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Report On

FCC Testing of the
Ericsson RRUS 61 B41A / KRC 118 041/1

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FCC ID: TA8AKRC118041-1

Document 75921519 Report 01 Issue 1

March 2013



Product Service

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

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Ericsson RRUS 61 B41A / KRC 118 041/1

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PREPARED FOR

ERICSSON AB
Isafjordsgatan 10
SE-164 80
Stockholm 16480
Sweden

PREPARED BY


Y He
Test Engineer

APPROVED BY


M Jenkins
Authorised Signatory

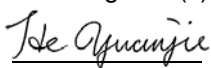
DATED

13 March 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 27. The sample tested was found to comply with the requirements defined in the applied rules.

Test Engineer(s);


Yuanjie HE


Xiaoying ZHANG





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SECTION 1

REPORT SUMMARY

FCC Testing of the
Ericsson RRUS 61 B41A / KRC 118 041/1



1.1 INTRODUCTION

The information contained in this report is intended to show verification of the Ericsson RRUS 61 B41A / KRC 118 041/1 to the requirements of FCC CFR 47 Part 27.

Testing was carried out in support of an application for Grant of Equipment Authorisation in the name of RRUS 61 B41A / KRC 118 041/1.

Objective	To perform FCC Testing to determine the Equipment Under Test's (EUT's) compliance with the Test Specification, for the series of tests carried out.
Manufacturer	Ericsson AB
Product Name	RRUS 61 B41A
Part Number	KRC 118 041/1
Serial Number(s)	CB4P926470
Software Version	CXP 102 051/16_R32AV
PIS Software Version	CXP 901 7316/3_R49DB
Hardware Version	R1B
Number of Samples Tested	1
Test Specification/Issue/Date	FCC CFR 47 Part 27: 2011
Incoming Release Date	Declaration of Build Status 15 February 2013
Order Number Date	PTP 16 February 2013
Start of Test	17 February 2013
Finish of Test	25 February 2013
Name of Engineer(s)	Yuanjie HE Xiaoying ZHANG
Related Document(s)	ANSI C63.4: 2009 FCC CFR 47 Part 2: 2012



1.2 BRIEF SUMMARY OF RESULTS

A brief summary of results in accordance with FCC CFR 47 Part 27, is shown below.

Configuration 1 – Radio Equipment						
Section	Spec Clause	Test Description	Mode	Mod State	Result	Comments
	FCC Part 2 and 27					
	27.50 (h)	Effective Isotropic Radiated Power	2498.5MHz (5.0MHz OBW) / 2506.0MHz (20.0MHz OBW)		N/A	No integral antenna.
			2577.0MHz (5.0MHz, 10.0MHz, 15.0MHz, 20.0MHz OBW)		N/A	
			2655.5MHz (5.0MHz OBW) / 2648.0MHz (20.0MHz OBW)		N/A	
2.1	2.1046, 27.50 (h)	Maximum Peak Output Power - Conducted	2498.5MHz (5.0MHz OBW) / 2506.0MHz (20.0MHz OBW)	0	Pass	-
			2577.0MHz (5.0MHz, 10.0MHz, 15.0MHz, 20.0MHz OBW)	0	Pass	
			2655.5MHz (5.0MHz OBW) / 2648.0MHz (20.0MHz OBW)	0	Pass	
2.2	27.50 (i)	Peak – Average Ratio	2498.5MHz (5.0MHz OBW) / 2506.0MHz (20.0MHz OBW)	0	Pass	-
			2577.0MHz (5.0MHz, 10.0MHz, 15.0MHz, 20.0MHz OBW)	0	Pass	
			2655.5MHz (5.0MHz OBW) / 2648.0MHz (20.0MHz OBW)	0	Pass	
2.3	2.1047 (d)	Modulation Characteristics	2498.5MHz (5.0MHz OBW)		N/A	-
			2577.0MHz (5.0MHz OBW)	0	Pass	
			2655.5MHz (5.0MHz OBW)		N/A	
2.4	2.1049, 27.53 (m)	Occupied Bandwidth	2498.5MHz (5.0MHz OBW) / 2506.0MHz (20.0MHz OBW)	0	Pass	-
			2577.0MHz (5.0MHz, 10.0MHz, 15.0MHz, 20.0MHz OBW)	0	Pass	
			2655.5MHz (5.0MHz OBW) / 2648.0MHz (20.0MHz OBW)	0	Pass	
2.5	2.1051, 27.53 (m)	Spurious Emissions at Antenna Terminals (±1MHz)	2498.5MHz (5.0MHz OBW) / 2501.0MHz (10.0MHz OBW) 2503.5MHz (15.0MHz OBW) / 2506.0MHz (20.0MHz OBW)	0	Pass	-
			2577.0MHz		N/A	
			2655.5MHz (5.0MHz OBW) / 2653.0MHz (10.0MHz OBW) 2650.5MHz (15.0MHz OBW) / 2648.0MHz (20.0MHz OBW)	0	Pass	
2.6	2.1053, 27.53 (m)	Radiated Spurious Emissions	2498.5MHz (5.0MHz OBW)	0	Pass	-
			2577.0MHz (5.0MHz, 10.0MHz, 15MHz, 20.0MHz OBW)	0	Pass	
			2655.5MHz (5.0MHz OBW)	0	Pass	



Product Service

Configuration 1 – Radio Equipment						
Section	Spec Clause	Test Description	Mode	Mod State	Result	Comments
	FCC Part 2 and 27					
2.7	2.1051, 27.53 (m)	Conducted Spurious Emissions	2498.5MHz (5.0MHz OBW) / 2506.0MHz (20.0MHz OBW)	0	Pass	
			2577.0MHz (5.0MHz, 10.0MHz, 15MHz, 20.0MHz OBW)	0	Pass	
			2655.5MHz (5.0MHz OBW) / 2648.0MHz (20.0MHz OBW)	0	Pass	
2.8	2.1055, 27.54	Frequency Stability Under Temperature Variations	2498.5MHz (5.0MHz OBW)		N/A	
			2577.0MHz (5.0MHz OBW)	0	Pass	
			2655.5MHz (5.0MHz OBW)		N/A	
2.9	2.1055, 27.54	Frequency Stability Under Voltage Variations	2498.5MHz (5.0MHz OBW)		N/A	
			2577.0MHz (5.0MHz OBW)	0	Pass	
			2655.5MHz (5.0MHz OBW)		N/A	

N/A – Not Applicable

1.3 DECLARATION OF BUILD STATUS

MAIN EUT	
MANUFACTURING DESCRIPTION	Radio Equipment
MANUFACTURER	Ericsson AB
PRODUCT NAME	RRUS 61 B41A
PART NUMBER	KRC 118 041/1
SERIAL NUMBER(s)	CB4P926470
HARDWARE VERSION	R1B
SOFTWARE VERSION	CXP 102 051/16_R32AV
PIS SOFTWARE VERSION	CXP 901 7316/3_R49DB
TRANSMITTER OPERATING RANGE	TX/RX: 2496MHz - 2658MHz
DUPLEXER MODE	TDD
MODULATIONS	QPSK, 16QAM, 64QAM
INTERMEDIATE FREQUENCIES	--
ITU DESIGNATION OF EMISSION	5M00F9W 10M0F9W 15M0F9W 20M0F9W
CHANNEL BANDWIDTH	5MHz, 10MHz, 15MHz and 20MHz according to 3GPP TS 36.141
OUTPUT POWER (RMS) (W or dBm)	2 x 46.0dBm (2 x 40W)
OUTPUT POWER TOLERANCE	± 2.0dB
NUMBER OF ANTENNA PORTS	2 TX/RX ports
SUPPORTED CONFIGURATION	Dual Single Carrier, TX Diversity and MIMO. Both RF chains are identical
FCC ID	TA8AKRC118041-1
TECHNICAL DESCRIPTION (a brief description of the intended use and operation)	The equipment is the Radio Part of LTE Base Station.

Signature



Date

04 March 2013

D of B S Serial No

75921519 /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.





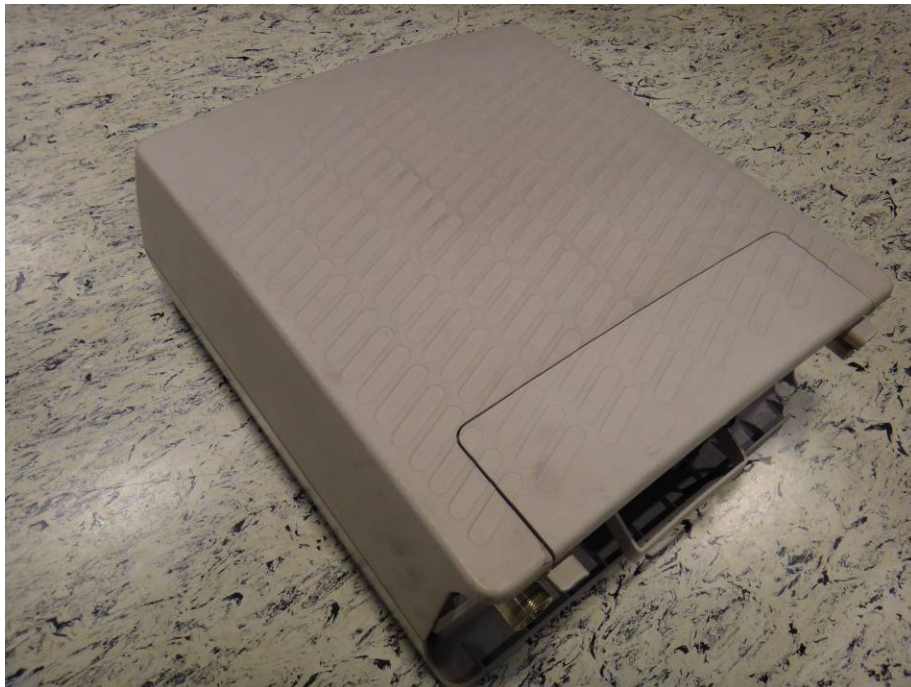
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1.4 PRODUCT INFORMATION

1.4.1 Technical Description

The Equipment Under Test (EUT) RRUS 61 B41A / KRC 118 041/1 is an Ericsson Radio Equipment working in the public mobile service 2496-2658MHz band which provides communication connections to TDD-LTE network. The RRUS 61 B41A / KRC 118 041/1 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 27.

The RRUS 61 B41A / KRC 118 041/1 supports Dual single mode, Tx Diversity mode and MIMO mode. All modes have been included when several settings were tested to find worst case setting, and Tx MIMO was used for the TX measurements.

The RRUS 61 B41A / KRC 118 041/1 supports Test Models E-TM1.1, E-TM3.2 and E-TM3.1 at 2496-2658MHz defined in 3GPP TS 36.141. Test Model E-TM1.1 was used to represent QPSK modulation only, Test Model E-TM3.2 was used to represent 16QAM modulation, and Test Model E-TM3.1 was used to represent 64QAM modulation.

The settings below were found to be representative for all traffic scenarios when several settings with the different modulations, channel bandwidths were tested to find the worst case setting. These settings were used for all measurements if not otherwise noted:

- Test Model E-TM1.1 in channel bandwidth 5MHz and 20MHz.

Frame structure is based on the Uplink-downlink configuration 3 and Special subframe configuration 8 defined in 3GPP TS 36.211. The subframe 5 was used for testing.

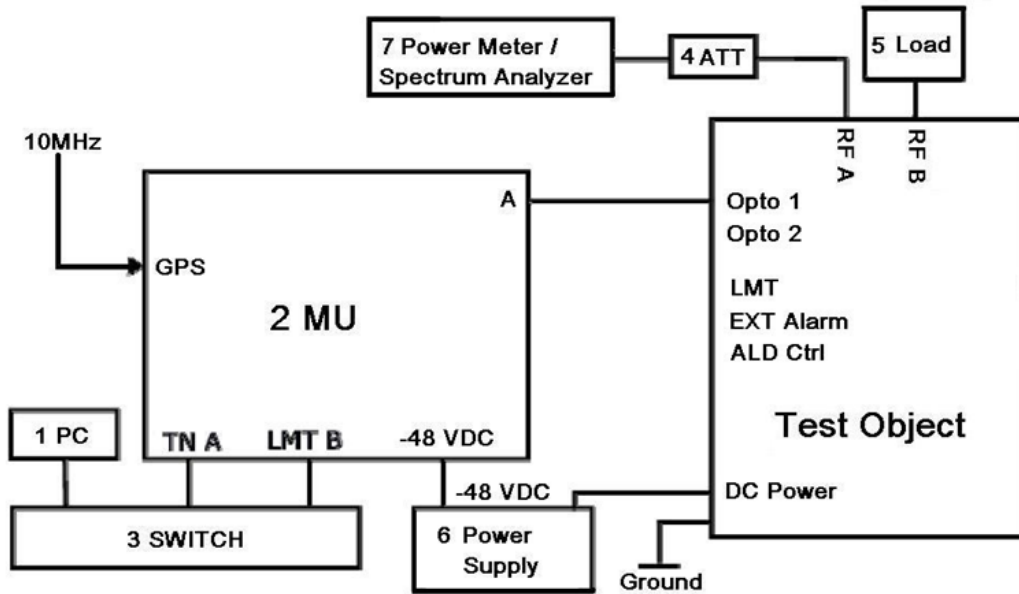
The EUT has two TX/RX ports and it can be configured to transmit in 2496-2658MHz with both TX are active.

For TX test cases: Maximum Conducted Output Power, Spurious Emissions at Antenna Terminals (± 1 MHz) and Conducted Spurious Emissions, measurements were performed on both combined TX/RX output connectors RF A and RF B of the EUT. For all other TX test cases, measurements were performed on the combined TX/RX output connector RF A. The complete testing was performed with the EUT transmitting at maximum RF power unless otherwise stated.

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



Test Setup, Conducted Measurement:

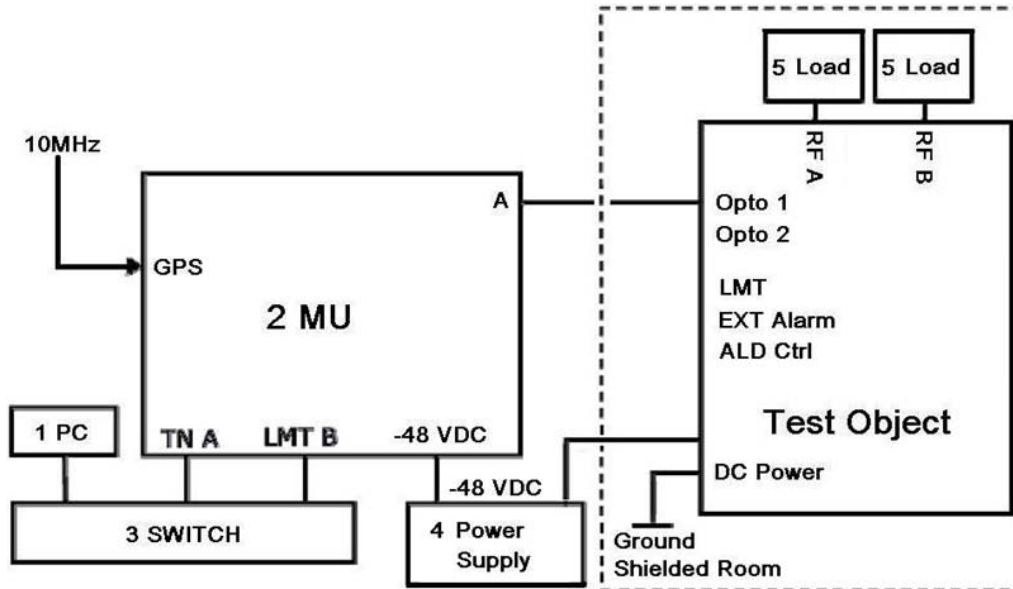


Test Object	Part Number	Version	Serial Number
Radio Part	RRUS 61 B41A / KRC 118 041/1	R1B	CB4P926470

No.	Auxiliary Equipment	Part Number / Model Type	Version	Serial Number
1	Computer	HP Compaq nc4400	--	CND6460KCL
2	RBS 6601	BFL 901 009/1	--	--
	DUL 20 01	KDU 137 533/4	R1C	TU8X385161
	SUP 6601	1/BFL 901 009/1	R3B	BR81066733
3	Switch	TEH1085K	--	S108SK014848011011
4	Attenuator	DC18	--	8F42L12E017
5	Load	TF100	--	09121614
6	Power Supply	DH1716-5D	--	2007060047
7	Power Meter	Rohde & Schwarz NRP	--	102432
	Diode Power Sensor	Rohde & Schwarz NRP-Z21	--	103606
	Spectrum Analyzer	FSQ26	--	200014
	Spectrum Analyzer	FSV13	--	101427
	Spectrum Analyzer	FSP	--	100680



Test Setup, Radiated Measurement:



Test Object	Part Number	Version	Serial Number
Radio Part	RRUS 61 B41A / KRC 118 041/1	R1B	CB4P926470

No.	Auxiliary Equipment	Part Number / Model Type	Version	Serial Number
1	Computer	HP Compaq nc4400	--	CND6460KCL
2	RBS 6601	BFL 901 009/1	--	--
	DUL 20 01	KDU 137 533/4	R1C	TU8X385161
	SUP 6601	1/BFL 901 009/1	R3B	BR81066733
3	Switch	TEH1085K	--	S108SK014848011011
4	Power Supply	DH1716-5D	--	2007060047
5	Load	TF100	--	09032343
	Load	TF100	--	09121614



1.4.3 Modes of Operation

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

Bottom Channel :

Mode 1 - 5 : EARFCN 39675: 2498.5MHz (5.0MHz Bandwidth)

Mode 1 - 10 : EARFCN 39700: 2501.0MHz (10.0MHz Bandwidth)

Mode 1 - 15 : EARFCN 39725: 2503.5MHz (15.0MHz Bandwidth)

Mode 1 - 20 : EARFCN 39750: 2506.0MHz (20.0MHz Bandwidth)

Middle Channel :

Mode 2 : EARFCN 40460: 2577.0MHz

Top Channel :

Mode 3 - 5 : EARFCN 41245: 2655.5MHz (5.0MHz Bandwidth)

Mode 3 - 10 : EARFCN 41220: 2653.0MHz (10.0MHz Bandwidth)

Mode 3 - 15 : EARFCN 41195: 2650.5MHz (15.0MHz Bandwidth)

Mode 3 - 20 : EARFCN 41170: 2648.0MHz (20.0MHz Bandwidth)

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



1.5 TEST CONDITIONS

For all tests the EUT was set up in accordance with the relevant test standard and to represent typical operating conditions. Tests were applied with the EUT situated in a 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 has been performed under the following site registrations:

FCC Accreditation 910917:

The State Radio Monitoring Centre, No.80 Beilishi Road Xicheng District Beijing, China.



