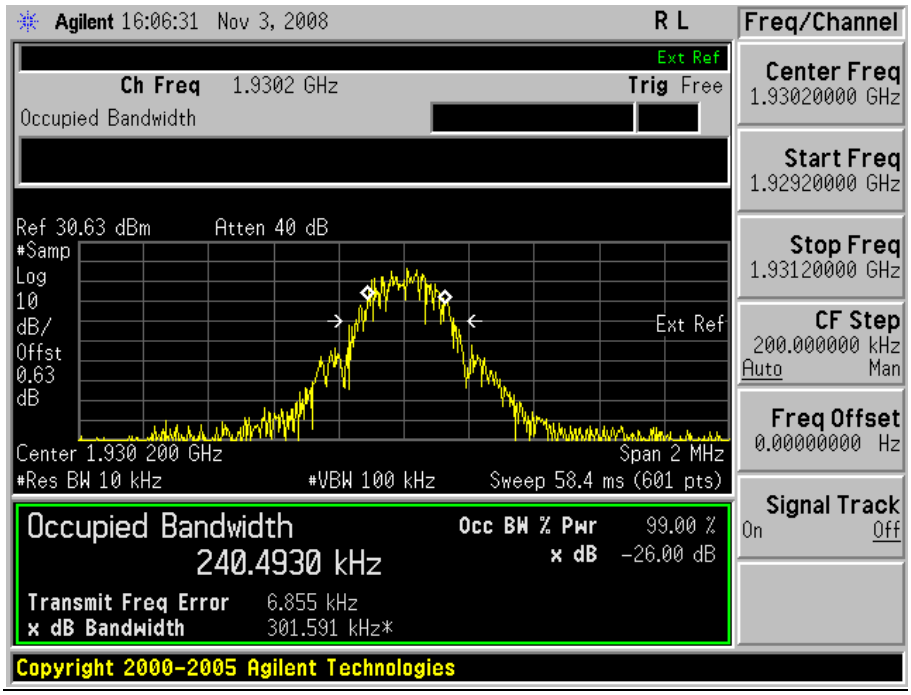
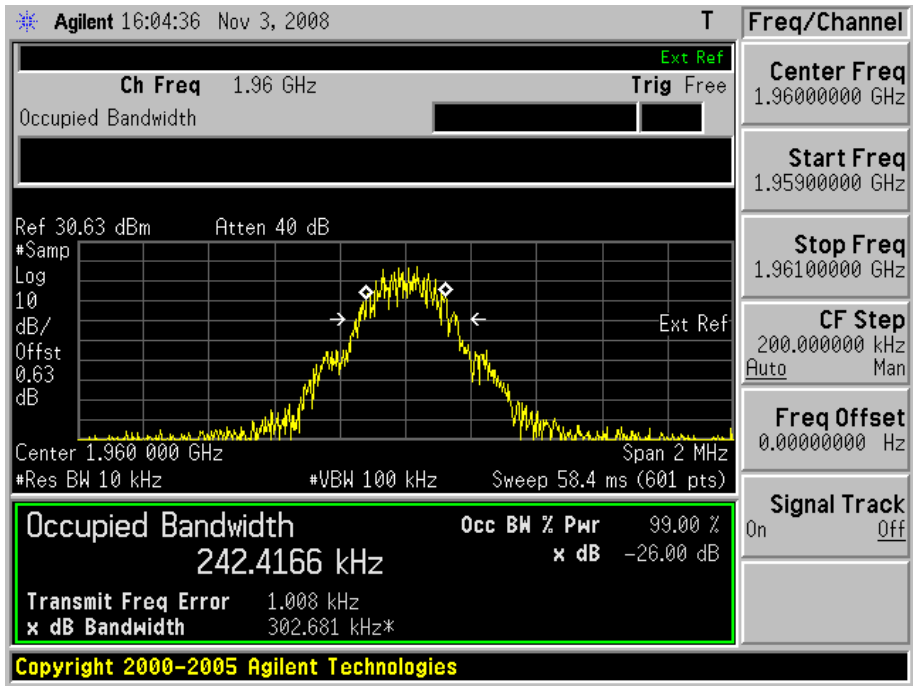
8PSK - Maximum Power



Configuration 1 - Mode 2

GMSK - Maximum Power



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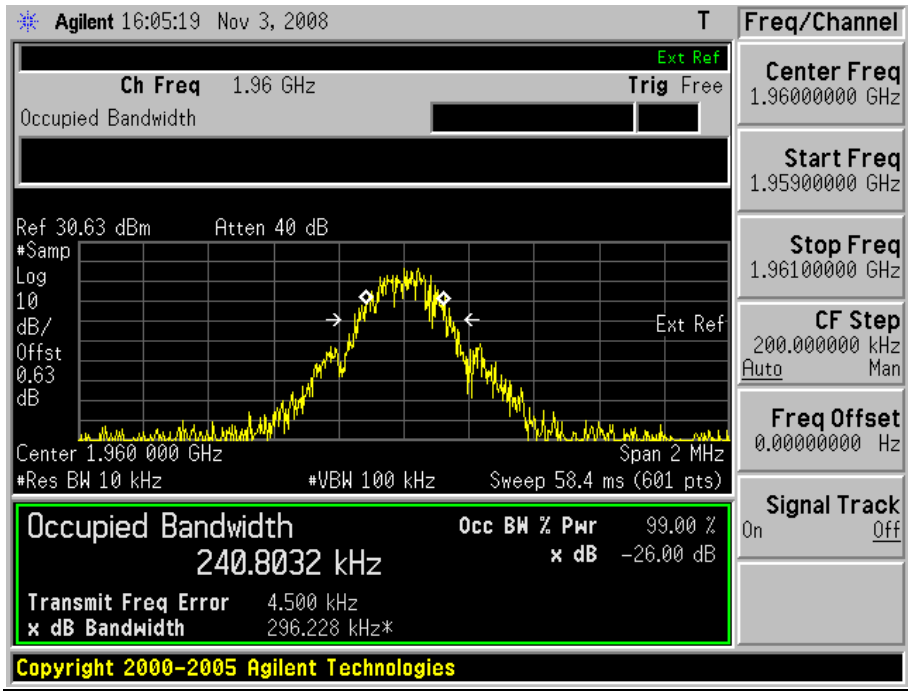
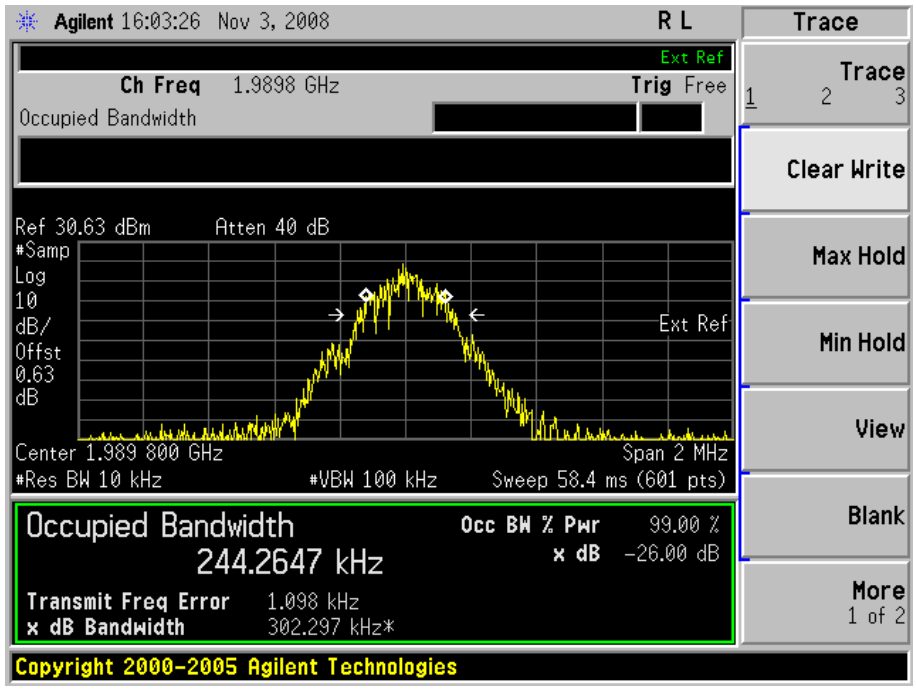
8PSK - Maximum Power



