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# Report On

Limited FCC and Industry Canada Testing of the  
Ericsson AB  
RU22 0860 / KRC 118 22/2

COMMERCIAL-IN-CONFIDENCE

FCC ID: TA8AKRC11822-2  
IC ID: 287AB-AW118222

Document 75911084 Report 01 Issue 1

December 2010



Product Service

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**REPORT ON**

Limited FCC and Industry Canada Testing of the  
Ericsson AB  
RU22 0860 / KRC 118 22/2

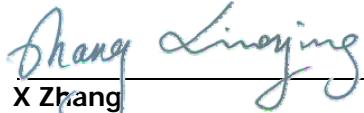
Document 75911084 Report 01 Issue 1

December 2010

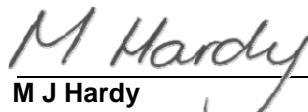
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X Zhang  
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**DATED**

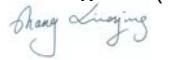
08 December 2010

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**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 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



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## **SECTION 1**

### **REPORT SUMMARY**

Limited FCC and Industry Canada Testing of the  
Ericsson AB  
RU22 0860 / KRC 118 22/2



## 1.1 INTRODUCTION

The information contained in this report is intended to show verification of the Ericsson AB RU22 0860 / KRC 118 22/2 to the requirements of FCC CFR 47 Part 2, 15 and 22 and Industry Canada RSS-132 and RSS-GEN.

Testing was carried out in support of a C2PC application for Grant of RU22 0860 / KRC 118 22/2 for the hardware update.

Objective	To perform limited 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	RU22 0860
Part Number	KRC 118 22/2
IC Model Name	AW118222
Serial Number(s)	CC42097511
Software Version	CXP9012183%7_R9YL
Hardware Version	R1C
Number of Samples Tested	1
Test Specification/Issue/Date	FCC CFR 47 Part 22: 2009 FCC CFR 47 Part 2: 2009 FCC CFR 47 Part 15:2009 Industry Canada RSS-132: 2005 Industry Canada RSS-GEN Issue 2: 2007
Incoming Release Date	Declaration of Build Status 13 October 2010
Order Number	PTP
Date	27 September 2010
Start of Test	22 October 2010
Finish of Test	19 November 2010
Name of Engineer(s)	X Zhang C Zhang
Related Document(s)	ANSI C63.4: 2003



## 1.2 BRIEF SUMMARY OF RESULTS

A brief summary of results in accordance with FCC CFR 47 Part 2, 15 and 22 and Industry Canada RSS-132 and RSS-GEN, is shown below.

Configuration – Radio Unit							
Section	Spec Clause		Test Description	Mode	Mod State	Result	Comments
	FCC Part 2, 15 and 22	RSS-132 and RSS-GEN					
	22.913(a)	4.4	Effective Radiated Power	871.4MHz		N/A	No integral antenna.
				881.4MHz		N/A	
				891.6MHz		N/A	
				871.4MHz+ 881.4MHz		N/A	
				881.4MHz+ 891.6MHz		N/A	
2.1	2.1046, 22.913 (a)	4.4	Maximum Peak Output Power - Conducted	871.4MHz	0	Pass	
				881.4MHz	0	Pass	
				891.6MHz	0	Pass	
				871.4MHz+ 881.4MHz	0	Pass	
				881.4MHz+ 891.6MHz	0	Pass	
2.2	2.1049, 22.917(b)	RSS-Gen 4.6.1	Occupied Bandwidth	871.4MHz	0	Pass	
				881.4MHz	0	Pass	
				891.6MHz	0	Pass	
				871.4MHz+ 881.4MHz		N/A	
				881.4MHz+ 891.6MHz		N/A	
2.3	2.1051, 22.917(b)	4.5	Spurious Emissions at Antenna Terminals ( $\pm 1\text{MHz}$ )	871.4MHz	0	Pass	
				881.4MHz		N/A	
				891.6MHz	0	Pass	
				871.4MHz+ 881.4MHz	0	Pass	
				881.4MHz+ 891.6MHz	0	Pass	
2.4	2.1053, 22.917(a)	4.5	Radiated Spurious Emissions	871.4MHz	0	Pass	
				881.4MHz	0	Pass	
				891.6MHz	0	Pass	
				871.4MHz+ 881.4MHz	0	Pass	
				881.4MHz+ 891.6MHz	0	Pass	



Configuration – Radio Unit							
Section	Spec Clause		Test Description	Mode	Mod State	Result	Comments
	FCC Part 2, 15 and 22	RSS-132 and RSS-GEN					
2.5	2.1051, 22.917(a)	4.5	Conducted Spurious Emissions	871.4MHz	0	Pass	
				881.4MHz	0	Pass	
				891.6MHz	0	Pass	
				871.4MHz+ 881.4MHz	0	Pass	
				881.4MHz+ 891.6MHz	0	Pass	
	2.1055, 22.355	4.3	Frequency Stability Under Temperature Variations	871.4MHz		N/T	Not tested <sup>1</sup>
				881.4MHz		N/T	
				891.6MHz		N/T	
				871.4MHz+ 881.4MHz		N/T	
				881.4MHz+ 891.6MHz		N/T	
	2.1055, 22.355	4.3	Frequency Stability Under Voltage Variations	871.4MHz		N/T	Not tested <sup>1</sup>
				881.4MHz		N/T	
				891.6MHz		N/T	
				871.4MHz+ 881.4MHz		N/T	
				881.4MHz+ 891.6MHz		N/T	
2.6	15.111	4.6	Receiver Spurious Emissions	871.4MHz	0	Pass	
				881.4MHz	0	Pass	
				891.6MHz	0	Pass	
				871.4MHz+ 881.4MHz		N/A	
				881.4MHz+ 891.6MHz		N/A	

N/A – Not Applicable

Note<sup>1</sup> – Limited testing has been performed as this report is to be used as justification for a Class II Permissive Change. See section 1.6.



### 1.3 DECLARATION OF BUILD STATUS

MAIN EUT	
MANUFACTURING DESCRIPTION	Radio Unit
MANUFACTURER	Ericsson AB
PRODUCT NAME	RU22 0860
PART NUMBER	KRC 118 22/2
IC Model Name	AW118222
SERIAL NUMBER	CC42097511
HARDWARE VERSION	R1C
SOFTWARE VERSION	CXP9012183%7_R9YL
TRANSMITTER OPERATING RANGE	TX: 871.4MHz - 891.6MHz RX: 826.4MHz - 846.6MHz
MODULATIONS	QPSK, 16QAM, 64QAM
INTERMEDIATE FREQUENCIES	--
ITU DESIGNATION OF EMISSION	4M13F9W
OUTPUT POWER (RMS) (W or dBm)	Single Carrier: 1 x 47.8dBm (1 x 60W) Multi Carrier: 2 x 44.8Bm (2 x 30W)
FCC ID	TA8AKRC11822-2
IC ID	287AB-AW118222
TECHNICAL DESCRIPTION (a brief description of the intended use and operation)	The equipment is a Radio Unit of WCDMA Base Station.

Signature

Date  
D of B S Serial No

18 November 2010  
75911084/01

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) RU22 0860 / KRC 118 22/2 is an Ericsson AB Radio Unit working in the public mobile service 800MHz band which provides communication connections to WCDMA850 network. The RU22 0860 / KRC 118 22/2 operates from a -48V DC volt supply.

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



Equipment Under Test



#### 1.4.2 Test Configuration

##### Configuration 1: Radio Unit

The EUT was configured in accordance with FCC CFR 47 Part 2, 15 and 22 and Industry Canada RSS-132 and RSS-GEN.

The RU22 0860 / KRC 118 22/2 supports Test Models TM1, TM5 and TM6 at 850MHz defined in 3GPP TS 25.141. Test Model 1 (TM1) uses the QPSK modulation only, Test Model 5 (TM5) includes 16QAM modulation and Test Model 6 (TM6) includes 64QAM modulation as follows:

Single carrier:

Test Model 1 (TM1): 64 DPCHs at 30 kps (SF=128)

Test Model 5 (TM5): 30 DPCHs at 30 kps (SF=128) and 8 HS-PDSCHs at 240 kps (SF=16)

Test Model 6 (TM6): 30 DPCHs at 30 kps (SF=128) and 8 HS-PDSCHs at 240 kps (SF=16)

Multi carrier:

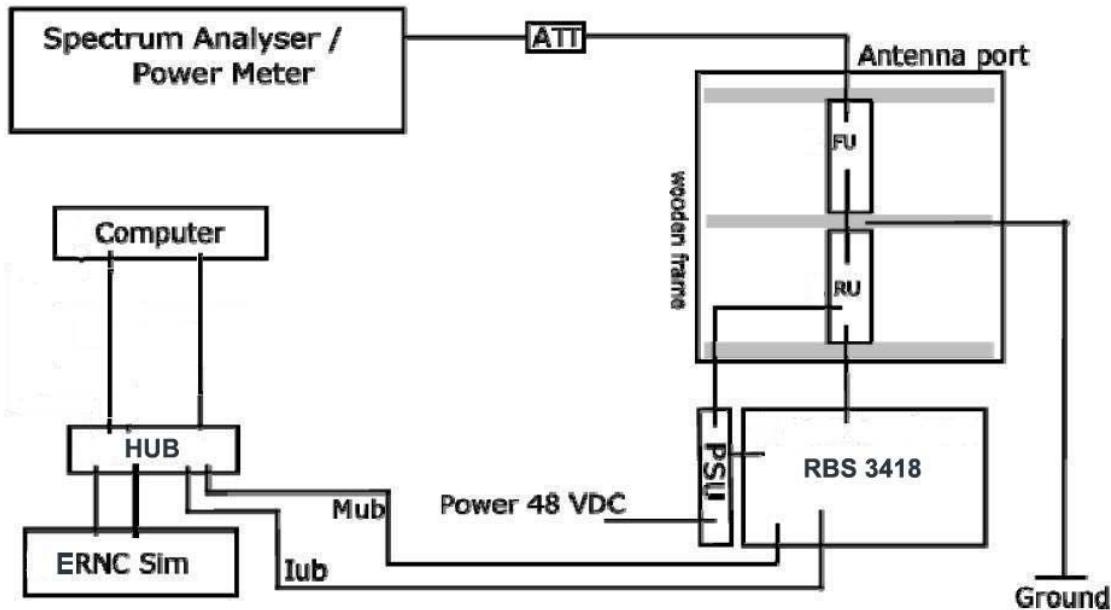
Test model 1 (TM1): 32 DPCHs at 30 kps (SF=128)

Test model 5 (TM5): 30 DPCHs at 30 kps (SF=128) and 8 HS-PDSCHs at 240 kps (SF=16)

Test model 6 (TM6): 30 DPCHs at 30 kps (SF=128) and 8 HS-PDSCHs at 240 kps (SF=16)

The EUT can be configured to transmit with 850MHz single or multi carrier at the RF output connector. All Tx Testing was performed on the Ant A connector and the Rx testing was performed on the Ant B connector of the Filter Unit FU12 08 / KRC 118 21/1. The complete testing was performed with the EUT transmitting at maximum RF power unless otherwise stated. The EUT was powered by a -48V DC Power supply.

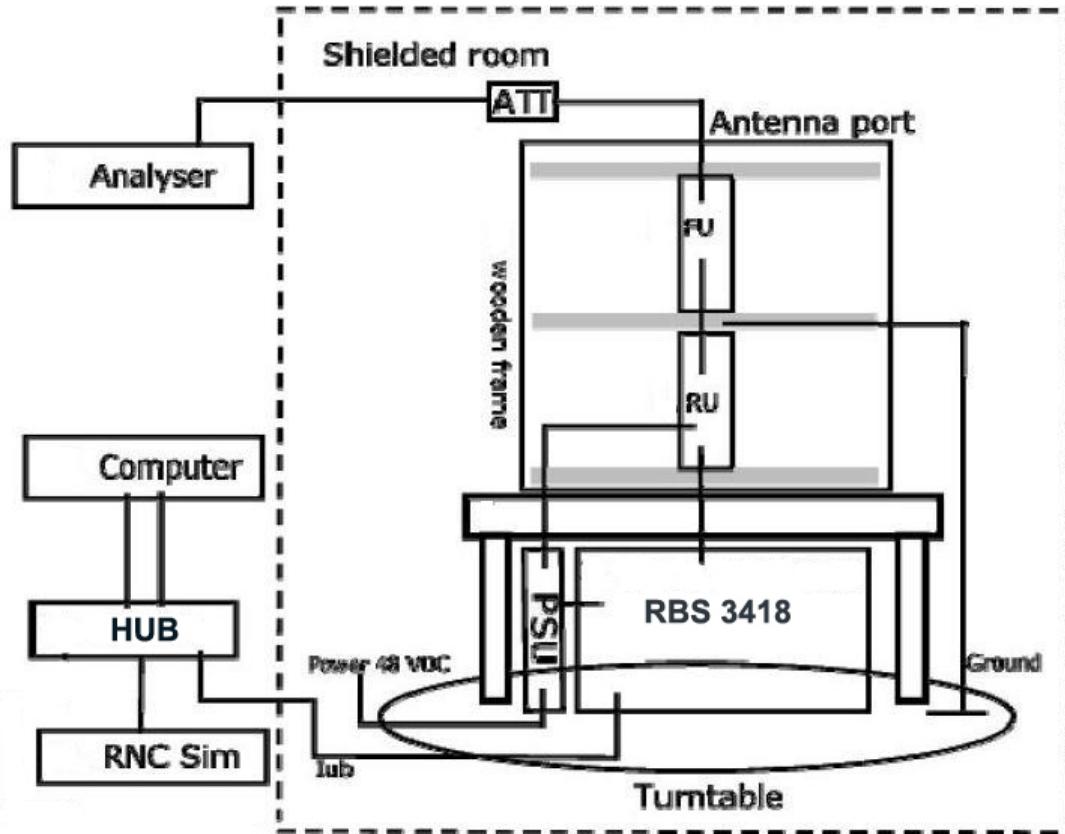
## Test Setup, Conducted Measurement:



Test Object	Part Number	Version	Serial Number
Radio Unit	RU22 0860 / KRC 118 22/2	R1C	CC42097511
Filter Unit	FU12 08 / KRC 118 21/1	R3A	TU8F947507

Auxiliary Equipment	Part Number / Model Type	Version	Serial Number
Computer	SunBlade 1500	--	MT41130005
RBS 3418	1/BFE 401 1019	R1C	TA64037772
HUB	10 BASE-T Ethernet HUB	--	--
ERNC Sim	ROJ 119 2106/53	R4E	TU8GH19419
PSU	BML 901 181/1	R1B	BG91308992
Power Meter	Rohde & Schwarz NRP	--	17-294752
Thermal Power Sensor	Rohde & Schwarz NRP-Z51	--	20-295642
Spectrum Analyzer	FSQ26	--	20-300542

## Test Setup, Radiated Measurement:



Test Object	Part Number	Version	Serial Number
Radio Unit	RU22 0860 / KRC 118 22/2	R1C	CC42097511
Filter Unit	FU12 08 / KRC 118 21/1	R3A	TU8F947507

Auxiliary Equipment	Part Number / Model Type	Version	Serial Number
Computer	SunBlade 1500	--	MT41130005
RBS 3418	1/BFE 401 1019	R1C	TA64037772
HUB	10 BASE-T Ethernet HUB	--	--
RNC Sim	4780A	REV:AAA	0208
PSU	BML 901 181/1	R1C	BG91308992
EMI Receiver	Rohde & Schwarz ESI 40	--	100015



#### 1.4.3 Modes of Operation

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

Mode 1 - ARFCN 4357: 871.4MHz (Bottom Channel)

Mode 2 - ARFCN 4407: 881.4MHz (Middle Channel)

Mode 3 - ARFCN 4458: 891.6MHz (Top Channel)

Mode 4 - ARFCN 4357 + 4407: 871.4MHz + 881.4MHz

Mode 5 - ARFCN 4407 + 4458: 881.4MHz + 891.6MHz

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



## 1.5 TEST CONDITIONS

For all tests the EUT was set up in accordance with the relevant test standard and to represent typical operating conditions. Tests were applied with the EUT situated in a wooden frame, test laboratories or a chamber as appropriate.

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

## 1.6 DEVIATIONS FROM THE STANDARD

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

## 1.7 MODIFICATION RECORD

No modifications were made to the EUT during testing.

## 1.8 ALTERNATIVE TEST SITE

Testing has been performed under the following site registrations:

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

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



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## **SECTION 2**

### **TEST DETAILS**

Limited FCC and Industry Canada Testing of the  
Ericsson AB  
RU22 0860 / KRC 118 22/2



## 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

RU22 0860 / KRC 118 22/2, S/N: CC42097511

### 2.1.3 Date of Test and Modification State

25 and 26 October 2010 – 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 QPSK, 16QAM and 64QAM using the test model described.

