



Product Service

**Choose certainty.
Add value.**

Report On

FCC and Industry Canada Testing of the
Ericsson RRUS 01 B5 / KRC 118 70/3

COMMERCIAL-IN-CONFIDENCE

FCC ID: TA8AKRC11870-3
IC ID: 287AB-AS118703

Document 75915030 Report 01 Issue 1

September 2011



Product Service

TÜV SÜD Product Service Ltd, Octagon House, Concorde Way, Segensworth North,
Fareham, Hampshire, United Kingdom, PO15 5RL
Tel: +44 (0) 1489 558100. Website: www.tups.co.uk

COMMERCIAL-IN-CONFIDENCE

REPORT ON FCC and Industry Canada Testing of the
Ericsson RRUS 01 B5 / KRC 118 70/3

Document 75915030 Report 01 Issue 1

September 2011

PREPARED FOR Ericsson AB
Torshamnsgatan 23
SE-164 80
Stockholm
Sweden

PREPARED BY 
X Zhang
Test Engineer


M Jenkins
Authorised Signatory

DATED 09 September 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 22 and Industry Canada RSS-132. The sample tested was found to comply with the requirements defined in the applied rules.

Test Engineer(s);


X 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	8
1.4 Product Information	9
1.5 Test Conditions	14
1.6 Deviations From the Standard	14
1.7 Modification Record	14
1.8 Alternative Test Site	14
2 TEST DETAILS	15
2.1 Maximum Peak Output Power - Conducted	16
2.2 Peak – Average Ratio	20
2.3 Modulation Characteristics	42
2.4 Occupied Bandwidth	46
2.5 Spurious Emissions at Antenna Terminals ($\pm 1\text{MHz}$)	51
2.6 Radiated Spurious Emissions	61
2.7 Conducted Spurious Emissions	67
2.8 Frequency Stability Under Temperature Variations	75
2.9 Frequency Stability Under Voltage Variations	77
2.10 Receiver Spurious Emissions	79
3 TEST EQUIPMENT USED	88
3.1 Test Equipment Used	89
3.2 Measurement Uncertainty	91
4 ACCREDITATION, DISCLAIMERS AND COPYRIGHT	92
4.1 Accreditation, Disclaimers and Copyright	93



Product Service

SECTION 1

REPORT SUMMARY

FCC and Industry Canada Testing of the
Ericsson RRUS 01 B5 / KRC 118 70/3



1.1 INTRODUCTION

The information contained in this report is intended to show verification of the Ericsson RRUS 01 B5 / KRC 118 70/3 to the requirements of FCC CFR 47 Part 22 and Industry Canada RSS-132.

Testing was carried out in support of an application for Grant of Equipment Authorisation in the name of RRUS 01 B5 / KRC 118 70/3.

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 B5
Product Number	KRC 118 70/3
IC Model Number	AS118703
Serial Number(s)	C824850049
Software Version	CXP 104 0013/06 (G12AG7) Rev P4BB
Hardware Version	R1A
Number of Samples Tested	1
Test Specification/Issue/Date	FCC CFR 47 Part 22: 2010 Industry Canada RSS-132 Issue 2: 2005
Incoming Release Date	Declaration of Build Status 15 August 2011
Order Number	PTP
Date	10 August 2011
Start of Test	15 August 2011
Finish of Test	25 August 2011
Name of Engineer(s)	X Zhang C Zhang
Related Document(s)	ANSI C63.4: 2009 FCC CFR 47 Part 2: 2010 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 22 and Industry Canada RSS-132, is shown below.

Configuration 1 – Radio Equipment							
Section	Spec Clause		Test Description	Mode	Mod State	Result	Comments
	FCC Part 2 and 22	RSS-132 and RSS-GEN					
	22.913 (a)	4.4	Effective Radiated Power	869.2MHz		N/A	No integral antenna.
				881.6MHz		N/A	
				893.8MHz		N/A	
				869.2MHz + 884.0MHz		N/A	
				879.0MHz + 893.8MHz		N/A	
				869.2MHz + 874.0MHz + 879.0MHz + 883.8MHz		N/A	
				876.8MHz + 881.6MHz + 886.6MHz + 891.4MHz		N/A	
				879.2MHz + 884.0MHz + 889.0MHz + 893.8MHz		N/A	
				869.2MHz	0	Pass	
2.1	2.1046, 22.913 (a)	4.4	Maximum Peak Output Power - Conducted	881.6MHz	0	Pass	-
				893.8MHz	0	Pass	
				869.2MHz + 884.0MHz	0	Pass	
				879.0MHz + 893.8MHz	0	Pass	
				869.2MHz + 874.0MHz + 879.0MHz + 883.8MHz	0	Pass	
				876.8MHz + 881.6MHz + 886.6MHz + 891.4MHz	0	Pass	
				879.2MHz + 884.0MHz + 889.0MHz + 893.8MHz	0	Pass	
				869.2MHz	0	Pass	-
				881.6MHz	0	Pass	
2.2	22.913 (a)	-	Peak – Average Ratio	893.8MHz	0	Pass	
				869.2MHz + 884.0MHz	0	Pass	
				879.0MHz + 893.8MHz	0	Pass	
				869.2MHz + 874.0MHz + 879.0MHz + 883.8MHz	0	Pass	
				876.8MHz + 881.6MHz + 886.6MHz + 891.4MHz	0	Pass	
				879.2MHz + 884.0MHz + 889.0MHz + 893.8MHz	0	Pass	



Configuration 1 – Radio Equipment							
Section	Spec Clause		Test Description	Mode	Mod State	Result	Comments
	FCC Part 2 and 22	RSS-132 and RSS-GEN					
2.3	2.1047 (d)	4.2	Modulation Characteristics	869.2MHz		N/A	-
				881.6MHz	0	Pass	
				893.8MHz		N/A	
				869.2MHz + 884.0MHz		N/A	
				879.0MHz + 893.8MHz		N/A	
				869.2MHz + 874.0MHz + 879.0MHz + 883.8MHz		N/A	
				876.8MHz + 881.6MHz + 886.6MHz + 891.4MHz		N/A	
				879.2MHz + 884.0MHz + 889.0MHz + 893.8MHz		N/A	
				869.2MHz	0	Pass	
2.4	2.1049, 22.917 (b)	RSS-Gen 4.6.1	Occupied Bandwidth	881.6MHz	0	Pass	-
				893.8MHz	0	Pass	
				869.2MHz + 884.0MHz		N/A	
				879.0MHz + 893.8MHz		N/A	
				869.2MHz + 874.0MHz + 879.0MHz + 883.8MHz		N/A	
				876.8MHz + 881.6MHz + 886.6MHz + 891.4MHz		N/A	
				879.2MHz + 884.0MHz + 889.0MHz + 893.8MHz		N/A	
				869.4MHz	0	Pass	
				881.6MHz		N/A	
2.5	2.1051, 22.917 (b)	4.5	Spurious Emissions at Antenna Terminals ($\pm 1\text{MHz}$)	893.6MHz	0	Pass	The channel adjacent to the lower and higher band-edge cannot be used. The lowest usable channel is 129 (869.4MHz), the highest usable channel is 250 (893.6MHz)
				869.4MHz + 869.8MHz	0	Pass	
				893.2MHz + 893.6MHz	0	Pass	
				869.4MHz + 869.8MHz + 870.2MHz + 870.6MHz		N/A	
				876.8MHz + 881.6MHz + 886.6MHz + 891.4MHz		N/A	
				892.4MHz + 892.8MHz + 893.2MHz + 893.6MHz		N/A	
				869.2MHz	0	Pass	
				881.6MHz	0	Pass	
				893.8MHz	0	Pass	
2.6	2.1053, 22.917 (a)	4.5	Radiated Spurious Emissions	869.2MHz + 884.0MHz	0	Pass	-
				879.0MHz + 893.8MHz	0	Pass	
				869.2MHz + 874.0MHz + 879.0MHz + 883.8MHz		N/A	
				876.8MHz + 881.6MHz + 886.6MHz + 891.4MHz		N/A	
				879.2MHz + 884.0MHz + 889.0MHz + 893.8MHz	0	Pass	



Configuration 1 – Radio Equipment							
Section	Spec Clause		Test Description	Mode	Mod State	Result	Comments
	FCC Part 2 and 22	RSS-132 and RSS-GEN					
2.7	2.1051, 22.917 (a)	4.5	Conducted Spurious Emissions	869.2MHz	0	Pass	-
				881.6MHz	0	Pass	
				893.8MHz	0	Pass	
				869.2MHz + 884.0MHz		N/A	
				879.0MHz + 893.8MHz		N/A	
				869.2MHz + 874.0MHz + 879.0MHz + 883.8MHz		N/A	
				876.8MHz + 881.6MHz + 886.6MHz + 891.4MHz		N/A	
				879.2MHz + 884.0MHz + 889.0MHz + 893.8MHz		N/A	
				869.2MHz		N/A	
2.8	2.1055, 22.355	4.3	Frequency Stability Under Temperature Variations	881.6MHz	0	Pass	-
				893.8MHz		N/A	
				869.2MHz + 884.0MHz		N/A	
				879.0MHz + 893.8MHz		N/A	
				869.2MHz + 874.0MHz + 879.0MHz + 883.8MHz		N/A	
				876.8MHz + 881.6MHz + 886.6MHz + 891.4MHz		N/A	
				879.2MHz + 884.0MHz + 889.0MHz + 893.8MHz		N/A	
				869.2MHz		N/A	
				881.6MHz	0	Pass	
2.9	2.1055, 22.355	4.3	Frequency Stability Under Voltage Variations	893.8MHz		N/A	-
				869.2MHz + 884.0MHz		N/A	
				879.0MHz + 893.8MHz		N/A	
				869.2MHz + 874.0MHz + 879.0MHz + 883.8MHz		N/A	
				876.8MHz + 881.6MHz + 886.6MHz + 891.4MHz		N/A	
				879.2MHz + 884.0MHz + 889.0MHz + 893.8MHz		N/A	
				869.2MHz	0	Pass	
				881.6MHz	0	Pass	
				893.8MHz	0	Pass	
2.10	-	4.6	Receiver Spurious Emissions	869.2MHz + 884.0MHz		N/A	-
				879.0MHz + 893.8MHz		N/A	
				869.2MHz + 874.0MHz + 879.0MHz + 883.8MHz		N/A	
				876.8MHz + 881.6MHz + 886.6MHz + 891.4MHz		N/A	
				879.2MHz + 884.0MHz + 889.0MHz + 893.8MHz		N/A	
				869.2MHz		N/A	
				881.6MHz		N/A	
				893.8MHz		N/A	
				869.2MHz + 884.0MHz		N/A	

N/A – Not Applicable



1.3 DECLARATION OF BUILD STATUS

MAIN EUT							
MANUFACTURING DESCRIPTION	Radio Equipment						
MANUFACTURER	Ericsson AB						
PRODUCT NUMBER	RRUS 01 B5						
PART NUMBER	KRC 118 70/3						
IC Model NUMBER	AS118703						
SERIAL NUMBER	C824850049						
HARDWARE VERSION	R1A						
SOFTWARE VERSION	CXP 104 0013/06 (G12AG7) Rev P4BB						
TRANSMITTER OPERATING RANGE	TX: 869.4MHz - 893.6MHz RX: 824.4MHz - 848.6MHz						
MODULATIONS	GMSK, 8-PSK, 16QAM, 32QAM, AQPSK						
INTERMEDIATE FREQUENCIES	--						
ITU DESIGNATION OF EMISSION	250KGXW 250KG7W						
OUTPUT POWER (RMS) (W or dBm)		GMSK	8-PSK	16QAM	32QAM	AQPSK	
	Single Carrier:	1x47.8dBm (1x60W)					
	Multi Carrier (1x2):	2x46.0dBm (2x40.0W)	2x46.0dBm (2x40.0W)	2x45.7dBm (2x37.2W)	2x45.3dBm (2x33.9W)	2x46.0dBm (2x40.0W)	
	Multi Carrier (1x4):	4x43.0dBm (4 x20.0W)	4x41.1dBm (4 x12.9W)	4x39.7dBm (4 x9.33W)	4x39.3dBm (4 x8.51W)	4x41.0dBm (4 x12.6W)	
	OUTPUT POWER TOLERANCE	± 1dB					
	NUMBER OF ANTENNA PORTS	1 TX/ RX and 1 RX ports					
FCC ID	TA8AKRC11870-3						
IC ID	287AB-AS118703						
TECHNICAL DESCRIPTION (a brief description of the intended use and operation)	The equipment is the Radio Part of GSM Base Station.						

Signature

Date

29 August 2011

D of B S Serial No

75915030/01

No responsibility will be accepted by TÜV SÜD Product Service 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 B5 / KRC 118 70/3 is an Ericsson Radio Equipment working in the public mobile service 850MHz band which provides communication connections to GSM850 network. The RRUS 01 B5 / KRC 118 70/3 operates from a - 48V DC supply.

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



1.4.2 Test Configuration

Configuration 1: Radio Equipment

The EUT was configured in accordance with FCC CFR 47 Part 22 and Industry Canada RSS-132.

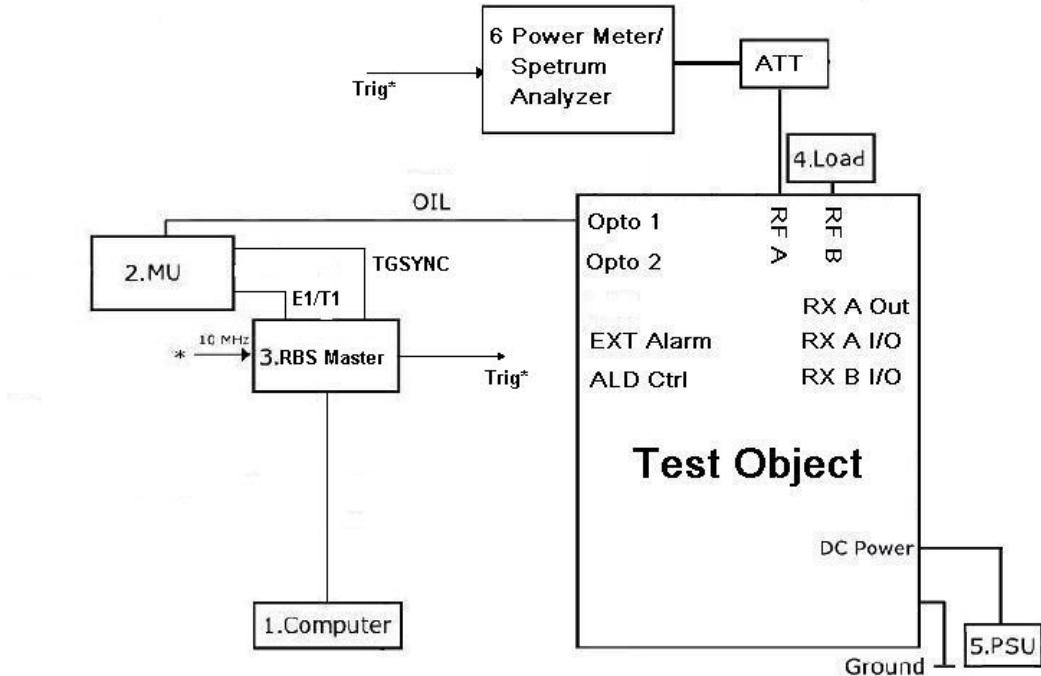
The RRUS 01 B5 / KRC 118 70/3 supports GMSK, 8-PSK, 16QAM, 32QAM and AQPSK modulations at 850MHz. The EUT includes a TX/RX port and a RX port. It can be configured to transmit with 850MHz single or multi carrier at the RF output connector. All TX measurements were performed on the combined TX/RX output connector RF A of the EUT, with RX antenna port RF B terminated, and RX testing was performed on the RX connector RF B.

The settings below were found to be representative for all modes when several settings with the different modulations were testing to find the worst case setting. The settings were used for all measurements if not otherwise noted:

- Single Carrier: GMSK and 8-PSK modulations

The complete testing was performed with the EUT transmitting at maximum RF power unless otherwise stated. For AQPSK modulation, the SCPIR is 0dB.

The EUT was powered by a -48V DC Power supply.

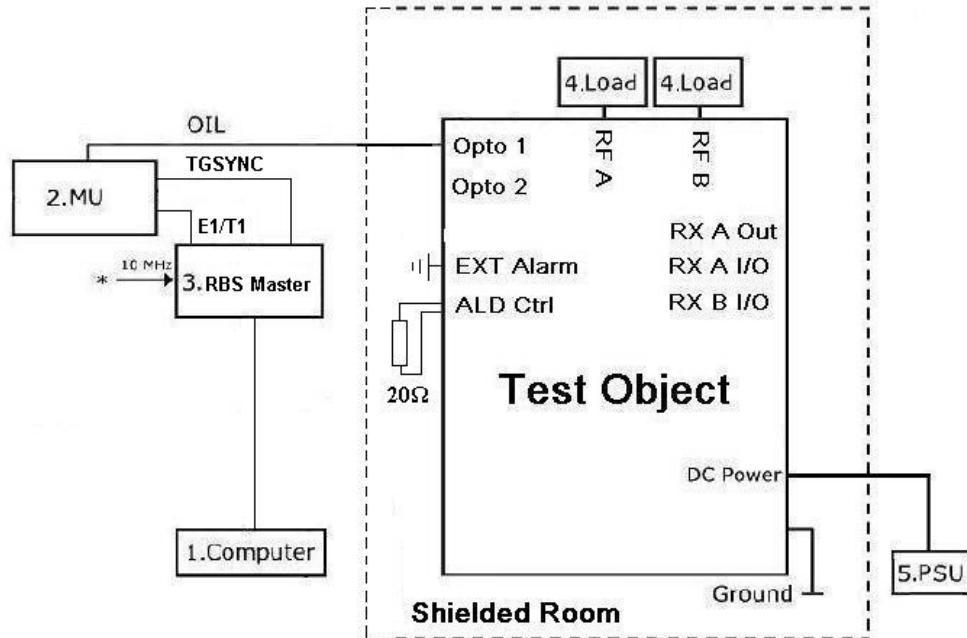
**Test Setup, Conducted Measurement:**

Product Name	Product Number	Version	Serial Number
RRUS 01 B5	KRC 118 70/3	R1A	C824850049

No.	Auxiliary Equipment	Part Number / Model Type	Version	Serial Number
1	Computer	HP Compaq nc4400	--	CND6460KCL
2	RBS 6601	BFL 901 009/1	--	--
	DUG 20 01	KDU 137 569/1	R2B	CB4H322724
	SUP 6601	1/BFL 901 009/1	R3B	BR81262541
3	RBS Master	LPY 107 1007/3	R1C	T01E050954
4	Load	TFZ50C-3FR	--	JW8042-04A-021
5	Power Supply	DH1716-5D	--	2007060028
	Power Supply	DH1716A-14	--	20080403
6	Power Meter	Rohde & Schwarz NRP	--	102624
	Thermal Power Sensor	Rohde & Schwarz NRP-Z21	--	102106
	Spectrum Analyzer	FSQ26	--	200960
	Signal Analyzer	MXA N9020A	--	MY49100419



Test Setup, Radiated Measurement:



Product Name	Product Number	Version	Serial Number
RRUS 01 B5	KRC 118 70/3	R1A	C824850049

No.	Auxiliary Equipment	Part Number / Model Type	Version	Serial Number
1	Computer	HP Compaq nc4400	--	CND6460KCL
2	RBS 6601	BFL 901 009/1	--	--
	DUG 20 01	KDU 137 569/1	R2B	CB4H322724
	SUP 6601	1/BFL 901 009/1	R3B	BR81262541
3	RBS Master	LPY 107 1007/3	R1C	T01E050954
4	Load	TFZ50C-3FR	--	JW8042-04A-021
	Load	TFE100	--	09121602
5	Power Supply	DH1716-5D	--	2007060028
	Power Supply	DH1716A-14	--	20080403



1.4.3 Modes of Operation

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

Mode 1 – ARFCN 128: 869.2MHz (Bottom Channel)

Mode 2 – ARFCN 190: 881.6MHz (Middle Channel)

Mode 3 – ARFCN 251: 893.8MHz (Top Channel)

Mode 4 – ARFCN 128 + 202: 869.2MHz + 884.0MHz (B and B+14.8MHz)

Mode 5 – ARFCN 177 + 251: 879.0MHz + 893.8MHz (T-14.8MHz and T)

Mode 6 – ARFCN 128 + 152 + 177 + 201:

869.2MHz + 874.0MHz + 879.0MHz + 883.8MHz (B, B+4.8MHz, B+9.8MHz and B+14.8MHz)

Mode 7 - ARFCN 166 + 190 + 215 + 239:

876.8MHz + 881.6MHz + 886.6MHz + 891.4MHz (M-4.8MHz, M, M+5MHz and M+9.8MHz)

Mode 8 - ARFCN 178 + 202 + 227 + 251:

879.2MHz + 884.0MHz + 889.0MHz + 893.8MHz (T-14.8MHz, T-9.8MHz, T-4.8MHz and T)

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

For test case Spurious Emissions at Antenna Terminals ($\pm 1\text{MHz}$), the following modes of operation were used:

Mode 1' – ARFCN 129: 869.4MHz (B+1 Channel)

Mode 3' – ARFCN 250: 893.6MHz (T-1 Channel)

Mode 4' – ARFCN 129 + 131: 869.4MHz + 869.8MHz (B+1 and B+3 Channels)

Mode 5' – ARFCN 248 + 250: 893.2MHz + 893.6MHz (T-3 and T-1 Channels)

Mode 6' – ARFCN 129 + 131 + 133 + 135:

869.4MHz + 869.8MHz + 870.2MHz + 870.6MHz (B+1, B+3, B+5 and B+7 Channels)

Mode 8' – ARFCN 244 + 246 + 248 + 250:

892.4MHz + 892.8MHz + 893.2MHz + 893.6MHz (T-7, T-5, T-3 and T-1 Channels)



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

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

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

FCC and Industry Canada Testing of the
Ericsson RRUS 01 B5 / KRC 118 70/3



2.1 MAXIMUM PEAK OUTPUT POWER - CONDUCTED

2.1.1 Specification Reference

FCC CFR 47 Part 2, Clause 2.1046
 FCC CFR 47 Part 22, Clause 22.913 (a)
 Industry Canada RSS-132, Clause 4.4

2.1.2 Equipment Under Test

RRUS 01 B5 / KRC 118 70/3, S/N: C824850049

2.1.3 Date of Test and Modification State

15 August 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 22 and Industry Canada RSS-132.

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, 8-PSK, 16QAM, 32QAM and AQPSK modulations.

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 1
 - Mode 2
 - Mode 3
 - Mode 4
 - Mode 5
 - Mode 6
 - Mode 7
 - Mode 8

2.1.6 Environmental Conditions

15 August 2011

Ambient Temperature 25.4 °C

Relative Humidity 58.9%



2.1.7 Test Results

For the period of test the EUT met the requirements of FCC CFR 47 Part 2 and Part 22 and Industry Canada RSS-132 for Maximum Peak Output Power.