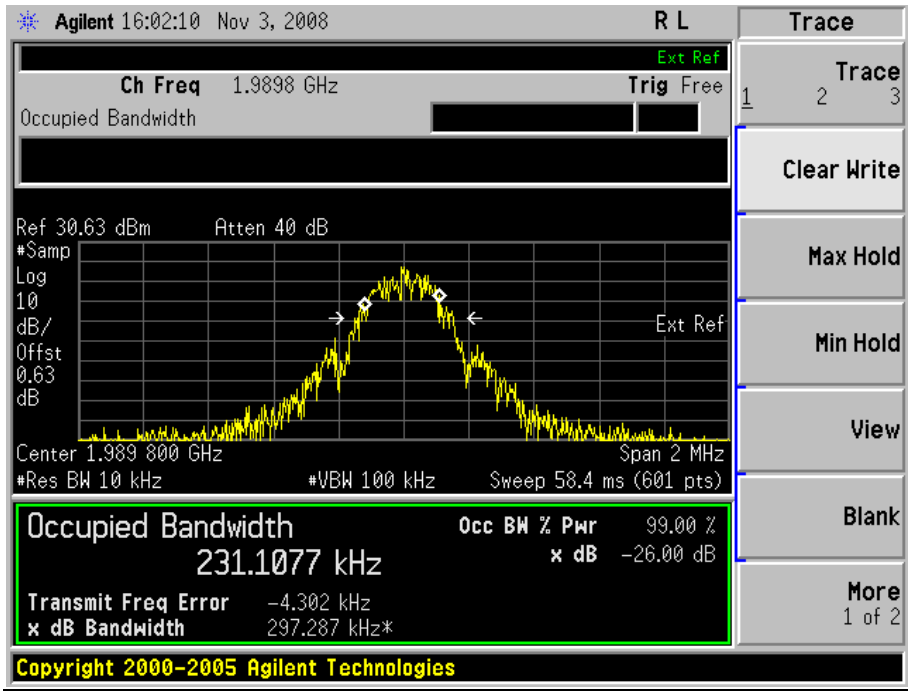
Configuration 1 - Mode 3

GMSK - Maximum Power



Product Service

8PSK - Maximum Power



2.4 SPURIOUS EMISSIONS AT TERMINALS (±1MHz)

2.4.1 Specification Reference

FCC CFR 47 Part 24: 2007, Clause 2.1051, 24.238(b) and Industry Canada RSS 133:2008 Clause 6.5

2.4.2 Equipment Under Test

RBS 2409, S/N: CB 47635657

2.4.3 Date of Test and Modification State

04 November 2008 – 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 24: 2007 and Industry Canada RSS 133:2008.

In accordance with 24.238(b), at least 1% of the 26dB bandwith was used for the resolution and video bandwidths up to 1 MHz away from the block edge. At greater than 1MHz the resolution and video bandwidths were increased to 1 MHz.

The reference power and path losses of all channels used for testing in each frequency block were measured. It was found that there was <0.5dB 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+10log (P)), limit.

The EUT was tested at it's 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

	04 November 2008
Ambient Temperature	27.8°C
Relative Humidity	34.4%

Product Service

2.4.7 Test Results

For the period of test the EUT met the requirements of FCC CFR 47 Part 24: 2007 and Industry Canada RSS 133:2008 for Spurious Emissions Antenna Terminals (±1MHz)

The test results are shown below.

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

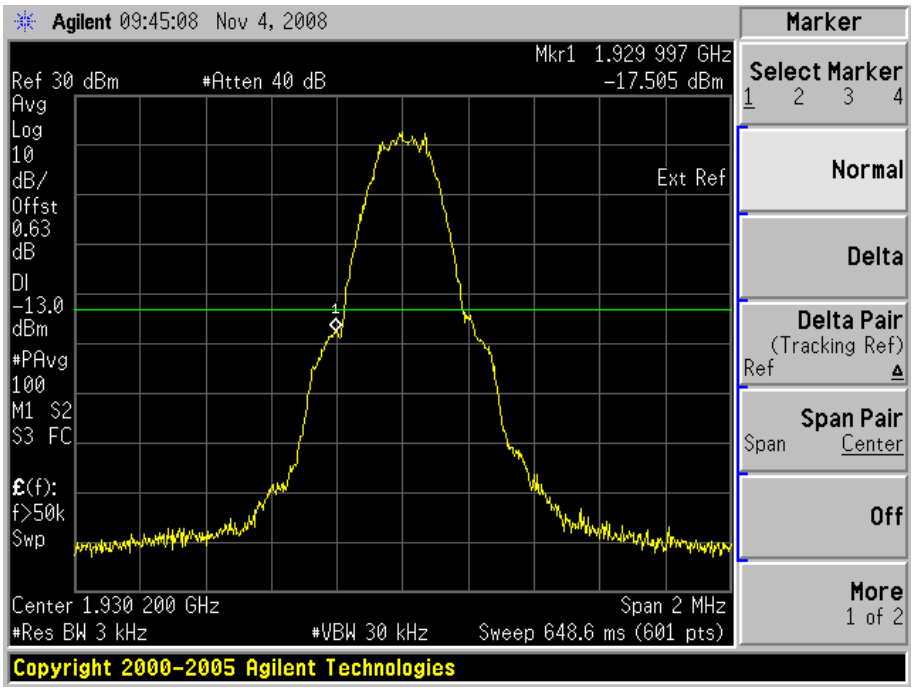
Channel (MHz)	Edge Test with GMSK modulation Channel No./Frequencies	Edge Test with 8PSK modulation Channel No./Frequencies
Bottom 1930.2	Channel: 512 Frequency: 1930MHz	Channel: 512 Frequency : 1930MHz
Top 1989.8	Channel: 810 Frequency : 1990MHz	Channel : 810 Frequency: 1990MHz