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

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

Configuration 1 - Mode 1  
 - Mode 2  
 - Mode 3  
 - Mode 4  
 - Mode 5

### 2.1.6 Environmental Conditions

	25 October 2010	26 October 2010
Ambient Temperature	23.7°C	22.2°C
Relative Humidity	32.2%	22.4%



### 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 - Modes 1, 2 and 3

###### TM1

UARFCN	Frequency (MHz)	Path Loss (dB)	PAR (dB)	Result (dBm) RMS	Result (W) RMS
4357 (Bottom)	871.4	40.4	6.58	47.34	54.20
4407 (Middle)	881.4	40.4	6.50	47.53	56.62
4458 (Top)	891.6	40.4	6.94	47.30	53.70

###### TM5

UARFCN	Frequency (MHz)	Path Loss (dB)	PAR (dB)	Result (dBm) RMS	Result (W) RMS
4357 (Bottom)	871.4	40.4	6.58	47.40	54.95
4407 (Middle)	881.4	40.4	6.42	47.49	56.10
4458 (Top)	891.6	40.4	6.62	47.30	53.70

###### TM6

UARFCN	Frequency (MHz)	Path Loss (dB)	PAR (dB)	Result (dBm) RMS	Result (W) RMS
4357 (Bottom)	871.4	40.4	6.81	47.20	52.48
4407 (Middle)	881.4	40.4	6.54	47.29	53.58
4458 (Top)	891.6	40.4	6.99	47.11	51.40

**Multi Carrier****Configuration 1 - Mode 4 and 5****TM1**

UARFCN	Frequency (MHz)	Path Loss (dB)	PAR (dB)	Result (dBm) RMS	Result (W) RMS
4357 & 4407	871.4 & 881.4	40.4	6.62	47.77	59.84
4407 & 1513	881.4 & 891.6	40.4	7.63	47.74	59.43

**TM5**

UARFCN	Frequency (MHz)	Path Loss (dB)	PAR (dB)	Result (dBm) RMS	Result (W) RMS
4357 & 4407	871.4 & 881.4	40.4	7.14	47.77	59.84
4407 & 1513	881.4 & 891.6	40.4	7.36	47.73	59.29

**TM6**

UARFCN	Frequency (MHz)	Path Loss (dB)	PAR (dB)	Result (dBm) RMS	Result (W) RMS
4357 & 4407	871.4 & 881.4	40.4	7.30	47.56	57.02
4407 & 1513	881.4 & 891.6	40.4	7.43	47.52	56.49

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

**Remarks**

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



## 2.2 OCCUPIED BANDWIDTH

### 2.2.1 Specification Reference

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

### 2.2.2 Equipment Under Test

RU22 0860 / KRC 118 22/2, S/N: CC42097511

### 2.2.3 Date of Test and Modification State

25 and 26 October 2010 – 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 2 and Part 22 and Industry Canada RSS-GEN.

The EUT was transmitting at maximum power, modulated using the test model described. Using a resolution bandwidth of 50kHz and a video bandwidth of 500kHz. 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

### 2.2.6 Environmental Conditions

	25 October 2010	26 October 2010
Ambient Temperature	23.7°C	22.2°C
Relative Humidity	32.2%	22.4%



## 2.2.7 Test Results

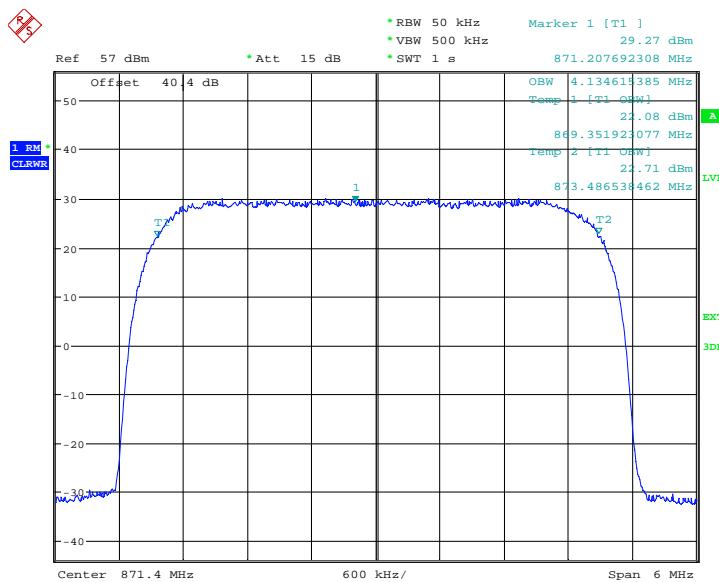
For the period of test the EUT met the requirements of FCC CFR 47 Part 2 and Part 22 and Industry Canada RSS-GEN for Occupied Bandwidth.

The test results are shown below

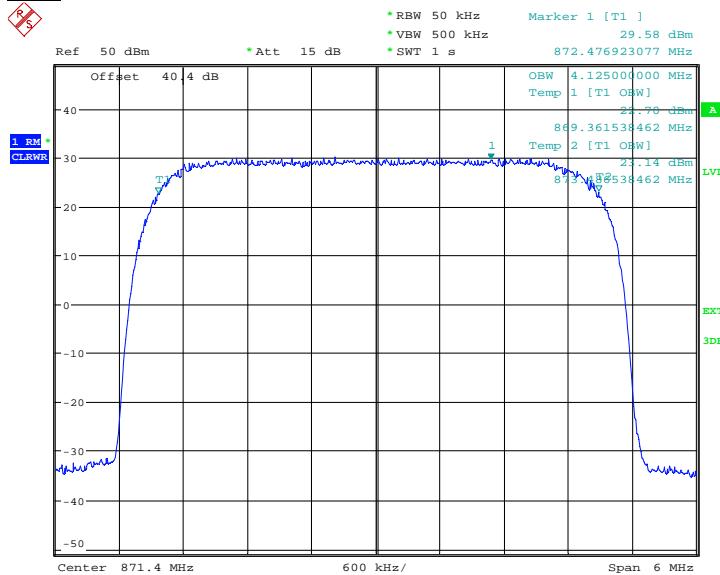
### Single Carrier

#### Configuration 1 - Mode 1

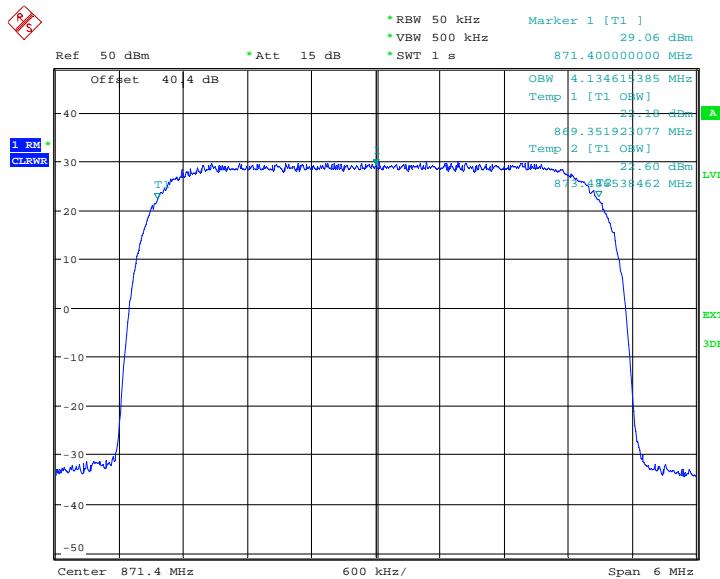
##### TM1



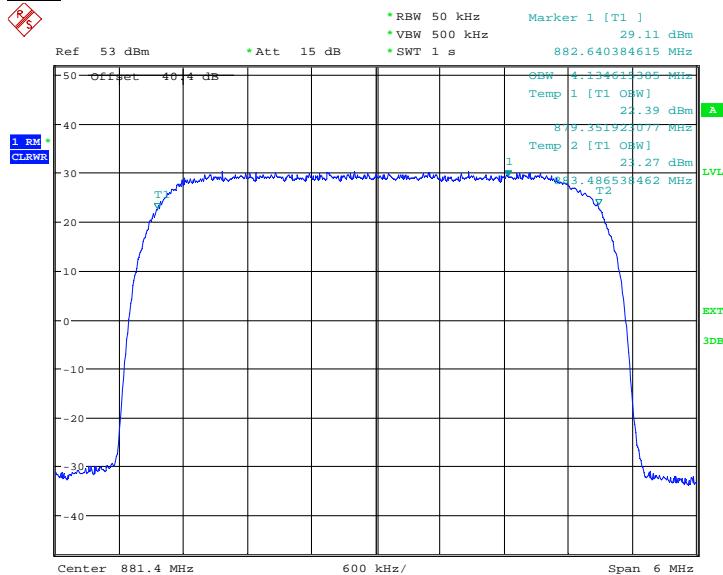
Date: 25.OCT.2010 11:12:15

TM5

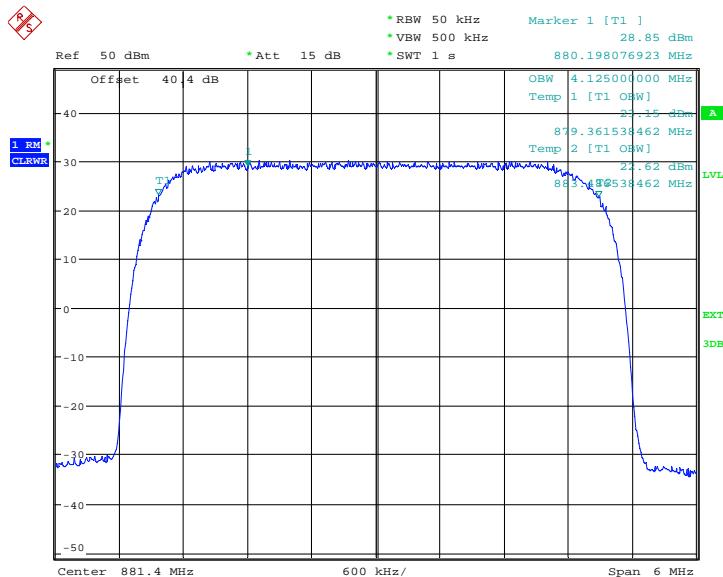
Date: 25.OCT.2010 11:37:26

TM6

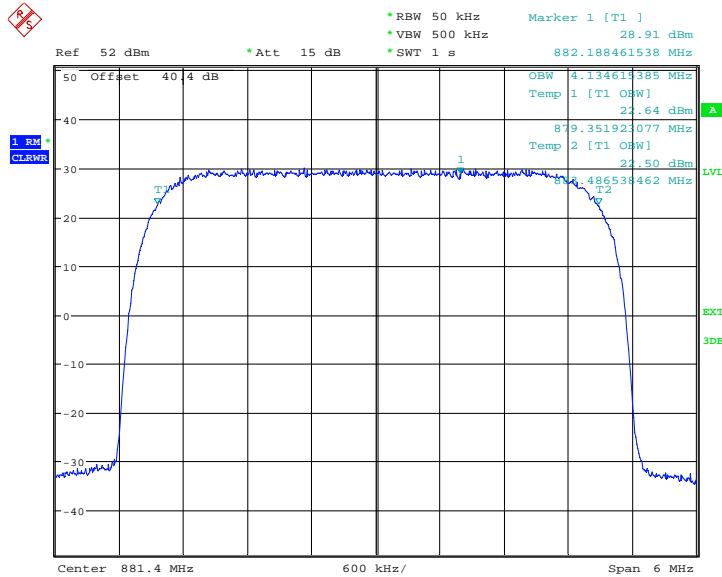
Date: 26.OCT.2010 03:36:13

Configuration 1 - Mode 2TM1

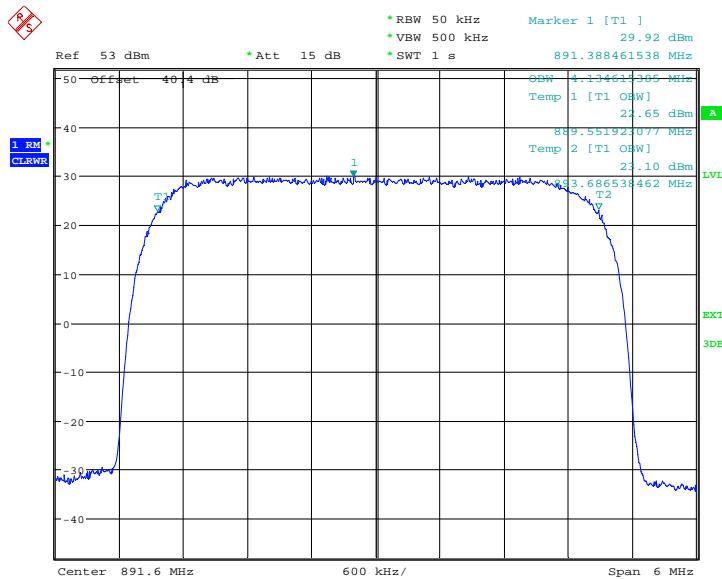
Date: 26.OCT.2010 04:44:59

TM5

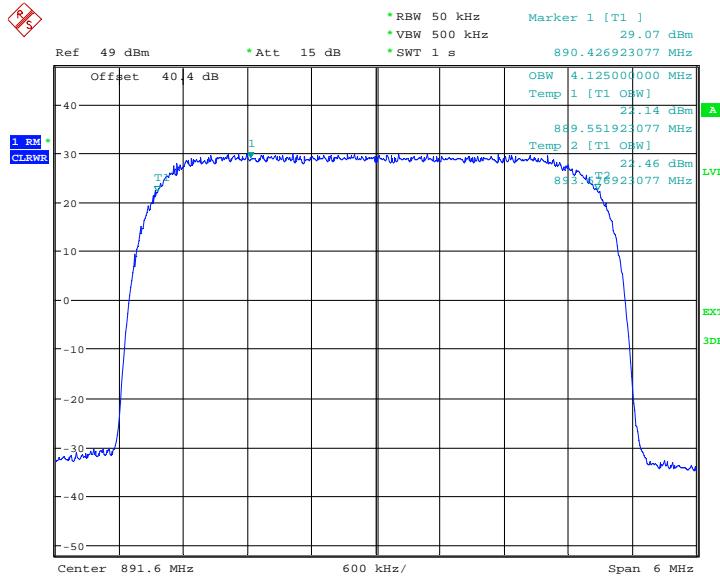
Date: 26.OCT.2010 04:16:12

TM6

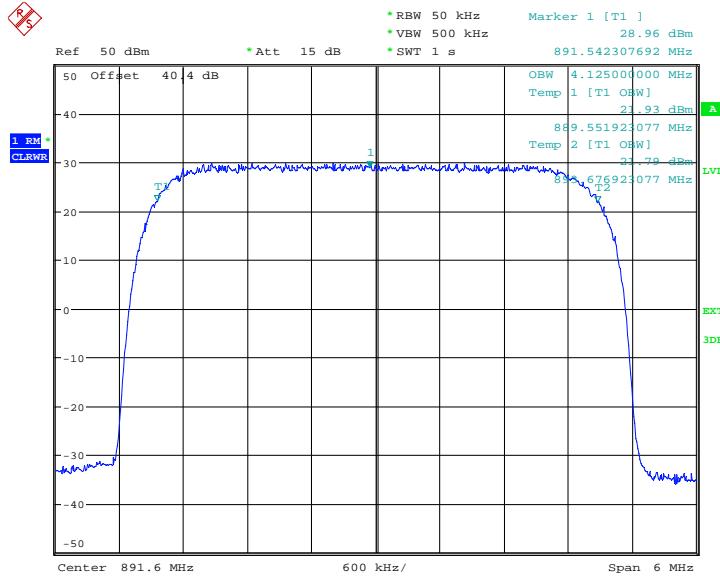
Date: 26.OCT.2010 04:04:25

Configuration 1 - Mode 3TM1

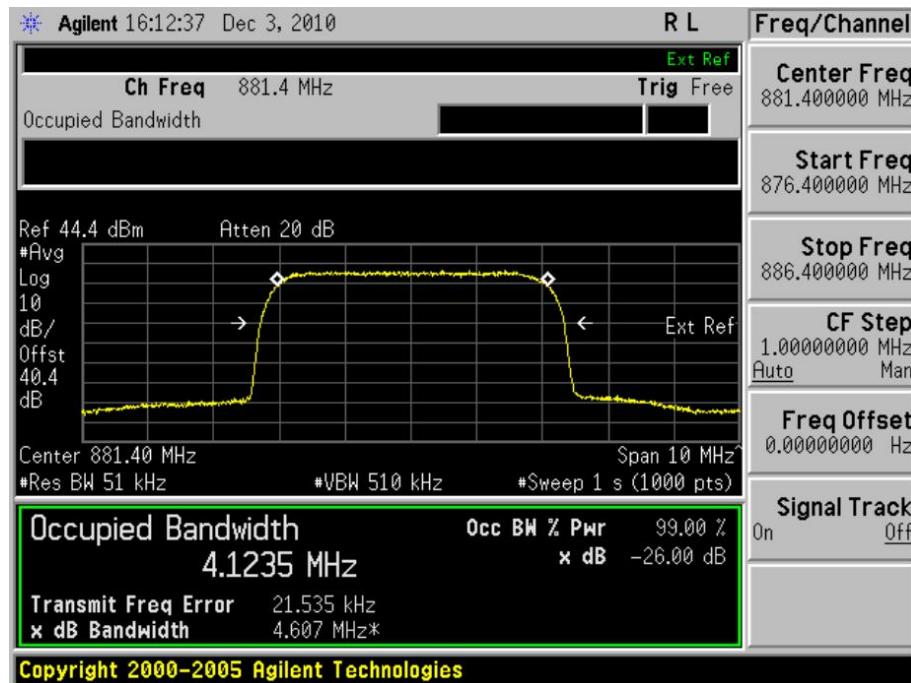
Date: 26.OCT.2010 04:51:46

TM5 - Mode 3

Date: 26.OCT.2010 05:12:11

TM6

Date: 26.OCT.2010 07:30:40

-26dBc Bandwidth



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

### 2.3.1 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

### 2.3.2 Equipment Under Test

RU22 0860 / KRC 118 22/2, S/N: CC42097511

### 2.3.3 Date of Test and Modification State

25 and 26 October 2010 – Modification State 0

### 2.3.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

### 2.3.5 Test Method and Operating Modes

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

In accordance with 22.917(b), at least 1% of the 26dB bandwidth was used for the resolution and video bandwidths up to 1MHz away from the block edge. A resolution bandwidth of 50kHz was used between 1MHz to 3.25MHz away from the band edge. 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.