The test results are shown below

Single Carrier

Configuration 1 - Mode 1, 2 and 3

GMSK

UARFCN	Frequency (MHz)	Path Loss (dB)	Result (dBm) RMS	Result (W) RMS
128 (Bottom)	869.2	41.4	47.33	54.08
190 (Middle)	881.6	41.4	47.43	55.34
251 (Top)	893.8	41.4	47.25	53.09

8-PSK

UARFCN	Frequency (MHz)	Path Loss (dB)	Result (dBm) RMS	Result (W) RMS
128 (Bottom)	869.2	41.4	47.40	54.95
190 (Middle)	881.6	41.4	47.54	56.75
251 (Top)	893.8	41.4	47.30	53.70

16QAM

UARFCN	Frequency (MHz)	Path Loss (dB)	Result (dBm) RMS	Result (W) RMS
128 (Bottom)	869.2	41.4	47.32	53.95
190 (Middle)	881.6	41.4	47.43	55.34
251 (Top)	893.8	41.4	47.14	51.76

32QAM

UARFCN	Frequency (MHz)	Path Loss (dB)	Result (dBm) RMS	Result (W) RMS
128 (Bottom)	869.2	41.4	47.27	53.33
190 (Middle)	881.6	41.4	47.40	54.95
251 (Top)	893.8	41.4	47.14	51.76

AQPSK

UARFCN	Frequency (MHz)	Path Loss (dB)	Result (dBm) RMS	Result (W) RMS
128 (Bottom)	869.2	41.4	47.23	52.84
190 (Middle)	881.6	41.4	47.35	54.33
251 (Top)	893.8	41.4	47.07	50.93

Multi Carrier (1x2)Configuration 1 - Mode 4 and 5GMSK

UARFCN	Frequency (MHz)	Path Loss (dB)	Result (dBm) RMS	Result (W) RMS
128 (Bottom)	869.2	41.4	45.48	35.32
251 (Top)	893.8	41.4	45.43	34.91

8-PSK

UARFCN	Frequency (MHz)	Path Loss (dB)	Result (dBm) RMS	Result (W) RMS
128 (Bottom)	869.2	41.4	45.50	35.48
251 (Top)	893.8	41.4	45.43	34.91

16QAM

UARFCN	Frequency (MHz)	Path Loss (dB)	Result (dBm) RMS	Result (W) RMS
128 (Bottom)	869.2	41.4	45.10	32.36
251 (Top)	893.8	41.4	45.04	31.92

32QAM

UARFCN	Frequency (MHz)	Path Loss (dB)	Result (dBm) RMS	Result (W) RMS
128 (Bottom)	869.2	41.4	44.67	29.31
251 (Top)	893.8	41.4	44.63	29.04

AQPSK

UARFCN	Frequency (MHz)	Path Loss (dB)	Result (dBm) RMS	Result (W) RMS
128 (Bottom)	869.2	41.4	45.25	34.50
251 (Top)	893.8	41.4	45.21	33.19

**Multi Carrier (1x4)****Configuration 1 - Mode 6, 7 and 8****GMSK**

UARFCN	Frequency (MHz)	Path Loss (dB)	Result (dBm) RMS	Result (W) RMS
128 (Bottom)	869.2	41.4	42.59	18.16
190 (Middle)	881.6	41.4	42.60	18.20
251 (Top)	893.8	41.4	42.57	18.07

8-PSK

UARFCN	Frequency (MHz)	Path Loss (dB)	Result (dBm) RMS	Result (W) RMS
128 (Bottom)	869.2	41.4	40.78	11.97
190 (Middle)	881.6	41.4	40.80	12.02
251 (Top)	893.8	41.4	40.76	11.91

16QAM

UARFCN	Frequency (MHz)	Path Loss (dB)	Result (dBm) RMS	Result (W) RMS
128 (Bottom)	869.2	41.4	39.46	8.83
190 (Middle)	881.6	41.4	39.43	8.77
251 (Top)	893.8	41.4	39.39	8.69

32QAM

UARFCN	Frequency (MHz)	Path Loss (dB)	Result (dBm) RMS	Result (W) RMS
128 (Bottom)	869.2	41.4	39.0	7.94
190 (Middle)	881.6	41.4	39.17	8.26
251 (Top)	893.8	41.4	39.14	8.20

AQPSK

UARFCN	Frequency (MHz)	Path Loss (dB)	Result (dBm) RMS	Result (W) RMS
128 (Bottom)	869.2	41.4	40.39	10.94
190 (Middle)	881.6	41.4	40.47	11.14
251 (Top)	893.8	41.4	40.38	10.91

Limit	≤500W or ≤+57dBm
-------	------------------

Remarks

The EUT does not exceed 500W or 57dBm at the measured frequencies.



2.2 PEAK – AVERAGE RATIO

2.2.1 Specification Reference

FCC CFR 47 Part 22, Clause 22.913 (a)

2.2.2 Equipment Under Test

RRUS 01 B5 / KRC 118 70/3, S/N: C824850049

2.2.3 Date of Test and Modification State

16 to 18 August 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 22.

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 spectrum analyzer Measurement bandwidth was set to 300kHz 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
 - Mode 4
 - Mode 5
 - Mode 6
 - Mode 7
 - Mode 8

2.2.6 Environmental Conditions

	16 August 2011	17 August 2011	18 August 2011
Ambient Temperature	25.8°C	24.9°C	25.3°C
Relative Humidity	58.6%	56.8%	55.6%



2.2.7 Test Results

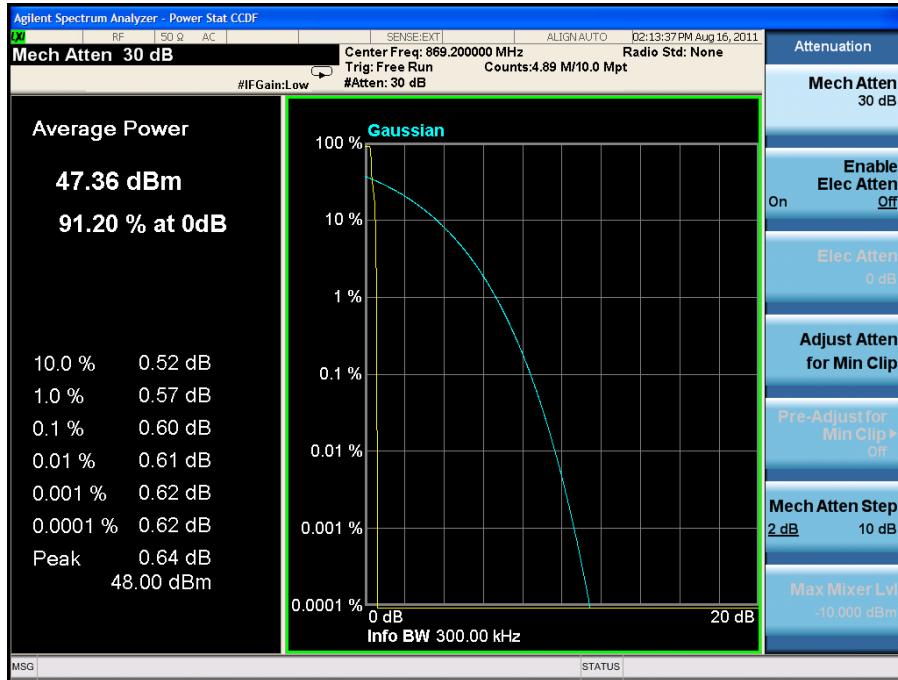
For the period of test the EUT met the requirements of FCC CFR 47 Part 22 Peak – Average Ratio.

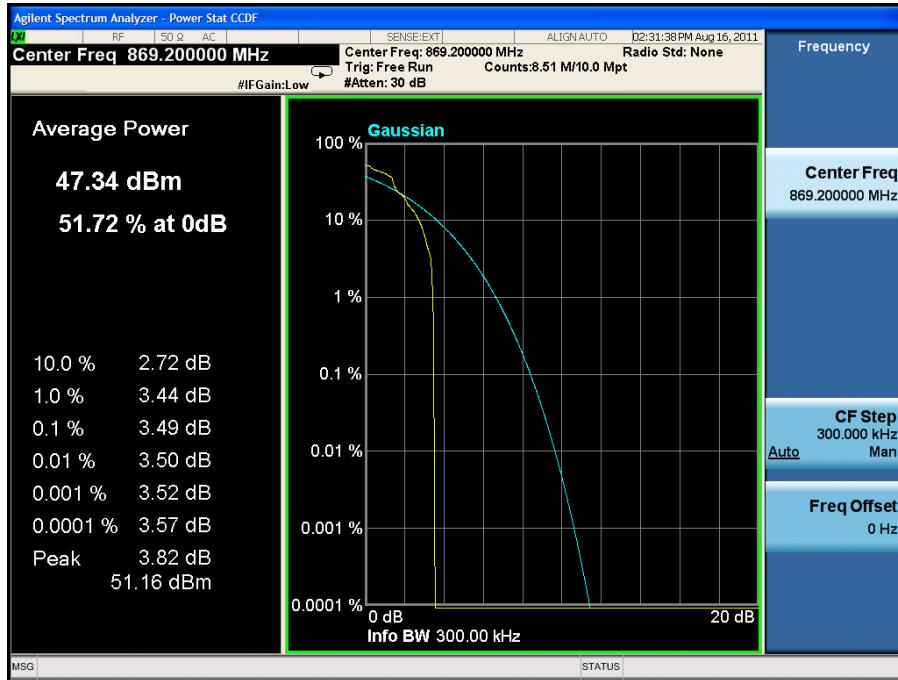
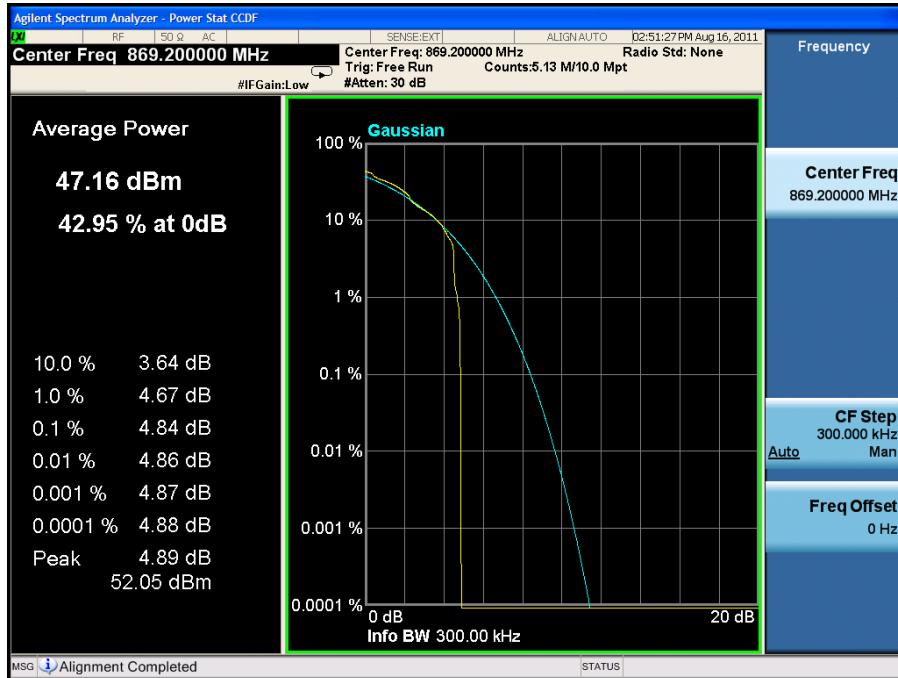
The test results are shown below.

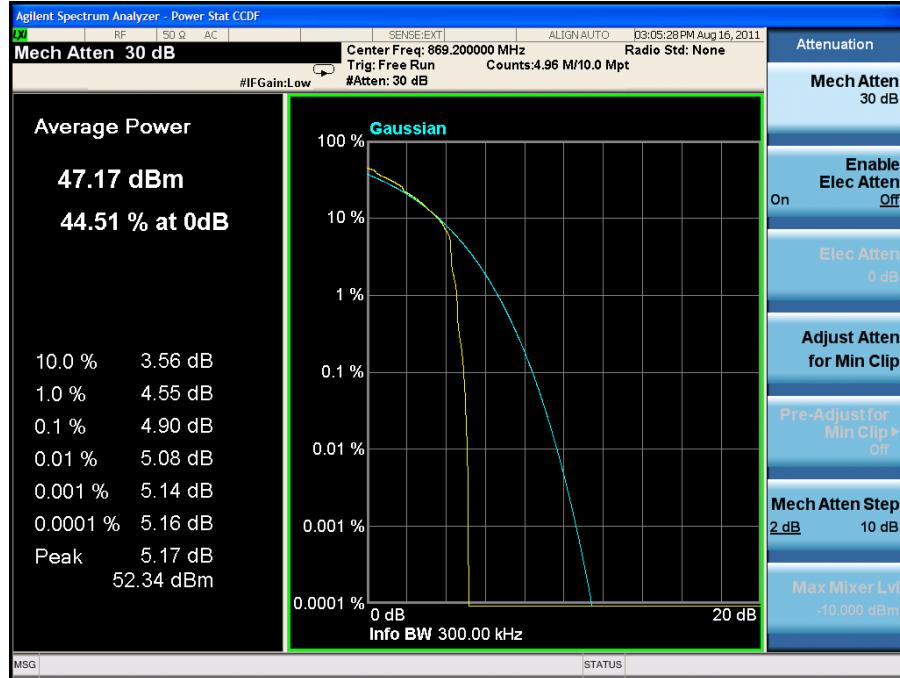
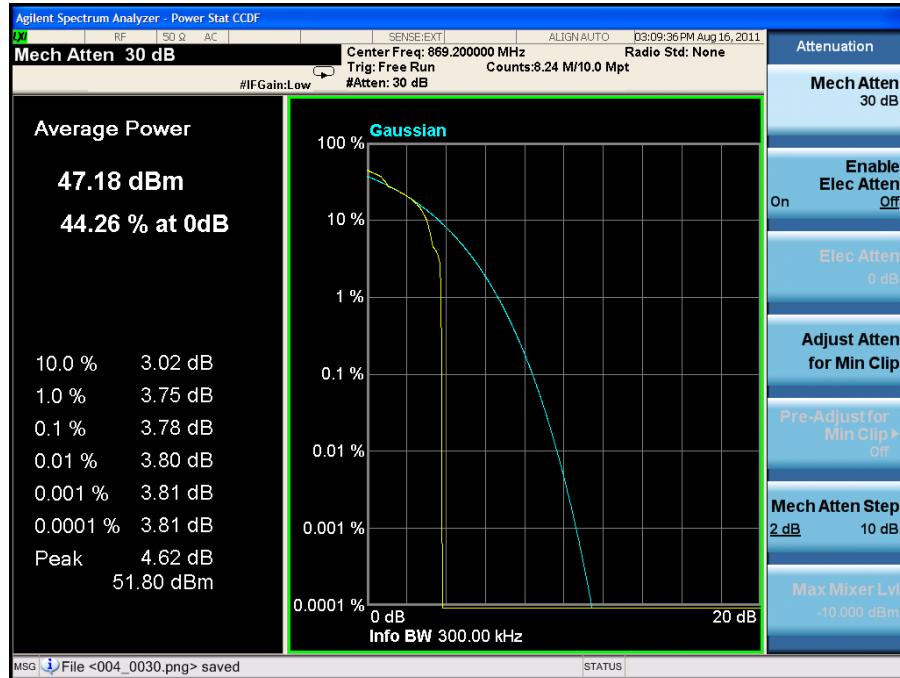
Single Carrier

Configuration 1 - Mode 1

GMSK



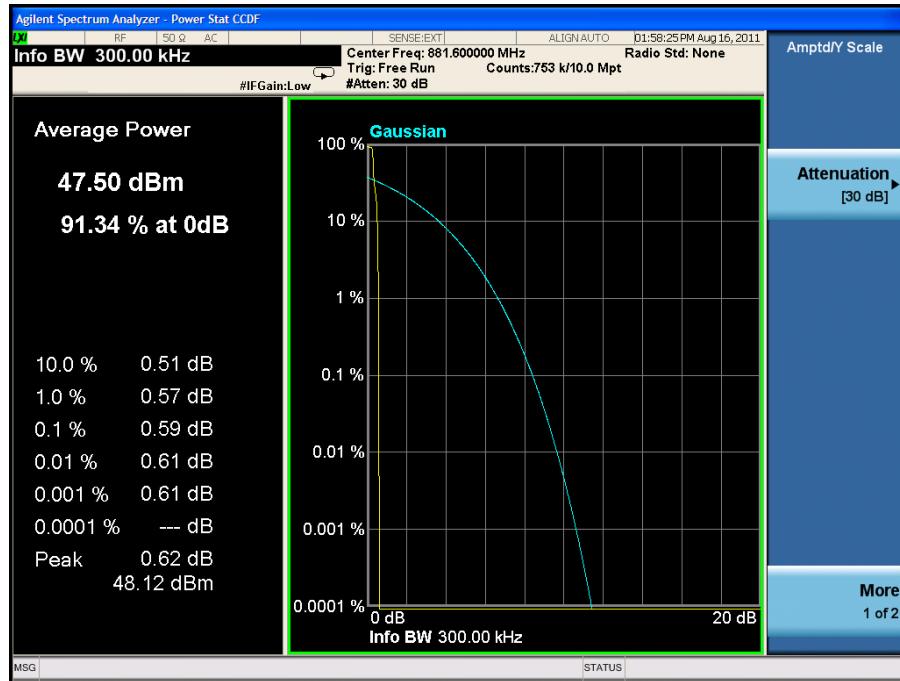
8-PSK16QAM

32QAMAQPSK

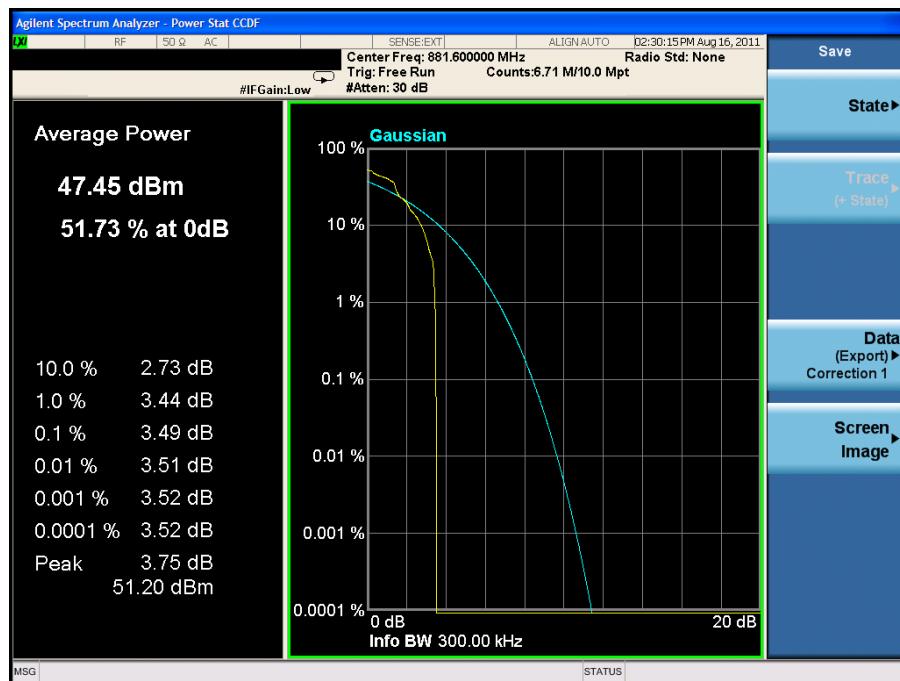


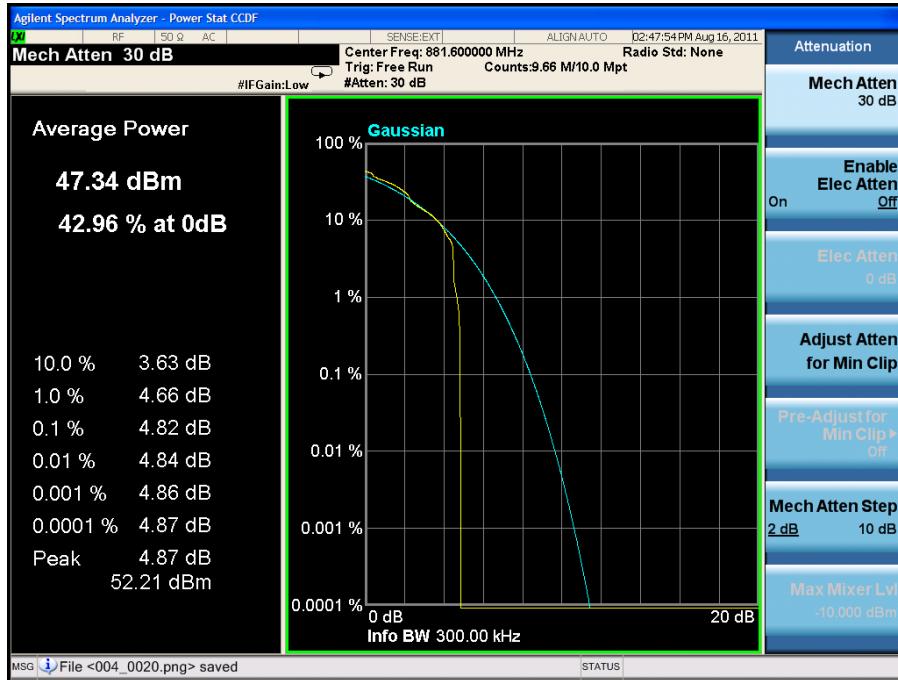
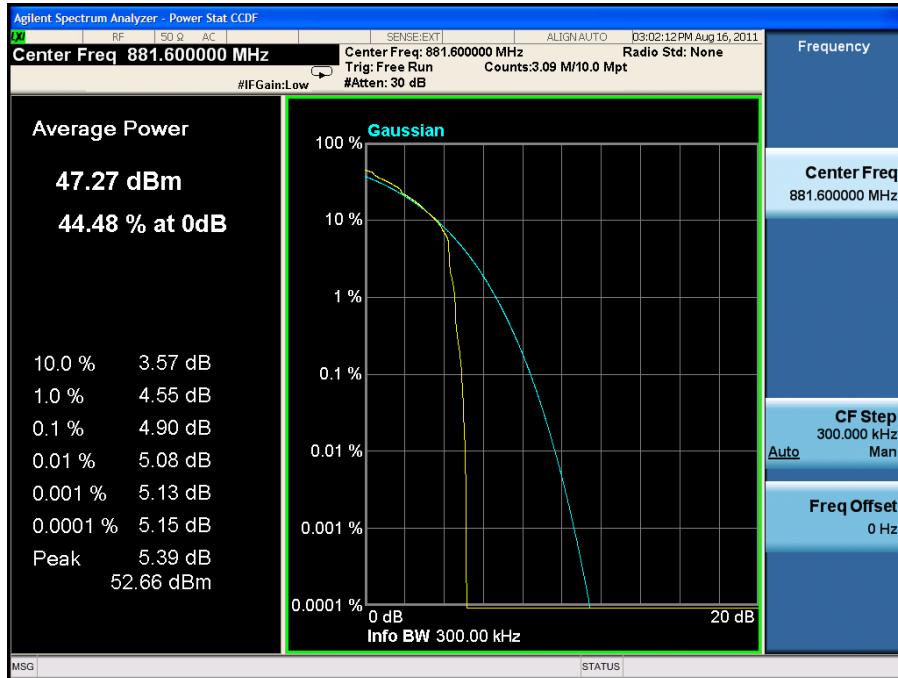
Configuration 1 – Mode 2

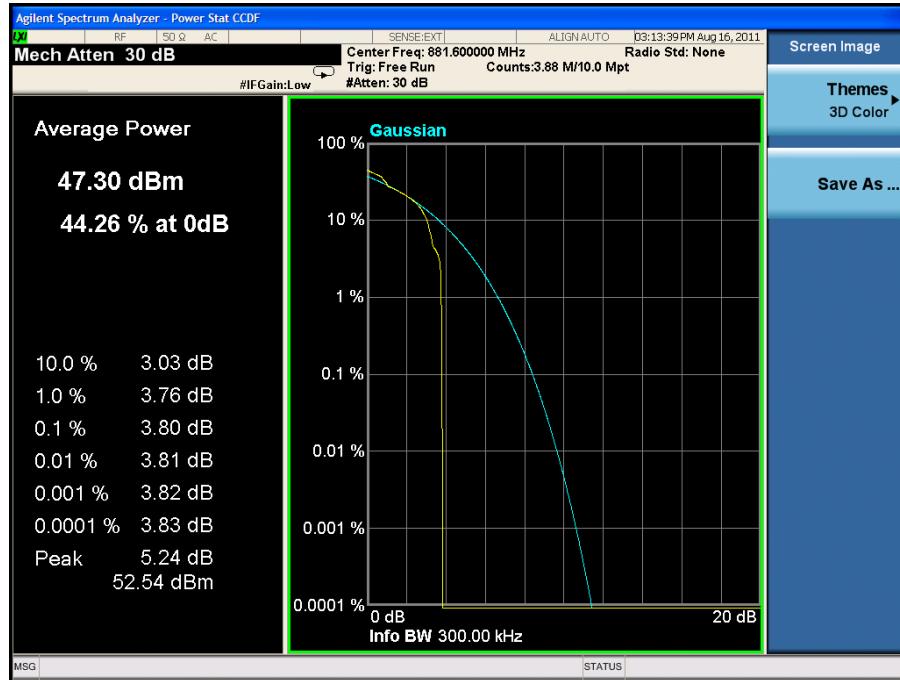
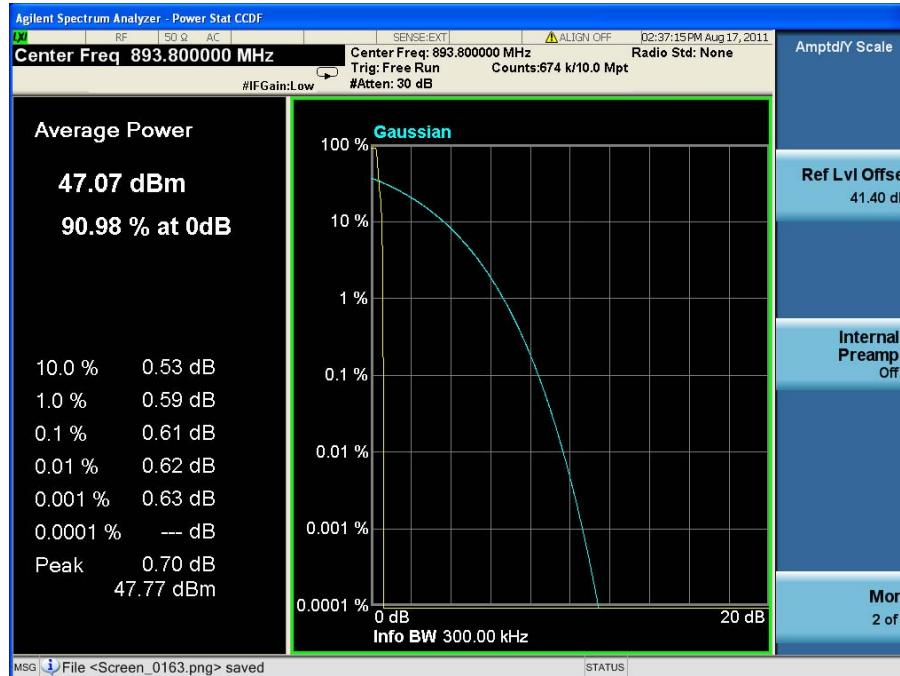
GMSK