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 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.

Configuration 1 - Mode 1

GMSK - Edge Measurement with EUT Transmitting on maximum power



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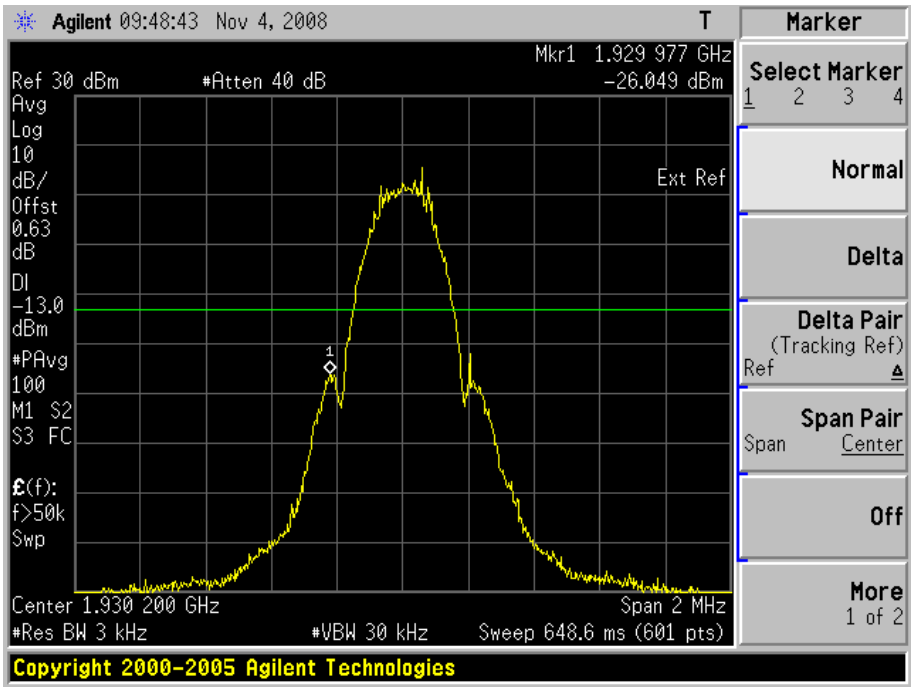
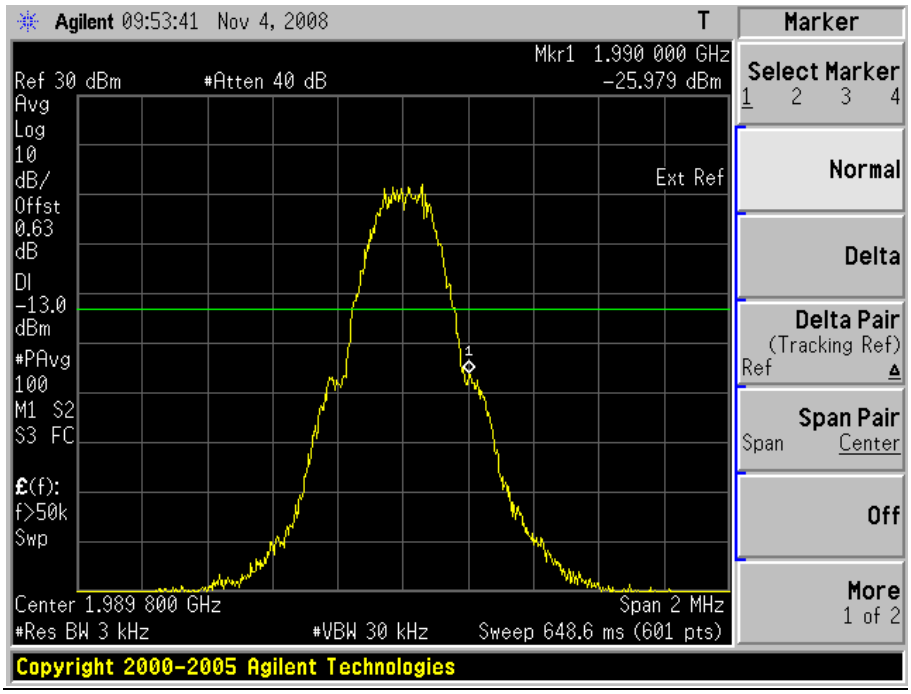
8PSK - Edge Measurement with EUT Transmitting on maximum power



Configuration 1 - Mode 3

GMSK - Edge Measurement with EUT Transmitting on maximum power



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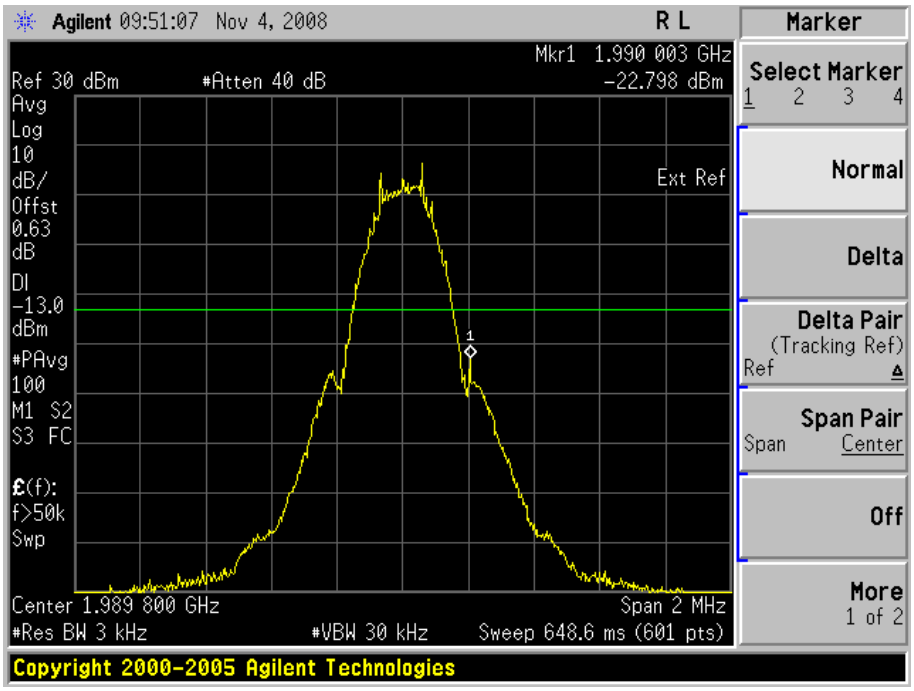
8PSK - Edge Measurement with EUT Transmitting on maximum power



