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Report On

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

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

Document 75926461 Report 03 Issue 2

July 2014



Product Service

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Ericsson RRUS 01 B2 / KRC 118 74/1

Document 75926461 Report 03 Issue 2

July 2014

PREPARED FOR

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G Zhao
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APPROVED BY


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DATED

21 July 2014

ENGINEERING STATEMENT

The measurements shown in this report were made in accordance with the procedures described on test pages. All reported testing was carried out on a sample equipment to demonstrate compliance with FCC CFR 47: Part 24 and Industry Canada RSS-133. The sample tested was found to comply with the requirements defined in the applied rules.

Test Engineer(s);


G Zhao


X Zhang





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SECTION 1

REPORT SUMMARY

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



1.1 INTRODUCTION

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

Testing was carried out in support of a C2PC application for Grant of RRUS 01 B2 / KRC 118 74/1 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 B2
Product Number	KRC 118 74/1
IC Model Number	AS118741
Serial Number(s)	CB4J094486, CF80011783
Software Version	CXP9021719 Rev R2JA61
PIS Software Version	CXP9017316/1 Rev R25SE
Hardware Version	R1E
Number of Samples Tested	2
Test Specification/Issue/Date	FCC CFR 47 Part 24: 2013 Industry Canada RSS-133 Issue 6: 2013
Incoming Release Date	Declaration of Build Status 12 June 2014
Order Number Date	PTP 12 June 2014
Start of Test	13 June 2014
Finish of Test	01 July 2014
Name of Engineer(s)	G Zhao X Zhang
Related Document(s)	ANSI C63.4: 2009 ANSI/TIA-603-C-2004 FCC CFR 47 Part 2: 2013 Industry Canada RSS-GEN Issue 3: 2010 Industry Canada SRSP510 Issue 5: 2009

This report has been up issued to Issue 2 and should be read in place of Issue 2. This report has been up issued to replace the PIS Software Version , which was incorrect



1.2 BRIEF SUMMARY OF RESULTS

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

Configuration 1 – Radio Equipment							
Section	Spec Clause		Test Description	Mode	Mod State	Result	Comments
	FCC Part 2 and 24	RSS-133 and RSS-GEN					
	24.232 (a)	6.4	Effective Radiated Power	1932.4MHz		N/A	No integral antenna.
				1960.0MHz		N/A	
				1987.6MHz		N/A	
				1932.4MHz + 1947.4MHz		N/A	
				1952.4MHz + 1967.4MHz		N/A	
				1972.6MHz + 1987.6MHz		N/A	
				1932.4MHz + 1937.4MHz + 1942.4MHz + 1947.4MHz		N/A	
				1952.4MHz + 1957.4MHz + 1962.4MHz + 1967.4MHz		N/A	
				1972.6MHz + 1977.6MHz + 1982.6MHz + 1987.6MHz		N/A	
2.1	2.1046, 24.232 (a)	6.4	RF Output Power - Conducted	1932.4MHz	0	Pass	-
				1960.0MHz	0	Pass	
				1987.6MHz	0	Pass	
				1932.4MHz + 1947.4MHz	0	Pass	
				1952.4MHz + 1967.4MHz	0	Pass	
				1972.6MHz + 1987.6MHz	0	Pass	
				1932.4MHz + 1937.4MHz + 1942.4MHz + 1947.4MHz	0	Pass	
				1952.4MHz + 1957.4MHz + 1962.4MHz + 1967.4MHz	0	Pass	
				1972.6MHz + 1977.6MHz + 1982.6MHz + 1987.6MHz	0	Pass	
2.2	24.232 (d)	6.4	Peak – Average Ratio	1932.4MHz	0	Pass	-
				1960.0MHz	0	Pass	
				1987.6MHz	0	Pass	
				1932.4MHz + 1947.4MHz	0	Pass	
				1952.4MHz + 1967.4MHz	0	Pass	
				1972.6MHz + 1987.6MHz	0	Pass	
				1932.4MHz + 1937.4MHz + 1942.4MHz + 1947.4MHz	0	Pass	
				1952.4MHz + 1957.4MHz + 1962.4MHz + 1967.4MHz	0	Pass	
				1972.6MHz + 1977.6MHz + 1982.6MHz + 1987.6MHz	0	Pass	



Configuration 1 – Radio Equipment							
Section	Spec Clause		Test Description	Mode	Mod State	Result	Comments
	FCC Part 2 and 24	RSS-133 and RSS-GEN					
2.3	2.1049, 24.238 (b)	RSS-Gen 4.6.1	Occupied Bandwidth	1932.4MHz	0	Pass	-
				1960.0MHz	0	Pass	
				1987.6MHz	0	Pass	
2.4	2.1051, 24.238 (b)	6.5	Spurious Emissions at Antenna Terminals (± 1 MHz)	1932.4MHz	0	Pass	-
				1987.6MHz	0	Pass	
				1932.4MHz + 1937.4MHz	0	Pass	
				1982.6MHz + 1987.6MHz	0	Pass	
2.5	2.1053, 24.238 (a)	6.5	Radiated Spurious Emissions	1932.4MHz	0	Pass	-
				1960.0MHz	0	Pass	
				1987.6MHz	0	Pass	
				1952.4MHz + 1967.4MHz	0	Pass	
2.6	2.1051, 24.238 (a)	6.5	Conducted Spurious Emissions	1952.4MHz + 1957.4MHz + 1962.4MHz + 1967.4MHz	0	Pass	-
				1932.4MHz	0	Pass	
				1960.0MHz	0	Pass	
				1987.6MHz	0	Pass	
				1932.4MHz + 1947.4MHz	0	Pass	
				1952.4MHz + 1967.4MHz	0	Pass	
	2.1055, 24.235	6.3	Frequency Stability Under Temperature Variations	1972.6MHz + 1987.6MHz	0	Pass	
				1932.4MHz		NT	Not tested due to C2PC
				1960.0MHz		NT	
	2.1055, 24.235	6.3	Frequency Stability Under Voltage Variations	1987.6MHz		NT	Not tested due to C2PC
				1932.4MHz		NT	
				1960.0MHz		NT	

N/A – Not Applicable
NT - Not Test



1.3 DECLARATION OF BUILD STATUS

MAIN EUT	
MANUFACTURING DESCRIPTION	Radio Equipment
MANUFACTURER	Ericsson AB
PRODUCT NUMBER	RUS 01 B2
PART NUMBER	KRC 118 74/1
IC Model NUMBER	AS118741
SERIAL NUMBER	CB4J094486, CF80011783
HARDWARE VERSION	R1E
SOFTWARE VERSION	CXP9021719 Rev R2JA61
PIS SOFTWARE VERSION	CXP9017316/1 Rev R25SE
TRANSMITTER OPERATING RANGE	TX: 1930MHz - 1990MHz RX: 1850MHz - 1910MHz
MODULATIONS	QPSK, 16QAM, 64QAM
ITU DESIGNATION OF EMISSION	5M00F9W
CHANNEL BANDWIDTH	4.2 to 5MHz (configurable in steps of 100/200kHz)
OUTPUT POWER (RMS) (W or dBm)	MIMO: Single Carrier: 1 x 47.0dBm per port (1 x 50W 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
NUMBER OF ANTENNA PORTS	MIMO 2 x 2: 2TX/RX ports and 2RX ports are supported by combining two Radio Units.
FCC ID	TA8AKRC11874-1
IC ID	287AB-AS118741
TECHNICAL DESCRIPTION (a brief description of the intended use and operation)	The equipment is the Radio Part of WCDMA Base Station.

Signature

Date

15 June 2014

D of B S Serial No

75926461/03

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



1.4 PRODUCT INFORMATION

1.4.1 Technical Description

The Equipment Under Test (EUT) RRUS 01 B2 / KRC 118 74/1 is an Ericsson Radio Equipment working in the public mobile service 1900MHz band which provides communication connections to WCDMA network. The RRUS 01 B2 / KRC 118 74/1 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 24 and Industry Canada RSS-133.

The RRUS 01 B2 / KRC 118 74/1 supports Test Models TM1, TM5 and TM6 at 1900MHz defined in 3GPP TS 25.141. Test Model 1 (TM1) uses the QPSK modulation, Test Model 5 (TM5) includes the 16QAM modulation and Test Model 6 (TM6) includes 64QAM modulation.

The EUT can be configured to transmit in 1900MHz mode with one TX/RX Port (RF A) and one RX Port (RF B). By combining two EUTs together, they can also be configured to transmit in MIMO mode with two TX/RX Ports (RF A1, RF A2) and two RX Ports (RF B1, RF B2). Only MIMO mode was used for measurements in this report.

The Maximum Output Power was tested on both TX/RX output connector RF A1 and RF A2, all other TX measurements were performed on the combined TX/RX output connector RF A1 of the EUT as the representative port.

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 traffic scenarios when several settings, with the different modulations and the number of carriers were tested to find the worst case setting. After the measured results were compared, the following settings were used for all measurements unless otherwise noted:

MIMO:

Single carrier

Test Model1 (TM1): 64 DPCHs at 30 ksps (SF=128)

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

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

Multi carrier (x 2)

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

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

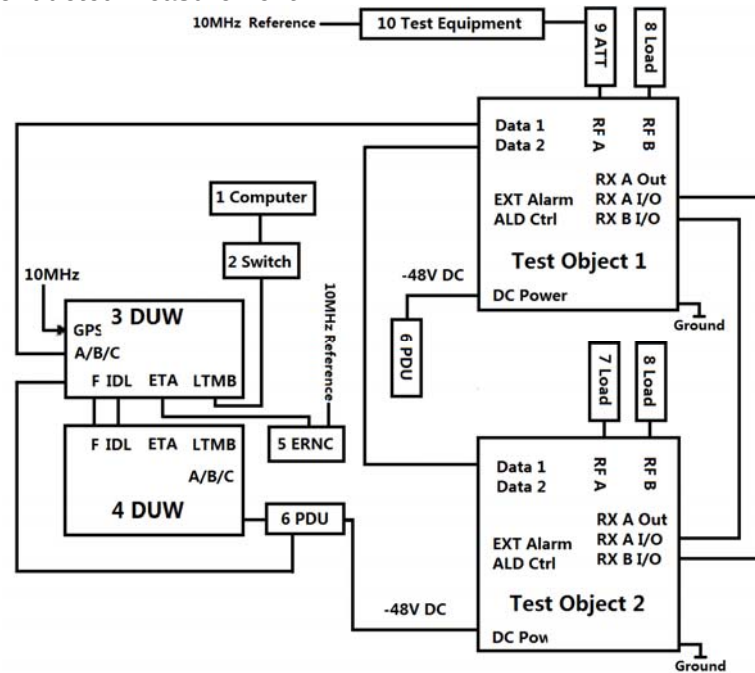
Test model 6 (TM6): 30 DPCHs at 30 ksps (SF=128) and 8 HS-PDSCHs at 240 ksps (SF=16)

Channel bandwidth 5MHz.

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

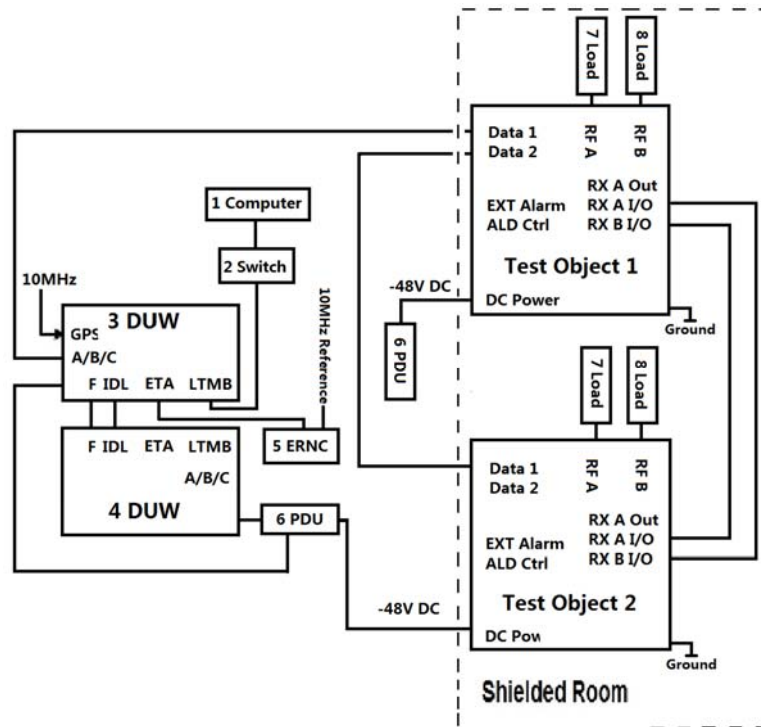


Test Setup, Conducted Measurement:



Product Name	Product Number	Version	Serial Number
RUS 01 B2	KRC 118 74/1	R1E	CB4J094486
RUS 01 B2	KRC 118 74/1	R1E	CF80011783

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 901 009/4	--	--
	DUW 30 01	KDU 127 161/3	R4F	TU8X969107
	SUP 6601	1/BFL 901 009/4	R1E	BR81844360
4	RBS 6601	BFL 901 009/1	--	--
	DUW 30 01	KDU 127 161/3	R4F	TU8X960825
	SUP 6601	1/BFL 901 009/1	R3B	BR81477047
5	ERNC SIM	FAB 102 614	--	ETC/L167
6	Power Supply	DH1716A-9	--	ETE/L676
7	Load	TF100	--	09121648
8	Load	TFE5-3	--	090323176
	Load	TFE5-3	--	090323220
9	40dB Attenuator	66-40-33	--	CD4019
10	Power Meter	Rohde & Schwarz NRP2	--	101283
	Power Sensor	Rohde & Schwarz NRP-Z51	--	102310
	Spectrum Analyzer	FSQ26	--	100253

**Test Setup, Radiated Measurement:**

Product Name	Product Number	Version	Serial Number
RUS 01 B2	KRC 118 74/1	R1E	CB4J094486
RUS 01 B2	KRC 118 74/1	R1E	CF80011783

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 901 009/4	--	--
4	DUW 30 01	KDU 127 161/3	R4F	TU8X969107
	SUP 6601	1/BFL 901 009/4	R1E	BR81844360
	RBS 6601	BFL 901 009/1	--	--
	DUW 30 01	KDU 127 161/3	R4F	TU8X960825
5	SUP 6601	1/BFL 901 009/1	R3B	BR81477047
	ERNC SIM	FAB 102 614	--	ETC/L167
6	Power Supply	DH1716A-9	--	ETE/L676
7	Load	TF100	--	09121648
	Load	TF100	--	09121605
8	Load	TFE5-3	--	090323176
	Load	TFE5-3	--	090323220



1.4.3 Modes of Operation

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

Mode 1 - ARFCN 9662: 1932.4MHz (Bottom Channel)

Mode 2 - ARFCN 9800: 1960.0MHz (Middle Channel)

Mode 3 - ARFCN 9938: 1987.6MHz (Top Channel)

Mode 4 - ARFCN 9662 + 9737: 1932.4MHz + 1947.4MHz (B and B+15MHz)

Mode 5 - ARFCN 9762 + 9837: 1952.4MHz + 1967.4MHz (M-7.6MHz and M+7.4MHz)

Mode 6 - ARFCN 9863 + 9938: 1972.6MHz + 1987.6MHz (T-15MHz and T)

Mode 7 - ARFCN 9662 + 9687: 1932.4MHz + 1937.4MHz (B and B+5MHz)

Mode 8 - ARFCN 9913 + 9938: 1982.6MHz + 1987.6MHz (T-5MHz and T)

Mode 9 - ARFCN 9662 + 9687 + 9712 + 9737:
1932.4MHz + 1937.4MHz + 1942.4MHz + 1947.4MHz (B, B+5MHz, B+10MHz and B+15MHz)

Mode 10 - ARFCN 9762 + 9787 + 9812 + 9837:
1952.4MHz + 1957.4MHz + 1962.4MHz + 1967.4MHz (M-7.6MHz, M-2.6MHz, M+2.4MHz and M+7.4MHz)

Mode 11 - ARFCN 9863 + 9888 + 9913 + 9938:
1972.6MHz + 1977.6MHz + 1982.6MHz + 1987.6MHz (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

Mod State 0 - No modifications were made to the EUT during testing.

1.8 ALTERNATIVE TEST SITE

Under our group UKAS Accreditation, TÜV SÜD Product Service conducted the following tests at Ericsson in Beijing, China:

- RF Output Power – Conducted
- Peak - Average Ratio
- Spurious Emissions at Antenna Terminals (± 1 MHz)
- Conducted Spurious Emissions

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 RRUS 01 B2 / KRC 118 74/1



Product Service

2.1 RF OUTPUT POWER - CONDUCTED

2.1.1 Specification Reference

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

2.1.2 Equipment Under Test

RRUS 01 B2 / KRC 118 74/1, S/N: CB4J094486, CF80011783

2.1.3 Date of Test and Modification State

13 to 19 June 2014 – Modification State 0

2.1.4 Test Equipment Used

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

2.1.5 Test Method and Operating Modes

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

Using a power meter and attenuator(s), the output power of the EUT was measured at the antenna terminal(s). The carrier power was measured with QPSK, 16QAM, 64QAM using the test models described.

Since the EUTs transmit on two antennas simultaneously in the same frequency range, i.e., TX MIMO mode, using the Measure-and-Sum approach, the output power at both antennas RF A1 and RF A2 were tested, and the total output power were then summed mathematically in linear power units according to FCC KDB 662911 D01 Multiple Transmitter Output v02r01.

The path loss was measured and entered to the power meter as a reference level offset to get the output power value directly.

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

Ambient Temperature 22.0 – 28.5°C

Relative Humidity 41.0 – 65.0%

2.1.7 Test Results

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

The test results are shown below

Declarative Maximum Output power:

Single Carrier of MIMO mode: 1 x 47.00dBm per port

Configuration 1 - Mode 1, 2 and 3

TM1

EARFCN	Frequency (MHz)	Result (RMS)						*Total (dBm) RMS	*Total (W) RMS
		RF A1			RF A2				
		dBm	W	dBm/MHz	dBm	W	dBm/MHz		
9662 (Bottom)	1932.4	47.02	50.35	41.65	46.90	48.98	41.43	49.97	99.33
9800 (Middle)	1960.0	47.01	50.23	41.39	46.88	48.75	41.28	49.96	98.99
9938 (Top)	1987.6	46.87	48.64	41.30	46.87	48.64	41.28	49.88	97.28

TM5

EARFCN	Frequency (MHz)	Result (RMS)						*Total (dBm) RMS	*Total (W) RMS
		RF A1			RF A2				
		dBm	W	dBm/MHz	dBm	W	dBm/MHz		
9662 (Bottom)	1932.4	47.01	50.23	41.65	46.89	48.87	41.37	49.96	99.10
9800 (Middle)	1960.0	47.01	50.23	41.42	46.87	48.64	41.32	49.95	98.87
9938 (Top)	1987.6	46.83	48.19	41.38	46.86	48.53	41.32	49.86	96.72

TM6

EARFCN	Frequency (MHz)	Result (RMS)						*Total (dBm) RMS	*Total (W) RMS
		RF A1			RF A2				
		dBm	W	dBm/MHz	dBm	W	dBm/MHz		
9662 (Bottom)	1932.4	46.82	48.08	41.43	46.64	46.13	41.20	49.74	94.22
9800 (Middle)	1960.0	46.83	48.19	41.37	46.68	46.56	41.21	49.77	94.75
9938 (Top)	1987.6	46.62	45.92	41.21	46.66	46.34	41.12	49.65	92.26

**Declarative Maximum Output power:****Multi Carrier (x2) of MIMO mode: 2 x 44.80dBm per port****Configuration 1 - Mode 4, 5 and 6****TM1**

UARFCN	Frequency (MHz)	RF A1		RF A2		Total (dBm) RMS	Total (W) RMS
		Result (dBm) RMS	Result (W) RMS	Result (dBm) RMS	Result (W) RMS		
9662 & 9737	1932.4 & 1947.4	47.73	59.29	47.61	57.68	50.68	116.97
9762 & 9837	1952.4 & 1967.4	47.77	59.84	47.75	59.57	50.77	119.41
9863 & 9938	1972.6 & 1987.6	47.80	60.26	47.65	58.21	50.74	118.47

TM5

UARFCN	Frequency (MHz)	RF A1		RF A2		Total (dBm) RMS	Total (W) RMS
		Result (dBm) RMS	Result (W) RMS	Result (dBm) RMS	Result (W) RMS		
9662 & 9737	1932.4 & 1947.4	47.70	58.88	47.67	58.48	50.70	117.36
9762 & 9837	1952.4 & 1967.4	47.78	59.98	47.70	58.88	50.75	118.86
9863 & 9938	1972.6 & 1987.6	47.78	59.98	47.67	58.48	50.74	118.46

TM6

UARFCN	Frequency (MHz)	RF A1		RF A2		Total (dBm) RMS	Total (W) RMS
		Result (dBm) RMS	Result (W) RMS	Result (dBm) RMS	Result (W) RMS		
9662 & 9737	1932.4 & 1947.4	47.55	56.89	47.43	55.34	50.50	112.23
9762 & 9837	1952.4 & 1967.4	47.56	57.02	47.51	56.36	50.55	113.38
9863 & 9938	1972.6 & 1987.6	47.54	56.75	47.45	55.59	50.51	112.34

**Declarative Maximum Output power:****Multi Carrier (x4) of MIMO mode: 4 x 41.80dBm per port****Configuration 1 - Mode 9, 10 and 11****TM1**

UARFCN	Frequency (MHz)	RF A1		RF A2		Total (dBm) RMS	Total (W) RMS
		Result (dBm) RMS	Result (W) RMS	Result (dBm) RMS	Result (W) RMS		
9662 & 9687 & 9712 & 9737	1932.4 & 1937.4 & 1942.4 & 1947.4	47.73	59.29	47.66	58.34	50.70	117.63
9762 & 9787 & 9812 & 9837	1952.4 & 1957.4 & 1962.4 & 1967.4	47.76	59.70	47.70	58.88	50.74	118.58
9863 & 9888 & 9913 & 9938	1972.6 & 1977.6 & 1982.6 & 1987.6	47.71	59.02	47.65	58.21	50.69	117.23

TM5

UARFCN	Frequency (MHz)	RF A1		RF A2		Total (dBm) RMS	Total (W) RMS
		Result (dBm) RMS	Result (W) RMS	Result (dBm) RMS	Result (W) RMS		
9662 & 9687 & 9712 & 9737	1932.4 & 1937.4 & 1942.4 & 1947.4	47.72	59.16	47.67	58.48	50.71	117.64
9762 & 9787 & 9812 & 9837	1952.4 & 1957.4 & 1962.4 & 1967.4	47.78	59.98	47.68	58.61	50.74	118.59
9863 & 9888 & 9913 & 9938	1972.6 & 1977.6 & 1982.6 & 1987.6	47.73	59.29	47.67	58.48	50.71	117.77

TM6

UARFCN	Frequency (MHz)	RF A1		RF A2		Total (dBm) RMS	Total (W) RMS
		Result (dBm) RMS	Result (W) RMS	Result (dBm) RMS	Result (W) RMS		
9662 & 9687 & 9712 & 9737	1932.4 & 1937.4 & 1942.4 & 1947.4	47.31	53.83	47.22	52.72	50.28	106.55
9762 & 9787 & 9812 & 9837	1952.4 & 1957.4 & 1962.4 & 1967.4	47.34	54.20	47.23	52.84	50.30	107.04
9863 & 9888 & 9913 & 9938	1972.6 & 1977.6 & 1982.6 & 1987.6	47.26	53.21	47.18	52.24	50.23	105.45

Note *:

Two transmitters output power were summed up according to FCC KDB662911 D01 Multiple Transmitter Output v02r01 for MIMO mode.