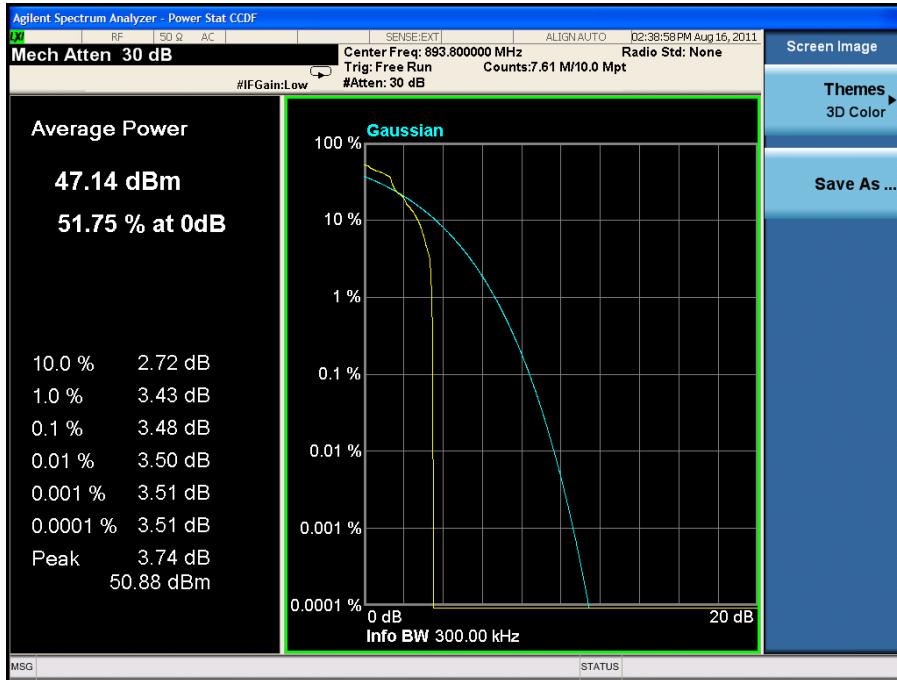
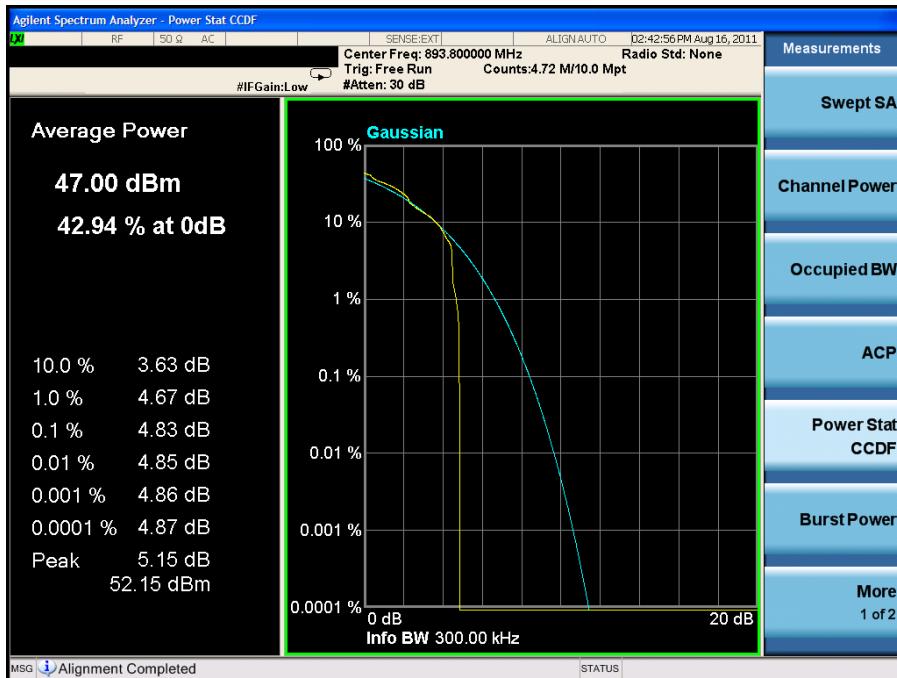


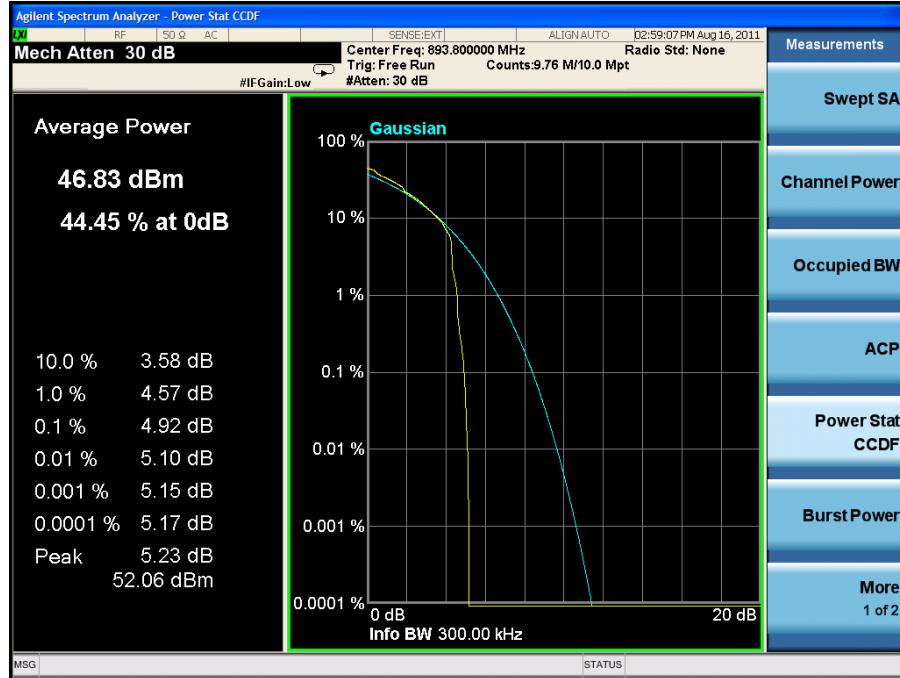
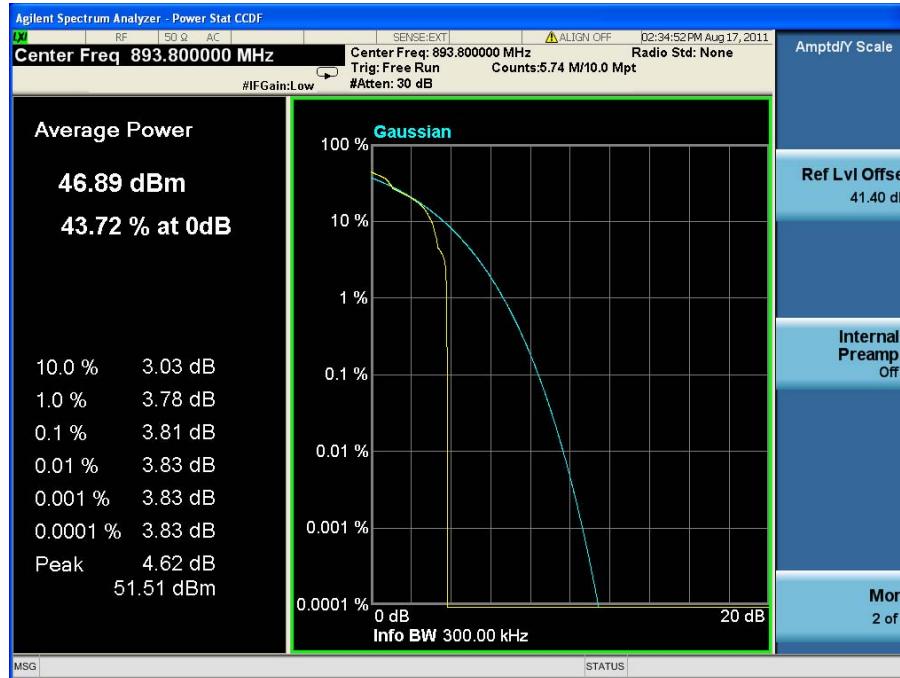
8-PSK



16QAM32QAM

AQPSKConfiguration 1 – Mode 3GMSK

8-PSK16QAM

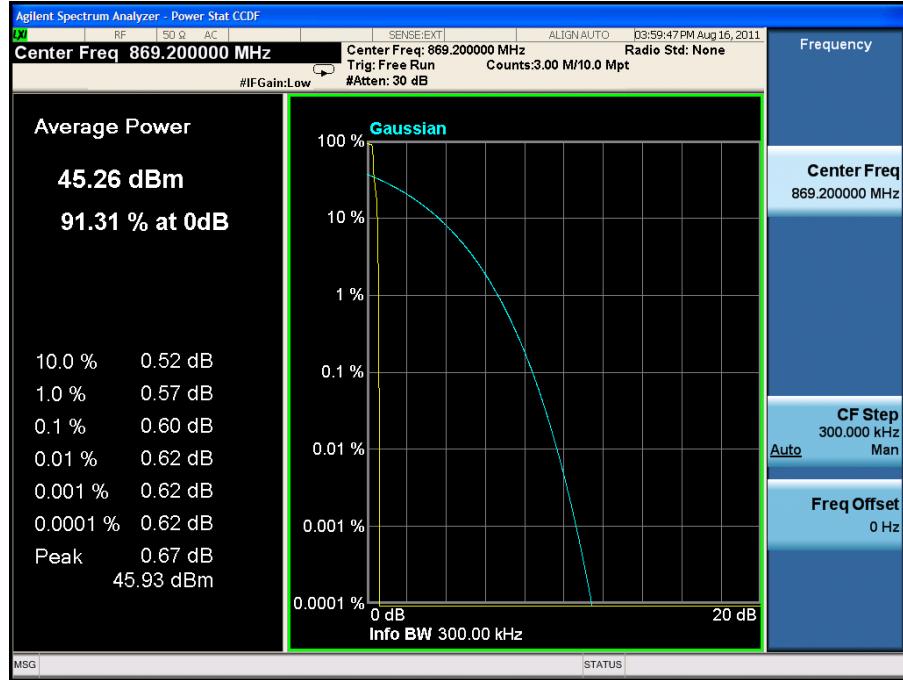
32QAMAQPSK



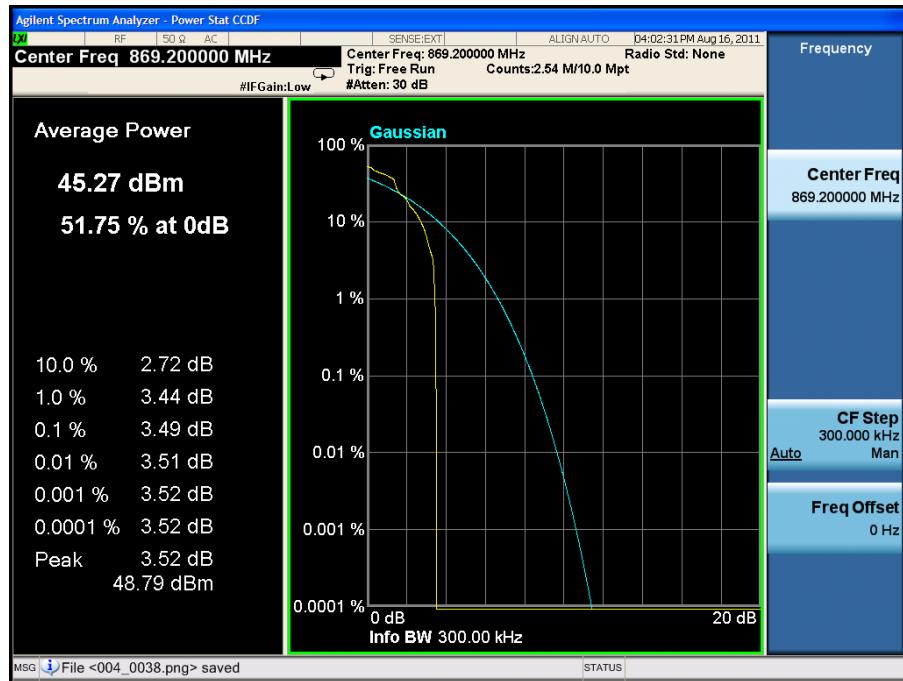
Multi Carrier (1x2)

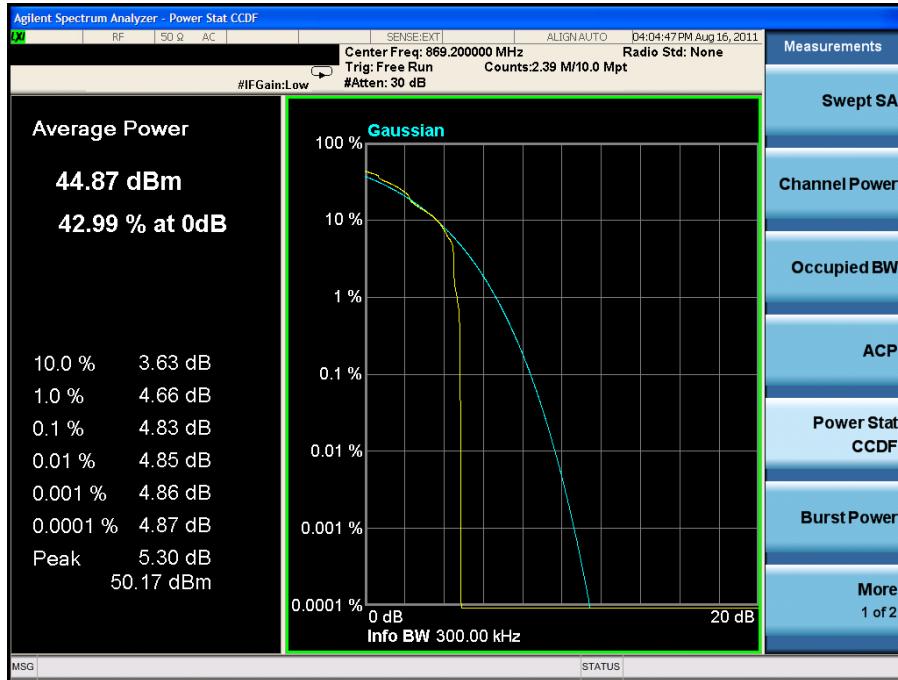
Configuration 1 - Mode 4

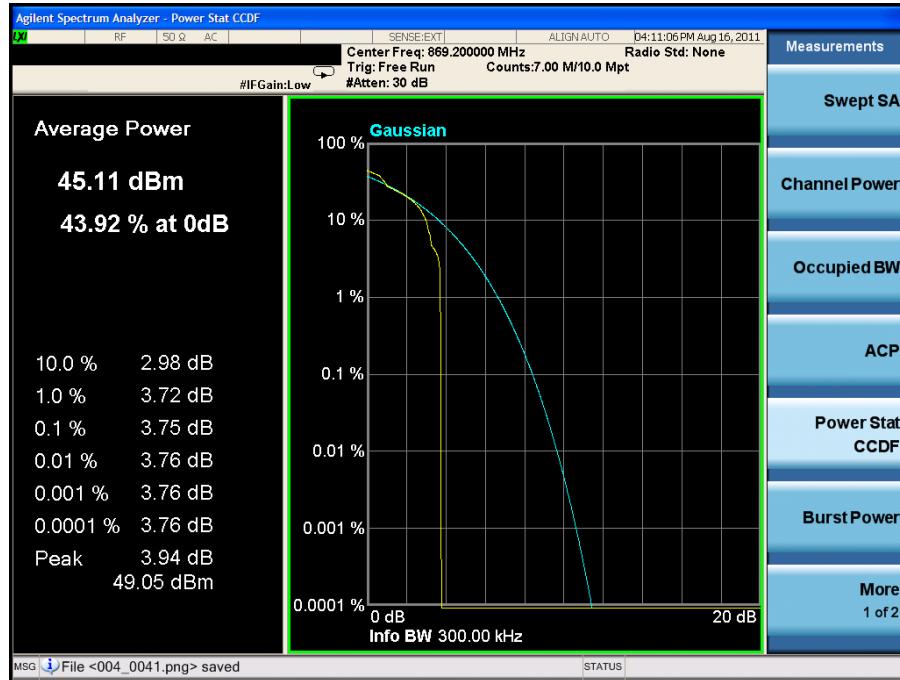
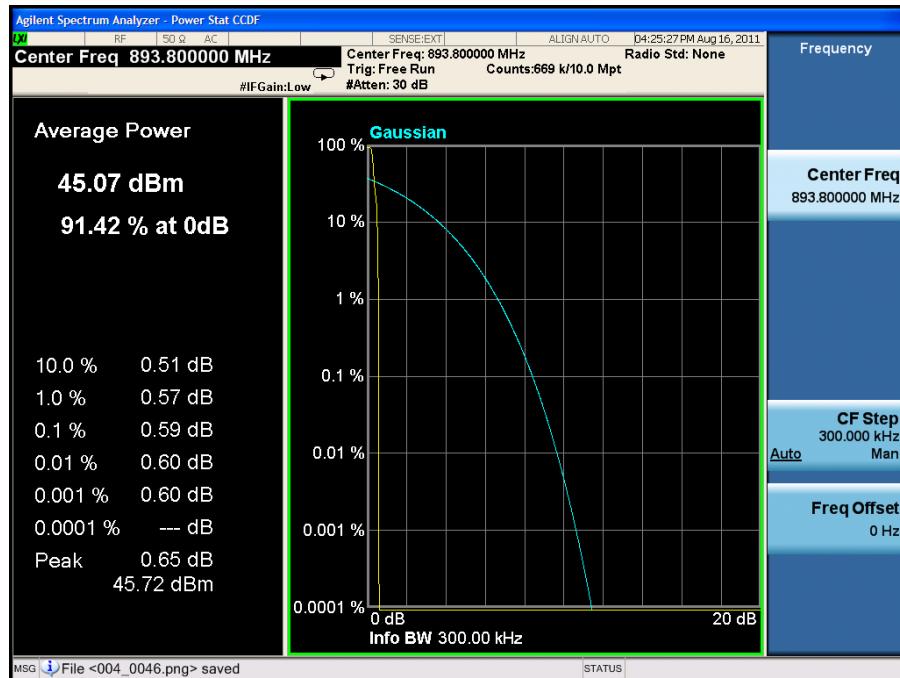
GMSK

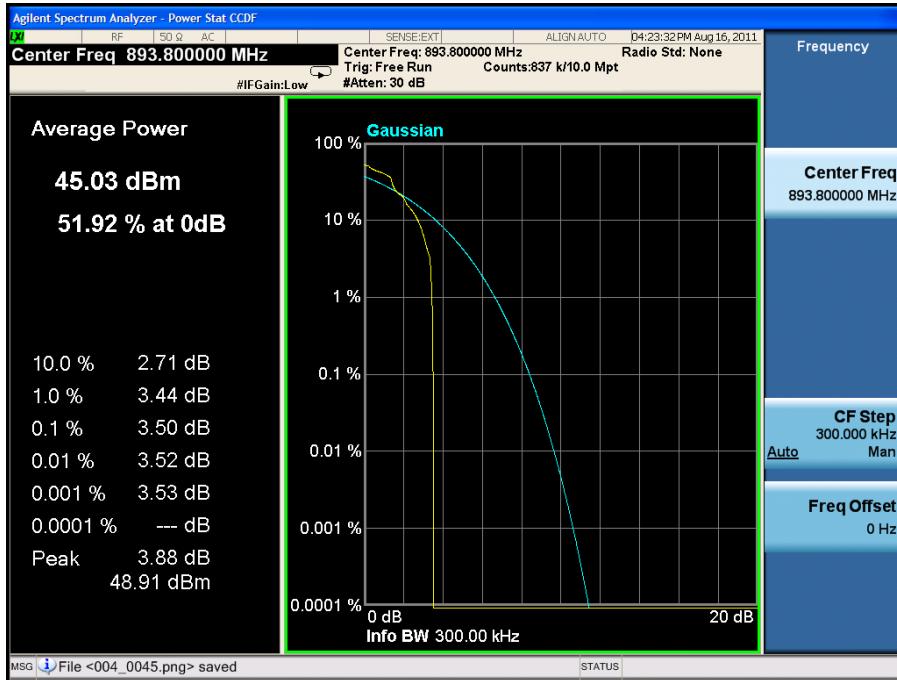
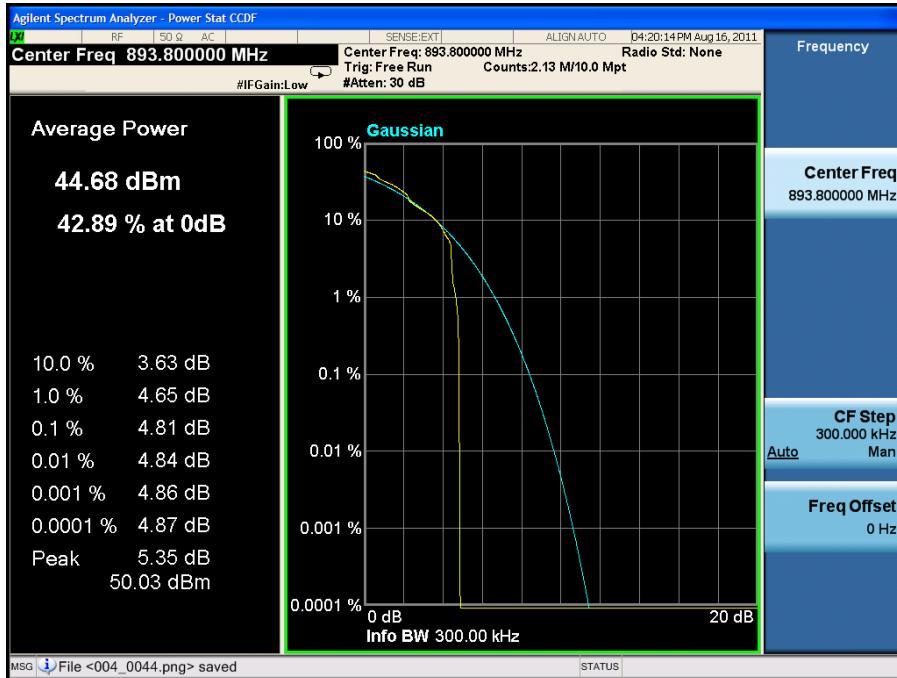


