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Report On

FCC and Industry Canada Testing of the
Ericsson AB RUS 01 B5 / KRC 118 64/2

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FCC ID: TA8AKRC11864-2

IC ID: 287AB-AS118642

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July 2013





Product Service

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Ericsson RUS 01 B5 / KRC 118 64/2

Document 75923085 Report 01 Issue 1

July 2013

PREPARED FOR

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DATED

03 July 2013

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);

G Zhao

X Zhang





CONTENTS

Section	Page No
1	REPORT SUMMARY 2
1.1	Introduction 4
1.2	Brief Summary of Results 5
1.3	Declaration of Build Status 9
1.4	Product Information 10
1.5	Test Conditions 17
1.6	Deviations From the Standard 17
1.7	Modification Record 17
1.8	Alternative Test Site 17
2	TEST DETAILS 18
2.1	Maximum Peak Output Power - Conducted 19
2.2	Peak – Average Ratio 23
2.3	Spurious Emissions at Antenna Terminals (± 1 MHz) 38
2.4	Radiated Spurious Emissions 44
2.5	Conducted Spurious Emissions 49
2.6	Receiver Spurious Emissions 60
3	TEST EQUIPMENT USED 65
3.1	Test Equipment Used 66
3.2	Measurement Uncertainty 67
4	ACCREDITATION, DISCLAIMERS AND COPYRIGHT 68
4.1	Accreditation, Disclaimers and Copyright 69

SECTION 1

REPORT SUMMARY



Product Service

FCC and Industry Canada Testing of the
Ericsson RUS 01 B5 / KRC 118 64/2



1.1 INTRODUCTION

The information contained in this report is intended to show verification of the Ericsson RUS 01 B5 / KRC 118 64/2 to the requirements of FCC CFR 47 Part 22 and Industry Canada RSS-132.

Testing was carried out in support of a C2PC application for Grant of RUS 01 B5 / KRC 118 64/2 to add MIMO support in WCDMA mode.

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	RUS 01 B5
Product Number	KRC 118 64/2
IC Model Number	AS118642
Serial Number(s)	C824937848 C824937852
WCDMA Software	CXP9021719 Rev R1CB18
PIS Software	CXP9013268/6 Rev R49DT
Hardware Version	R2A
Number of Samples Tested	2
Test Specification/Issue/Date	FCC CFR 47 Part 22: 2012 Industry Canada RSS-132 Issue 3: 2013
Incoming Release Date	Declaration of Build Status 21 June 2013
Order Number Date	PTP 30 May 2013
Start of Test	21 June 2013
Finish of Test	26 June 2013
Name of Engineer(s)	G Zhao X Zhang
Related Document(s)	ANSI C63.4: 2009 FCC CFR 47 Part 2: 2012 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, 15 and 22	RSS-132 and RSS-GEN					
	22.913 (a)	5.4	Effective Radiated Power	871.4MHz		N/A	No integral antenna.
				881.4MHz		N/A	
				891.6 MHz		N/A	
				871.4 MHz + 886.4 MHz		N/A	
				873.8 MHz + 888.8 MHz		N/A	
				876.6 MHz + 891.6 MHz		N/A	
				871.4 MHz + 876.4 MHz + 881.4 MHz + 886.4 MHz		N/A	
				873.8 MHz + 878.8 MHz + 883.8 MHz + 888.8 MHz		N/A	
876.6 MHz + 881.6 MHz + 886.6 MHz + 891.6 MHz		N/A					
2.1	2.1046, 22.913 (a)	5.4	Maximum Peak Output Power - Conducted	871.4MHz	0	Pass	-
				881.4MHz	0	Pass	
				891.6 MHz	0	Pass	
				871.4 MHz + 886.4 MHz	0	Pass	
				873.8 MHz + 888.8 MHz	0	Pass	
				876.6 MHz + 891.6 MHz	0	Pass	
				871.4 MHz + 876.4 MHz + 881.4 MHz + 886.4 MHz	0	Pass	
				873.8 MHz + 878.8 MHz + 883.8 MHz + 888.8 MHz	0	Pass	
876.6 MHz + 881.6 MHz + 886.6 MHz + 891.6 MHz	0	Pass					
2.2	22.913 (a)	5.4	Peak – Average Ratio	871.4MHz	0	Pass	-
				881.4MHz	0	Pass	
				891.6 MHz	0	Pass	
				871.4 MHz + 886.4 MHz	0	Pass	
				873.8 MHz + 888.8 MHz	0	Pass	
				876.6 MHz + 891.6 MHz	0	Pass	
				871.4 MHz + 876.4 MHz + 881.4 MHz + 886.4 MHz	0	Pass	
				873.8 MHz + 878.8 MHz + 883.8 MHz + 888.8 MHz	0	Pass	
876.6 MHz + 881.6 MHz + 886.6 MHz + 891.6 MHz	0	Pass					



Configuration 1 – Radio Equipment							
Section	Spec Clause		Test Description	Mode	Mod State	Result	Comments
	FCC Part 2, 15 and 22	RSS-132 and RSS-GEN					
	2.1047 (d)	5.2	Modulation Characteristics	871.4MHz		N/A	-
				881.4MHz		N/A	
				891.6 MHz		N/A	
				871.4 MHz + 886.4 MHz		N/A	
				873.8 MHz + 888.8 MHz		N/A	
				876.6 MHz + 891.6 MHz		N/A	
				871.4 MHz + 876.4 MHz + 881.4 MHz + 886.4 MHz		N/A	
				873.8 MHz + 878.8 MHz + 883.8 MHz + 888.8 MHz		N/A	
	2.1049, 22.917 (b)	RSS-Gen 4.6.1	Occupied Bandwidth	871.4MHz		N/A	-
				881.4MHz		N/A	
				891.6 MHz		N/A	
				871.4 MHz + 886.4 MHz		N/A	
				873.8 MHz + 888.8 MHz		N/A	
				876.6 MHz + 891.6 MHz		N/A	
				871.4 MHz + 876.4 MHz + 881.4 MHz + 886.4 MHz		N/A	
				873.8 MHz + 878.8 MHz + 883.8 MHz + 888.8 MHz		N/A	
2.3	2.1051, 22.917 (b)	5.5	Spurious Emissions at Antenna Terminals (±1MHz)	871.4MHz	0	Pass	-
				881.4MHz		N/A	
				891.6 MHz	0	Pass	
				871.4 MHz + 876.4 MHz	0	Pass	
				873.8 MHz + 888.8 MHz		N/A	
				886.6 MHz + 891.6 MHz	0	Pass	
				871.4 MHz + 876.4 MHz + 881.4 MHz + 886.4 MHz		N/A	
				873.8 MHz + 878.8 MHz + 883.8 MHz + 888.8 MHz		N/A	
876.6 MHz + 881.6 MHz + 886.6 MHz + 891.6 MHz		N/A					



Configuration 1 – Radio Equipment							
Section	Spec Clause		Test Description	Mode	Mod State	Result	Comments
	FCC Part 2, 15 and 22	RSS-132 and RSS-GEN					
2.4	2.1053, 22.917 (a)	5.5	Radiated Spurious Emissions	871.4MHz	0	Pass	-
				881.4MHz	0	Pass	
				891.6 MHz	0	Pass	
				871.4 MHz + 886.4 MHz		N/A	
				873.8 MHz + 888.8 MHz	0	Pass	
				876.6 MHz + 891.6 MHz		N/A	
				871.4 MHz + 876.4 MHz + 881.4 MHz + 886.4 MHz		N/A	
				873.8 MHz + 878.8 MHz + 883.8 MHz + 888.8 MHz	0	Pass	
876.6 MHz + 881.6 MHz + 886.6 MHz + 891.6 MHz		N/A					
2.5	2.1051, 22.917 (a)	5.5	Conducted Spurious Emissions	871.4MHz	0	Pass	-
				881.4MHz	0	Pass	
				891.6 MHz	0	Pass	
				871.4 MHz + 886.4 MHz	0	Pass	
				873.8 MHz + 888.8 MHz	0	Pass	
				876.6 MHz + 891.6 MHz	0	Pass	
				871.4 MHz + 876.4 MHz + 881.4 MHz + 886.4 MHz		N/A	
				873.8 MHz + 878.8 MHz + 883.8 MHz + 888.8 MHz		N/A	
876.6 MHz + 881.6 MHz + 886.6 MHz + 891.6 MHz		N/A					
	2.1055, 22.355	5.3	Frequency Stability Under Temperature Variations	871.4MHz		N/A	-
				881.4MHz		N/A	
				891.6 MHz		N/A	
				871.4 MHz + 886.4 MHz		N/A	
				873.8 MHz + 888.8 MHz		N/A	
				876.6 MHz + 891.6 MHz		N/A	
				871.4 MHz + 876.4 MHz + 881.4 MHz + 886.4 MHz		N/A	
				873.8 MHz + 878.8 MHz + 883.8 MHz + 888.8 MHz		N/A	
876.6 MHz + 881.6 MHz + 886.6 MHz + 891.6 MHz		N/A					



Configuration 1 – Radio Equipment							
Section	Spec Clause		Test Description	Mode	Mod State	Result	Comments
	FCC Part 2, 15 and 22	RSS-132 and RSS-GEN					
	2.1055, 22.355	5.3	Frequency Stability Under Voltage Variations	871.4MHz		N/A	-
				881.4MHz		N/A	
				891.6 MHz		N/A	
				871.4 MHz + 886.4 MHz		N/A	
				873.8 MHz + 888.8 MHz		N/A	
				876.6 MHz + 891.6 MHz		N/A	
				871.4 MHz + 876.4 MHz + 881.4 MHz + 886.4 MHz		N/A	
				873.8 MHz + 878.8 MHz + 883.8 MHz + 888.8 MHz		N/A	
2.6	15.111	-	Receiver Spurious Emissions	871.4MHz		N/A	-
				881.4MHz	0	Pass	
				891.6 MHz		N/A	
				871.4 MHz + 886.4 MHz		N/A	
				873.8 MHz + 888.8 MHz	0	Pass	
				876.6 MHz + 891.6 MHz		N/A	
				871.4 MHz + 876.4 MHz + 881.4 MHz + 886.4 MHz		N/A	
				873.8 MHz + 878.8 MHz + 883.8 MHz + 888.8 MHz		N/A	
876.6 MHz + 881.6 MHz + 886.6 MHz + 891.6 MHz		N/A					

N/A – Not Applicable



1.3 DECLARATION OF BUILD STATUS

MAIN EUT	
MANUFACTURING DESCRIPTION	Radio Equipment
MANUFACTURER	Ericsson AB
PRODUCT NUMBER	RUS 01 B5
PART NUMBER	KRC 118 64/2
IC Model NUMBER	AS118642
SERIAL NUMBER	C824937848 C824937852
HARDWARE VERSION	R2A
WCDMA Software	CXP9021719 Rev R1CB18
PIS Software	CXP9013268/6 Rev R49DT
TRANSMITTER OPERATING RANGE	TX: 869MHz - 894MHz RX: 824MHz - 849MHz
MODULATIONS	QPSK, 16QAM, 64QAM
NUMBER OF CARRIERS	Maximum 4 carriers
ITU DESIGNATION OF EMISSION	5M00F9W
OUTPUT POWER (RMS) (W or dBm)	Single Carrier: 1 x 47.8dBm per port (1 x 60W per port) Multi Carrier(x 2): 2 x 44.8dBm per port (2 x 30W per port) Multi Carrier(x 4): 4 x 41.8dBm per port (4 x 15W per port)
OUTPUT POWER TOLERANCE	± 2.0dB
INSTANTANEOUS BANDWIDTH	20MHz
CHANNEL BANDWIDTH	4.2 MHz to 5MHz (configurable in steps of 100/200kHz)
NUMBER OF ANTENNA PORTS	Non-MIMO: 1 TX/RX port and 1 RX port MIMO 2x 2: 2 TX/RX ports and 2 RX ports are supported by combining two Radio Units.
FCC ID	TA8AKRC11864-2
IC ID	287AB-AS118642
TECHNICAL DESCRIPTION (a brief description of the intended use and operation)	The equipment is the Radio Part of WCDMA Base Station.

Signature

Date

27 July 2013

D of B S Serial No

75923085/01

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) RUS 01 B5 / KRC 118 64/2 is an Ericsson Radio Equipment working in the public mobile service 850MHz band which provides communication connections to WCDMA850 network. The RUS 01 B5 / KRC 118 64/2 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 RUS 01 B5 / KRC 118 64/2 supports Test Model TM1, TM5 and TM6 defined in 3GPP TS 25.141 at 850MHz. Test Model 1 (TM1) uses the QPSK modulation, Test Model 5 (TM5) includes the 16QAM modulation and Test Model 6 (TM6) includes 64QAM modulation.

By combining two EUTs together, the EUTs were configured to transmit in 850MHz MIMO mode with two TX/RX ports (RF A1, RF A2) and two RX ports (RF B1, RF B2). MIMO mode was used for measurements as the worst configuration.

The Maximum Output Power was tested on both TX/RX output connector RF A1 and RF A2, all other measurements were performed on the combined TX/RX output connector RF A1 of the EUTs. RX testing was performed on the RX connector RF B1 of the EUT. The complete testing was performed with the EUT transmitting at maximum RF power unless otherwise stated.

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

Single Carrier:

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

Multi Carrier (x2):

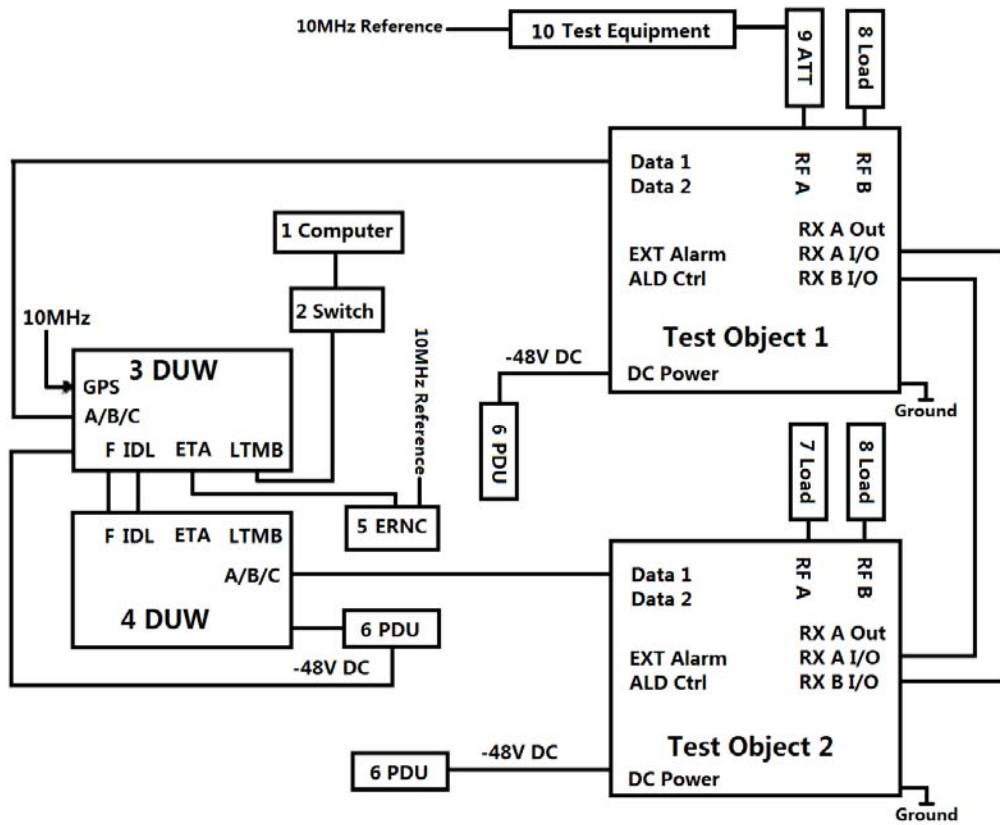
Test Model 1 (TM1): 32 DPCHs at 30 ksps (SF=128)

Channel Bandwidth: 5MHz

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



Test Setup, Conducted Measurement:



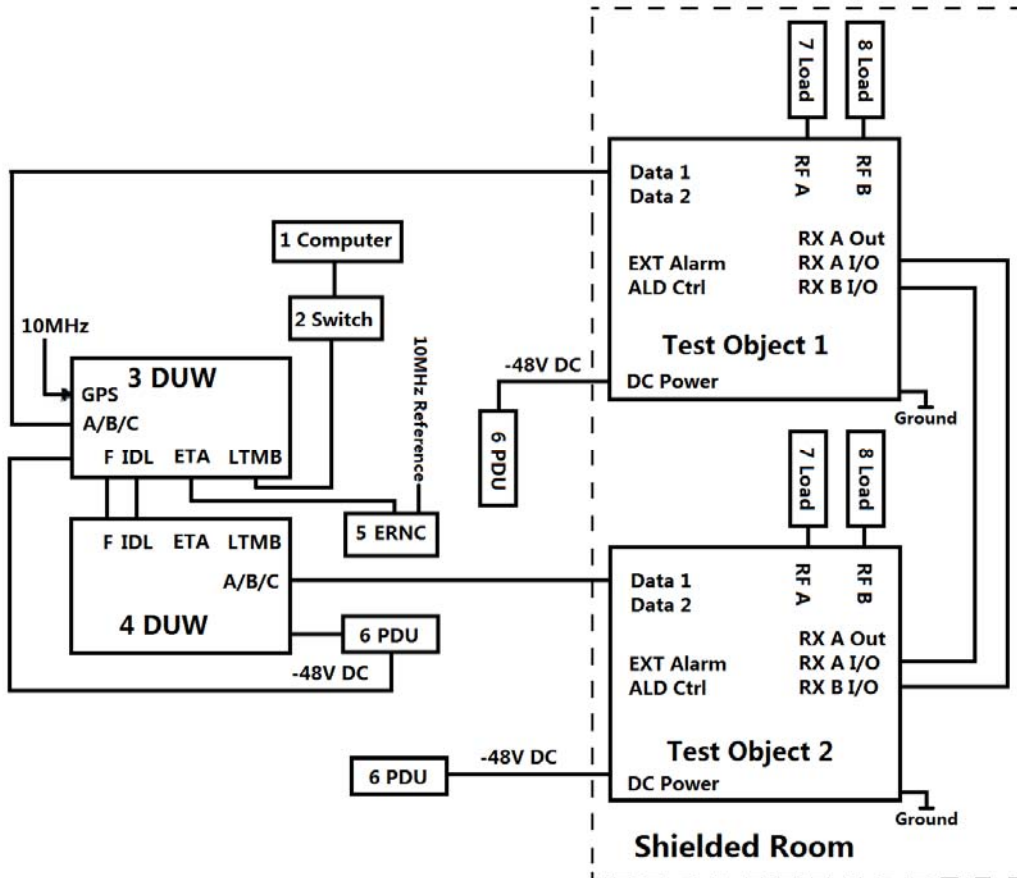


Product Name	Product Number	Version	Serial Number
RUS 01 B5	KRC 118 64/2	R2A	C824937848
RUS 01 B5	KRC 118 64/2	R2A	C824937852

No.	Auxiliary Equipment	Part Number / Model Type	Version	Serial Number
1	Work Station	Sun A70-XHZB1-9AG-2GDT	--	0826TFC1V9
2	Switch	TL-HP8MU	--	05300902892
3	RBS 6601	BFL 901 009/1	--	--
	DUW 30 01	KDU 127 161/3	R4F	TU8X960893
	SUP 6601	1/BFL 901 009/1	R3B	BR80908065
4	RBS 6601	BFL 901 009/1	--	--
	DUW 30 01	KDU 127 161/3	R4F	TU8X960894
	SUP 6601	1/BFL 901 009/1	R3B	BR80993658
5	ERNC SIM	FAB 102 614	--	ETC/L167
	Power Supply	DH1716-5D	--	2008040041
6	Power Supply	DH1716-5D	--	2008040050
	Power Supply	DH1716-5D	--	20030062
7	Load	TF100	--	09121648
	Load	TFE5-3	--	090323194
8	Load	TFE5-3	--	090323220
	30dB Attenuator	DTS100	--	04081801
9	10dB Attenuator	48-10-43	--	BB8290
	Power Meter	Rohde & Schwarz NRP	--	102625
10	Power Sensor	Rohde & Schwarz NRP-Z51	--	102433
	Spectrum Analyzer	FSQ26	--	200235



Test Setup, Radiated Measurement:





Product Name	Product Number	Version	Serial Number
RUS 01 B5	KRC 118 64/2	R2A	C824937848
RUS 01 B5	KRC 118 64/2	R2A	C824937852

No.	Auxiliary Equipment	Part Number / Model Type	Version	Serial Number
1	Work Station	Sun A70-XHZB1-9AG-2GDT	--	0826TFC1V9
2	Switch	TL-HP8MU	--	05300902892
3	RBS 6601	BFL 901 009/1	--	--
	DUW 30 01	KDU 127 161/3	R4F	TU8X960893
	SUP 6601	1/BFL 901 009/1	R3B	BR80908065
4	RBS 6601	BFL 901 009/1	--	--
	DUW 30 01	KDU 127 161/3	R4F	TU8X960894
	SUP 6601	1/BFL 901 009/1	R3B	BR80993658
5	ERNC SIM	FAB 102 614	--	ETC/L167
6	Power Supply	DH1716-5D	--	2008040041
	Power Supply	DH1716-5D	--	2008040050
	Power Supply	DH1716-5D	--	20030062
7	Load	TF100	--	09121648
	Load	TF100	--	09121605
8	Load	TFE5-3	--	090323194
	Load	TFE5-3	--	090323220



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 + 4432: 871.4MHz + 886.4MHz (B and B+15MHz)

Mode 5 - ARFCN 4369 + 4444: 873.8MHz + 888.8MHz (M-7.6MHz and M+7.4MHz)

Mode 6 - ARFCN 4383 + 4458: 876.6MHz + 891.6MHz (T-15MHz and T)

Mode 7 - ARFCN 4357 + 4382: 871.4MHz + 876.4MHz (B and B+5MHz)

Mode 8 - ARFCN 4433 + 4458: 886.6MHz + 891.6MHz (T-5MHz and T)

Mode 9 - ARFCN 4357 + 4382 + 4407 + 4432:
871.4MHz + 876.4MHz + 881.4MHz + 886.4MHz (B, B+5MHz, B+10MHz and B+15MHz)

Mode 10 - ARFCN 4369 + 4394 + 4419 + 4444:
873.8MHz + 878.8MHz + 883.8MHz + 888.8MHz (M-12.6MHz, M-7.6MHz, M+7.4MHz and M+12.4MHz)

Mode 11 - ARFCN 4383 + 4408 + 4433 + 4458:
876.6MHz + 881.6MHz + 886.6MHz + 891.6MHz (T-15MHz, T-10MHz, T-5MHz and T)

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



Product Service

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

Only Radiated Spurious Emissions 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-1:

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 RUS 01 B5 / KRC 118 64/2



Product Service

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 5.4

2.1.2 Equipment Under Test

RUS 01 B5 / KRC 118 64/2, S/N: C824937848 / C824937852

2.1.3 Date of Test and Modification State

21 and 24 June 2013 – 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 EUTs was measured at the antenna terminal.

Since the EUTs working in MIMO mode, the EUTs transmit two antennas simultaneously in the same frequency range, using the Measure-and-Sum approach, the output power at both TX antennas RF A1 and RF A2 were tested, and the total output power were then summed mathematically in linear power units.

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 9
 - Mode 10
 - Mode 11

2.1.6 Environmental Conditions

	21 June 2013	24 June 2013
Ambient Temperature	24.0°C	22.2°C
Relative Humidity	59.0%	63.5%



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

Antenna RF A1 and RF A2

Single Carrier:

Configuration 1 - Mode 1, 2 and 3

TM1

UARFCN	Frequency(MHz)	Antenna A1		Antenna A2		*Total (dBm) RMS	*Total (W) RMS
		Result (dBm) RMS	Result (W) RMS	Result (dBm) RMS	Result (W) RMS		
4357	871.4	47.59	57.41	47.56	57.02	50.59	114.43
4407	881.4	47.75	59.57	47.75	59.57	50.76	119.14
4458	891.6	47.63	57.94	47.51	56.36	50.58	114.30

TM5

UARFCN	Frequency(MHz)	Antenna A1		Antenna A2		*Total (dBm) RMS	*Total (W) RMS
		Result (dBm) RMS	Result (W) RMS	Result (dBm) RMS	Result (W) RMS		
4357	871.4	47.67	58.48	47.59	57.41	50.64	115.89
4407	881.4	47.73	59.29	47.71	59.02	50.73	118.31
4458	891.6	47.55	56.89	47.55	56.89	50.56	113.78

TM6

UARFCN	Frequency(MHz)	Antenna A1		Antenna A2		*Total (dBm) RMS	*Total (W) RMS
		Result (dBm) RMS	Result (W) RMS	Result (dBm) RMS	Result (W) RMS		
4357	871.4	47.47	55.85	47.46	55.72	50.48	111.57
4407	881.4	47.57	57.15	47.61	57.68	50.60	114.83
4458	891.6	47.45	55.59	47.31	53.83	50.39	109.42

**Multi Carrier(x2):****Configuration 1 - Mode 4, 5 and 6****TM1**

UARFCN	Frequency(MHz)	Antenna A1		Antenna A2		*Total (dBm) RMS	*Total (W) RMS
		Result (dBm) RMS	Result (W) RMS	Result (dBm) RMS	Result (W) RMS		
4357+4432	871.4+886.4	47.84	60.81	47.82	60.53	50.84	121.34
4369+4444	873.8+888.8	47.73	59.29	47.74	59.43	50.75	118.72
4383+4458	876.6+891.6	47.76	59.70	47.68	58.61	50.73	118.31

TM5

UARFCN	Frequency(MHz)	Antenna A1		Antenna A2		*Total (dBm) RMS	*Total (W) RMS
		Result (dBm) RMS	Result (W) RMS	Result (dBm) RMS	Result (W) RMS		
4357+4432	871.4+886.4	47.72	59.16	47.70	58.88	50.72	118.04
4369+4444	873.8+888.8	47.74	59.43	47.73	59.29	50.75	118.72
4383+4458	876.6+891.6	47.75	59.57	47.70	58.88	50.74	118.45

TM6

UARFCN	Frequency(MHz)	Antenna A1		Antenna A2		*Total (dBm) RMS	*Total (W) RMS
		Result (dBm) RMS	Result (W) RMS	Result (dBm) RMS	Result (W) RMS		
4357+4432	871.4+886.4	47.52	56.49	47.48	55.98	50.51	112.47
4369+4444	873.8+888.8	47.54	56.75	47.52	56.49	50.54	113.24
4383+4458	876.6+891.6	47.56	57.02	47.51	56.36	50.55	113.38



Multi Carrier(x4):

Configuration 1 - Mode 9, 10 and 11

TM1

UARFCN	Frequency(MHz)	Antenna A1		Antenna A2		*Total (dBm) RMS	*Total (W) RMS
		Result (dBm) RMS	Result (W) RMS	Result (dBm) RMS	Result (W) RMS		
4357+4382+4407+4432	871.4+876.4+881.4+886.4	47.80	60.26	47.75	59.57	50.79	119.83
4369+4394+4419+4444	873.8+878.8+883.8+888.8	47.76	59.70	47.74	59.43	50.76	119.13
4383+4408+4433+4458	876.6+881.6+886.6+891.6	47.78	59.98	47.72	59.16	50.76	119.14

TM5

UARFCN	Frequency(MHz)	Antenna A1		Antenna A2		*Total (dBm) RMS	*Total (W) RMS
		Result (dBm) RMS	Result (W) RMS	Result (dBm) RMS	Result (W) RMS		
4357+4382+4407+4432	871.4+876.4+881.4+886.4	47.78	59.98	47.79	60.12	50.80	120.10
4369+4394+4419+4444	873.8+878.8+883.8+888.8	47.75	59.57	47.76	59.70	50.77	119.27
4383+4408+4433+4458	876.6+881.6+886.6+891.6	47.78	59.98	47.72	59.16	50.76	119.14

TM6

UARFCN	Frequency(MHz)	Antenna A1		Antenna A2		*Total (dBm) RMS	*Total (W) RMS
		Result (dBm) RMS	Result (W) RMS	Result (dBm) RMS	Result (W) RMS		
4357+4382+4407+4432	871.4+876.4+881.4+886.4	47.34	54.20	47.32	53.95	50.34	108.15
4369+4394+4419+4444	873.8+878.8+883.8+888.8	47.33	54.08	47.28	53.46	50.32	107.54
4383+4408+4433+4458	876.6+881.6+886.6+891.6	47.31	53.83	47.26	53.21	50.30	107.04

Note *:

Two transmitters output power were summed up according to FCC KDB662911 D01 for MIMO mode.

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

Remarks

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



Product Service

2.2 PEAK – AVERAGE RATIO

2.2.1 Specification Reference

FCC CFR 47 Part 22, Clause 22.913 (a)
Industry Canada RSS-132, Clause 5.4

2.2.2 Equipment Under Test

RUS 01 B5 / KRC 118 64/2, S/N: C824937848 / C824937852

2.2.3 Date of Test and Modification State

21 and 24 June 2013 – 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 Peak to Average was measured with QPSK, 16QAM, 64QAM using the test models described.

The measurements were performed on the combined output connector RF A1. Limited complementary measurement were done at output connector RF A2 to verify identical performance for both transmitter chains in MIMO mode.

The spectrum analyzer measurement bandwidth was set 50MHz for single and multi carrier, and the path loss measured was 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 9
 - Mode 10
 - Mode 11



Product Service

2.2.6 Environmental Conditions

	21 June 2013	24 June 2013
Ambient Temperature	24.0°C	22.2°C
Relative Humidity	59.0%	63.5%

2.2.7 Test Results

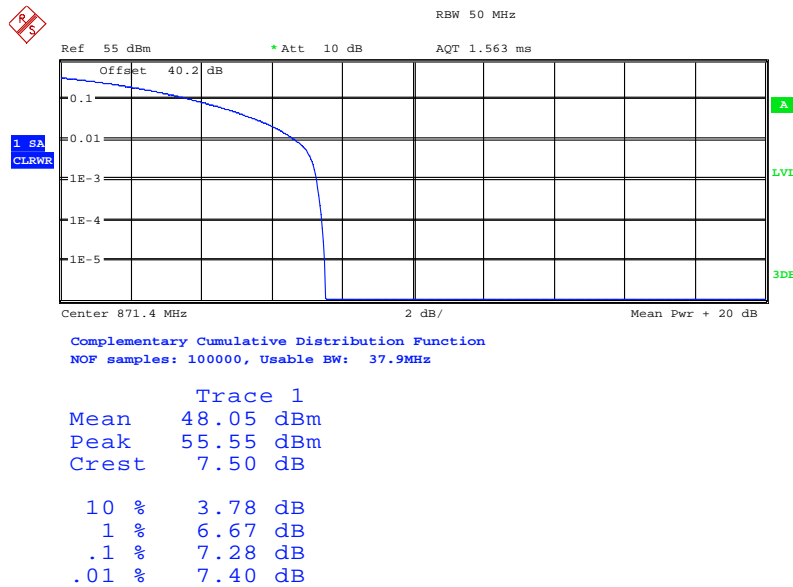
For the period of test the EUT met the requirements of FCC CFR 47 Part 22 Peak – Average Ratio.

The test results are shown below.

Single Carrier:

Configuration 1 - Mode 1

TM1

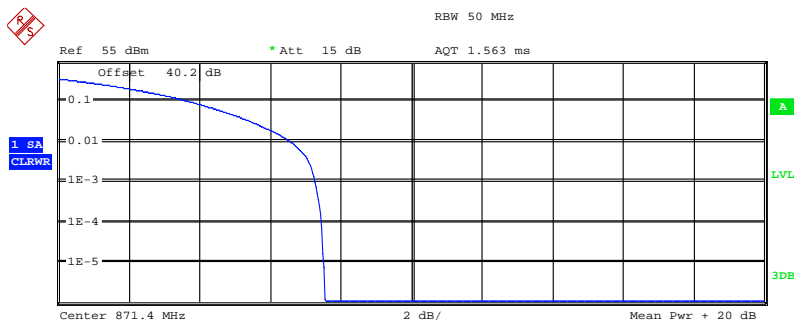


Date: 24.JUN.2013 16:39:35



Product Service

TM5



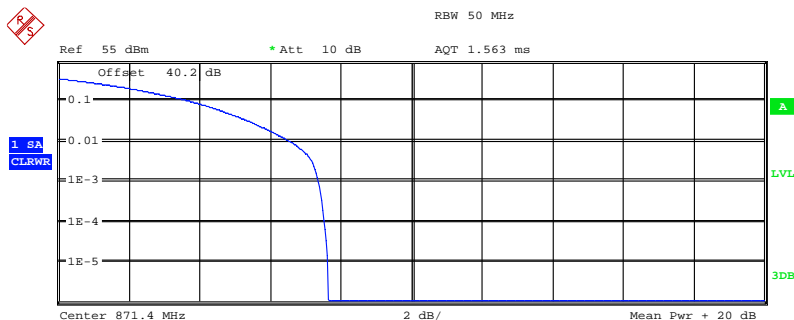
Complementary Cumulative Distribution Function
NOF samples: 100000, Usable BW: 37.9MHz

Trace 1

Mean	47.99 dBm
Peak	55.53 dBm
Crest	7.54 dB
10 %	3.72 dB
1 %	6.57 dB
.1 %	7.28 dB
.01 %	7.47 dB

Date: 24.JUN.2013 16:18:07

TM6



Complementary Cumulative Distribution Function
NOF samples: 100000, Usable BW: 37.9MHz

