Report On

FCC Testing of the
Sepura plc SRG3900 Vehicle Mounted Tetra Radio
In accordance with FCC CFR 47 Part 90

COMMERCIAL-IN-CONFIDENCE

FCC ID: XX6SRG3900UW

Document 75908189 Report 01 Issue 1 March 2010

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March 2010

PREPARED FOR

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PREPARED BY

N Bennett
Senior Administrator

APPROVED BY

M J Hardy
Authorised Signatory

C Gould
Authorised Signatory

DATED 11 March 2010

ENGINEERING STATEMENT

The measurements shown in this report were made in accordance with the procedures described on test pages. All reported testing was carried out on a sample equipment to demonstrate limited compliance with FCC CFR 47 Part 90. The sample tested was found to comply with the requirements defined in the applied rules.

Test Engineers;

R A Blagg

G Lawler

Product Service

CONTENTS

SECTION 1

REPORT SUMMARY

FCC Testing of the
Sepura plc SRG3900 Vehicle Mounted Tetra Radio
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1.1 INTRODUCTION

The information contained in this report is intended to show verification of the FCC Testing of the Sepura plc, SRG3900 Vehicle Mounted Tetra Radio to the requirements of FCC CFR 47 Part 90.

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	Sepura plc
Model Number(s)	SRG3900 Vehicle Mounted Tetra Radio
Serial Number(s)	2PN000219VA
Number of Samples Tested	One
Test Specification/Issue/Date	FCC CFR 47 Part 90: 2008
Incoming Release Date	Declaration of Build Status 10 December 2009
Disposal Reference Number Date	Held Pending Disposal Not Applicable Not Applicable
Order Number Date	315351/T0201 19 November 2009
Start of Test	03 December 2009
Finish of Test	04 March 2010
Name of Engineer(s)	R A Blagg G Lawler
Related Document(s)	ANSI 63.4 : 2003

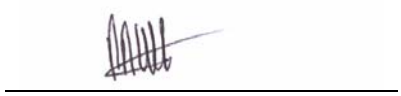
1.2 BRIEF SUMMARY OF RESULTS

A brief summary of the tests carried out in accordance with FCC CFR 47 Part 90 is shown below.

Section	Spec Clause	Test Description	Mode	Result	Comments
2.1	90.210(b)(3)	Emission Masks	Transmit Bottom	Pass	
			Transmit Middle	Pass	
			Transmit Top	Pass	
2.2	90.205, 2.1046	Effective Radiated Power	Transmit Bottom	Pass	
			Transmit Middle	Pass	
			Transmit Top	Pass	
2.3	90.205, 2.1046	Power and Antenna Height Limits	Transmit Bottom	Pass	
			Transmit Middle	Pass	
			Transmit Top	Pass	
2.4	90.207, 2.1047	Types of Emission / Types of Modulation	Transmit Bottom	Pass	Customer to Declare
			Transmit Middle	Pass	
			Transmit Top	Pass	
2.5	90.209, 2.1049	Bandwidth Limitations	Transmit Bottom	Pass	
			Transmit Middle	Pass	
			Transmit Top	Pass	
2.6	90.210, 2.1051	Emission Mask	Transmit Bottom	Pass	
			Transmit Middle	Pass	
			Transmit Top	Pass	
2.7	90.213, 2.1055	Frequency Stability	Transmit Bottom	Pass	
			Transmit Middle	Pass	
			Transmit Top	Pass	
2.8	90.214	Transient Frequency Behaviour	Transmit Bottom	Pass	
			Transmit Middle	Pass	
			Transmit Top	Pass	

1.3 DECLARATION OF BUILD STATUS

MAIN EUT				
MANUFACTURING DESCRIPTION	Tetra Mobile/Gateway terminal			
MANUFACTURER	Sepura			
TYPE	SRG3900 UW			
PART NUMBER	n/a			
SERIAL NUMBER	2PN000219VA			
HARDWARE VERSION	Production			
SOFTWARE VERSION				
TRANSMITTER OPERATING RANGE	407MHz to 473MHz			
RECEIVER OPERATING RANGE	407MHz to 473MHz			
COUNTRY OF ORIGIN	UK			
INTERMEDIATE FREQUENCIES	69.25MHz			
ITU DESIGNATION OF EMISSION	25K0Q1D			
HIGHEST INTERNALLY GENERATED FREQUENCY	Fc (TX)x4/3 MHz or Fc (RX)+69.25MHz			
OUTPUT POWER (W or dBm)	10 Watts			
FCC ID	XX6SRG3900UW			
INDUSTRY CANADA ID	8739-SRG3900			
TECHNICAL DESCRIPTION (a brief description of the intended use and operation)	Tetra Mobile/Gateway terminal			
ANCILLARIES (if applicable)				
MANUFACTURING DESCRIPTION	Handset	RSM	Fist Mic	Hands-free kit
MANUFACTURER	ADI	ADI	ADI	ADI
TYPE				
PART NUMBER	300 00061	300-00444	300 00062	300 00085
SERIAL NUMBER				
COUNTRY OF ORIGIN	Taiwan	Taiwan	Taiwan	Taiwan
ANCILLARIES (if applicable)				
MANUFACTURING DESCRIPTION	Console	Console	HBC	AIU
MANUFACTURER	Sepura	Sepura	Sepura	Sepura
TYPE	Standard	Colour		
PART NUMBER	300 00149	300 00771	300 00669	300 00217
SERIAL NUMBER				
COUNTRY OF ORIGIN	UK	UK	UK	UK

Signature 

Date 10 December 2009

D of B S Serial No 75908189

Note: This document has been prepared to enable manufacturers with no mechanism for producing their own Declaration of Build Status, to declare the build state of the equipment submitted for test.