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SECTION 2

TEST DETAILS

FCC Testing of the
Ericsson RRUS 61 B41A / KRC 118 041/1



2.1 MAXIMUM PEAK OUTPUT POWER - CONDUCTED

2.1.1 Specification Reference

FCC CFR 47 Part 2, Clause 2.1046
 FCC CFR 47 Part 27, Clause 27.50 (h)(1)(i)

2.1.2 Equipment Under Test

RRUS 61 B41A / KRC 118 041/1, S/N: CB4P926470

2.1.3 Date of Test and Modification State

17 and 18 February 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 27.

Using a power meter and attenuator(s), the output power of the EUT was measured at the antenna terminal. The carrier power was measured with E-TM1.1, E-TM3.2 and E-TM3.1 test models. Since the EUT transmits on two antennas simultaneously in the same frequency range, i.e, TX Diversity and MIMO, using the Measure-and-Sum approach, the output power at both antennas were tested, and the total output power were then summed. The T'gate function was used to measure the power during the active part of transmission only.

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 - 5, Mode 1 - 20
- Mode 2 (5.0MHz, 10.0MHz, 15.0MHz, 20.0MHz OBW)
- Mode 3 - 5, Mode 3 -20

2.1.6 Environmental Conditions

	17 February 2013	18 February 2013
Ambient Temperature	20.5°C	22.6°C
Relative Humidity	35.8%	37.5%



2.1.7 Test Results

For the period of test the EUT met the requirements of FCC CFR 47 Part 2 and Part 27 Maximum Peak Output Power.

The test results are shown below

Antenna A and B

E-TM1.1: 5.0MHz Bandwidth

Configuration 1 - Mode 1, Mode 2 and Mode 3 - 5.0

EARFCN	Frequency (MHz)	Antenna A		Antenna B		Total (dBW) RMS
		Result (dBm) RMS	Result (W) RMS	Result (dBm) RMS	Result (W) RMS	
39675	2498.5	46.08	40.55	45.92	39.08	19.01
40460	2577.0	46.22	41.88	46.09	40.64	19.17
41245	2655.5	46.21	41.78	46.02	39.99	19.13

E-TM1.1: 20.0MHz Bandwidth

Configuration 1 - Mode 1, Mode 2 and Mode 3 - 20

EARFCN	Frequency (MHz)	Antenna A		Antenna B		Total (dBW) RMS
		Result (dBm) RMS	Result (W) RMS	Result (dBm) RMS	Result (W) RMS	
39750	2506.0	46.06	40.36	45.95	39.36	19.02
40460	2577.0	46.15	41.21	46.06	40.36	19.12
41170	2648.0	46.16	41.30	45.98	39.63	19.08

E-TM1.1: 10.0MHz and 15.0MHz Bandwidth

Configuration 1 - Mode 2

EARFCN / Frequency (MHz)	BW Config. (MHz)	Antenna A		Antenna B		Total (dBW) RMS
		Result (dBm) RMS	Result (W) RMS	Result (dBm) RMS	Result (W) RMS	
40460 / 2577.0	10.0	46.12	40.93	46.08	40.55	19.11
	15.0	46.15	41.21	46.09	40.64	19.13



E-TM3.2: 5.0MHz and 20.0MHz Bandwidth

Configuration 1 - Mode 2

EARFCN / Frequency (MHz)	BW Config. (MHz)	Antenna A		Antenna B		Total (dBW) RMS
		Result (dBm) RMS	Result (W) RMS	Result (dBm) RMS	Result (W) RMS	
40460 / 2577.0	5.0	46.14	41.11	46.05	40.27	19.11
	20.0	46.13	41.02	46.05	40.27	19.10

E-TM3.1: 5.0MHz and 20.0MHz Bandwidth

Configuration 1 - Mode 2

EARFCN / Frequency (MHz)	BW Config. (MHz)	Antenna A		Antenna B		Total (dBW) RMS
		Result (dBm) RMS	Result (W) RMS	Result (dBm) RMS	Result (W) RMS	
40460 / 2577.0	5.0	46.20	41.69	46.10	40.74	19.16
	20.0	46.14	41.11	46.06	40.36	19.11

Limit 33 dBW+10log(X/Y) dBW	Where X is the actual channel width and Y is 6MHz. X=4.47, Limit=31.72 dBW X=8.94, Limit=34.73 dBW X=13.41, Limit=36.49 dBW X=17.88, Limit=37.74dBW
--------------------------------	---

Remarks

The EUT does not exceed the limit at the measured frequencies.



2.2 PEAK – AVERAGE RATIO

2.2.1 Specification Reference

FCC CFR 47 Part 27, Clause 27.50 (i)

2.2.2 Equipment Under Test

RRUS 61 B41A / KRC 118 041/1, S/N: CB4P926470

2.2.3 Date of Test and Modification State

18 to 19 February and 11 March 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 27.

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 path loss measured and entered as a reference level offset. The test was performed with the EUT operating on the modes in section 1.4.3 and record the result of the following configurations and modes of operation for worst case:

- Configuration 1 - Mode 1 - 5, Mode 1 - 20
- Mode 2 (5.0MHz, 10.0MHz, 15.0MHz, 20.0MHz OBW)
- Mode 3 - 5, Mode 3 - 20

2.2.6 Environmental Conditions

	18 February 2013	19 February 2013	11 March 2013
Ambient Temperature	22.6°C	20.0°C	22.5°C
Relative Humidity	37.5%	36.0%	37.5%



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2.2.7 Test Results

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

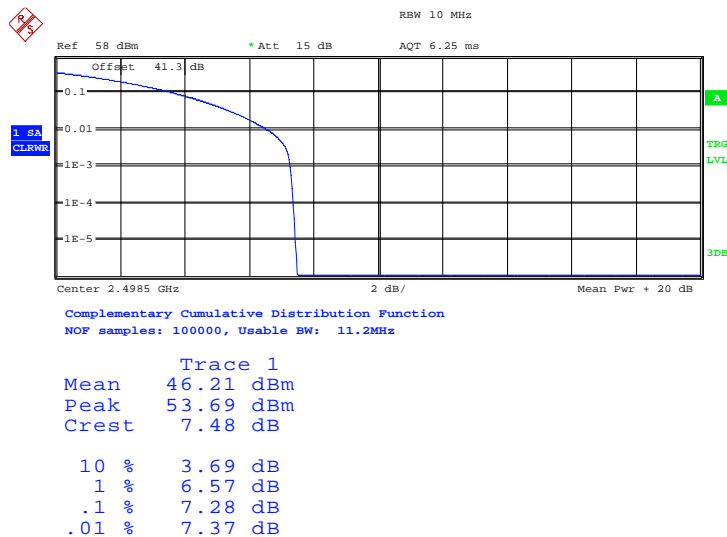
The test results are shown below

Antenna A:

E-TM1.1:

Configuration 1 - Mode 1 - 5

5.0MHz Bandwidth

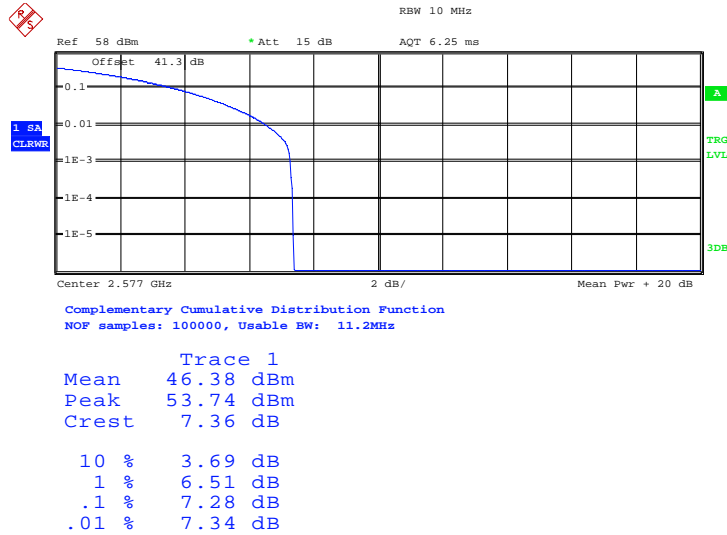


Date: 11.MAR.2013 04:54:38



Configuration 1 - Mode 2 - 5

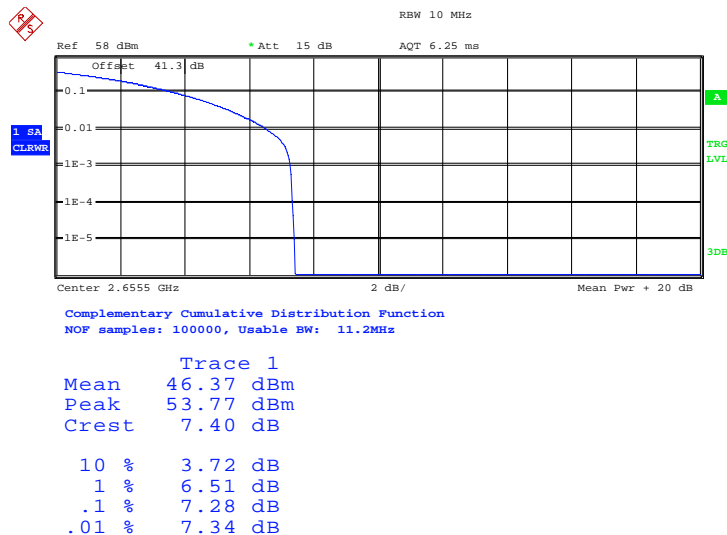
5.0MHz Bandwidth



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Configuration 1 - Mode 3 - 5

5.0MHz Bandwidth



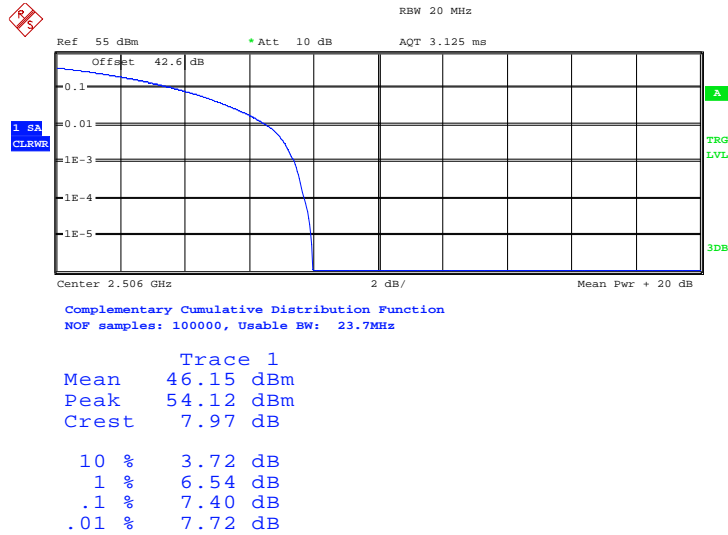
Date: 11.MAR.2013 04:56:01



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Configuration 1 - Mode 1 - 20

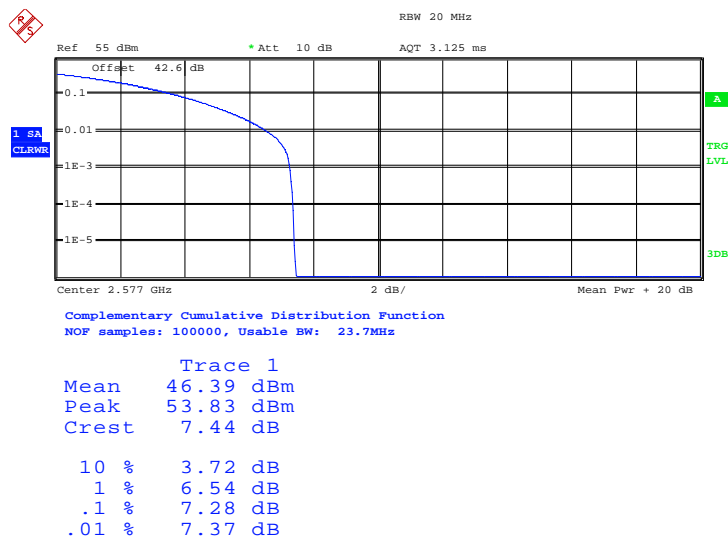
20.0MHz Bandwidth



Date: 18.FEB.2013 03:34:10

Configuration 1 - Mode 2 - 20

20.0MHz Bandwidth



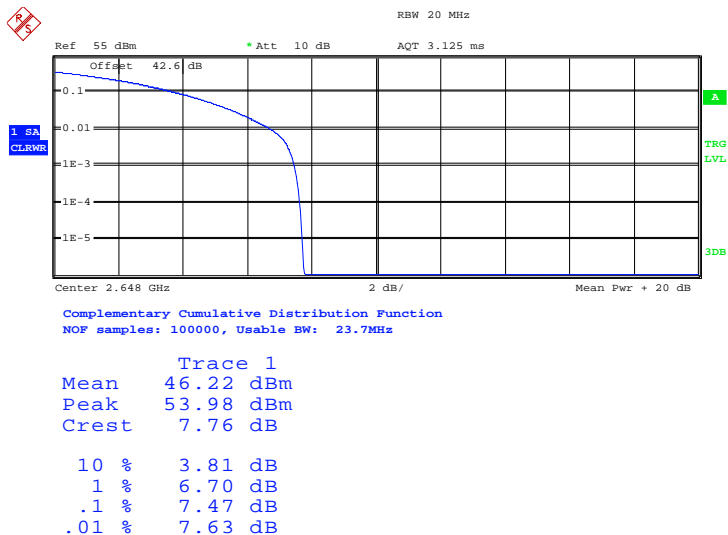
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Configuration 1 - Mode 3 - 20

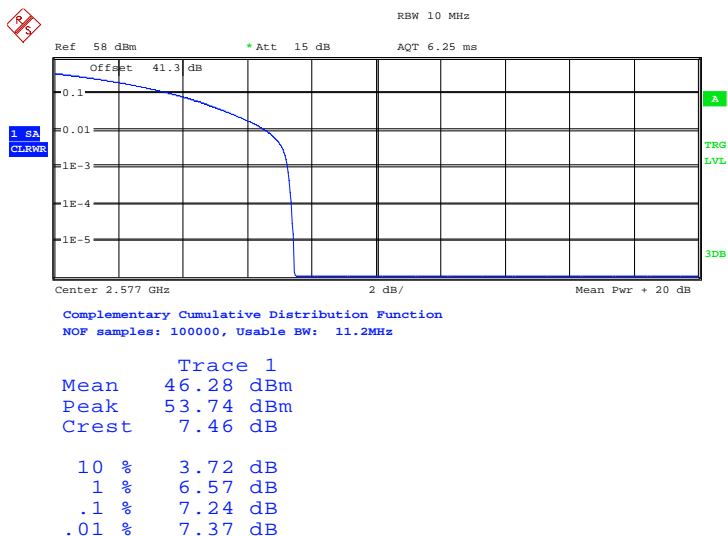
20.0MHz Bandwidth



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Configuration 1 - Mode 2 -10

10.0MHz Bandwidth



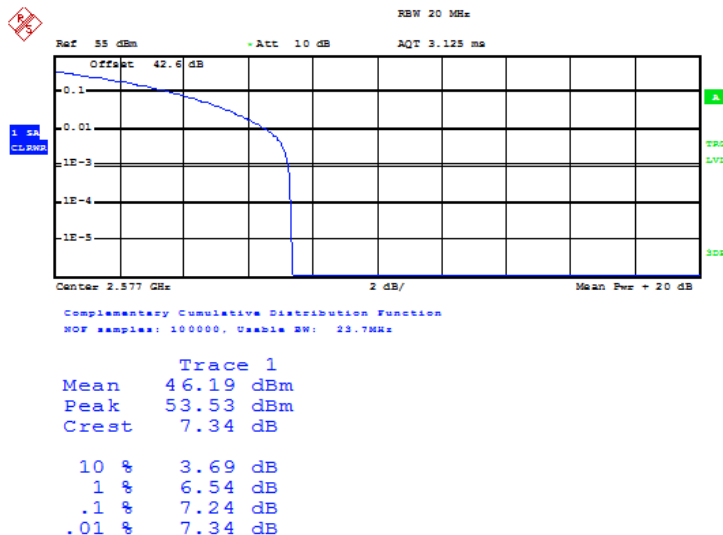
Date: 11.MAR.2013 04:39:02



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Configuration 1 - Mode 2 - 15

15.0MHz Bandwidth

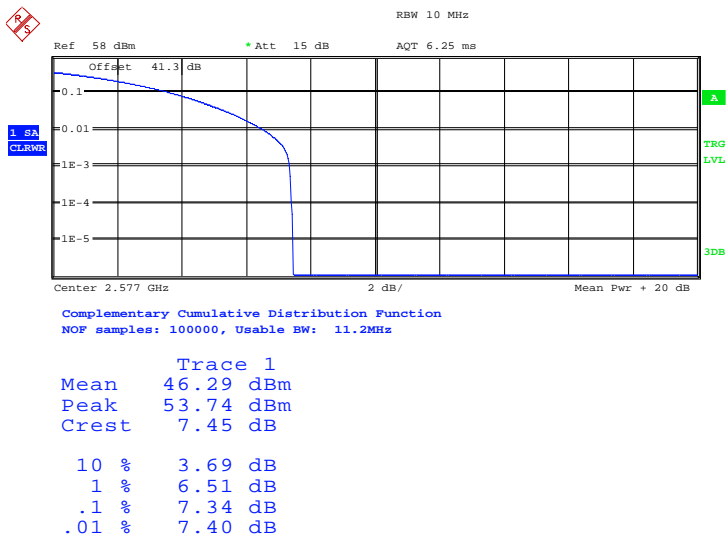


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E-TM3.2:

Configuration 1 - Mode 2 - 5

5.0MHz Bandwidth



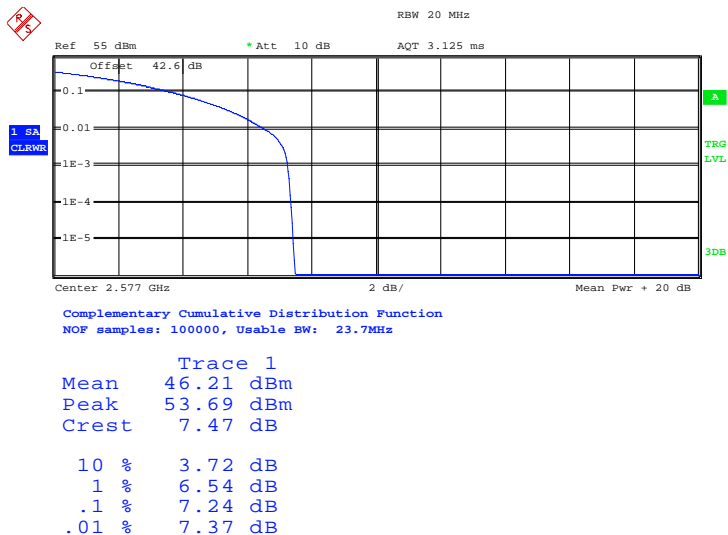
Date: 11.MAR.2013 04:50:11



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Configuration 1 - Mode 2 - 20

20.0MHz Bandwidth

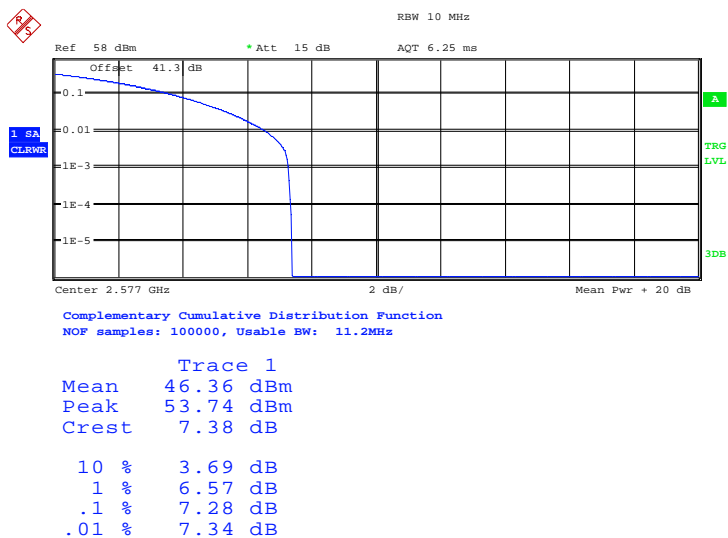


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E-TM3.1:

Configuration 1 - Mode 2 - 5

5.0MHz Bandwidth



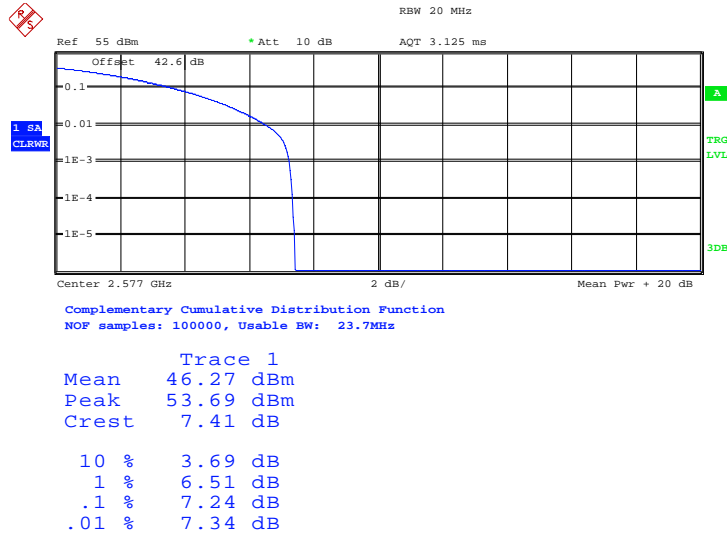
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Product Service

Configuration 1 - Mode 2 - 20

20.0MHz Bandwidth



Date: 18.FEB.2013 04:13:49

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

Remarks:

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



2.3 MODULATION CHARACTERISTICS

2.3.1 Specification Reference

FCC CFR 47 Part 2, Clause 2.1047 (d)

2.3.2 Equipment Under Test

RRUS 61 B41A / KRC 118 041/1, S/N: CB4P926470

2.3.3 Date of Test and Modification State

19 February 2013 – Modification State 0

2.3.4 Test Method and Operating Modes

The test was applied in accordance with the test method requirements of FCC CFR 47 Part 2

Connect the TX output connector RF A to a spectrum analyzer with an attenuator. The other connector RF B was connected to match load. The EUT was controlled to transmit maximum power. Measure and record the constellation of the EUT by the spectrum analyzer.

The EUT supports QPSK, 16QAM and 64QAM modulations.

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

Configuration 1 - Mode 2 (5.0MHz OBW)

2.3.5 Environmental Conditions

19 February 2013

Ambient Temperature 20.0°C

Relative Humidity 36.0%



2.3.6 Test Result

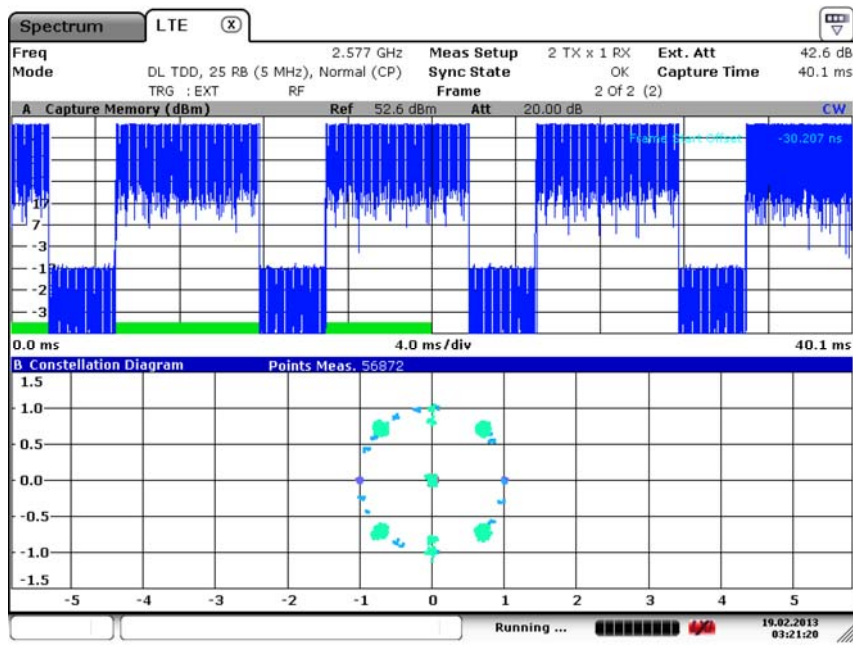
Plots are shown on the following showing the EUT transmitting with all of the modulations:

The test results are shown below

Configuration 1 - Mode 2

5.0MHz Bandwidth

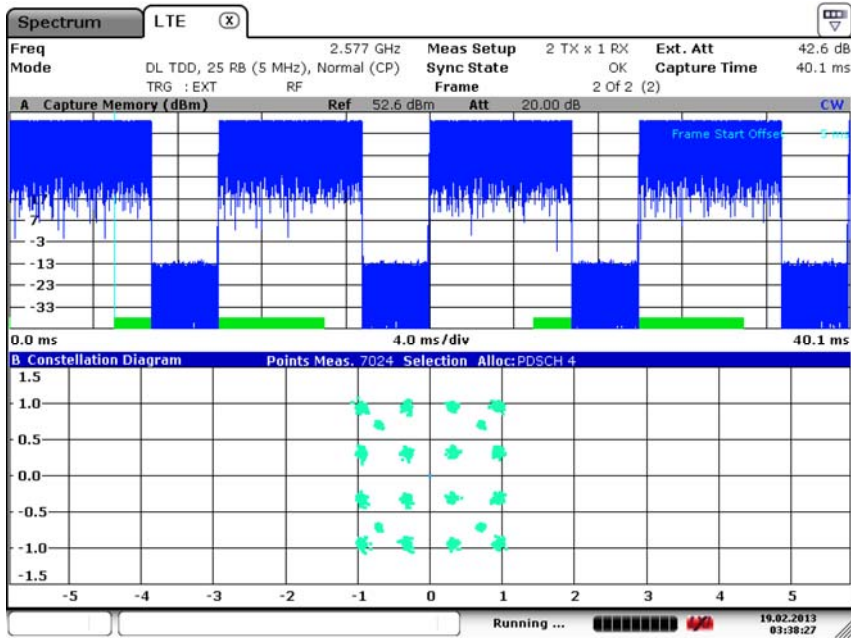
E-TM1.1: EUT transmitting with QPSK modulation in:



Date: 19.FEB.2013 03:21:20

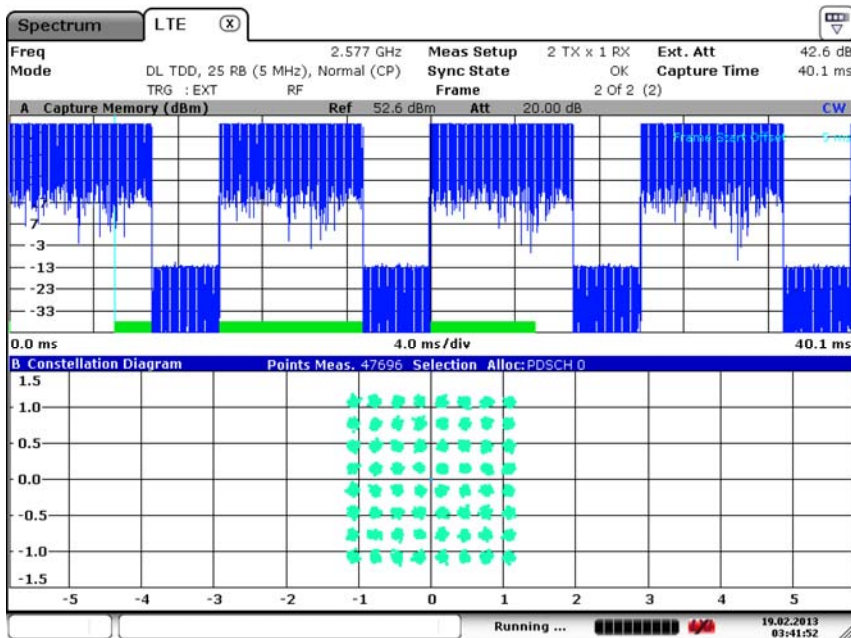


E-TM3.2: EUT transmitting with 16QAM modulation in:



Date: 19.FEB.2013 03:38:27

E-TM3.1: EUT transmitting with 64QAM modulation in:



Date: 19.FEB.2013 03:41:52



Product Service

2.4 OCCUPIED BANDWIDTH

2.4.1 Specification Reference

FCC CFR 47 Part 2, Clause 2.1049
FCC CFR 47 Part 27, Clause 27.53 (m)

2.4.2 Equipment Under Test

RRUS 61 B41A / KRC 118 041/1, S/N: CB4P926470

2.4.3 Date of Test and Modification State

18 and 19 February 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 27.

The EUT was transmitting at maximum power, modulated using the test model described. Using resolution bandwidth of 1% OBW and appropriate video bandwidth. The occupied bandwidth, that is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission.

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

Configuration 1 - Mode 1 - 5, Mode 1 - 20
- Mode 2 (5.0MHz, 10.0MHz, 15.0MHz, 20.0MHz OBW)
- Mode 3 - 5, Mode 3 -20

2.4.6 Environmental Conditions

	18 February 2013	19 February 2013
Ambient Temperature	22.6°C	20.0°C
Relative Humidity	37.5%	36.0%



Product Service

2.4.7 Test Results

For the period of test the EUT met the requirements of FCC CFR 47 Part 2 and Part 27 for Occupied Bandwidth.

The test results are shown below

Test Model	BW configuration (MHz)	Frequency (MHz) / Channel	Occupied Bandwidth (MHz)
E-TM1.1	5.0	2498.5 (Bottom)	4.47
	20.0	2506.0 (Bottom)	17.88
	5.0	2577.0 (Middle)	4.47
	10.0	2577.0 (Middle)	8.94
	15.0	2577.0 (Middle)	13.41
	20.0	2577.0 (Middle)	17.88
	5.0	2655.5 (Top)	4.47
	20.0	2648.0 (Top)	17.88
E-TM3.2	5.0	2577.0 (Middle)	4.47
	20.0	2577.0 (Middle)	17.88
E-TM3.1	5.0	2577.0 (Middle)	4.47
	20.0	2577.0 (Middle)	17.88

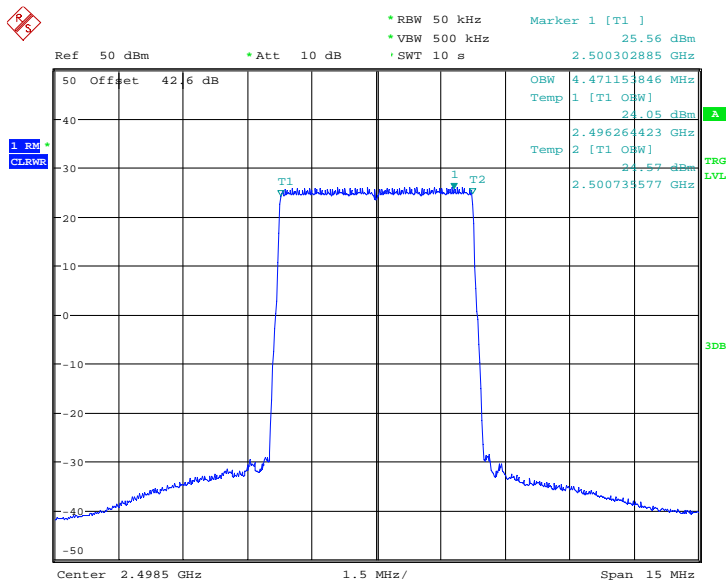


Product Service

E-TM1.1:

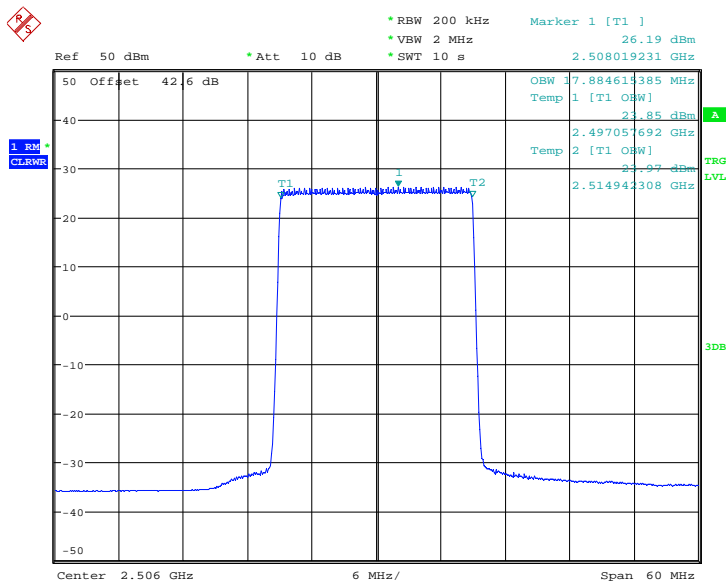
Configuration 1 - Mode 1 - 5

5.0MHz Bandwidth



Date: 18.FEB.2013 00:48:23

Configuration 1 - Mode 1 - 20

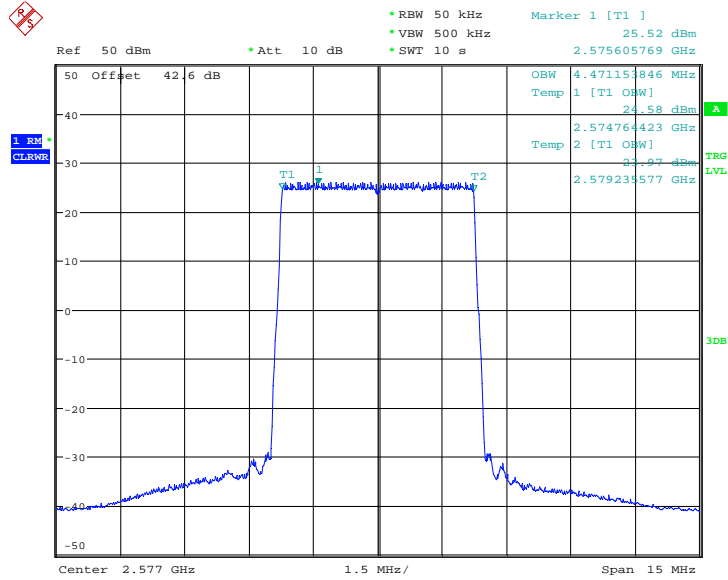


Date: 18.FEB.2013 03:36:13



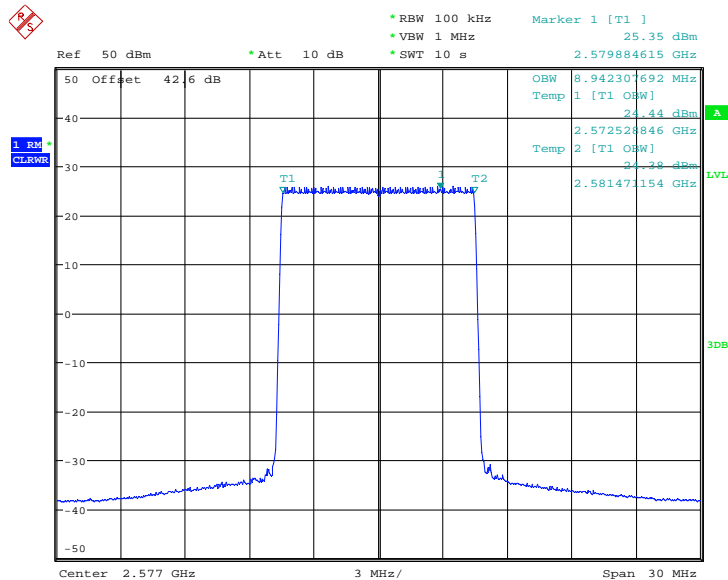
Product Service

Configuration 1 - Mode 2 - 5



Date: 18.FEB.2013 00:56:09

Configuration 1 - Mode 2 - 10

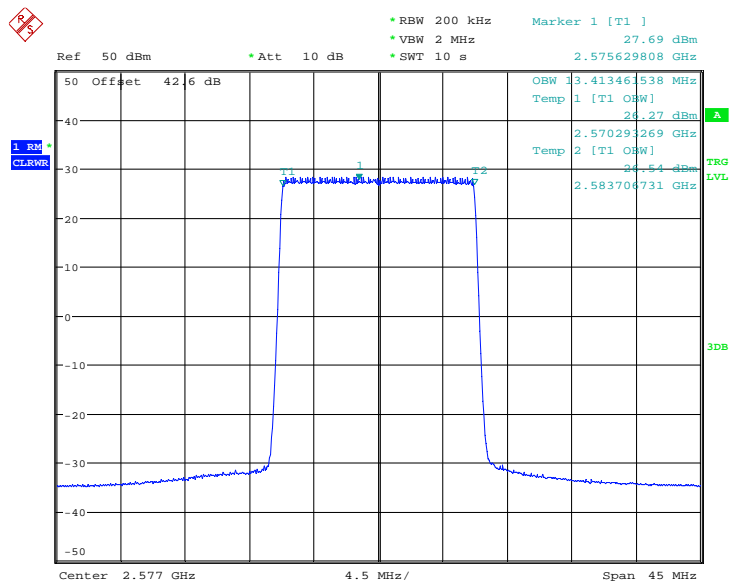


Date: 18.FEB.2013 05:28:32



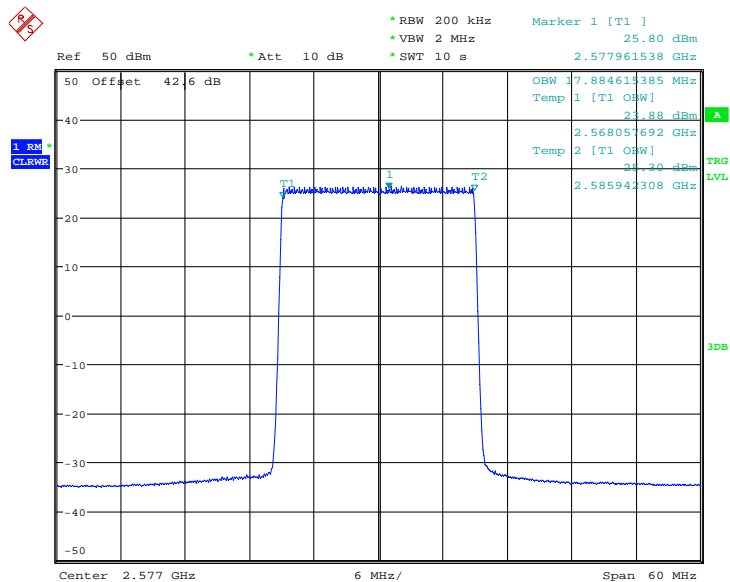
Product Service

Configuration 1 - Mode 2 - 15



Date: 18.FEB.2013 05:55:02

Configuration 1 - Mode 2 - 20

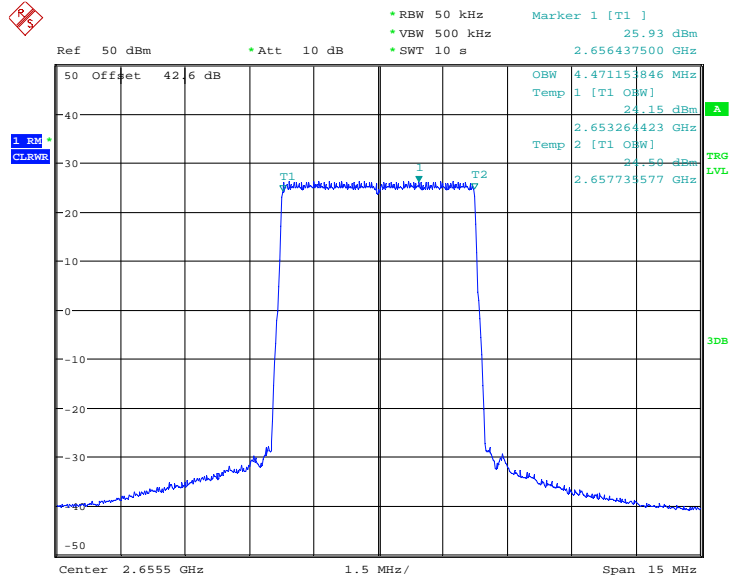


Date: 18.FEB.2013 03:53:56



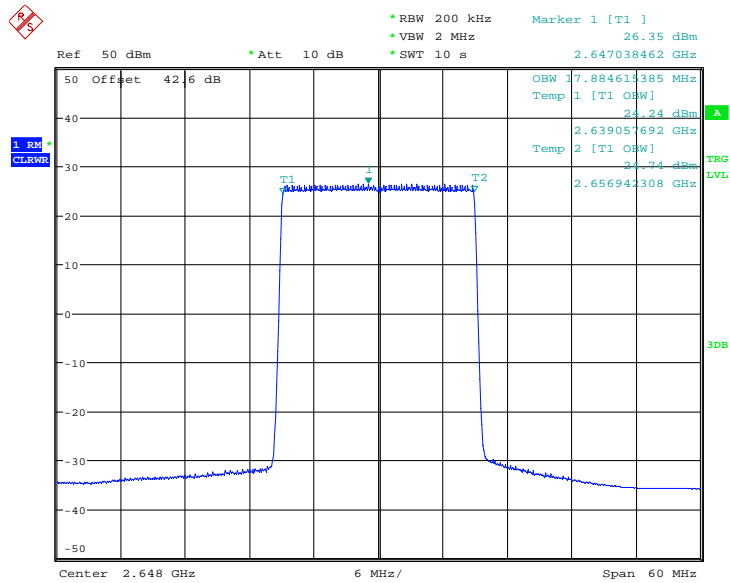
Product Service

Configuration 1 - Mode 3 - 5



Date: 18.FEB.2013 00:32:34

Configuration 1 - Mode 3 - 20



Date: 18.FEB.2013 03:49:29

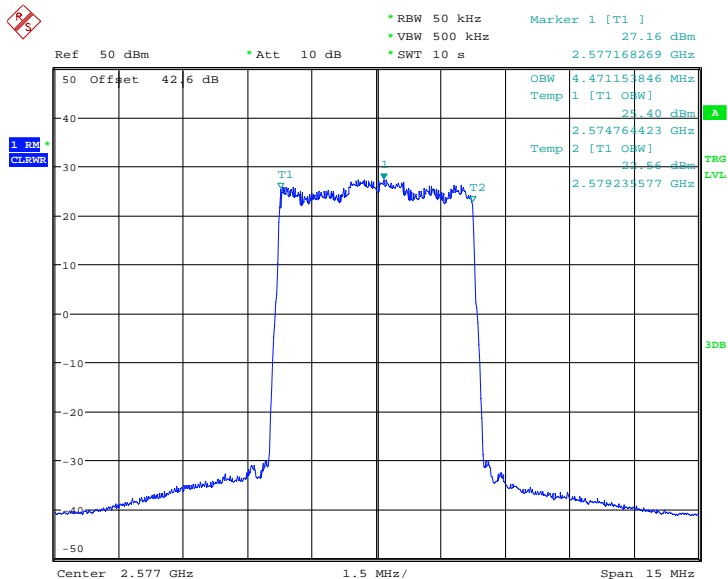


Product Service

E-TM3.2:

Configuration 1 - Mode 2 - 5

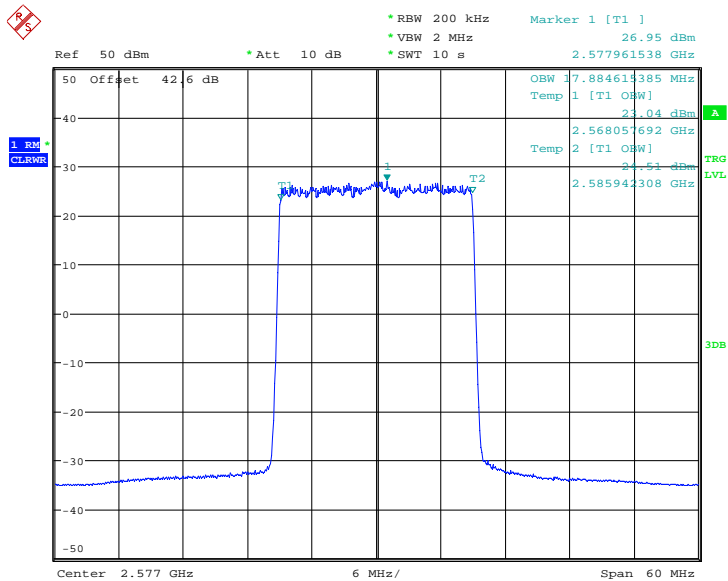
5.0MHz Bandwidth



Date: 18.FEB.2013 01:17:19

Configuration 1 - Mode 2 - 20

20.0MHz Bandwidth



Date: 18.FEB.2013 04:07:49

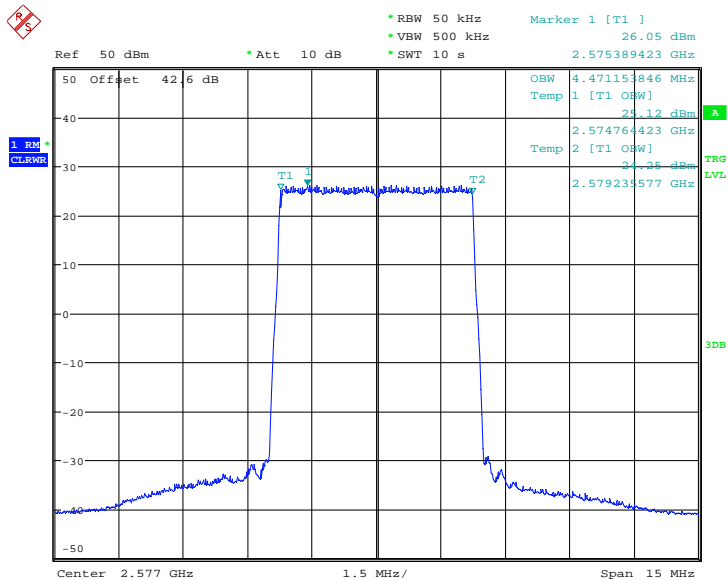


Product Service

E-TM3.1:

Configuration 1 - Mode 2 - 5

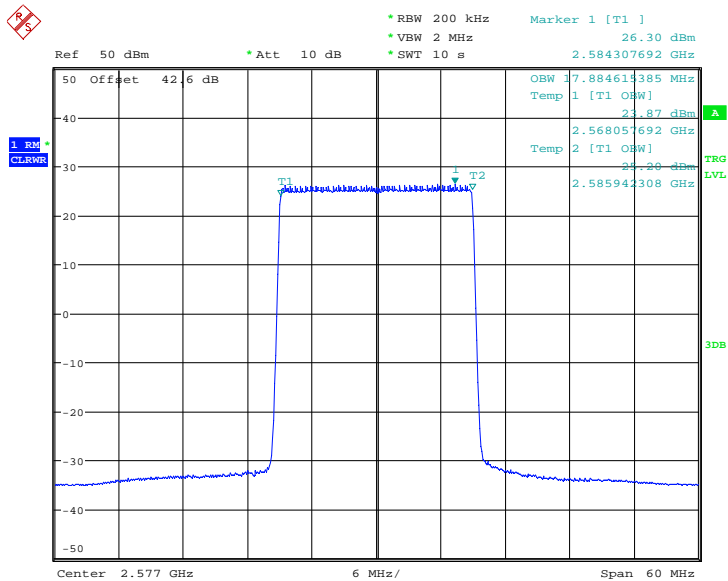
5.0MHz Bandwidth



Date: 18.FEB.2013 01:21:06

Configuration 1 - Mode 2 - 20

20.0MHz Bandwidth



Date: 18.FEB.2013 04:09:30



2.5 SPURIOUS EMISSIONS AT ANTENNA TERMINALS (± 1 MHz)

2.5.1 Specification Reference

FCC CFR 47 Part 2, Clause 2.1051
FCC CFR 47 Part 27, Clause 27.53 (m)

2.5.2 Equipment Under Test

RRUS 61 B41A / KRC 118 041/1, S/N: CB4P926470

2.5.3 Date of Test and Modification State

18 and 19 February 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 27.

Since the EUT transmits on two antennas simultaneously in the same frequency range, i.e., TX Diversity and MIMO using the Measure and Add $10\log(N)$ dB technique, the limits for spurious emissions at antenna terminals (± 1 MHz) should be adjusted with a correction of $10\log 2$.

In accordance with 27.53(m)(6), at least 1% of the emission bandwidth was used for the resolution bandwidth up to 1MHz away from the block edge. The limit -13dBm was adjusted with a correction of $10\log 2$ to -16dBm. A resolution bandwidth of 50kHz was used between 1MHz to 5MHz away from the band edge. The limit was adjusted to -29dBm to compensate for the reduced measurement bandwidth. Spectrum analyzer detector was set as RMS.

E-TM1.1 was selected as the representative Test Mode.

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 - 5, Mode 1 - 10, Mode 1 - 15, Mode 1 - 20
- Mode 3 - 5, Mode 3 - 10, Mode 3 - 15, Mode 3 - 20

2.5.6 Environmental Conditions

	18 February 2013	19 February 2013
Ambient Temperature	22.6°C	20.0°C
Relative Humidity	37.5%	36.0%



2.5.7 Test Results

For the period of test the EUT met the requirements of FCC CFR 47 Part 2 and Part 27 for Spurious Emissions Antenna Terminals (± 1 MHz)

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

Antenna A

ETM1.1:

5.0MHz Bandwidth

Configuration 1 - Mode 1 - 5 and Mode 3 - 5

Band Edge Frequency	Edge Test with 5.0MHz Bandwidth Channel No./Frequencies	RBW / VBW (Hz)
Bottom 2496 MHz	Channel: 39675 Frequency: 2498.5 MHz	50k / 500k
Top 2658MHz	Channel: 41245 Frequency: 2655.5 MHz	

10.0MHz Bandwidth

Configuration 1 - Mode 1 - 10 and Mode 3 - 10

Band Edge Frequency	Edge Test with 10.0MHz Bandwidth Channel No./Frequencies	RBW / VBW (Hz)
Bottom 2496 MHz	Channel: 39700 Frequency: 2501.0MHz	100k / 1M
Top 2658MHz	Channel: 41220 Frequency: 2653.0MHz	

15.0MHz Bandwidth

Configuration 1 - Mode 1 - 15 and Mode 3 - 15

Band Edge Frequency	Edge Test with 15.0MHz Bandwidth Channel No./Frequencies	RBW / VBW (Hz)
Bottom 2496 MHz	Channel: 39725 Frequency: 2503.5 MHz	200k / 1M
Top 2658MHz	Channel: 41195 Frequency: 2650.5 MHz	



Product Service

20.0MHz BandwidthConfiguration 1 - Mode 1 - 20 and Mode 3 - 20

Band Edge Frequency	Edge Test with 20.0MHz Bandwidth Channel No./Frequencies	RBW / VBW (Hz)
Bottom 2496 MHz	Channel: 39750 Frequency: 2506.0 MHz	200k / 1M
Top 2658MHz	Channel: 41170 Frequency: 2648.0 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 outside of ranges shown in the above tables shall not be made available to the end user.