Trace 1

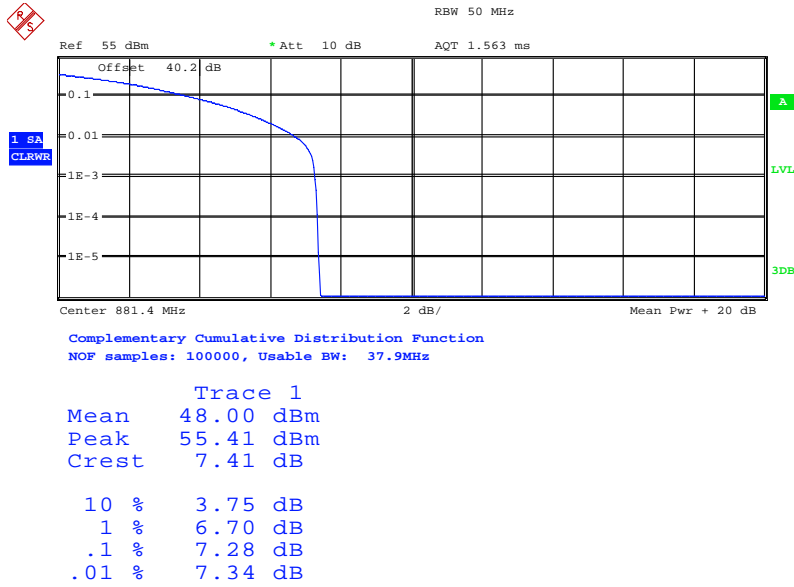
Mean	47.84 dBm
Peak	55.48 dBm
Crest	7.64 dB
10 %	3.75 dB
1 %	6.57 dB
.1 %	7.37 dB
.01 %	7.53 dB

Date: 24.JUN.2013 15:51:53



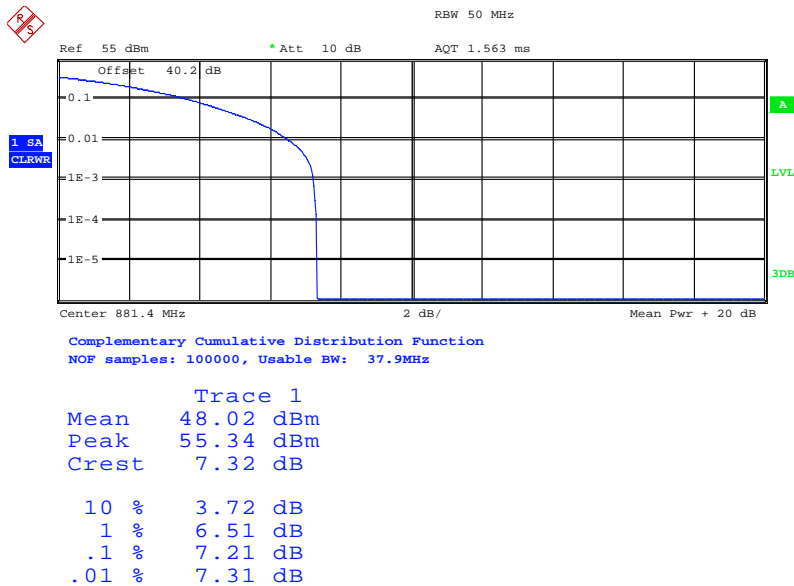
Configuration 1 - Mode 2

TM1



Date: 24.JUN.2013 14:54:45

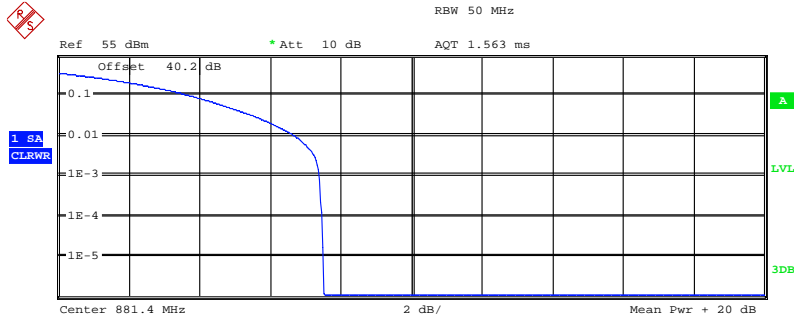
TM5



Date: 24.JUN.2013 15:17:32



TM6



Complementary Cumulative Distribution Function
NOF samples: 100000, Usable BW: 37.9MHz

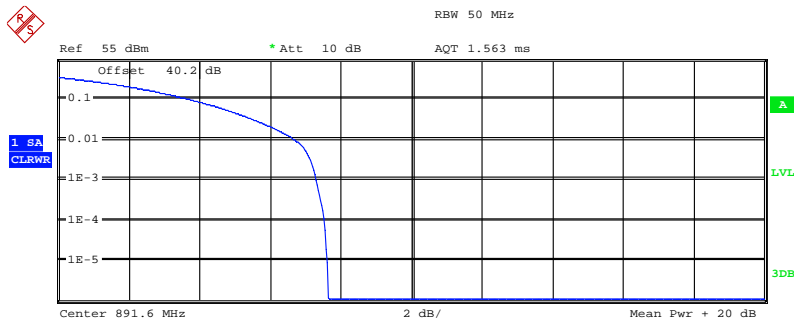
Trace 1

Mean	47.92 dBm
Peak	55.41 dBm
Crest	7.49 dB
10 %	3.75 dB
1 %	6.67 dB
.1 %	7.40 dB
.01 %	7.47 dB

Date: 24.JUN.2013 15:36:19

Configuration 1 - Mode 3

TM1



Complementary Cumulative Distribution Function
NOF samples: 100000, Usable BW: 37.9MHz

Trace 1

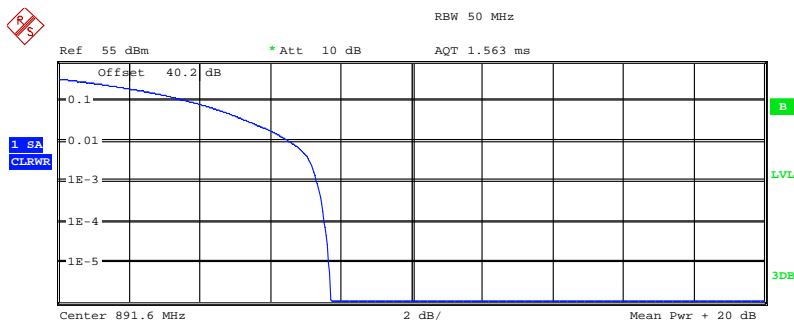
Mean	47.91 dBm
Peak	55.55 dBm
Crest	7.65 dB
10 %	3.75 dB
1 %	6.67 dB
.1 %	7.31 dB
.01 %	7.53 dB

Date: 24.JUN.2013 16:56:31



Product Service

TM5



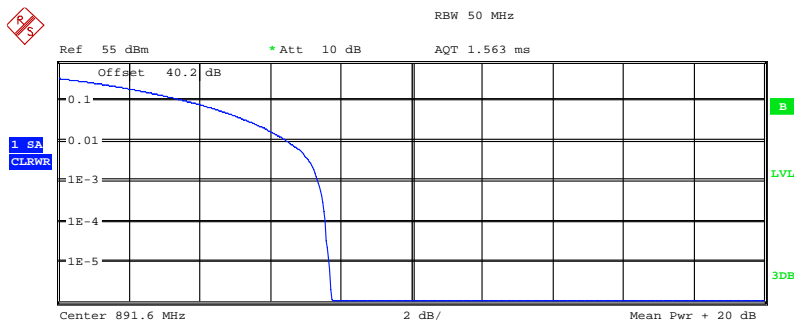
Center 891.6 MHz 2 dB/ Mean Pwr + 20 dB
 Complementary Cumulative Distribution Function
 NOF samples: 100000, Usable BW: 37.9MHz

Trace 1

Mean	47.98 dBm
Peak	55.69 dBm
Crest	7.72 dB
10 %	3.75 dB
1 %	6.54 dB
.1 %	7.31 dB
.01 %	7.53 dB

Date: 24.JUN.2013 17:11:01

TM6



Center 891.6 MHz 2 dB/ Mean Pwr + 20 dB
 Complementary Cumulative Distribution Function
 NOF samples: 100000, Usable BW: 37.9MHz

Trace 1

Mean	47.68 dBm
Peak	55.41 dBm
Crest	7.73 dB
10 %	3.69 dB
1 %	6.47 dB
.1 %	7.34 dB
.01 %	7.56 dB

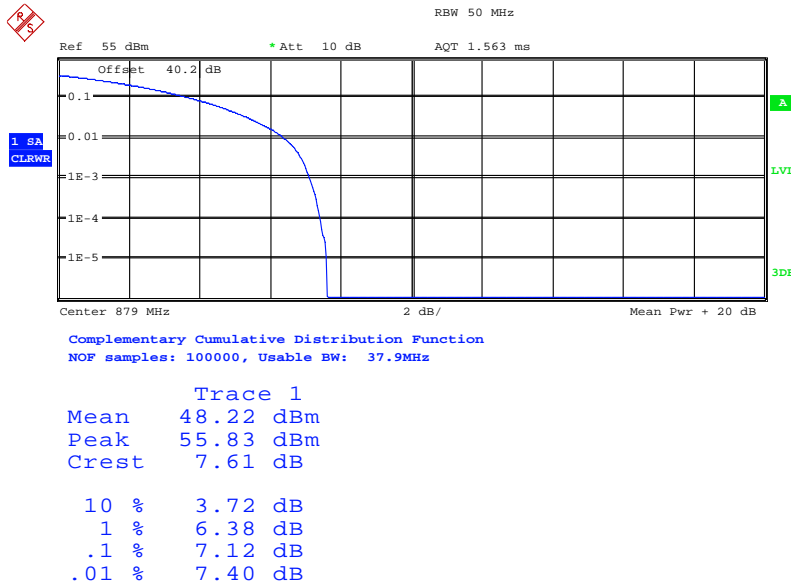
Date: 24.JUN.2013 17:26:16



Multi Carrier(x2):

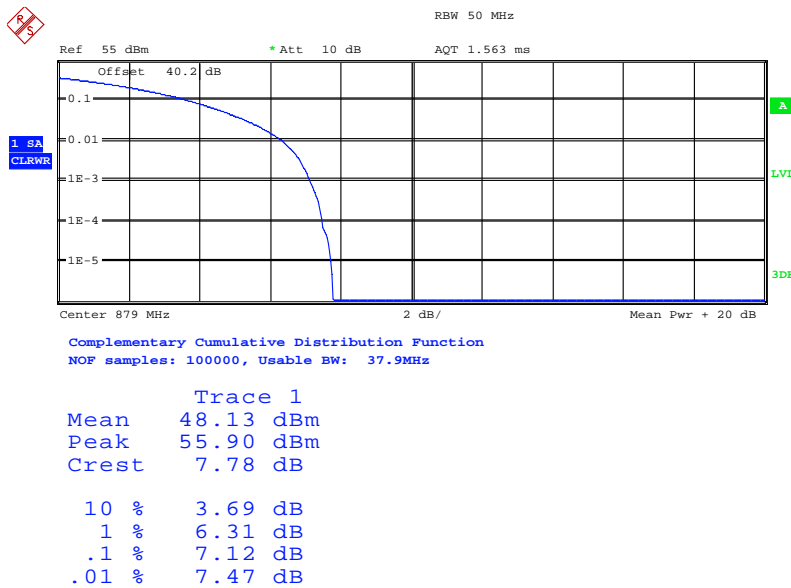
Configuration 1 - Mode 4

TM1



Date: 21.JUN.2013 13:06:05

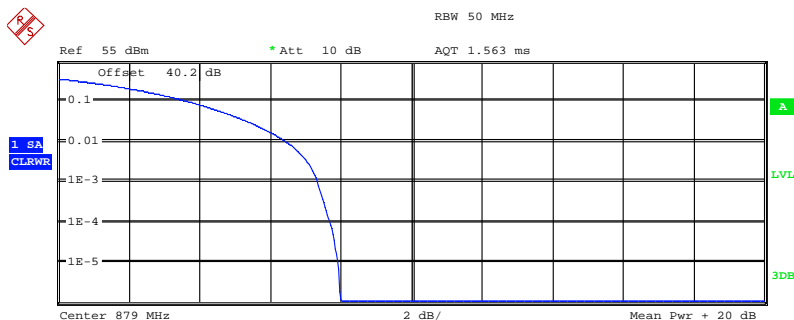
TM5



Date: 21.JUN.2013 13:43:58



TM6



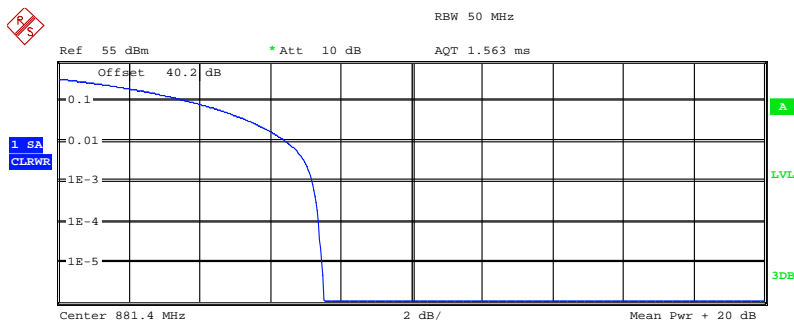
Center 879 MHz 2 dB/ Mean Pwr + 20 dB
 Complementary Cumulative Distribution Function
 NOF samples: 100000, Usable BW: 37.9MHz

Trace 1	
Mean	47.85 dBm
Peak	55.83 dBm
Crest	7.98 dB
10 %	3.69 dB
1 %	6.44 dB
.1 %	7.34 dB
.01 %	7.69 dB

Date: 21.JUN.2013 13:55:03

Configuration 1 - Mode 5

TM1



Center 881.4 MHz 2 dB/ Mean Pwr + 20 dB
 Complementary Cumulative Distribution Function
 NOF samples: 100000, Usable BW: 37.9MHz

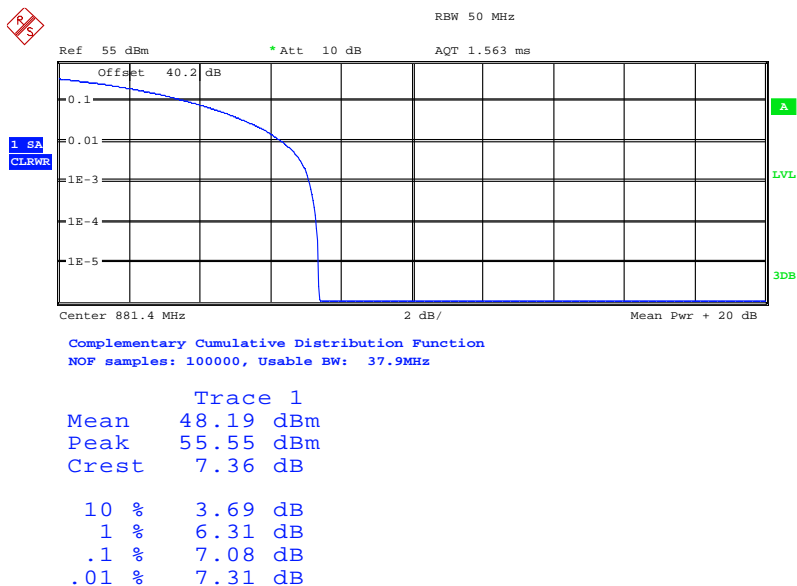
Trace 1	
Mean	48.17 dBm
Peak	55.69 dBm
Crest	7.52 dB
10 %	3.75 dB
1 %	6.44 dB
.1 %	7.18 dB
.01 %	7.37 dB