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2.5 SPURIOUS EMISSIONS

2.5.1 Specification Reference

FCC CFR 47 Part 24: 2007, Clause 2.1051, 24.238(a) and Industry Canada RSS 133:2008 Clause 6.5

2.5.2 Equipment Under Test

RBS 2409, S/N: CB 47635657

2.5.3 Date of Test and Modification State

04 November 2008 – 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 24: 2007 and Industry Canada RSS 133:2008.

In accordance with Part 2.1051, the spurious emissions from the antenna terminal were measured. The frequency spectrum investigated from 9kHz to 20GHz. The EUT was set to transmit on full power. The EUT was tested on Bottom, Middle and Top channels for both power levels. The resolution was set to 1MHz and video bandwidths were set to 1MHz thus meeting the requirements of Part 24.238(b). The spectrum analyser detector was set to 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 10^{th} harmonic of the fundamental.

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

Configuration 1 - Mode 1
- Mode 2
- Mode 3

2.5.6 Environmental Conditions

	04 November 2008
Ambient Temperature	28.0°C
Relative Humidity	32.8%

Product Service

2.5.7 Test Results

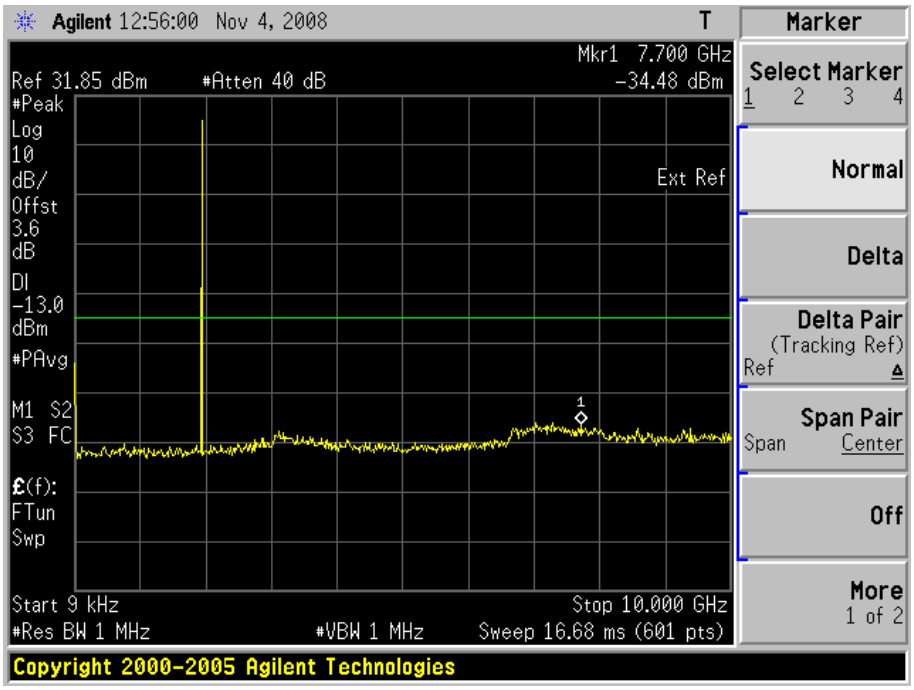
For the period of test the EUT met the requirements of FCC CFR 47 Part 24: 2007 and Industry Canada RSS 133:2008 for Spurious Emissions.

The test results are shown below.