This unit is tested without antenna. ERP/EIRP compliance is addressed at the time of licensing, as required by the responsible FCC/IC Bureau(s). Licensees are required to take into account maximum allowed antenna gain used in combination with above power settings to prevent the radiated output power to exceeding the limits.



Product Service

Limit	FCC: $\leq 1640\text{W/MHz}$ or $\leq +62.15\text{dBm/MHz}$ IC: $\leq 100\text{W}$ or $\leq +50\text{dBm}$
-------	---

Remarks

The total output power of the EUT does not exceed 1640W/MHz or 62.15dBm/MHz, and the output power per transmitter does not exceed 100W or 50dBm at the measured frequencies.



Product Service

2.2 PEAK – AVERAGE RATIO

2.2.1 Specification Reference

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

2.2.2 Equipment Under Test

RRUS 01 B2 / KRC 118 74/1, S/N: CB4J094486, CF80011783

2.2.3 Date of Test and Modification State

13 to 19 June 2014 – Modification State 0

2.2.4 Test Equipment Used

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

2.2.5 Test Method and Operating Modes

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

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 ratio was measured with QPSK, 16QAM, 64QAM using the test models described.

The EUT was tested at its maximum power level and the spectrum analyzer measurement bandwidth was set to 50MHz. The measurements were performed on the combined output connector RF A1. Limited complementary measurements were done at output connector RF A2 to verify identical performance for both transmitter chains in MIMO mode.

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

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

Configuration 1 - Mode 1
 - Mode 2
 - Mode 3
 - Mode 4
 - Mode 5
 - Mode 6
 - Mode 9
 - Mode 10
 - Mode 11



Product Service

2.2.6 Environmental Conditions

Ambient Temperature 22.0 – 28.5°C

Relative Humidity 41.0 – 65.0%

2.2.7 Test Results

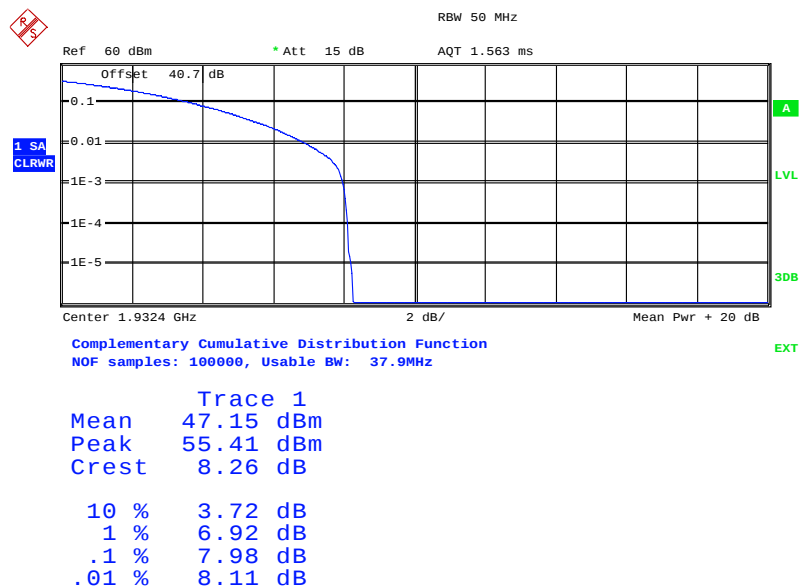
For the period of test the EUT met the requirements of FCC CFR 47 Part 24 Peak – Average Ratio.

The test results are shown below.