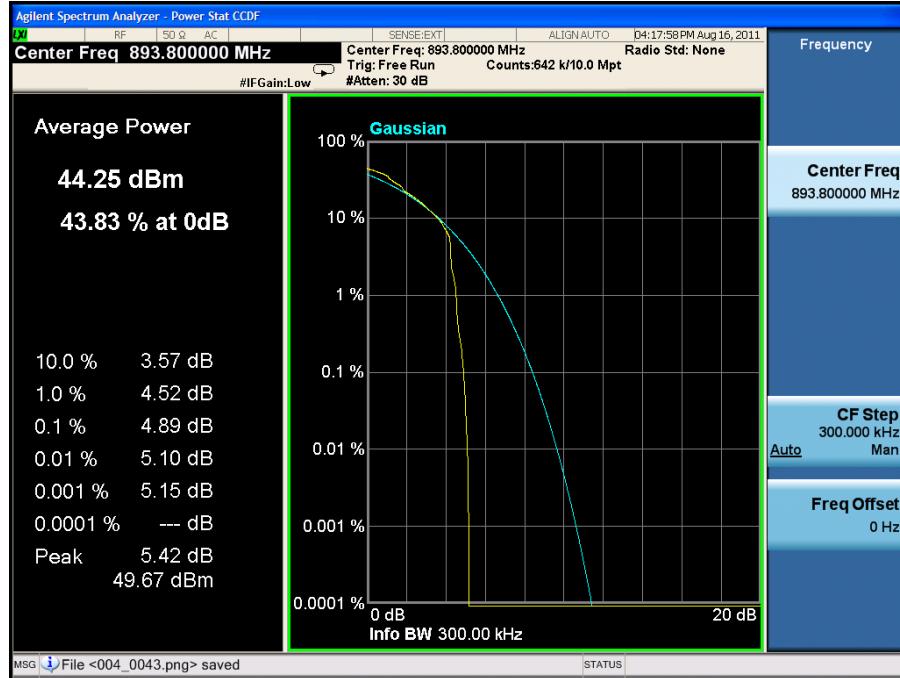
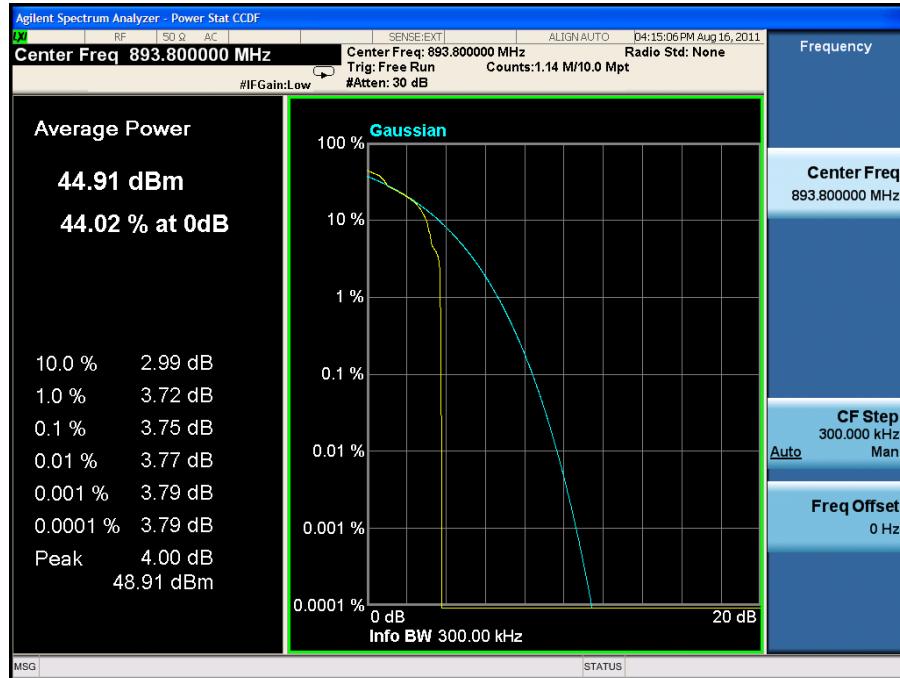
8-PSK



16QAM32QAM

AQPSKConfiguration 1 – Mode 5GMSK

8-PSK16QAM

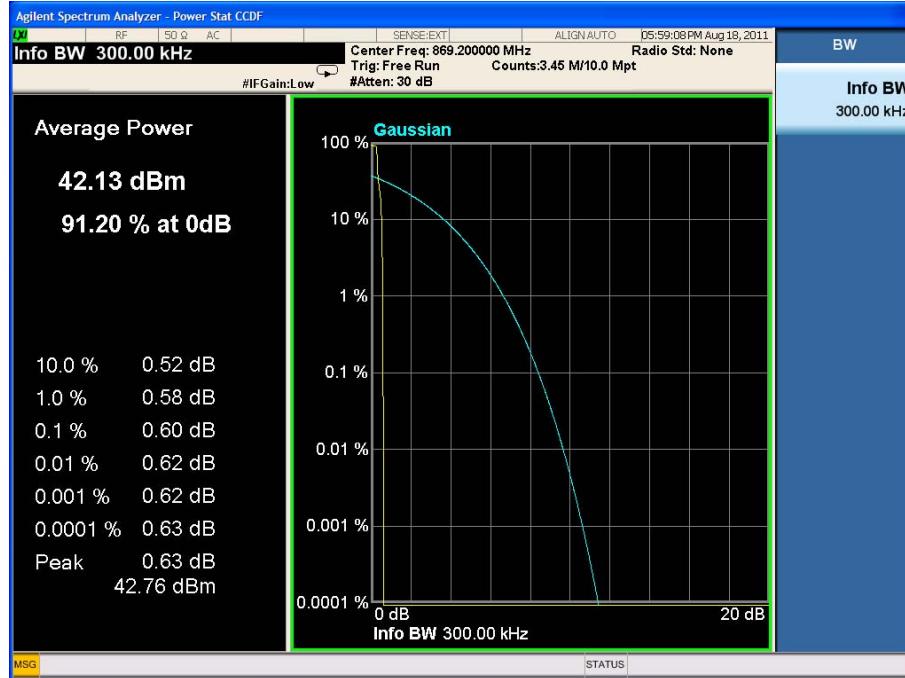
32QAMAQPSK



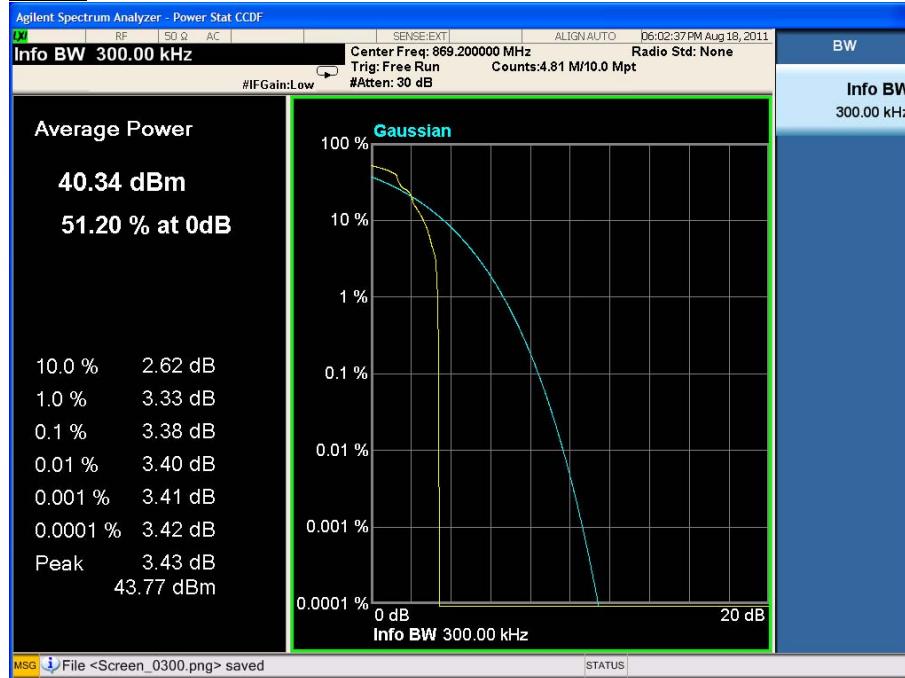
Multi Carrier (1x4)

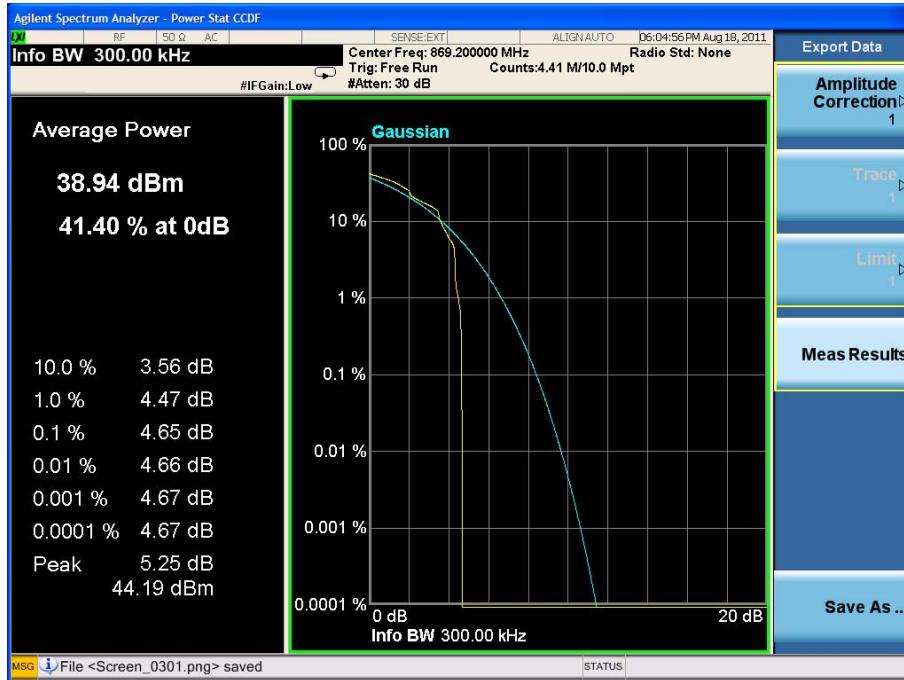
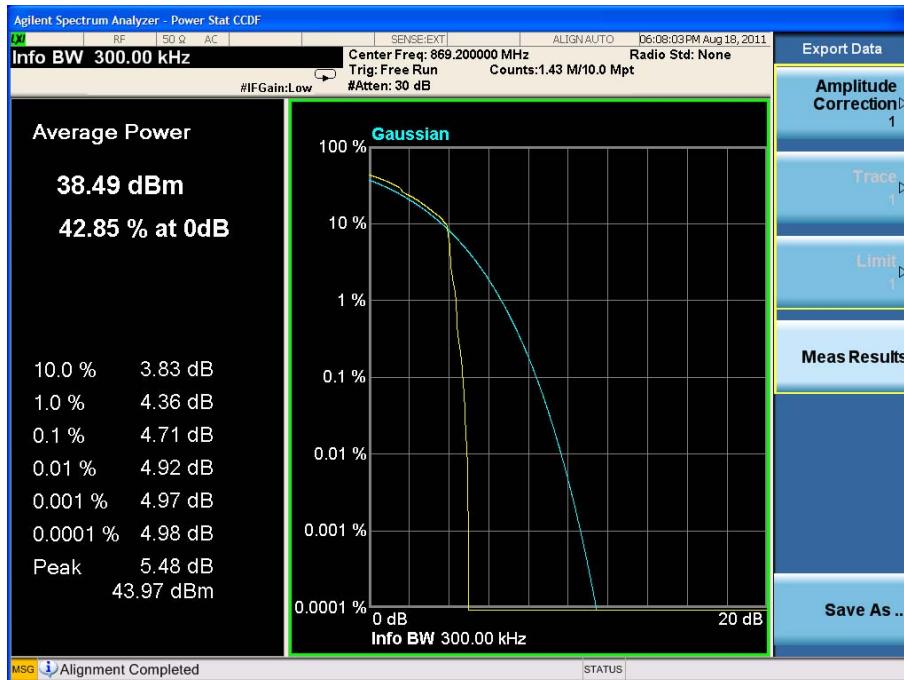
Configuration 1 – Mode 6

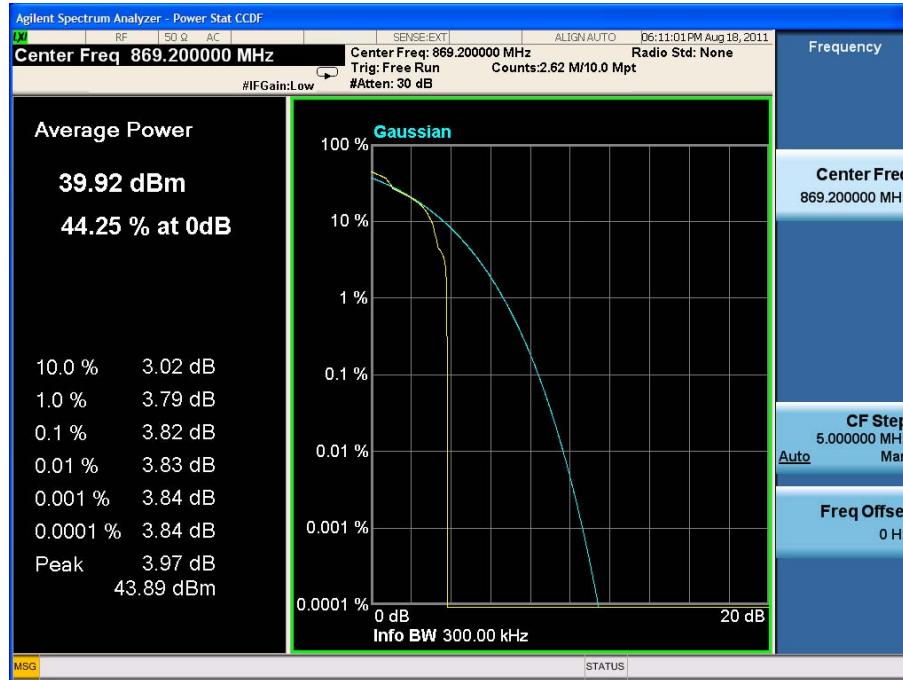
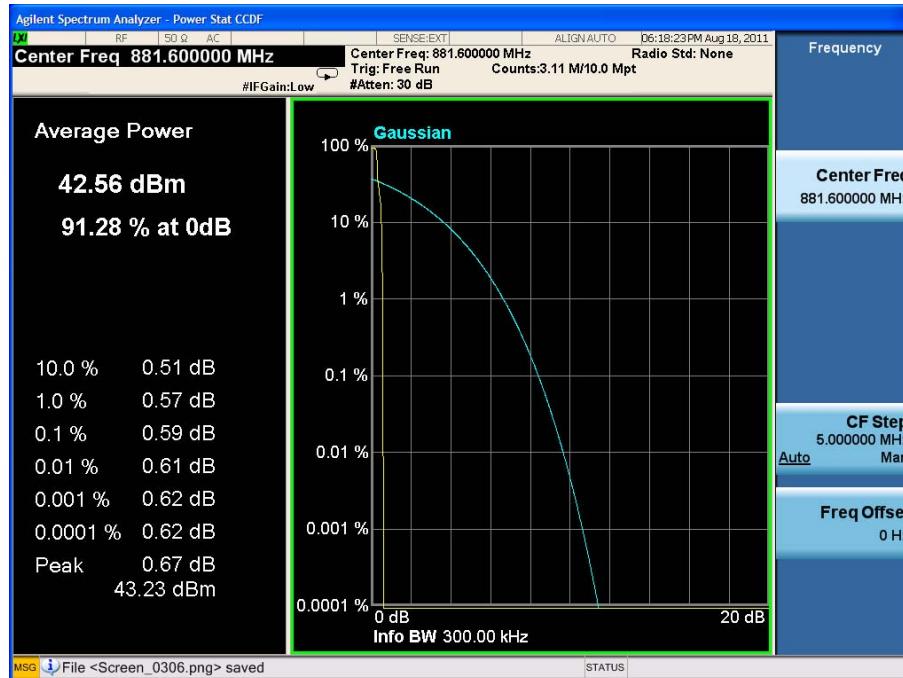
GMSK

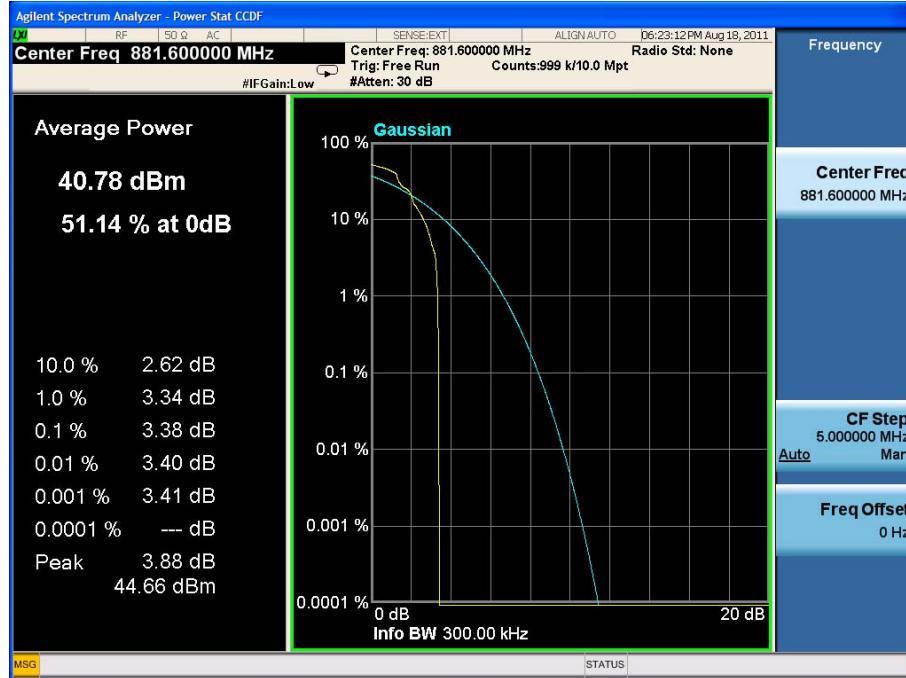


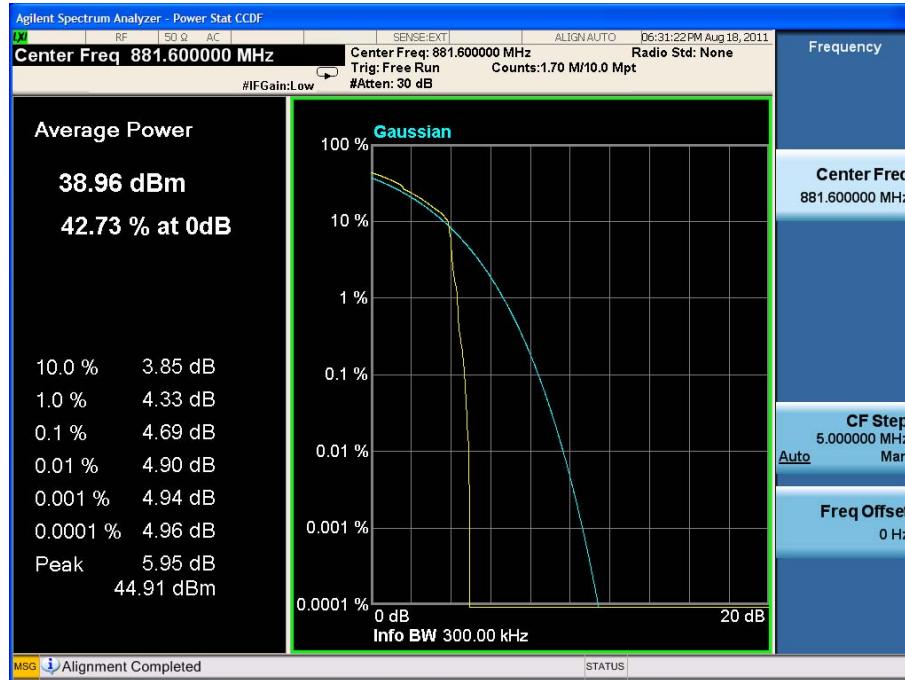
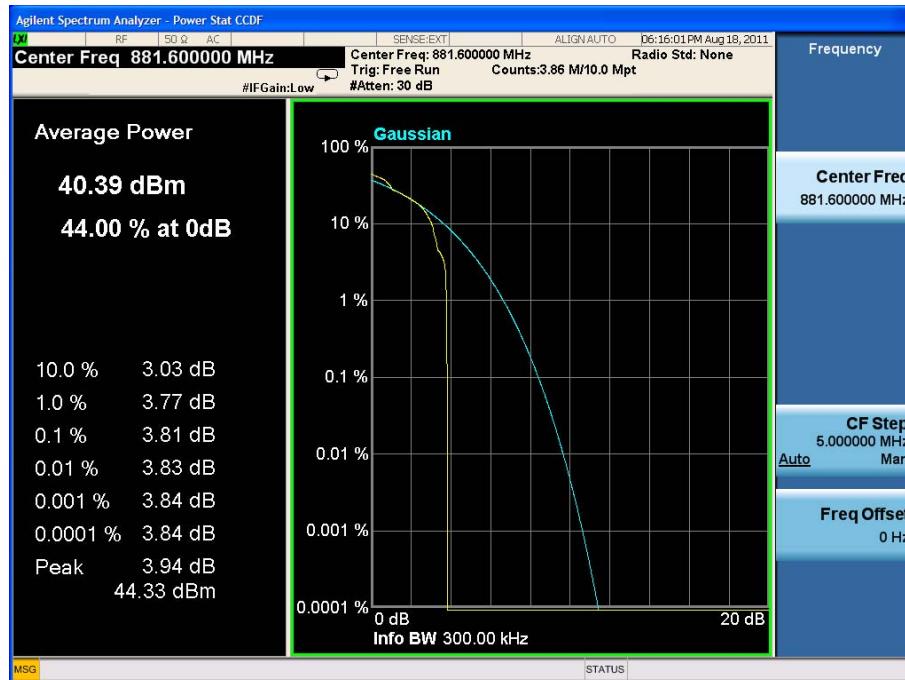
8-PSK