Date: 21.JUN.2013 16:05:12



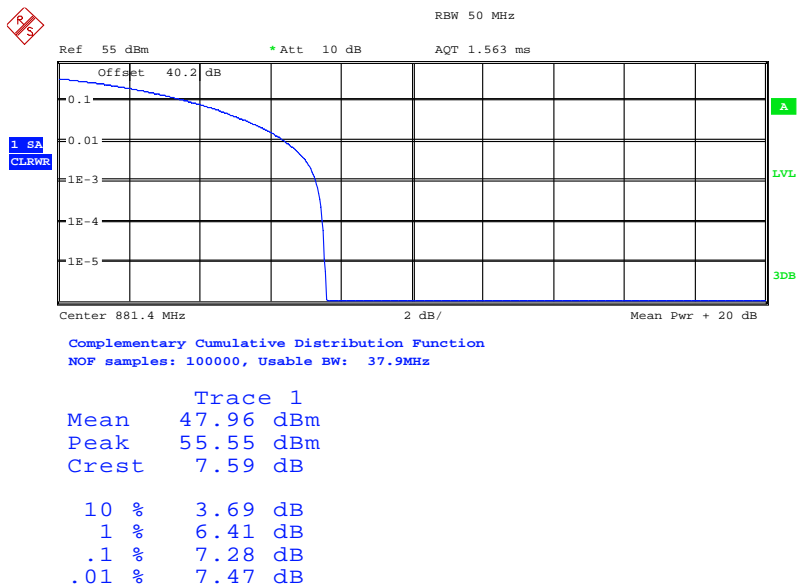
Product Service

TM5



Date: 21.JUN.2013 16:26:22

TM6

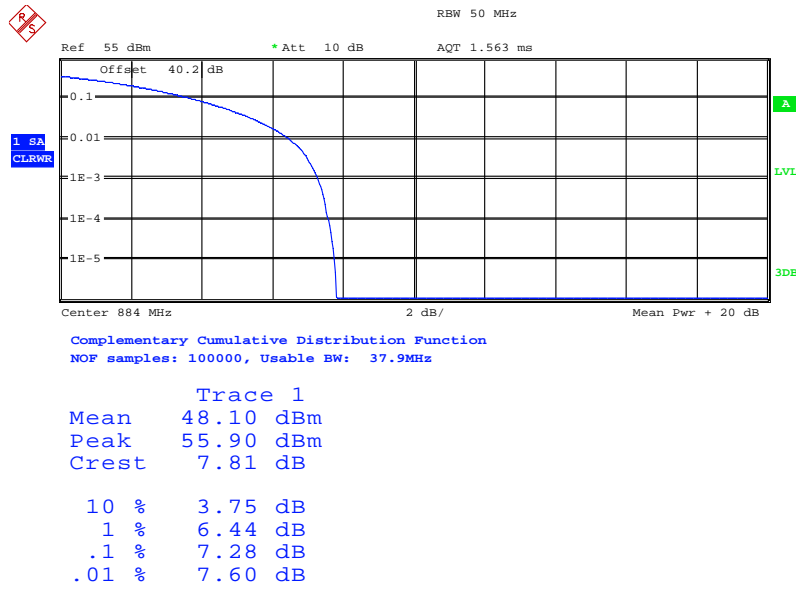


Date: 21.JUN.2013 16:53:35



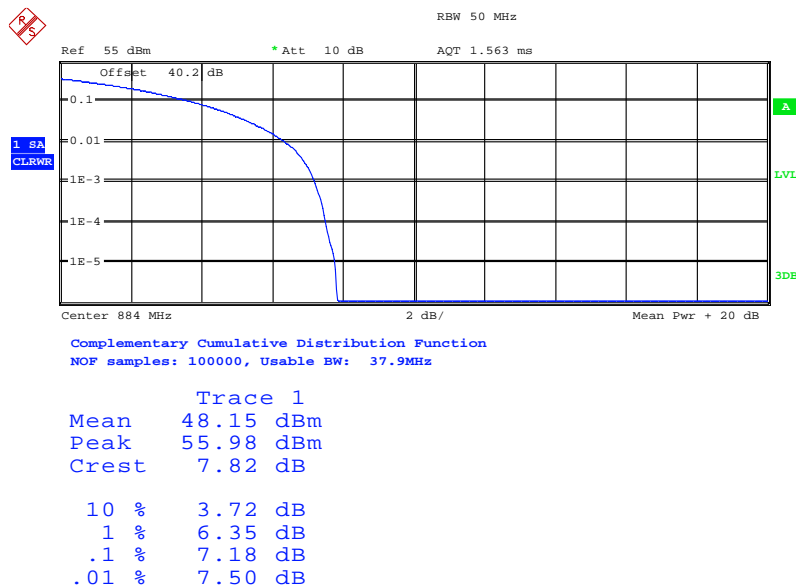
Configuration 1 - Mode 6

TM1



Date: 21.JUN.2013 15:45:54

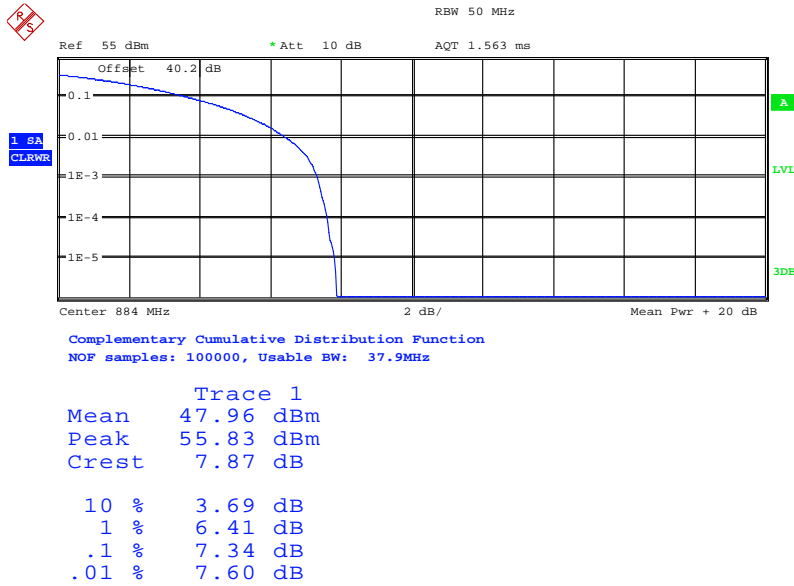
TM5



Date: 21.JUN.2013 15:30:19



TM6

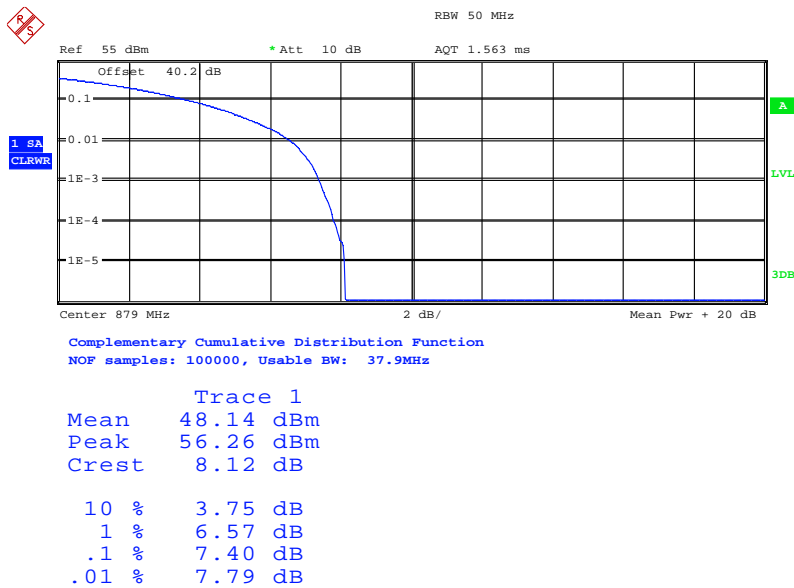


Date: 21.JUN.2013 15:22:55

Multi Carrier(x4):

Configuration 1 - Mode 9

TM1

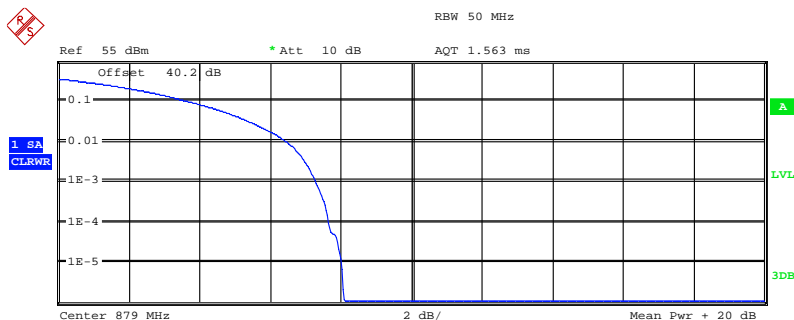


Date: 21.JUN.2013 17:31:30



Product Service

TM5



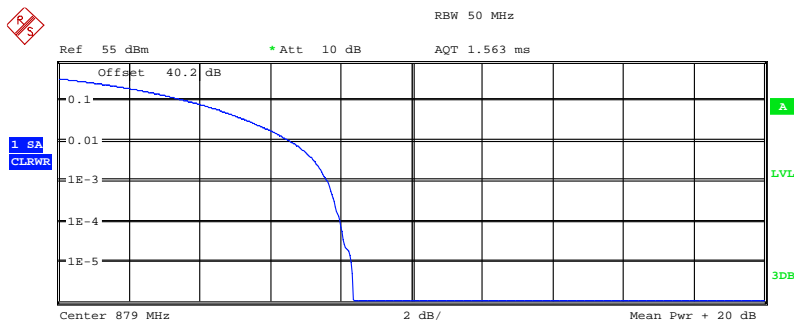
Complementary Cumulative Distribution Function
NOF samples: 100000, Usable BW: 37.9MHz

Trace 1

Mean	48.18 dBm
Peak	56.26 dBm
Crest	8.08 dB
10 %	3.72 dB
1 %	6.44 dB
.1 %	7.28 dB
.01 %	7.66 dB

Date: 21.JUN.2013 17:43:53

TM6



Complementary Cumulative Distribution Function
NOF samples: 100000, Usable BW: 37.9MHz

Trace 1

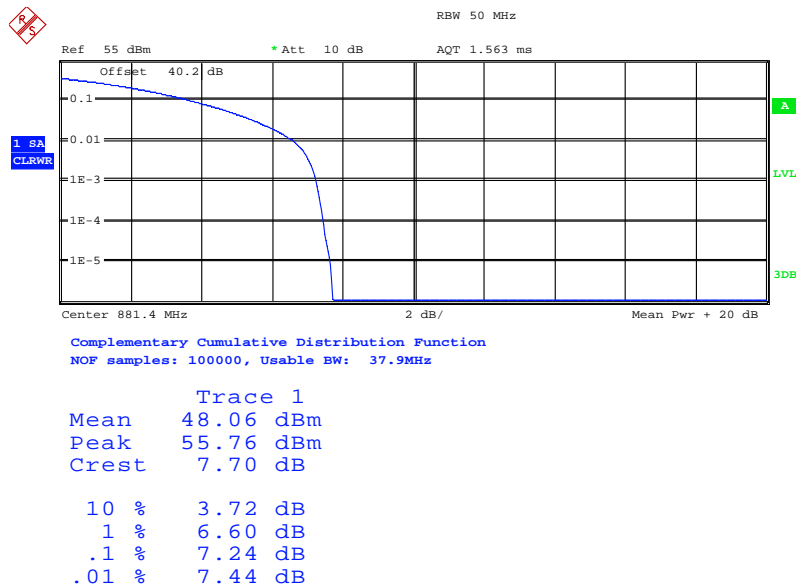
Mean	47.62 dBm
Peak	55.97 dBm
Crest	8.35 dB
10 %	3.69 dB
1 %	6.57 dB
.1 %	7.63 dB
.01 %	7.98 dB

Date: 24.JUN.2013 11:03:17



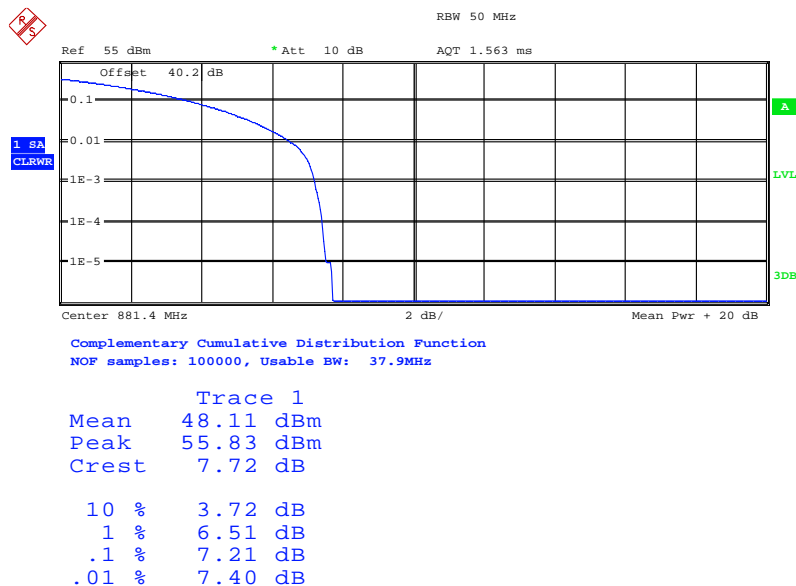
Configuration 1 - Mode 10

TM1



Date: 24.JUN.2013 13:11:16

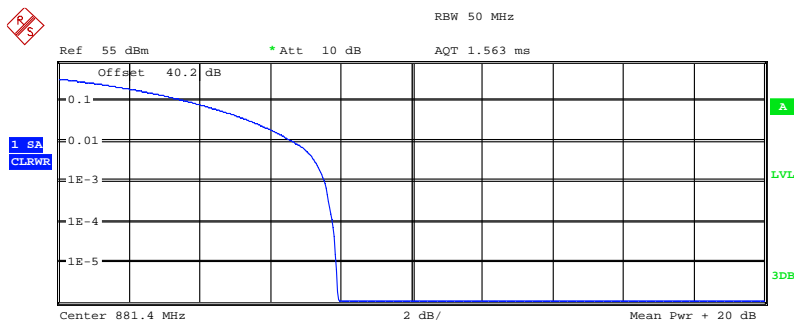
TM5



Date: 24.JUN.2013 13:33:37



TM6



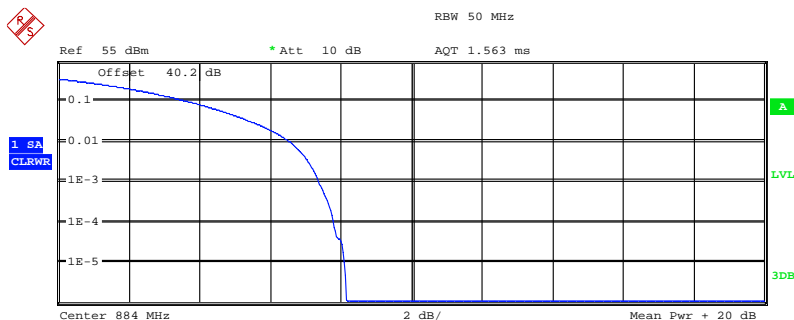
Center 881.4 MHz 2 dB/ Mean Pwr + 20 dB
 Complementary Cumulative Distribution Function
 NOF samples: 100000, Usable BW: 37.9MHz

Trace 1	
Mean	47.63 dBm
Peak	55.55 dBm
Crest	7.92 dB
10 %	3.69 dB
1 %	6.63 dB
.1 %	7.53 dB
.01 %	7.76 dB

Date: 24.JUN.2013 13:48:09

Configuration 1 - Mode 11

TM1



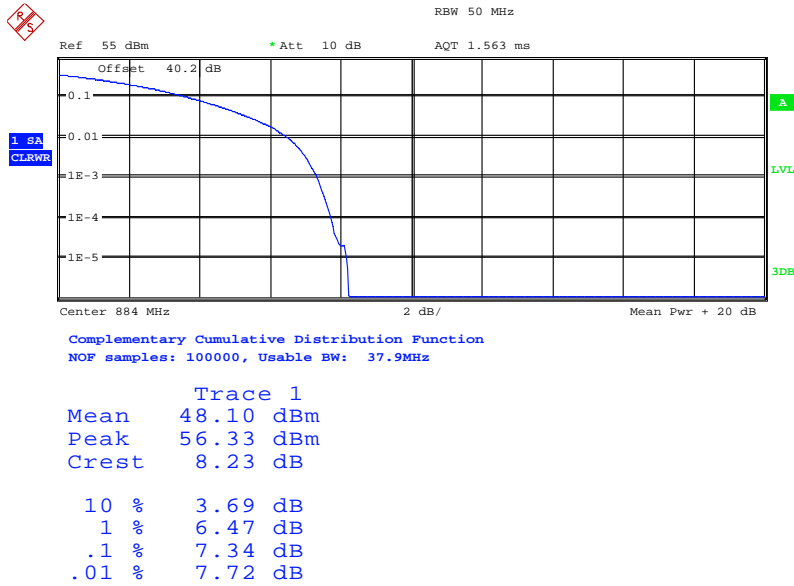
Center 884 MHz 2 dB/ Mean Pwr + 20 dB
 Complementary Cumulative Distribution Function
 NOF samples: 100000, Usable BW: 37.9MHz

Trace 1	
Mean	48.17 dBm
Peak	56.33 dBm
Crest	8.16 dB
10 %	3.72 dB
1 %	6.54 dB
.1 %	7.37 dB
.01 %	7.79 dB

Date: 24.JUN.2013 12:51:54

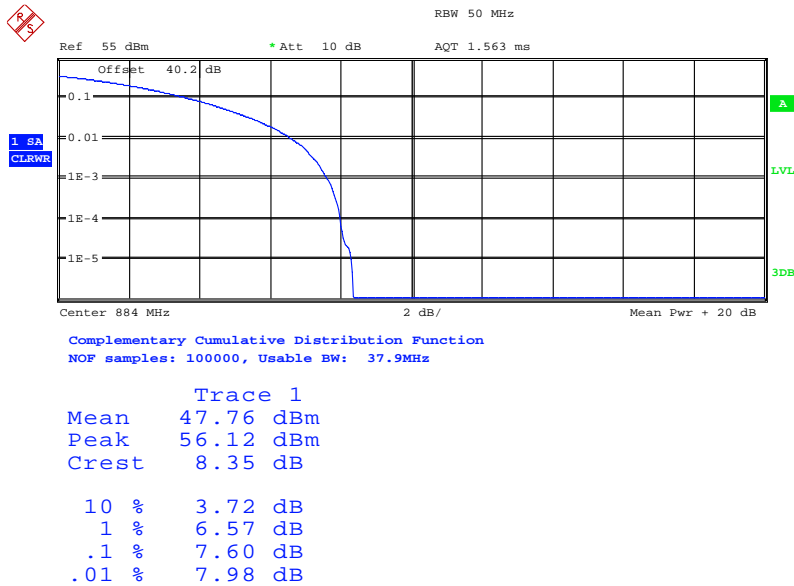


TM5



Date: 24.JUN.2013 12:10:20

TM6



Date: 24.JUN.2013 11:38:30

Limit	13dB
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Remarks

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



2.3 SPURIOUS EMISSIONS AT ANTENNA TERMINALS (± 1 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 5.5

2.3.2 Equipment Under Test

RUS 01 B5 / KRC 118 64/2, S/N: C824937848 / C824937852

2.3.3 Date of Test and Modification State

21 and 24 June 2013 – 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 emission bandwidth should be used for the frequencies offset up to 1MHz away from the block edge. A resolution bandwidth of 20kHz was used for single carrier and 30kHz was used for multi carriers (x2) up to 1MHz away from the band edges. 20kHz and 30kHz are <1% of the Emission Bandwidth (4.7MHz), to compensate for the reduced measurement bandwidth, at the frequency range up to 1MHz away from the band edges, the limit for single carrier was adjusted from -13dBm to -16.7dBm and the limit for multi carriers (x2) was adjusted to -14.9dBm. According to the FCC rules, a RBW of 100kHz for measurements of emissions > 1MHz away from the band edges. Spectrum analyser detector was set as RMS. Spectrum analyser detector was set as RMS.