Configuration 1 - Mode 1

9kHz to 10GHz

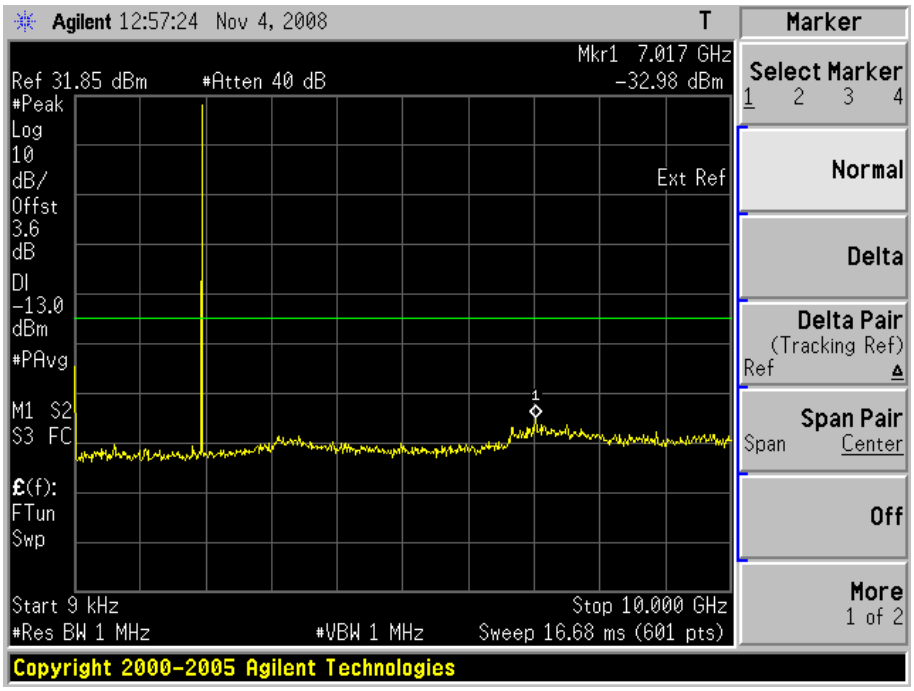
GMSK - Maximum Power



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

Product Service

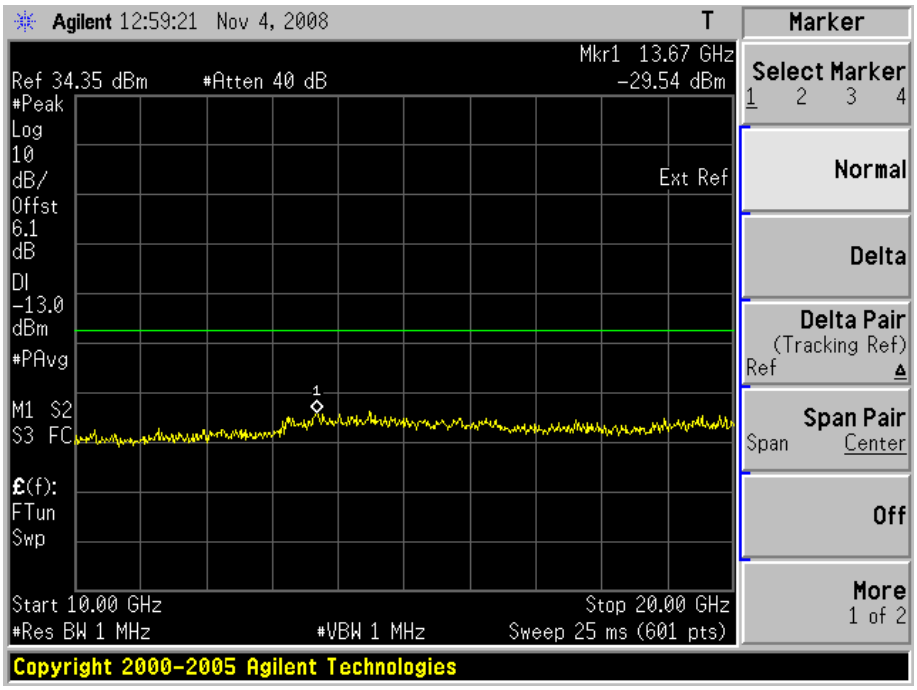
8PSK - Maximum Power



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

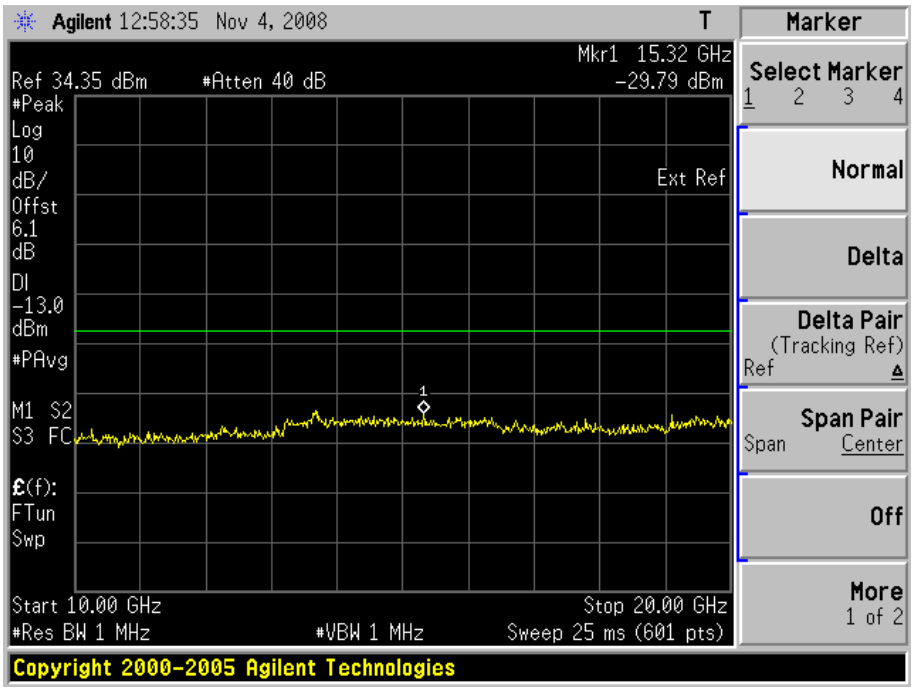
10GHz to 20GHz

GMSK - Maximum Power



Product Service

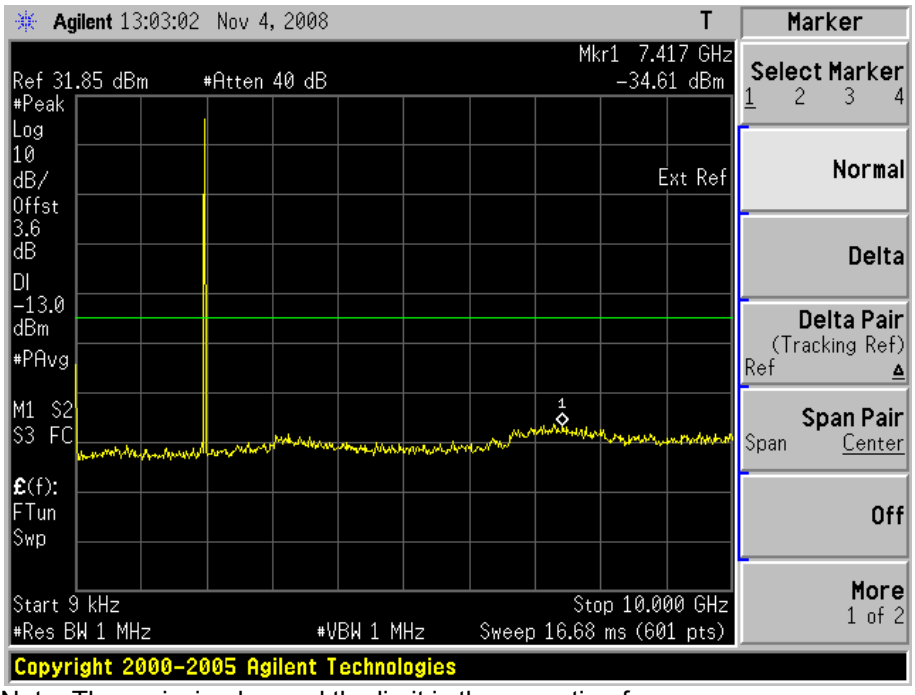
8PSK - Maximum Power



Configuration 1 - Mode 2

9kHz to 10GHz

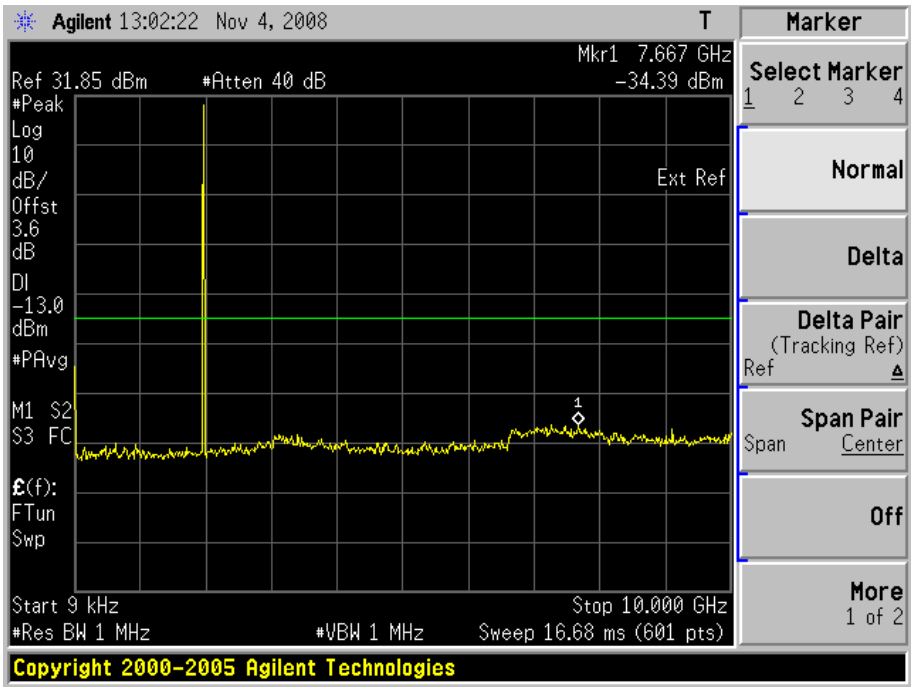
GMSK - Maximum Power



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

Product Service

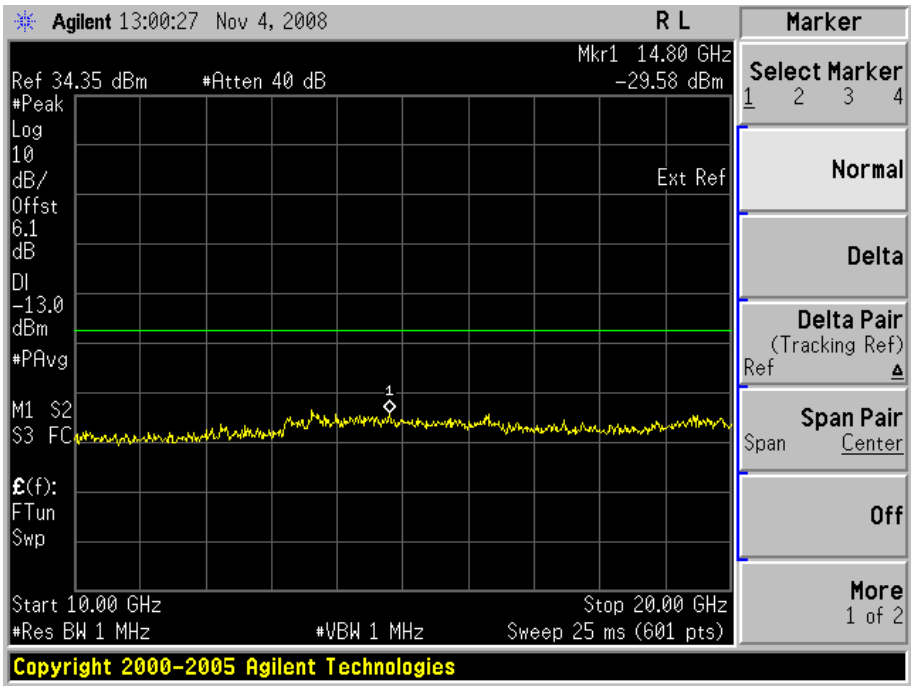
8PSK - Maximum Power



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

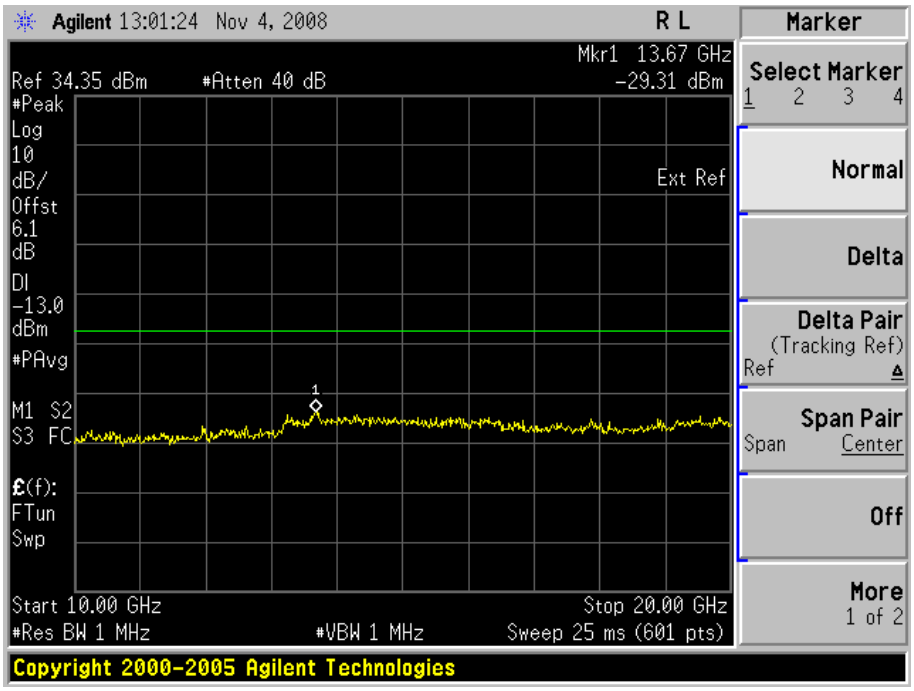
10GHz to 20GHz

GMSK - Maximum Power



Product Service

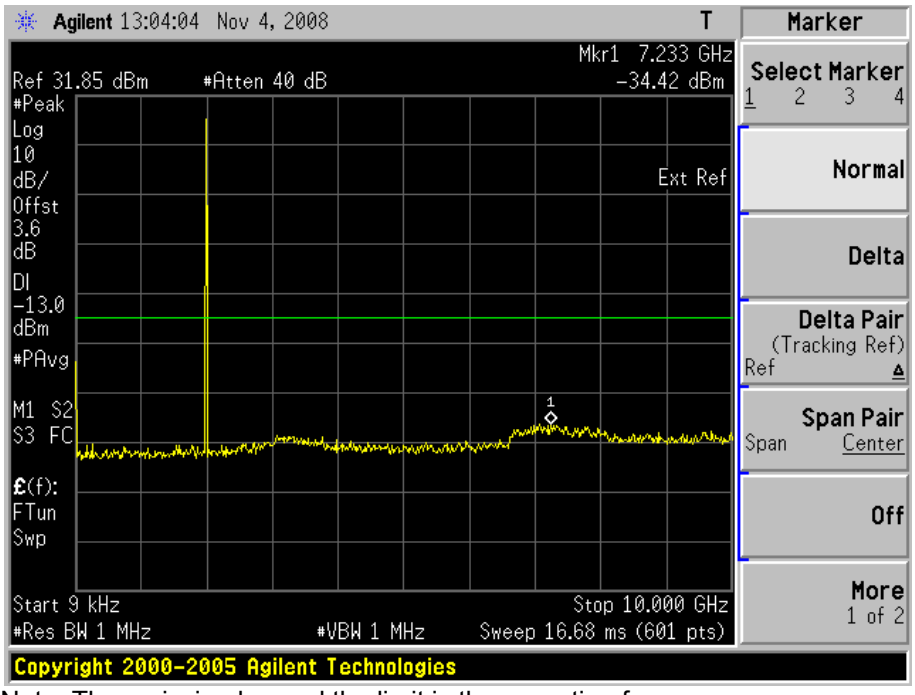
8PSK - Maximum Power



Configuration 1 - Mode 3

9kHz to 10GHz

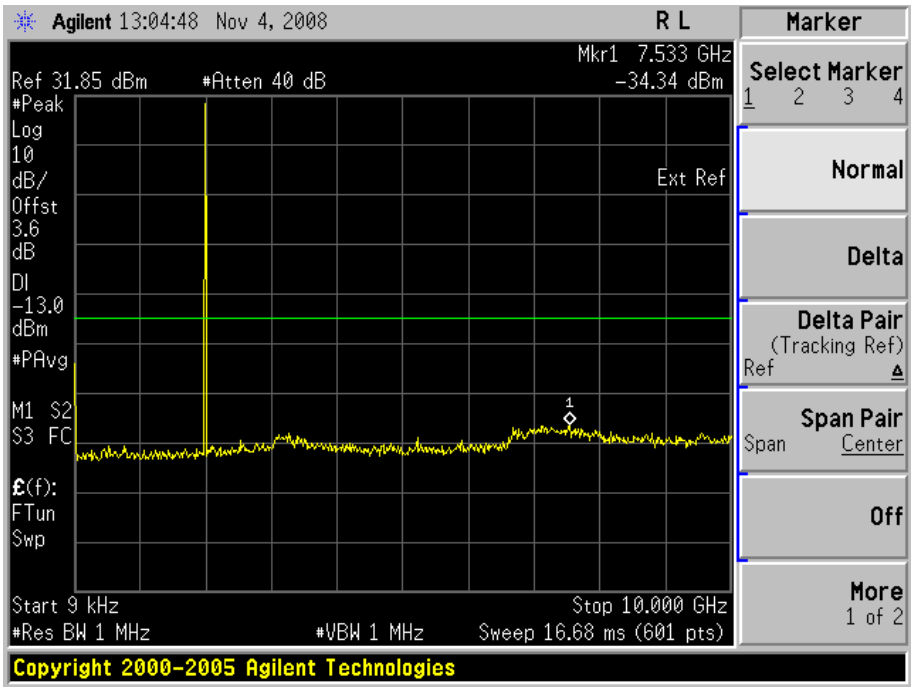
GMSK - Maximum Power



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

Product Service

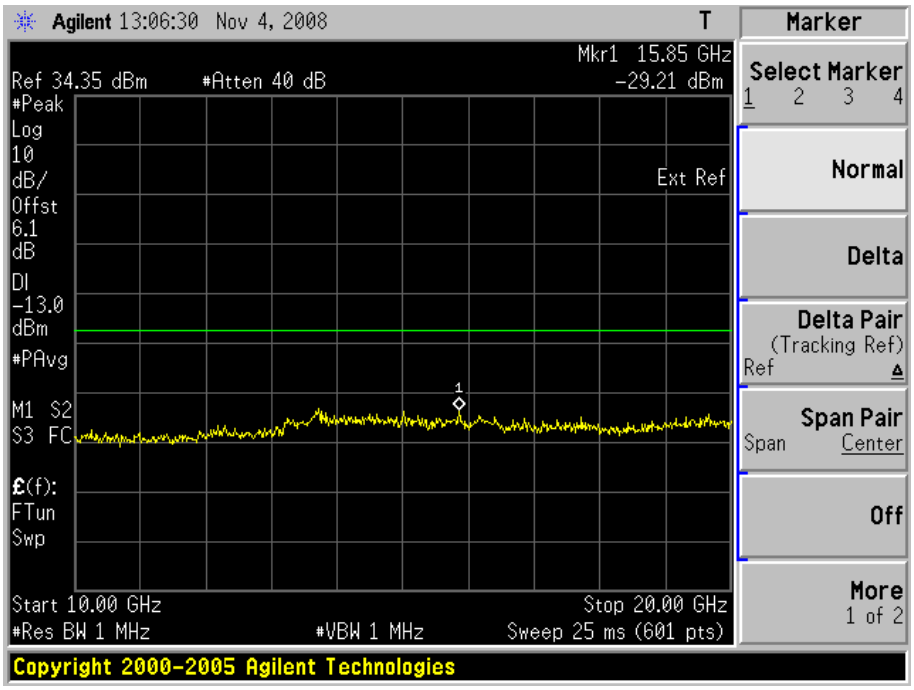
8PSK - Maximum Power



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

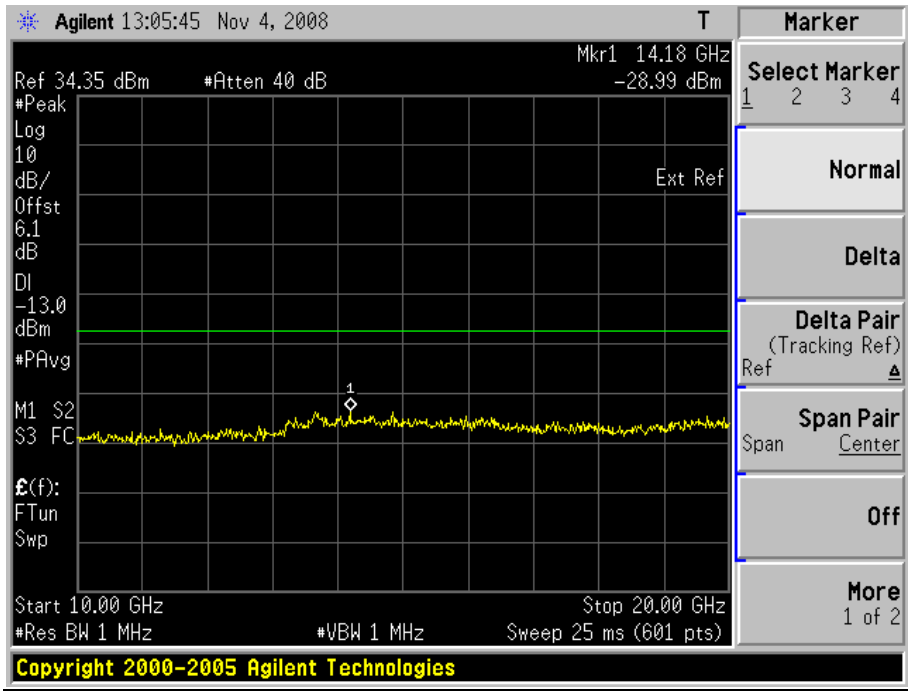
10GHz to 20GHz

GMSK - Maximum Power



Product Service

8PSK - Maximum Power



2.6 FREQUENCY STABILITY UNDER TEMPERATURE VARIATIONS

2.6.1 Specification Reference

FCC CFR 47 Part 24: 2007, Clause 2.1055, 24.235 and Industry Canada RSS 133:2008 Clause 6.3