MIMO: Single Carrier

Configuration 1 - Mode 1

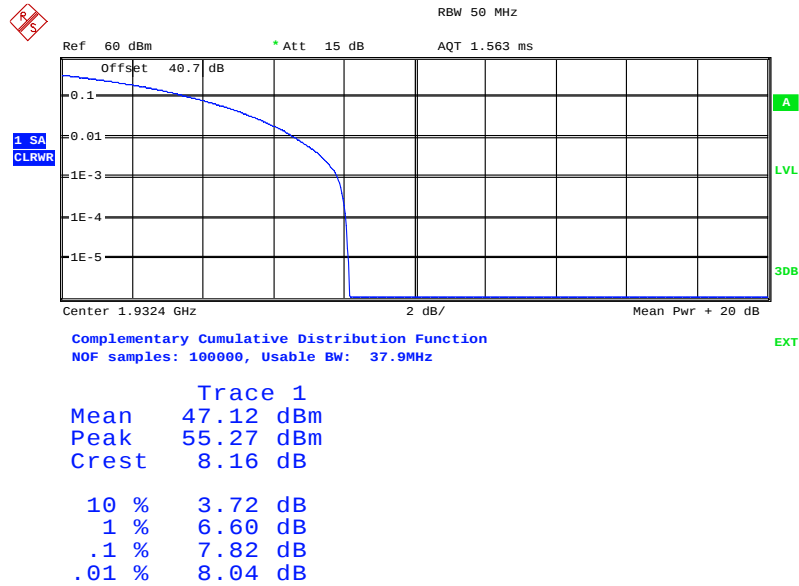
TM1



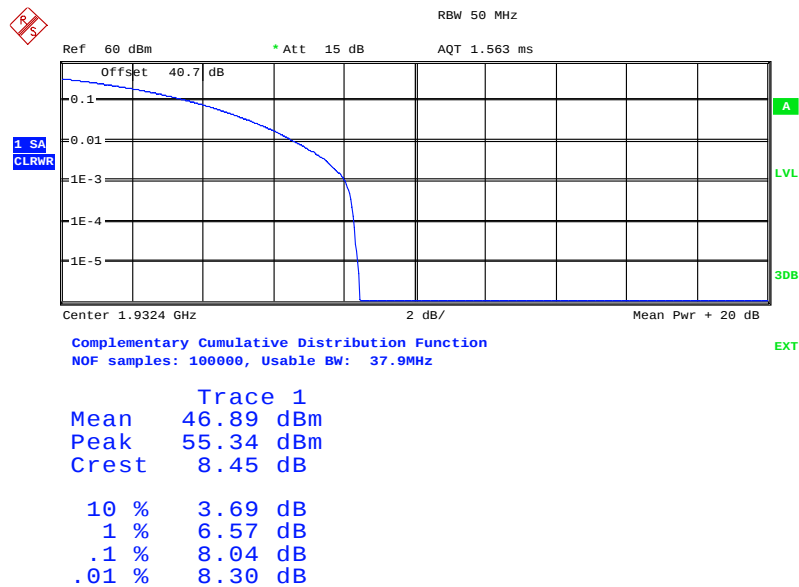
Date: 19. JUN. 2014 15:09:56



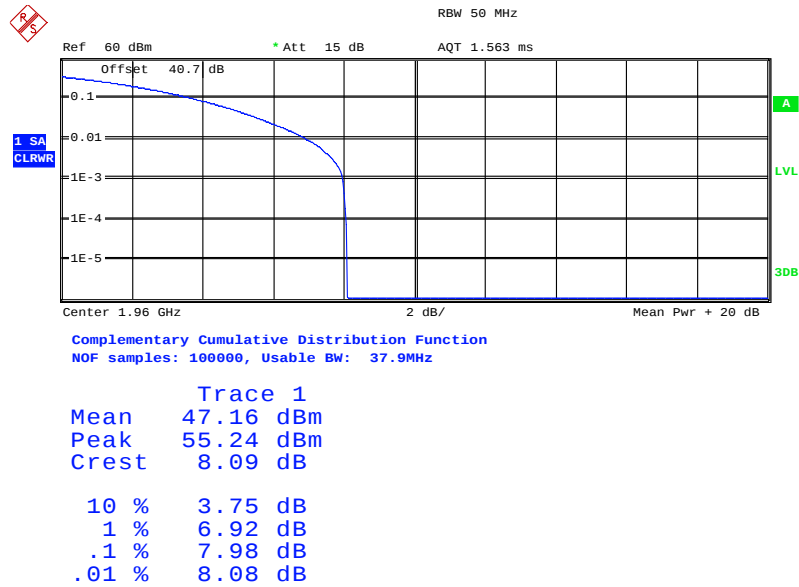
Product Service

TM5

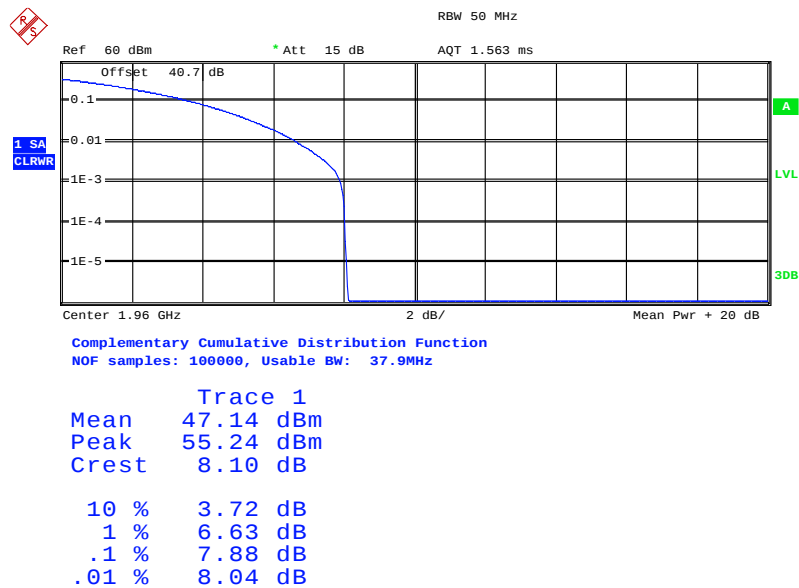
Date: 19.JUN.2014 15:41:53

TM6

Date: 19.JUN.2014 15:49:08

Configuration 1 - Mode 2TM1

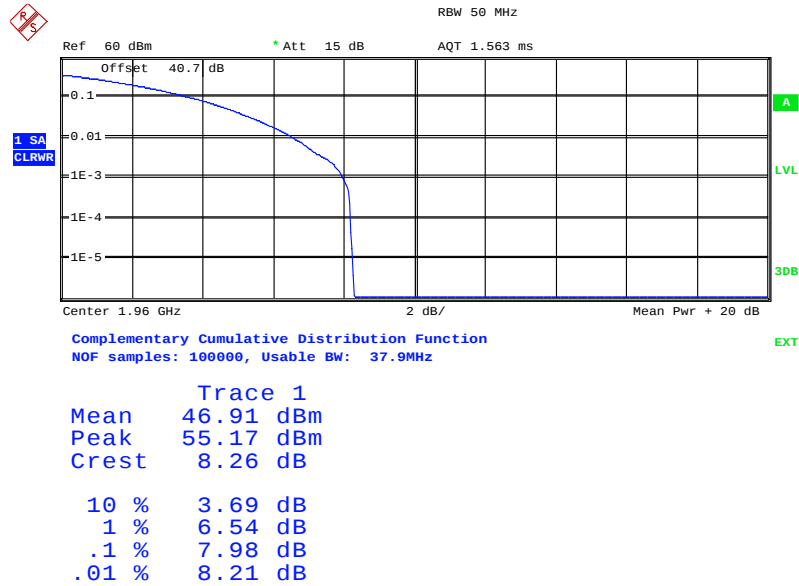
Date: 19.JUN.2014 10:24:35

TM5

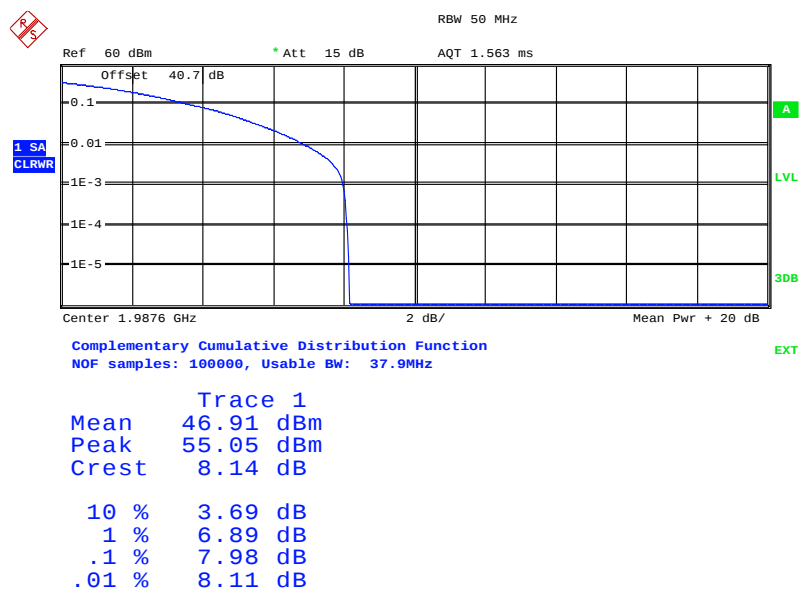
Date: 19.JUN.2014 11:03:13



Product Service

TM6

Date: 19.JUN.2014 14:25:11

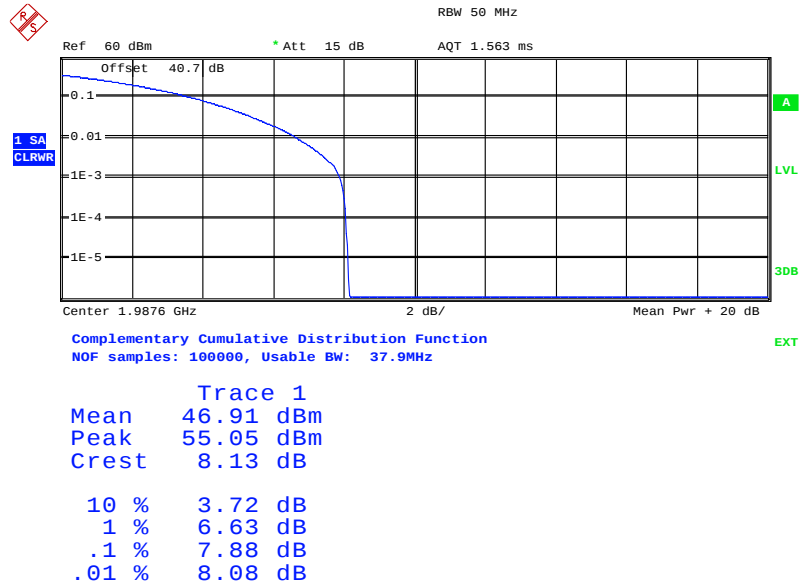
Configuration 1 - Mode 3TM1

Date: 19.JUN.2014 17:09:26



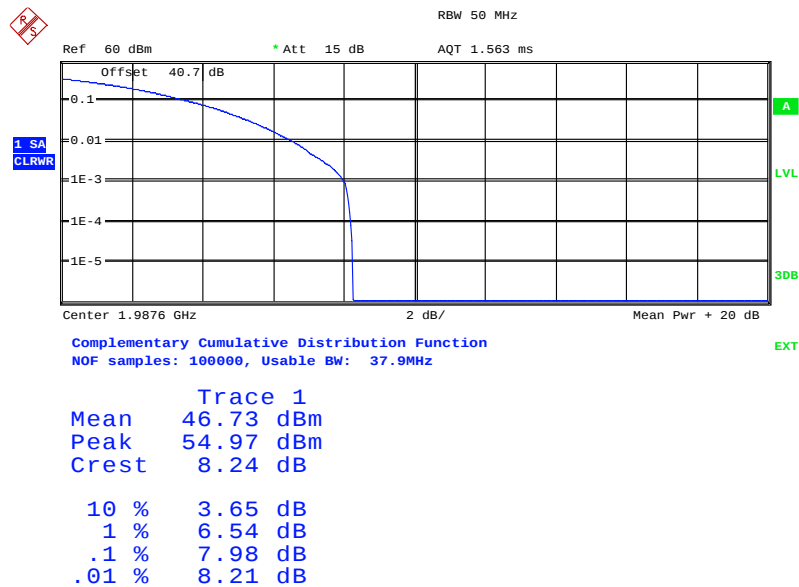
Product Service

TM5

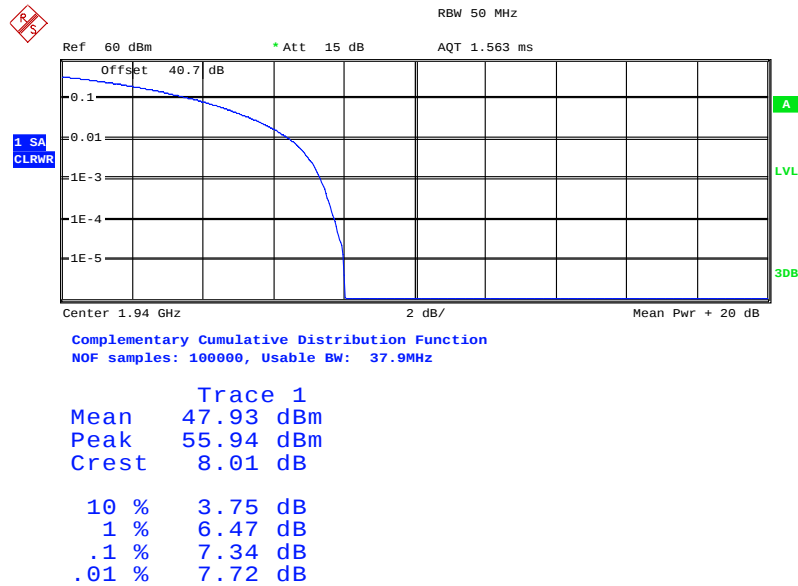


Date: 19.JUN.2014 16:37:35

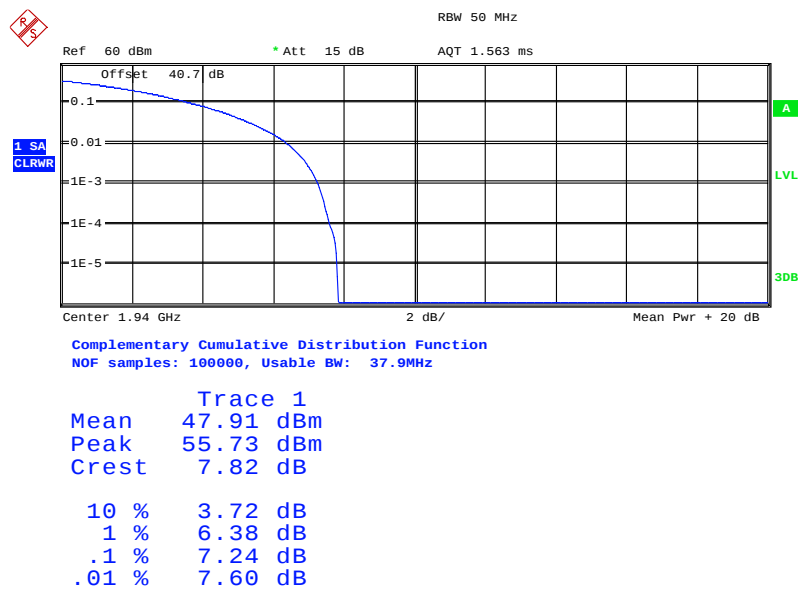
TM6



Date: 19.JUN.2014 16:24:07

**MIMO: Multi Carrier (x2)****Configuration 1 - Mode 4****TM1**

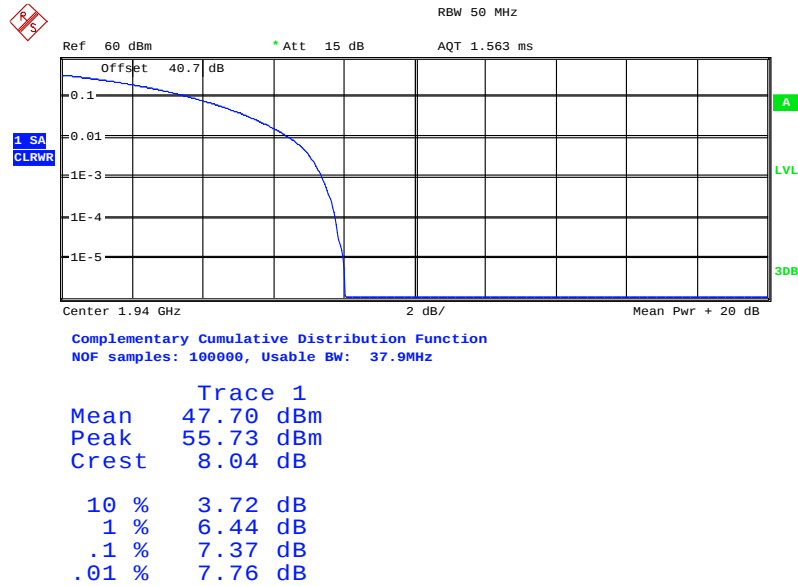
Date: 13.JUN.2014 14:51:39

TM5

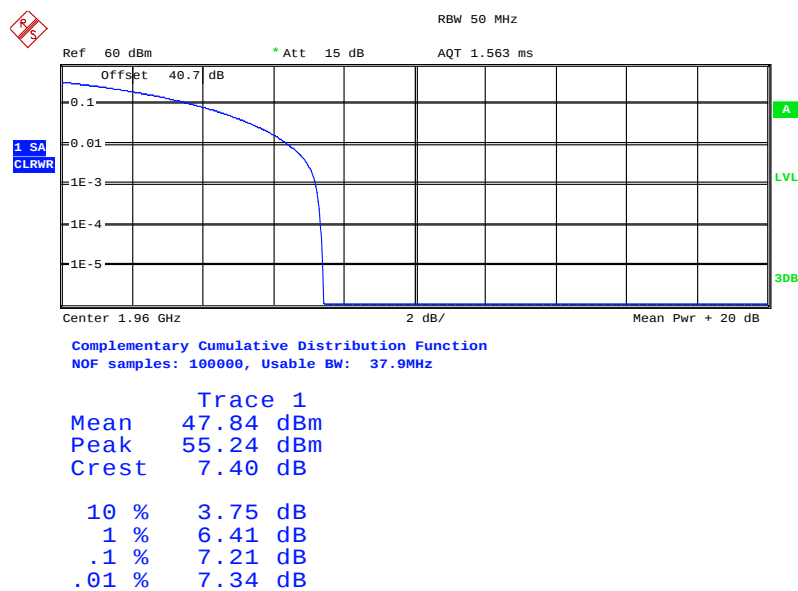
Date: 13.JUN.2014 16:52:05



Product Service

TM6

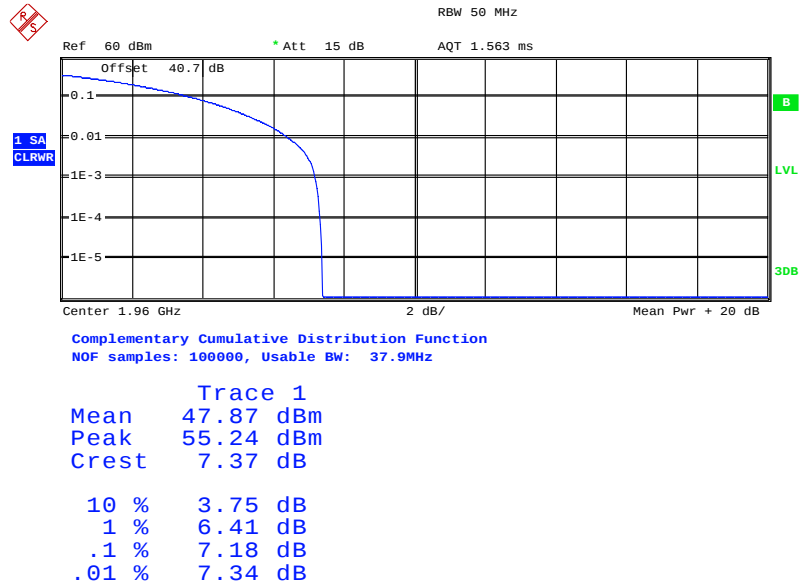
Date: 13.JUN.2014 17:01:59

Configuration 1 – Mode 5TM1

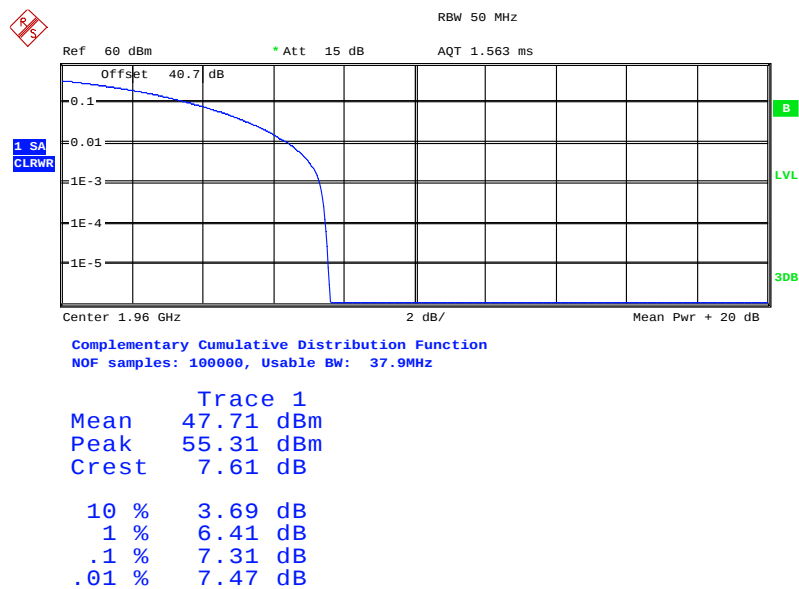
Date: 17.JUN.2014 10:03:30



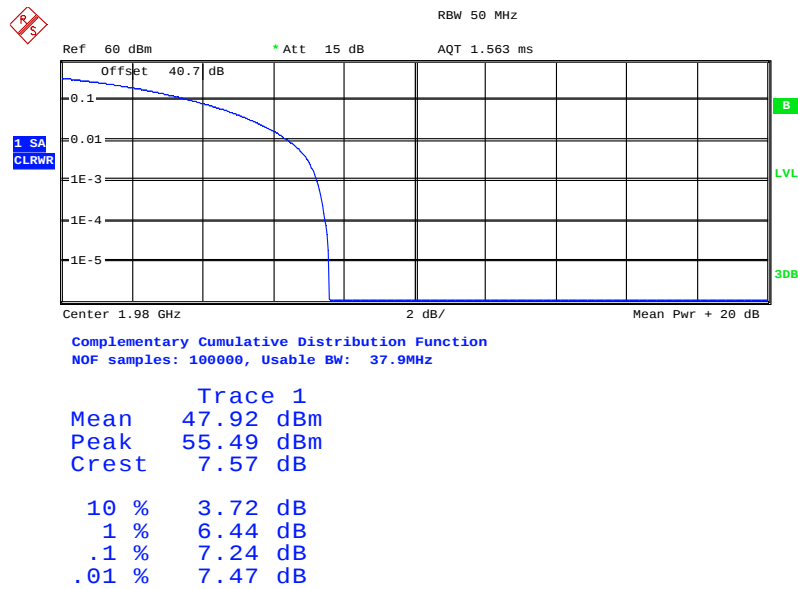
Product Service

TM5

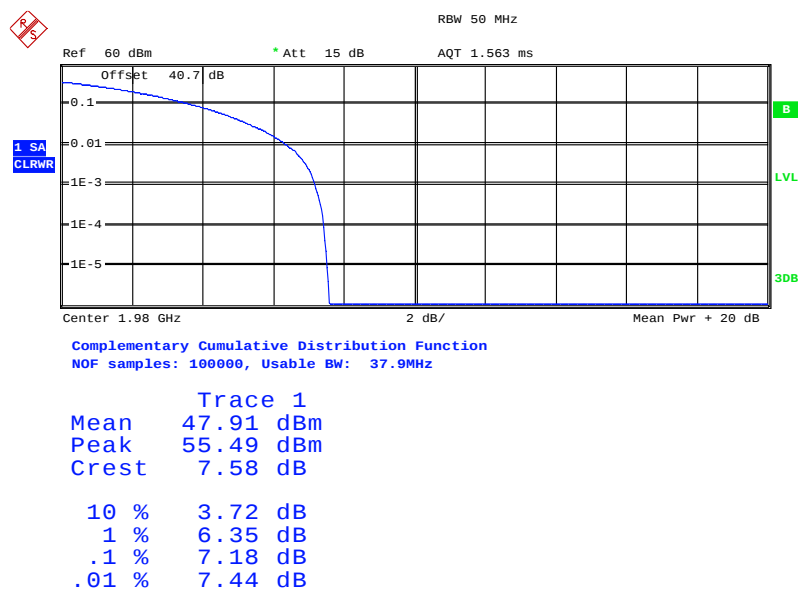
Date: 17.JUN.2014 10:47:36

TM6

Date: 17.JUN.2014 11:02:07

Configuration 1 – Mode 6TM1

Date: 17.JUN.2014 13:31:17

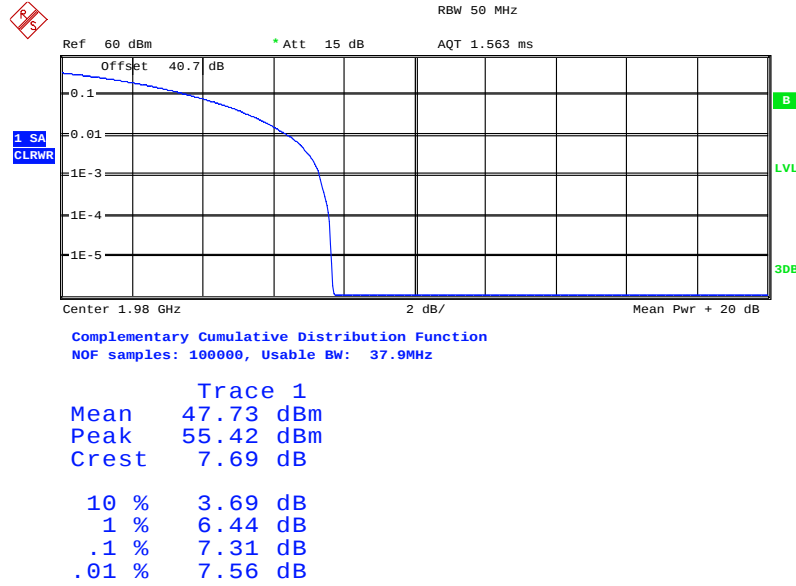
TM5

Date: 17.JUN.2014 13:56:04



Product Service

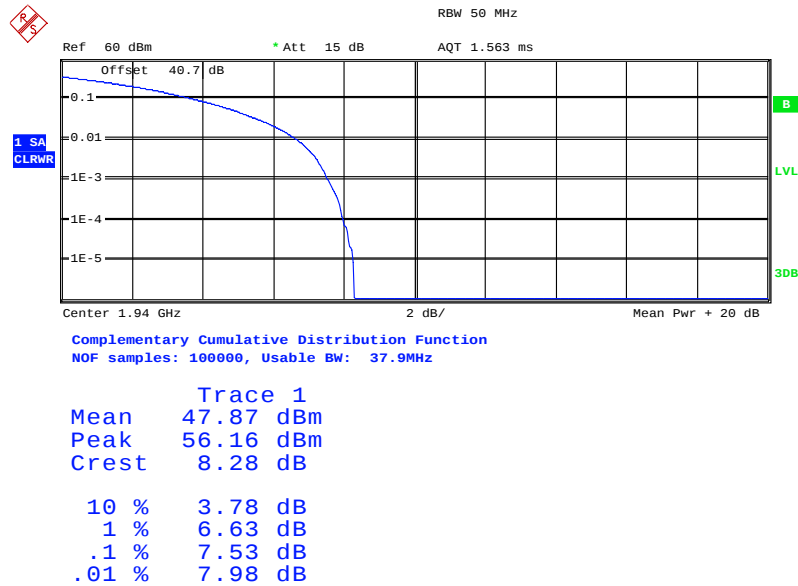
TM6



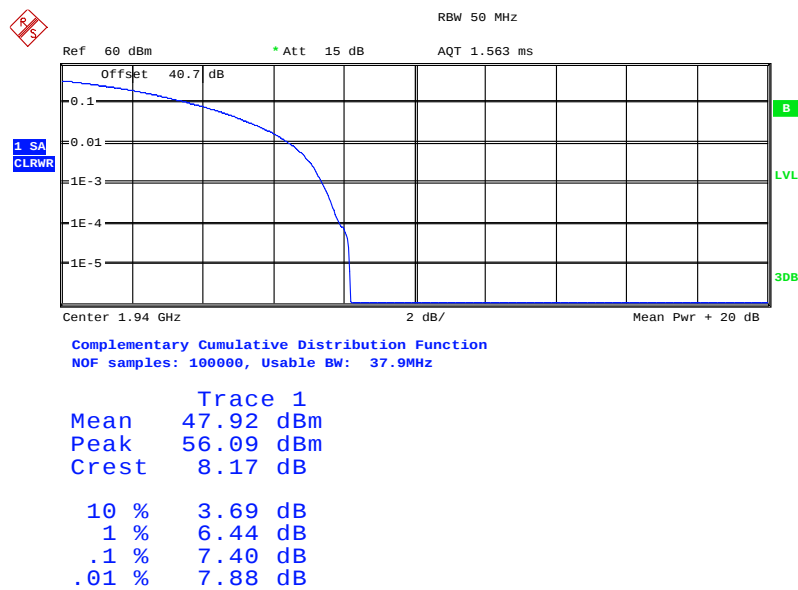
Date: 17.JUN.2014 14:11:33



Product Service

MIMO: Multi Carrier (x4)**Configuration 1 – Mode 9****TM1**

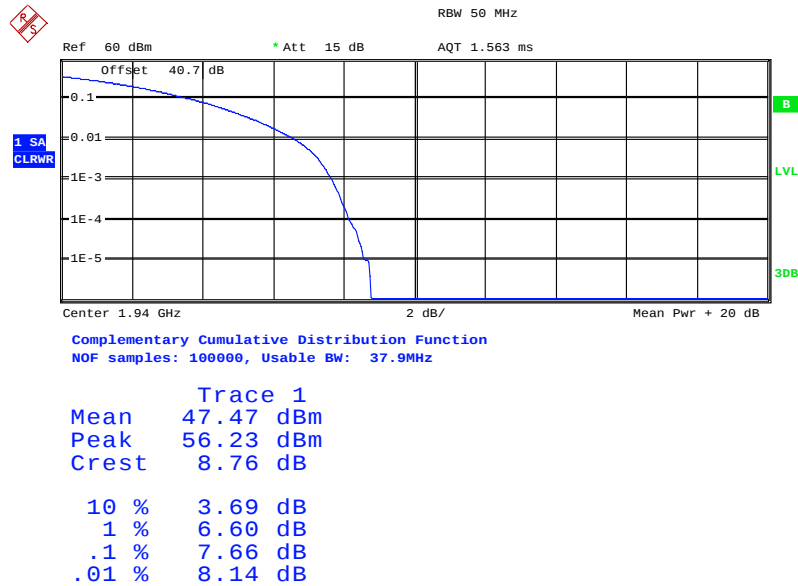
Date: 17.JUN.2014 16:22:56

TM5

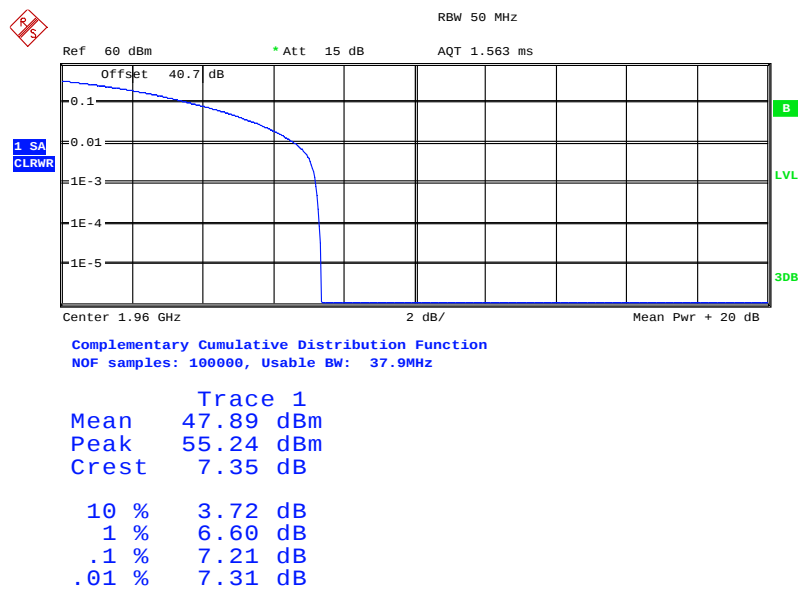
Date: 17.JUN.2014 16:11:15



Product Service

TM6

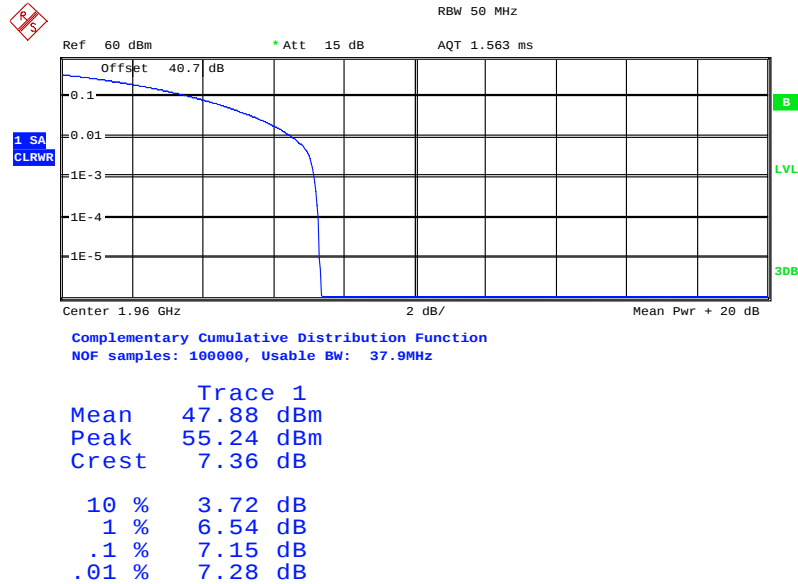
Date: 17.JUN.2014 15:50:53

Configuration 1 – Mode 10TM1

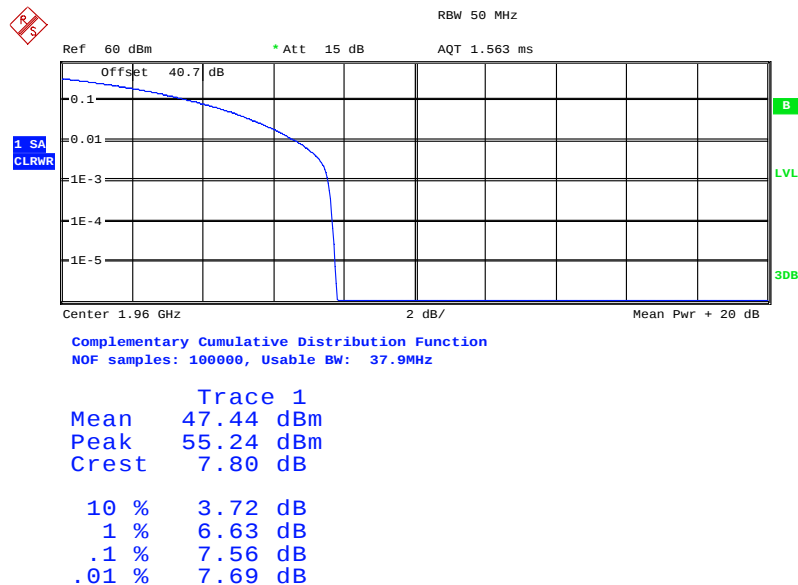
Date: 17.JUN.2014 16:45:28



Product Service

TM5

Date: 17.JUN.2014 16:59:20

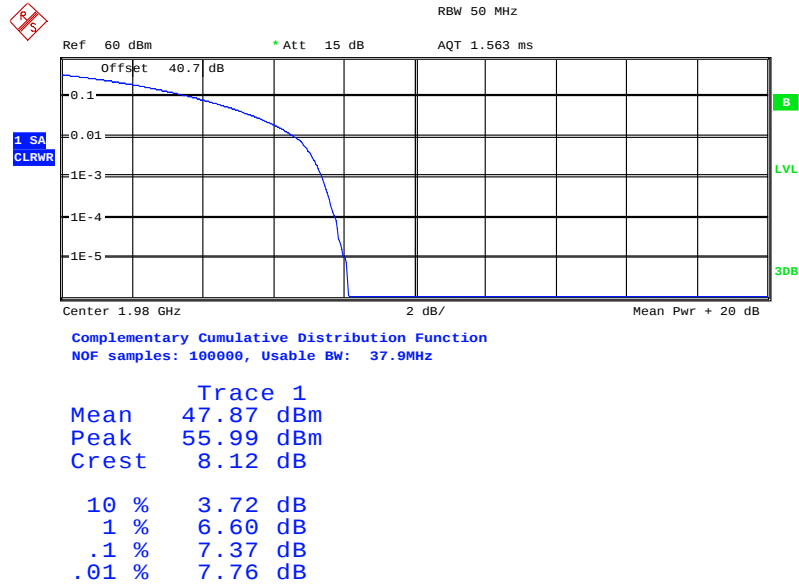
TM6

Date: 17.JUN.2014 17:15:05

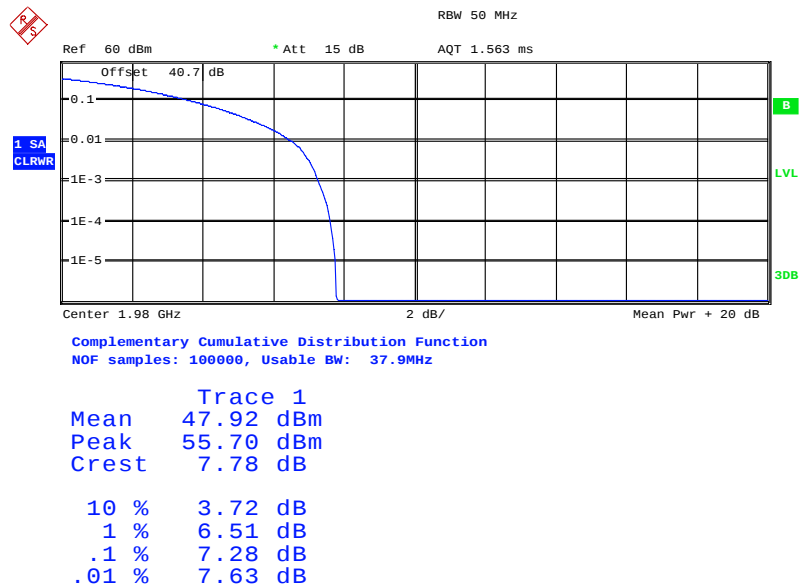
Configuration 1 – Mode 11



Product Service

TM1

Date: 17.JUN.2014 15:05:32

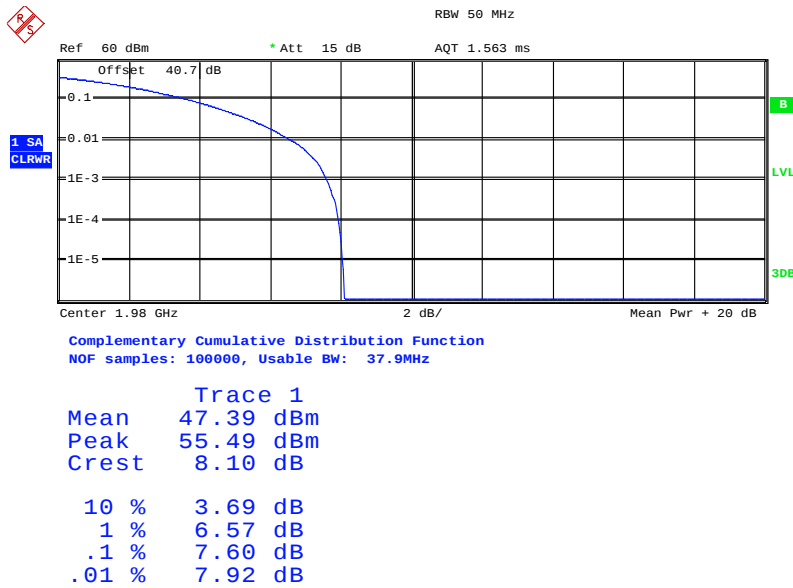
TM5

Date: 17.JUN.2014 15:21:08

TM6



Product Service



Date: 17.JUN.2014 15:39:42

Limit	13dB
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Remarks

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



Product Service

2.3 OCCUPIED BANDWIDTH

2.3.1 Specification Reference

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

2.3.2 Equipment Under Test

RRUS 01 B2 / KRC 118 74/1, S/N: CB4J094486, CF80011783

2.3.3 Date of Test and Modification State

19 June 2014 – Modification State 0

2.3.4 Test Equipment Used

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

2.3.5 Test Method and Operating Modes

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

The EUT was set to transmit at maximum power in MIMO single carrier, and testing was carried out on Bottom, Middle and Top Channels with modulation of the test models TM1, TM5 and TM6 described. Using the Occupied Bandwidth measurement function in the Spectrum Analyser, the 26dB bandwidth was measured in accordance with FCC KDB 971168 D01 Power Meas License Digital Systems v02r01 Clause 4.1. In addition, measurements of 99% occupied bandwidths were made in accordance with Industry Canada RSS-GEN Clause 4.6.1. The RBW was configured to 1% of the theoretical channel bandwidth, meeting the requirement of being between 1 to 5% of the Occupied Bandwidth described in the KDB aforementioned.