16QAM32QAM

AQPSKConfiguration 1 – Mode 7GMSK

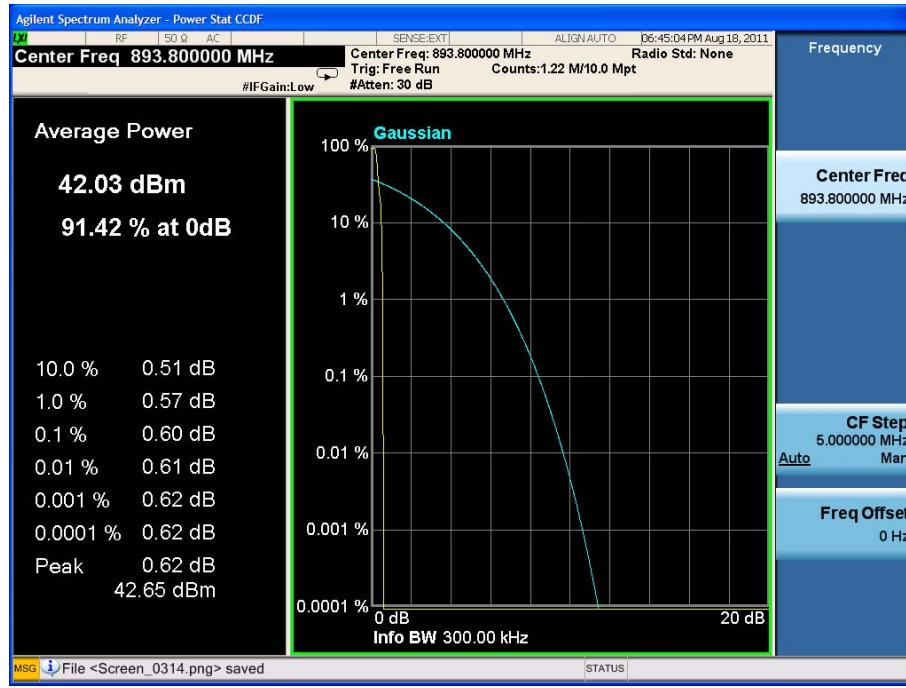
8-PSK16QAM

32QAMAQPSK

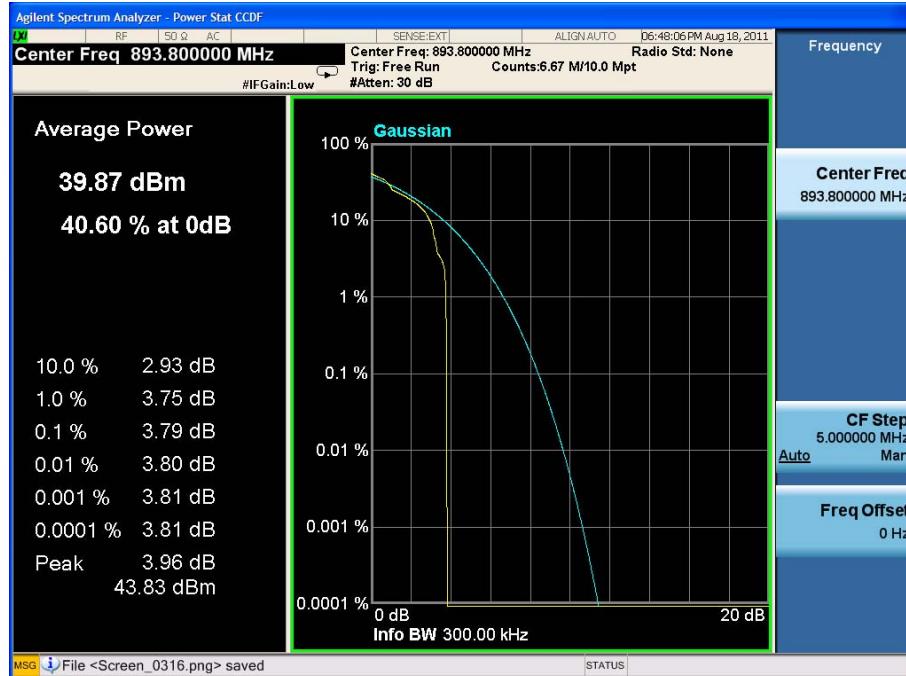


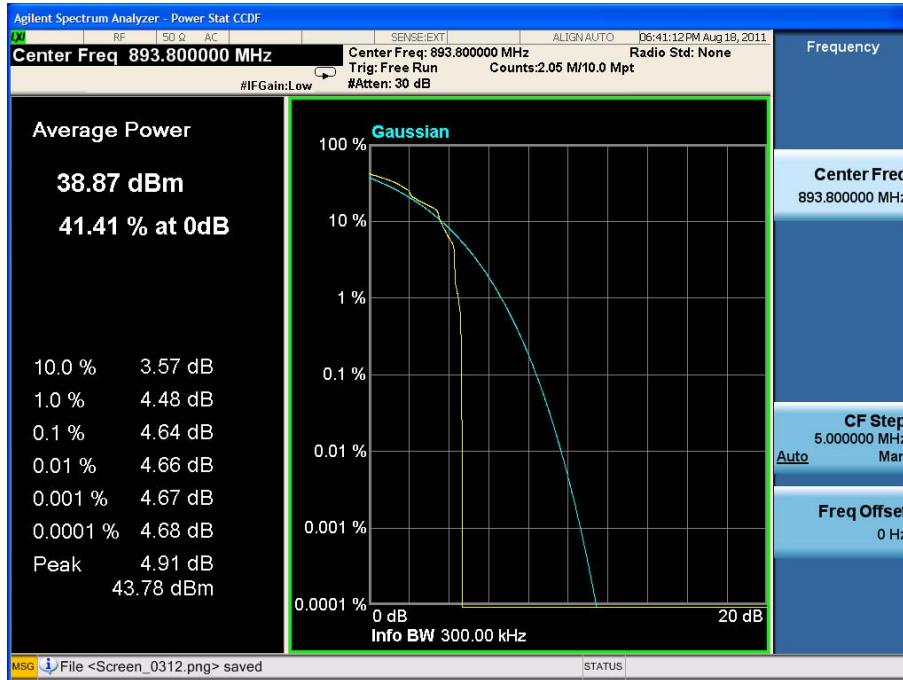
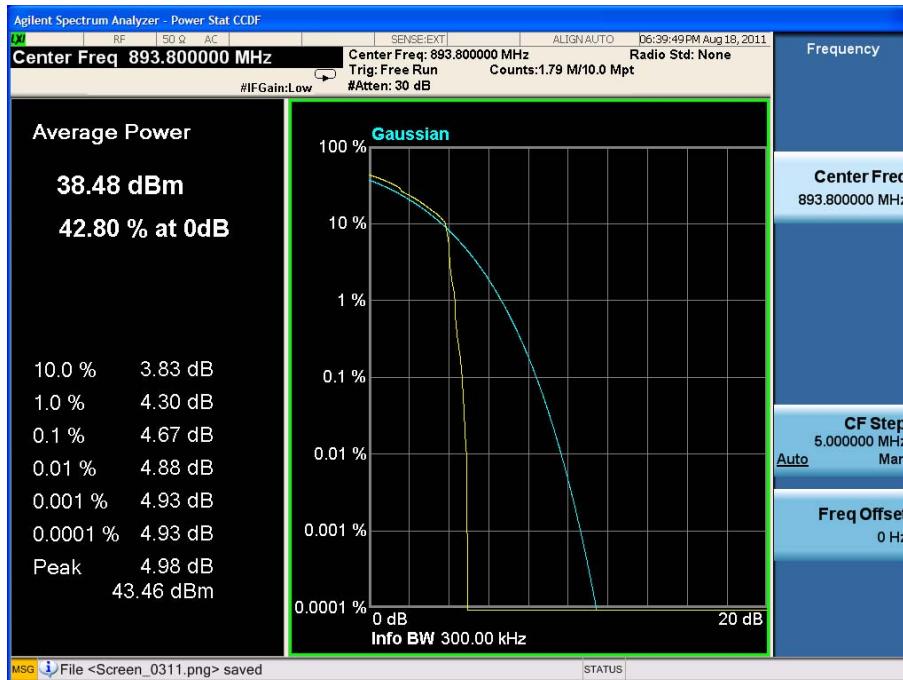
Configuration 1 – Mode 8

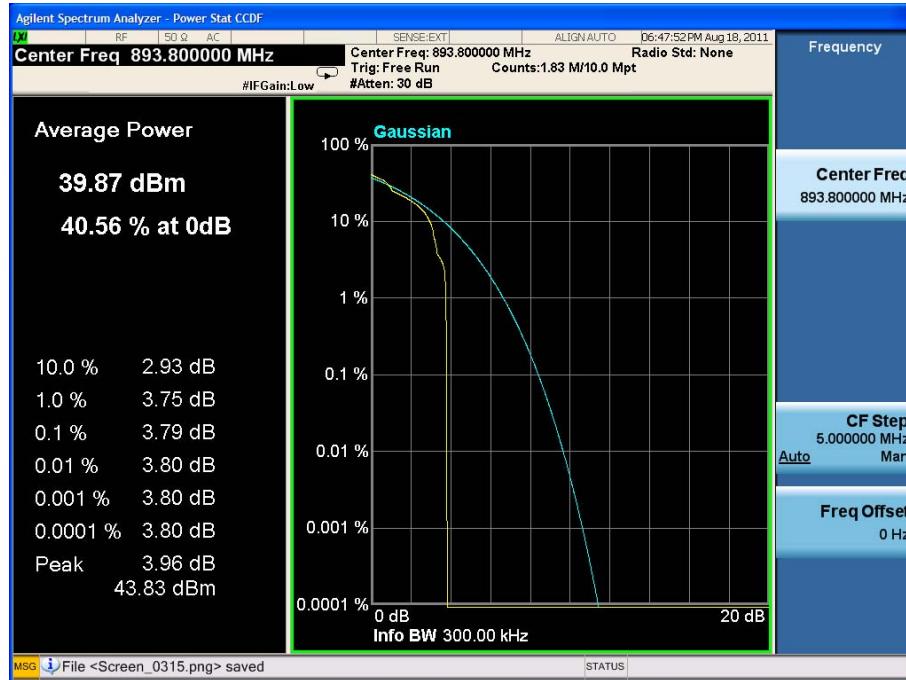
GMSK



8-PSK



16QAM32QAM

AQPSK

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

Remarks

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



2.3 MODULATION CHARACTERISTICS

2.3.1 Specification Reference

FCC CFR 47 Part 2, Clause 2.1047 (d)
Industry Canada RSS-132 Clause 4.2

2.3.2 Equipment Under Test

RRUS 01 B5 / KRC 118 70/3, S/N: C824850049

2.3.3 Date of Test and Modification State

16 and 17 August 2011 – Modification State 0

2.3.4 Test Method and Operating Modes

The test was applied in accordance with the test method requirements of FCC CFR 47 Part 2 and Industry Canada RSS-132.

The EUT supports GMSK, 8-PSK, 16QAM, 32QAM and AQPSK modulations.

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

Configuration 1 - Mode 2

2.3.5 Environmental Conditions

	16 August 2011	17 August 2011
Ambient Temperature	25.8°C	24.9°C
Relative Humidity	58.6%	56.8%



2.3.6 Test Results

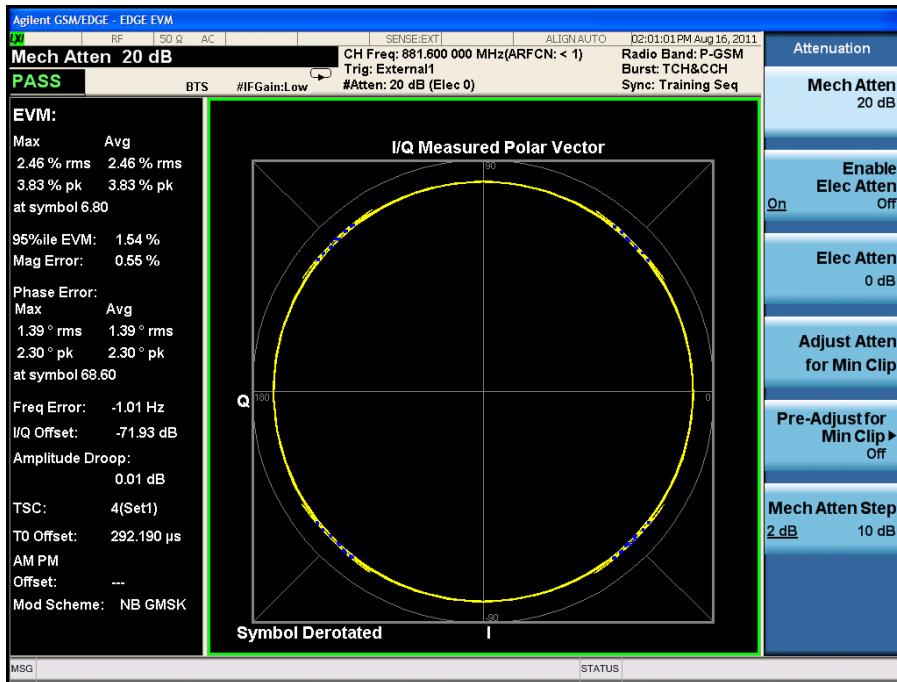
For the period of test the EUT met the requirements of FCC CFR 47 Part 2 and Industry Canada RSS-132 for Modulation Characteristics.

The test results are shown below

Single Carrier

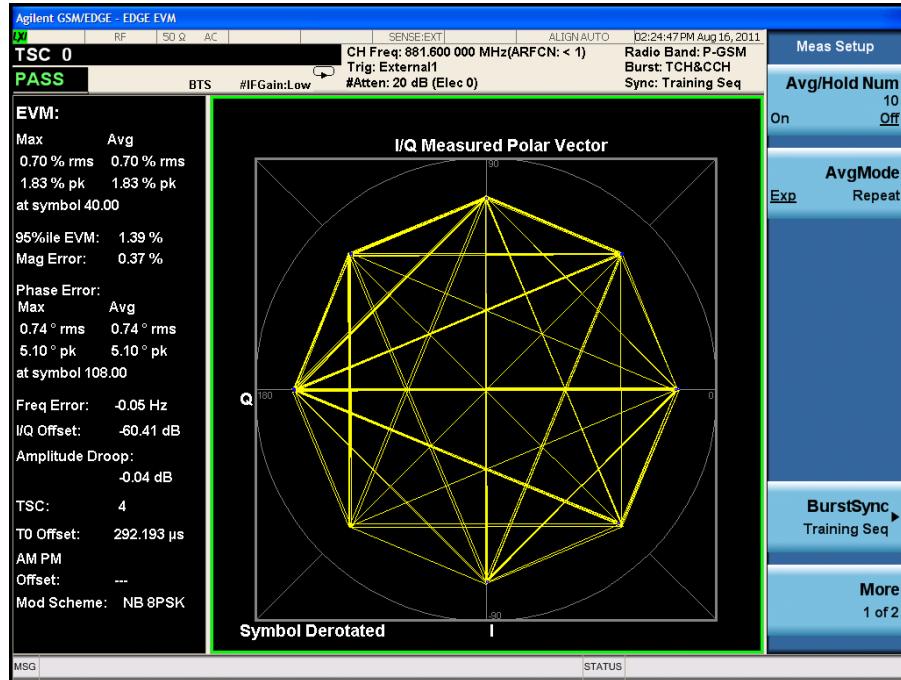
Configuration 1 - Mode 2

GMSK

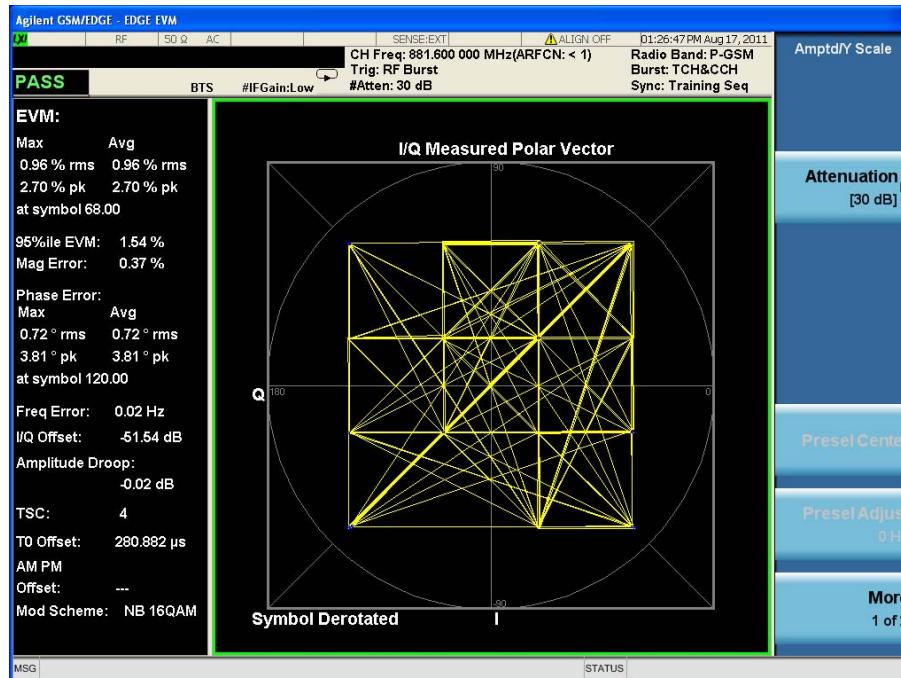




8-PSK

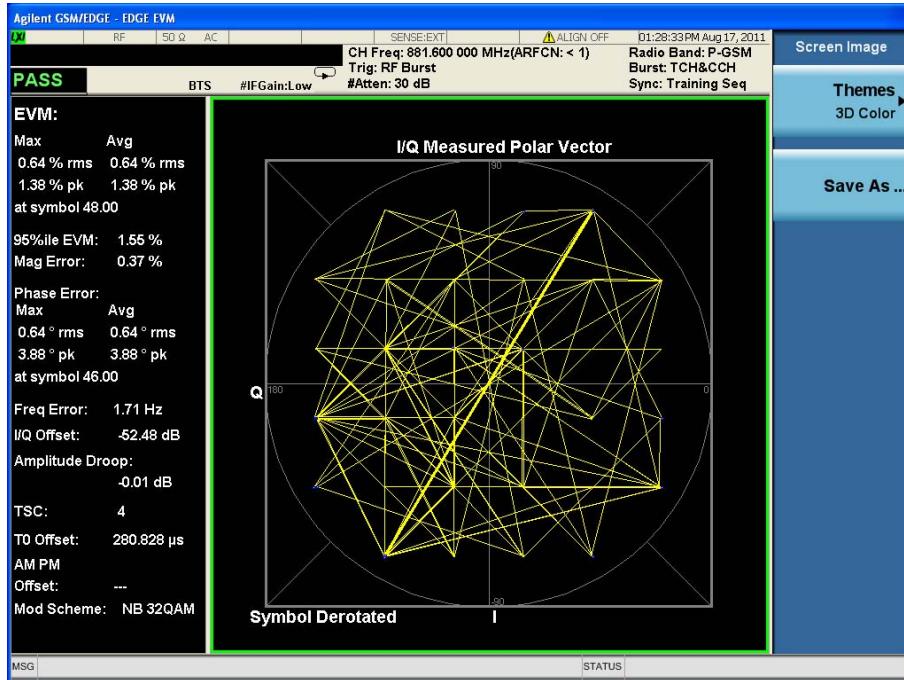


16QAM

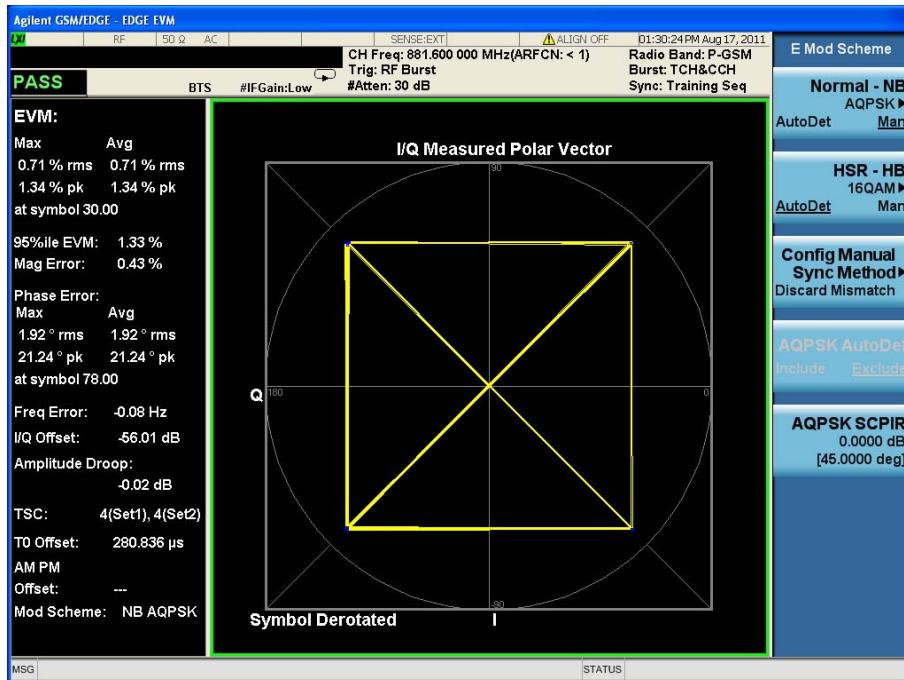




32QAM



AQPSK





2.4 OCCUPIED BANDWIDTH

2.4.1 Specification Reference

FCC CFR 47 Part 2, Clause 2.1049
 FCC CFR 47 Part 22, Clause 22.917 (b)
 Industry Canada RSS-GEN, Clause 4.6.1

2.4.2 Equipment Under Test

RRUS 01 B5 / KRC 118 70/3, S/N: C824850049

2.4.3 Date of Test and Modification State

16 August 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 22 and Industry Canada RSS-GEN.

The EUT was transmitting at maximum power, modulated with all timeslot 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 test was performed with the EUT in the following configurations and modes of operation:

Configuration 1 - Mode 1
 - Mode 2
 - Mode 3

2.4.6 Environmental Conditions

16 August 2011

Ambient Temperature 25.8°C

Relative Humidity 58.6%



2.4.7 Test Results

For the period of test the EUT met the requirements of FCC CFR 47 Part 2 and Part 22 and Industry Canada RSS-GEN for Occupied Bandwidth.