The limit was adjusted with a correction of -3dB [10Log(2)] by using the Measure and Add 10Log(N) dB technique according to FCC KDB662911 D01 accounting for simultaneous transmission from antenna ports RF A1 and RF A2.

The measurements were performed on the combined output connector RF A1. Limited complementary measurement were done at the output connector RF A2 to verify identical performance for both transmitter chains.

The EUT was tested at its maximum power level. 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 3
- Mode 7
- Mode 8



2.3.6 Environmental Conditions

	21 June 2013	24 June 2013
Ambient Temperature	24.0°C	22.2°C
Relative Humidity	59.0%	63.5%

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 (± 1 MHz).

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

Single Carrier

Configuration 1 - Mode 1 and 3

Band Edge Frequency	Edge Test with QPSK modulation Channel No./Frequencies	RBW / VBW (kHz)	Limit (dB)
Bottom 869MHz	Channel: 4357 Frequency: 871.4MHz	20 / 200	-19.7
Top 894MHz	Channel: 4458 Frequency: 891.6 MHz	20 / 200	-19.7

Multi Carrier(x2)

Configuration 1 - Mode 7 and 8

Band Edge Frequency	Edge Test with QPSK modulation Channel No./Frequencies	RBW / VBW (kHz)	Limit (dB)
Bottom 869MHz	Channel: 4357+4382 Frequency: 871.4MHz+876.4MHz	30 / 300	-17.9
Top 894MHz	Channel: 4433+4458 Frequency: 886.6 MHz+891.6 MHz	30 / 300	-17.9

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.

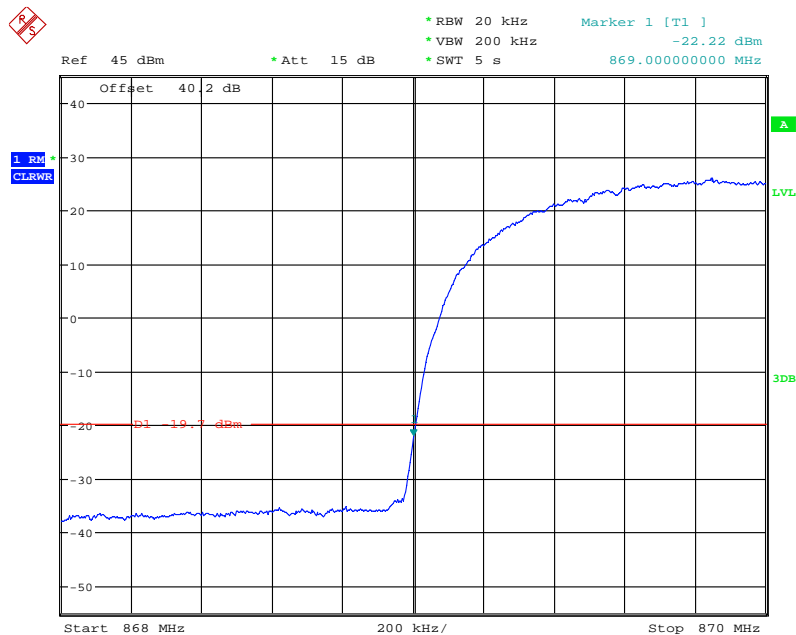


The test results are shown below

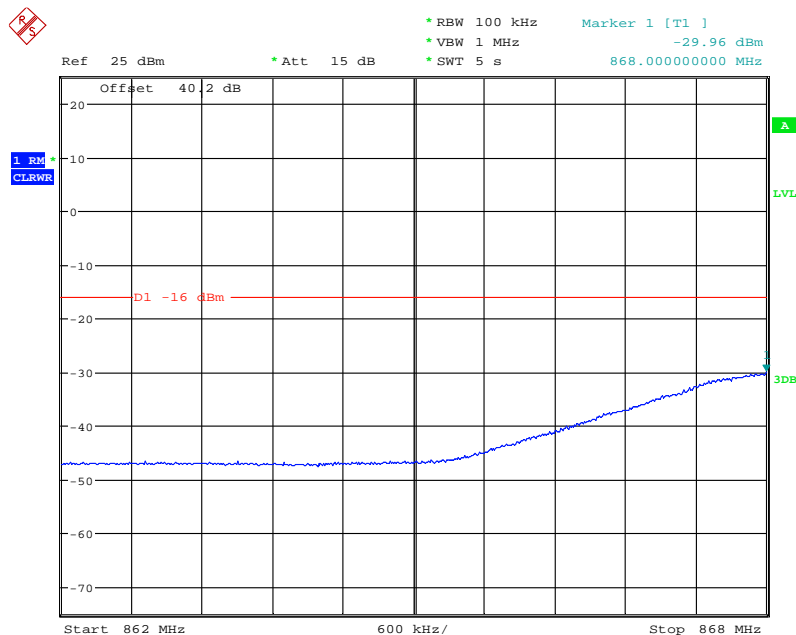
TM1

Single Carrier:

Configuration 1 - Mode 1



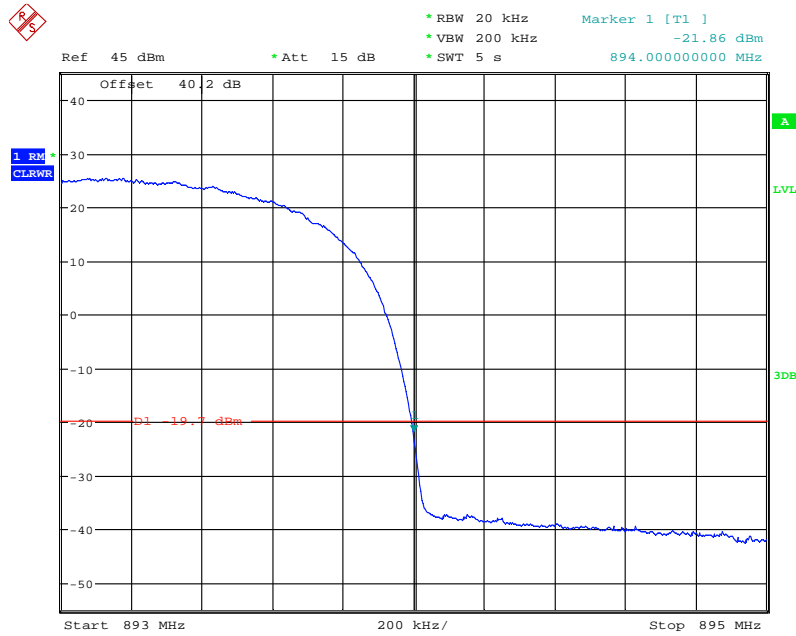
Date: 24.JUN.2013 16:38:24



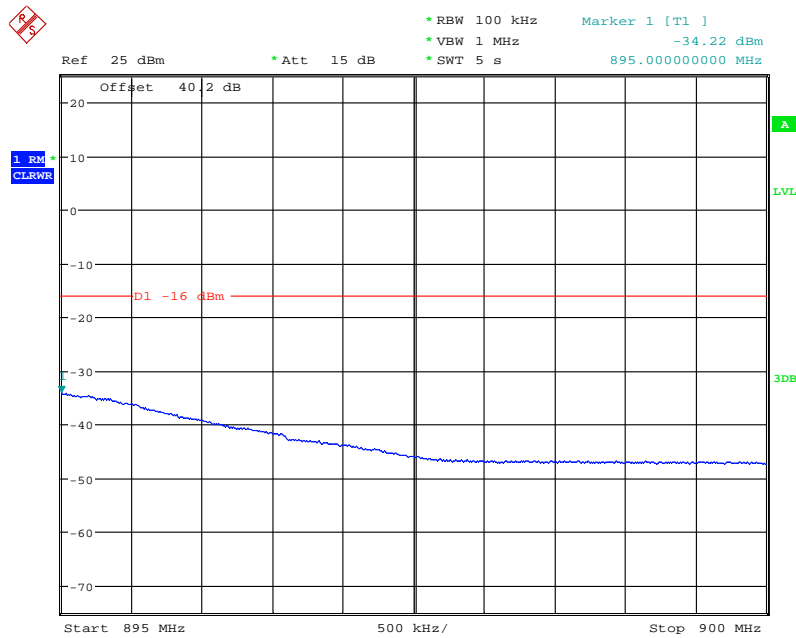
Date: 24.JUN.2013 16:36:37



Configuration 1 - Mode 3



Date: 24.JUN.2013 16:52:22



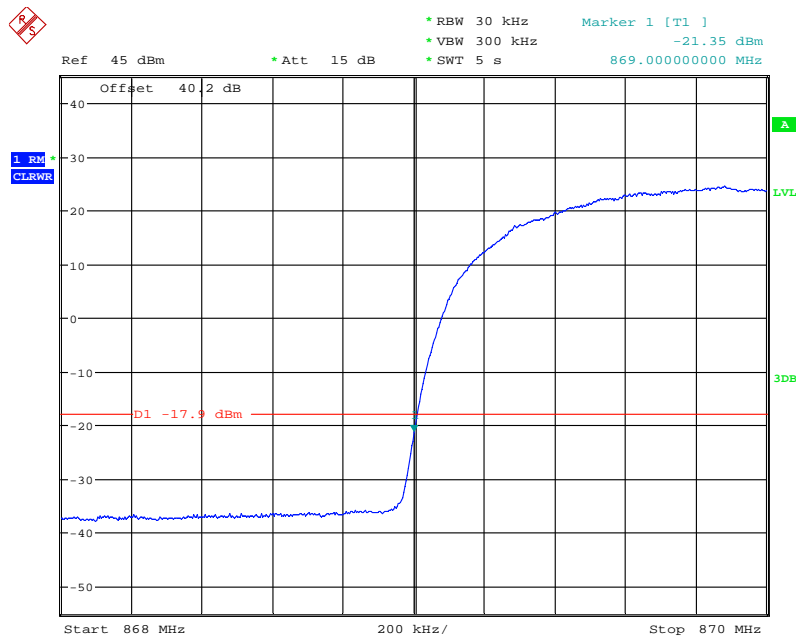
Date: 24.JUN.2013 16:59:05



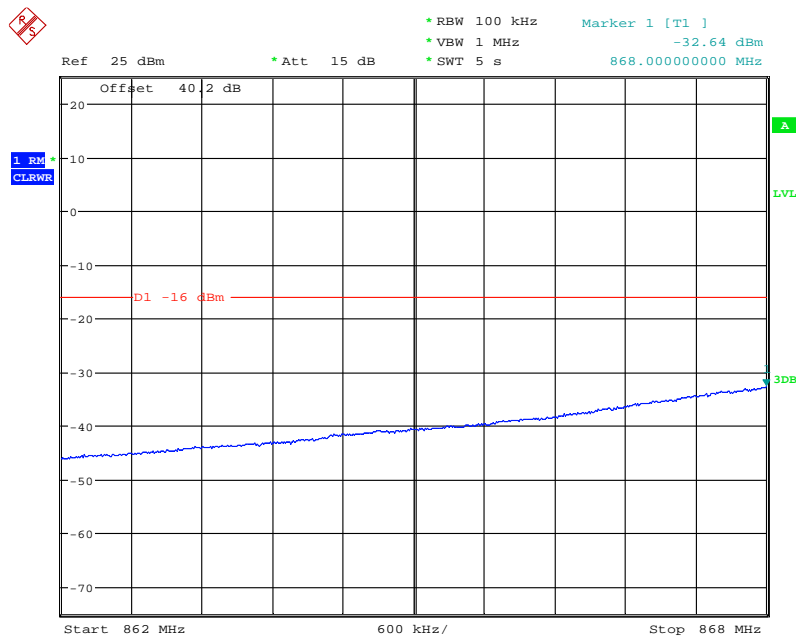
Product Service

Multi Carrier(x2):

Configuration 1 - Mode 7



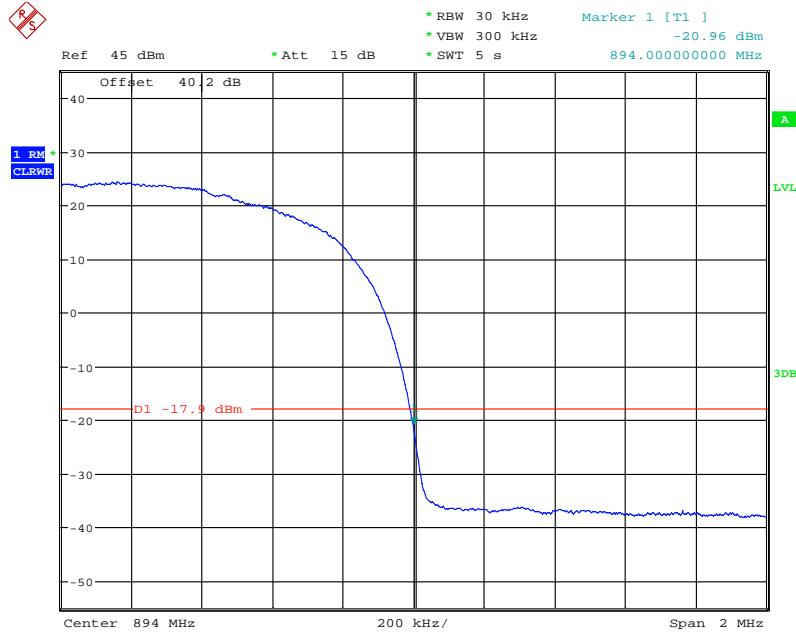
Date: 21.JUN.2013 14:32:35



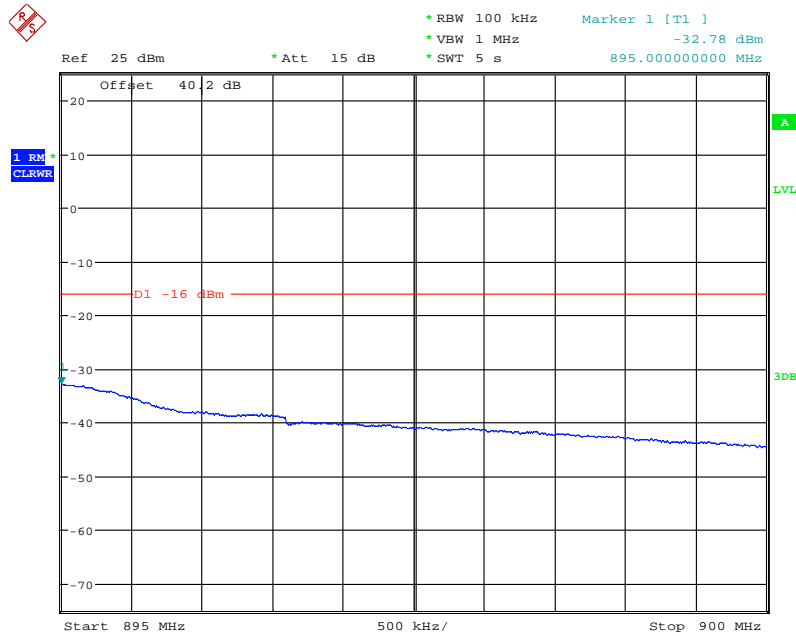
Date: 21.JUN.2013 14:31:53



Configuration 1 - Mode 8



Date: 21.JUN.2013 14:41:36



Date: 21.JUN.2013 14:42:53

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.