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

Configuration 1 - Mode 1
 - Mode 2
 - Mode 3

2.3.6 Environmental Conditions

Ambient Temperature 22.0 – 28.5°C
Relative Humidity 41.0 – 65.0%



Product Service

2.3.7 Test Results

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

The test results are shown below

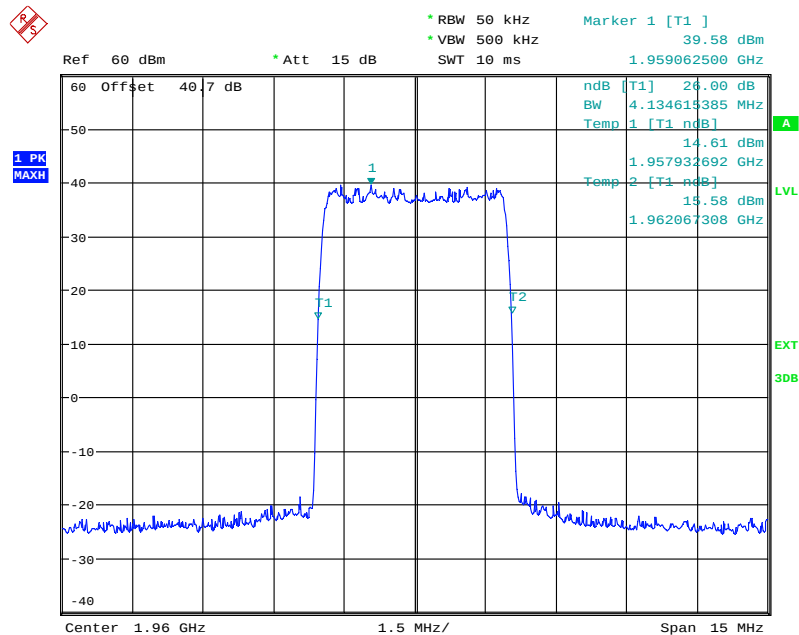
MIMO: Single Carrier

4.2MHz Bandwidth

Configuration 1 - Mode 2

TM1

-26dB Occupied Bandwidth

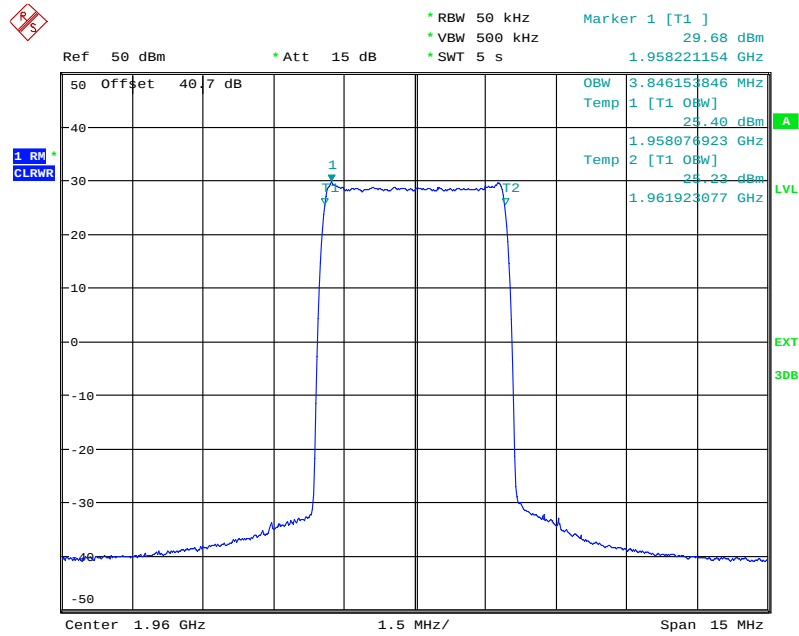


Date: 19.JUN.2014 14:56:22



Product Service

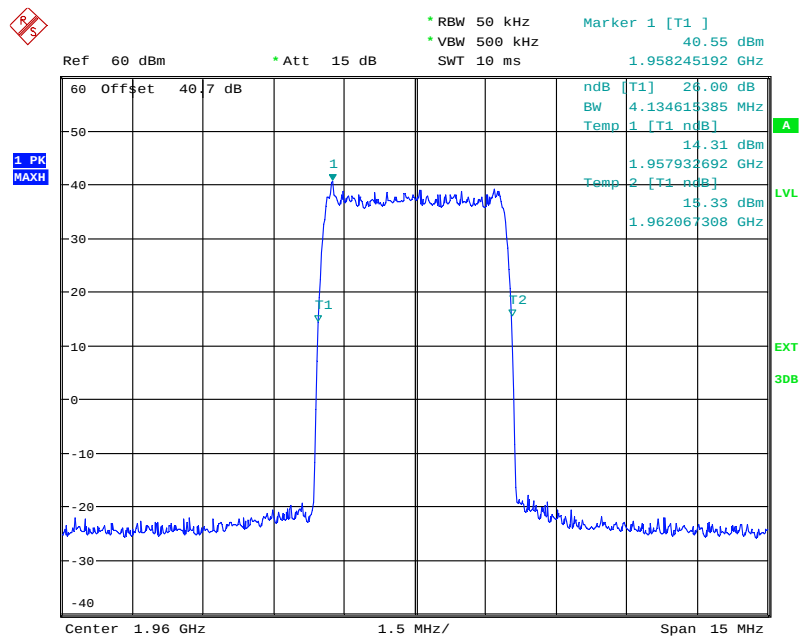
99% Occupied Bandwidth



Date: 19.JUN.2014 14:54:58

TM5

-26dB Occupied Bandwidth

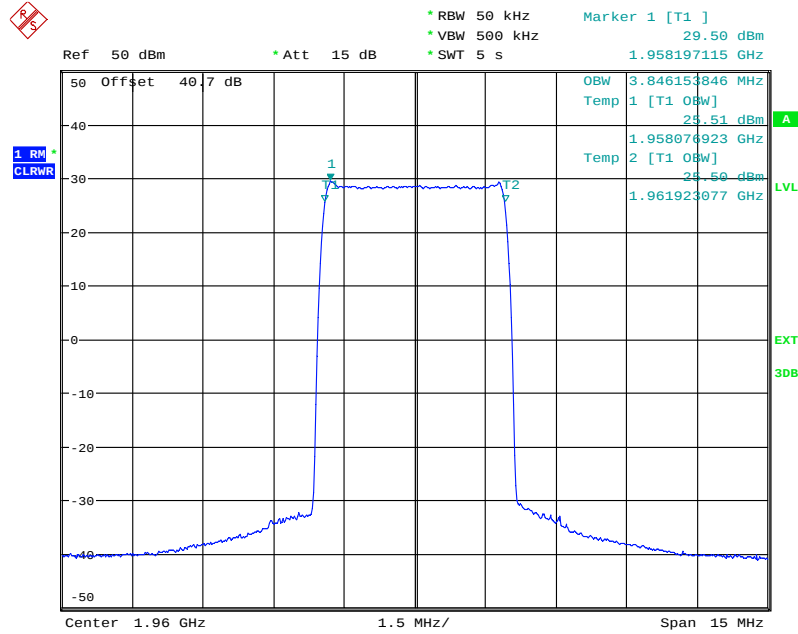


Date: 19.JUN.2014 14:46:33



Product Service

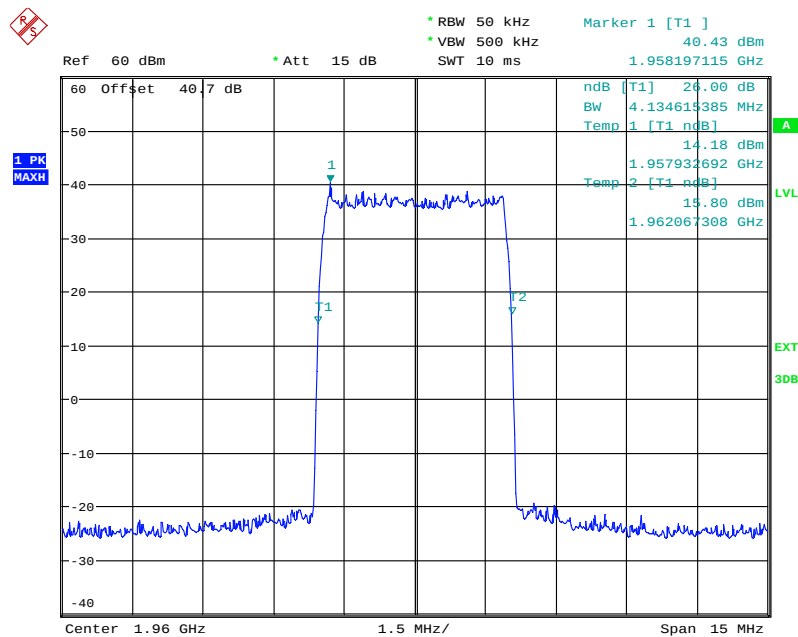
99% Occupied Bandwidth



Date: 19.JUN.2014 14:49:42

TM6

-26dB Occupied Bandwidth

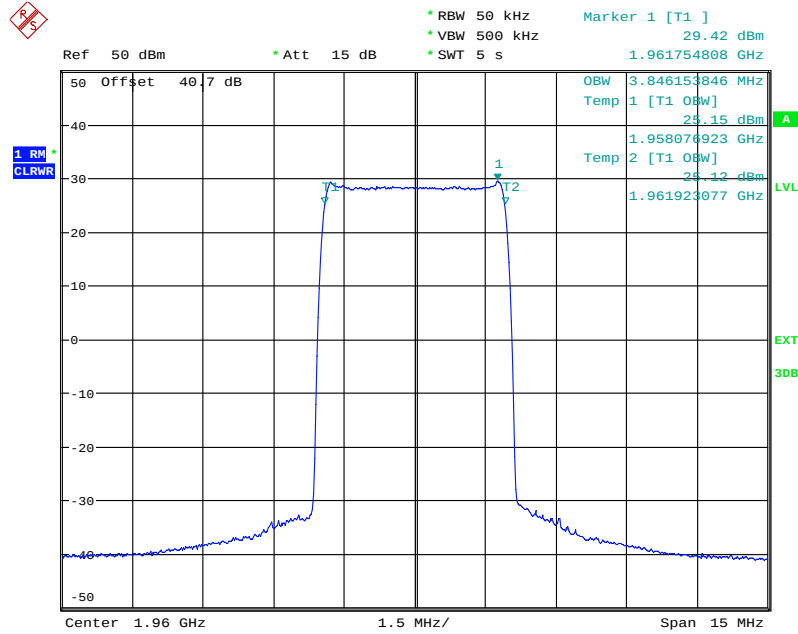


Date: 19.JUN.2014 14:41:35



Product Service

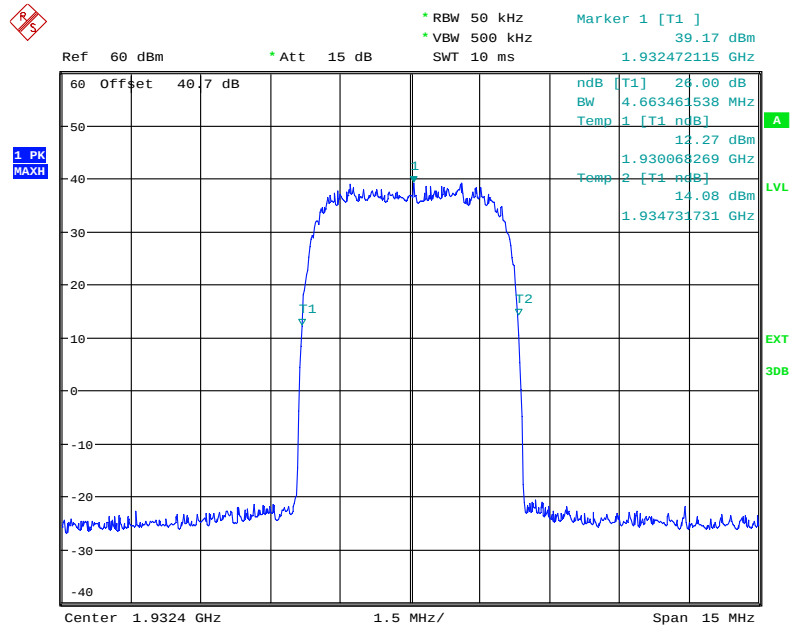
99% Occupied Bandwidth



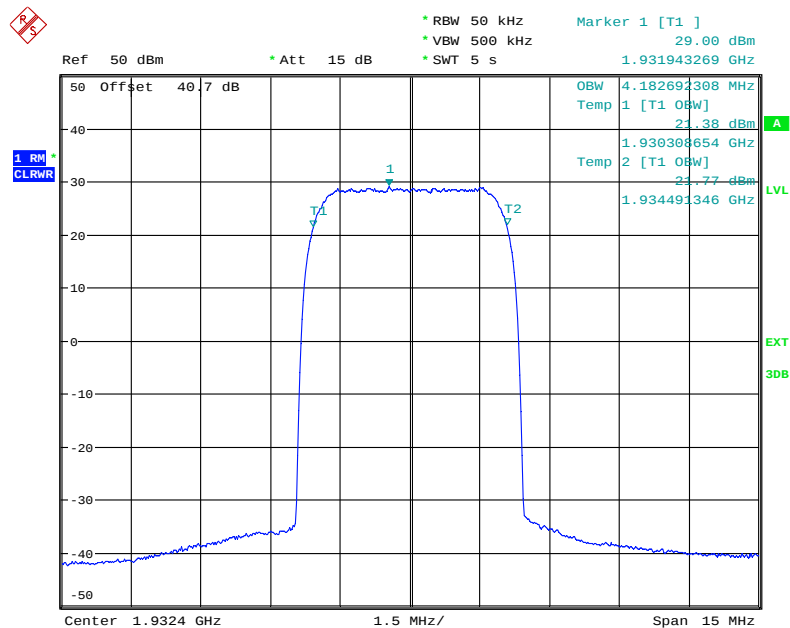
Date: 19. JUN. 2014 14:39:39



Product Service

5MHz Bandwidth**Configuration 1 – Mode 1****TM1****-26dB Occupied Bandwidth**

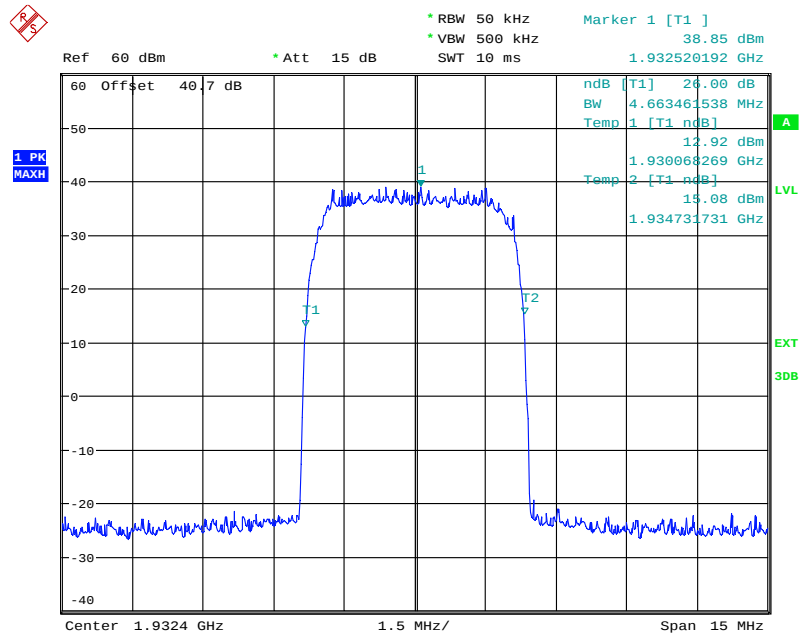
Date: 19.JUN.2014 15:08:28

99% Occupied Bandwidth

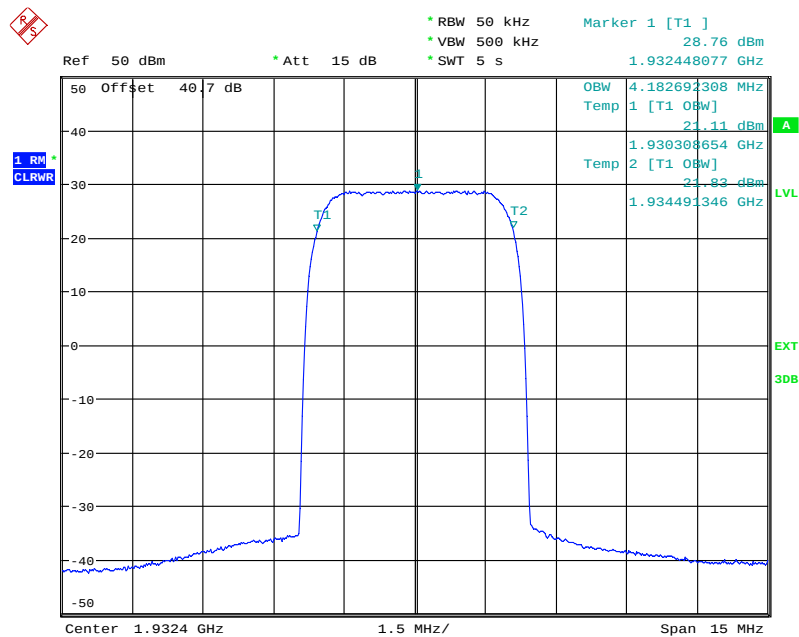
Date: 19.JUN.2014 15:09:22



TM5

-26dB Occupied Bandwidth

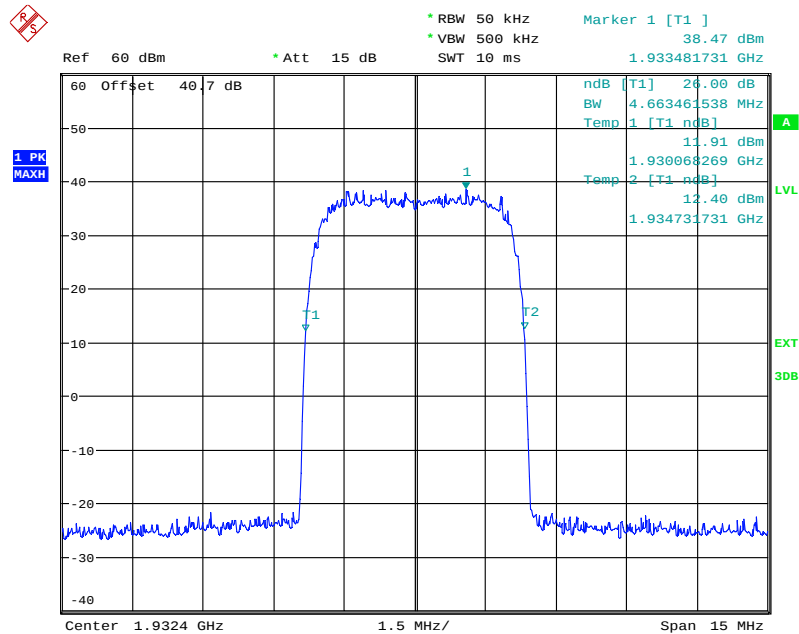
Date: 19.JUN.2014 15:41:15

99% Occupied Bandwidth

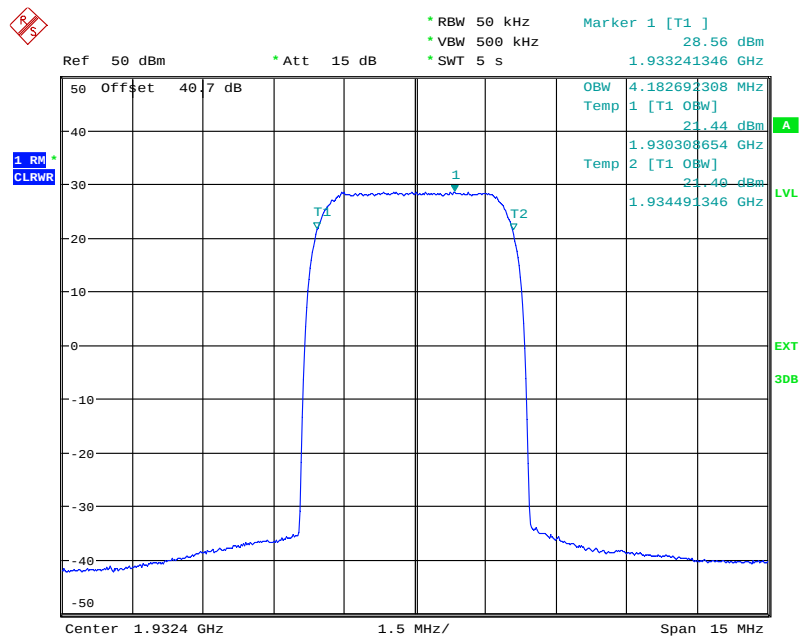
Date: 19.JUN.2014 15:39:30



TM6

-26dB Occupied Bandwidth

Date: 19.JUN.2014 15:50:23

99% Occupied Bandwidth

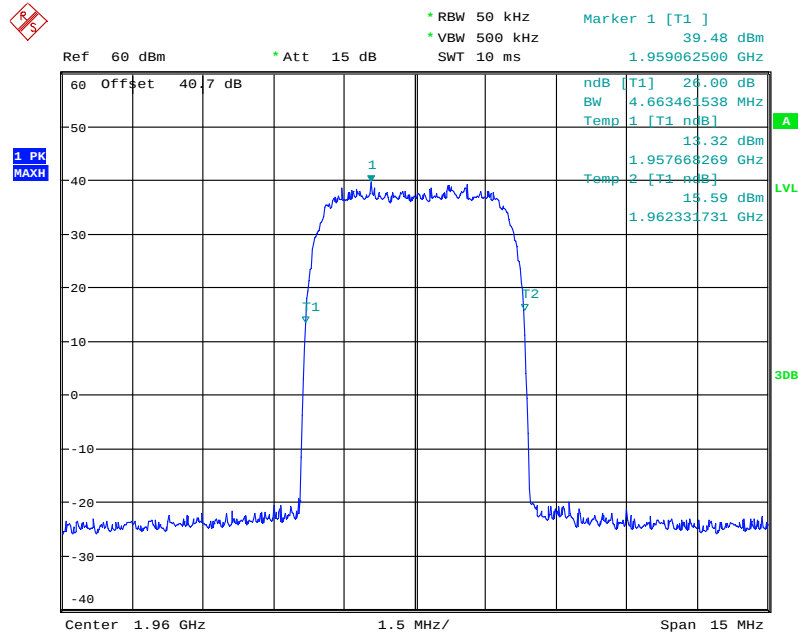
Date: 19.JUN.2014 15:51:47



Configuration 1 – Mode 2

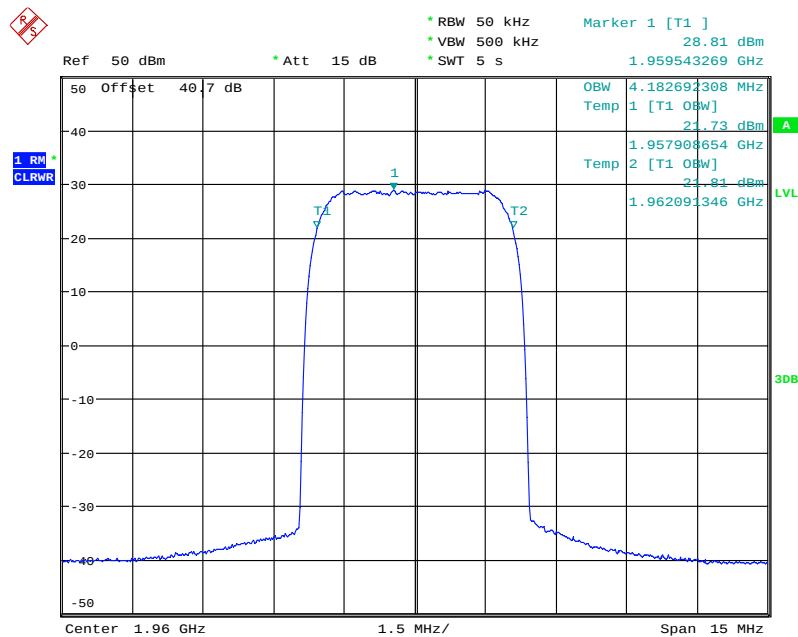
TM1

-26dB Occupied Bandwidth



Date: 19.JUN.2014 10:26:58

99% Occupied Bandwidth

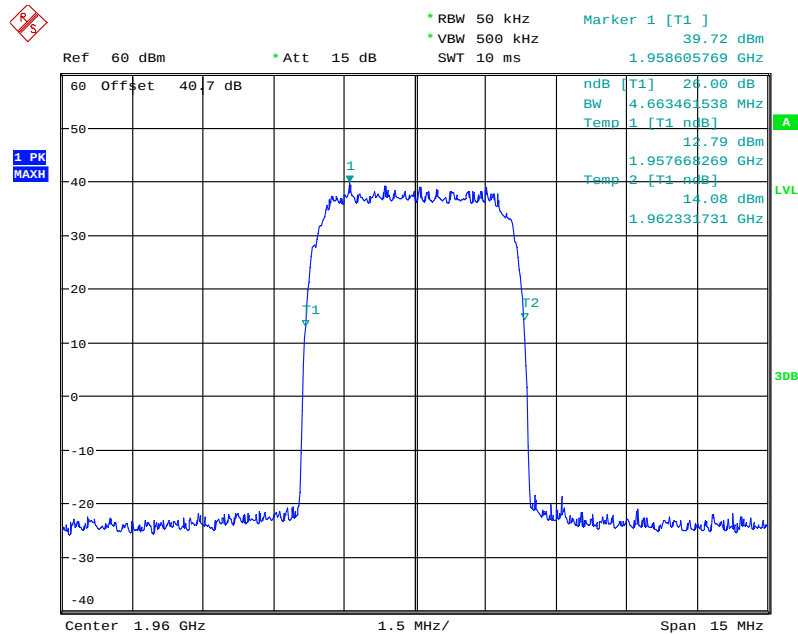


Date: 19.JUN.2014 10:27:41

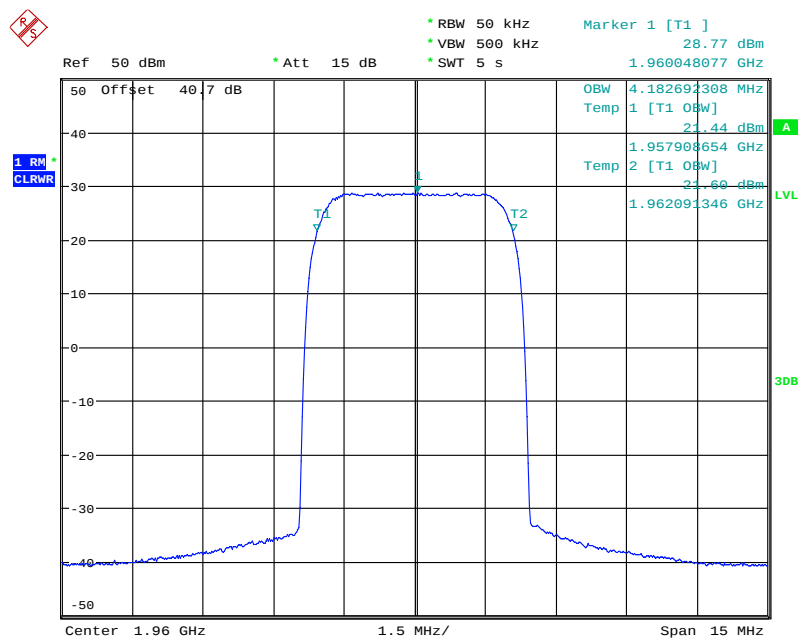


Product Service

TM5

-26dB Occupied Bandwidth

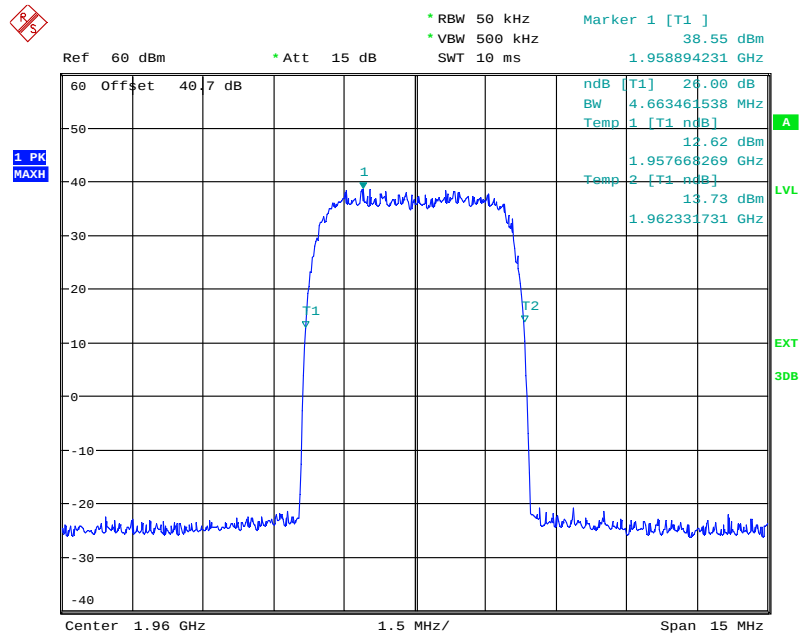
Date: 19.JUN.2014 11:05:43

99% Occupied Bandwidth

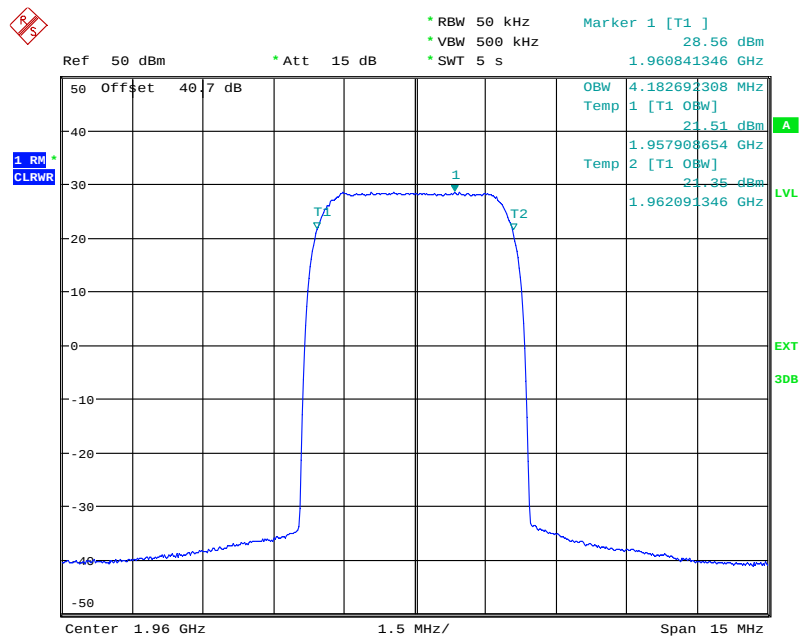
Date: 19.JUN.2014 11:06:20



TM6

-26dB Occupied Bandwidth

Date: 19.JUN.2014 14:26:26

99% Occupied Bandwidth

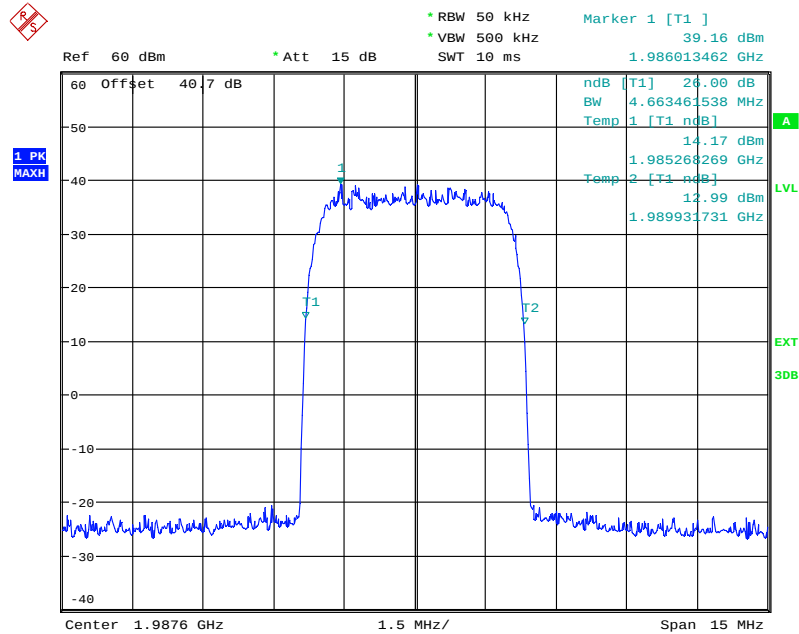
Date: 19.JUN.2014 14:27:16



Configuration 1 – Mode 3

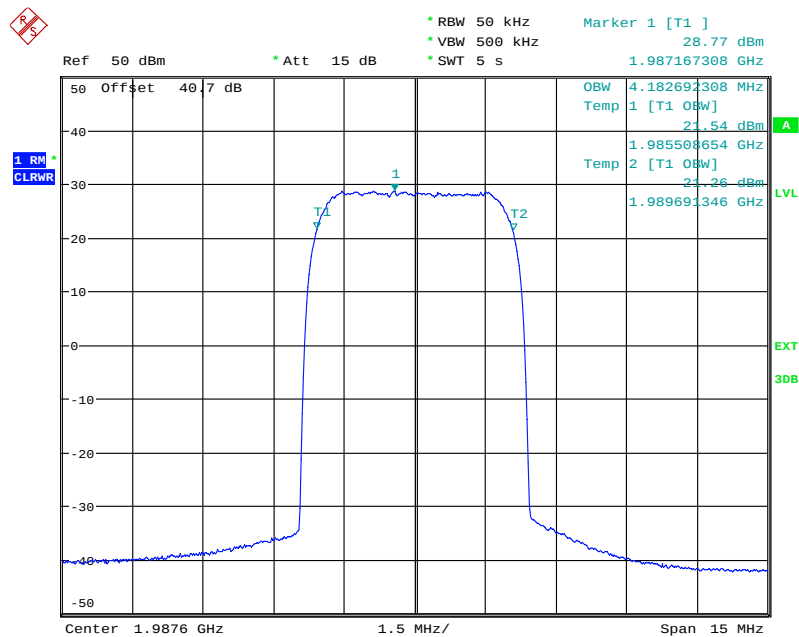
TM1

-26dB Occupied Bandwidth



Date: 19.JUN.2014 17:08:56

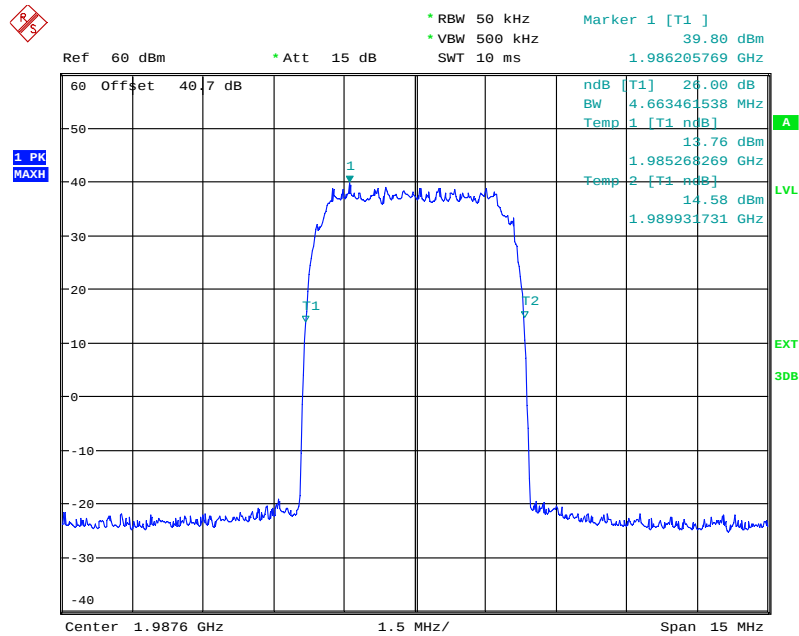
99% Occupied Bandwidth



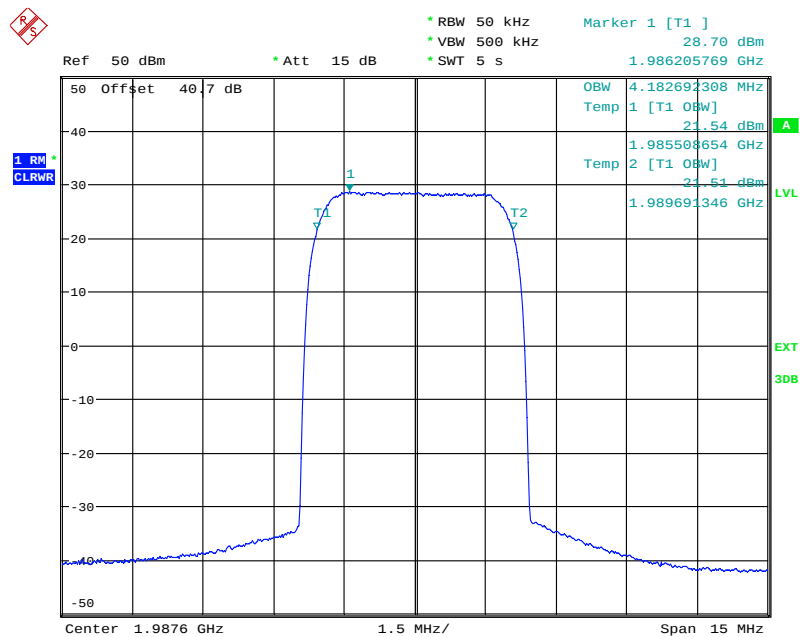
Date: 19.JUN.2014 17:07:41



Product Service

TM5-26dB Occupied Bandwidth

Date: 19.JUN.2014 16:41:03

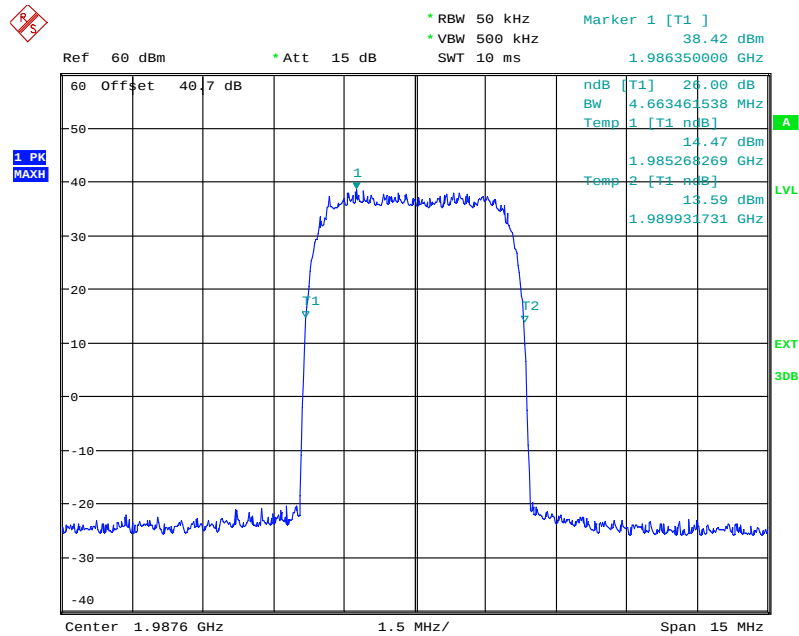
99% Occupied Bandwidth