The test results are shown below

Single Carrier

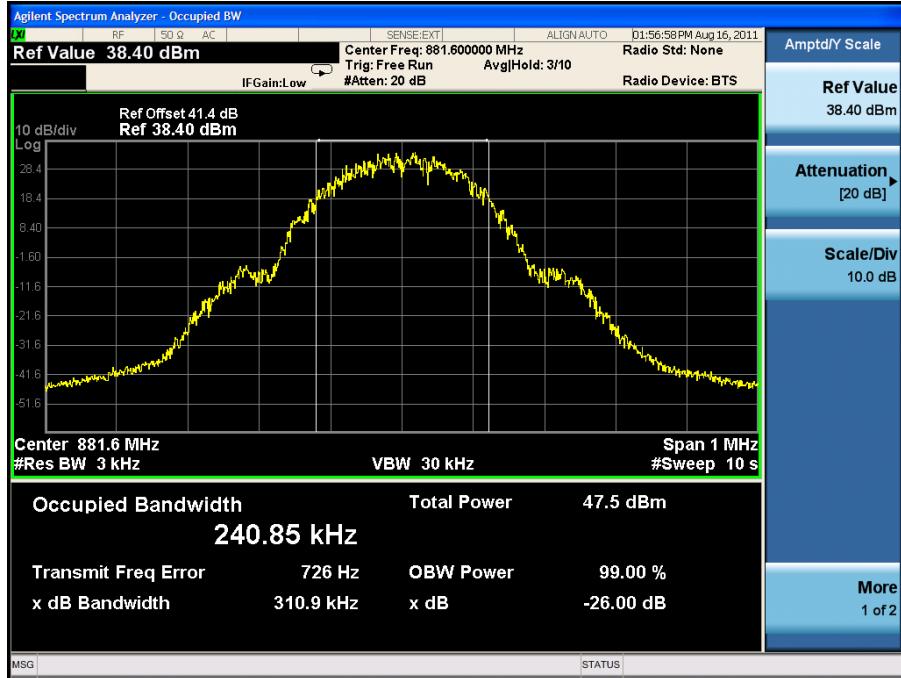
GMSK

Configuration 1 - Mode 1

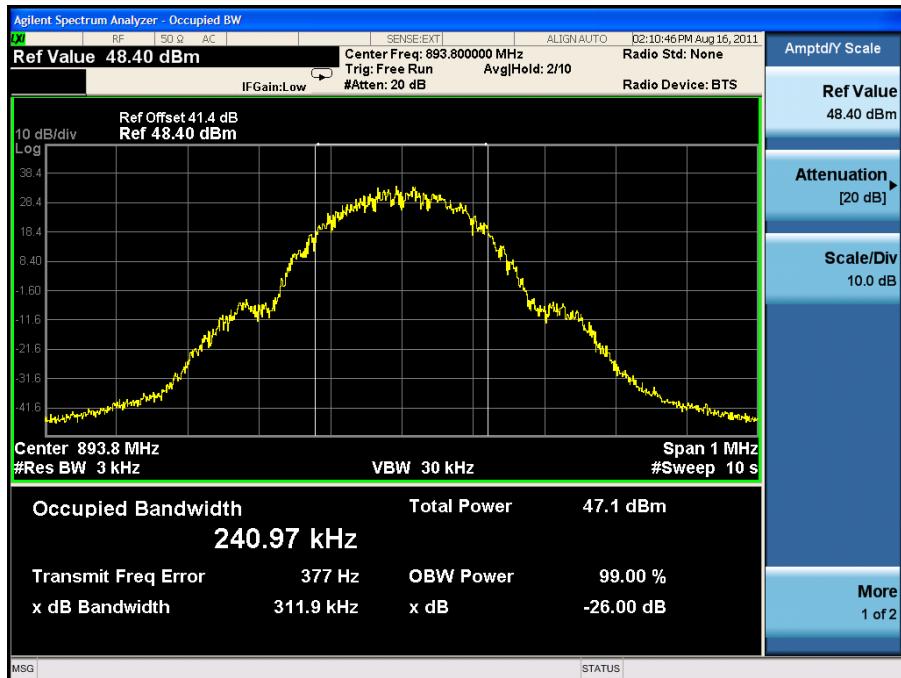




Configuration 1 – Mode 2



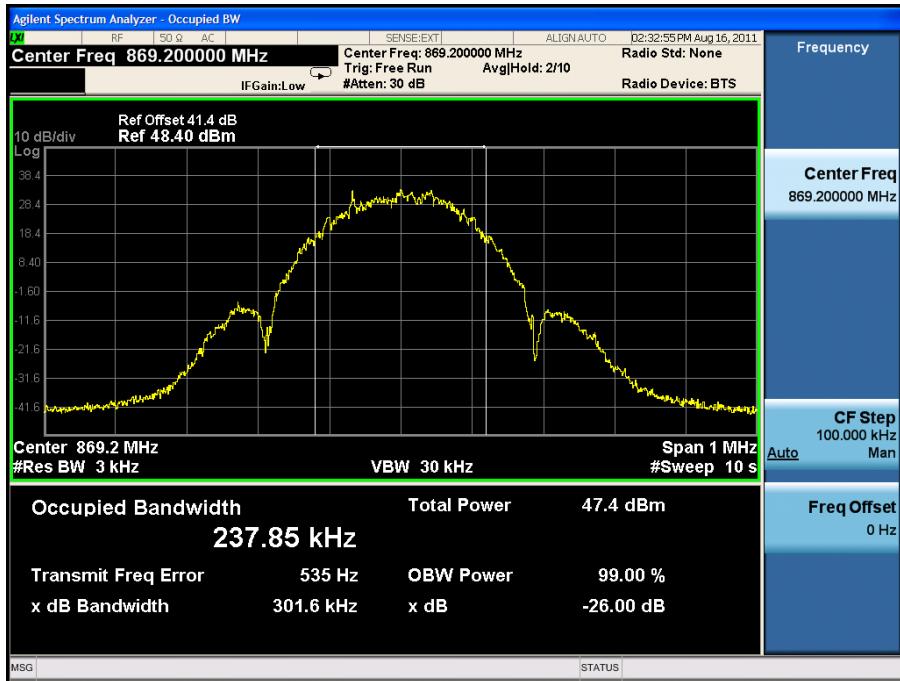
Configuration 1 – Mode 3



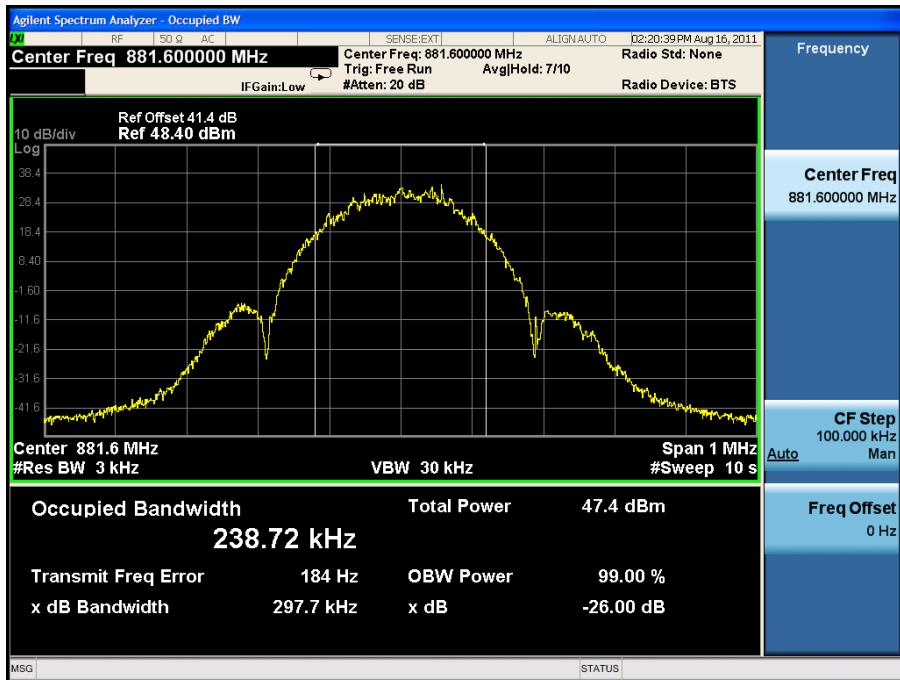


8-PSK

Configuration 1 – Mode 1

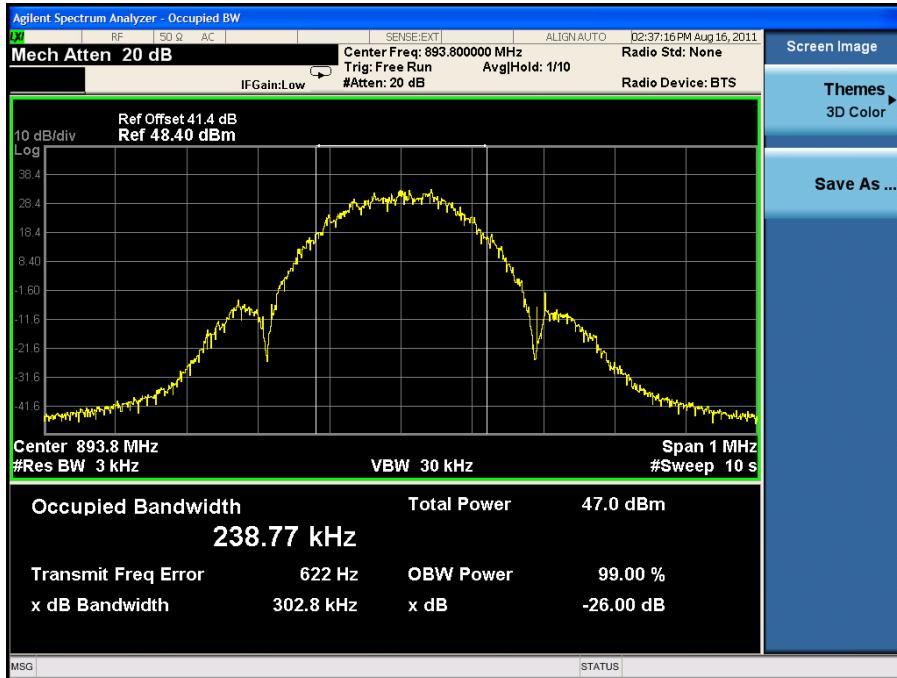


Configuration 1 – Mode 2





Configuration 1 – Mode 3





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

2.5.1 Specification Reference

FCC CFR 47 Part 2, Clause 2.1051
 FCC CFR 47 Part 22, Clause 22.917 (b)
 Industry Canada RSS-132 Clause 4.5

2.5.2 Equipment Under Test

RRUS 01 B5 / KRC 118 70/3, S/N: C824850049

2.5.3 Date of Test and Modification State

17 August 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 22 and Industry Canada RSS-132.

In accordance with 22.917(b), at least 1% of the emission bandwidth was used for the resolution bandwidths up to 1MHz 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 100kHz or greater 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 activated.

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

Configuration 1 - Mode 1'
 - Mode 3'
 - Mode 4'
 - Mode 5'

2.5.6 Environmental Conditions

17 August 2011

Ambient Temperature 24.9°C

Relative Humidity 56.8%



2.5.7 Test Results

For the period of test the EUT met the requirements of FCC CFR 47 Part 2 and Part 22 and Industry Canada RSS-132 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 129 (869.4MHz), the highest usable channel is 250 (893.6MHz)

Configuration 1 - Mode 1' and 3'

Band Edge Frequency	Edge Test with GMSK modulation Channel No./Frequencies	Edge Test with 8-PSK modulation Channel No./Frequencies
Bottom 869MHz	Channel: 129 Frequency: 869.4 MHz	Channel: 129 Frequency: 869.4 MHz
Top 894MHz	Channel: 250 Frequency: 893.6 MHz	Channel: 250 Frequency: 893.6 MHz

Configuration 1 - Mode 4' and 5'

Band Edge Frequency	Edge Test with GMSK modulation Channel No./Frequencies	Edge Test with 8-PSK modulation Channel No./Frequencies
Bottom 869MHz	Channel: 129 & 131 Frequency: 869.4 MHz & 869.8MHz	Channel: 129 & 131 Frequency: 869.4 MHz & 869.8MHz
Top 894MHz	Channel: 248 & 250 Frequency: 893.2MHz & 893.6 MHz	Channel: 248 & 250 Frequency: 893.2MHz & 893.6 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.

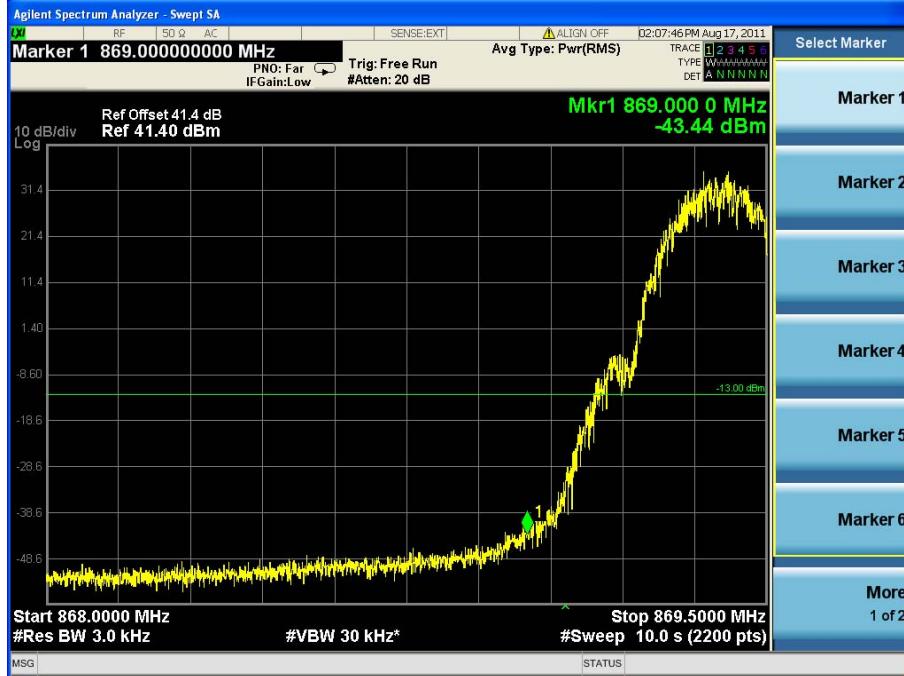


The test results are shown below

Single Carrier

GMSK

Configuration 1 - Mode 1'

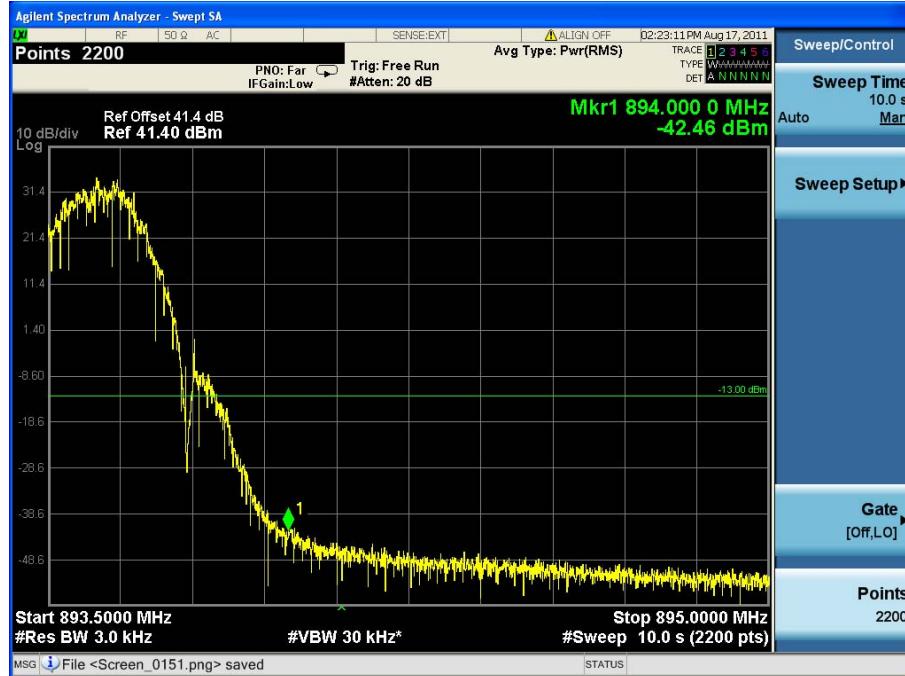


Configuration 1 – Mode 3'

**8-PSK****Configuration 1 - Mode 1'**

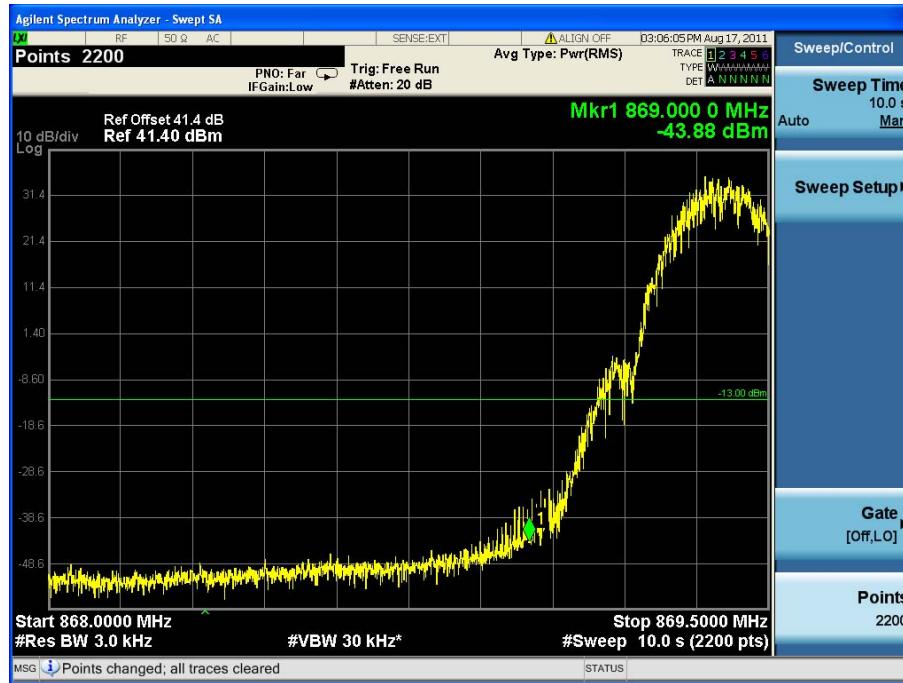


Configuration 1 - Mode 3'



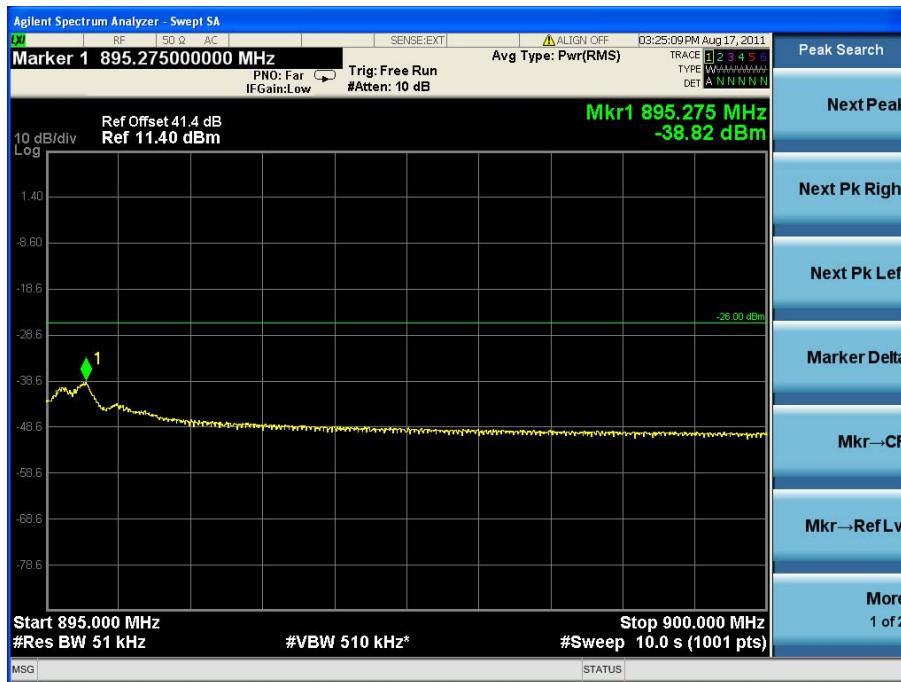
Multi Carrier (1x2)GMSK

Configuration 1 - Mode 4'





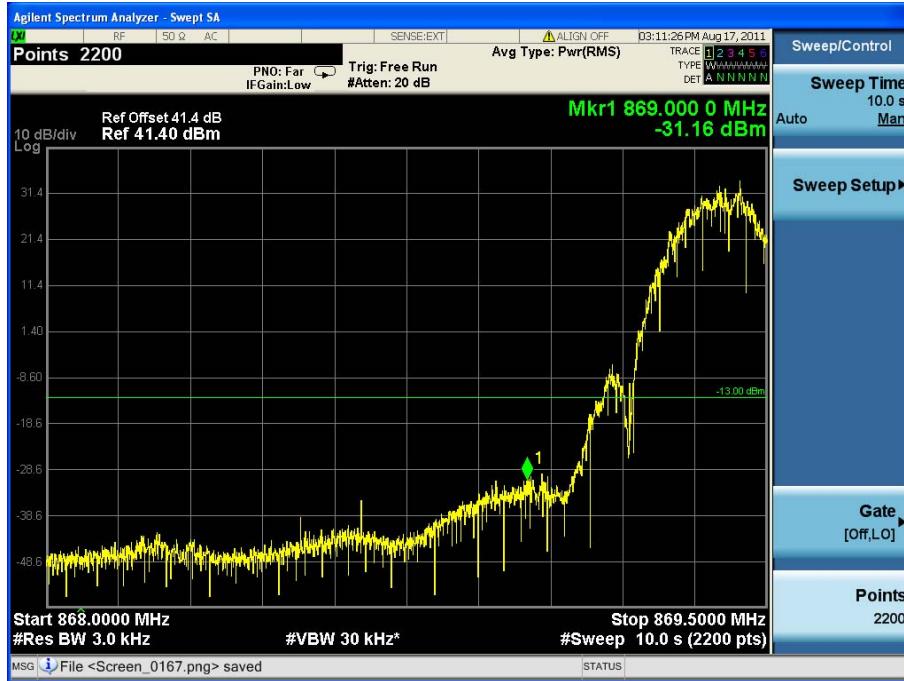
Configuration 1 - Mode 5'





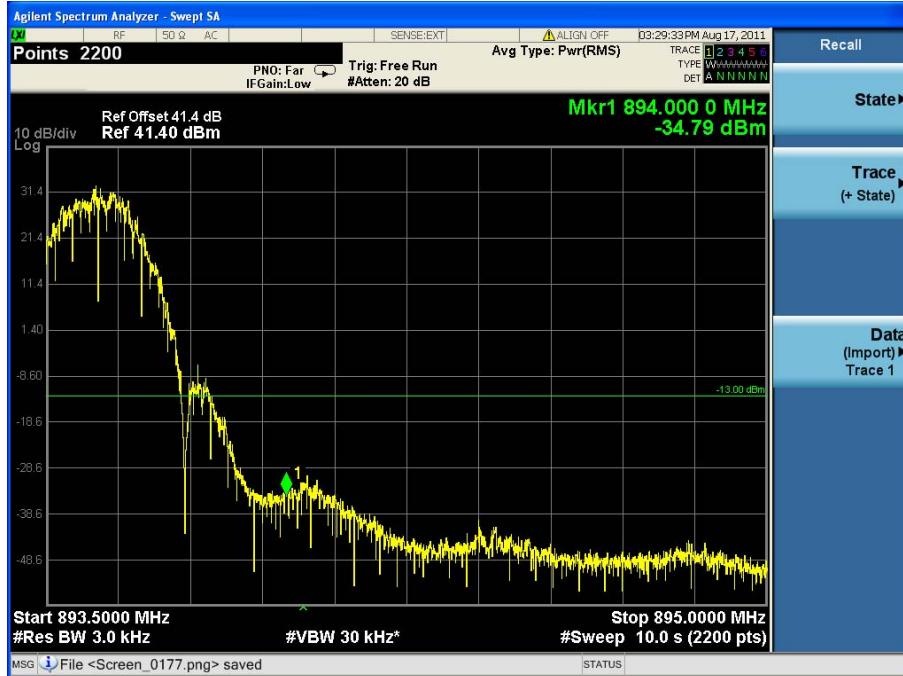
8-PSK

Configuration 1 - Mode 4'





Configuration 1 - Mode 5'



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.



2.6 RADIATED SPURIOUS EMISSIONS

2.6.1 Specification Reference

FCC CFR 47 Part 2, Clause 2.1053
 FCC CFR 47 Part 22, Clause 22.917 (a)
 Industry Canada RSS-132, Clause 4.5

2.6.2 Equipment Under Test

RRUS 01 B5 / KRC 118 70/3, S/N: C824850049

2.6.3 Date of Test and Modification State

24 and 25 August 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 22 and Industry Canada RSS-132.

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:

$$E_{(V/m)} = (30 \times 1.64 \times 7.94)^{0.5} / 3 = 6.59V/m = 136.4dB\mu V/m$$

As per 22.917(a) the spurious emission must be attenuated by $43 + 10\log(P_o)$ dB this gives:

$$43 + 10\log(7.94) = 52.0dB$$

Therefore the limit at 3m measurement distance is:

$$136.4 - 52.0 = 84.4 dB\mu V/m$$

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 1
 - Mode 2
 - Mode 3
 - Mode 4
 - Mode 5
 - Mode 8

2.6.6 Environmental Conditions

	24 August 2011	25 August 2011
Ambient Temperature	26.0°C	25.5°C
Relative Humidity	56.0%	56.5%



2.6.7 Test Results

For the period of test the EUT met the requirements of FCC CFR 47 Part 2 & Part 22 and Industry Canada RSS-132 for Radiated Spurious Emissions.

The test results are shown below

Note: Only the worst case results plots have been included as all of the emissions are greater than 20dB below the limit. A set of plots have been included to show the measurement system noise floor.

Single Carrier

GMSK

Configuration 1 – Mode 2

No emissions were detected within 20dB of the limit.

8-PSK

Configuration 1 – Mode 2

No emissions were detected within 20dB of the limit.

16QAM

Configuration 1 – Mode 1, 2 and 3

No emissions were detected within 20dB of the limit.

32QAM

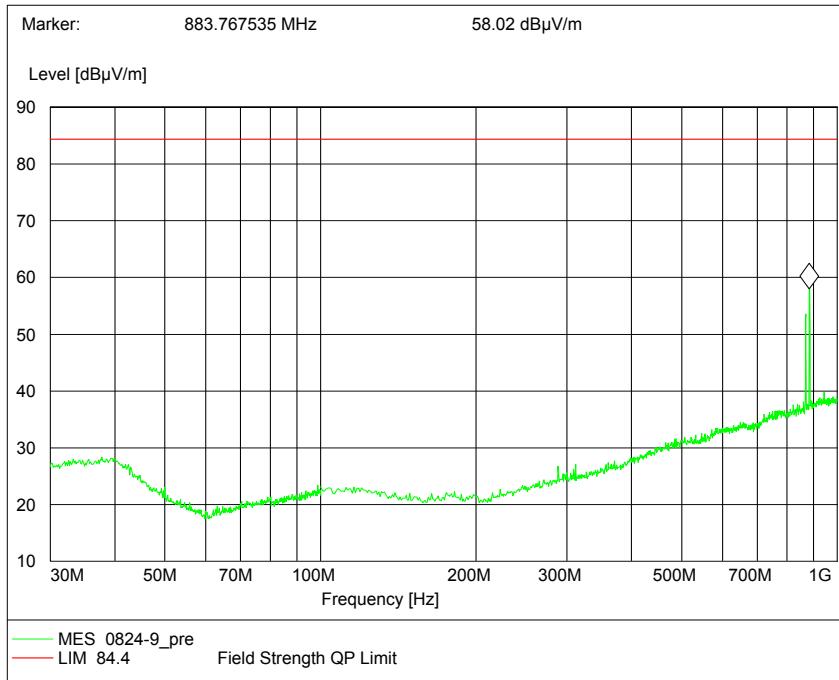
Configuration 1 – Mode 2

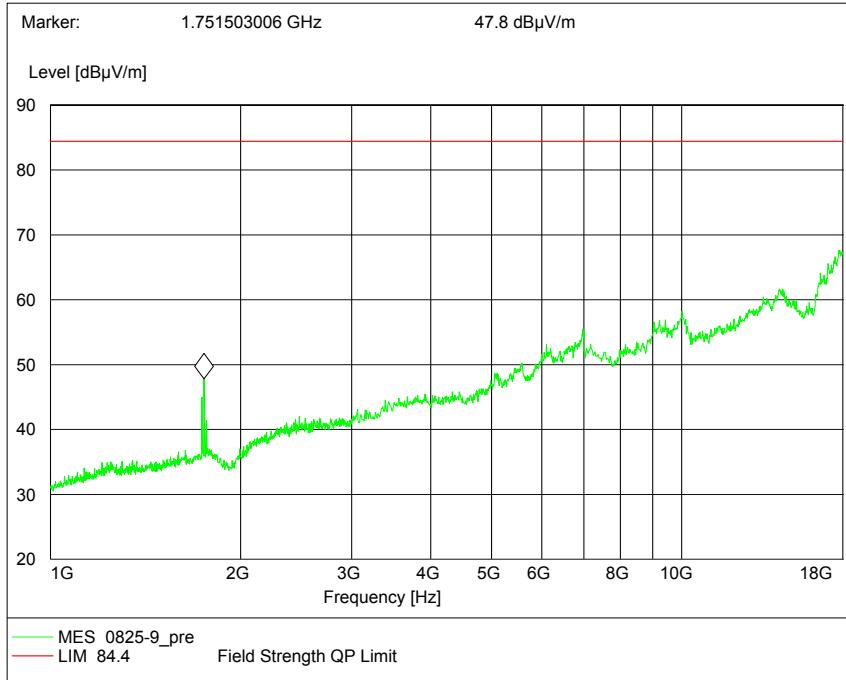
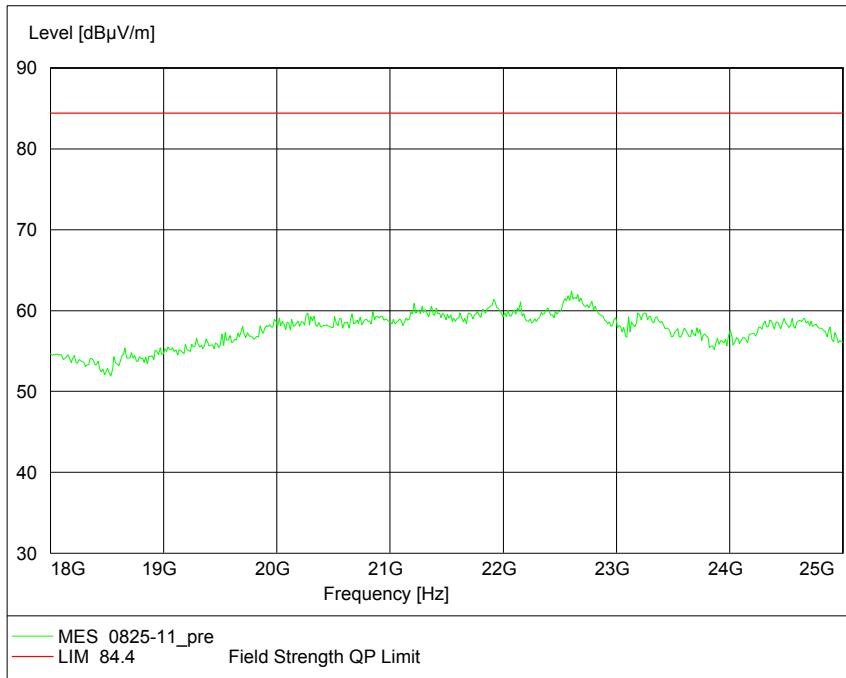
No emissions were detected within 20dB of the limit.