Product Service

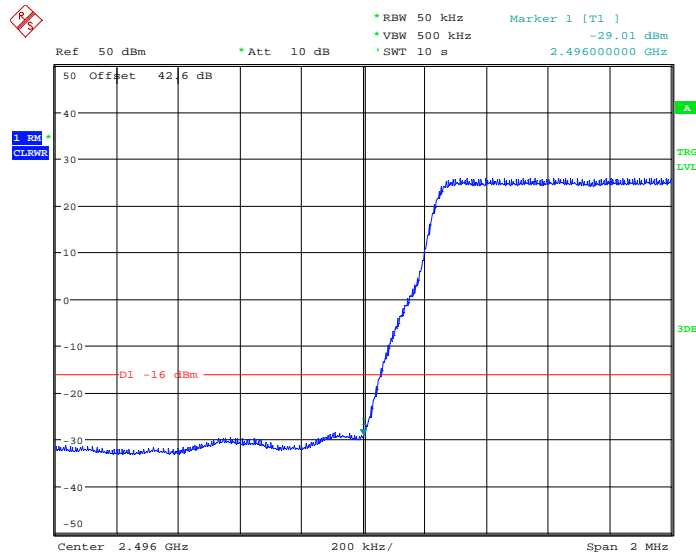
The test results are shown below

Antenna A

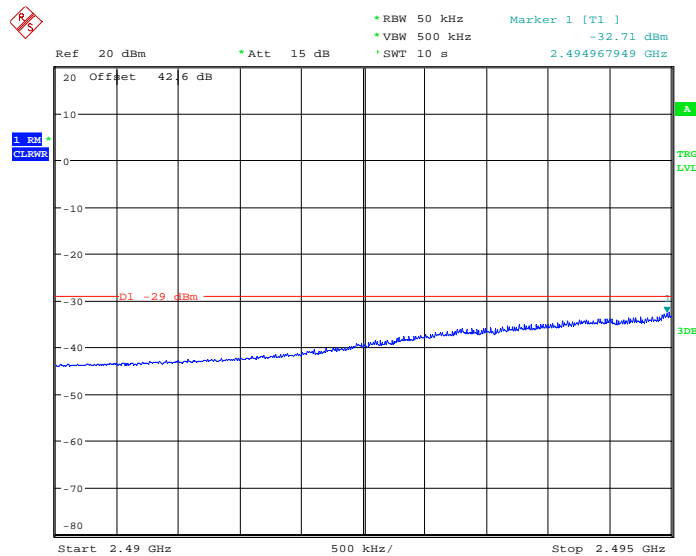
E-TM1.1

5.0MHz Bandwidth

Configuration 1 - Mode 1 - 5



Date: 18.FEB.2013 00:44:51

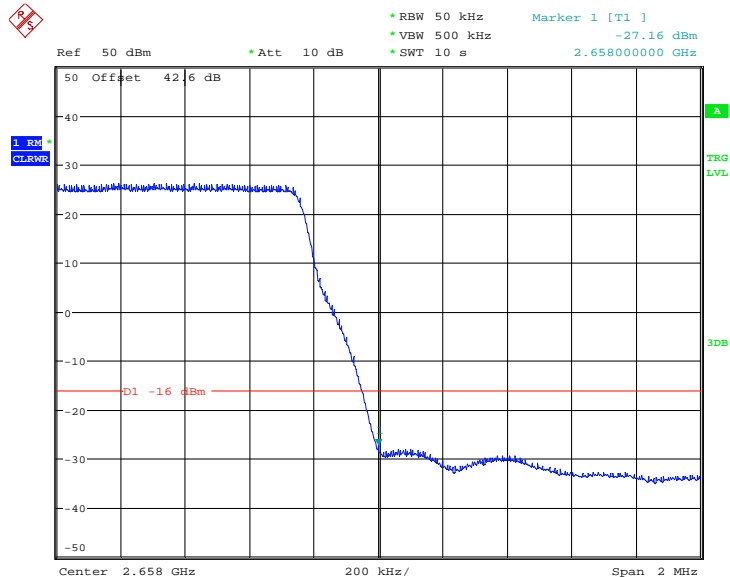


Date: 18.FEB.2013 00:46:12

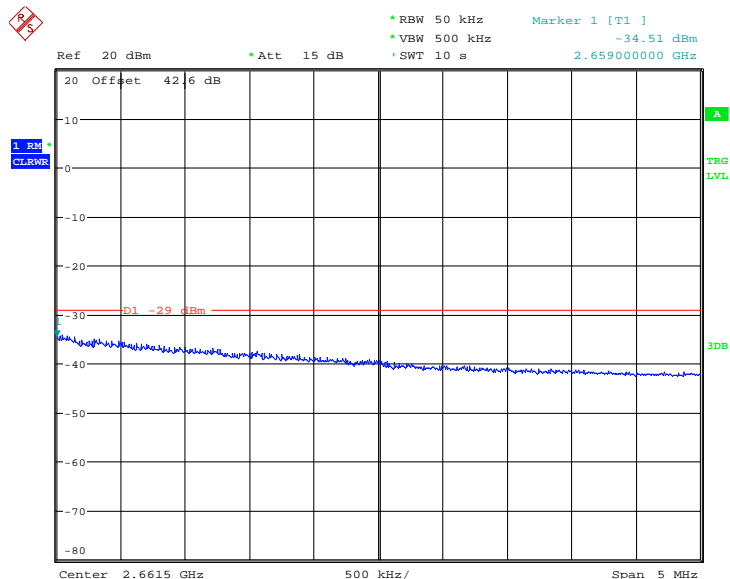


Product Service

Configuration 1 - Mode 3 - 5



Date: 18.FEB.2013 00:39:35

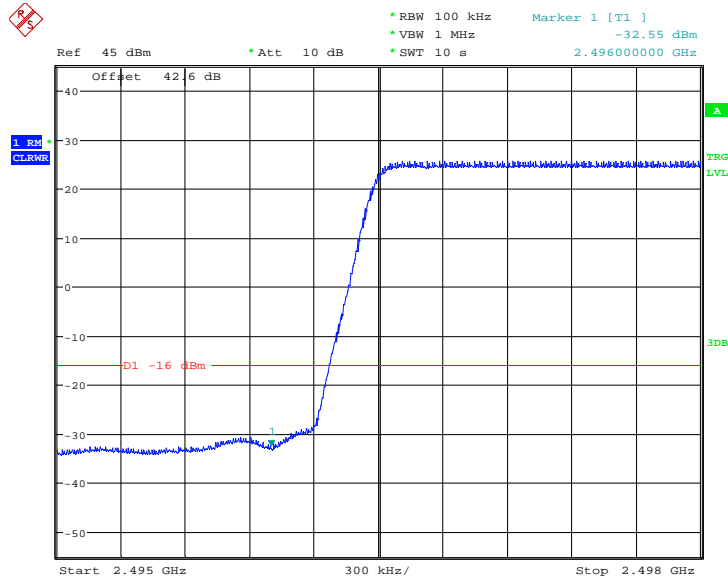


Date: 18.FEB.2013 00:40:48

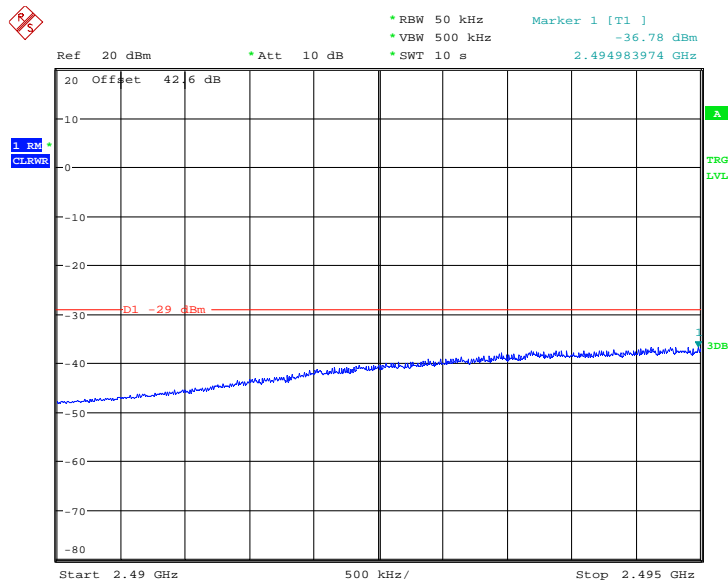


10.0MHz Bandwidth

Configuration 1 - Mode 1 - 10



Date: 18.FEB.2013 06:38:19

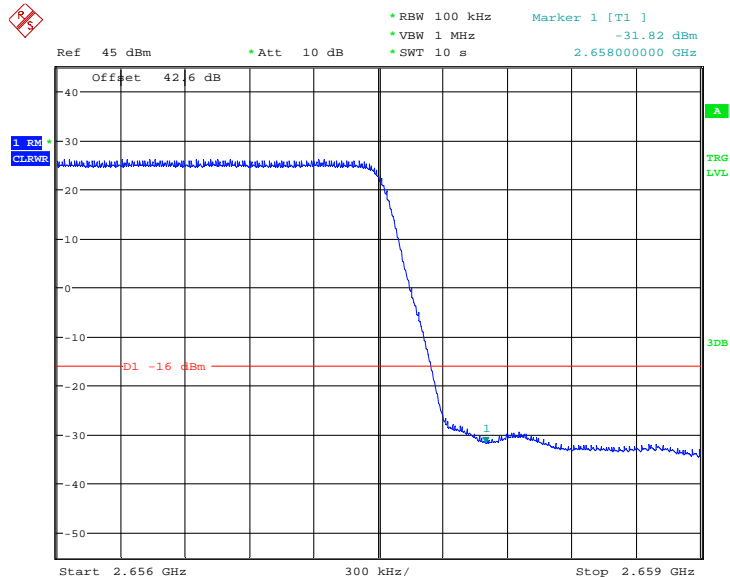


Date: 18.FEB.2013 06:39:56

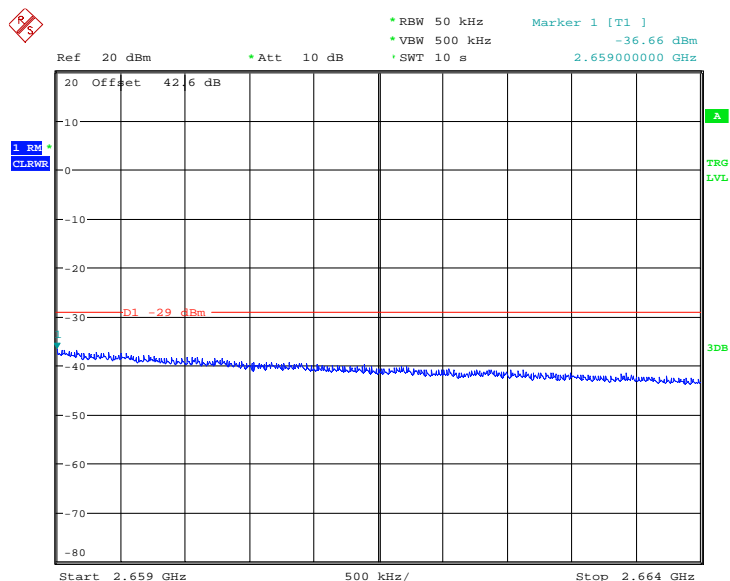


Product Service

Configuration 1 - Mode 3 - 10



Date: 18.FEB.2013 06:43:25



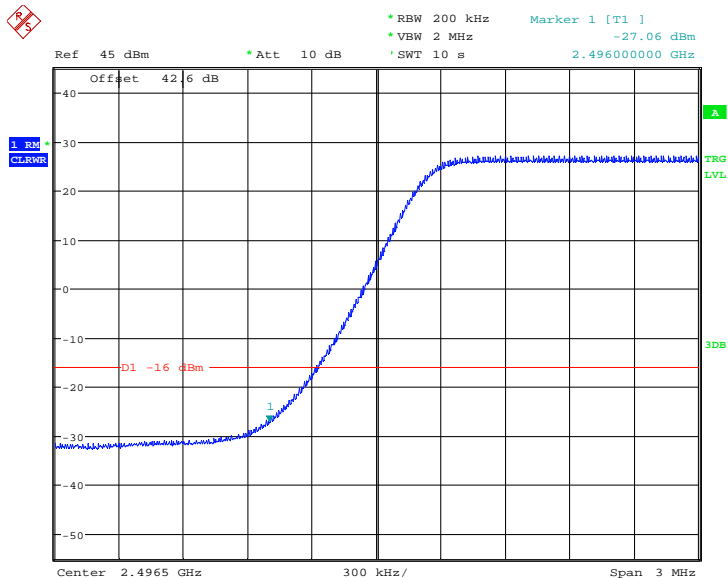
Date: 18.FEB.2013 06:42:12



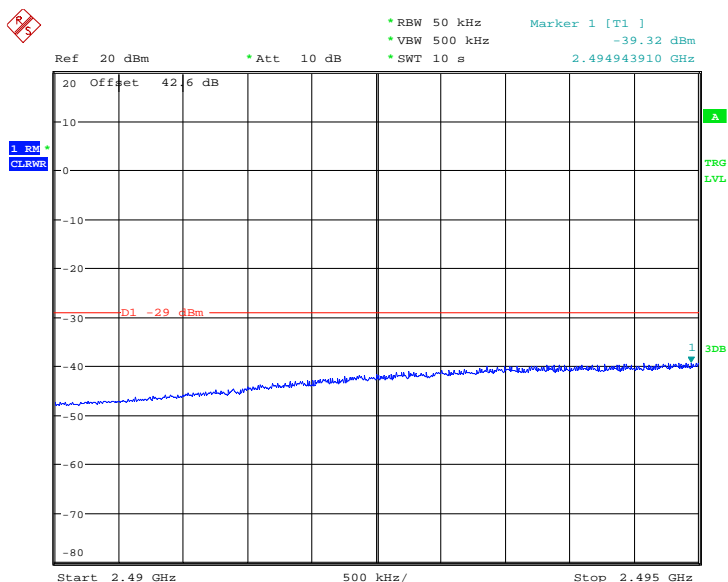
Product Service

15.0MHz Bandwidth

Configuration 1 - Mode 1 - 15



Date: 18.FEB.2013 06:26:12

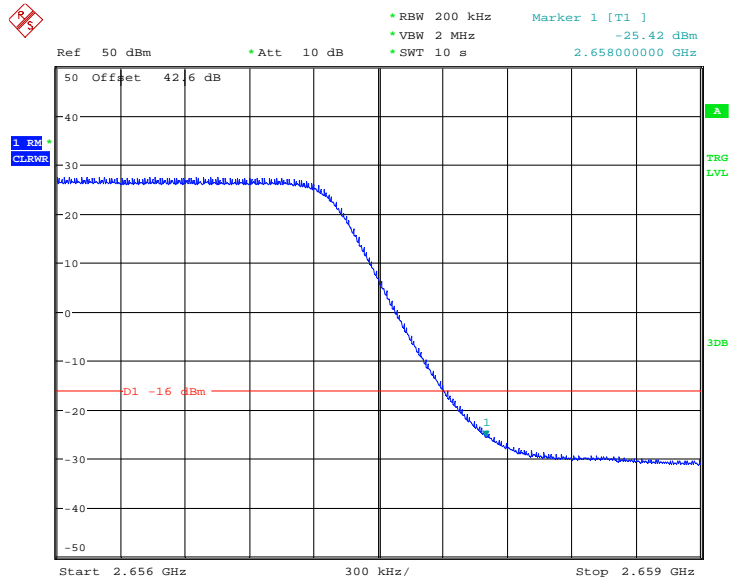


Date: 18.FEB.2013 06:27:14

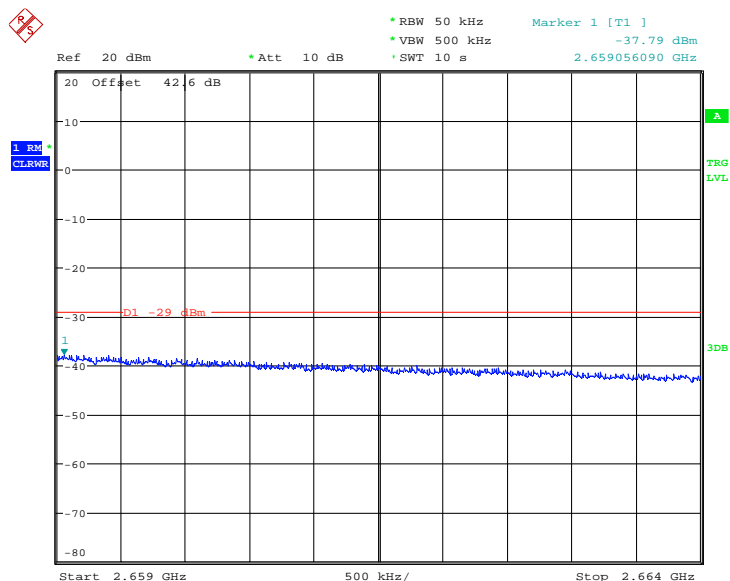


Product Service

Configuration 1 - Mode 3 - 15



Date: 18.FEB.2013 06:30:12



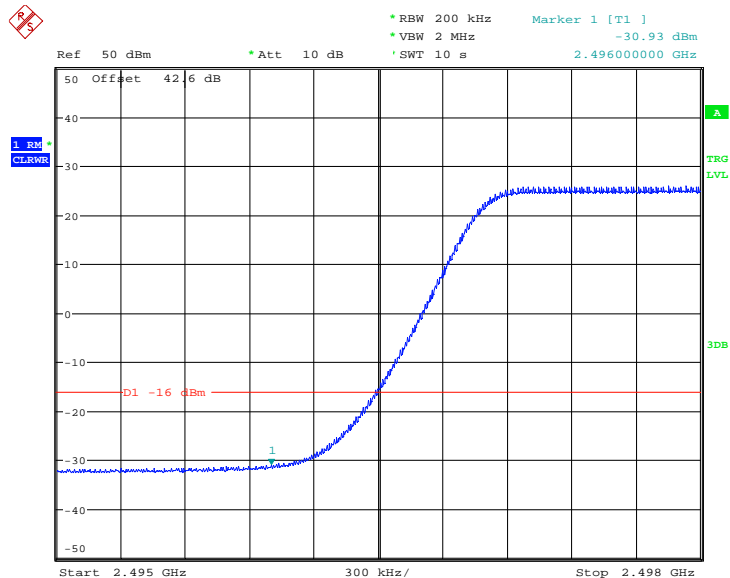
Date: 18.FEB.2013 06:28:56



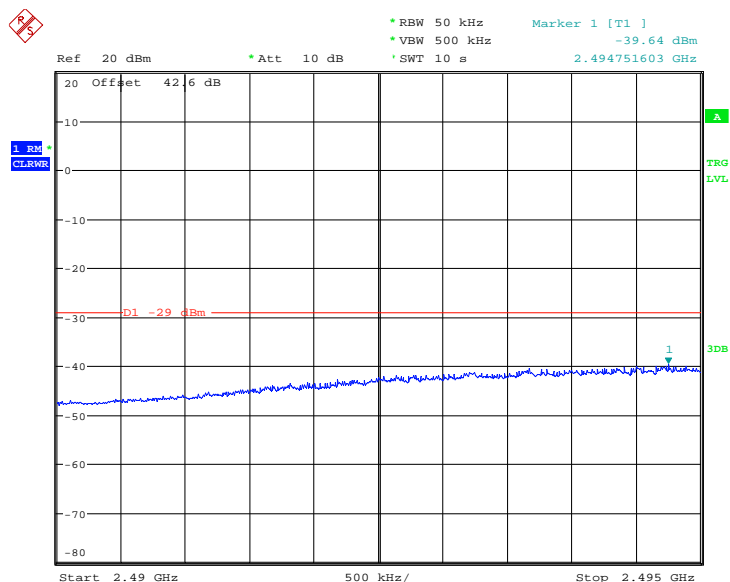
Product Service

20.0MHz Bandwidth

Configuration 1 - Mode 1 - 20



Date: 18.FEB.2013 03:39:25

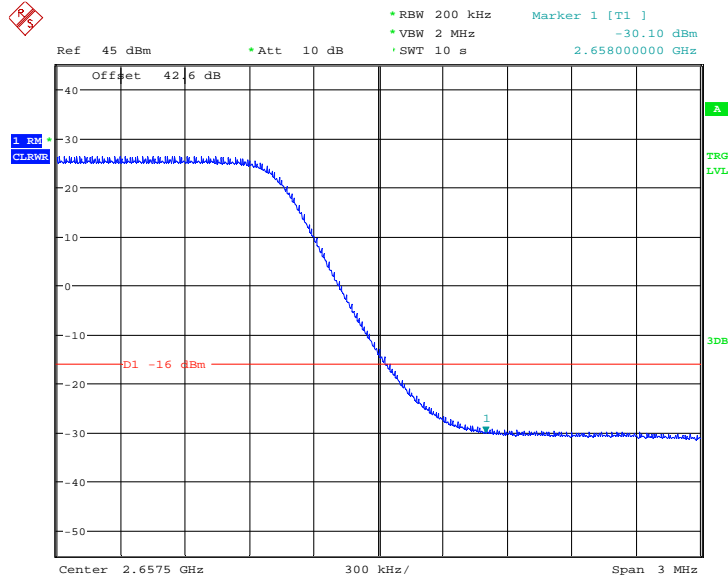


Date: 18.FEB.2013 03:40:43

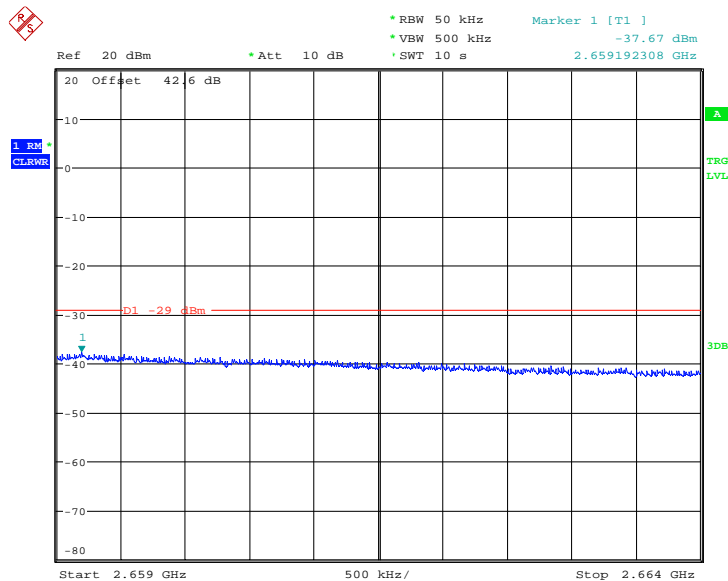


Product Service

Configuration 1 - Mode 3 - 20



Date: 18.FEB.2013 03:48:28



Date: 18.FEB.2013 03:45:42

Limit

The power of any emission outside the frequency band shall be attenuated below the transmitter power (P) by at least $43 + 10\log P$ dB.