Date: 19.JUN.2014 16:38:54

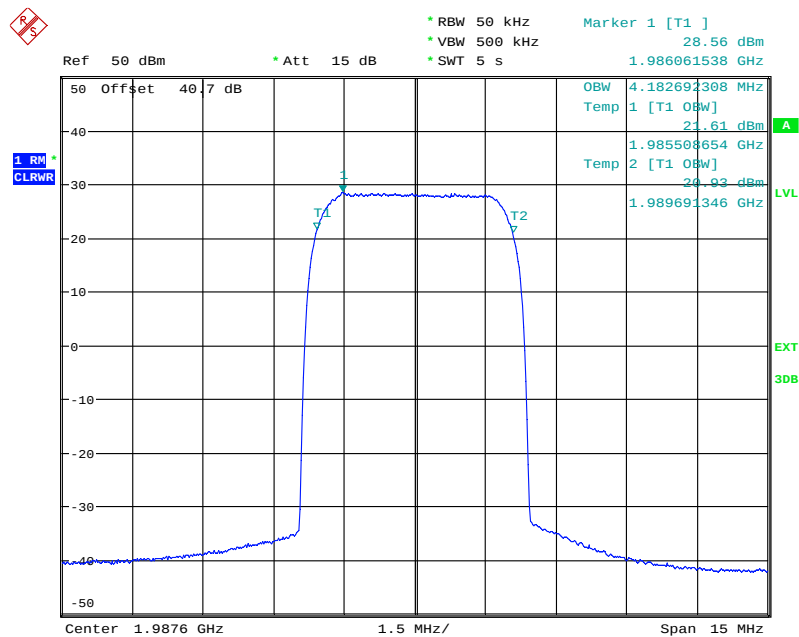


Product Service

TM6

-26dB Occupied Bandwidth

Date: 19.JUN.2014 16:23:16

99% Occupied Bandwidth

Date: 19.JUN.2014 16:22:10



2.4 SPURIOUS EMISSIONS AT ANTENNA TERMINALS (± 1 MHz)

2.4.1 Specification Reference

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

2.4.2 Equipment Under Test

RRUS 01 B2 / KRC 118 74/1, S/N: D164655167 / CB4J094486, CF80011783

2.4.3 Date of Test and Modification State

13 to 19 June 2014 – Modification State 0

2.4.4 Test Equipment Used

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

2.4.5 Test Method and Operating Modes

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

In accordance with FCC CFR 47 Part 24, 24.238(b), at least 1% of the emission bandwidth should be used for the resolution up to 1MHz away from the block edge. A resolution bandwidth of 30kHz was used up to 1MHz away from the band edges. 30kHz is <1% of the Emission Bandwidth (4.7MHz emission bandwidth setting), the limit was adjusted from -13dBm to -14.95dBm to compensate for the reduced measurement bandwidth. A resolution bandwidth of 100kHz was used between 1MHz to 5MHz away from the band edge. As the FCC rules specify a RBW of 1MHz for the measurements of emissions > 1MHz away from the band edges, the limit was adjusted from -13dBm to -23dBm in Non-MIMO mode. 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 Multiple Transmitter Output v02r01 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 path loss measured and entered as a reference level offset. The EUT was tested at it's maximum power level.

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

Configuration 1 - Mode 1
 - Mode 3
 - Mode 7
 - Mode 8



2.4.6 Environmental Conditions

Ambient Temperature 22.0 – 28.5°C

Relative Humidity 41.0 – 65.0%

2.4.7 Test Results

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

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

MIMO: Single Carrier

Configuration 1 - Mode 1 and 3

Band Edge Frequency	Edge Test with QPSK modulation Channel No./Frequency
Bottom 1930 MHz	Channel: 9662 Frequency: 1932.4 MHz
Top 1990 MHz	Channel: 9938 Frequency: 1987.6 MHz

MIMO: Multi Carrier (x2)

Configuration 1 - Mode 7 and 8

Band Edge Frequency	Edge Test with QPSK modulation Channel No./Frequencies
Bottom 1930 MHz	Channel: 9662 & 9687 Frequency: 1932.4 & 1937.4 MHz
Top 1990 MHz	Channel: 9913 & 9938 Frequency: 1982.6 & 1987.6 MHz

The channels shown in the table above are the minimum and maximum channels that can be used in the authorised frequency ranges to maintain compliance. Channels used outside of those stated and power levels used beyond those stated in the table exceed the specification limits, thus they cannot be used.