AQPSK

Configuration 1 – Mode 2

No emissions were detected within 20dB of the limit.

**Multi Carrier (1x2)****16QAM****Configuration 1 - Mode 4****30MHz – 1GHz**

1GHz - 18GHz18GHz -25GHz

Configuration 1 – Mode 5

No emissions were detected within 20dB of the limit.

Multi Carrier (1x4)16QAMConfiguration 1 - Mode 8

No emissions were detected within 20dB of the limit.

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

Remarks

The EUT does not exceed -13dBm at the measured frequencies.



2.7 CONDUCTED SPURIOUS EMISSIONS

2.7.1 Specification Reference

FCC CFR 47 Part 2, Clause 2.1051
 FCC CFR 47 Part 22, Clause 22.917 (a)
 Industry Canada RSS-132, Clause 4.5

2.7.2 Equipment Under Test

RRUS 01 B5 / KRC 118 70/3, S/N: C824850049

2.7.3 Date of Test and Modification State

16 August 2011 – 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 2 and Part 22 and Industry Canada RSS-132.

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 resolution was set to 1MHz for 9kHz to 25GHz thus meeting the requirements of Part 22.917(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 harmonics of the highest internal frequency.

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

Configuration 1 - Mode 1
 - Mode 2
 - Mode 3

2.7.6 Environmental Conditions

16 August 2011

Ambient Temperature 25.8°C

Relative Humidity 58.6%



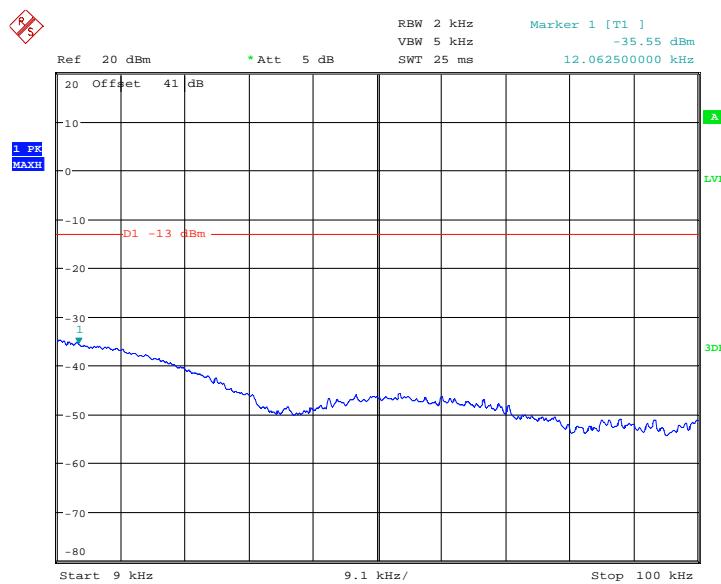
2.7.7 Test Results

For the period of test the EUT met the requirements of FCC CFR 47 Part 2 and Part 22 and Industry Canada RSS-132 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.



Date: 16.AUG.2011 11:47:58

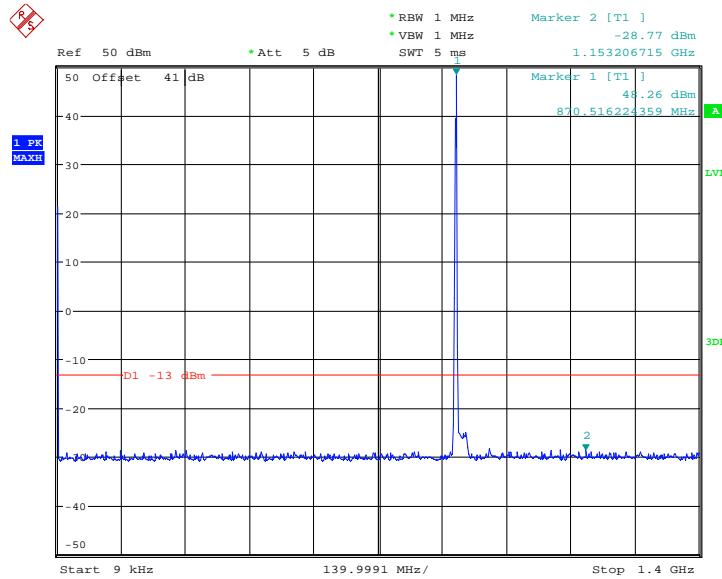


Single Carrier

GMSK

Configuration 1 - Mode 1

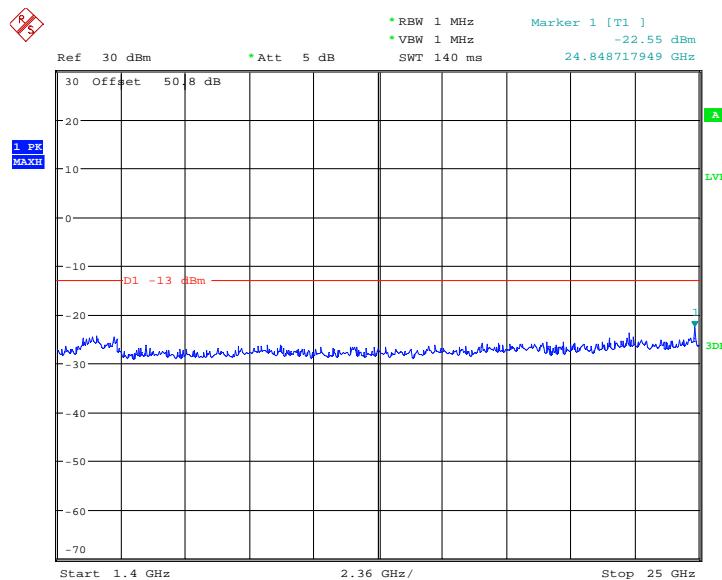
9kHz to 1.4GHz



Date: 16.AUG.2011 11:43:10

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

1.4GHz to 25GHz

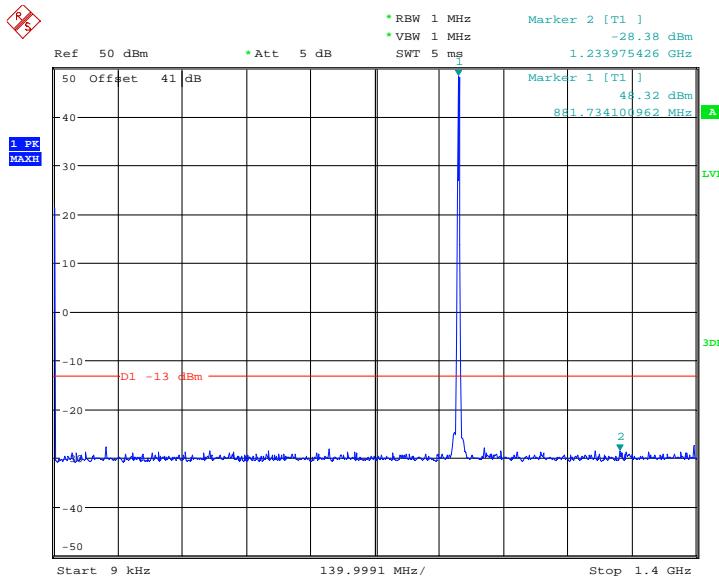


Date: 16.AUG.2011 11:09:21



Configuration 1 - Mode 2

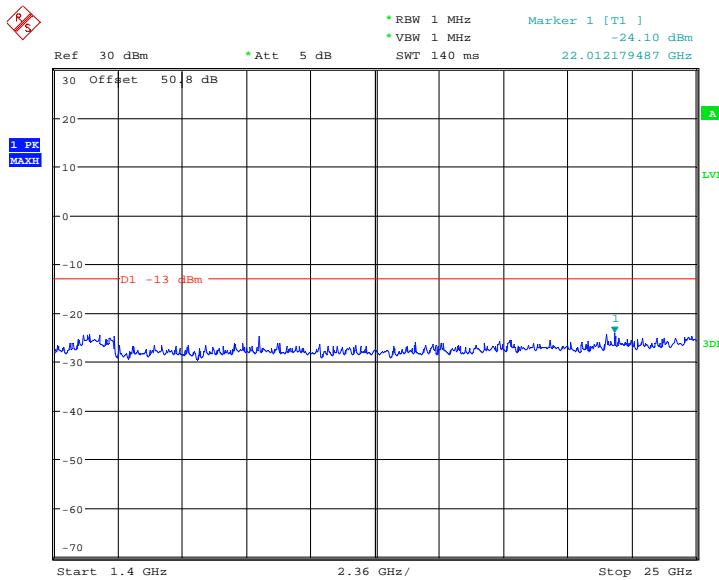
9kHz to 1.4GHz



Date: 16.AUG.2011 11:42:11

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

1.4GHz to 25GHz

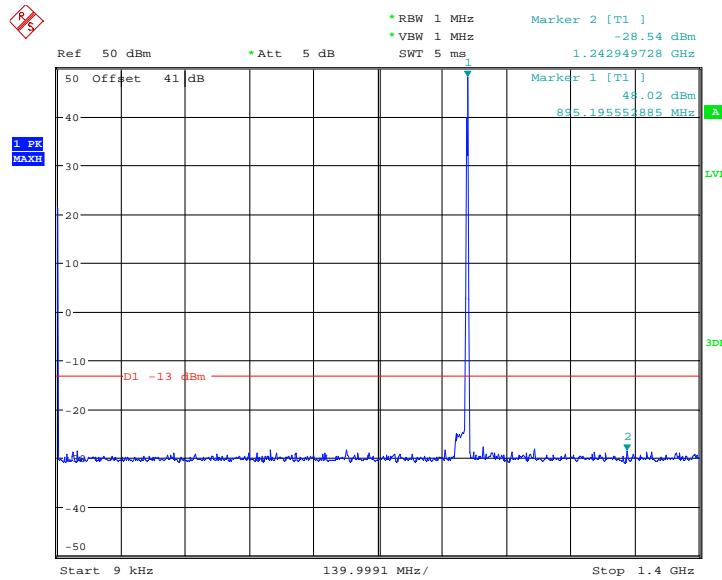


Date: 16.AUG.2011 11:12:54



Configuration 1 – Mode 3

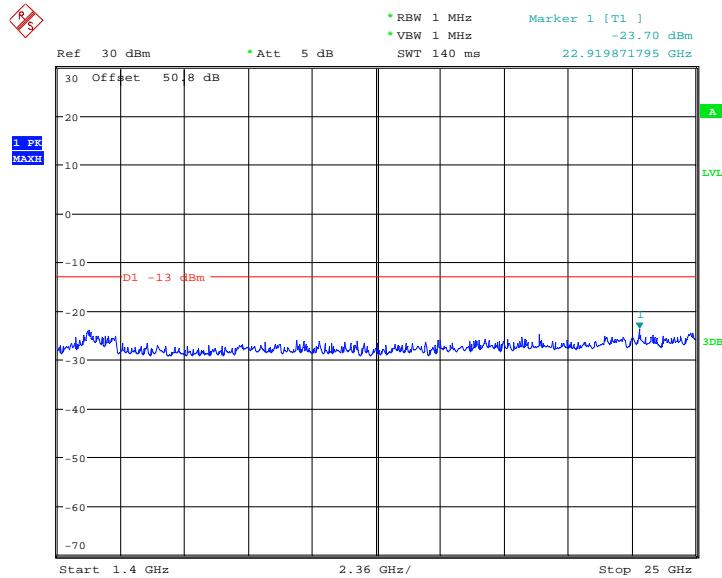
9kHz – 1.4GHz



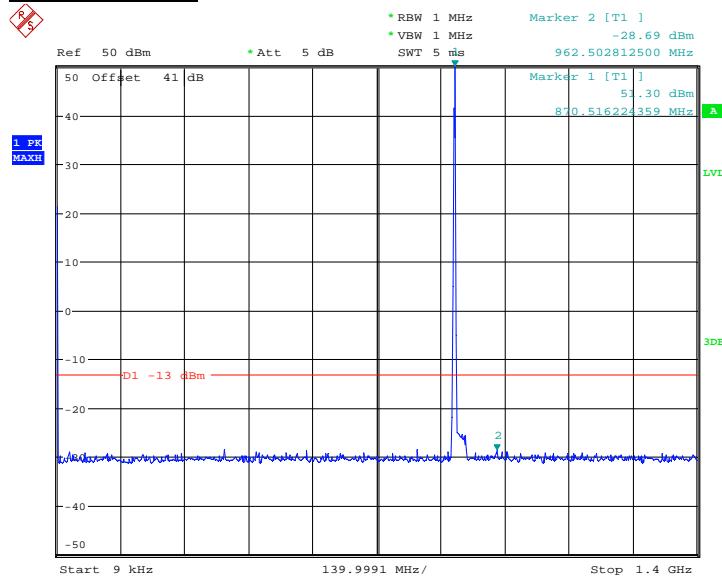
Date: 16.AUG.2011 11:47:09

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

1.4GHz – 25GHz

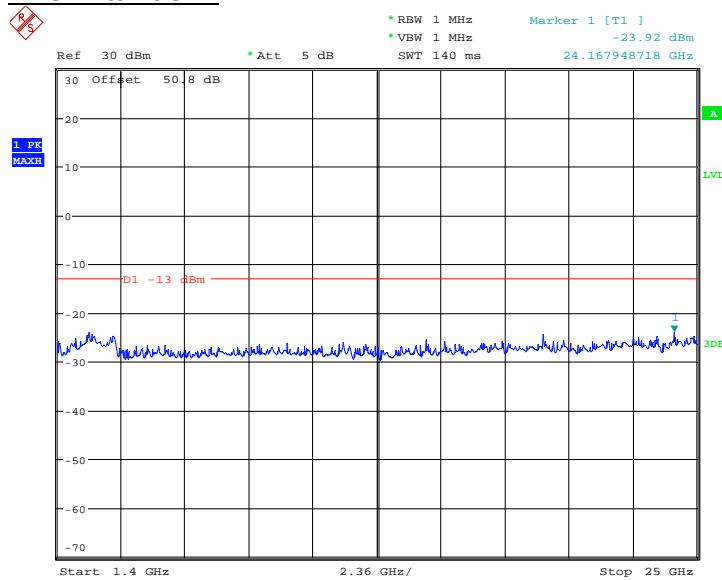


Date: 16.AUG.2011 11:14:48

**8-PSK****Configuration 1 - Mode 1****9kHz to 1.4GHz**

Date: 16.AUG.2011 11:44:11

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

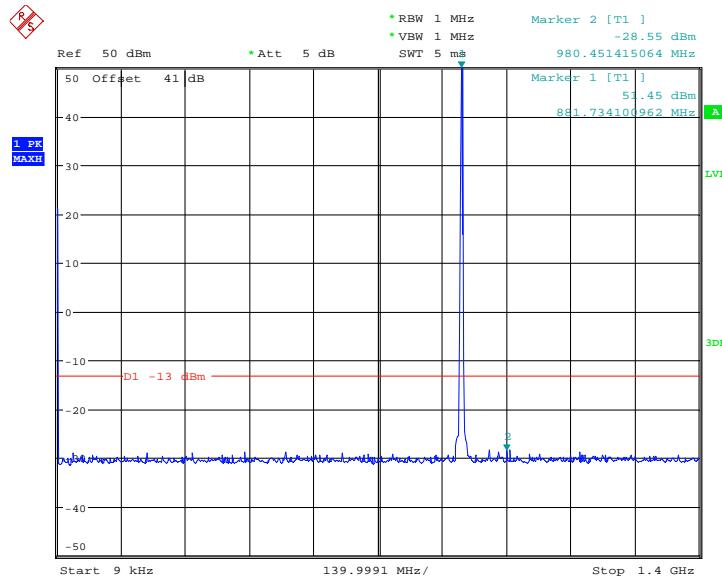
1.4GHz to 25GHz

Date: 16.AUG.2011 11:10:38



Configuration 1 - Mode 2

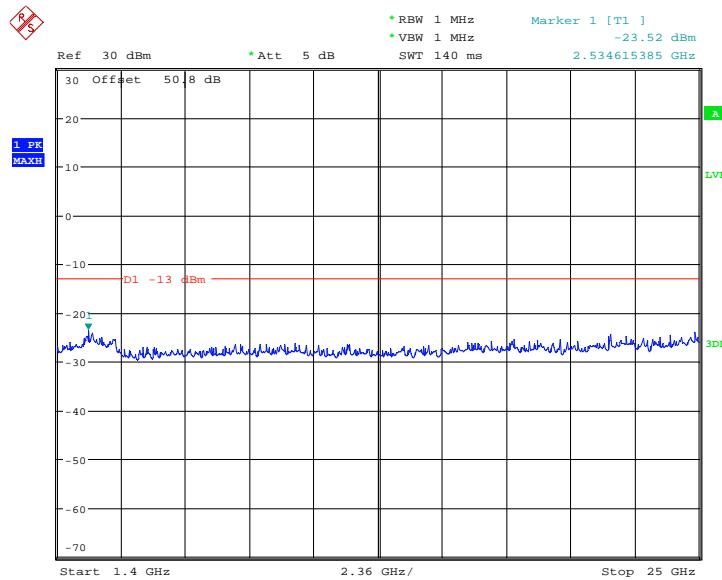
9kHz to 1.4GHz



Date: 16.AUG.2011 11:41:00

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

1.4GHz to 25GHz

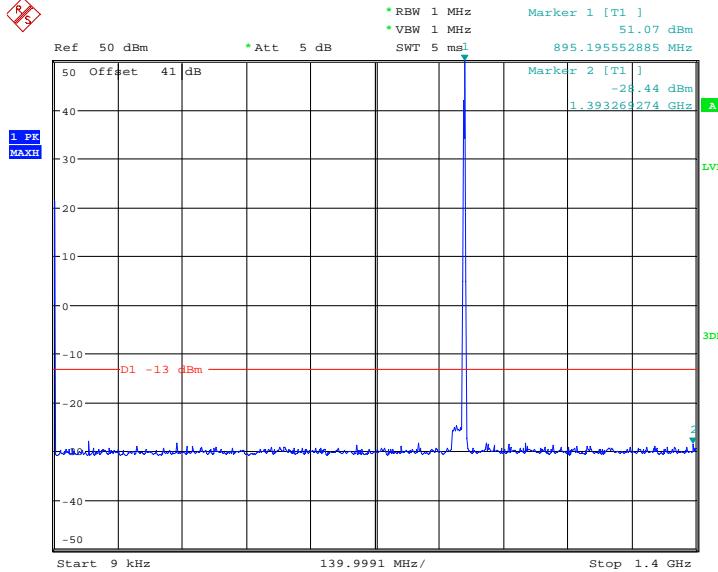


Date: 16.AUG.2011 11:11:41



Configuration 1 – Mode 3

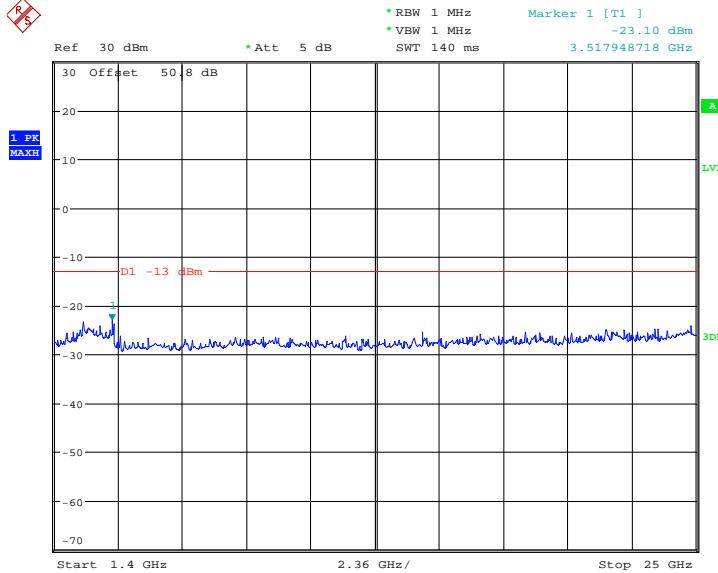
9kHz – 1.4GHz



Date: 16.AUG.2011 11:46:07

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

1.4GHz – 25GHz



Date: 16.AUG.2011 11:16:43

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

Remarks

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



2.8 FREQUENCY STABILITY UNDER TEMPERATURE VARIATIONS

2.8.1 Specification Reference

FCC CFR 47 Part 2, Clause 2.1055
 FCC CFR 47 Part 22, Clause 22.355
 Industry Canada RSS-132, Clause 4.3

2.8.2 Equipment Under Test

RRUS 01 B5 / KRC 118 70/3, S/N: C824850049

2.8.3 Date of Test and Modification State

18 and 19 August 2011 – Modification State 0

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 Method and Operating Modes

The test was applied in accordance with the test method requirements of FCC CFR 47 Part 2 and Part 22 and Industry Canada RSS-132.

The EUT was set to transmit on maximum power. A Spectrum Analyser was used to measure the frequency error. The temperature was adjusted between -30°C and +50°C in 10°C steps as per 2.1055.

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

Configuration 1 - Mode 2

2.8.6 Environmental Conditions

	18 August 2011	19 August 2011
Ambient Temperature	25.3°C	25.6°C
Relative Humidity	55.6%	56.9%



2.8.7 Test Results

For the period of test the EUT met the requirements of FCC CFR 47 Part 2 and Part 22 and Industry Canada RSS-132 for Frequency Stability Under Temperature Variations.

The test results are shown below

Power Supply: -48V DC

Configuration 1 - Mode 2

GMSK

Temperature Interval (°C)	Deviation (Hz)
-30	3.15
-20	3.59
-10	3.52
0	3.01
+10	-3.71
+20	4.46
+30	3.71
+40	-4.16
+50	-4.23

8-PSK

Temperature Interval (°C)	Deviation (Hz)
-30	4.60
-20	3.92
-10	-3.93
0	-3.11
+10	-4.01
+20	4.67
+30	-3.84
+40	-3.23
+50	4.90

Limit	±1.5 ppm or ±1.322kHz
-------	-----------------------

Remarks

The frequency stability of the EUT is sufficient to keep it within the authorised frequency ranges under voltage variations across the measured range.



2.9 FREQUENCY STABILITY UNDER VOLTAGE VARIATIONS

2.9.1 Specification Reference

FCC CFR 47 Part 2, Clause 2.1055
FCC CFR 47 Part 22, Clause 22.355
Industry Canada RSS-132, Clause 4.3

2.9.2 Equipment Under Test

RRUS 01 B5 / KRC 118 70/3, S/N: C824850049

2.9.3 Date of Test and Modification State

18 August 2011 – Modification State 0

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 Method and Operating Modes

The test was applied in accordance with the test method requirements of FCC CFR 47 Part 2 and Part 22 and Industry Canada RSS-132.