2.6 RADIATED SPURIOUS EMISSIONS

2.6.1 Specification Reference

FCC CFR 47 Part 2, Clause 2.1053
FCC CFR 47 Part 27, Clause 27.53 (m)

2.6.2 Equipment Under Test

RRUS 61 B41A / KRC 118 041/1, S/N: CB4P926470

2.6.3 Date of Test and Modification State

20 and 21 February 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 2 and Part 27.

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 Polarisation.

Emissions identified within the range 30MHz – 27GHz were then formally measured using a Peak detector as the worst case.

In the frequency Range 30MHz – 27GHz, 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:

$$E_{(v/m)} = (30 \times 1.64 \times 79.63)^{0.5} / 3 = 20.864V/m = 146.39dB\mu V/m$$

As per 27.53(h) the spurious emission must be attenuated by $43 + 10\log(P_o)$ dB this gives:

$$43 + 10\log(79.63) = 62.01dB$$

Therefore the limit at 3m measurement distance is:

$$146.39 - 62.01 = 84.4 \text{ dB}\mu V/m$$

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 - 5
 - Mode 2 (5.0MHz, 10.0MHz, 15.0MHz, 20.0MHz OBW)
 - Mode 3 - 5

2.6.6 Environmental Conditions

	20 February 2013	21 February 2013
Ambient Temperature	22.8°C	23.5°C
Relative Humidity	42.5%	45.6%



2.6.7 Test Results

For the period of test the EUT met the requirements of FCC CFR 47 Part 2 & Part 27 and for Radiated Spurious Emissions.

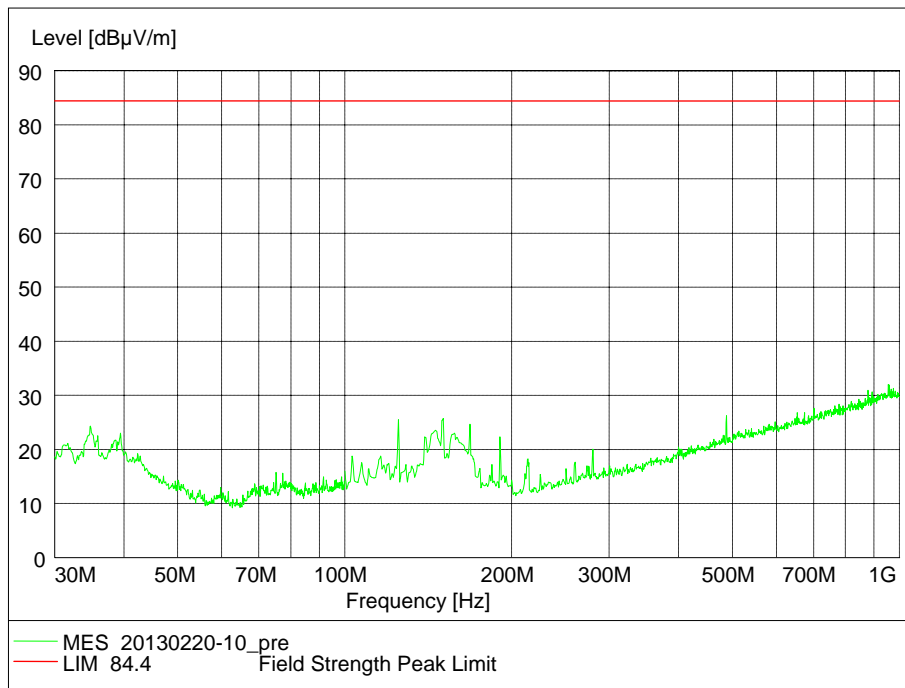
The test results are shown below

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

E-TM 1.1: 5.0MHz Bandwidth

Configuration 1 - Mode 1

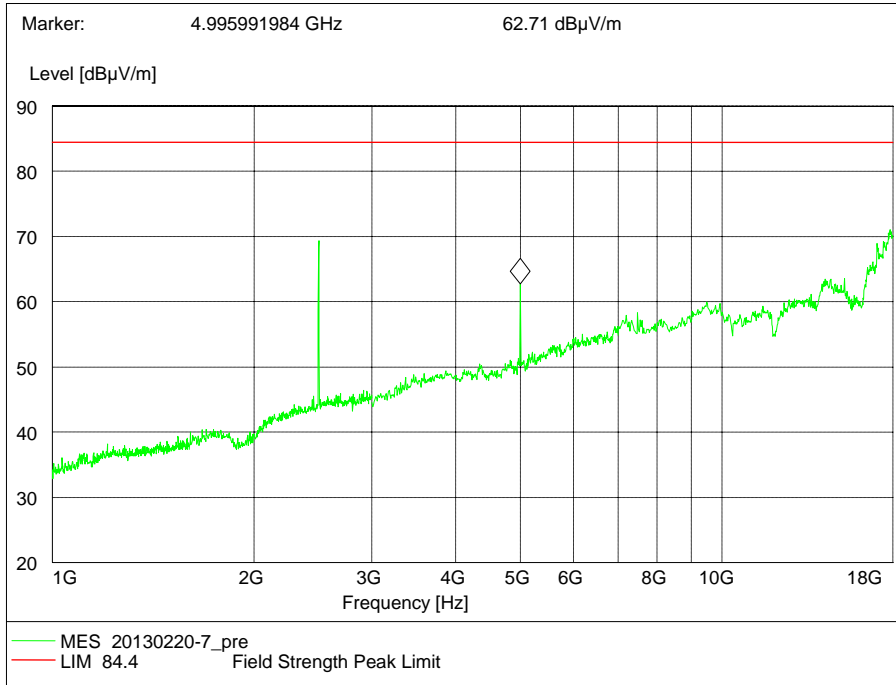
30MHz to 1GHz



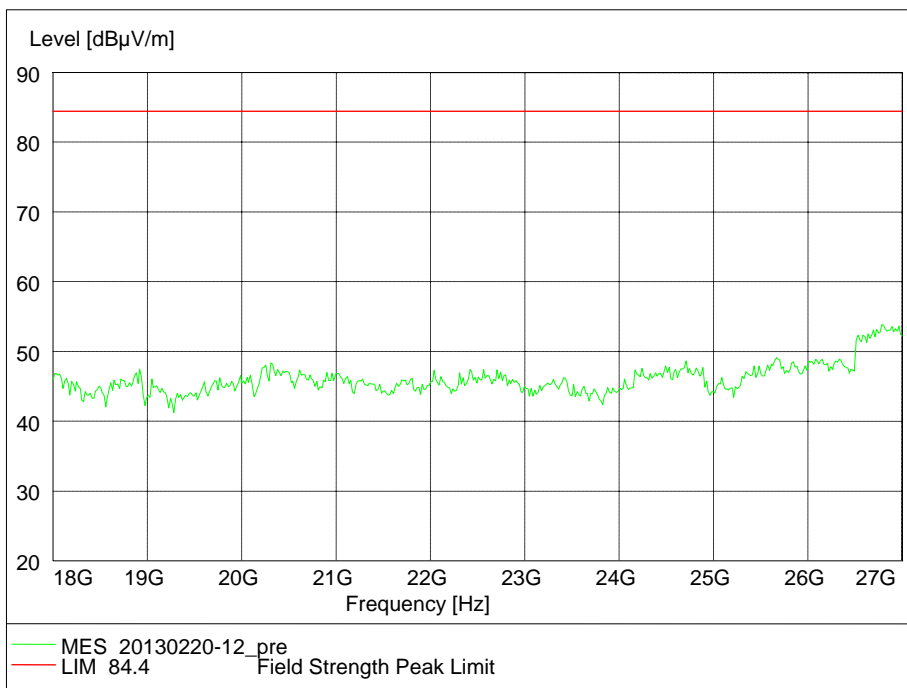
No emissions were detected within 20dB of the limit.



1GHz to 18GHz



18GHz to 27GHz



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 3

No emissions were detected within 20dB of the limit.

E-TM 1.1: 10MHz, 15MHz, 20MHz Bandwidth

Configuration 1 - Mode 2

No emissions were detected within 20dB of the limit.

E-TM 3.2: 5.0MHz Bandwidth

Configuration 1 - Mode 2

No emissions were detected within 20dB of the limit.

E-TM 3.1: 5.0MHz Bandwidth

Configuration 1 - Mode 2

No emissions were detected within 20dB of the limit.

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

Remarks

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



2.7 CONDUCTED SPURIOUS EMISSIONS

2.7.1 Specification Reference

FCC CFR 47 Part 2, Clause 2.1051
FCC CFR 47 Part 27, Clause 27.53 (m)

2.7.2 Equipment Under Test

RRUS 61 B41A / KRC 118 041/1, S/N: CB4P926470

2.7.3 Date of Test and Modification State

18 and 19 February 2013 – Modification State 0

2.7.4 Test Equipment Used

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

2.7.5 Test Method and Operating Modes

The test was applied in accordance with the test method requirements of FCC CFR 47 Part 2 and Part 27.

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 26.58GHz. The EUT was set to transmit on maximum power. The EUT was tested on Bottom, Middle and Top channels for QPSK, 16QAM and 64QAM modulation types. The resolution was set to 1MHz for 9kHz to 26.58GHz thus meeting the requirements of Part 27.53(m)(6). The spectrum analyser detector was set to peak and trace was kept on Max Hold.

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

In addition, measurements were made up to the 10th harmonic of the fundamental.

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

Configuration 1 - Mode 1 - 5, Mode 1 - 20
- Mode 2 (5.0MHz, 20.0MHz OBW)
- Mode 3 - 5, Mode 3 - 20

2.7.6 Environmental Conditions

	18 February 2013	19 February 2013
Ambient Temperature	22.6°C	20.0°C
Relative Humidity	37.5%	36.0%



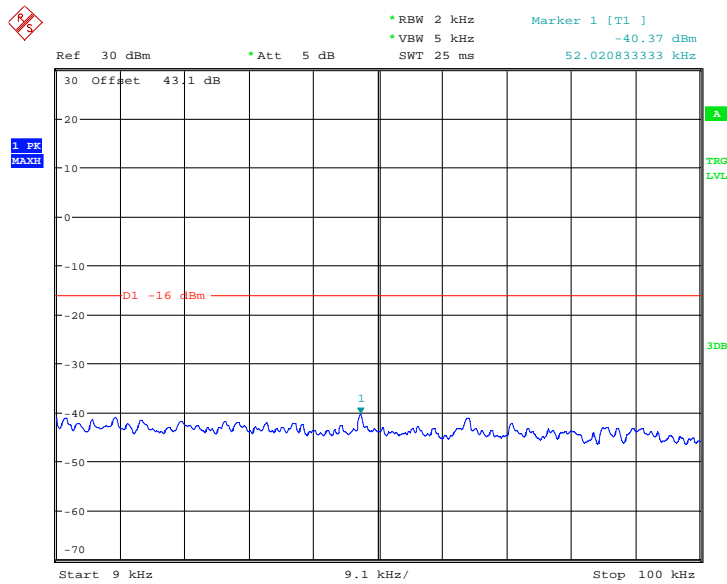
2.7.7 Test Results

For the period of test the EUT met the requirements of FCC CFR 47 Part 2 and Part 27 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.FEB.2013 03:37:48



Product Service

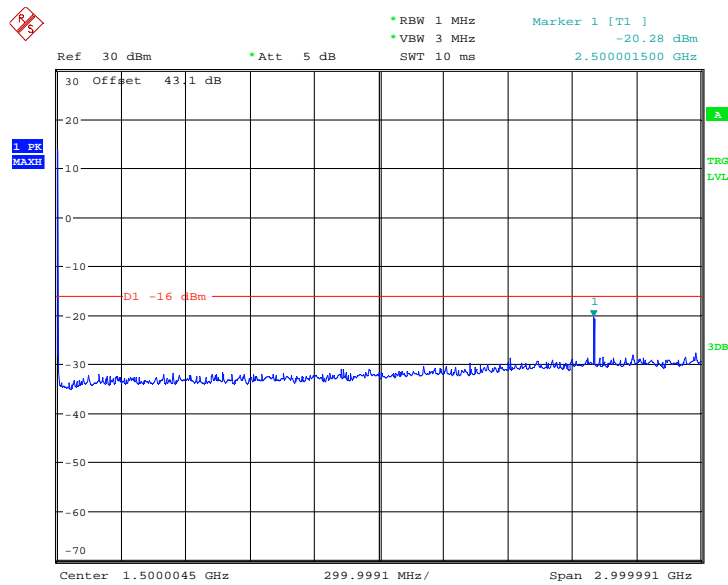
Antenna A

E-TM1.1

5.0MHz Bandwidth

Configuration 1 - Mode 1 - 5

9kHz to 3GHz



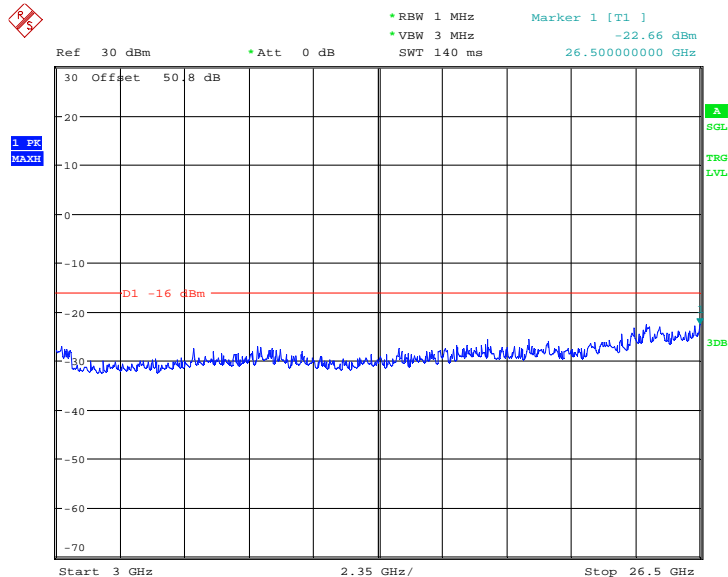
Date: 19.FEB.2013 03:35:03

Note: The marked emission is the operating frequency which pass though a notch filter.