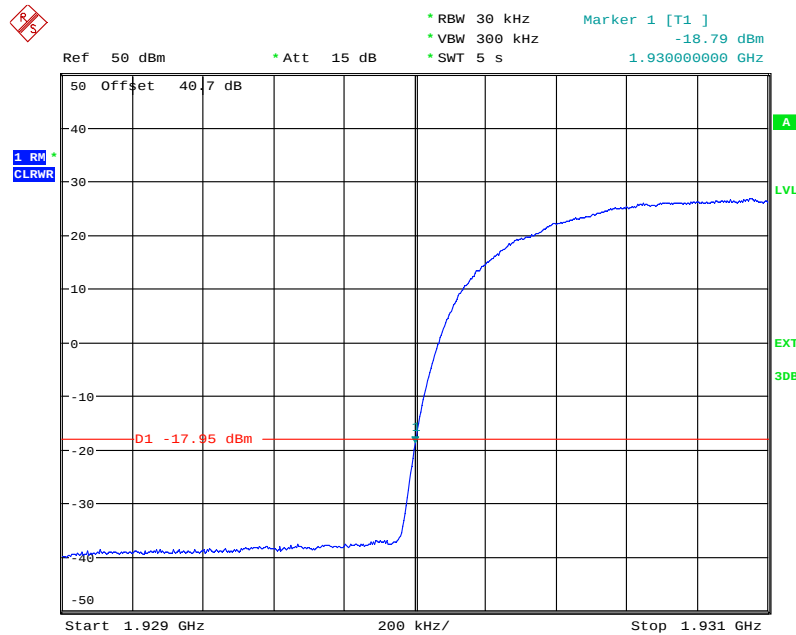
Product Service

The test results are shown below

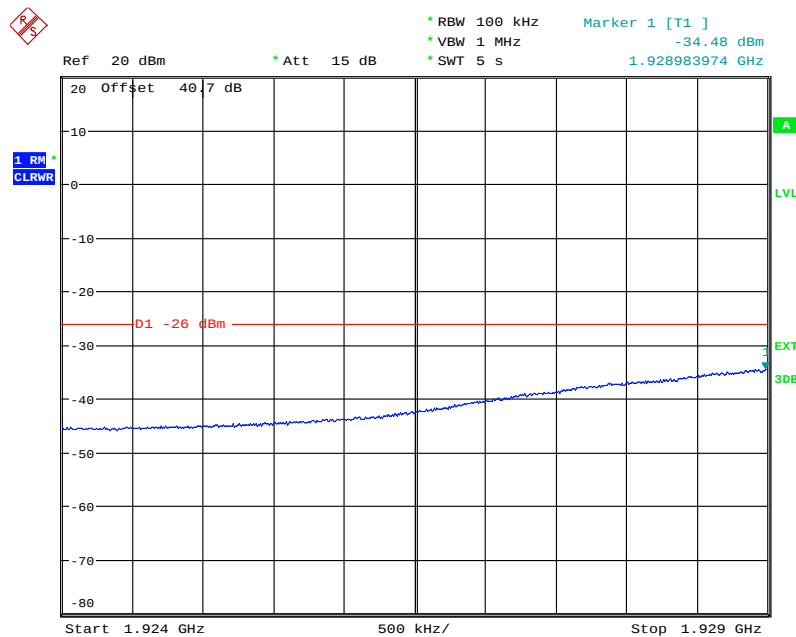
TM1

MIMO: Single Carrier

Configuration 1 - Mode 1



Date: 19.JUN.2014 15:23:39

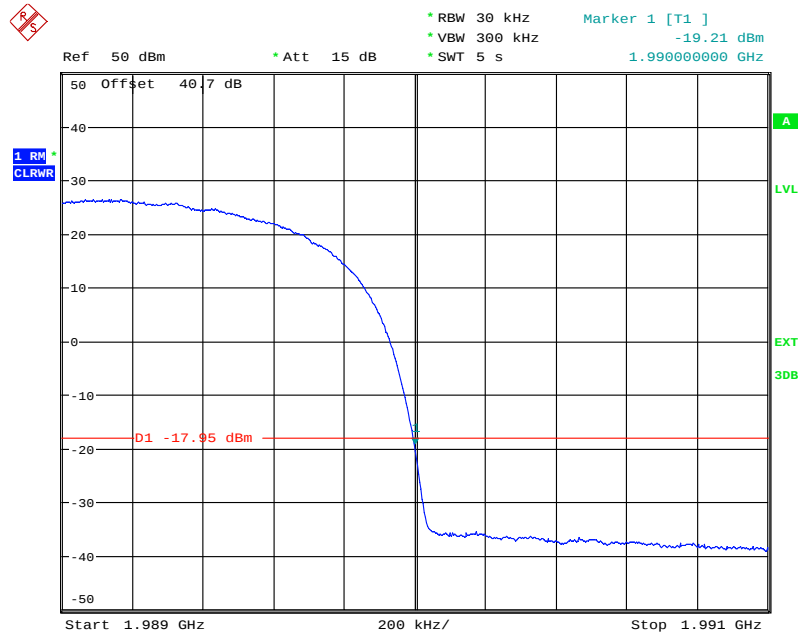


Date: 19.JUN.2014 15:15:37

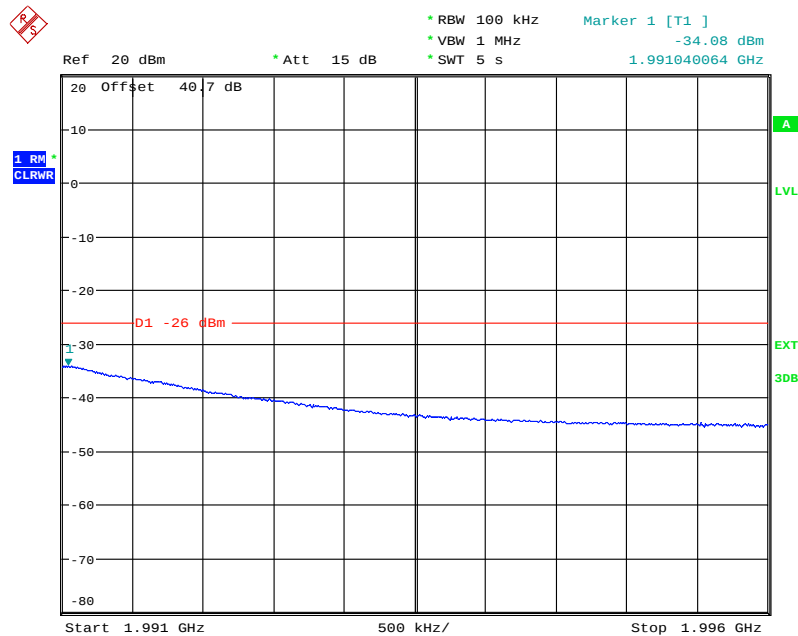


Product Service

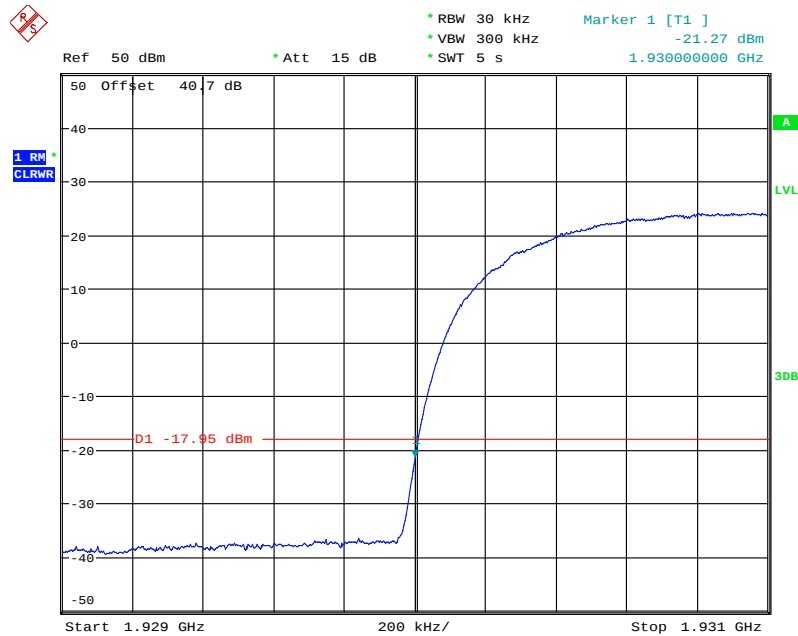
Configuration 1 – Mode 3



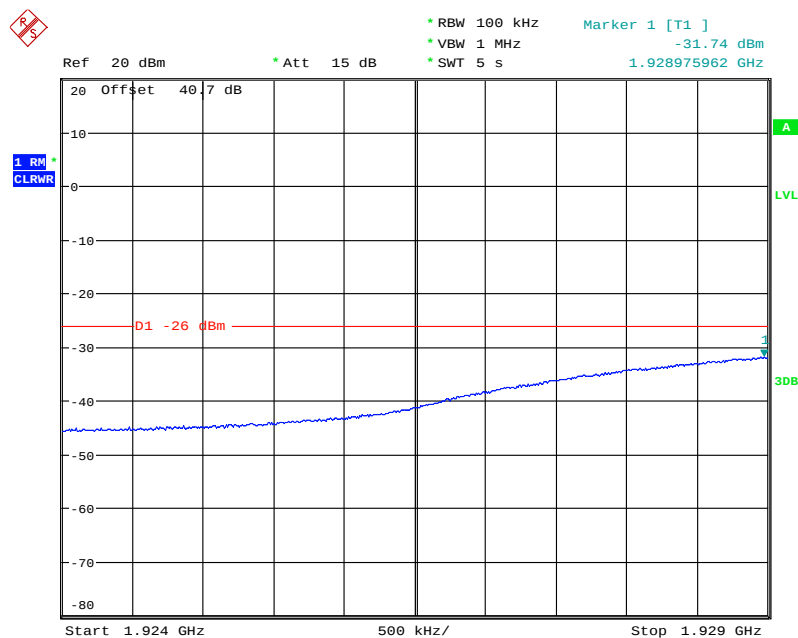
Date: 19.JUN.2014 16:58:47



Date: 19.JUN.2014 17:02:32

**MIMO: Multi Carrier (x2)****Configuration 1 - Mode 7**

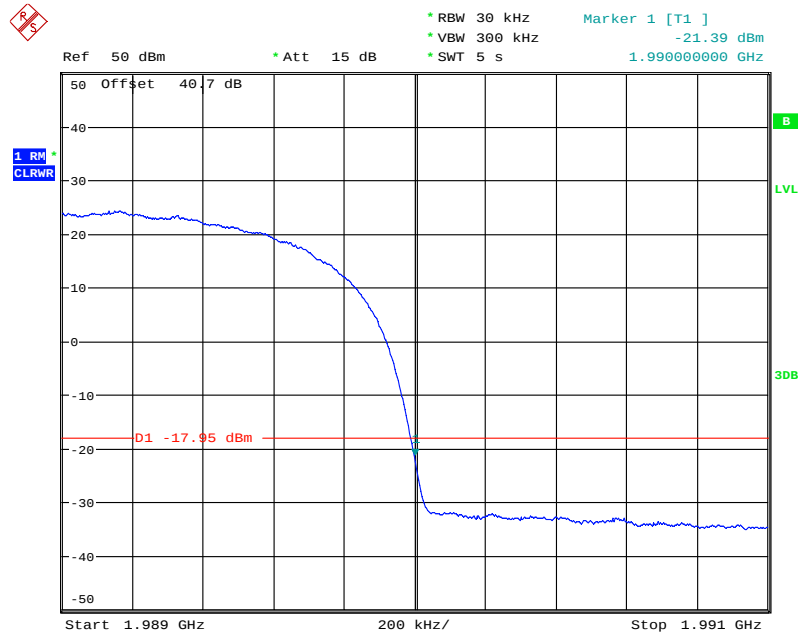
Date: 13.JUN.2014 16:15:31



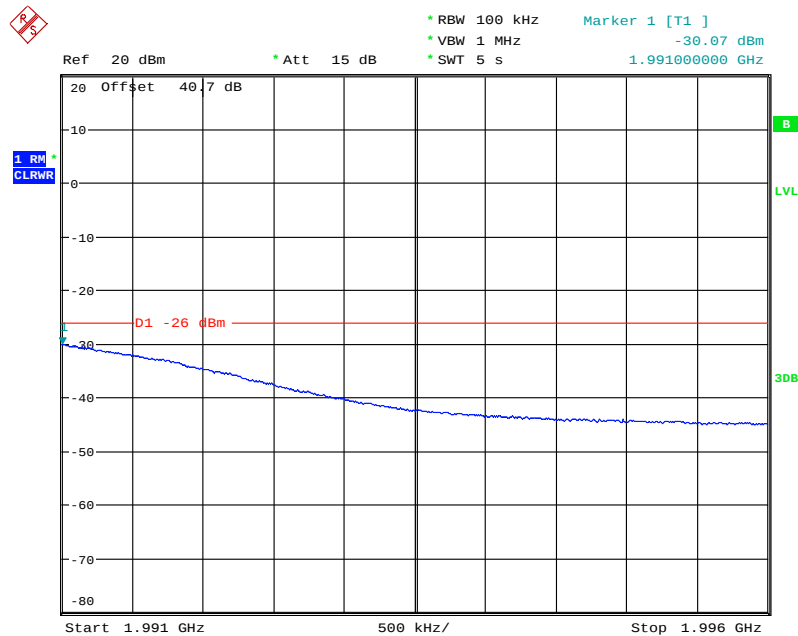
Date: 13.JUN.2014 15:35:19



Configuration 1 - Mode 8



Date: 17.JUN.2014 13:29:39



Date: 17.JUN.2014 13:30:35

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

2.5 RADIATED SPURIOUS EMISSIONS

2.5.1 Specification Reference

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

2.5.2 Equipment Under Test

RRUS 01 B2 / KRC 118 74/1, S/N: CB4J094486, CF80011783

2.5.3 Date of Test and Modification State

27 June and 01 July 2014 – Modification State 0

2.5.4 Test Equipment Used

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

2.5.5 Test Method and Operating Modes

The test was applied in accordance with the test method requirements of FCC CFR 47 Part 2 and Part 24 and Industry Canada RSS-133 and ANSI/TIA-603-C-2004.

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.

The measurement of radiated spurious emissions in the frequency range 30MHz to 20GHz was performed using a peak detector and a resolution bandwidth of 1MHz which satisfied the minimum measurement bandwidth requirement of 1MHz as the worst case.

The EUTs were measured with the antenna height varied between 1 and 4 m with the turntable rotated between 0 and 360 degrees. The unwanted emission of any frequencies within 10dB of the limit were measured with the substitution method used according to the standard.

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 - $(43 + 10\log(P))$ 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:

$$E_{(v/m)} = (30 \times 1.64 \times 45.92)^{0.5} / 3 = 15.84V/m = 144.00dB\mu V/m$$

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

$$43 + 10\log(45.92) = 59.62dB$$

Therefore the limit at 3m measurement distance is:

$$144.00 - 59.62 = 84.4 \text{ dB}\mu V/m$$

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 as the worst cases:

- Configuration 1 - Mode 1
 - Mode 2
 - Mode 3
 - Mode 5
 - Mode 10

2.5.6 Environmental Conditions

Ambient Temperature 22.0 – 28.5°C

Relative Humidity 41.0 – 65.0%



2.5.7 Test Results

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

The test results are shown below

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 2

No emissions were detected within 20dB of the limit.

TM5

Configuration 1 - Mode 2

No emissions were detected within 20dB of the limit.

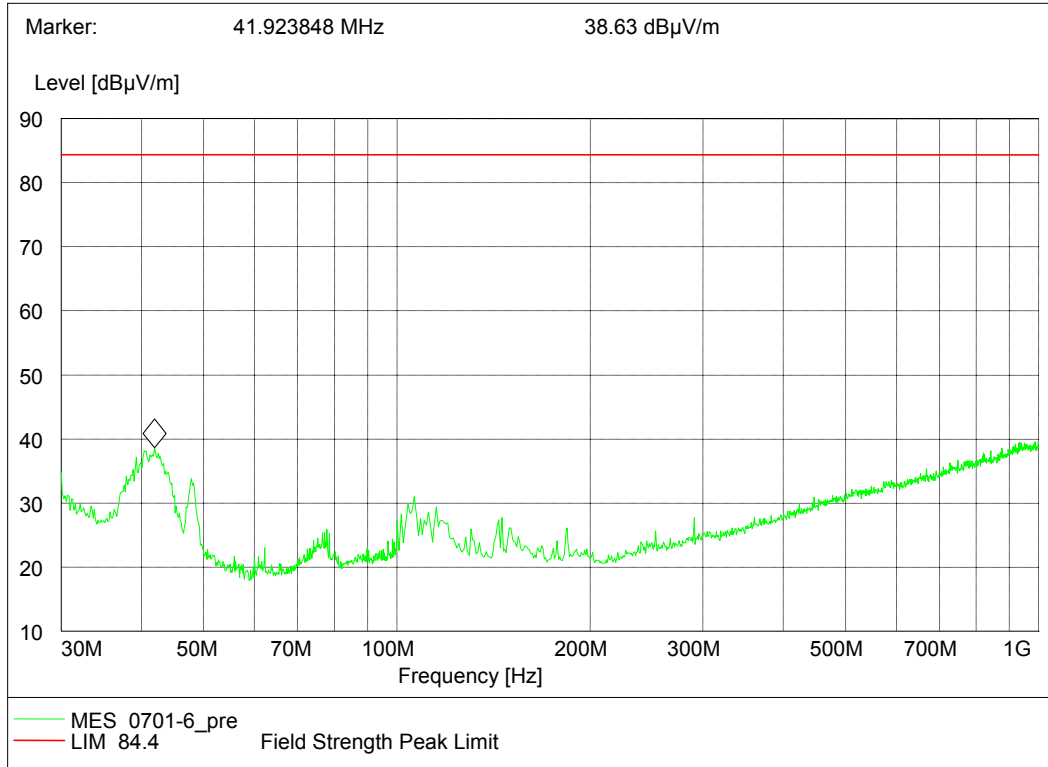
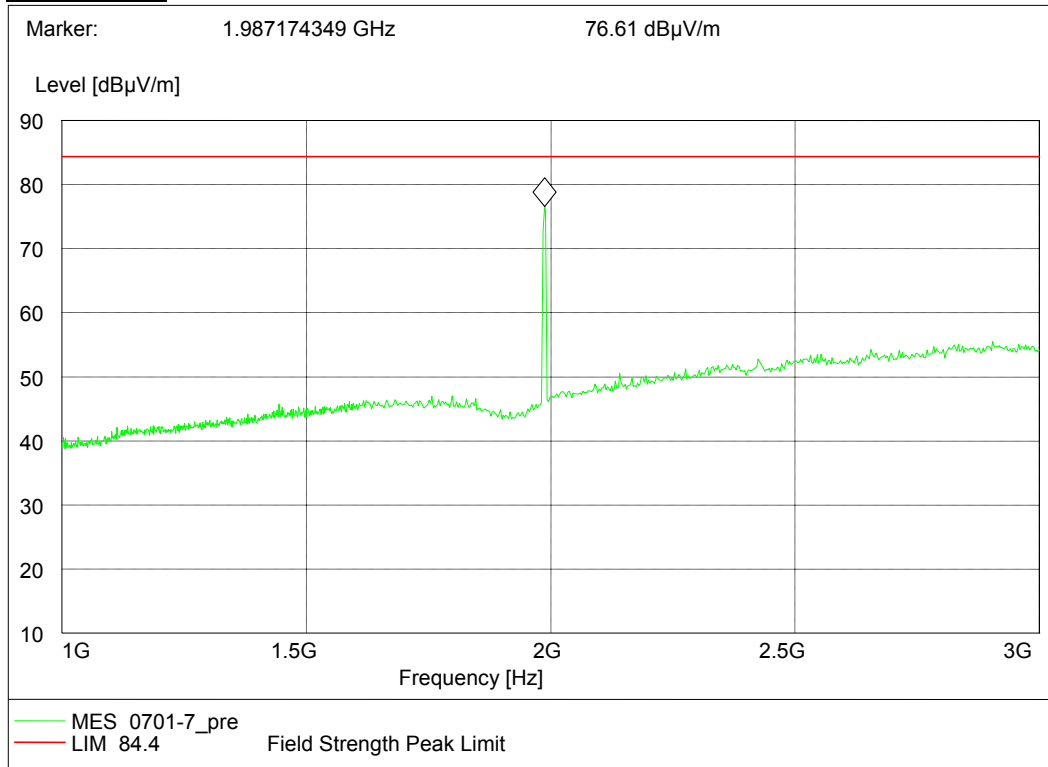
TM6

Configuration 1 - Mode 1

No emissions were detected within 20dB of the limit.

Configuration 1 - Mode 2

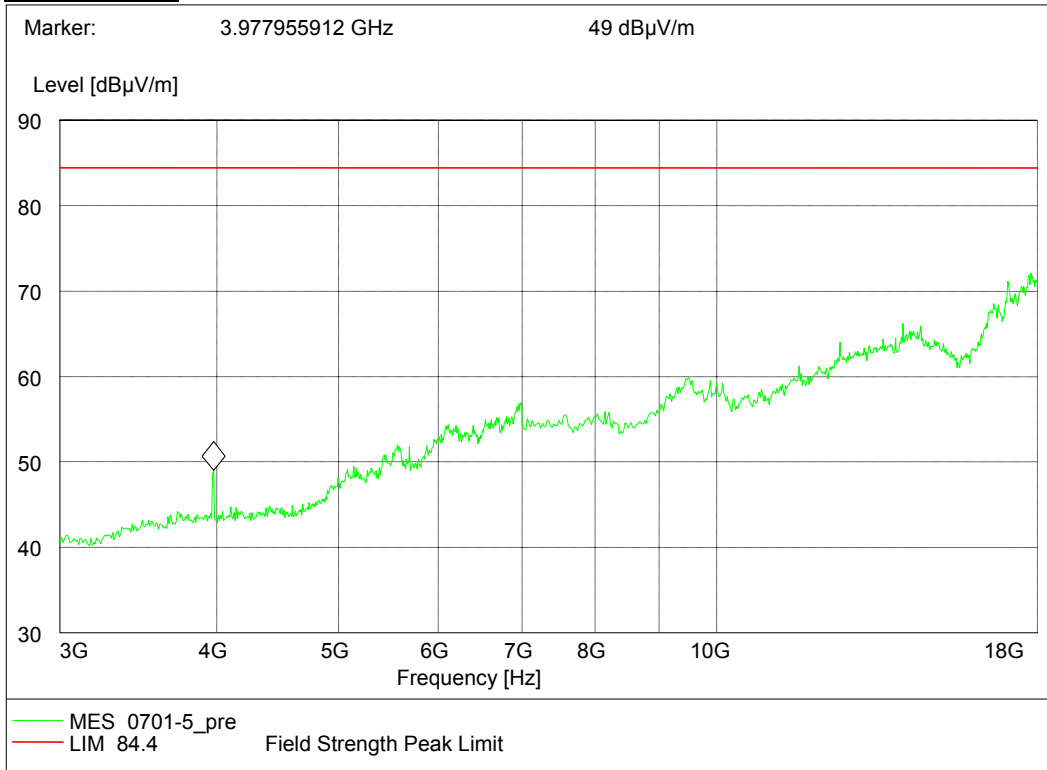
No emissions were detected within 20dB of the limit.