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

### 2.3.6 Environmental Conditions

	25 October 2010	26 October 2010
Ambient Temperature	23.7°C	22.2°C
Relative Humidity	32.2%	22.4%



### 2.3.7 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.

#### Single Carrier

##### Configuration 1 - Modes 1 and 3

##### TM1, TM5 and TM6

Band Edge Frequency	Edge Test with QPSK modulation Channel No./Frequencies	Edge Test with 16QAM modulation Channel No./Frequencies	Edge Test with 64QAM modulation Channel No./Frequencies
Bottom 869 MHz	Channel: 4357 Frequency: 871.4 MHz	Channel: 4357 Frequency: 871.4 MHz	Channel: 4357 Frequency: 871.4 MHz
Top 894 MHz	Channel: 4458 Frequency : 891.6 MHz	Channel: 4458 Frequency : 891.6 MHz	Channel: 4458 Frequency : 891.6 MHz

#### Multi Carrier

##### Configuration 1 - Mode 4 and 5

##### TM1, TM5 and TM6

Band Edge Frequency	Edge Test with QPSK modulation Channel No./Frequencies	Edge Test with 16QAM modulation Channel No./Frequencies	Edge Test with 64QAM modulation Channel No./Frequencies
Bottom 869 MHz	Channel: 4357 & 4407 Frequency: 871.4 & 881.4 MHz	Channel: 4357 & 4407 Frequency: 871.4 & 881.4 MHz	Channel: 4357 & 4407 Frequency: 871.4 & 881.4 MHz
Top 894 MHz	Channel: 4407 & 4458 Frequency : 881.4 & 891.6 MHz	Channel: 4407 & 4458 Frequency : 881.4 & 891.6 MHz	Channel: 4407 & 4458 Frequency : 881.4 & 891.6 MHz

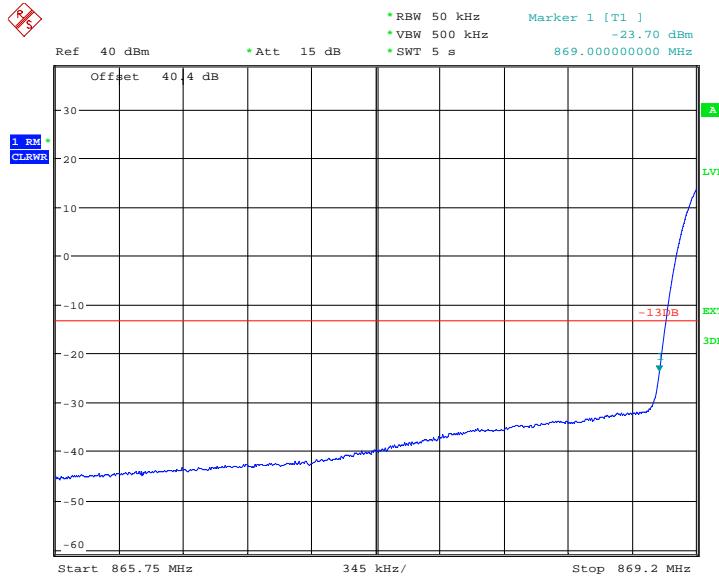
The channels shown in the table above are the minimum and maximum channels that can be used in the authorised frequency ranges to maintain compliance.