The EUT was set to transmit on maximum power. A Spectrum Analyser was used to measure the frequency error. 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

2.9.6 Environmental Conditions

18 August 2011

Ambient Temperature 25.3°C

Relative Humidity 55.6%



2.9.7 Test Results

For the period of test the EUT met the requirements of FCC CFR 47 Part 2 and Part 22 and Industry Canada RSS-132 for Frequency Stability Under Voltage Variations.

The test results are shown below

Temperature: 20°C

Configuration 1 - Mode 2

GMSK

DC Voltage (V)	Deviation (Hz)
-40.8	3.89
-48.0	4.46
-55.2	4.39

8-PSK

DC Voltage (V)	Deviation (Hz)
-40.8	6.26
-48.0	4.67
-55.2	5.90

Limit	±1.5 ppm or ±1.322 kHz
-------	------------------------

Remarks

The frequency stability of the EUT is sufficient to keep it within the authorised frequency ranges under voltage variations across the measured range.



2.10 RECEIVER SPURIOUS EMISSIONS

2.10.1 Specification Reference

Industry Canada RSS-132, Clause 4.6

2.10.2 Equipment Under Test

RRUS 01 B5 / KRC 118 70/3, S/N: C824850049

2.10.3 Date of Test and Modification State

17 August 2011 – Modification State 0

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 Method and Operating Modes

The test was applied in accordance with the test method requirements of Industry Canada RSS-132.

In accordance with RSS-Gen Clause 6.2, the receiver spurious emissions from the antenna terminal were measured. Measurements were performed on the receiver antenna connector RF B. The EUT was set to transmitter mode on the TX connector RF A and during the measurement the RF A was terminated with a match load (50 Ohm).

The resolution was set to 1MHz in the frequency range 9kHz to 13GHz thus meeting the requirements of RSS-Gen Clause 4.10, the spectrum analyser detector was set to peak and trace was kept on Max Hold to give the worst case. The limit line was displayed, showing the -57dBm, 2 nanowatts in band 9kHz to 1GHz and above 1GHz, -53dBm, 5 nanowatts.

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

In addition, measurements were made from 9kHz up to the 5th harmonic of the highest internal frequency.

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

Configuration 1 - Mode 1
 - Mode 2
 - Mode 3

2.10.6 Environmental Conditions

17 August 2011

Ambient Temperature 24.9°C

Relative Humidity 56.8%



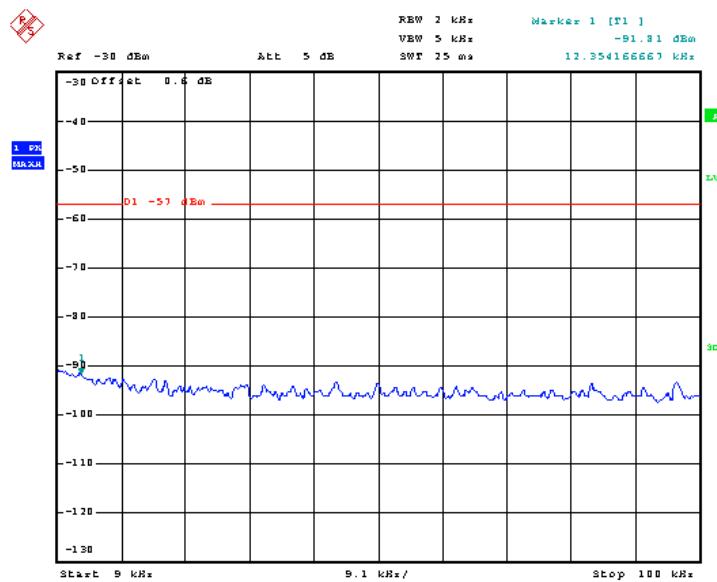
2.10.7 Test Results

For the period of test the EUT met the requirements of Industry Canada RSS-132 for Receiver 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.



Date: 17.AUG.2011 05:39:35

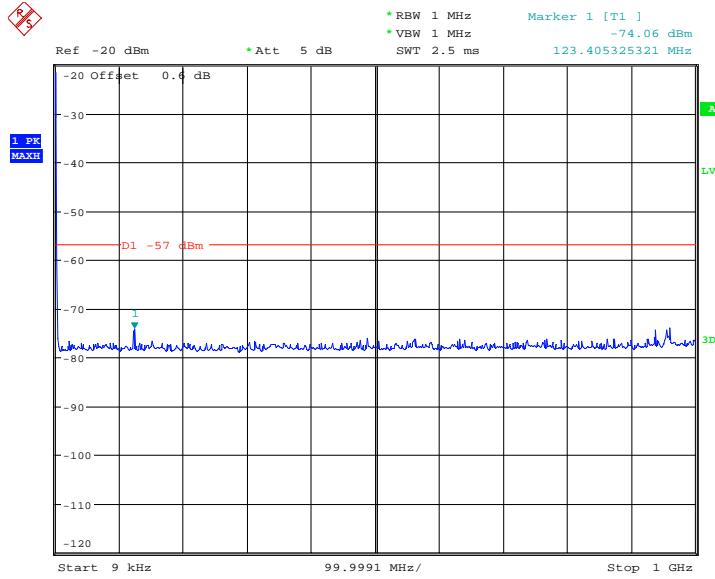


Single Carrier

GMSK

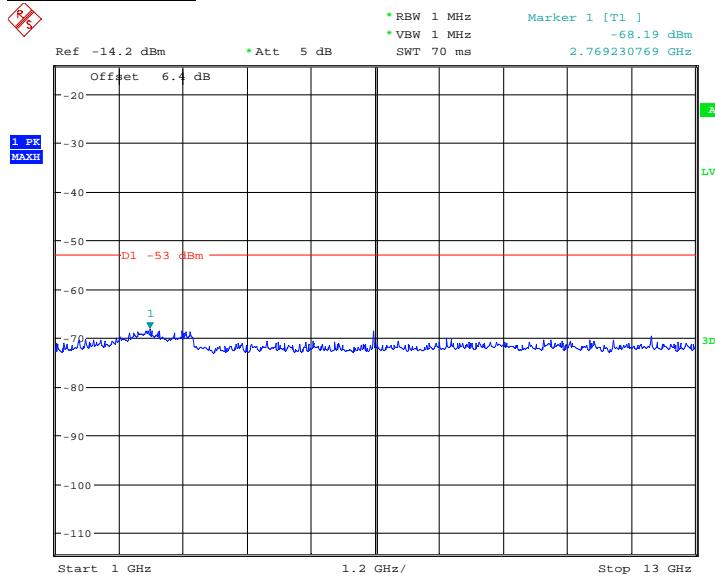
Configuration 1 - Mode 1

9kHz to 1GHz

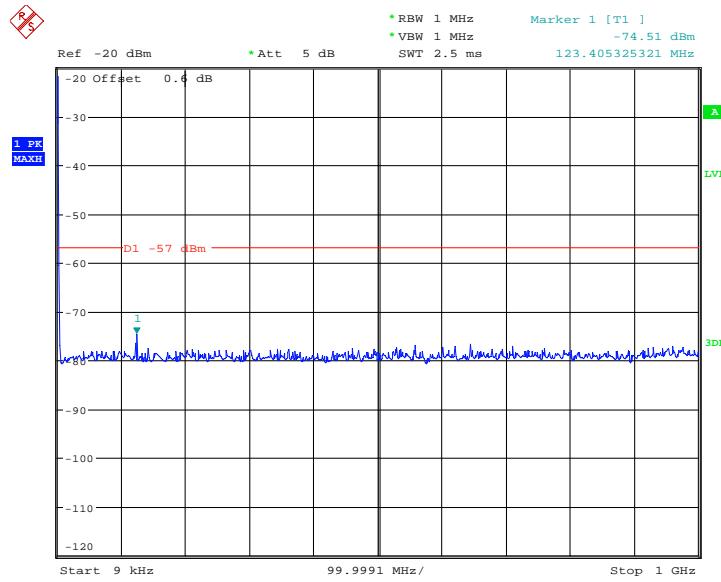


Date: 17.AUG.2011 05:18:57

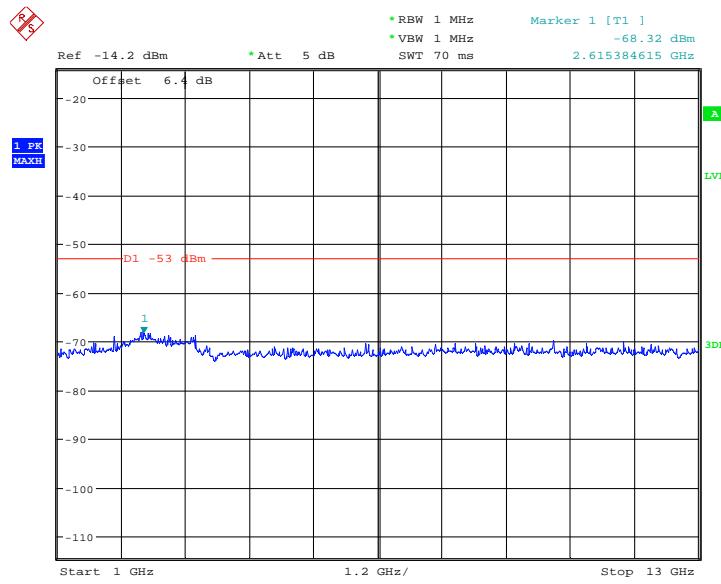
1GHz to 13GHz



Date: 17.AUG.2011 05:22:45

Configuration 1 - Mode 29kHz to 1GHz

Date: 17.AUG.2011 05:32:54

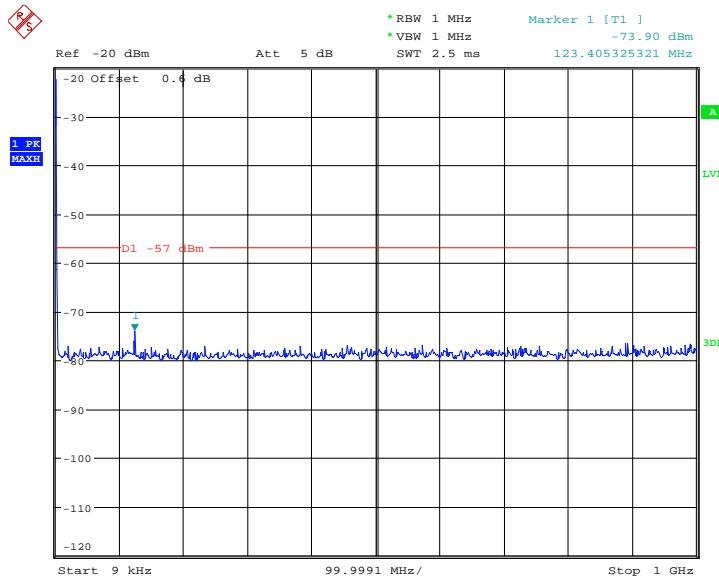
1GHz to 13GHz

Date: 17.AUG.2011 05:37:30



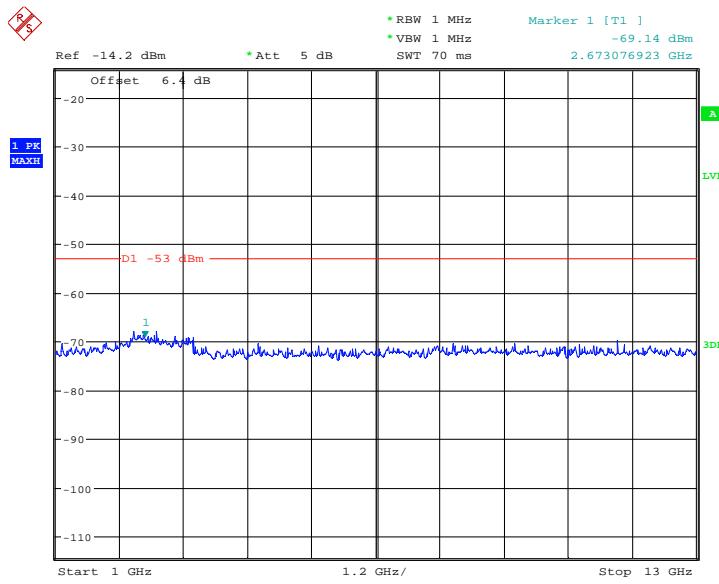
Configuration 1 – Mode3

9kHz to 1GHz

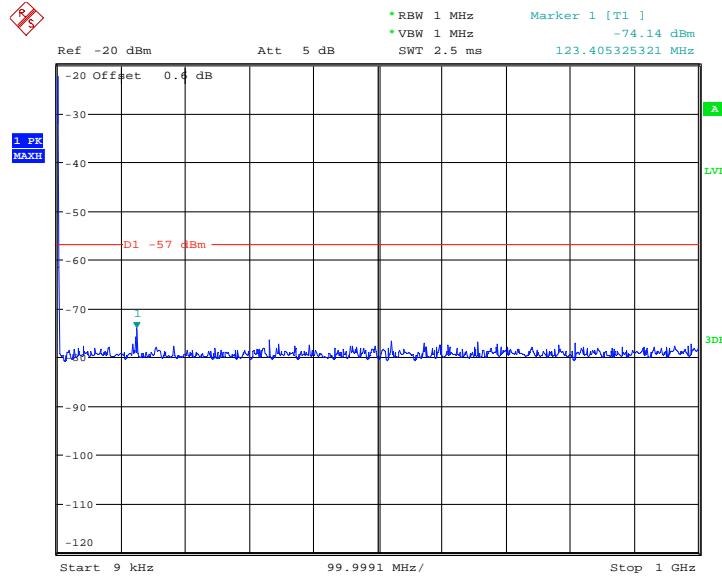


Date: 17.AUG.2011 05:39:04

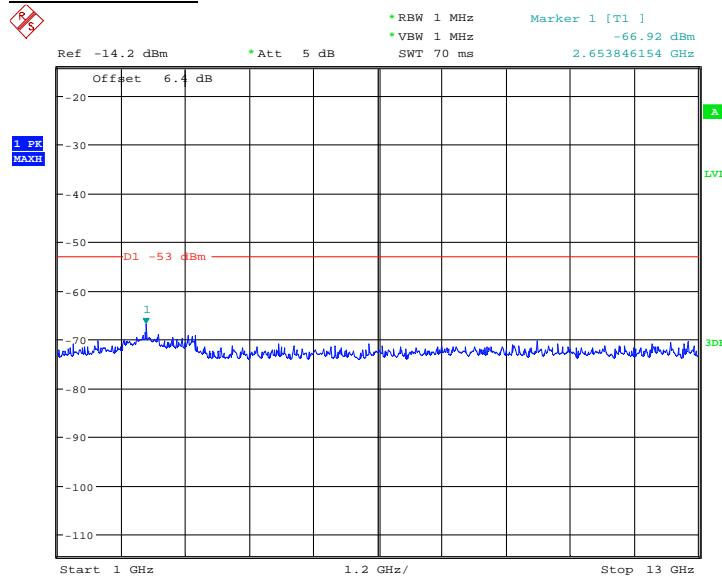
1GHz to 13GHz



Date: 17.AUG.2011 05:37:11

**8-PSK****Configuration 1 - Mode 1****9kHz to 1GHz**

Date: 17.AUG.2011 05:39:46

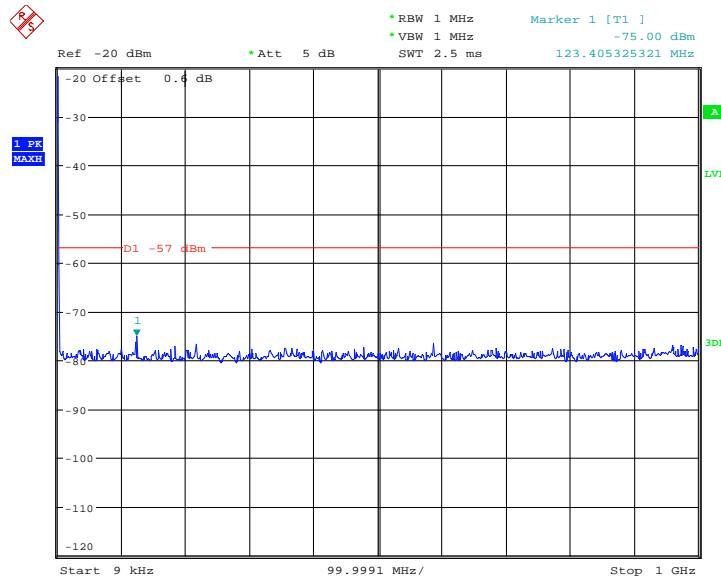
1GHz to 13GHz

Date: 17.AUG.2011 05:38:04



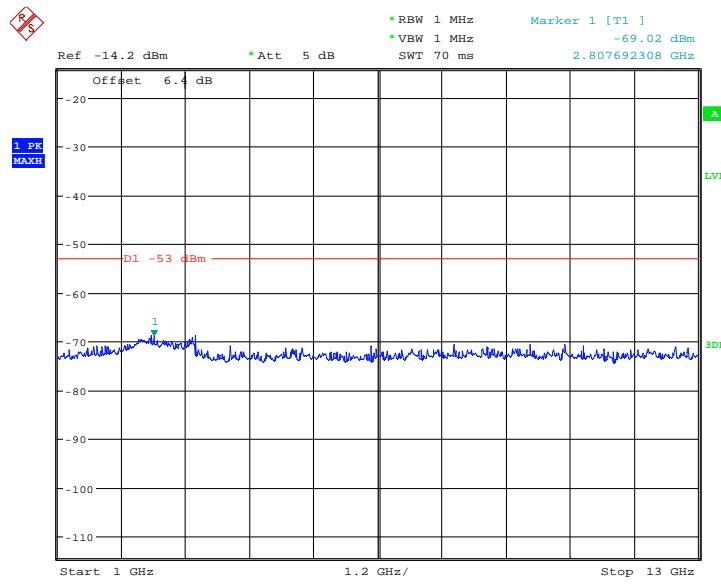
Configuration 1 - Mode 2

9kHz to 1GHz



Date: 17.AUG.2011 05:33:11

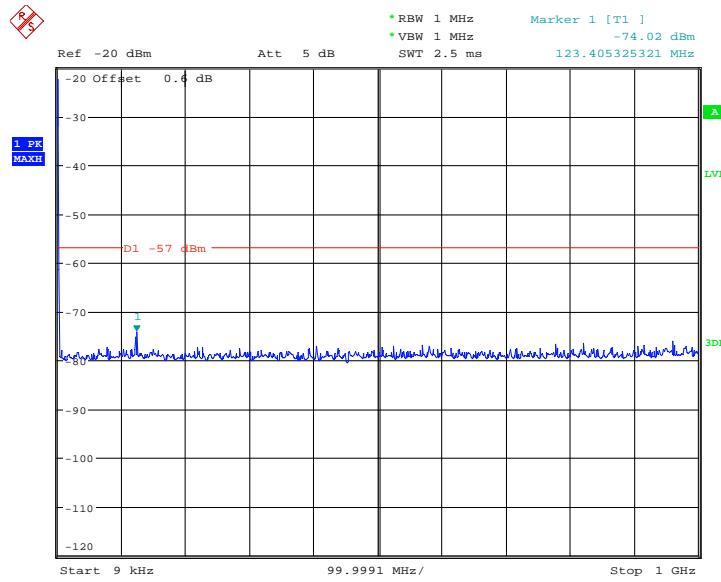
1GHz to 13GHz



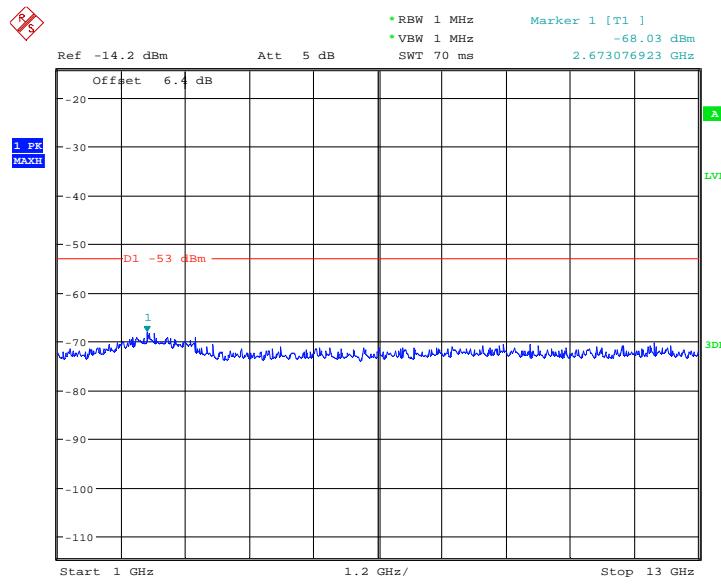
Date: 17.AUG.2011 05:38:16



Product Service

Configuration 1 - Mode 39kHz to 1GHz

Date: 17.AUG.2011 05:40:54

1GHz to 13GHz

Date: 17.AUG.2011 05:41:33



Product Service

Limit	-57dBm (30MHz-1GHz) and -53dBm (above 1GHz)
-------	---

Remarks

The EUT does not exceed -57dBm at the frequency range of 9kHz to 1GHz and does not exceed -53dBm at the frequency range of 1GHz to 13GHz.



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 Period (months)	Calibration Due
Section 2.1, 2.2, 2.3, 2.4, 2.5, 2.7 and 2.10 – Maximum Conducted Output Power, Peak – Average Ratio, Modulation Characteristics, Occupied Bandwidth, Spurious Emissions at Antenna Terminals ($\pm 1\text{MHz}$), Conducted Spurious Emissions and Receiver Spurious Emissions.					
Spectrum Analyser	Rohde & Schwarz	FSQ26	200960	12	12-Apr-2012
Spectrum Analyser	Agilent	MXA N9020A	MY49100419	12	27-Mar-2012
Power Meter	Rohde & Schwarz	NRP	102624	12	27-Mar-2012
Thermal Power Sensor	Rohde & Schwarz	NRP-Z21	102106	12	27-Mar-2012
Network Analyzer	Agilent	8720D	US38431317	12	24-Aug-2011
40dB Attenuator	Aeroflex / Weinschel	48-40-43-LIM	BR5020	-	O/P MON
40dB Attenuator	SHX	DTS100	04051204	-	O/P MON
Load	Nanjing Jiexi	TF100	09121602	-	O/P MON
Power Supply	Dahua	DH1716-5D	2007060028	-	O/P MON
Power Supply	Dahua	DH1716A-14	20080403	-	O/P MON
Digital Multi-meter	FLUKE	179	91820401	12	03-Jan-2012
Thermo-hygrometer	AZ Instruments	8705	9151655	12	16-Dec-2011
Section 2.6 – Radiated Spurious Emissions					
Load	Shanghai Huaxiang	TFZ50C-3FR	JW8042-04A-021	-	O/P MON
Load	Shanghai Huaxiang	TF100	09121602	-	O/P MON
EMI Receiver	Rohde & Schwarz	ESI 40	100015	12	19-Aug-2012
Ultra log test antenna	Rohde & Schwarz	HL562	100167	12	19-Aug-2012
Double-Ridged Waveguide Horn Antenna	Rohde & Schwarz	HF 906	100029	12	19-Aug-2012
Pyramidal Horn Antenna	EMCO	3160-09	-	-	TU
Antenna master	Frankonia	MA 260	-	12	19-Aug-2012
Relay Switch Unit	Rohde & Schwarz	331.1601.31	338965002	-	TU
Semi Anechoic Chamber	Frankonia	23.18m×16.88m×9.60m	-	12	19-Aug-2012
Power Supply	Dahua	DH1716-5D	2007060028	-	O/P MON
Power Supply	Dahua	DH1716A-14	20080403	-	O/P MON
Digital Multimeter	FLUKE	179	91820401	12	03-Jan-2012
Thermo-hygrometer	AZ Instruments	8705	9151655	12	16-Dec-2011



Section 2.8 and 2.9 – Frequency Stability Under Temperature and Voltage Variations					
Spectrum Analyser	Agilent	MXA N9020A	MY49100419	12	27-Mar-2012
40dB Attenuator	Aeroflex / Weinschel	48-40-43-LIM	BR5020	-	O/P MON
Load	Nanjing Jiexi	TF100	09121602	-	O/P MON
Temperature Chamber	ZENGDA	WGD/SJ7-10	200505100	-	O/P MON
Power Supply	Dahua	DH1716-5D	2007060028	-	O/P MON
Power Supply	Dahua	DH1716A-14	20080403	-	O/P MON
Digital Multimeter	FLUKE	179	91820401	12	03-Jan-2012
Thermo-hygrometer	AZ Instruments	8705	9151655	12	16-Dec-2011

O/P MON Output monitored with calibration equipment
 TU Traceability Unscheduled



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
(Not UKAS Accredited).

This report must not be reproduced, except in its entirety, without the written permission of
TÜV SÜD Product Service Limited

© 2011 TÜV SÜD Product Service Limited