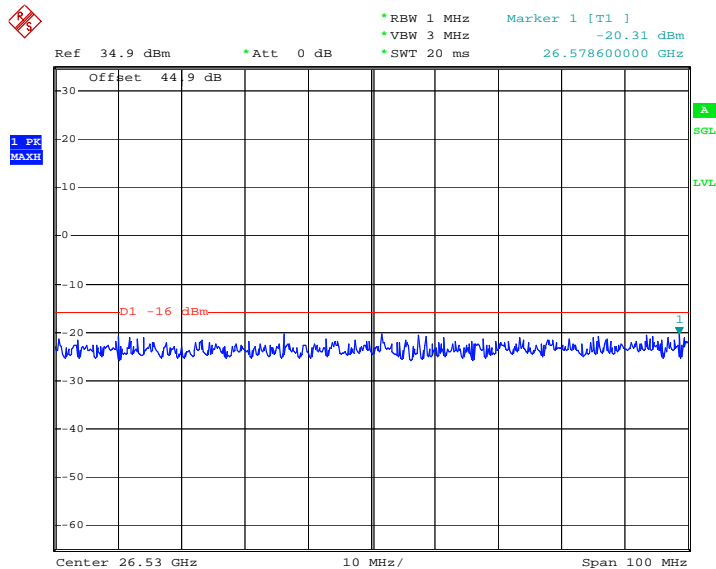
Product Service

3GHz to 26.5GHz



Date: 19.FEB.2013 06:23:16

26.5GHz to 26.58GHz



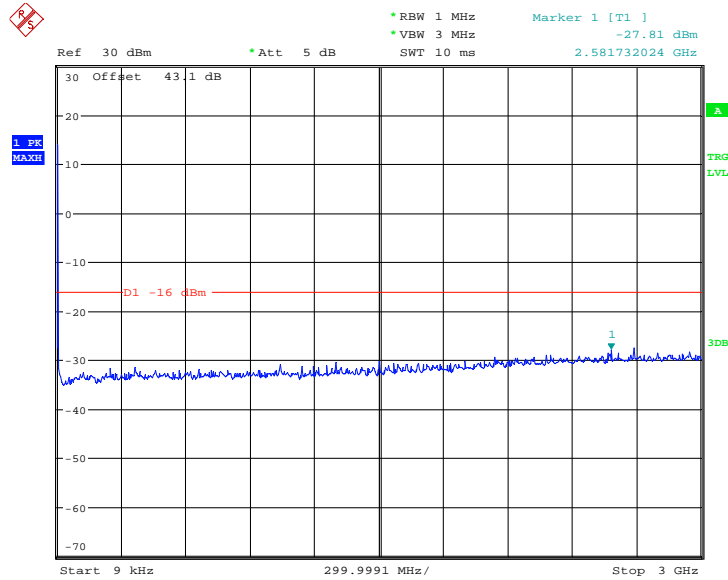
Date: 19.FEB.2013 08:04:03



Product Service

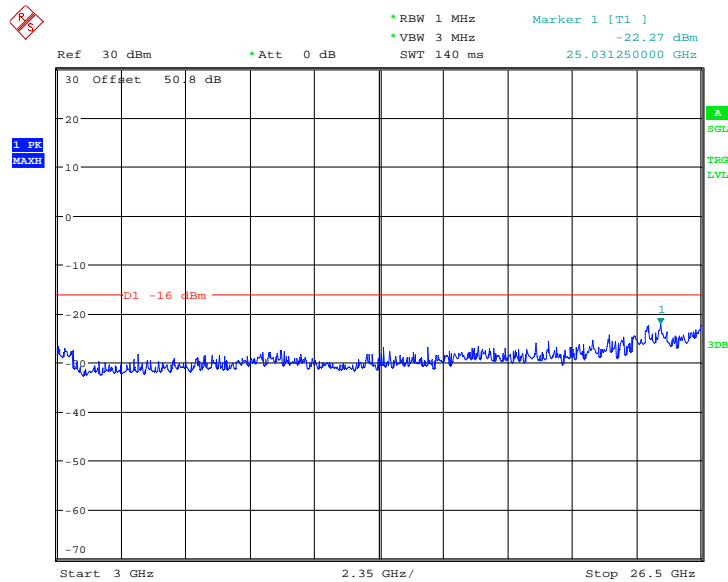
Configuration 1 - Mode 2 - 5

9kHz to 3GHz



Date: 19.FEB.2013 01:17:42

3GHz to 26.5GHz

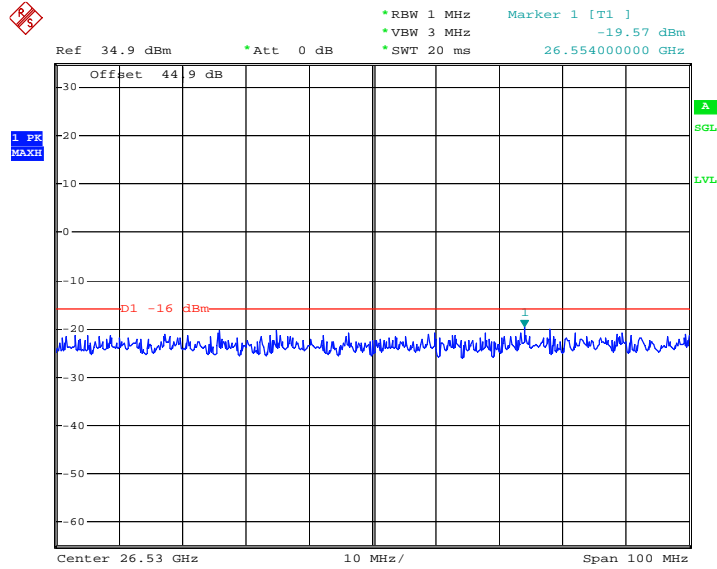


Date: 19.FEB.2013 06:23:42



Product Service

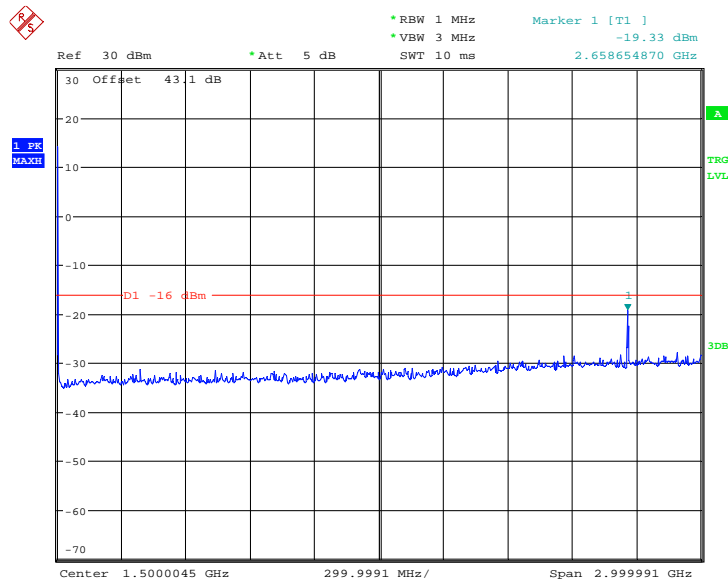
26.5GHz to 26.58GHz



Date: 19.FEB.2013 08:04:50

Configuration 1 - Mode 3 - 5

9kHz to 3GHz



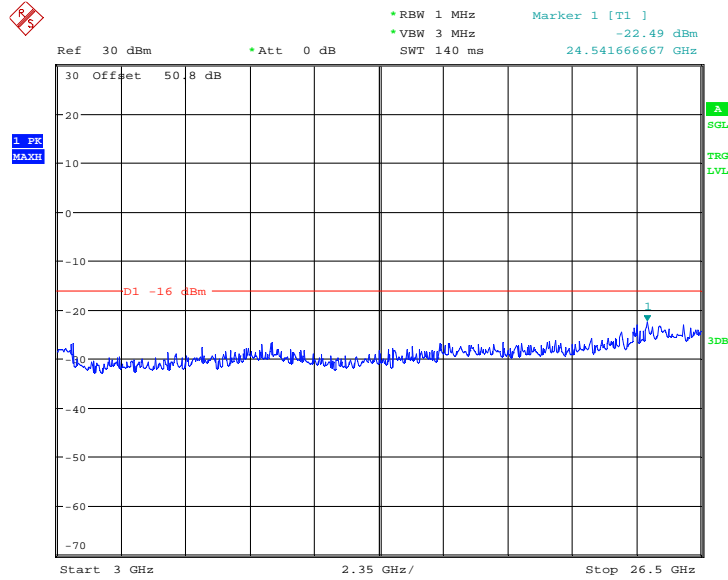
Date: 19.FEB.2013 03:37:15

Note: The marked emission is the operating frequency which pass through a notch filter.



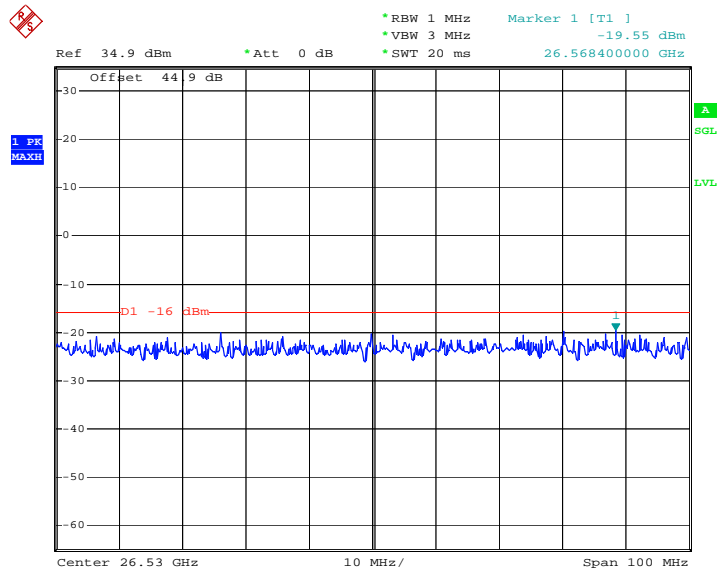
Product Service

3GHz to 26.5GHz



Date: 19.FEB.2013 06:24:08

26.5GHz to 26.58GHz



Date: 19.FEB.2013 08:06:02

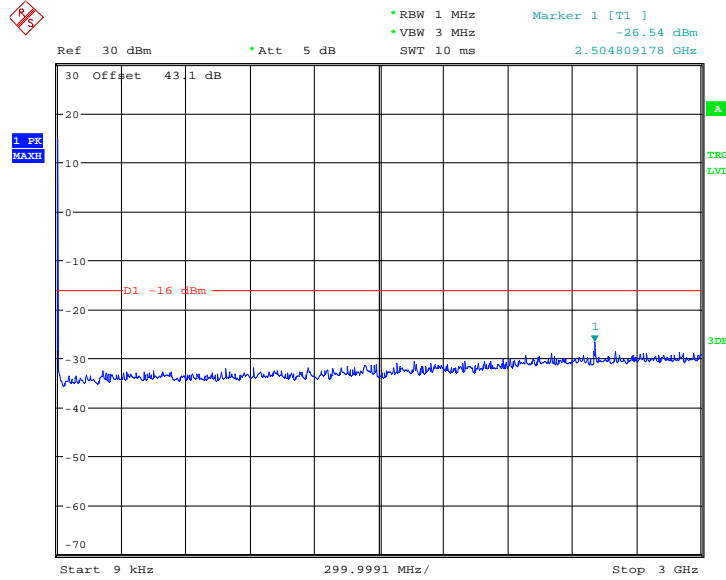


Product Service

20.0MHz Bandwidth

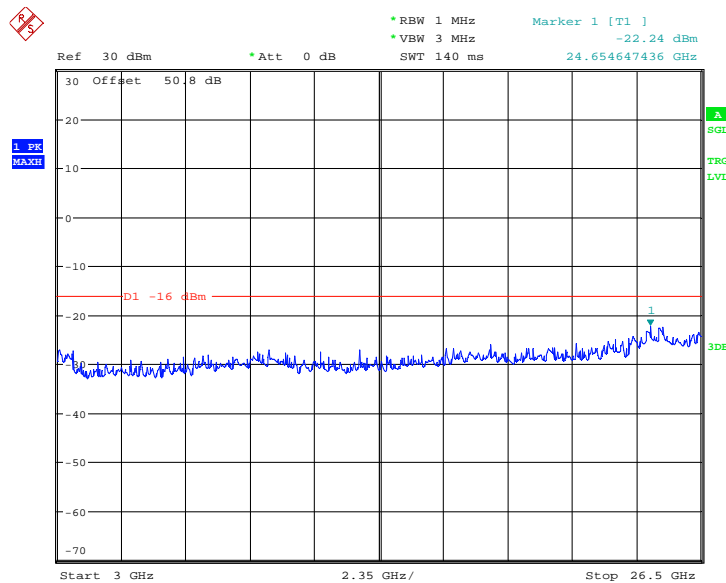
Configuration 1 - Mode 1 - 20

9kHz to 3GHz



Date: 19.FEB.2013 04:00:44

3GHz to 26.5GHz

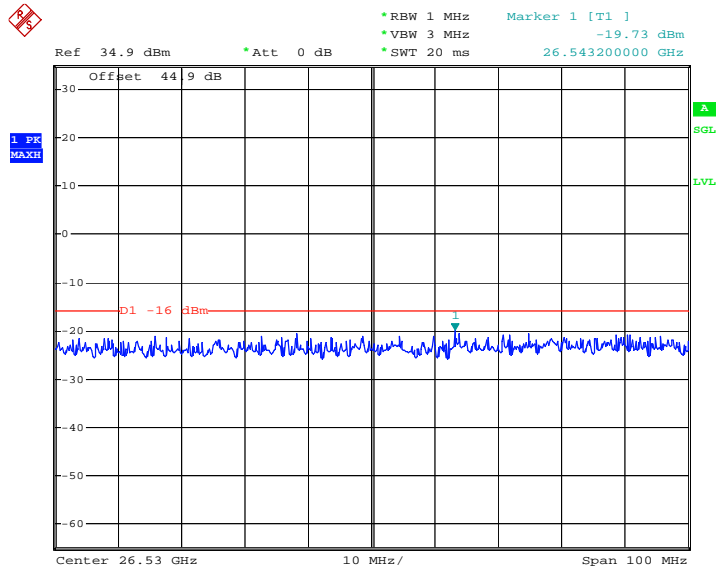


Date: 19.FEB.2013 06:14:59



Product Service

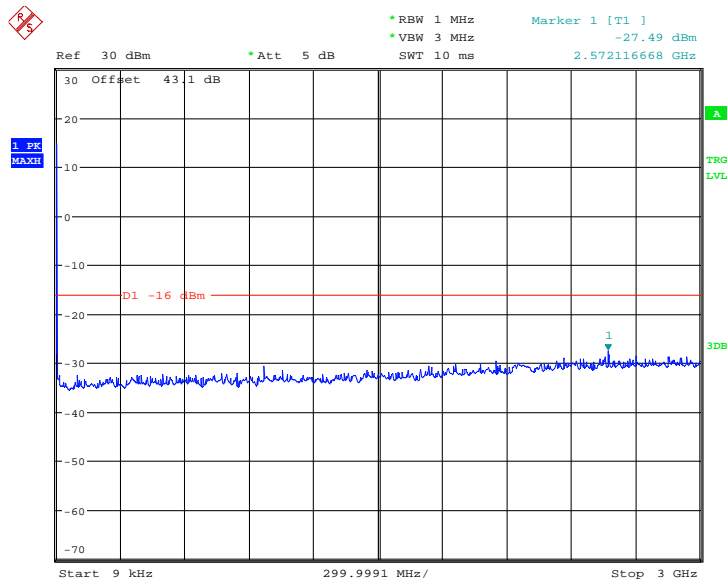
26.5GHz to 26.58GHz



Date: 19.FEB.2013 08:06:21

Configuration 1 - Mode 2 - 20

9kHz to 3GHz

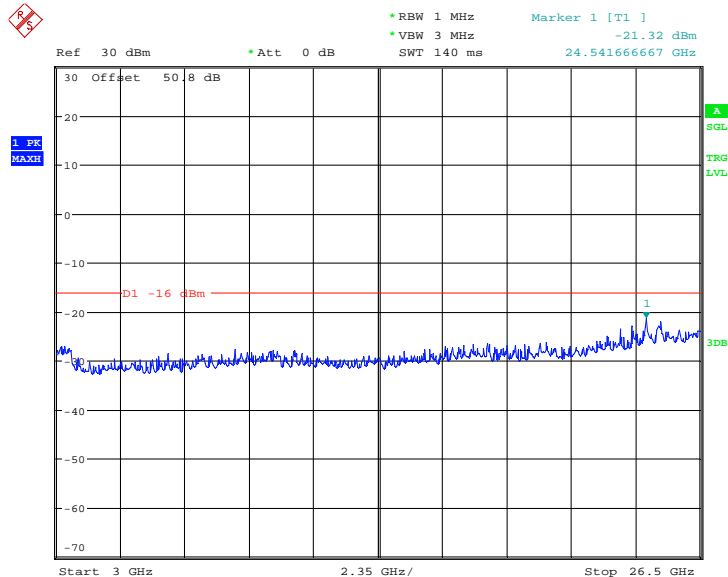


Date: 19.FEB.2013 03:50:06



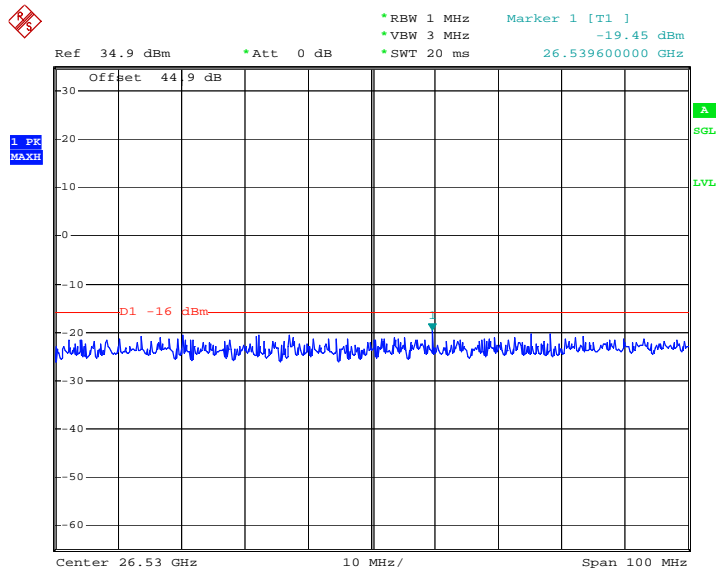
Product Service

3GHz to 26.5GHz



Date: 19.FEB.2013 06:14:06

26.5GHz to 26.58GHz

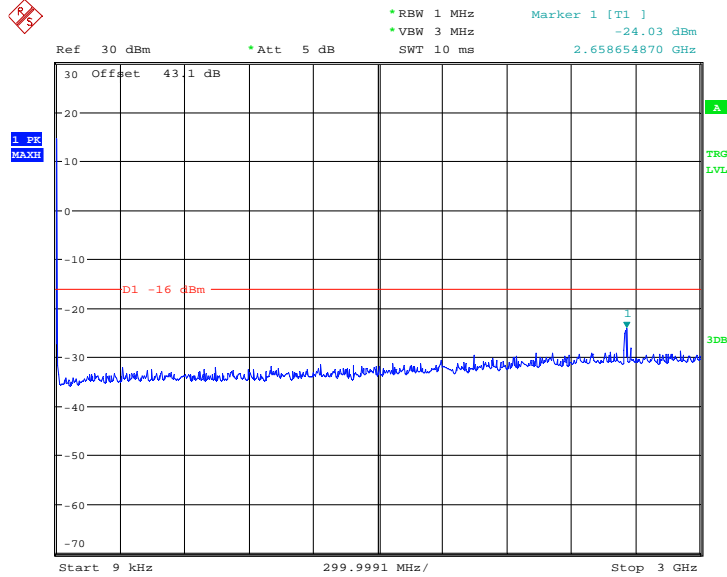


Date: 19.FEB.2013 08:07:06



Configuration 1 - Mode 3 - 20

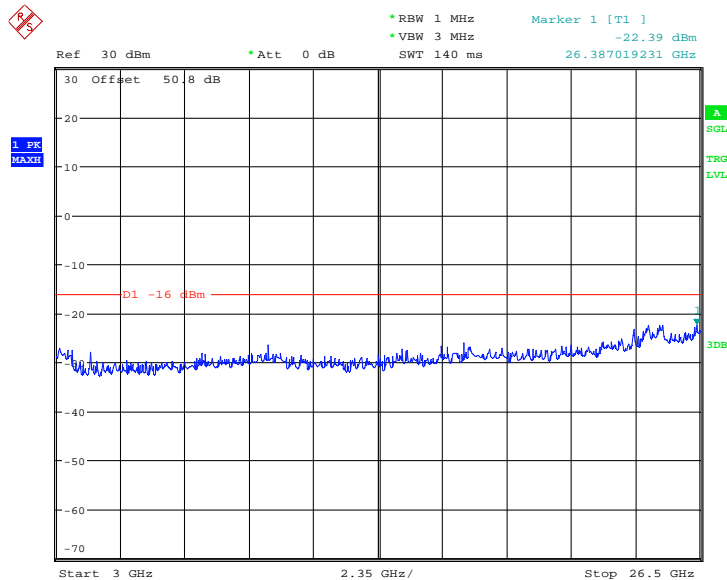
9kHz to 3GHz



Date: 19.FEB.2013 04:02:07

Note: The marked emission is the operating frequency which pass though a notch filter.