### Single Carrier

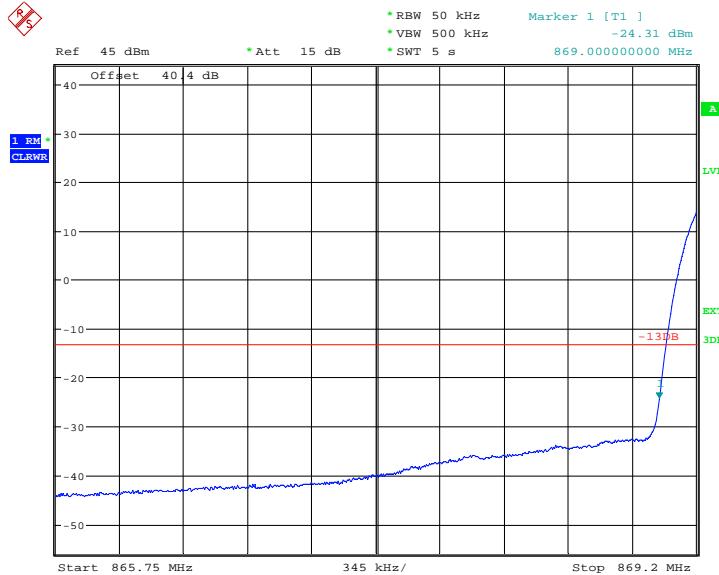
#### Configuration 1 - Mode 1

##### TM1



Date: 25.OCT.2010 11:06:00

##### TM5

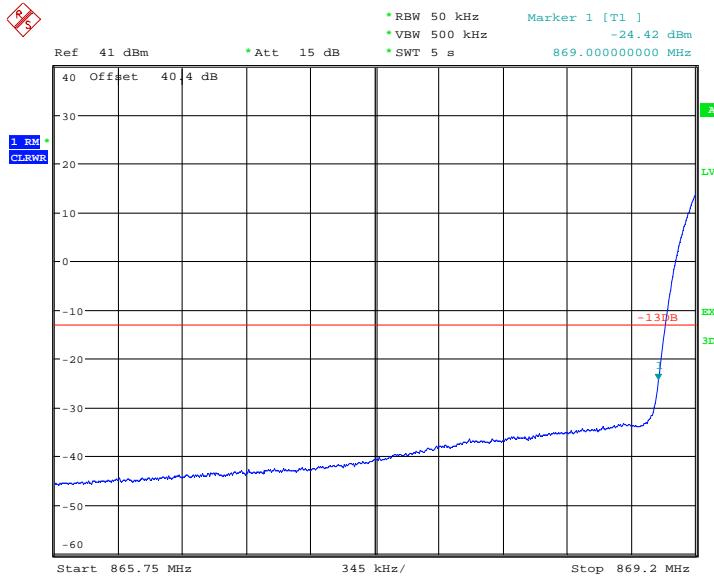


Date: 25.OCT.2010 11:25:43



## Product Service

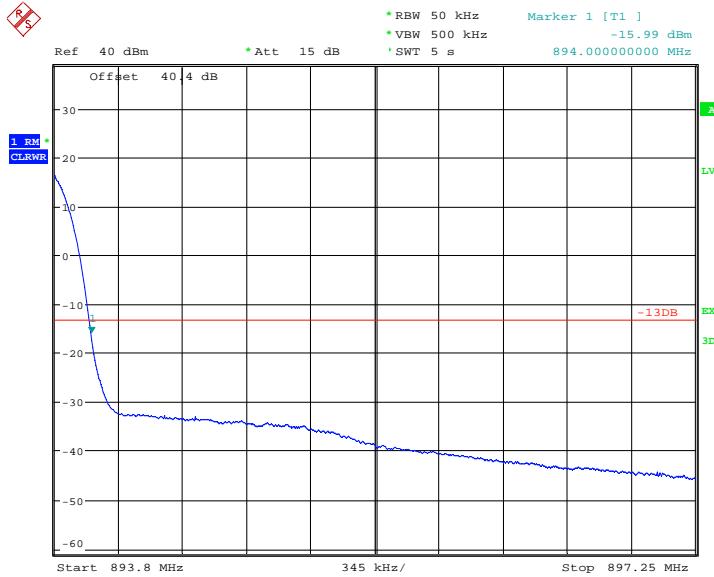
TM6



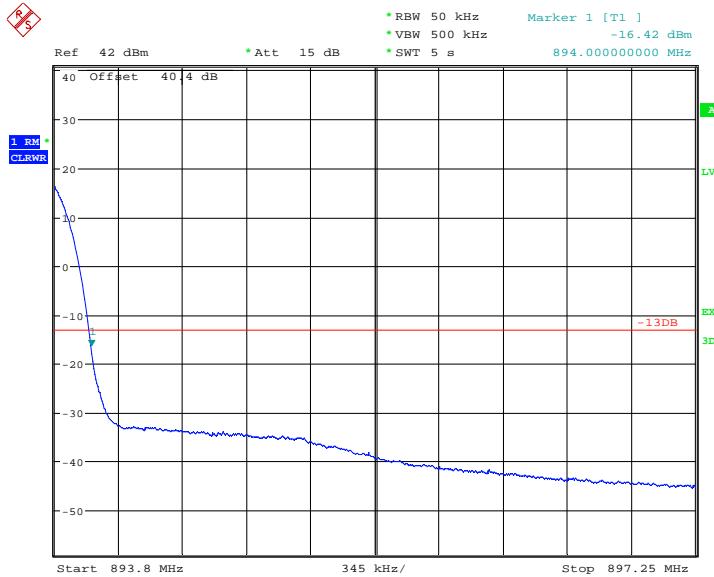
Date: 26.OCT.2010 03:41:02

### Configuration 1 - Mode 3

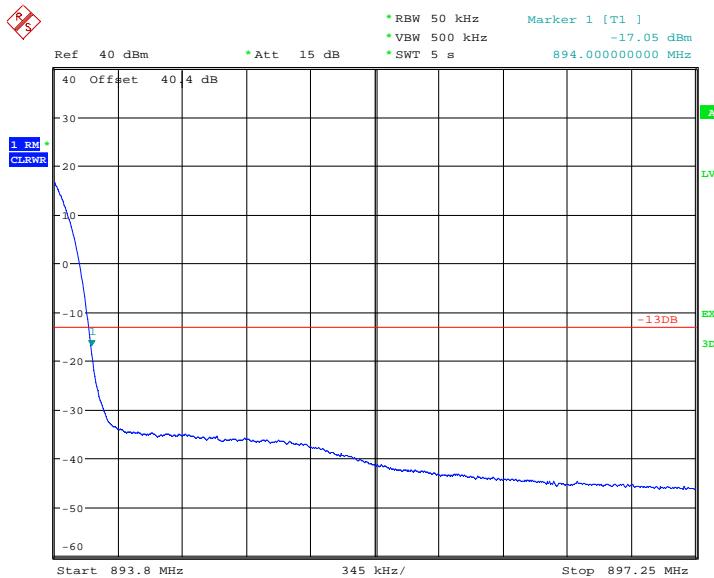
TM1



Date: 26.OCT.2010 04:55:54

TM5

Date: 26.OCT.2010 05:09:42

TM6

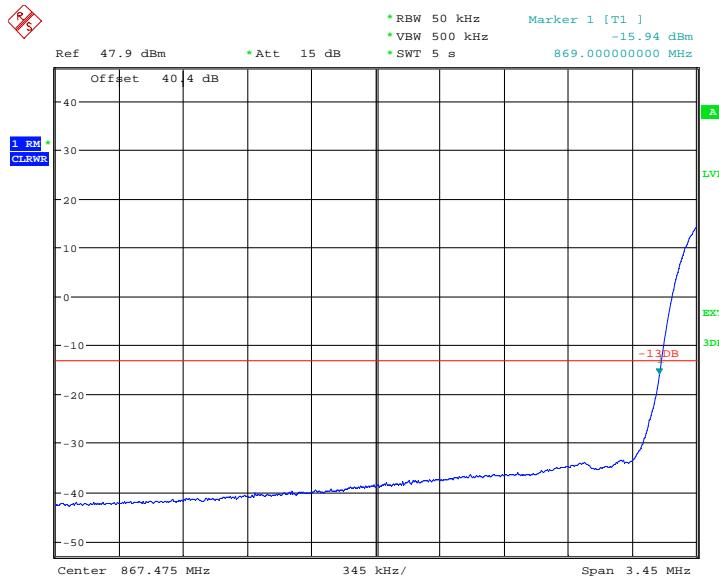
Date: 26.OCT.2010 07:33:59



### Multi Carrier

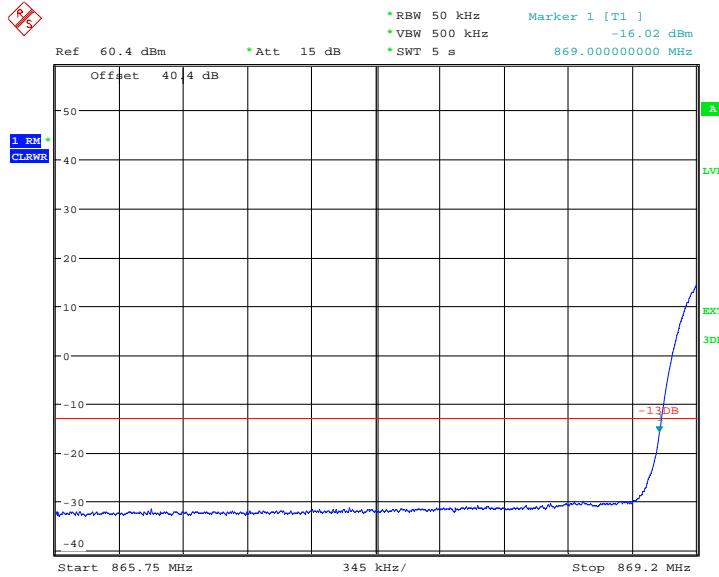
#### Configuration 1 - Mode 4

##### TM1

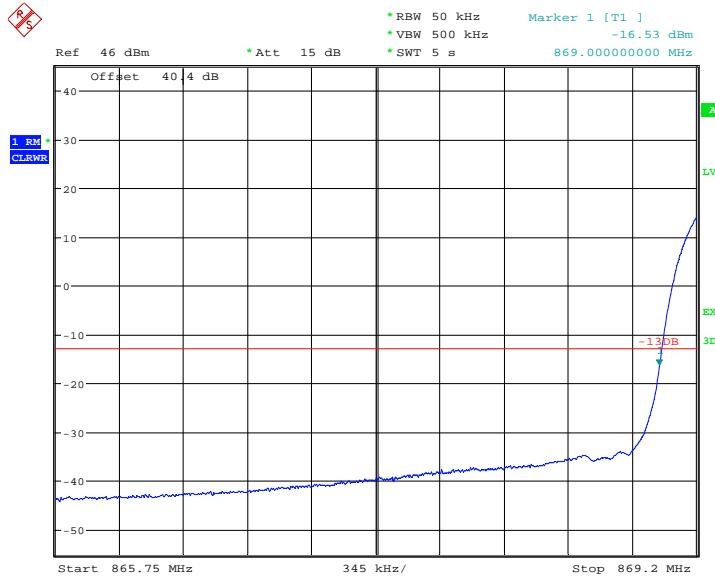


Date: 25.OCT.2010 04:55:25

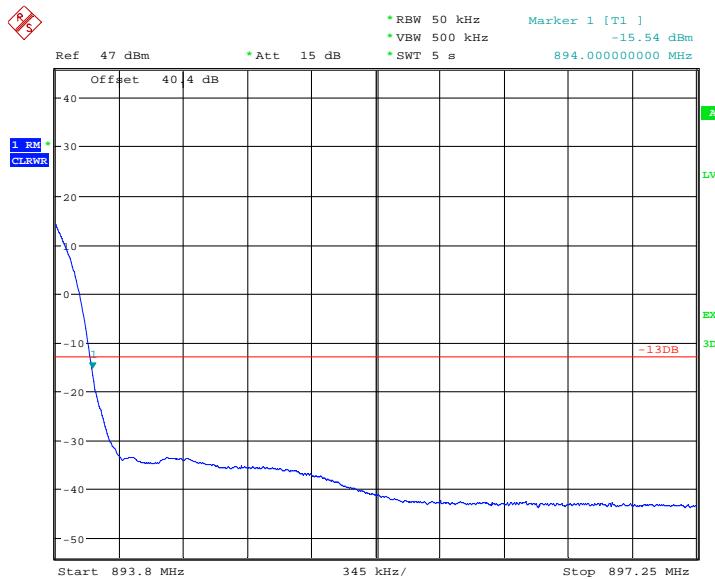
##### TM5



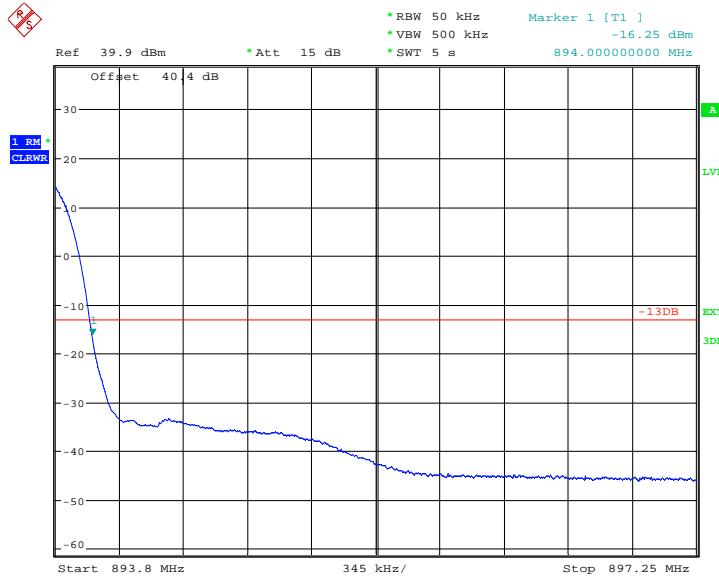
Date: 25.OCT.2010 05:38:24

TM6

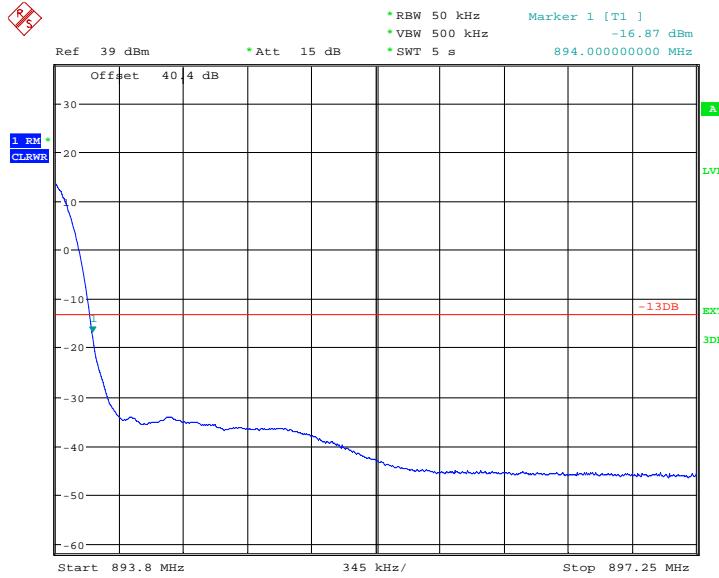
Date: 25.OCT.2010 07:45:00

Configuration 1 - Mode 5TM1

Date: 25.OCT.2010 09:39:54

TM5

Date: 25.OCT.2010 10:11:46

TM6

Date: 25.OCT.2010 08:24:57

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.



## 2.4 RADIATED SPURIOUS EMISSIONS

### 2.4.1 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

### 2.4.2 Equipment Under Test

RU22 0860 / KRC 118 22/2, S/N: CC42097511

### 2.4.3 Date of Test and Modification State

02 and 03 November 2010 – 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-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 – 10GHz were then formally measured using a Peak detector as the worst case.

In the frequency Range 30MHz – 10GHz, the measurement was performed with a resolution bandwidth of 1MHz.

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

The limits was displayed, showing the -13dBm.

The test was performed with the EUT operating on all modes in section 1.4.3 and record the result of the following configurations and modes of operation for worst case:

Configuration 1 - Mode 1  
 - Mode 2  
 - Mode 3  
 - Mode 4  
 - Mode 5



#### 2.4.6 Environmental Conditions

	02 November 2010	03 November 2010
Ambient Temperature	19.0°C	20.1°C
Relative Humidity	32.7%	32.0%

#### 2.4.7 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

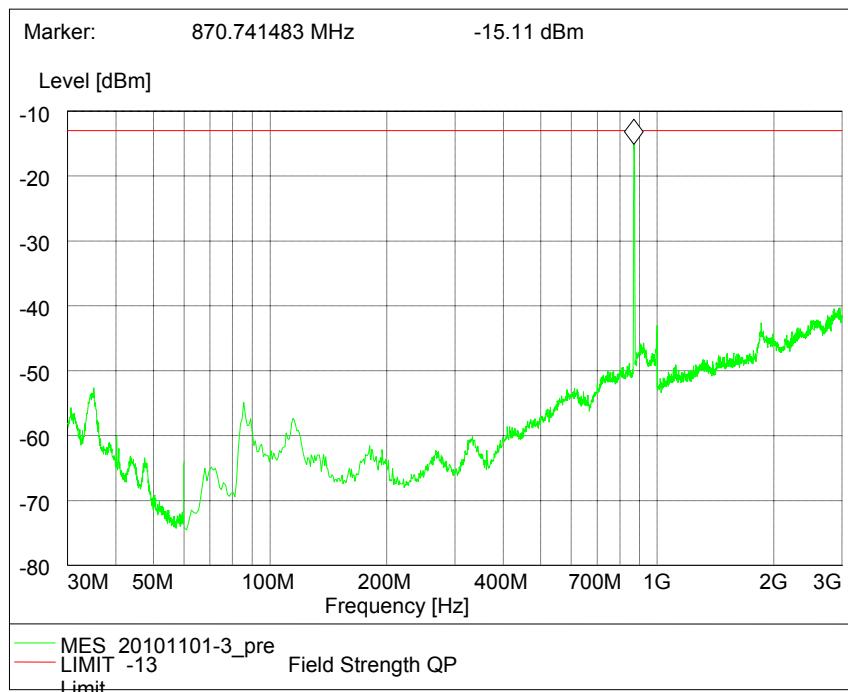
###### Configuration 1 - Mode 1

###### TM1 and TM6

No emissions were detected within 20dB of the limit.

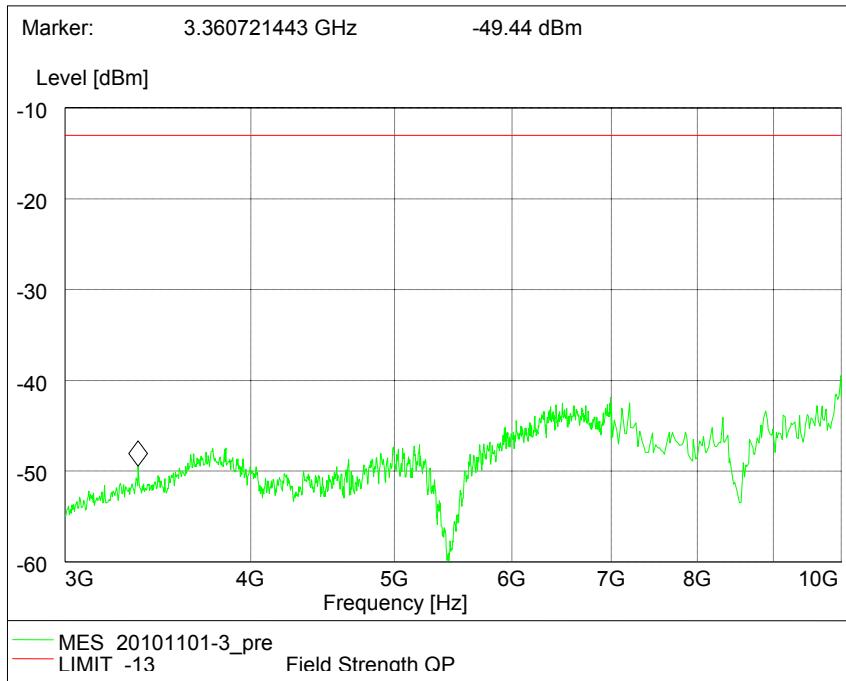
###### TM5

###### 30MHz to 3GHz





### 3GHz to 10GHz



### Configuration 1 – Mode 2

#### TM1, TM5 and TM6

No emissions were detected within 20dB of the limit.

#### Configuration 1 - Mode 3

#### TM1, TM5 and TM6

No emissions were detected within 20dB of the limit.

**Multi Carrier****Configuration 1 - Mode 4****TM1, TM5 and TM6**

No emissions were detected within 20dB of the limit.

**Configuration 1 - Mode 5****TM1, TM5 and TM6**

No emissions were detected within 20dB of the limit.

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

**Remarks**

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



## 2.5 CONDUCTED SPURIOUS EMISSIONS

### 2.5.1 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

### 2.5.2 Equipment Under Test

RU22 0860 / KRC 118 22/2, S/N: CC42097511

### 2.5.3 Date of Test and Modification State

25, 26 October and 19 November 2010 – 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 Part 2.1051, the spurious emissions from the antenna terminal were measured. The transmitter output power was attenuated using a combination of a filter and an attenuator and the frequency spectrum investigated from 9kHz to 10GHz. The EUT was set to transmit on maximum power. The EUT was tested on Bottom, Middle and Top channels for QPSK, 16QAM and 64QAM modulation types. The resolution was set to 1MHz for 9kHz to 10GHz 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 10<sup>th</sup> 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  
 - Mode 4  
 - Mode 5



### 2.5.6 Environmental Conditions

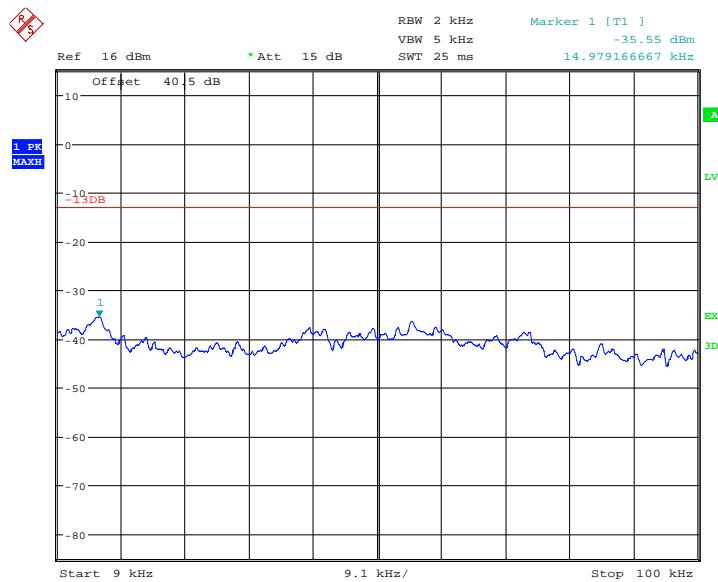
	25 October 2010	26 October 2010	19 November 2010
Ambient Temperature	23.7°C	22.2°C	20.3°C
Relative Humidity	32.2%	22.4%	23.8%