Product Service

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 5.5

2.4.2 Equipment Under Test

RUS 01 B5 / KRC 118 64/2, S/N: C824937848 / C824937852

2.4.3 Date of Test and Modification State

26 June 2013 – 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 for Spurious Emissions have been calculated, as shown below using the following formula:

Field Strength of Carrier - $(43 + 10\text{Log}(P))$ 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:

$$E_{(v/m)} = (30 \times 1.64 \times 107.04)^{0.5} / 3 = 24.19V/m = 147.7dB\mu V/m$$

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

$$43 + 10\log(107.04) = 63.3dB$$

Therefore the limit at 3m measurement distance is:

$$147.7 - 63.3 = 84.4 \text{ dB}\mu V/m$$

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 5
 - Mode 10

2.4.6 Environmental Conditions

	26 June 2013
Ambient Temperature	26.3°C
Relative Humidity	46.0%



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:

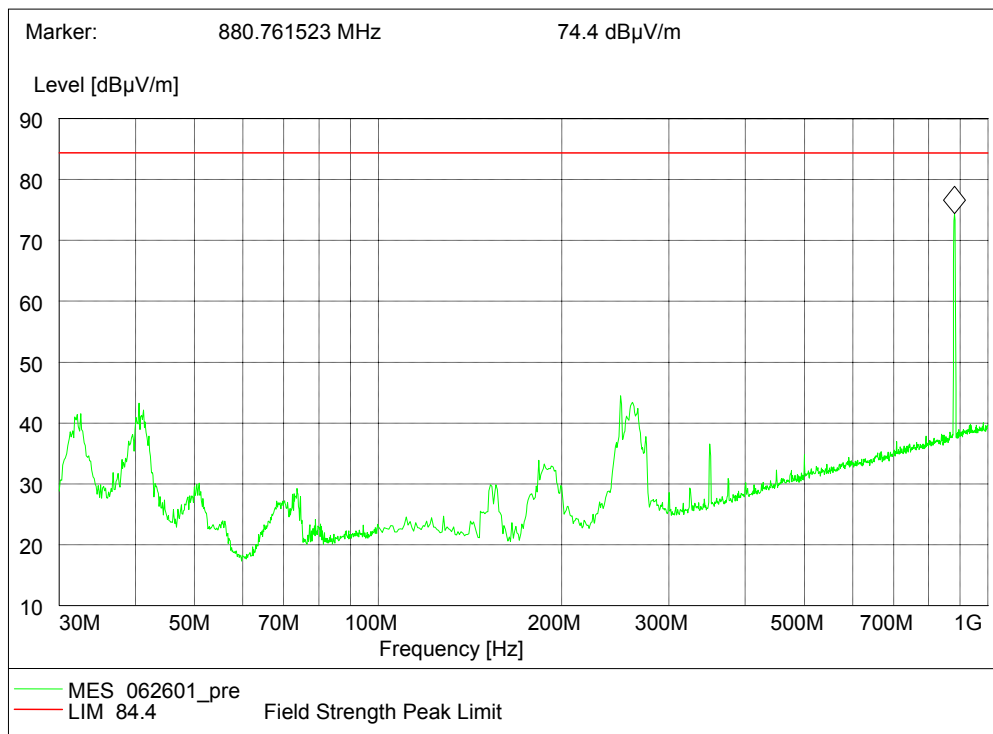
TM1

Configuration 1 - Mode 1

No emissions were detected within 20dB of the limit.

Configuration 1 - Mode 2

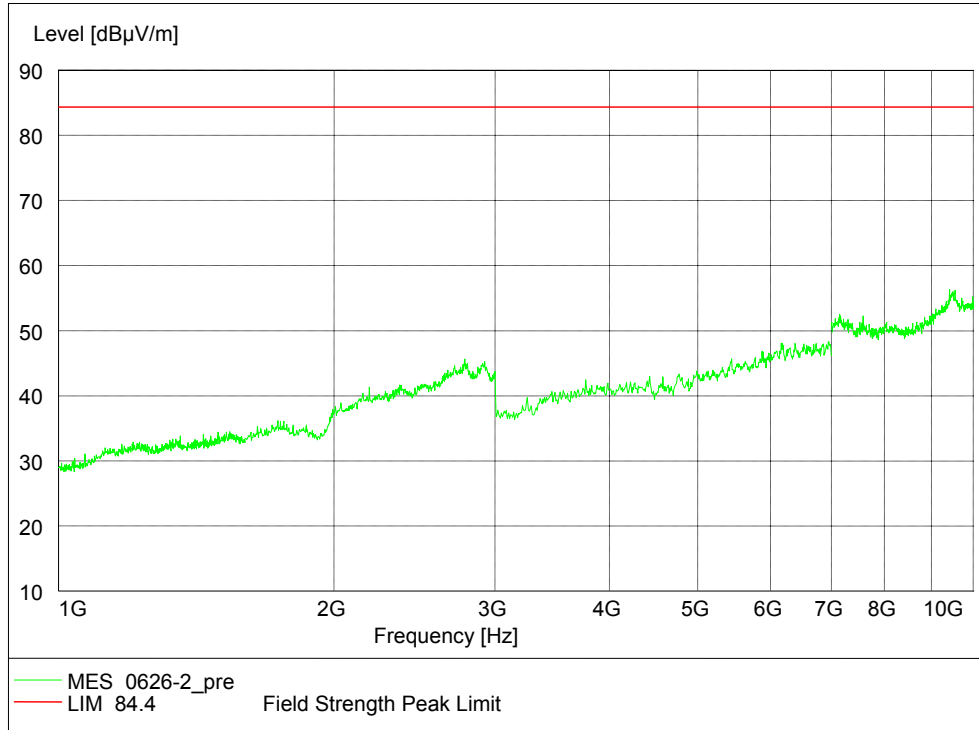
30MHz - 1GHz



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



1GHz - 10GHz



Configuration 1 - Mode 3

No emissions were detected within 20dB of the limit.

TM5

Configuration 1 - Mode 2

No emissions were detected within 20dB of the limit.

TM6

Configuration 1 - Mode 2

No emissions were detected within 20dB of the limit.

Multi Carrier(x2):

TM1

Configuration 1 - Mode 5

No emissions were detected within 20dB of the limit.



Product Service

Multi Carrier(x4):**TM1**Configuration 1 - Mode 10

No emissions were detected within 20dB of the limit.

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

Remarks

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



Product Service

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 5.5

2.5.2 Equipment Under Test

RUS 01 B5 / KRC 118 64/2, S/N: C824937848 / C824937852

2.5.3 Date of Test and Modification State

21 and 24 June 2013 – 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 an attenuator and the frequency spectrum investigated from 9kHz to 10GHz. The EUT was set to transmit on maximum power. The resolution was set to 100kHz for 9kHz to 10GHz thus meeting the requirements of FCC CFR 47 Part 22, Clause 22.917 (a) and Industry Canada RSS-132, Clause 5.5. The spectrum analyser detector was set to peak and trace was kept on Max Hold.

The limit was adjusted with a correction of -3dB [10Log(2)] by using the Measure and Add 10Log(N) dB technique according to FCC KDB662911 D01 accounting for simultaneous transmission from antenna ports RF A1 and RF A2.

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
- Mode 4
- Mode 5
- Mode 6



Product Service

2.5.6 Environmental Conditions

	21 June 2013	24 June 2013
Ambient Temperature	24.0°C	22.2°C
Relative Humidity	59.0%	63.5%

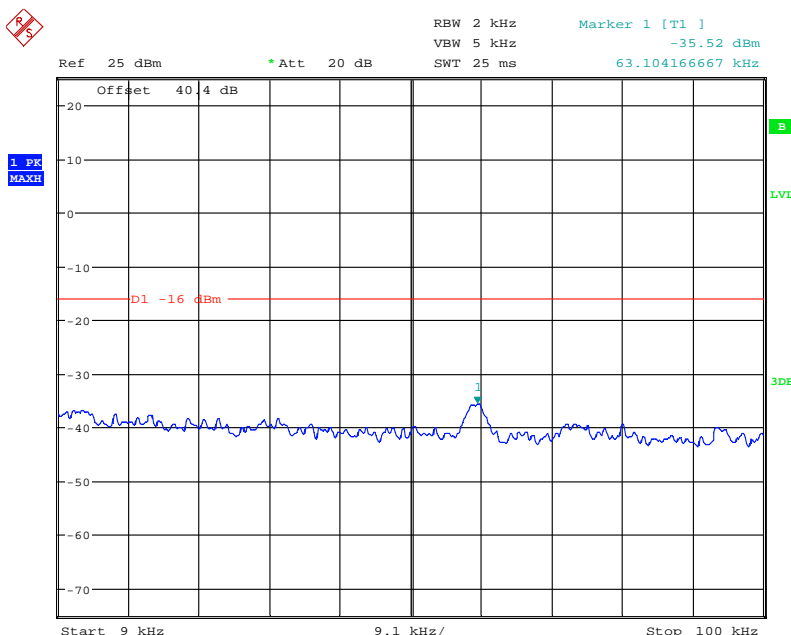
2.5.7 Test Results

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 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.



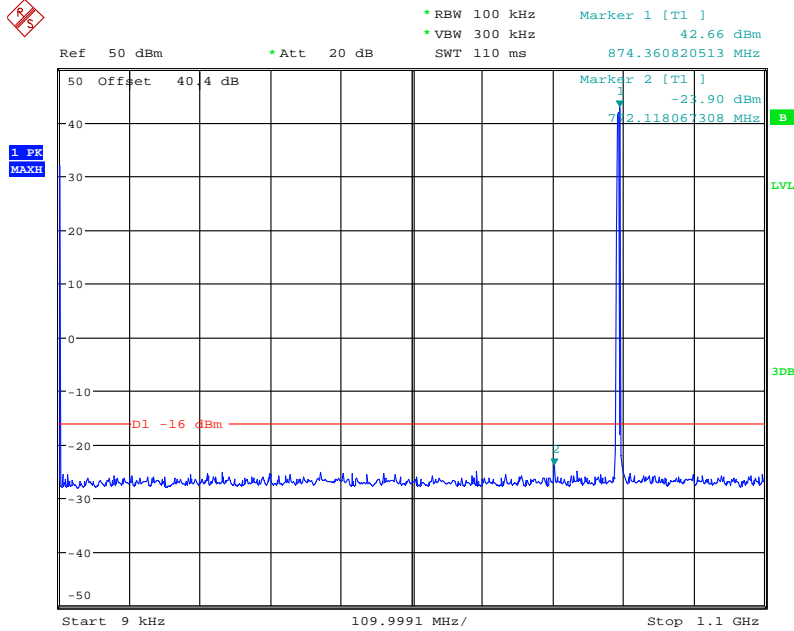
Date: 21.JUN.2013 16:14:41



Single Carrier:

Configuration 1 - Mode 1

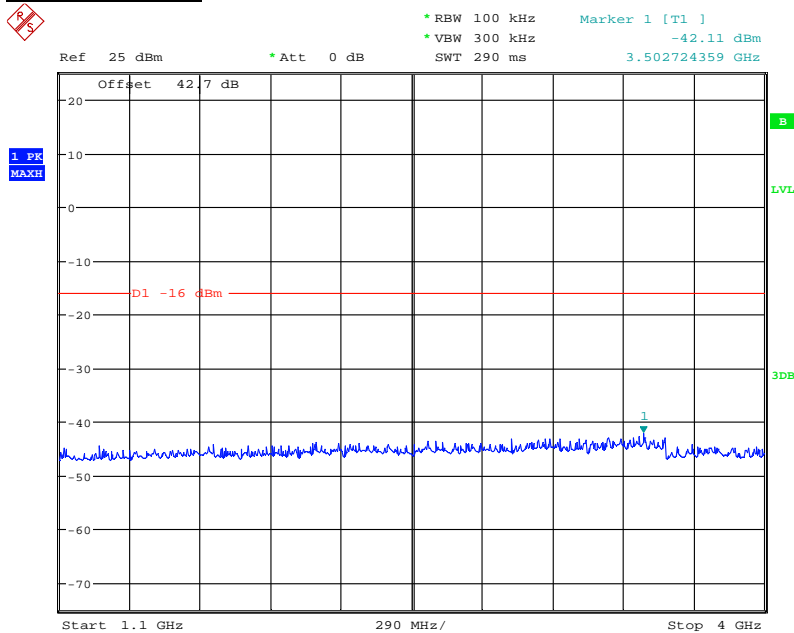
9kHz to 1.1GHz



Date: 24.JUN.2013 16:33:05

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

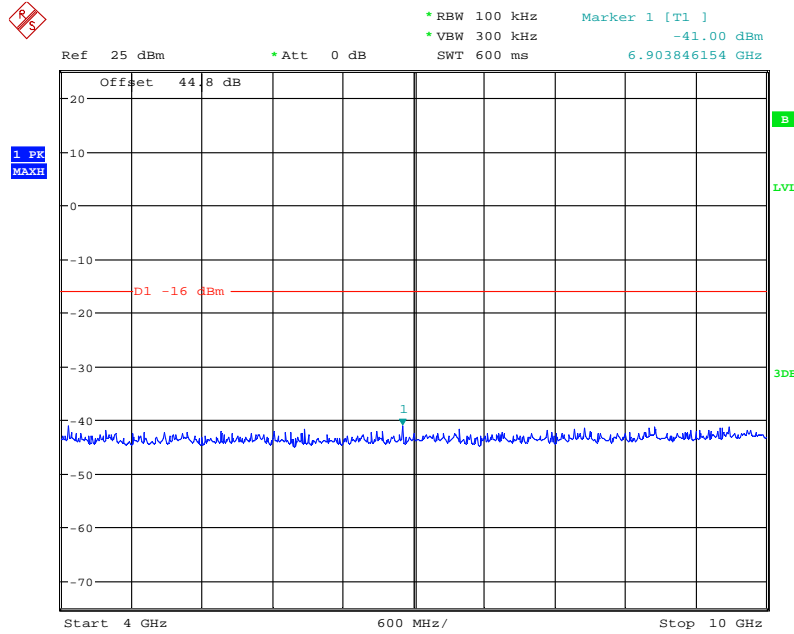
1.1GHz to 4GHz



Date: 24.JUN.2013 16:35:42



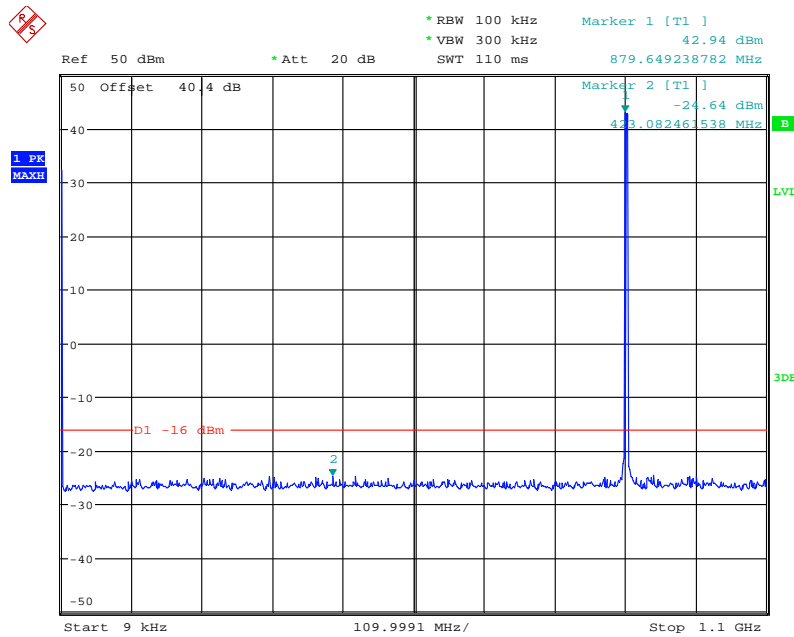
4GHz to 10GHz



Date: 24.JUN.2013 16:34:32

Configuration 1 - Mode 2

9kHz to 1.1GHz

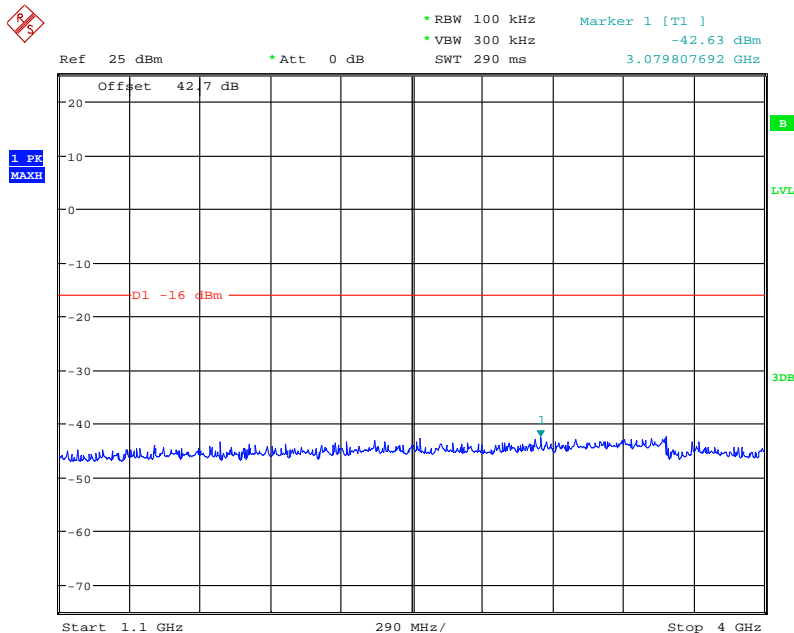


Date: 24.JUN.2013 15:02:28

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

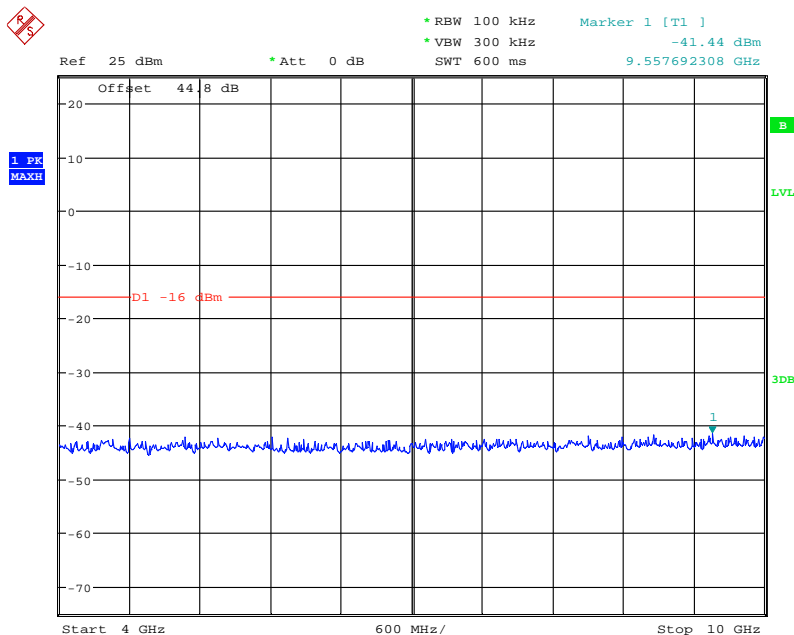


1.1GHz to 4GHz



Date: 24.JUN.2013 14:55:55

4GHz to 10GHz

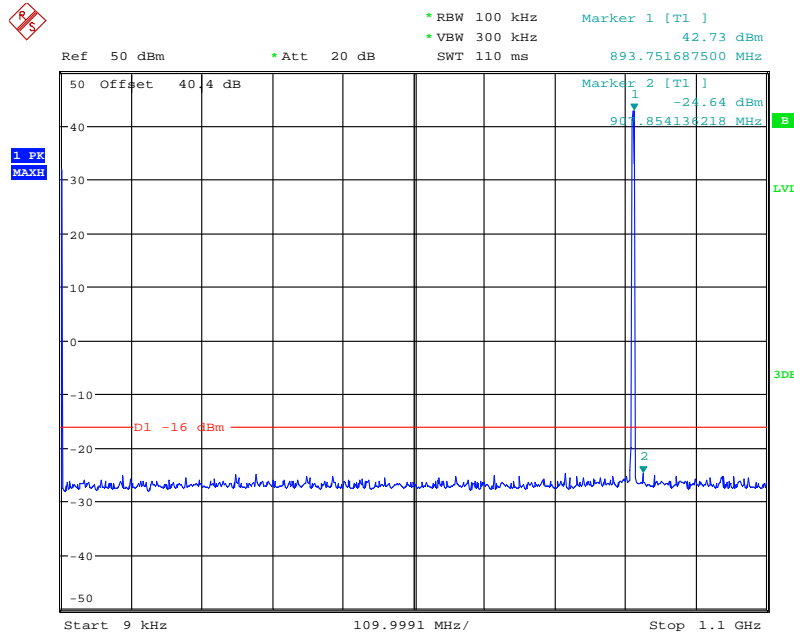


Date: 24.JUN.2013 14:56:58



Configuration 1 - Mode 3

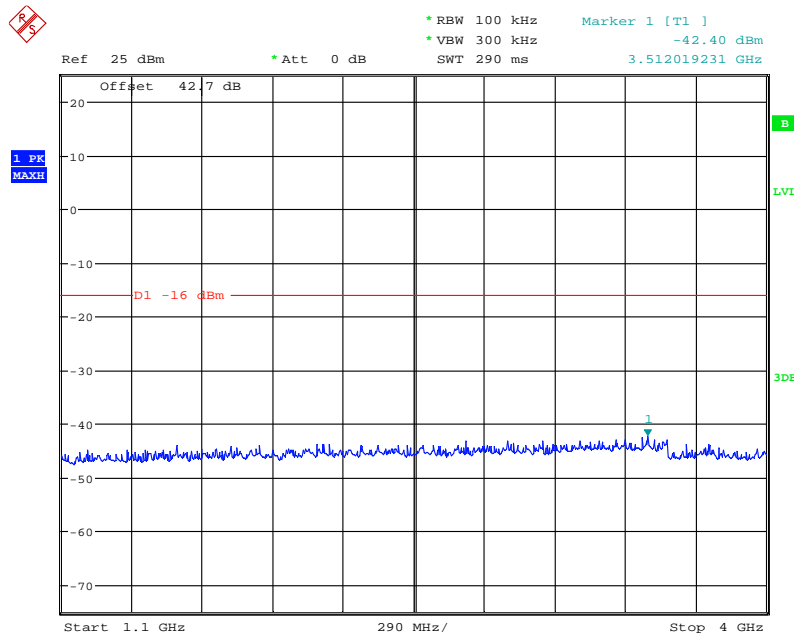
9kHz to 1.1GHz



Date: 24.JUN.2013 17:02:27

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

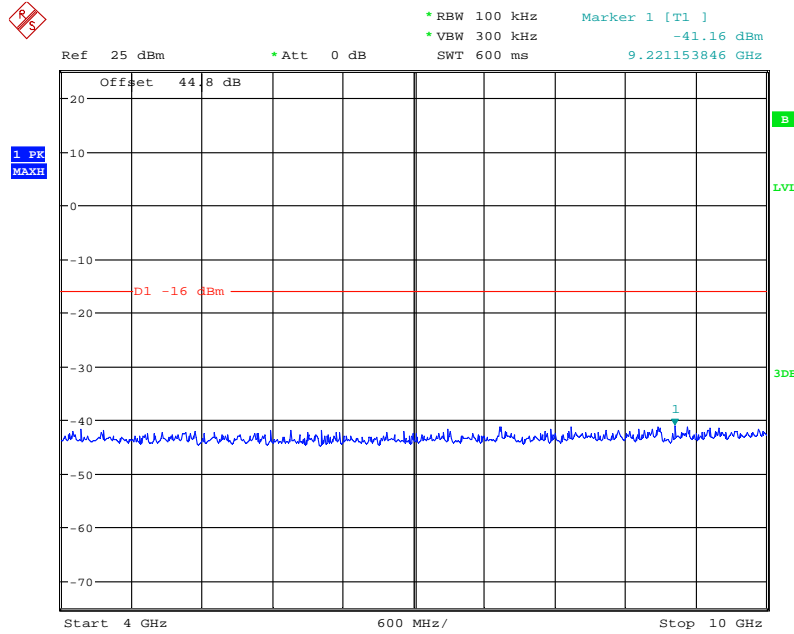
1.1GHz to 4GHz



Date: 24.JUN.2013 16:59:55



4GHz to 10GHz

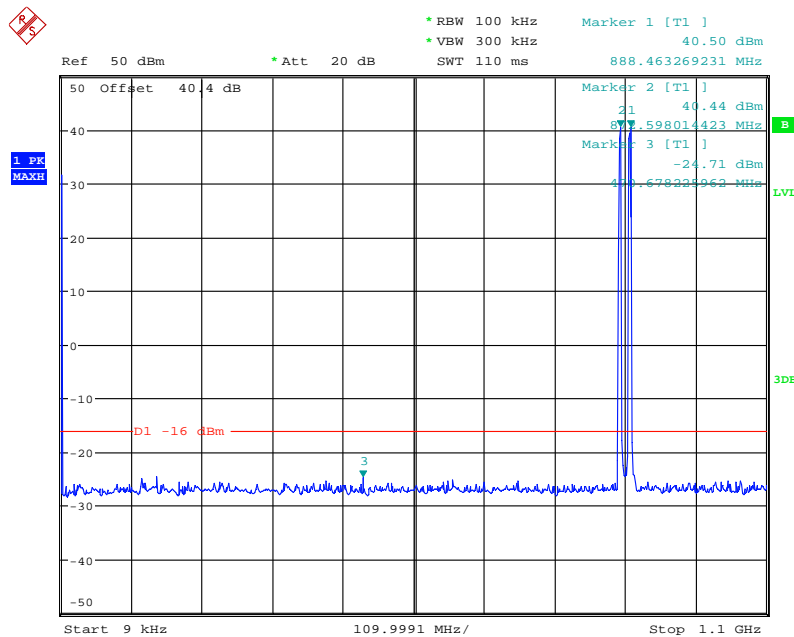


Date: 24.JUN.2013 17:01:04

Multi Carrier(x2):