Configuration 1 - Mode 330MHz – 1GHz1GHz - 3GHz

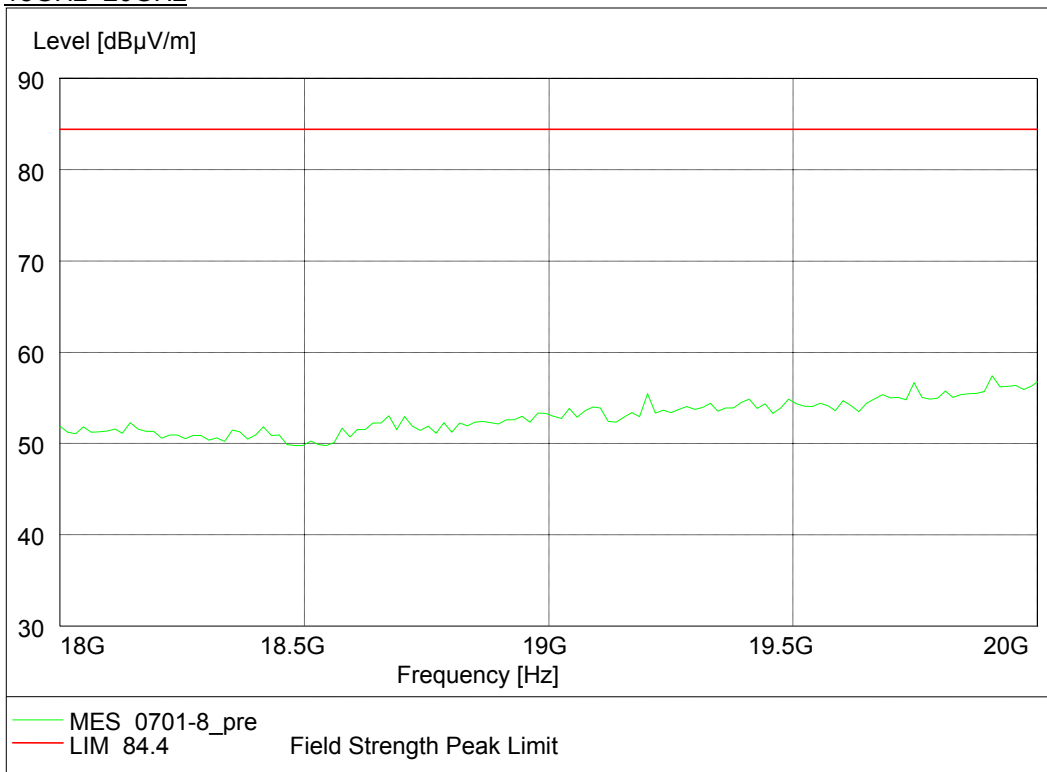
Note: The emission beyond the limit is the operating frequency.



3GHz - 18GHz



18GHz - 20GHz





Product Service

Multi Carrier (x2)**TM6**Configuration 1 - Mode 5

No emissions were detected within 20dB of the limit.

Multi Carrier (x4)**TM6**Configuration 1 – Mode 10

No emissions were detected within 20dB of the limit.

Limit	-13dBm / 84.4 dBµV/m
-------	----------------------

Remarks

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



Product Service

2.6 CONDUCTED SPURIOUS EMISSIONS

2.6.1 Specification Reference

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

2.6.2 Equipment Under Test

RRUS 01 B2 / KRC 118 74/1, S/N: CB4J094486, CF80011783

2.6.3 Date of Test and Modification State

13 to 19 June 2014 – Modification State 0

2.6.4 Test Equipment Used

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

2.6.5 Test Method and Operating Modes

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

In accordance with FCC CFR 47 Part 24, Clause 24.238(a), any emissions outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least $43 + 10 \log(P)$ dB. The transmitter output power was attenuated using an attenuator and the frequency spectrum investigated from 9kHz to 20GHz. The EUT was set to transmit on maximum power. The resolution was set to 1MHz for 9kHz to 20GHz thus meeting the requirements of FCC CFR 47 Part 24, Clause 24.238 (b) and Industry Canada RSS-133, Clause 6.5. 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 Multiple Transmitter Output v02r01 accounting for simultaneous transmission from antenna ports RF A1 and RF A2. The limit was adjusted from -13dBm to -16dBm.

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

Measurements were made up to the 10th harmonics of the highest carrier frequency at least.

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



2.6.6 Environmental Conditions

Ambient Temperature 22.0 – 28.5°C

Relative Humidity 41.0 – 65.0%

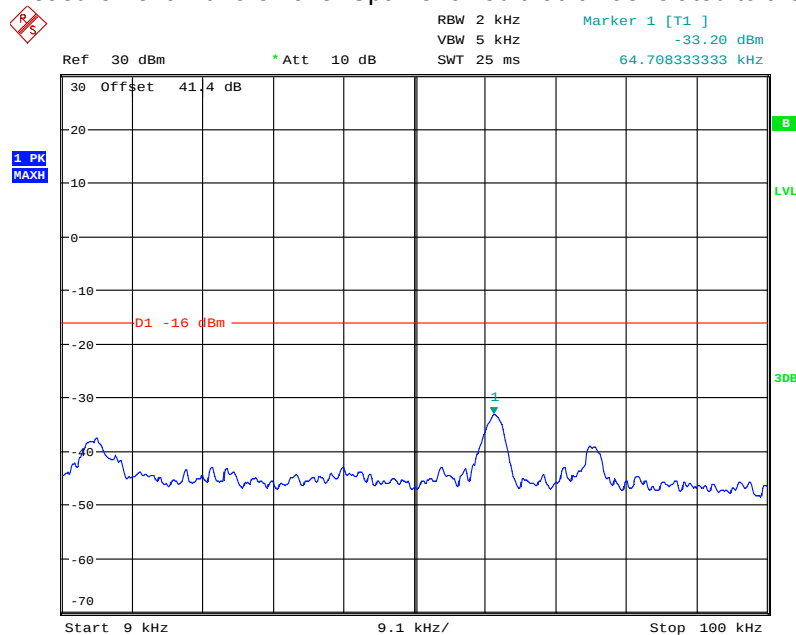
2.6.7 Test Results

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

The test results are shown below

Remark:

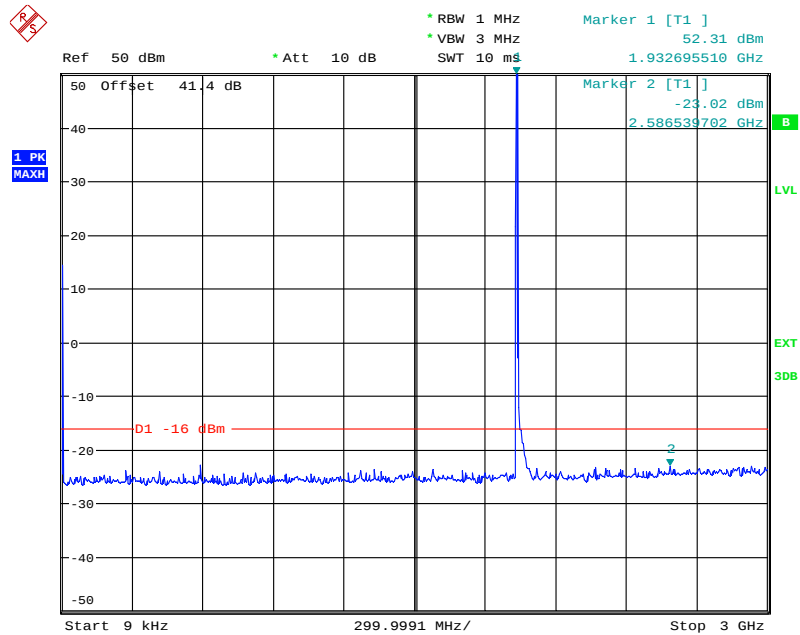
The emissions at 9kHz on the plots was not generated by the test object. A complementary measurement with a smaller Span showed that it was related to the LO feedthrough.



Date: 19.JUN.2014 09:55:35



Product Service

TM1**MIMO: Single Carrier****Configuration 1 - Mode 1****9kHz to 3GHz**

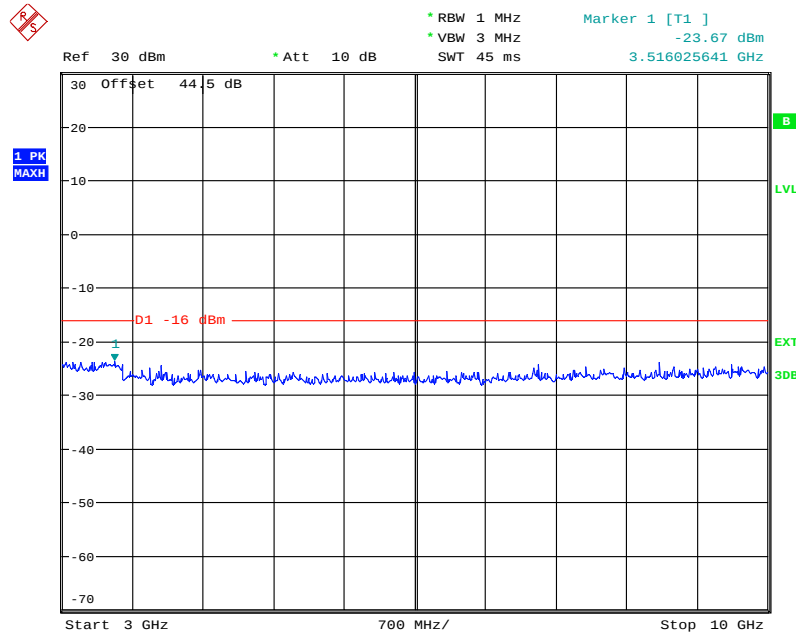
Date: 19.JUN.2014 15:17:11

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



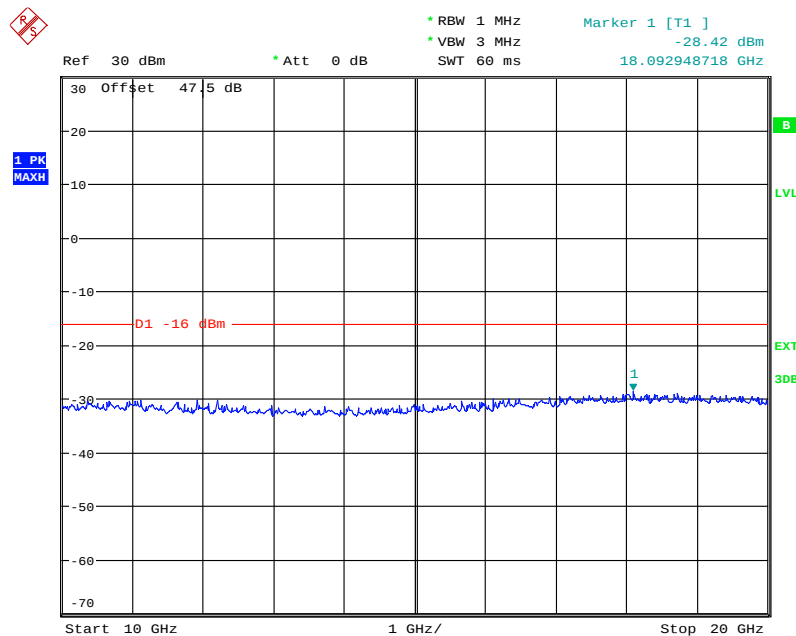
Product Service

10GHz to 20GHz



Date: 19.JUN.2014 15:18:23

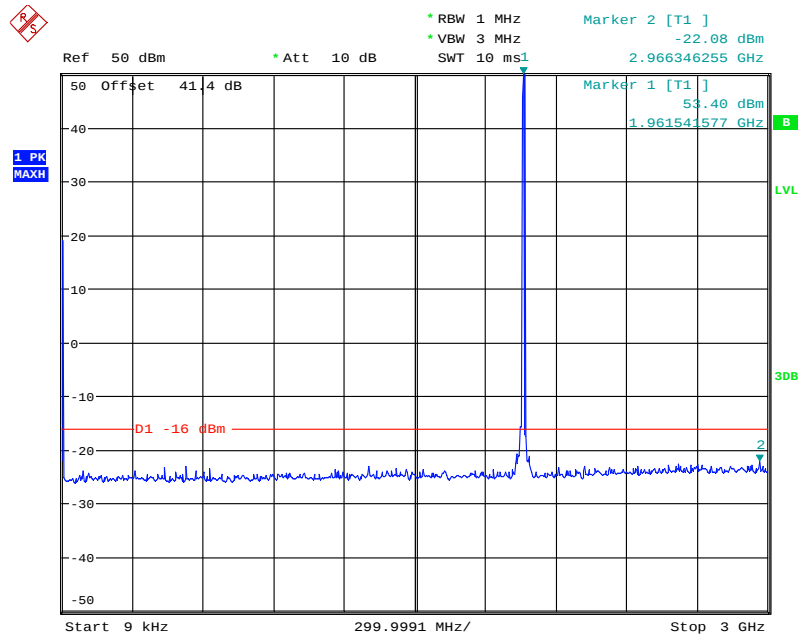
10GHz to 20GHz



Date: 19.JUN.2014 15:19:54

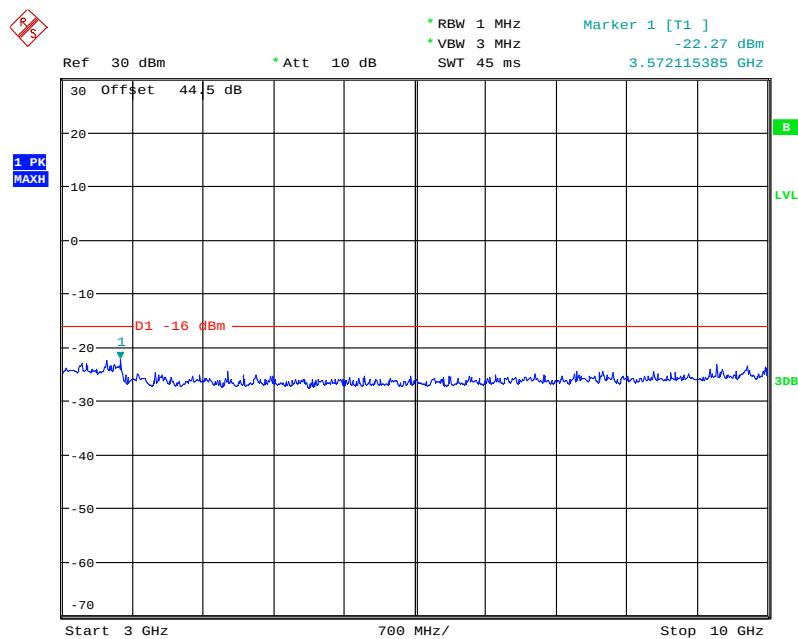


Product Service

Configuration 1 - Mode 29kHz to 3GHz

Date: 19.JUN.2014 09:54:21

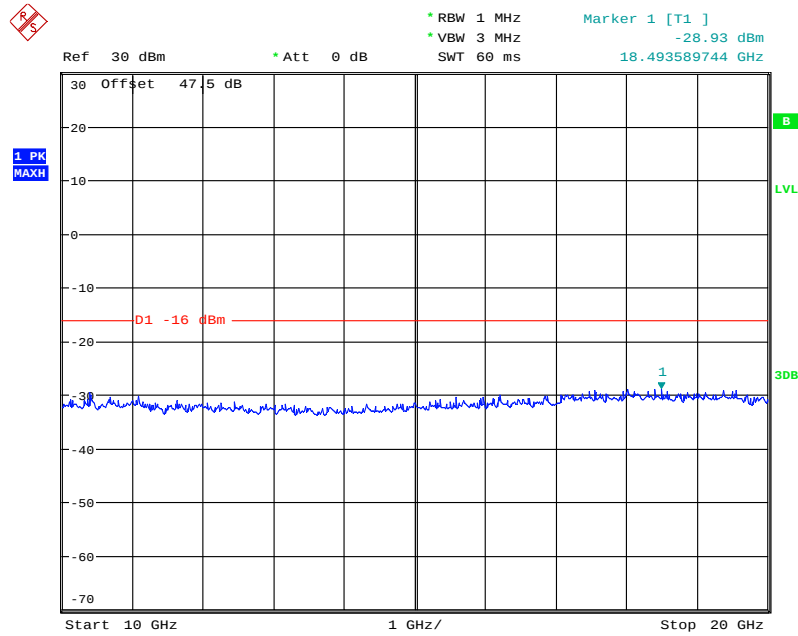
Note: The emission beyond the limit is the operating frequency.

10GHz to 20GHz

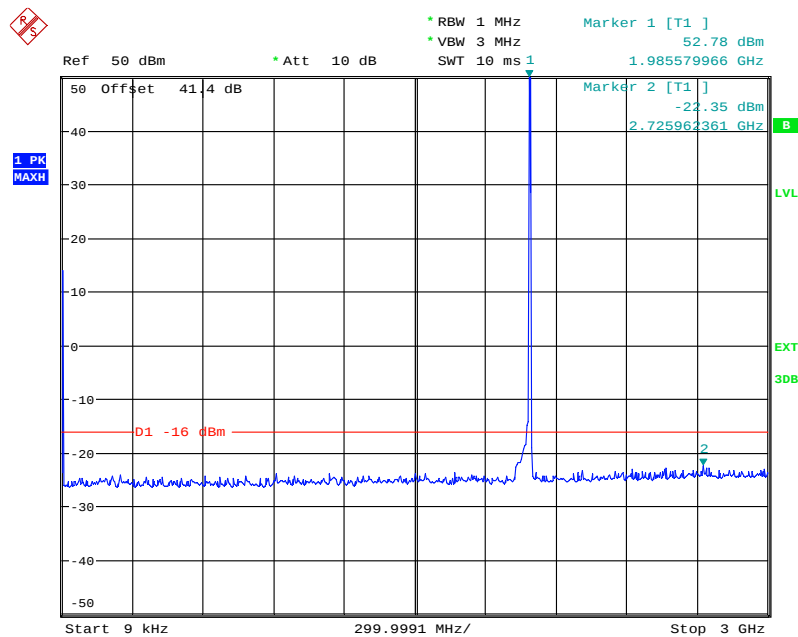
Date: 19.JUN.2014 09:56:54



Product Service

10GHz to 20GHz

Date: 19.JUN.2014 10:28:53

Configuration 1 – Mode 39kHz – 3GHz

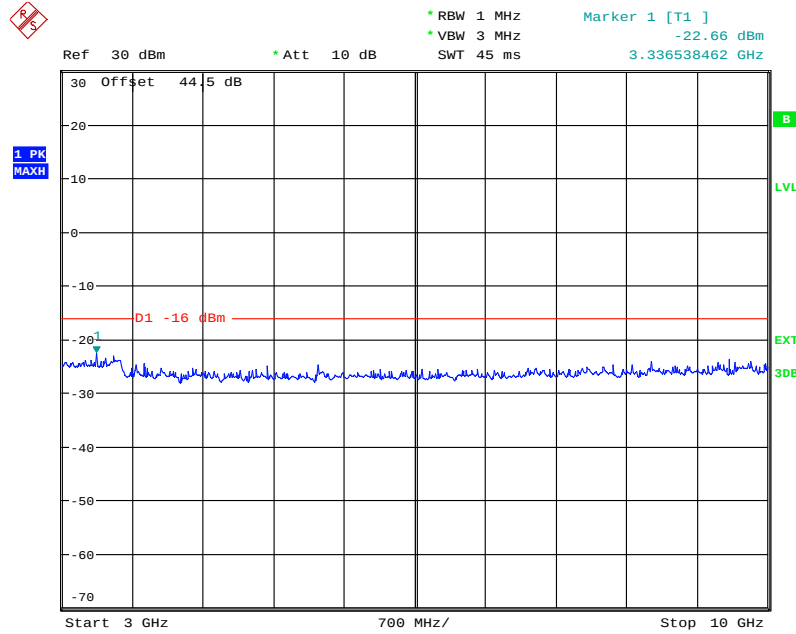
Date: 19.JUN.2014 17:06:32

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



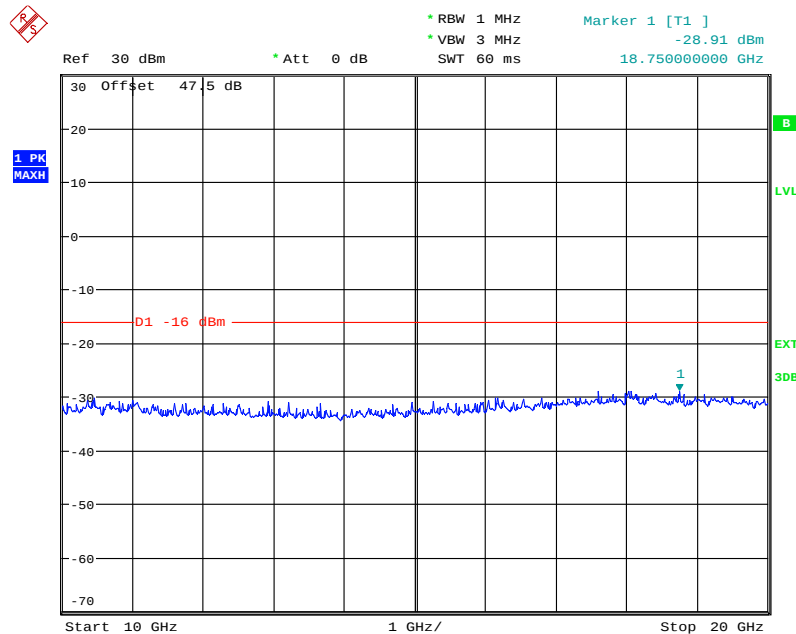
Product Service

10GHz to 20GHz

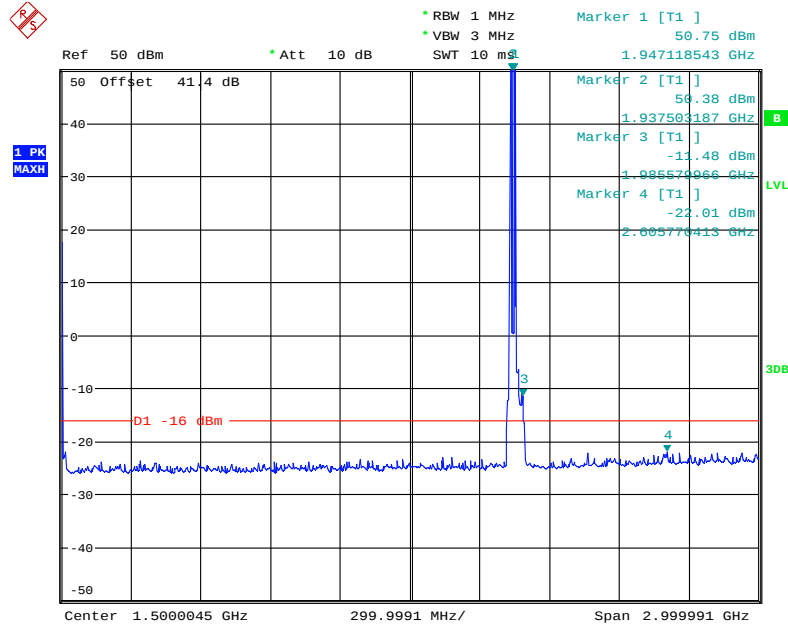


Date: 19.JUN.2014 17:05:08

10GHz to 20GHz

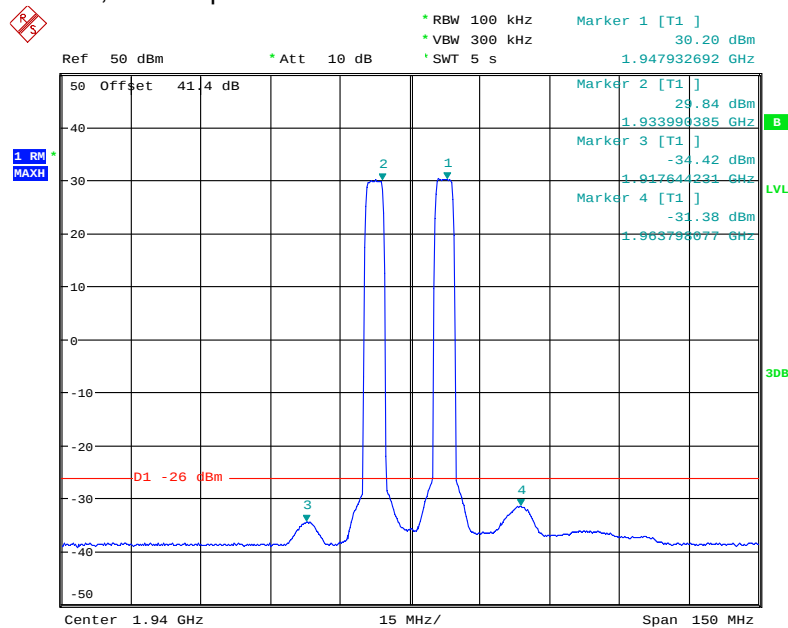


Date: 19.JUN.2014 17:04:03

**MIMO: Multi Carrier (x2)****Configuration 1 - Mode 4****9kHz to 3GHz**

Date: 13.JUN.2014 15:39:33

Note: The emissions above the limit are measured in a smaller bandwidth and using a RMS detector, see the plot below.