### 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 Radiated Spurious Emissions.

The test results are shown below

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: 25.OCT.2010 11:17:15

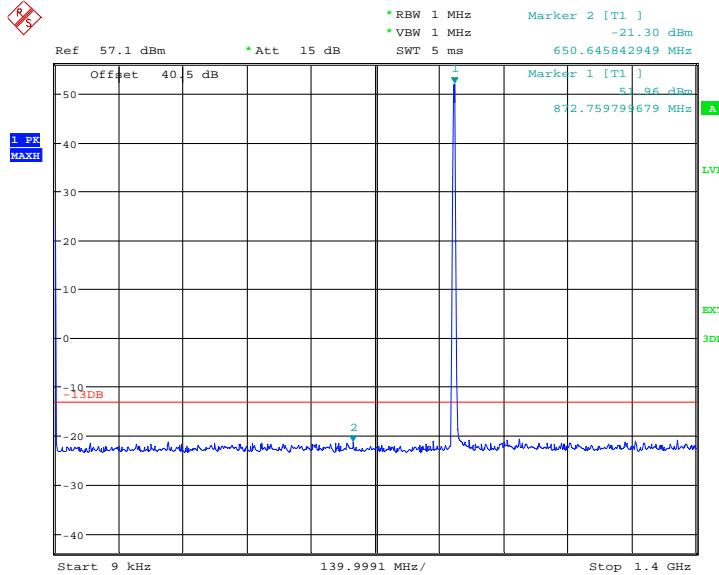


## Single Carrier

### Configuration 1 - Mode 1

#### TM1

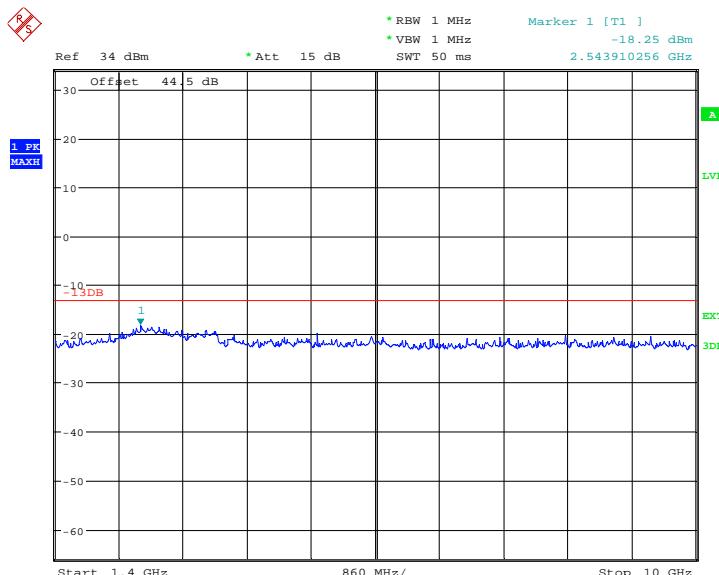
#### 9kHz to 1.4GHz



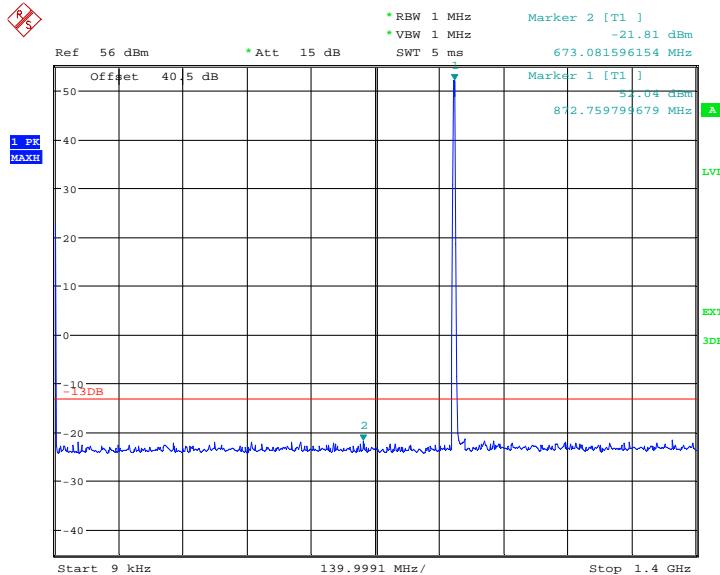
Date: 25.OCT.2010 11:16:33

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

#### 1.4GHz to 10GHz

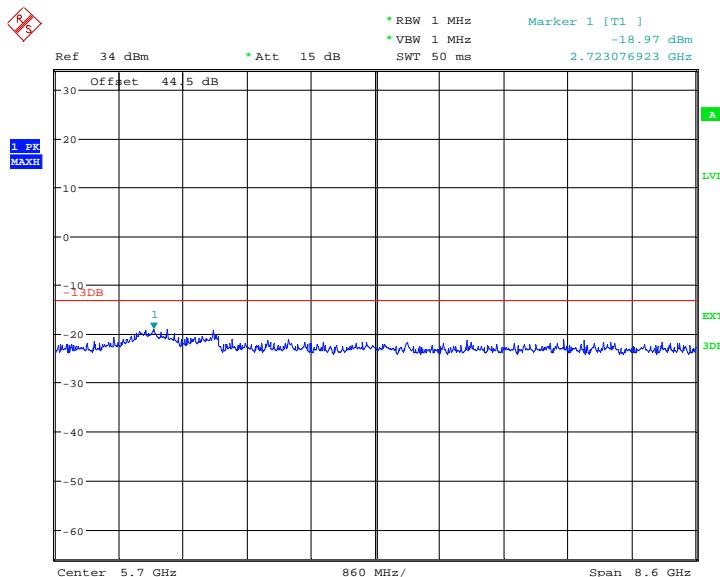


Date: 19.NOV.2010 02:52:22

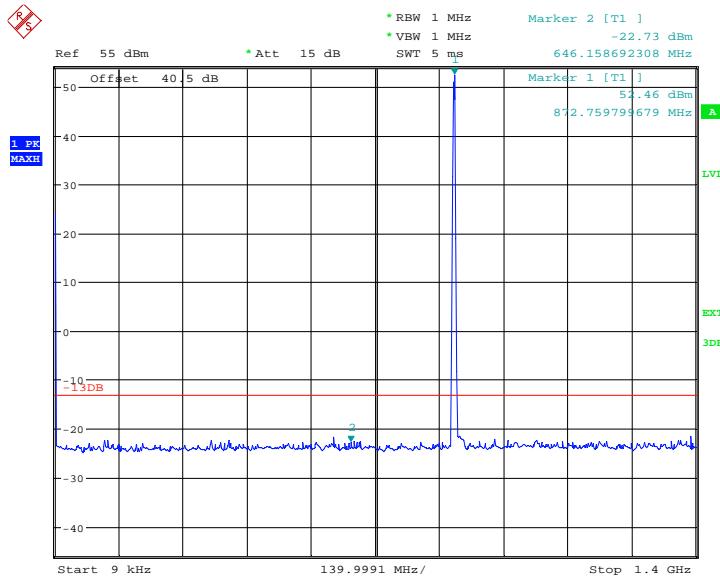
TM59kHz to 1.4GHz

Date: 25.OCT.2010 11:23:50

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

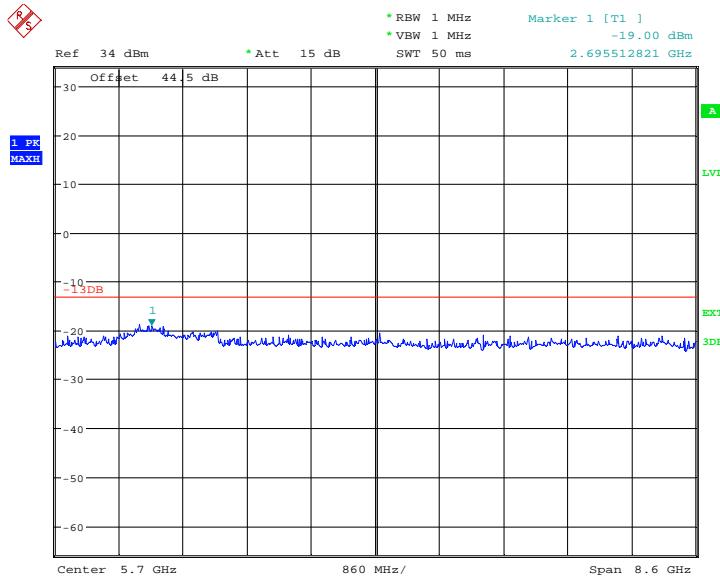
1.4GHz to 10GHz

Date: 19.NOV.2010 03:23:20

TM69kHz to 1.4GHz

Date: 26.OCT.2010 03:48:57

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

1.4GHz to 10GHz

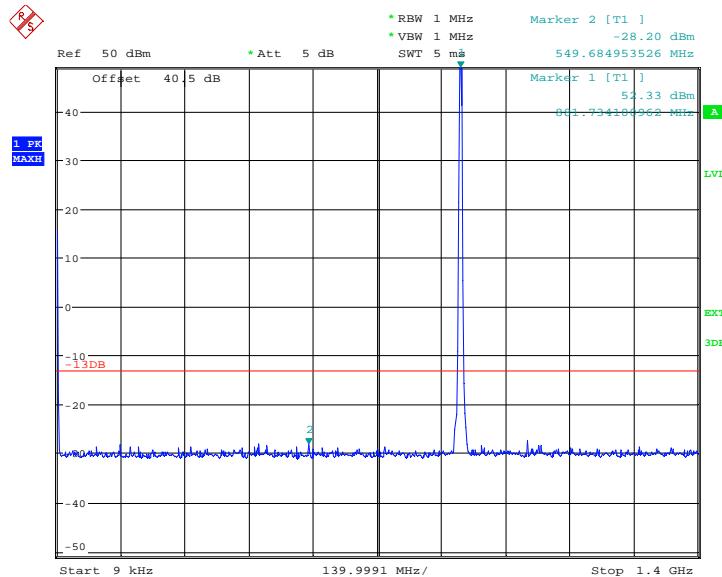
Date: 19.NOV.2010 03:28:09



### Configuration 1 - Mode 2

#### TM1

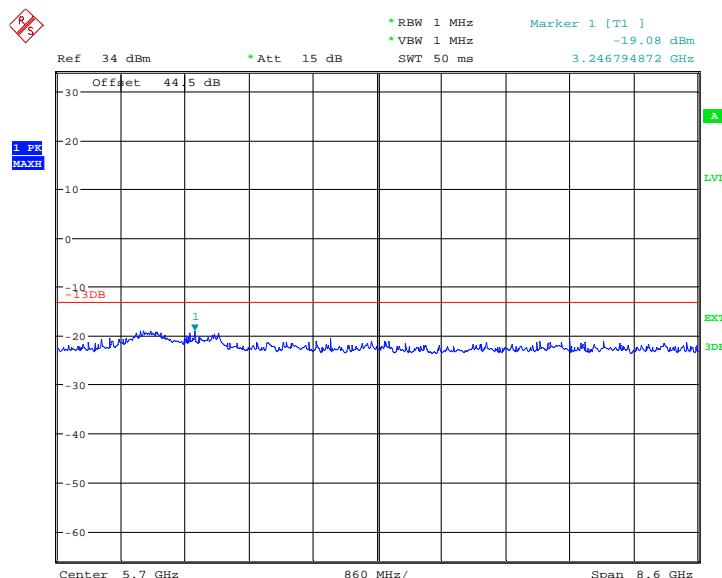
##### 9kHz to 1.4GHz



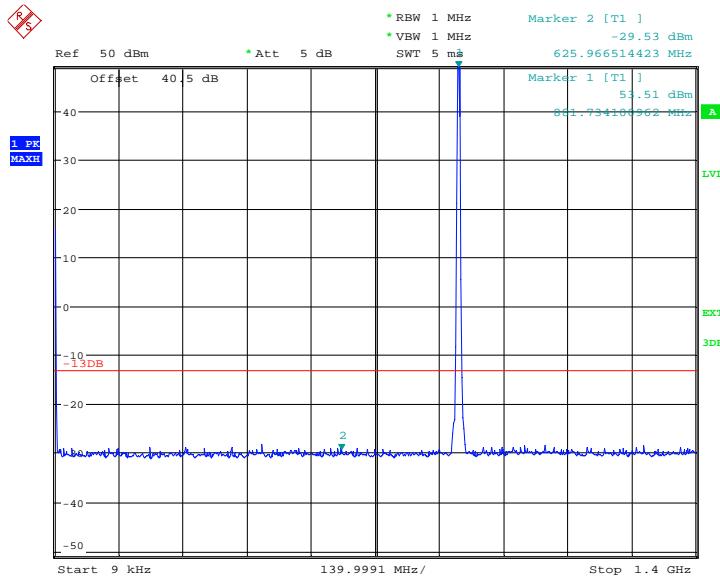
Date: 26.OCT.2010 04:36:52

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

##### 1.4GHz to 10GHz

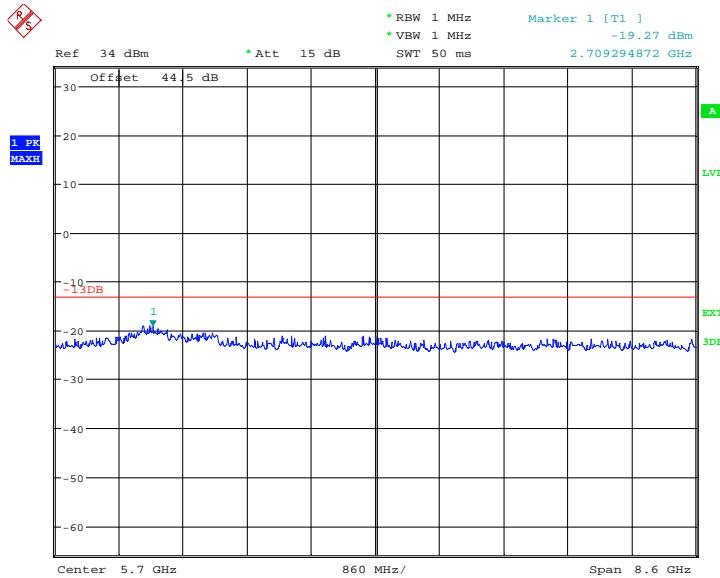


Date: 19.NOV.2010 03:03:08

TM59kHz to 1.4GHz

Date: 26.OCT.2010 04:27:58

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

1.4GHz to 10GHz

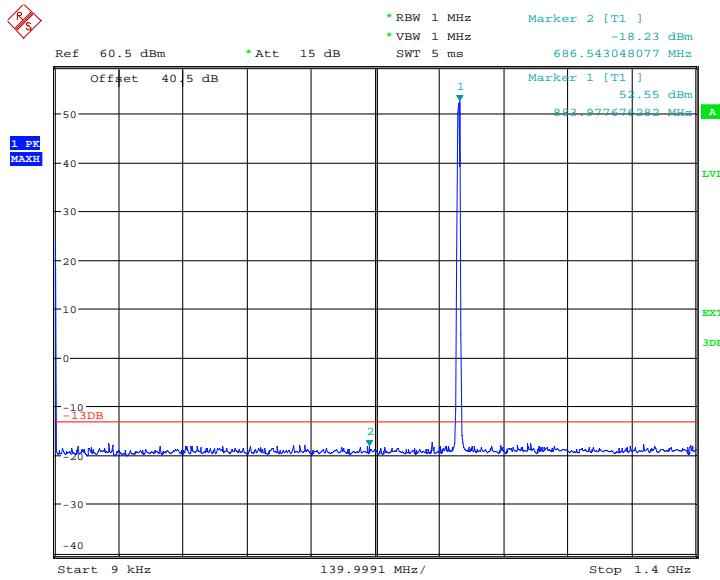
Date: 19.NOV.2010 03:18:40



## Product Service

TM6

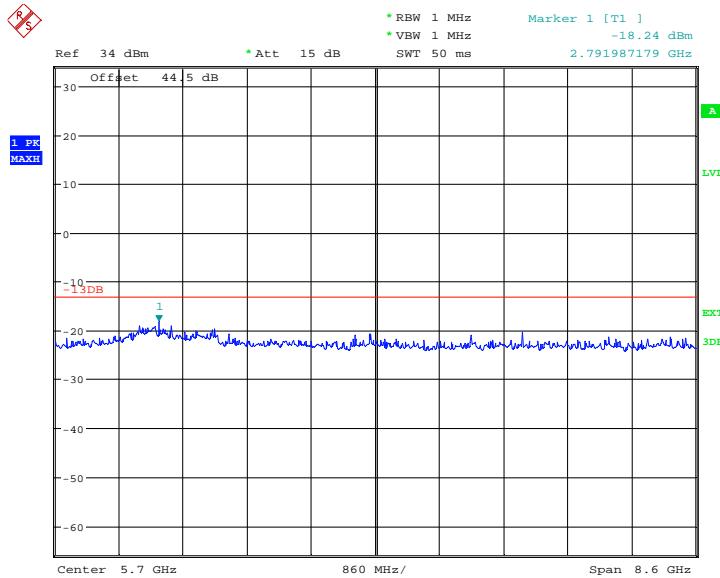
9kHz to 1.4GHz



Date: 26.OCT.2010 04:00:58

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

## 1.4GHz to 10GHz



Date: 19.NOV.2010 03:32:07

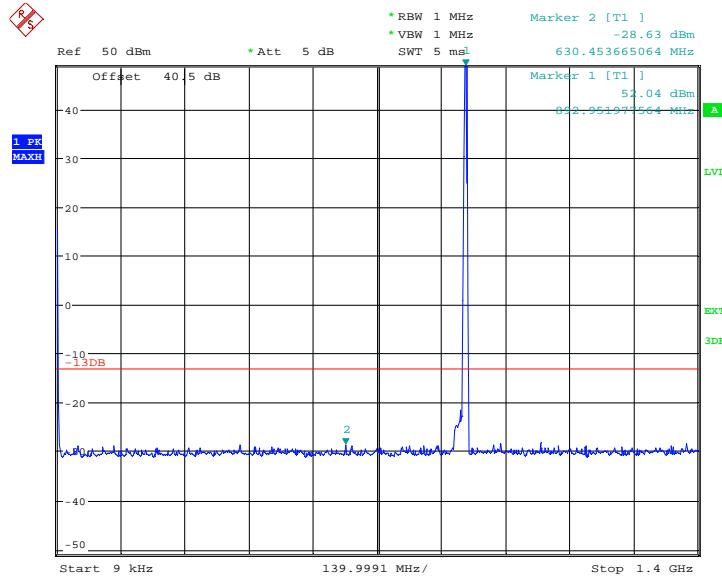


## Product Service

### Configuration 1 - Mode 3

TM1

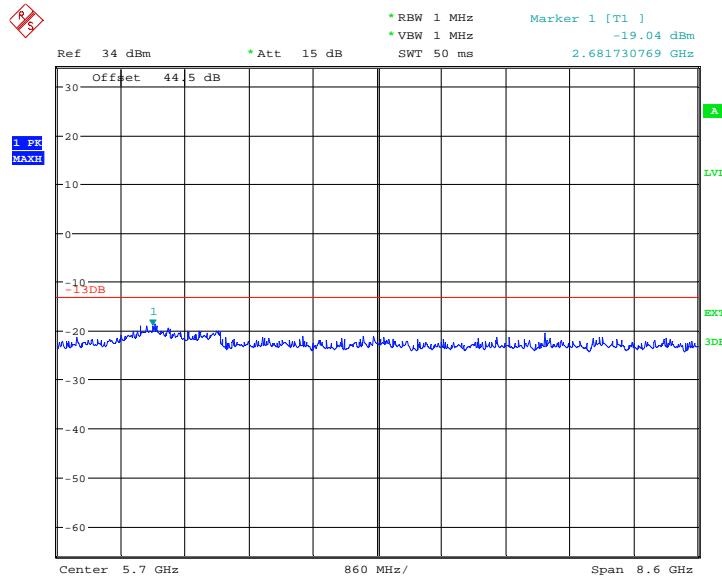