3GHz to 26.5GHz

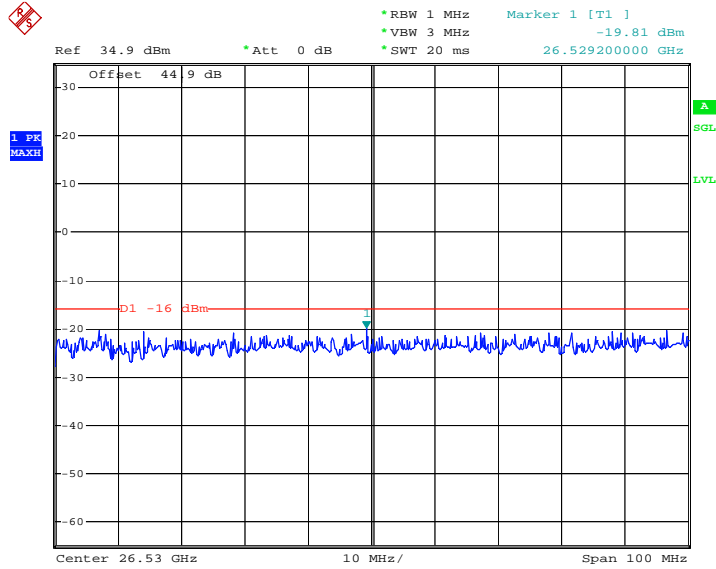


Date: 19.FEB.2013 06:15:22



Product Service

26.5GHz to 26.58GHz



Date: 19.FEB.2013 08:07:38

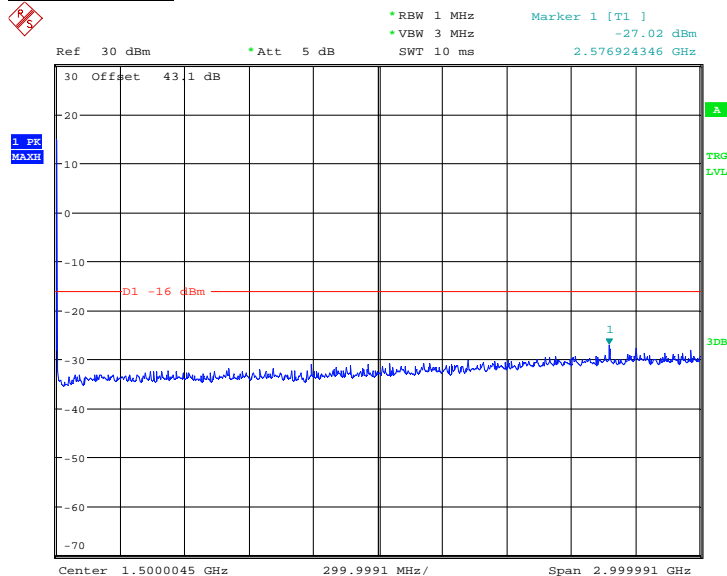
Antenna B

E-TM1.1

5.0MHz Bandwidth

Configuration 1 - Mode 2 - 5

9kHz to 3GHz

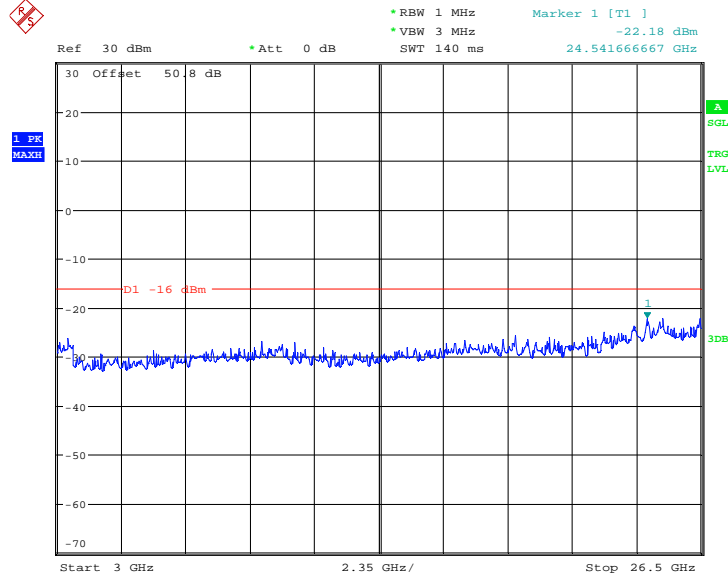


Date: 19.FEB.2013 04:13:50



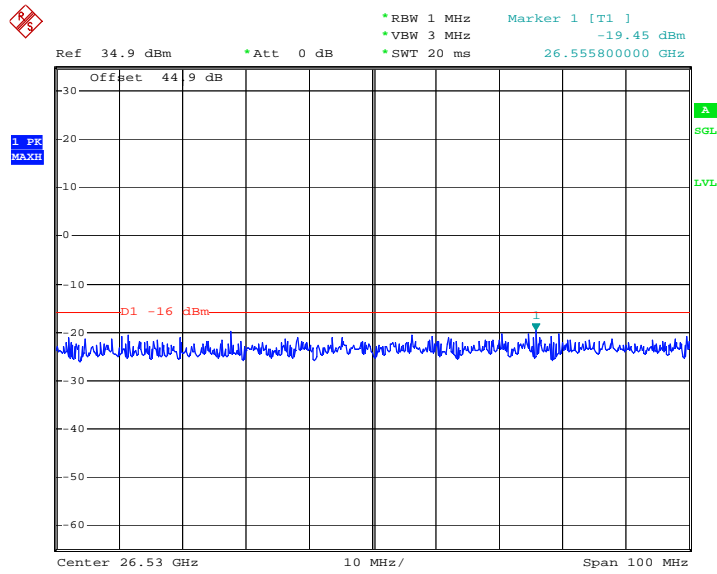
Product Service

3GHz to 26.5GHz



Date: 19.FEB.2013 06:25:05

26.5Hz to 26.58GHz



Date: 19.FEB.2013 08:09:45

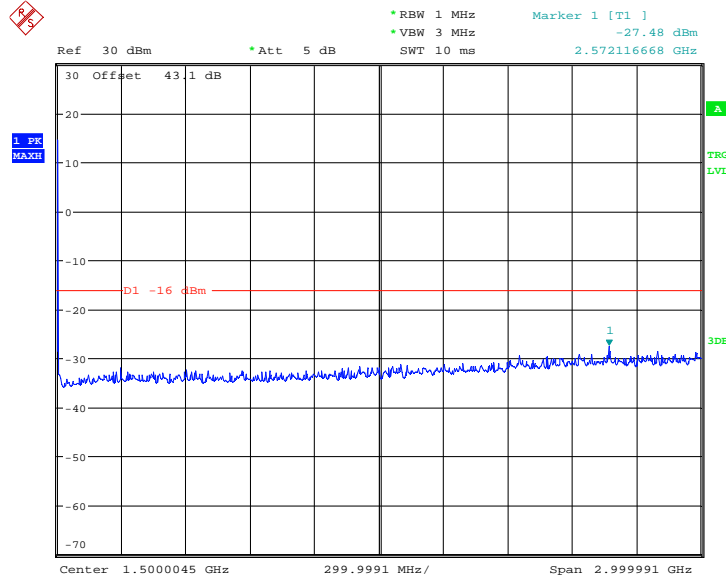


Product Service

20.0MHz Bandwidth

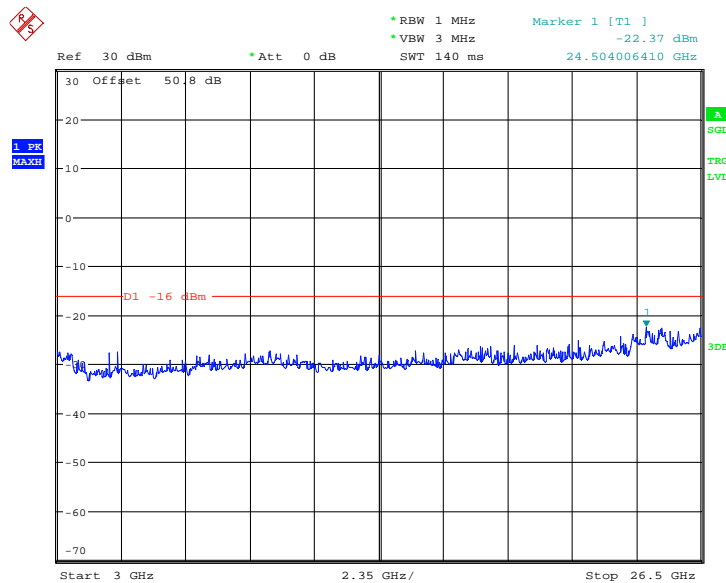
Configuration 1 - Mode 2 - 20

9kHz to 3GHz



Date: 19.FEB.2013 04:16:12

3GHz to 26.5GHz

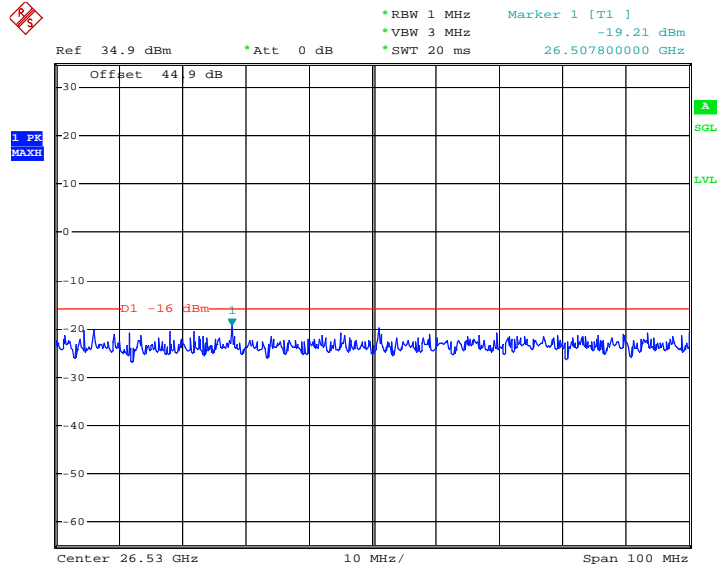


Date: 19.FEB.2013 06:25:43



Product Service

26.5Hz to 26.58GHz



Date: 19.FEB.2013 08:10:20

Limit	-16dBm
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Remarks

The EUT does not exceed -16dBm (-13dBm – 10log2) at the frequency range of 9kHz to 26.58GHz.



2.8 FREQUENCY STABILITY UNDER TEMPERATURE VARIATIONS

2.8.1 Specification Reference

FCC CFR 47 Part 2, Clause 2.1055
FCC CFR 47 Part 27, Clause 27.54

2.8.2 Equipment Under Test

RRUS 61 B41A / KRC 118 041/1, S/N: CB4P926470

2.8.3 Date of Test and Modification State

22 and 25 February 2013 – Modification State 0

2.8.4 Test Equipment Used

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

2.8.5 Test Method and Operating Modes

The test was applied in accordance with the test method requirements of FCC CFR 47 Part 2 and Part 27.

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

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

Configuration 1 - Mode 2 (5MHz OBW)

2.8.6 Environmental Conditions

	22 February 2013	25 February 2013
Ambient Temperature	24.4°C	22.3°C
Relative Humidity	40.2%	38.5%



2.8.7 Test Results

For the period of test the EUT met the requirements of FCC CFR 47 Part 2 and Part 27 for Frequency Stability Under Temperature Variations.

The test results are shown below

Power Supply: -48V DC

E-TM1.1: 5MHz Bandwidth

Configuration 1 - Mode 2

Temperature Interval (°C)	Deviation (Hz)
-30	+45.26
-20	+45.63
-10	+44.28
0	+44.19
+10	+50.25
+20	+47.38
+30	+51.41
+40	+53.23
+50	+50.25

Limit	± 0.05 ppm or ± 128.85 Hz*
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Remarks

* Limit according to 3GPP TS 36.141 V9.9.0.

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



2.9 FREQUENCY STABILITY UNDER VOLTAGE VARIATIONS

2.9.1 Specification Reference

FCC CFR 47 Part 2, Clause 2.1055
FCC CFR 47 Part 27, Clause 27.54

2.9.2 Equipment Under Test

RRUS 61 B41A / KRC 118 041/1, S/N: CB4P926470

2.9.3 Date of Test and Modification State

22 February 2013 – Modification State 0

2.9.4 Test Equipment Used

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

2.9.5 Test Method and Operating Modes

The test was applied in accordance with the test method requirements of FCC CFR 47 Part 2 and Part 27.

The EUT was set to transmit on maximum power. A Spectrum Analyser was used to measure the frequency error. The supplied voltage was varied from 85 to 115 percent of the nominal value.

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

Configuration 1 - Mode 2 (5MHz OBW)

2.9.6 Environmental Conditions

	22 February 2013
Ambient Temperature	24.4°C
Relative Humidity	40.2%



2.9.7 Test Results

For the period of test the EUT met the requirements of FCC CFR 47 Part 2 and Part 27 for Frequency Stability Under Voltage Variations.

The test results are shown below

Temperature: 20°C

E-TM1.1: 5MHz Bandwidth

Configuration 1 - Mode 2

DC Voltage (V)	Deviation (Hz)
-40.8	+47.63
-48.0	+47.38
-55.2	+48.28

Limit	± 0.05 ppm or ± 128.85 Hz*
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Remarks

* Limit according to 3GPP TS 36.141 V9.9.0.

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



Product Service

SECTION 3

TEST EQUIPMENT USED



3.1 TEST EQUIPMENT USED

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

Instrument	Manufacturer	Type No.	Serial No.	Calibration Period (months)	Calibration Due
Section 2.1, 2.2, 2.3, 2.4, 2.5 and 2.7 – Maximum Conducted Output Power, Peak – Average Ratio, Modulation Characteristics, Occupied Bandwidth, Spurious Emissions at Antenna Terminals (± 1MHz), Conducted Spurious Emissions.					
Spectrum Analyzer	Rohde & Schwarz	FSQ26	200014	12	06-Sep-2013
Spectrum Analyzer	Rohde & Schwarz	FSV13	101427	12	20-Dec-2013
Spectrum Analyzer	Rohde & Schwarz	FSP	100680	12	29-Nov-2013
Power Meter	Rohde & Schwarz	NRP	102432	12	12-Aug-2013
Diode Power Sensor	Rohde & Schwarz	NRP-Z21	103606	12	06-Jan-2014
Network Analyzer	Hewlett Packard	8720D	US36140166	12	09-Sep-2013
40 dB Attenuator	Shanghai Huaxiang	DTS100G	11081901	-	O/P MON
Load	Shanghai Huaxiang	TF100	09121602	-	O/P MON
Power Supply	Dahua	DH1716-5D	2007060047	-	O/P MON
Digital Multi-meter	FLUKE	179	91820401	12	13-Dec-2013
Thermo-hygrometer	AZ Instruments	8705	9151655	12	16-Dec-2013
Section 2.6 – Radiated Spurious Emissions					
Load	Shanghai Huaxiang	TF100	09032343	-	O/P MON
Load	Shanghai Huaxiang	TF100	09121614	-	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 Wave-guide 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	23.18mx16.88mx9.60m	-	12	19-Aug-2013
Power Supply	Dahua	DH1716-5D	200360033	-	O/P MON
Digital Multi-meter	FLUKE	179	91820401	12	13-Dec-2013
Thermo-hygrometer	AZ Instruments	8705	9151655	12	16-Dec-2013
Section 2.8 and 2.9 – Frequency Stability Under Temperature and Voltage Variations					
Spectrum Analyzer	Rohde & Schwarz	FSP	100680	12	29-Nov-2013
40 dB Attenuator	Shanghai Huaxiang	DTS100G	11081901	-	O/P MON
Temperature Chamber	Weis-Voetsch	C1000	-	-	O/P MON
Power Supply	Dahua	DH1716-5D	2007060047	-	O/P MON
Digital Multimeter	FLUKE	179	91820401	12	03-Dec-2013
Thermo-hygrometer	AZ Instruments	8705	9151655	12	16-Dec-2013

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



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*
Frequency Stability	30MHz to 3GHz	$<1 \times 10^{-7}$
Radiated Emissions, Bilog Antenna, AOATS	30MHz to 1GHz Amplitude	5.1dB*
Radiated Emissions, Horn Antenna, AOATS	1GHz to 40GHz Amplitude	6.3dB*
Worst case error for both Time and Frequency measurement 12 parts in 10^6		

* In accordance with CISPR 16-4



Product Service

SECTION 4

ACCREDITATION, DISCLAIMERS AND COPYRIGHT



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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