2.6.2 Equipment Under Test

RBS 2409, S/N: CB 47635657

2.6.3 Date of Test and Modification State

05 November 2008 – 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 24: 2007 and Industry Canada RSS 133:2008.

The EUT was set to transmit on maximum power with all timeslots active. A Spectrum Analyser was used to measure the frequency error. The average result was taken over 200 bursts. The temperature was adjusted between –10ºC and +50ºC in 10º steps as per 2.1055.

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

Configuration 1 - Mode 2

2.6.6 Environmental Conditions

	05 November 2008
Ambient Temperature	28.0°C
Relative Humidity	35.0%

Product Service

2.6.7 Test Results

For the period of test the EUT met the requirements of FCC CFR 47 Part 24: 2007 and Industry Canada RSS 133:2008 for Frequency Stability Under Temperature Variations.

The test results are shown below.

Configuration 1 - Mode 2

120VAC 60Hz

GMSK

Temperature Interval (ºC)	Deviation (Hz)
-10	83.05
0	83.16
+10	94.71
+20	94.98
+30	100.03
+40	106.58
+50	109.64

8PSK

Temperature Interval (ºC)	Deviation (Hz)
-10	80.93
0	85.69
+10	92.68
+20	95.99
+30	98.96
+40	102.97
+50	106.35

Limit	±1.0 ppm or ±1.96 kHz

Remarks

According to the declaration from manufacturer, the Radio Equipment(RE) with a thermal sensor that will shut down the exciter power amplifier in the RE in a controlled way at temperatures below - 10º C and above + 55º C, so the frequency stability was tested by - 10º C.