## 9kHz to 1.4GHz



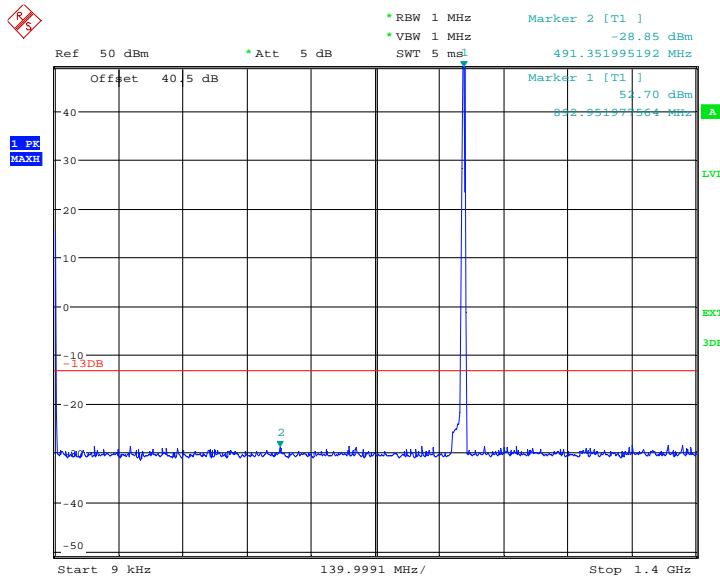
Date: 26.OCT.2010 05:00:06

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

## 1.4GHz to 10GHz

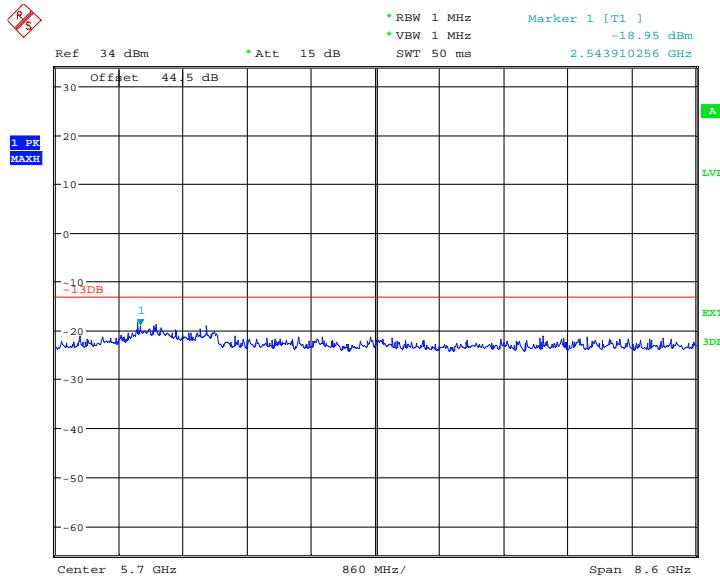


Date: 19.NOV.2010 03:07:54

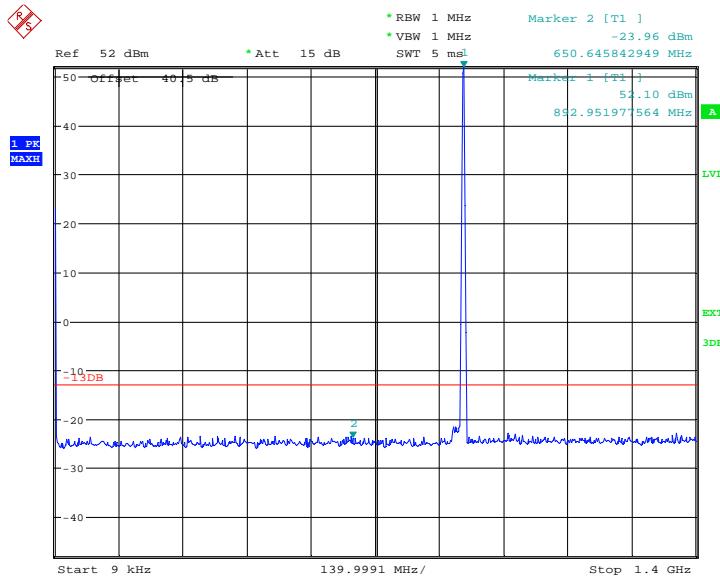
TM59kHz to 1.4GHz

Date: 26.OCT.2010 05:06:14

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

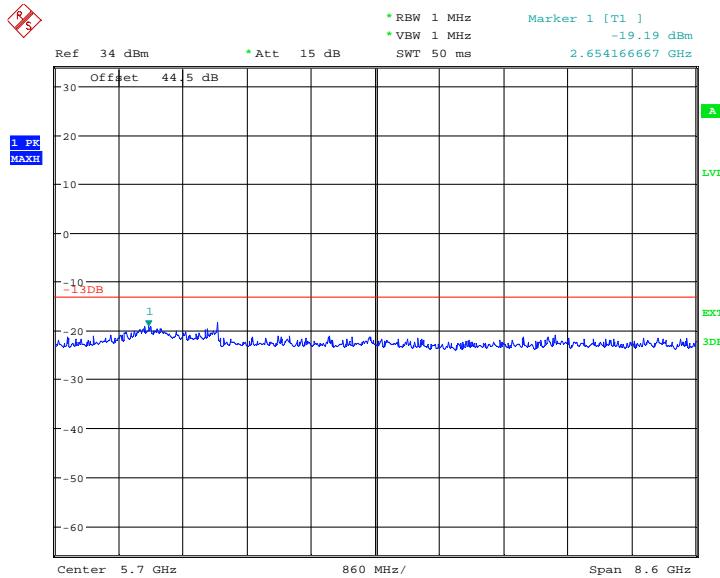
1.4GHz to 10GHz

Date: 19.NOV.2010 03:13:10

TM69kHz to 1.4GHz

Date: 26.OCT.2010 07:37:43

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

1.4GHz to 10GHz

Date: 19.NOV.2010 03:37:33

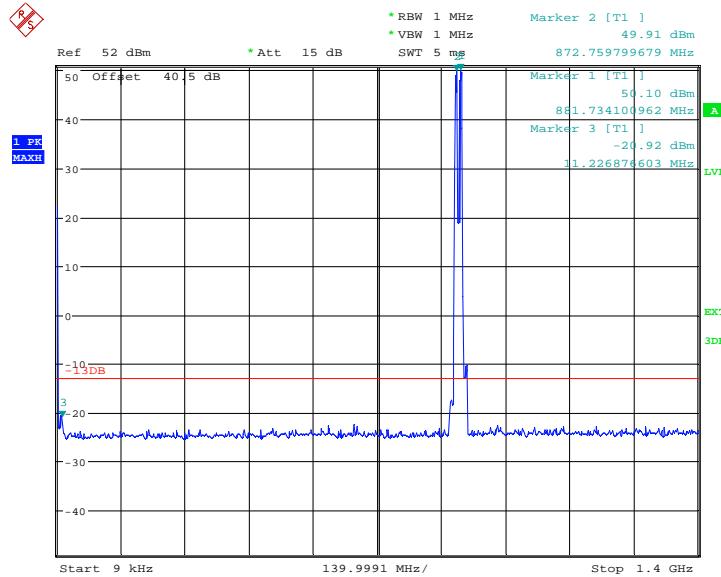


## Multi Carrier

### Configuration 1 - Mode 4

#### TM1

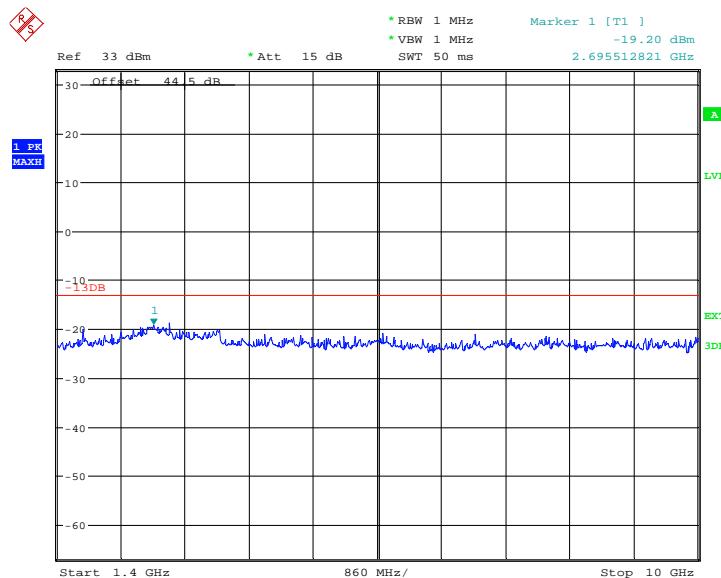
#### 9kHz to 1.4GHz



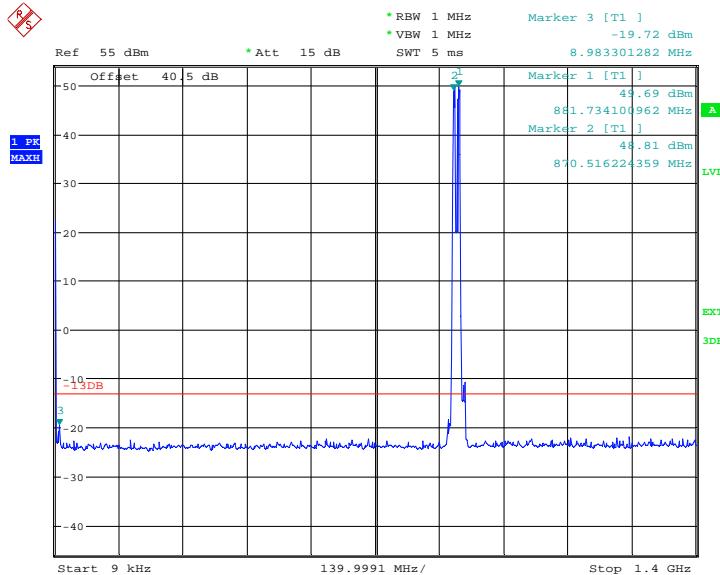
Date: 25.OCT.2010 05:00:04

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

#### 1.4GHz to 10GHz

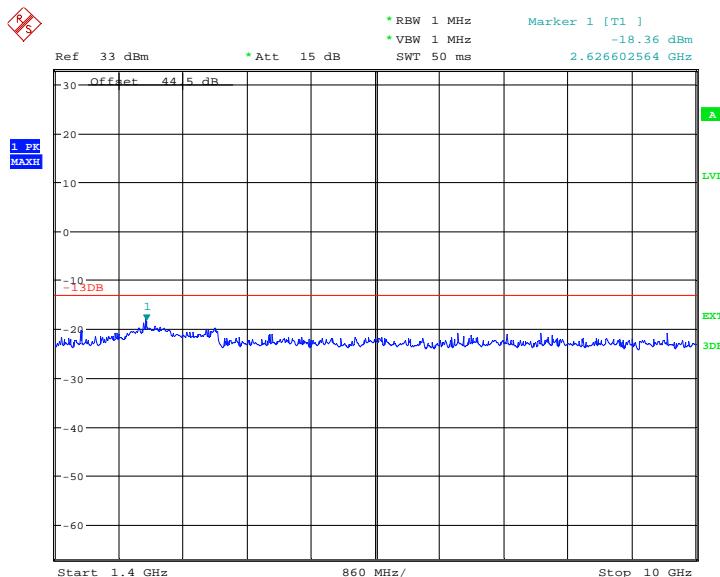


Date: 19.NOV.2010 10:29:49

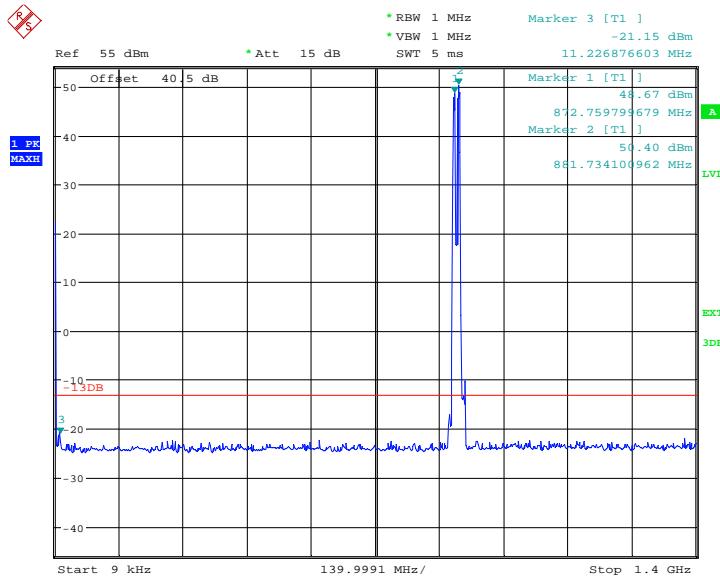
TM59kHz to 1.4GHz

Date: 25.OCT.2010 05:32:19

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

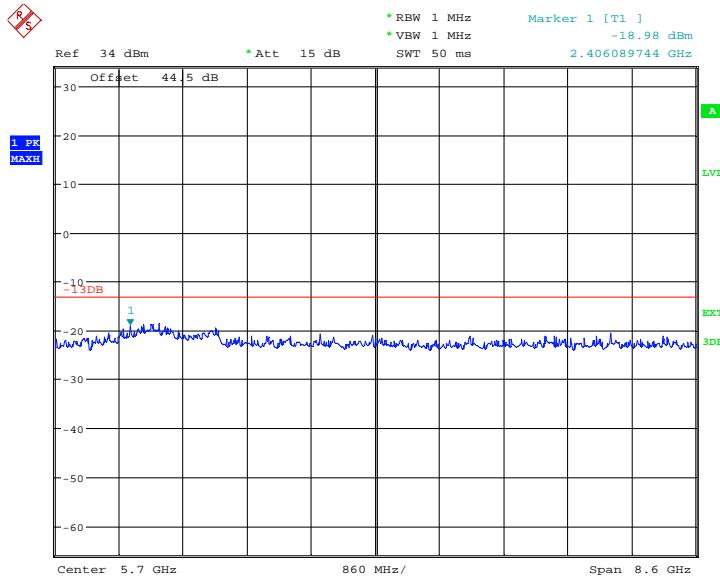
1.4GHz to 10GHz

Date: 19.NOV.2010 10:24:00

TM69kHz to 1.4GHz

Date: 25.OCT.2010 07:48:50

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

1.4GHz to 10GHz

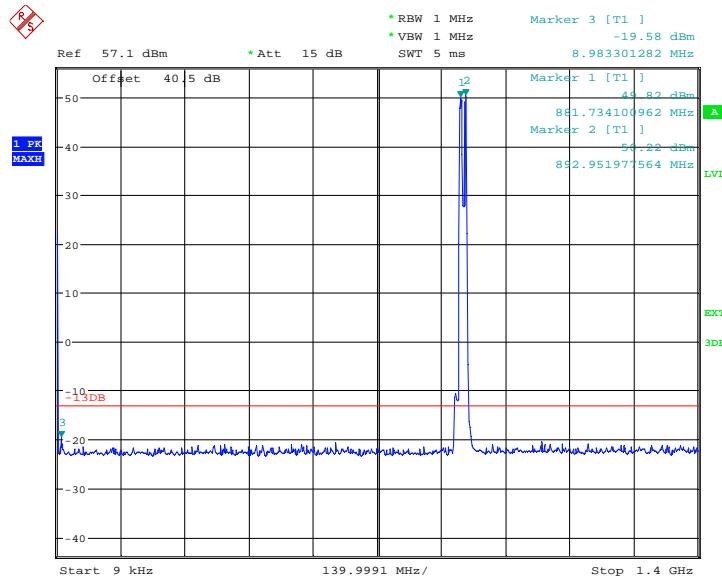
Date: 19.NOV.2010 03:55:03



### Configuration 1 - Mode 5

#### TM1

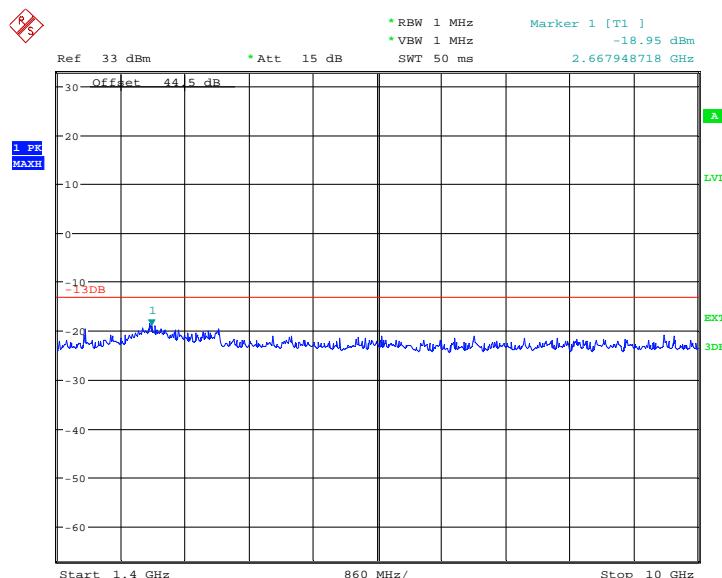
##### 9kHz to 1.4GHz



Date: 25.OCT.2010 09:45:07

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

##### 1.4GHz to 10GHz



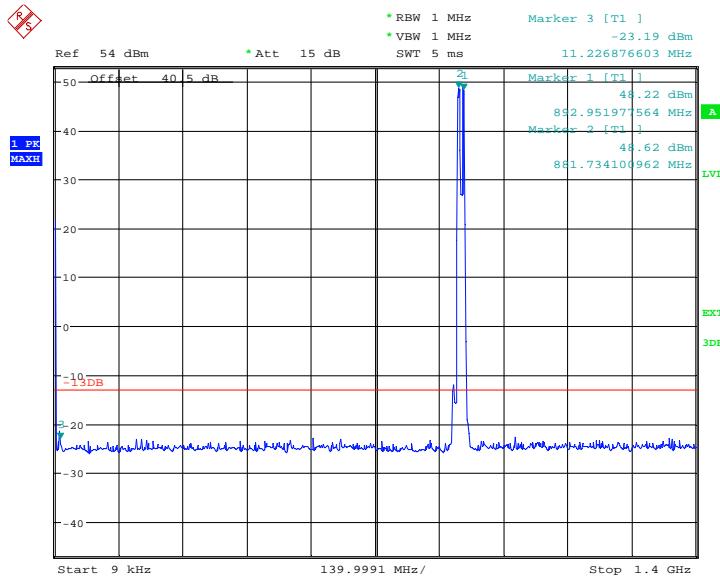
Date: 19.NOV.2010 10:36:15



## Product Service

TM5

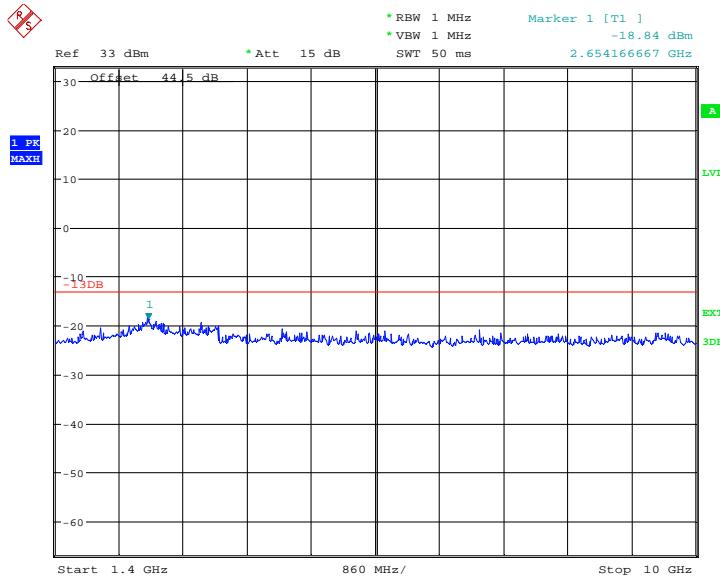
9kHz to 1.4GHz



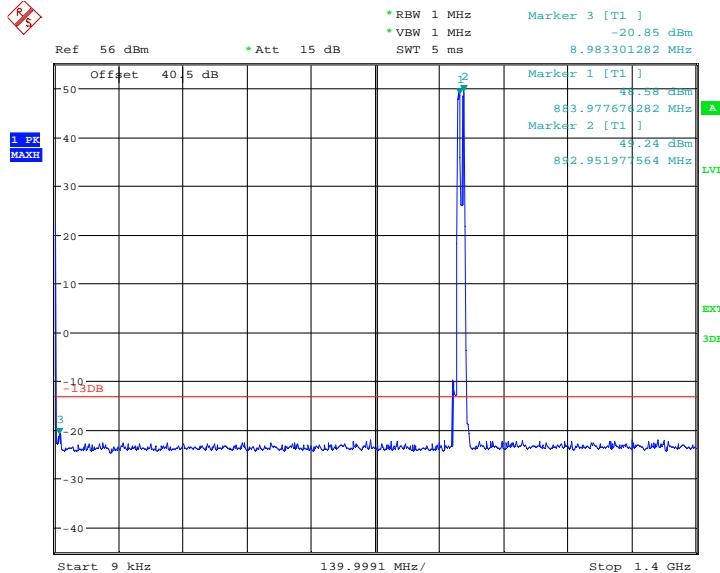
Date: 25.OCT.2010 10:08:38

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