Configuration 1 - Mode 4

9kHz to 1.1GHz

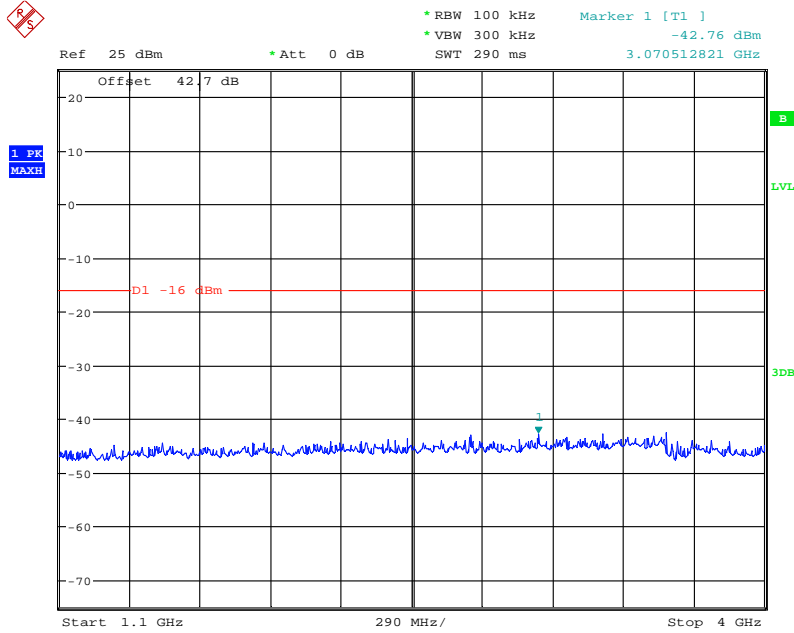


Date: 21.JUN.2013 13:15:47

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

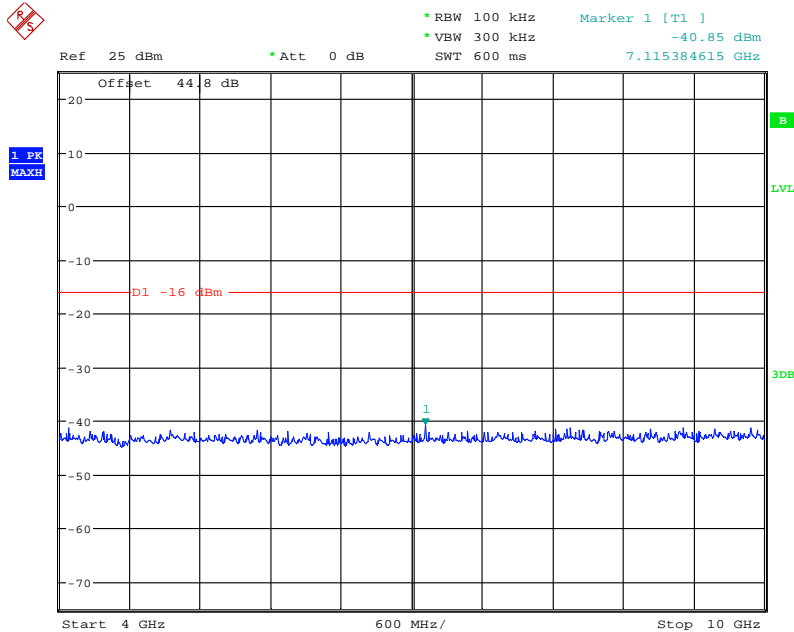


1.1GHz to 4GHz



Date: 21.JUN.2013 13:20:05

4GHz to 10GHz

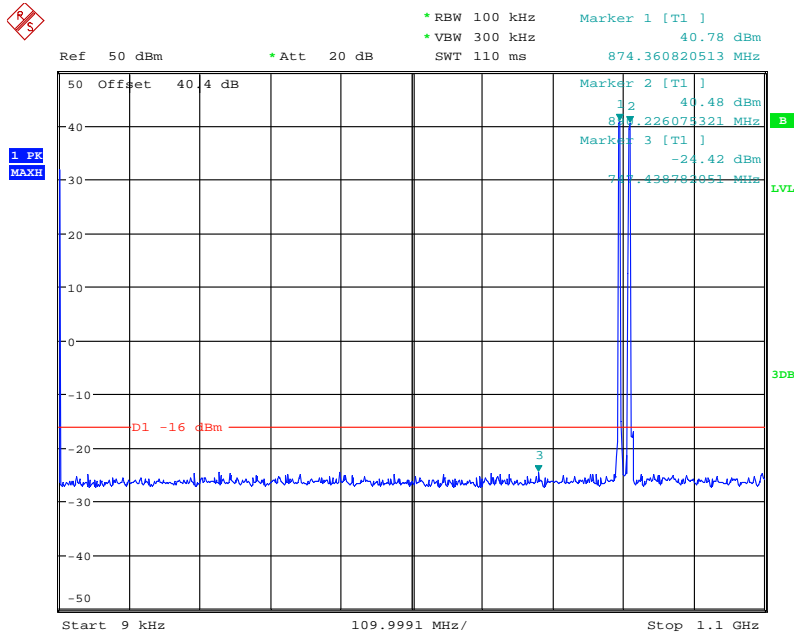


Date: 21.JUN.2013 13:21:14



Configuration 1 - Mode 5

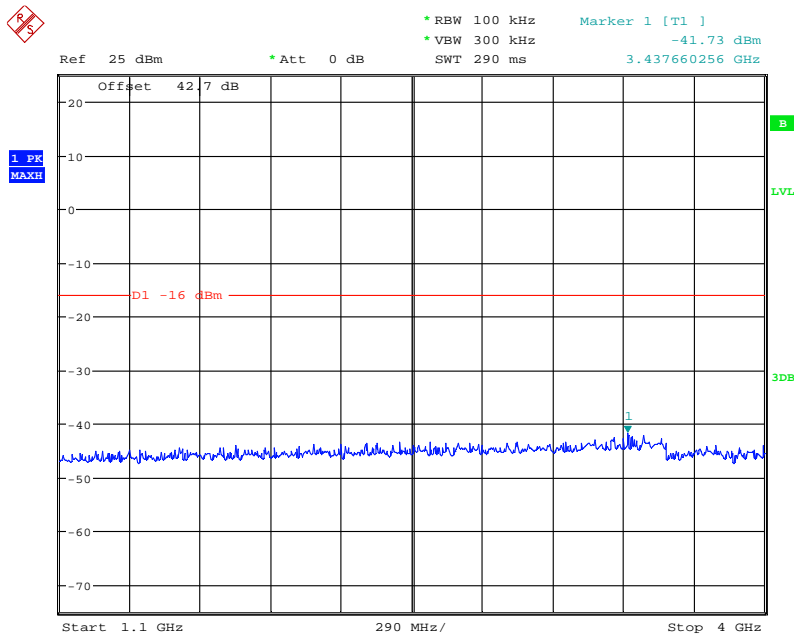
9kHz to 1.1GHz



Date: 21.JUN.2013 16:02:12

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

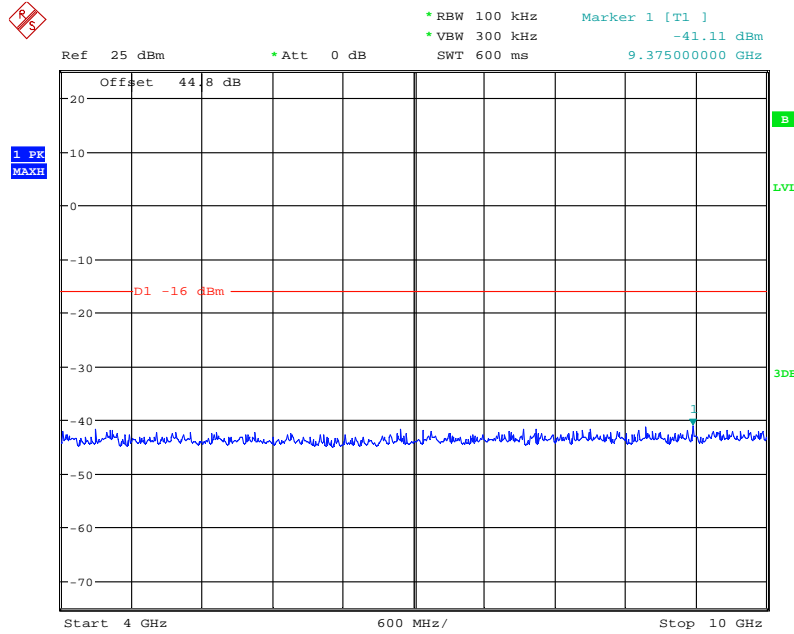
1.1GHz to 4GHz



Date: 21.JUN.2013 16:04:08



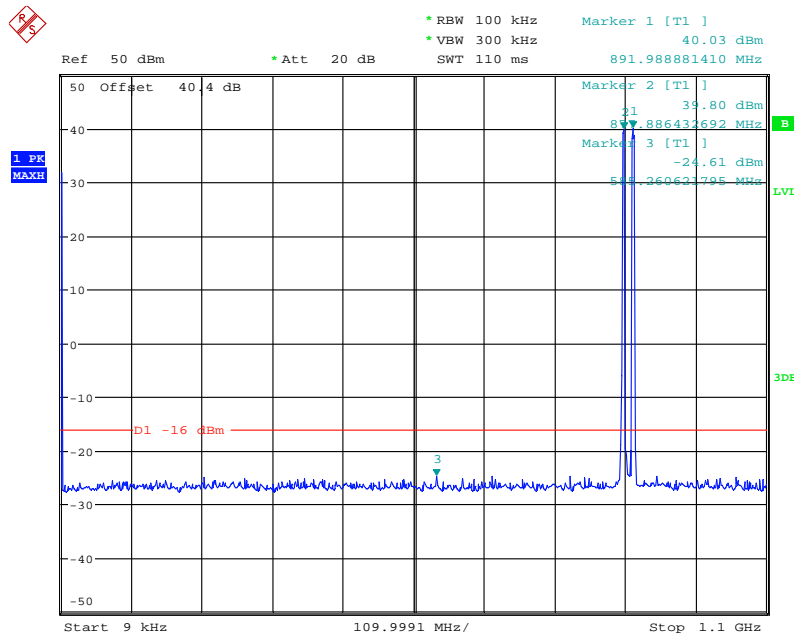
4GHz to 10GHz



Date: 21.JUN.2013 16:03:20

Configuration 1 - Mode 6

9kHz to 1.1GHz

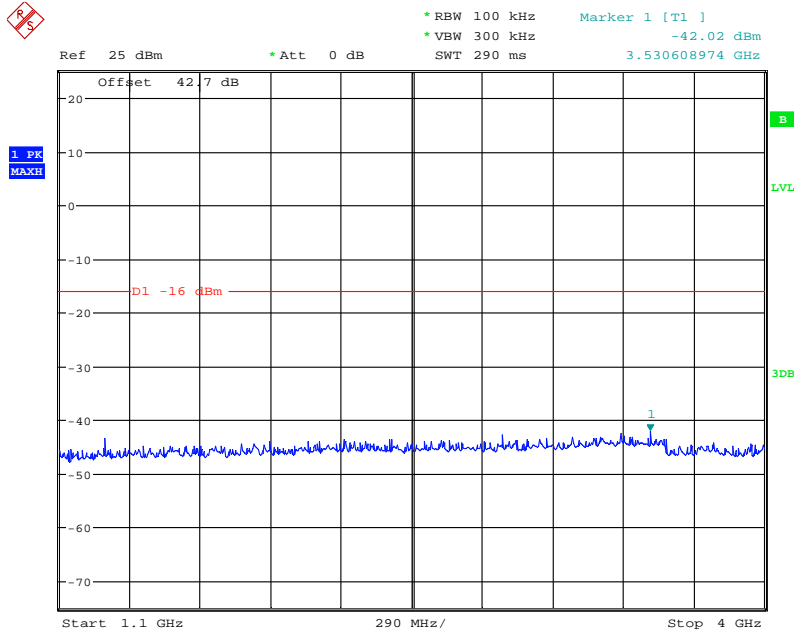


Date: 21.JUN.2013 15:50:12

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

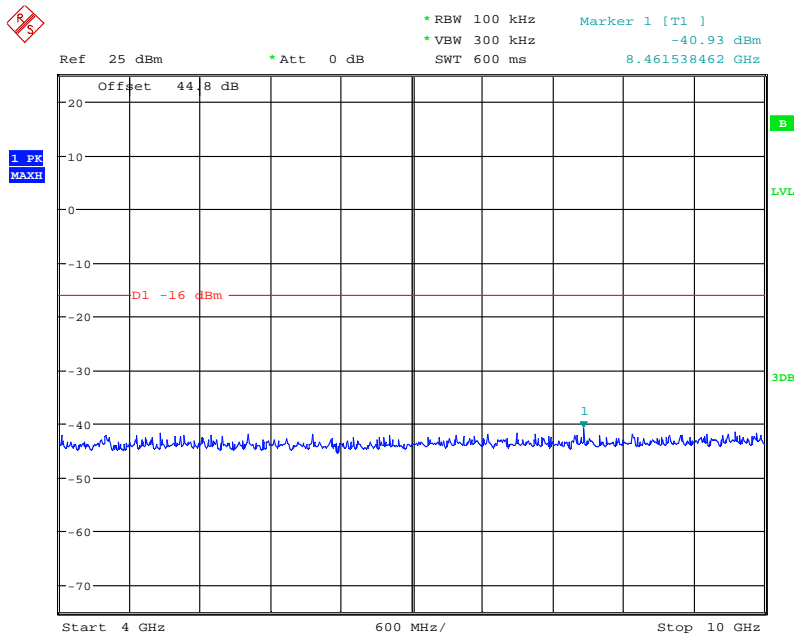


1.1GHz to 4GHz



Date: 21.JUN.2013 15:47:57

4GHz to 10GHz



Date: 21.JUN.2013 15:47:09

Remarks

The EUT does not exceed -16dBm at the frequency range of 9kHz to 10GHz.



Product Service

2.6 RECEIVER SPURIOUS EMISSIONS

2.6.1 Specification Reference

FCC CFR 47 Part 15, Clause 15.111

2.6.2 Equipment Under Test

RUS 01 B5 / KRC 118 64/2, S/N: C824937848

2.6.3 Date of Test and Modification State

21 and 24 June 2013 – 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.

In accordance with FCC CFR 47 Part 15 Clause 15.111, the receiver spurious emissions from the antenna terminal were measured. Measurements were performed on the receiver antenna connector RF B1. The EUT was set to transmitter mode on the TX connector RF A1 and during the measurement the RF A1 was terminated with match load, (50 Ohm).

The resolution was set to 1MHz in the frequency range 9kHz to 15GHz. The spectrum analyzer detector was set to peak and trace was kept on Max Hold to give the worst case. The limit line that apply is -57dBm, 2 nanowatts in band 9kHz to 15GHz.

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

Measurements were made from 9kHz up to at least 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 2
- Mode 5

2.6.6 Environmental Conditions

	21 June 2013	24 June 2013
Ambient Temperature	24.0°C	22.2°C
Relative Humidity	59.0%	63.5%



Product Service

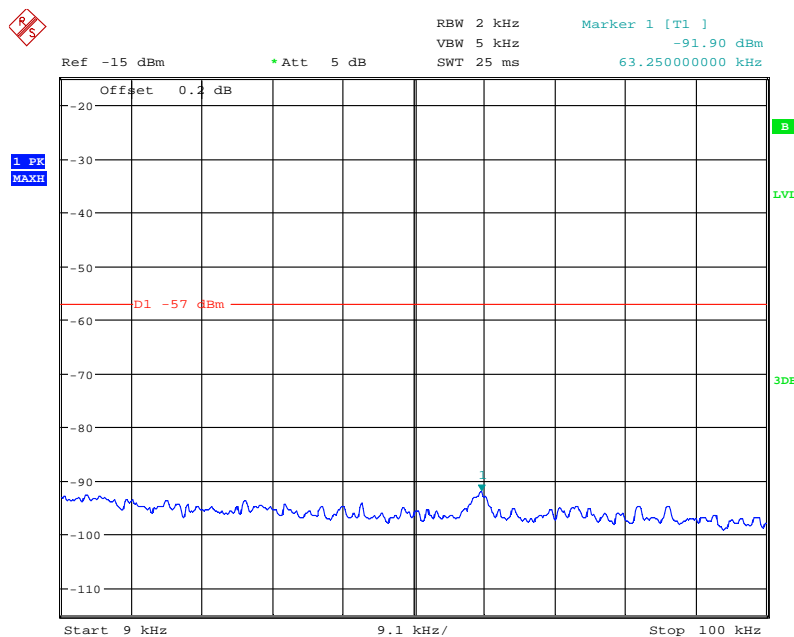
2.6.7 Test Results

For the period of test the EUT met the requirements of FCC CFR 47 Part 15 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.



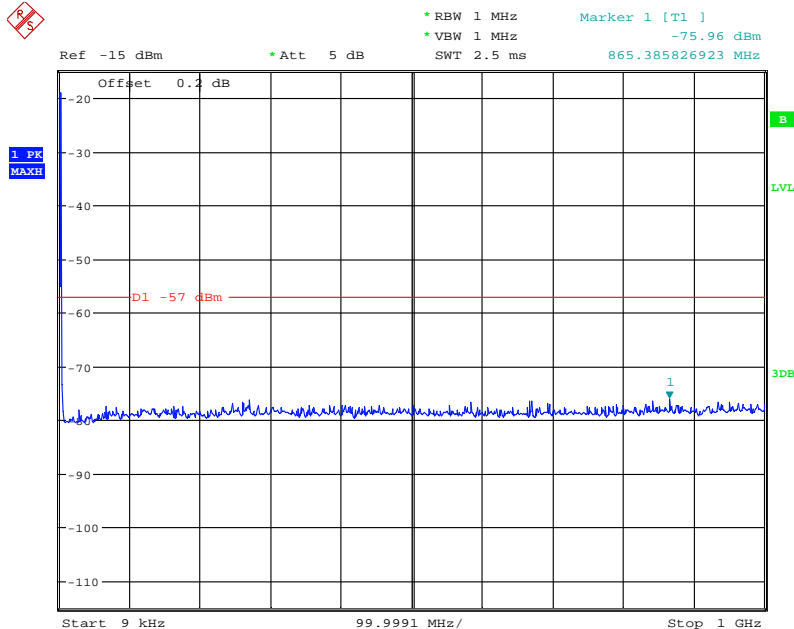
Date: 21.JUN.2013 16:12:38



Single Carrier:

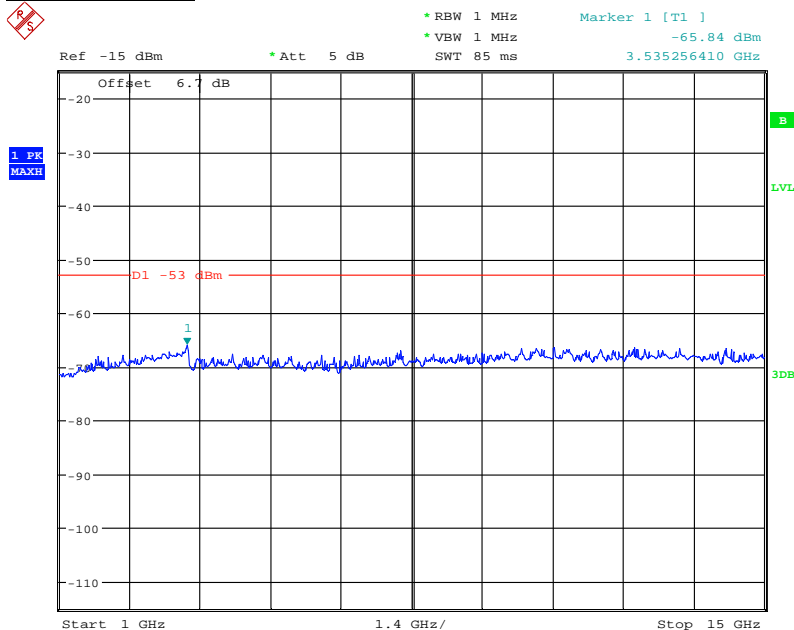
Configuration 1 - Mode 2

9kHz to 1GHz



Date: 24.JUN.2013 15:05:06

1GHz to 15GHz



Date: 24.JUN.2013 15:06:11

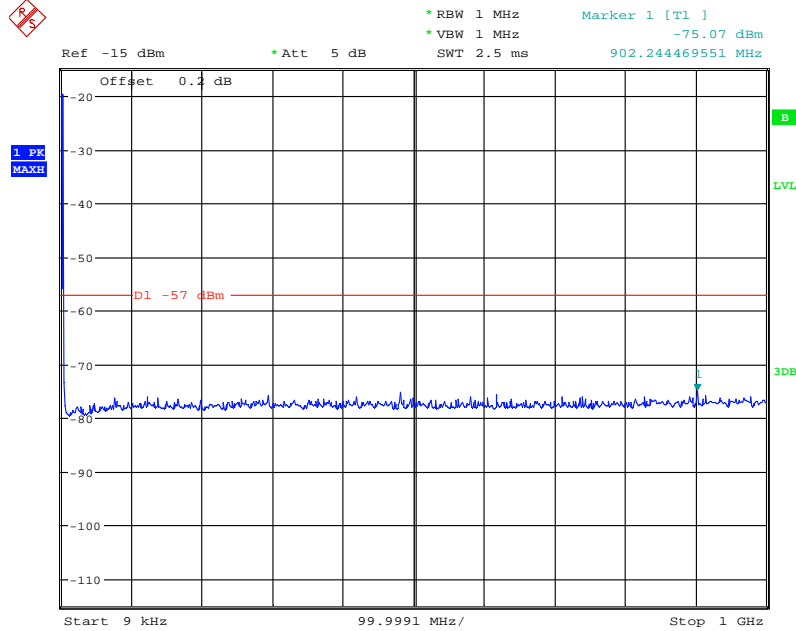
Note: The results above 1 GHz should be compared to a limit of -57dBm.



Multi Carrier(x2):

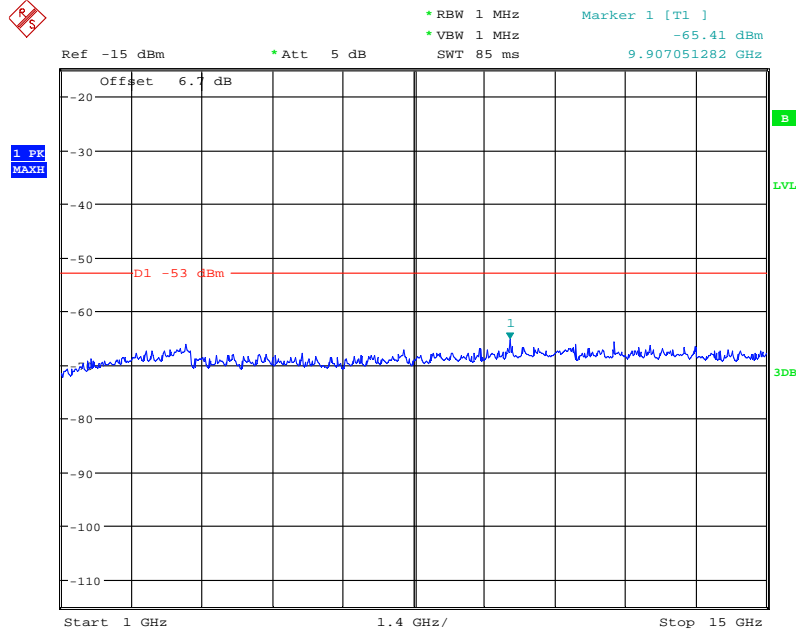
Configuration 1 - Mode 5

9kHz to 1GHz



Date: 21.JUN.2013 16:09:12

1GHz to 15GHz



Date: 21.JUN.2013 16:11:08

Note: The results above 1 GHz should be compared to a limit of -57dBm.



Product Service

Limit

Receiver spurious emissions shall not exceed -57dBm / 2 nanowatts in the band 9kHz to 15GHz.

Remarks

The EUT does not exceed the limit at the frequency range of 9kHz to 15GHz.



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, 2.5, 2.6 – Maximum Conducted Output Power, Peak – Average Ratio, Spurious Emissions at Antenna Terminals (± 1MHz), Conducted Spurious Emissions and Receiver Spurious Emission.					
Spectrum Analyser	Rohde & Schwarz	FSQ26	200235	12	06-Sep-2013
Power Meter	Rohde & Schwarz	NRP	102625	12	12-Aug-2013
Power Sensor	Rohde & Schwarz	NRP-Z51	102433	12	12-Aug-2013
Network Analyzer	Agilent	8720D	US36140166	12	06-Sep-2013
30dB Attenuator	XHS	DTS100	04081801	-	O/P MON
10dB Attenuator	Weinschel Crop	48-10-43	BB8290	-	O/P MON
Pass Filter	K&L	ULK 904 098/2	16	-	O/P MON
Load	Shanghai Huaxiang	TF100	09121648	-	O/P MON
Load	Shanghai Huaxiang	TFE5-3	090323194	-	O/P MON
Load	Shanghai Huaxiang	TFE5-3	090323220	-	O/P MON
Power Supply	Dahua	DH1716-5D	2008040041	-	O/P MON
Power Supply	Dahua	DH1716-5D	2008040050	-	O/P MON
Power Supply	Dahua	DH1716-5D	20030062	-	O/P MON
Section 2.4 – Radiated Spurious Emissions					
Load	Shanghai Huaxiang	TF100	09121648	-	O/P MON
Load	Shanghai Huaxiang	TF100	09121605	-	O/P MON
Load	Shanghai Huaxiang	TFE5-3	090323194	-	O/P MON
Load	Shanghai Huaxiang	TFE5-3	090323220	-	O/P MON
EMI Receiver	Rohde & Schwarz	ESI 40	100015	12	19-Aug-2013
Ultra log test antenna	Rohde & Schwarz	HL562	100167	12	19-Aug-2013
Double-Ridged Waveguide Horn Antenna	Rohde & Schwarz	HF 906	100029	12	19-Aug-2013
Pyramidal Horn Antenna	EMCO	3160-09	-	-	-
Antenna master	Frankonia	MA 260	-	12	19-Aug-2013
Relay Switch Unit	Rohde & Schwarz	331.1601.31	338965002	-	TU
Semi Anechoic Chamber	Frankonia	23.18m×16.88 m×9.60m	-	12	19-Aug-2013
Power Supply	Dahua	DH1716-5D	2008040041	-	O/P MON
Power Supply	Dahua	DH1716-5D	2008040050	-	O/P MON
Power Supply	Dahua	DH1716-5D	20030062	-	O/P MON
Digital Multimeter	FLUKE	179	91820401	12	13-Dec-2013
Thermo-hygrometer	AZ Instruments	8705	9151655	12	16-Dec-2013

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



Product Service

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*
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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