The frequency stability of the EUT is sufficient to keep it within the authorised frequency ranges at any temperature interval across the measured range.

Product Service

2.7 FREQUENCY STABILITY UNDER VOLTAGE VARIATIONS

2.7.1 Specification Reference

FCC CFR 47 Part 24: 2007, Clause 2.1055, 24.235 and Industry Canada RSS 133:2008 Clause 6.3

2.7.2 Equipment Under Test

RBS 2409, S/N: CB 47635657

2.7.3 Date of Test and Modification State

05 November 2008 – Modification State 0

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 Method and Operating Modes

The test was applied in accordance with the test method requirements of FCC CFR 47 Part 24: 2007 and Industry Canada RSS 133:2008.

The EUT was set to transmit on maximum power with all timeslots active. A Spectrum Analyser was used to measure the frequency error. The average result was taken over 200 bursts. The supplied voltage was varied from 85 to 115 percent of the nominal value.

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

Configuration 1 - Mode 2

2.7.6 Environmental Conditions

	05 November 2008
Ambient Temperature	27.5°C
Relative Humidity	35%

Product Service

2.7.7 Test Results

For the period of test the EUT met the requirements of FCC CFR 47 Part 24: 2007 and Industry Canada RSS 133:2008 for Frequency Stability Under Voltage Variations.

The test results are shown below.

Configuration 1 - Mode 2

20°C

GMSK

AC Voltage (V)	Deviation (Hz)
102	94.97
120	94.98
138	64.81

8PSK

AC Voltage (V)	Deviation (Hz)
102	93.27
120	95.99
138	53.00