## 1.4GHz to 10GHz

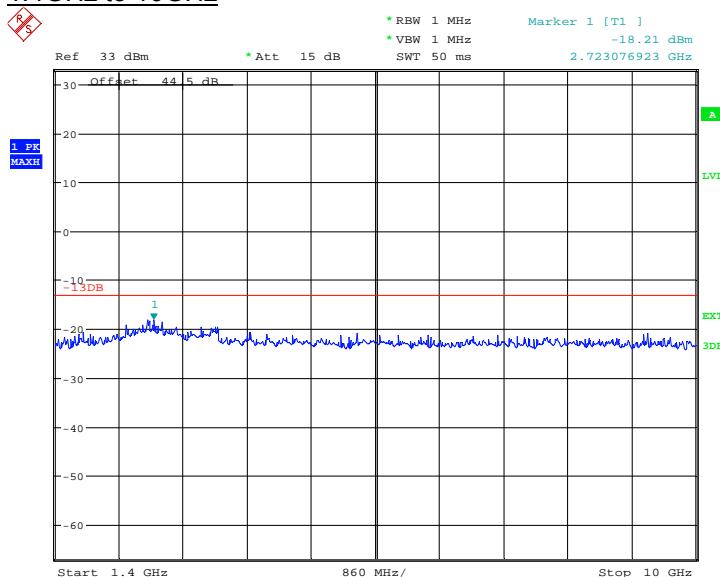


Date: 19.NOV.2010 10:42:47

TM69kHz to 1.4GHz

Date: 25.OCT.2010 08:20:56

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

1.4GHz to 10GHz

Date: 19.NOV.2010 10:49:43

Limit	-13dBm
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Remarks

The EUT does not exceed -13dBm at the frequency range of 9kHz to 10GHz.



## 2.6 RECEIVER SPURIOUS EMISSIONS

### 2.6.1 Specification Reference

FCC CFR 47 Part 15, Clause 15.111  
Industry Canada RSS 132, Clause 4.6

### 2.6.2 Equipment Under Test

RU22 0860 / KRC 118 22/2, S/N: CC42097511

### 2.6.3 Date of Test and Modification State

26 October 2010 – 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 15 and Industry Canada RSS 132.

In accordance with RSS-Gen Clause 6(b), the receiver spurious emissions from the antenna terminal were measured. Measurements were performed on the receiver antenna connector Ant B. The EUT was set to transmitter mode on the TX connector Ant A and during the measurement the Ant A was terminated with match load (50 Ohm).

The resolution was set to 100kHz in the frequency range 9kHz to 1GHz and 1MHz in the frequency range 1GHz to 5GHz thus meeting the requirements of RSS-Gen Clause 6(b), 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 -53dBm, 5 nanowatts above 1GHz.

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 5<sup>th</sup> harmonic of the fundamental.

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

Configuration 1 - Mode 1  
- Mode 2  
- Mode 3

### 2.6.6 Environmental Conditions

26 October 2010

Ambient Temperature 22.1°C

Relative Humidity 22.4%

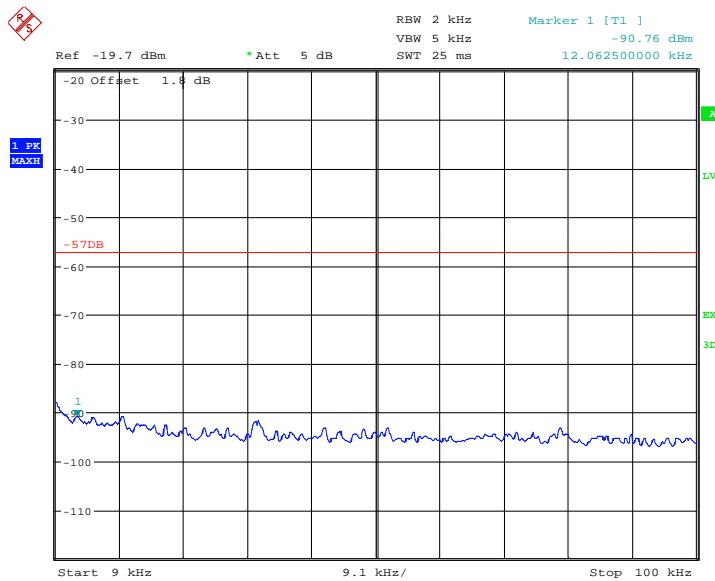


## 2.6.7 Test Results

For the period of test the EUT met the requirements of FCC CFR 47 Part 15 and Industry Canada RSS 132 for Receiver Spurious Emissions.