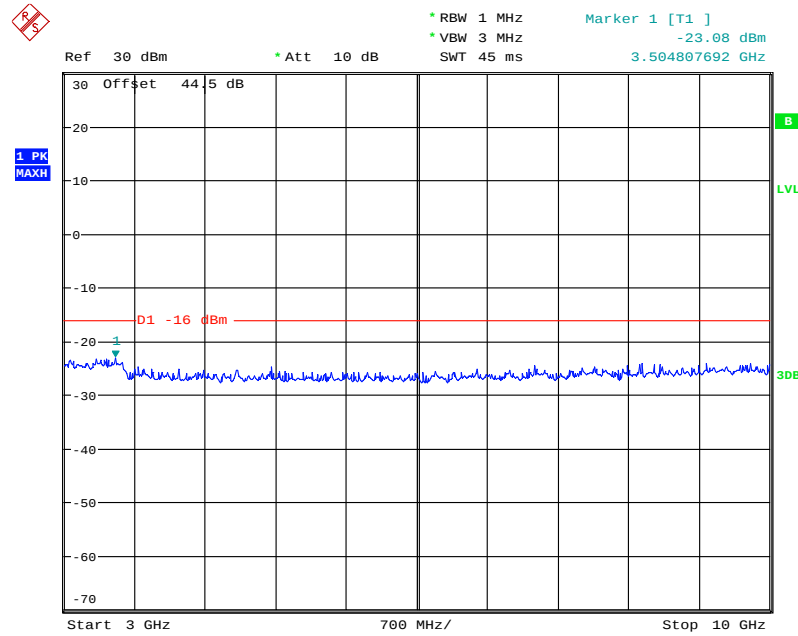
Date: 13.JUN.2014 15:40:54

Note: The limit has been tightened by 10dB to account for the reduction in measurement bandwidth.



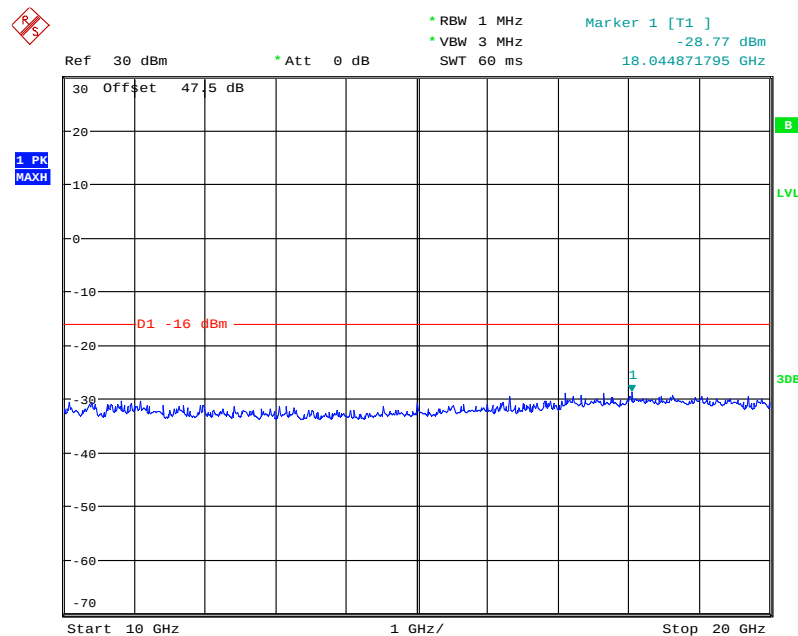
Product Service

3GHz to 10GHz



Date: 13.JUN.2014 15:48:51

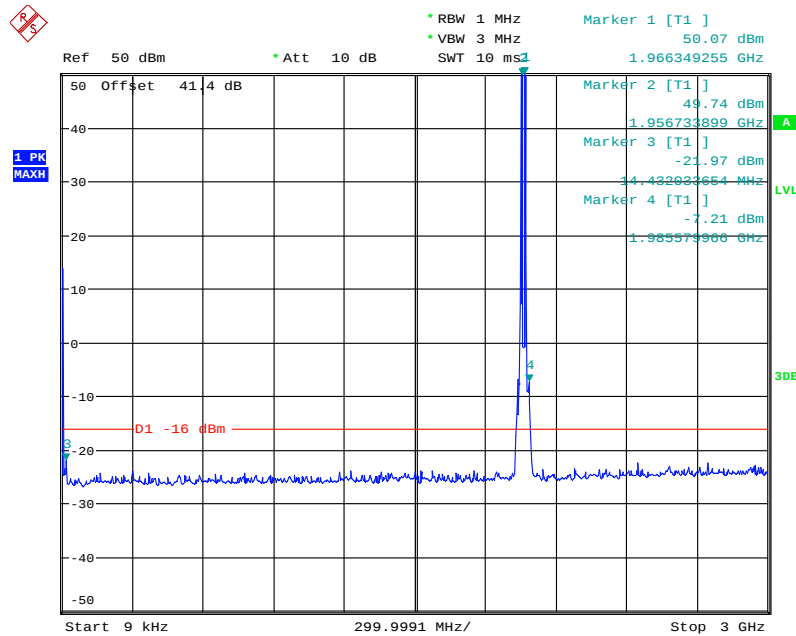
10GHz to 20GHz



Date: 13.JUN.2014 15:49:39

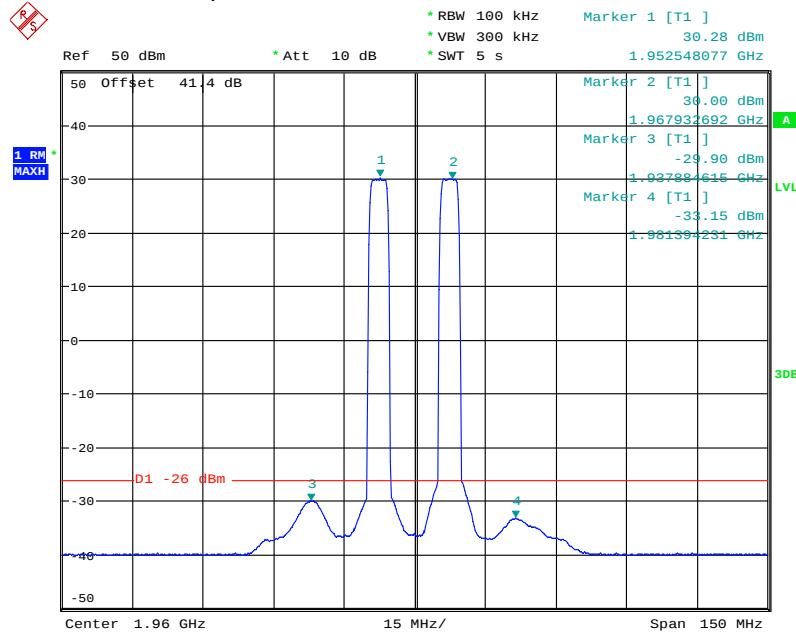


Product Service

Configuration 1 - Mode 59kHz to 3GHz

Date: 17.JUN.2014 10:10:11

Note: The emissions above the limit are measured in a smaller bandwidth and using a RMS detector, see the plot below.



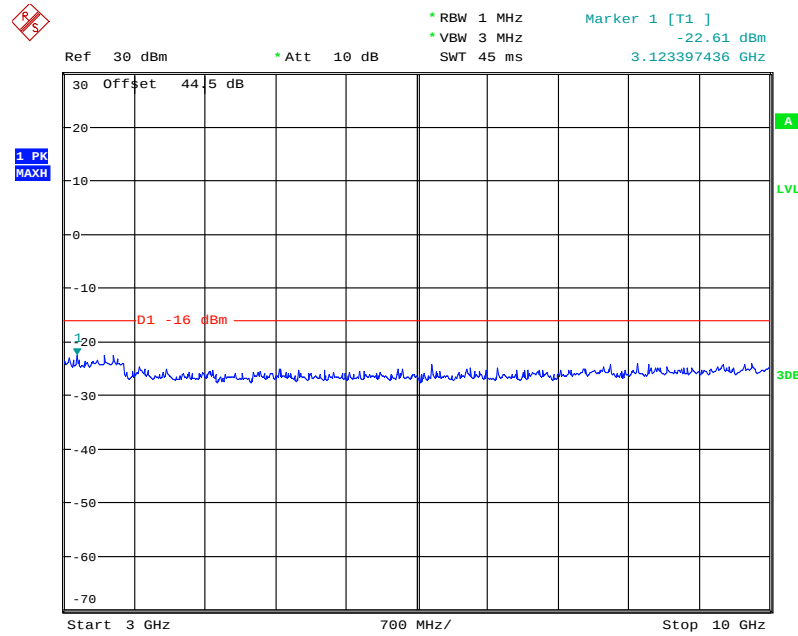
Date: 17.JUN.2014 10:22:05

Note: The limit has been tightened by 10dB to account for the reduction in measurement bandwidth.



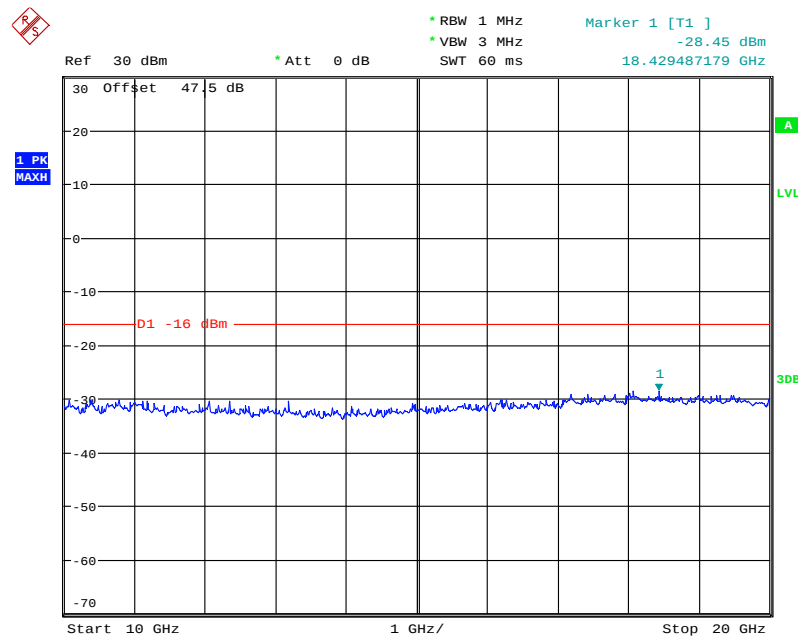
Product Service

3GHz to 10GHz



Date: 17.JUN.2014 10:08:11

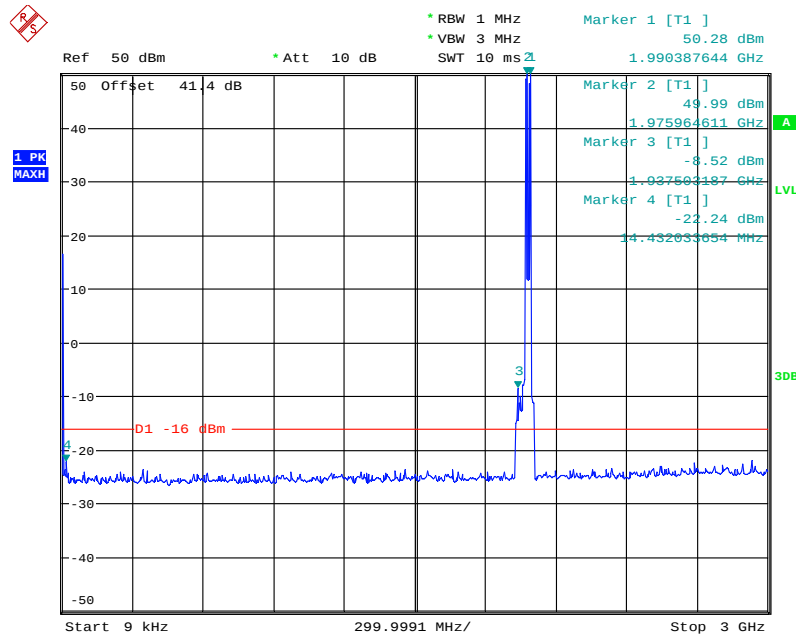
10GHz to 20GHz



Date: 17.JUN.2014 10:06:49

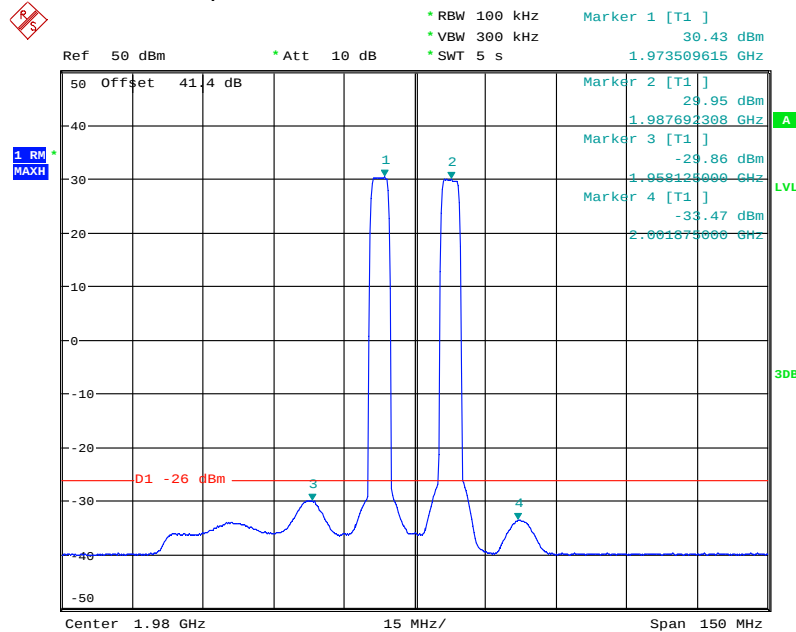


Product Service

Configuration 1 - Mode 69kHz to 3GHz

Date: 17.JUN.2014 13:23:47

Note: The emissions above the limit are measured in a smaller bandwidth and using a RMS detector, see the plot below.

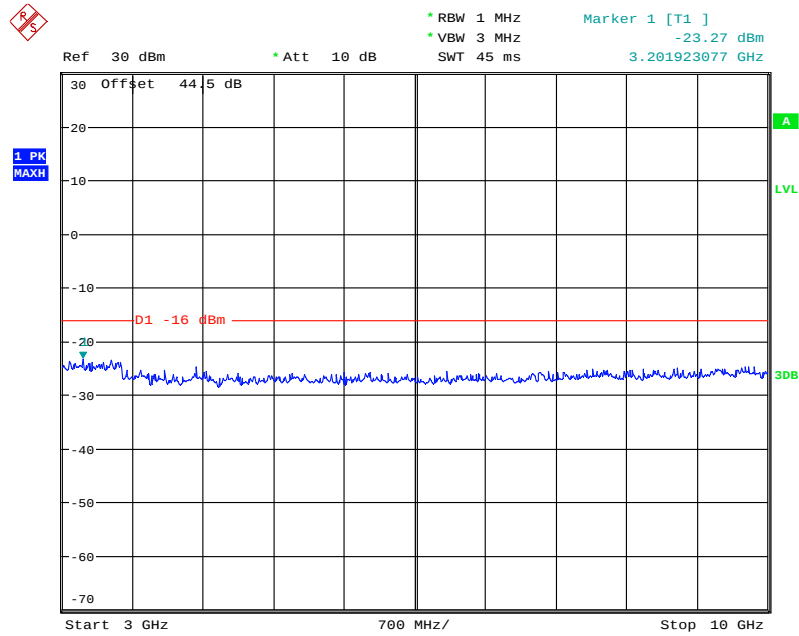


Date: 17.JUN.2014 13:25:02

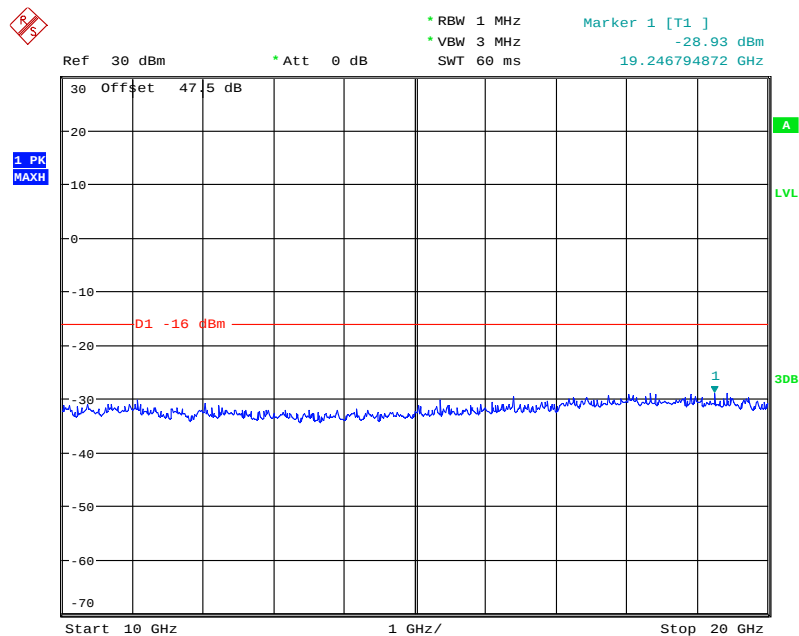
Note: The limit has been tightened by 10dB to account for the reduction in measurement bandwidth.



Product Service

3GHz to 10GHz

Date: 17.JUN.2014 13:26:38

10GHz to 20GHz

Date: 17.JUN.2014 13:27:35



Product Service

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.

Remarks

The EUT does not exceed -16dBm at the frequency range of 9kHz to 20GHz.



Product Service

SECTION 3

TEST EQUIPMENT USED



3.1 TEST EQUIPMENT USED

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

Instrument	Manufacturer	Type No.	Serial No.	Calibration Period (months)	Calibration Due
Section 2.1, 2.2, 2.3, 2.4 and 2.6 – Maximum Conducted Output Power, Peak – Average Ratio, Occupied Bandwidth, Spurious Emissions at Antenna Terminals (± 1MHz) and Conducted Spurious Emissions.					
Spectrum Analyser	Rohde & Schwarz	FSQ26	100253	12	04-Aug-2014
Power Meter	Rohde & Schwarz	NRP2	101283	12	04-Aug-2014
Power Sensor	Rohde & Schwarz	NRP-Z51	102310	12	04-Aug-2014
Network Analyzer	Agilent	8720D	US36140166	12	26-Sep-2014
40dB Attenuator	Aeroflex / Weinschel	66-40-33	CD4019	-	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	090323176	-	O/P MON
Load	Shanghai Huaxiang	TFE5-3	090323220	-	O/P MON
Power Supply	Dahua	DH1716A-9	ETE/L676	-	O/P MON
Digital Multi-meter	FLUKE	179	91820401	12	24-Dec-2014
Thermo-hygrometer	AZ Instruments	8705	9151665	12	12-Dec-2014
Section 2.5 – Radiated Spurious Emissions					
Load	Shanghai Huaxiang	TF100	09121648	-	O/P MON
Load	Shanghai Huaxiang	TF100	09121605	-	O/P MON
Load	Shanghai Huaxiang	TFE5-3	090323176	-	O/P MON
Load	Shanghai Huaxiang	TFE5-3	090323220	-	O/P MON
EMI Receiver	Rohde & Schwarz	ESI 40	100015	12	19-Aug-2014
Ultra log test antenna	Rohde & Schwarz	HL562	100167	12	19-Aug-2014
Double-Ridged Waveguide Horn Antenna	Rohde & Schwarz	HF 906	100029	12	19-Aug-2014
Pyramidal Horn Antenna	EMCO	3160-09	-	-	-
Antenna master	Frankonia	MA 260	-	12	19-Aug-2014
Relay Switch Unit	Rohde & Schwarz	331.1601.31	338965002	-	TU
Semi Anechoic Chamber	Frankonia	23.18m×16.88 m×9.60m	-	12	19-Aug-2014
Power Supply	Dahua	DH1716A-10	1000303181	-	O/P MON
Digital Multi-meter	FLUKE	179	91820401	12	24-Dec-2014
Thermo-hygrometer	AZ Instruments	8705	9151665	12	12-Dec-2014

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 RF 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
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