Limit	±1.0ppm or ±1.96 kHz

Product Service

SECTION 3

TEST EQUIPMENT USED

Product Service

3.1 TEST EQUIPMENT USED

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

Instrument	Manufacturer	Type No.	Serial No.
Section 2.1, 2.3, 2.4 and 2.5 – Maximum Conducted Output Power , Emission Limitations for Cellular Equipment/Occupied Bandwidth , Spurious Emissions at Antenna Terminals (±1MHz) and Spurious Emissions			
Spectrum Analyser	Agilent	E4440A	MY46186610
Digital Multimeter	FLUKE	179	91820401
Thermo-hygrometer	AZ Instruments	8705	9151655
Section 2.6 and 2.7 – Frequency Stability Under Temperature and Voltage Variations			
Spectrum Analyser	Agilent	E4440A	MY46186610
Temperature Chamber	Zengda Technology	GDW/SJ 710	10070063
AC Power Source	HP	6813A	3729A00762
Digital Multimeter	FLUKE	179	91820401
Thermo-hygrometer	AZ Instruments	8705	9151655

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*
Conducted Emissions, LISN	150kHz to 30MHz Amplitude	3.2dB*
Conducted Emissions, ISN	150kHz to 30MHz Amplitude	2.1dB
Substitution Antenna, Radiated Field	30MHz to 18GHz Amplitude	2.6dB
Worst case error for both Time and Frequency measurement 12 parts in 106.		

* In accordance with CISPR 16-4

Product Service

SECTION 4

ACCREDITATION, DISCLAIMERS AND COPYRIGHT

Product Service

4.1 ACCREDITATION, DISCLAIMERS AND COPYRIGHT

UKAS TESTING 0141

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

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

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