The test results are shown below

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: 26.OCT.2010 09:26:42

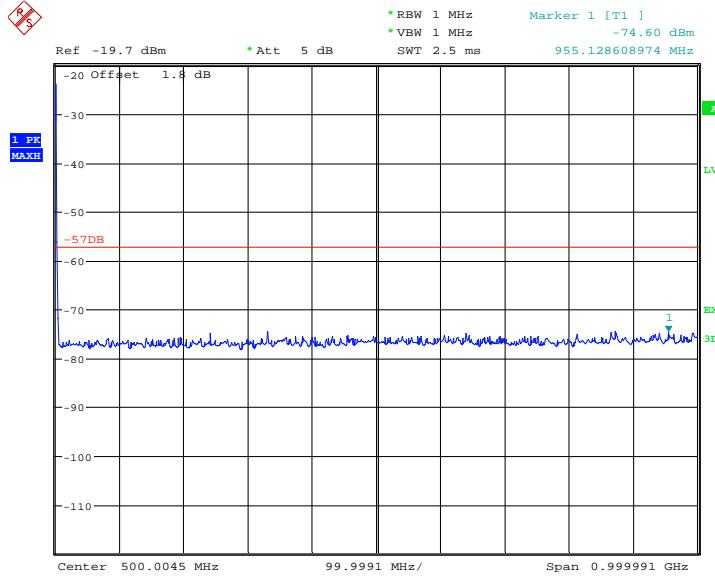


### Single Carrier

#### Configuration 1 - Mode 1

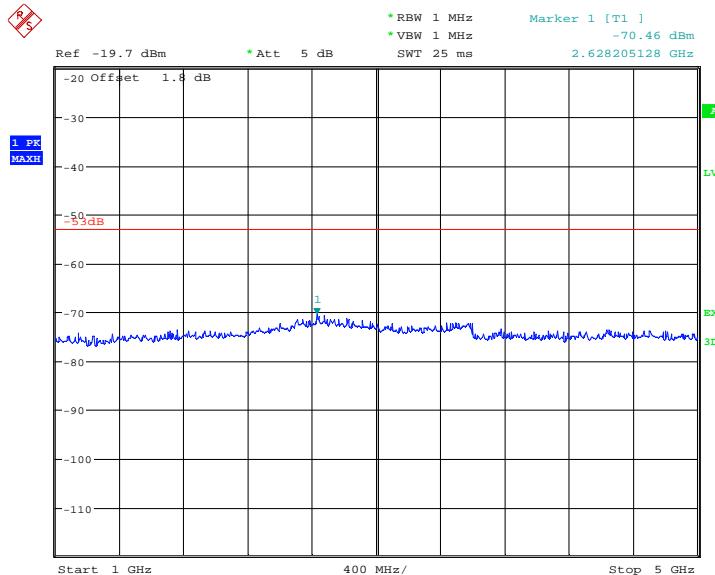
TM1

9kHz to 1GHz

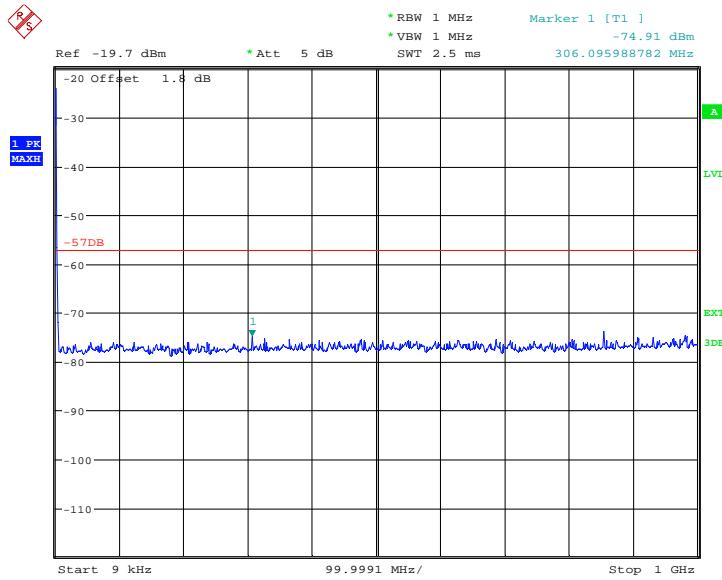


Date: 26.OCT.2010 08:45:28

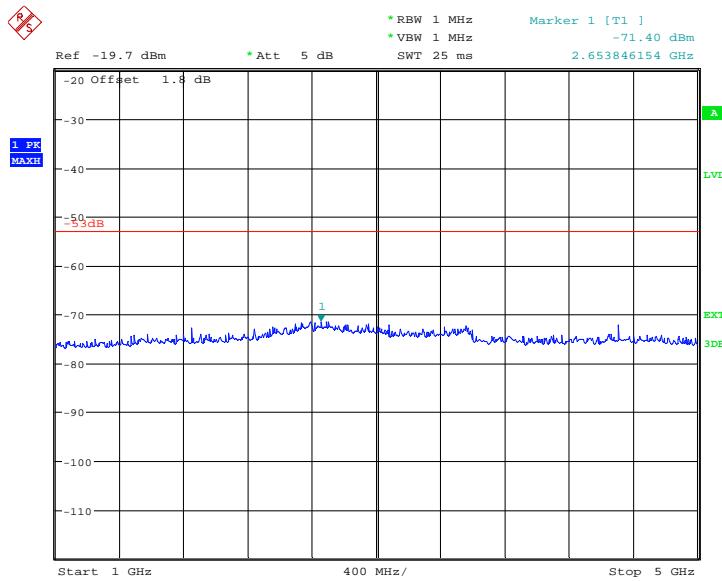
1GHz to 5GHz



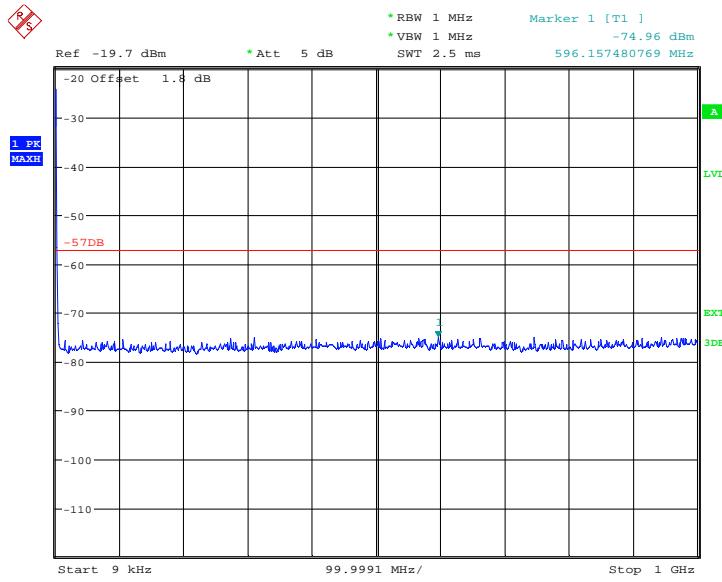
Date: 26.OCT.2010 08:47:29

TM59kHz to 1GHz

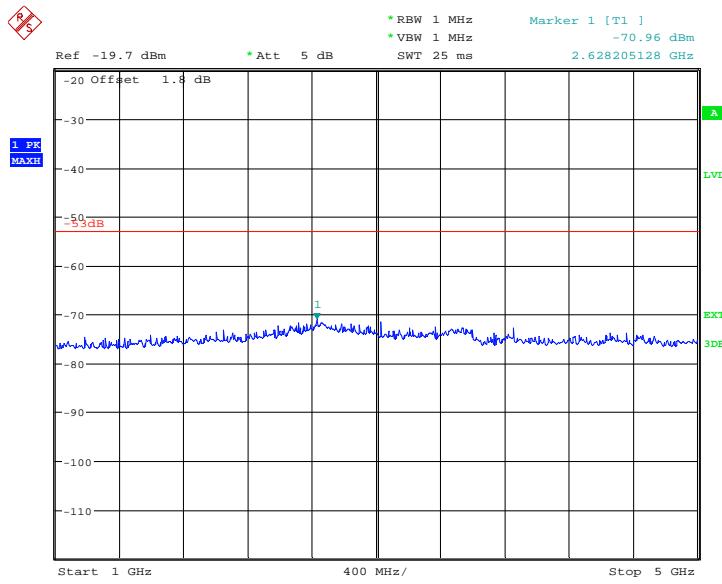
Date: 26.OCT.2010 08:54:46

1GHz to 5GHz

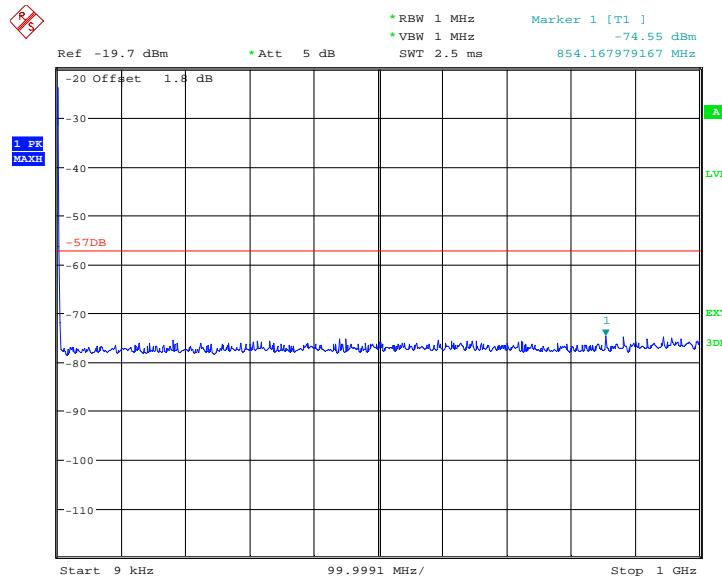
Date: 26.OCT.2010 08:53:33

TM69kHz to 1GHz

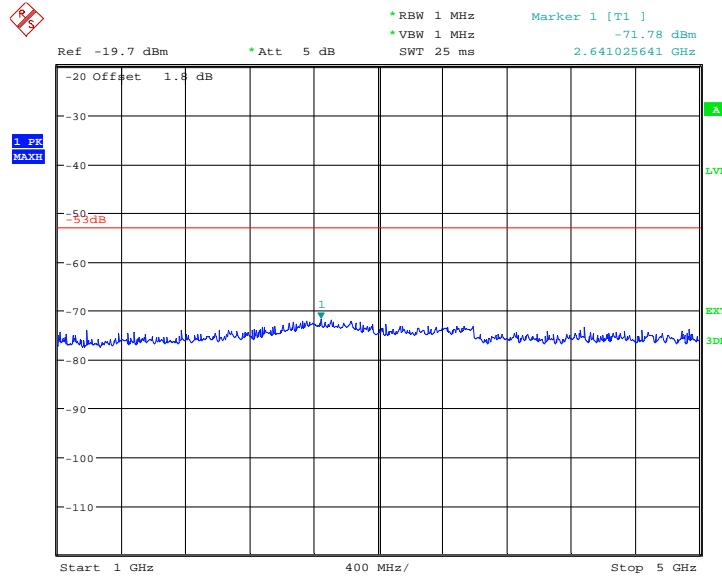
Date: 26.OCT.2010 08:59:41

1GHz to 5GHz

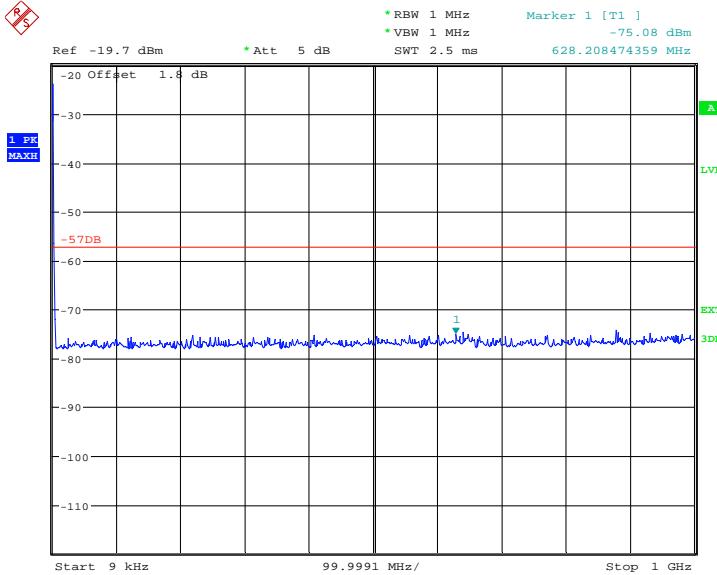
Date: 26.OCT.2010 09:02:37

Configuration 1 - Mode 2TM19kHz to 1GHz

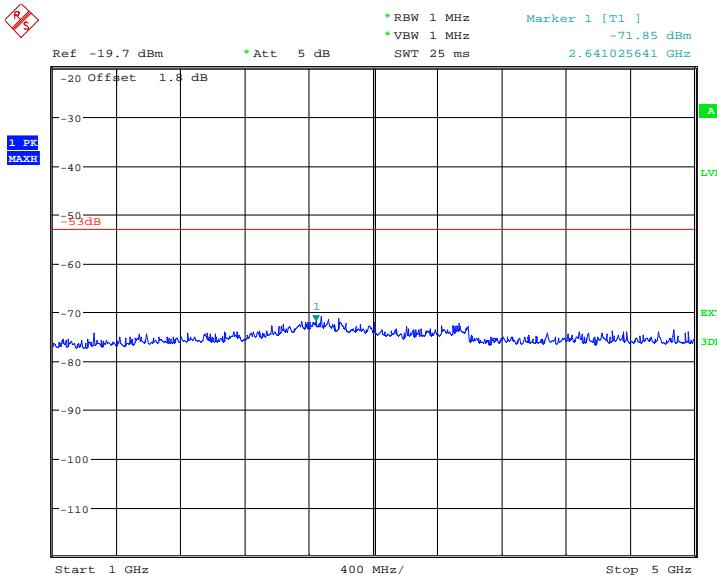
Date: 26.OCT.2010 09:26:11

1GHz to 5GHz

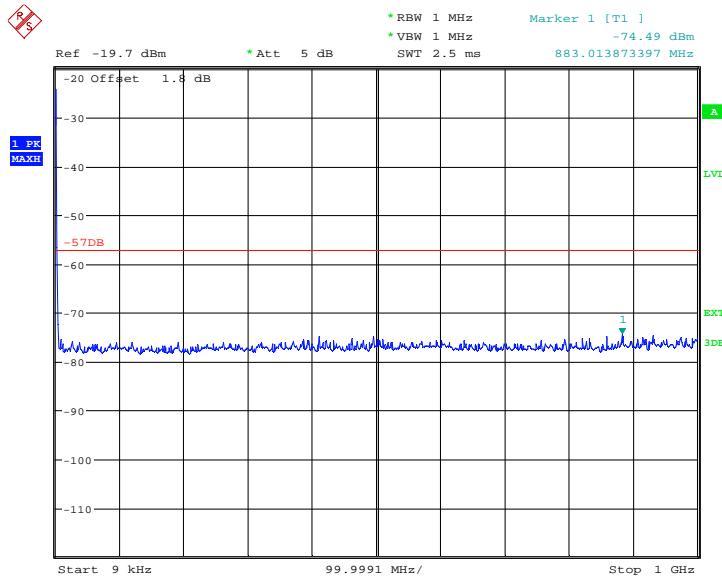
Date: 26.OCT.2010 09:25:38

TM59kHz to 1GHz

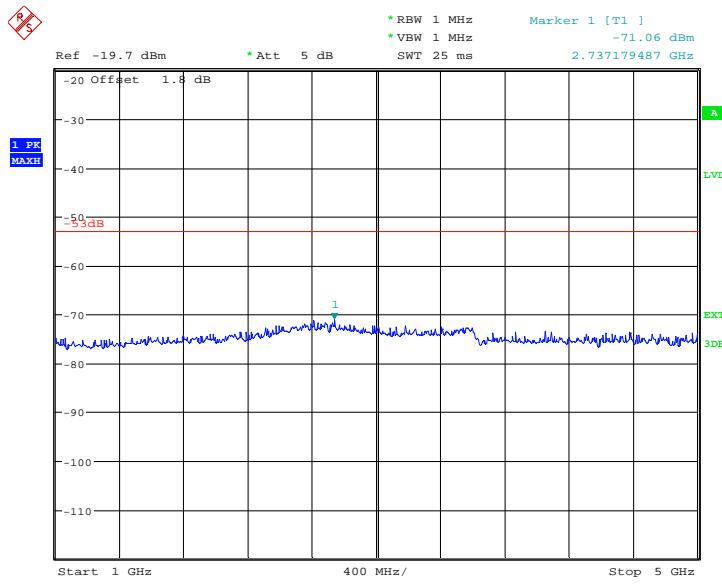
Date: 26.OCT.2010 09:19:25

1GHz to 5GHz

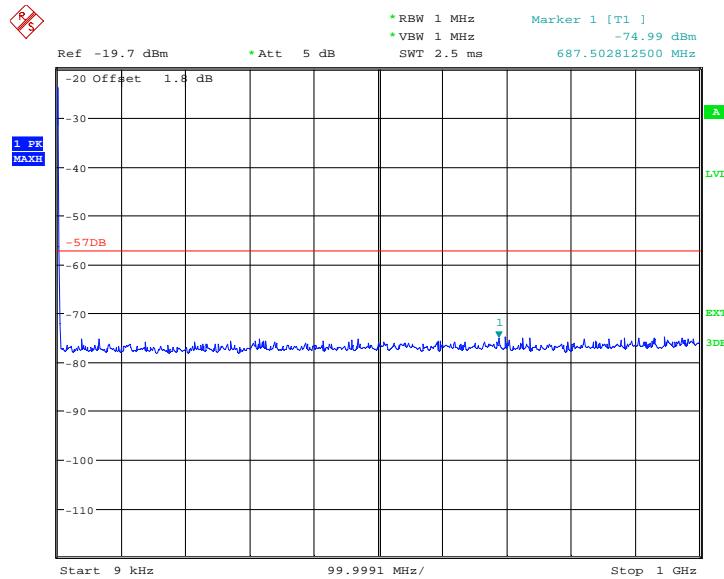
Date: 26.OCT.2010 09:20:14

TM69kHz to 1GHz

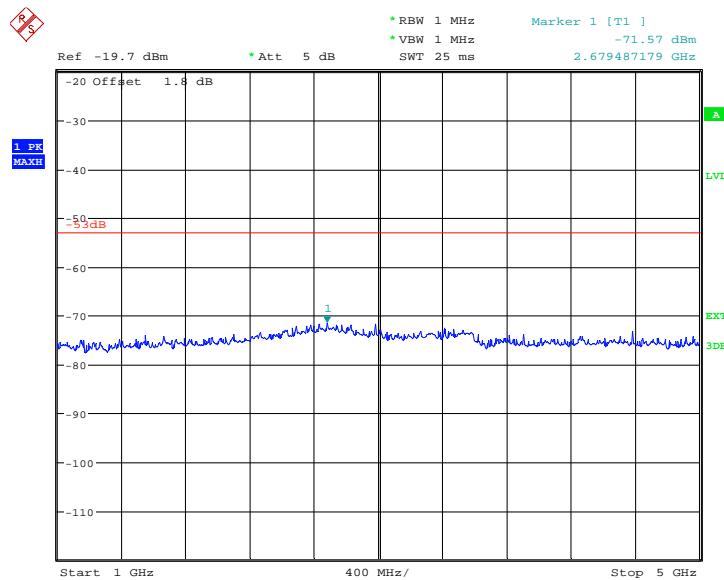
Date: 26.OCT.2010 09:09:34

1GHz to 5GHz

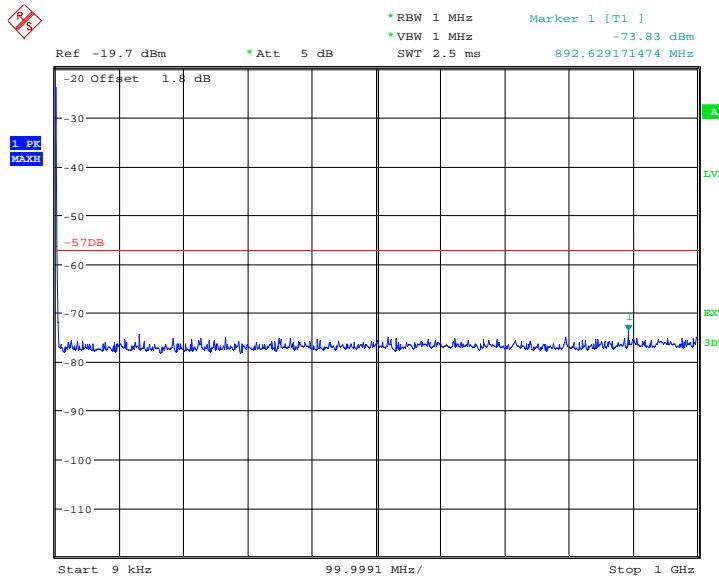
Date: 26.OCT.2010 09:08:21

Configuration 1 - Mode 3TM19kHz to 1GHz

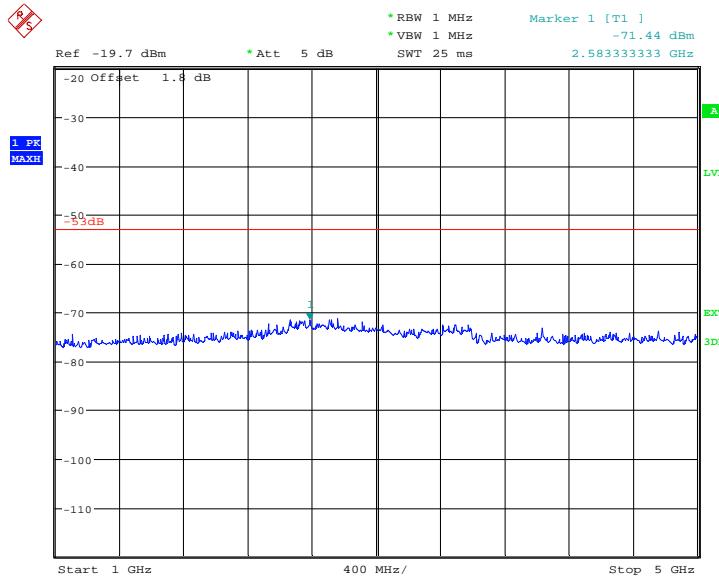
Date: 26.OCT.2010 09:31:20

1GHz to 5GHz

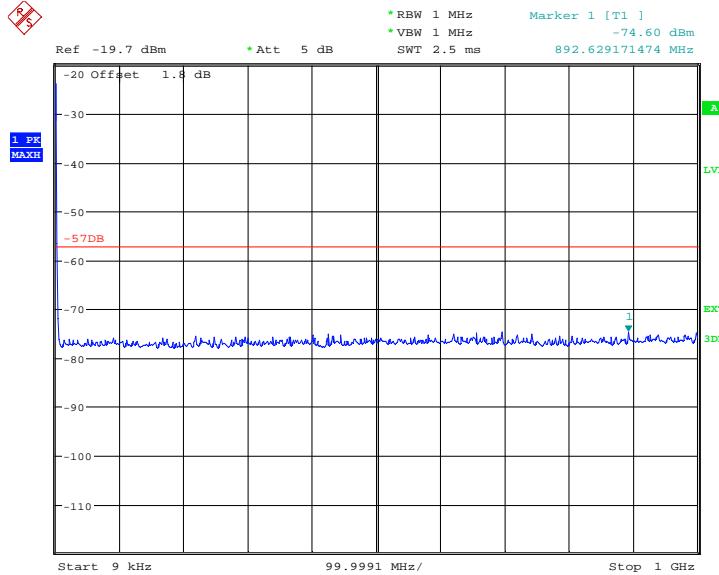
Date: 26.OCT.2010 09:31:59

TM59kHz to 1GHz

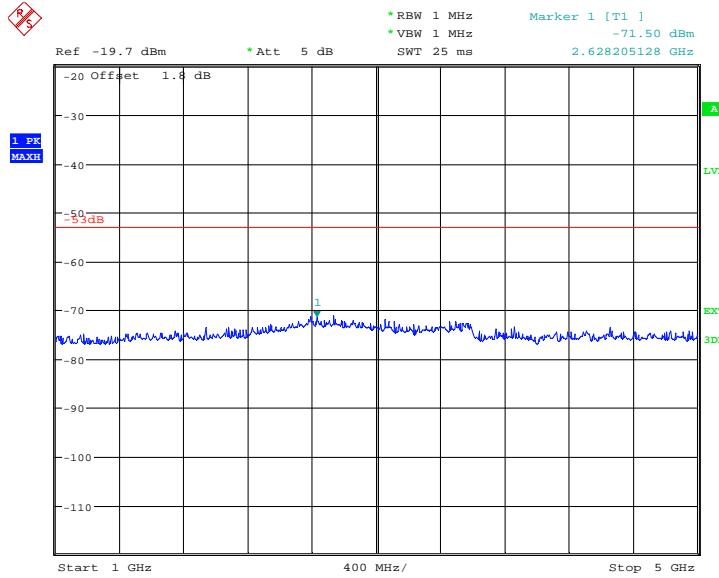
Date: 26.OCT.2010 09:38:11

1GHz to 5GHz

Date: 26.OCT.2010 09:36:30

TM69kHz to 1GHz

Date: 26.OCT.2010 09:44:59

1GHz to 5GHz

Date: 26.OCT.2010 09:46:29

Limit	-57dBm (30MHz-1GHz) and -53dBm (above 1GHz)
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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 5GHz.



Product Service

## **SECTION 3**

### **TEST EQUIPMENT USED**



### 3.1 TEST EQUIPMENT USED

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

Instrument	Manufacturer	Type No.	Serial No.	Calibration Due
<b>Section 2.1, 2.2, 2.3, 2.5 and 2.6 – Maximum Conducted Output Power, Occupied Bandwidth, Spurious Emissions at Antenna Terminals (<math>\pm 1\text{MHz}</math>), Conducted Spurious Emissions and Receiver Spurious Emissions.</b>				
Spectrum Analyser	Rohde & Schwarz	FSQ26	20-300542	25-Jul-2011
Power Meter	Rohde & Schwarz	NRP	17-294752	26-May-2011
Thermal Power Sensor	Rohde & Schwarz	NRP-Z51	20-295642	07-Jun-2011
Network Analyzer	Agilent	8720D	US38431317	24-Aug-2011
40dB Attenuator	SHX	DTS100G	08011720	O/P MON
Load	Shanghai Huaxiang	TF100	08011704	O/P MON
Load	Shanghai Huaxiang	TF100	08011705	O/P MON
Digital Multi-meter	FLUKE	179	91820401	03-Jan-2011
Thermo-hygrometer	AZ Instruments	8705	9151655	16-Dec-2010
<b>Section 2.4 – Radiated Spurious Emissions</b>				
EMI Receiver	Rohde & Schwarz	ESI 40	100015	19-Aug-2011
Ultra log test antenna	Rohde & Schwarz	HL562	100167	19-Aug-2011
Double-Ridged Waveguide Horn Antenna	Rohde & Schwarz	HF 906	100029	19-Aug-2011
Antenna master	Frankonia	MA 260	-	19-Aug-2011
Relay Switch Unit	Rohde & Schwarz	331.1601.31	338965002	TU
Full Anechoic Chamber	Frankonia	12.65m×8.03m×7.50m	-	19-Aug-2011
Digital Multimeter	FLUKE	179	91820401	03-Jan-2011
Thermo-hygrometer	AZ Instruments	8705	9151655	16-Dec-2010

TU – Traceability Unscheduled

O/P MON - Output monitored with calibration equipment



### 3.2 MEASUREMENT UNCERTAINTY

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

Test Discipline	Frequency / Parameter	MU
Conducted Maximum Peak Output Power	30MHz to 10GHz Amplitude	0.5dB*
Conducted Emissions	30MHz to 40GHz Amplitude	3.0dB*
Frequency Stability	30MHz to 2GHz Amplitude	$<1 \times 10^{-7}$
Radiated Emissions, Bilog Antenna, AOATS	30MHz to 1GHz Amplitude	5.1dB*
Radiated Emissions, Horn Antenna, AOATS	1GHz to 40GHz Amplitude	6.3dB*
Worst case error for both Time and Frequency measurement 12 parts in $10^6$		

\* In accordance with CISPR 16-4



Product Service

## **SECTION 4**

### **ACCREDITATION, DISCLAIMERS AND COPYRIGHT**



Product Service

#### 4.1 ACCREDITATION, DISCLAIMERS AND COPYRIGHT



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

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

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

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