No responsibility will be accepted by TÜV 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) was a Sepura plc, SRG3900 Vehicle Mounted Tetra Radio as shown in the photograph below. A full technical description can be found in the manufacturer's documentation.

Equipment Under Test

1.4.2 Test Configuration

Configuration 1: Mono Console & Handset Base Console

The EUT was configured in accordance with FCC Part 90.

Configuration 2: Colour Console & Handset Base Console

The EUT was configured in accordance with FCC Part 90.

1.4.3 EUT Cable / Port Identification

Port	Max Cable Length specified	Usage	Type	Screened
DC Power	1.5m	DC Power Lead	2 core	No
Data	1.5m	Mono or Colour Console	Multicore	No
Signal	1.0m	Hands free Microphone Cable	Multicore	No
Earth	1.0m	Earth	Braid	No

1.4.4 Modes of Operation

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

Mode 1 - 450.025MHz Transmit Bottom

Mode 2 - 460.025MHz Transmit Middle

Mode 3 - 469.975MHz Transmit Top

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 13.2V DC Power supply unit.

FCC Accreditation
90987 Octagon House, Fareham Test Laboratory

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.

SECTION 2

TEST DETAILS

FCC Testing of the
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In accordance with FCC CFR 47 Part 90

2.1 EMISSION MASKS

2.1.1 Specification Reference

FCC CFR 47 Part 90, Clause 90.210(c)(3)

2.1.2 Equipment Under Test

SRG3900 Vehicle Mounted Tetra Radio, S/N: 2PN000219VA

2.1.3 Date of Test and Modification State

11 January 2010 - Modification State 0

2.1.4 Test Equipment Used

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

2.1.5 Test Method and Operating Modes

The test was applied in accordance with the test method requirements of FCC CFR 47 Part 90

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

Configuration 1 - Mode 1
- Mode 2
- Mode 3

Configuration 2 - Mode 1
- Mode 2
- Mode 3

2.1.6 Environmental Conditions

	11 January 2010
Ambient Temperature	18.9°C
Relative Humidity	27%
Atmospheric Pressure	1015mbar

2.1.7 Test Results

The EUT meet the requirements of FCC CFR 47 Part 90 for Emission Masks.

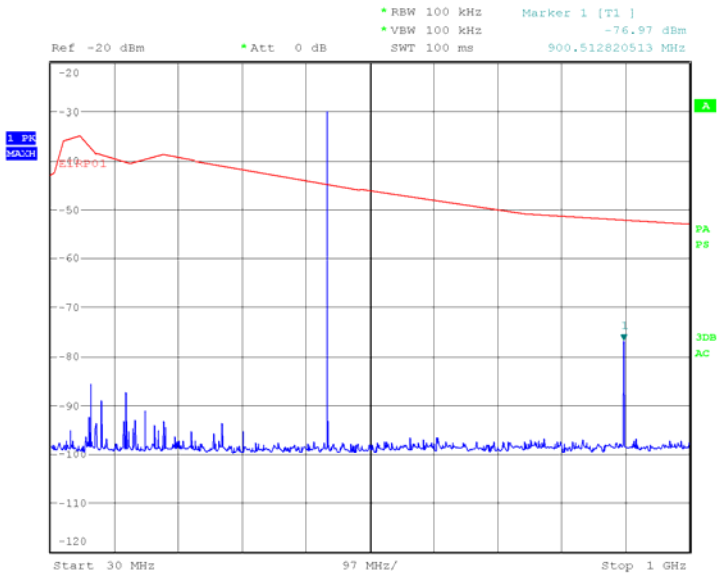
No emissions measured from the EUT were within 10dB of the limit.

The emission plots are shown on the following pages.

Configuration 1 - Mode 1

30MHz to 1GHz

Vertical



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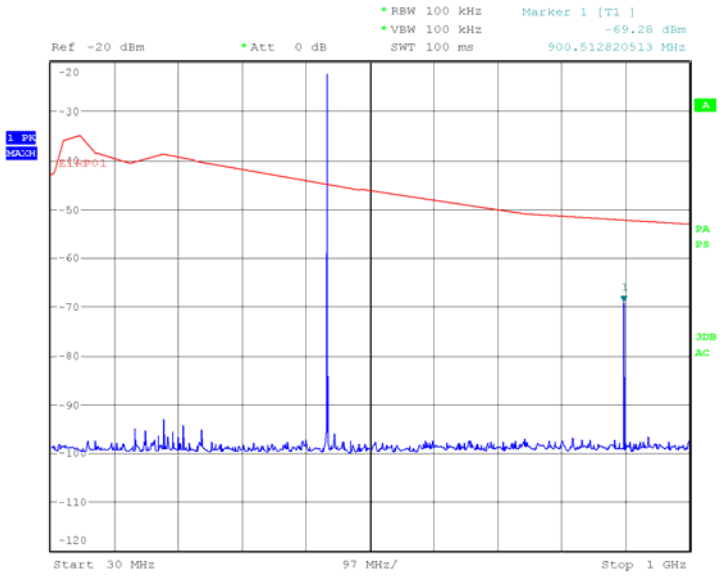

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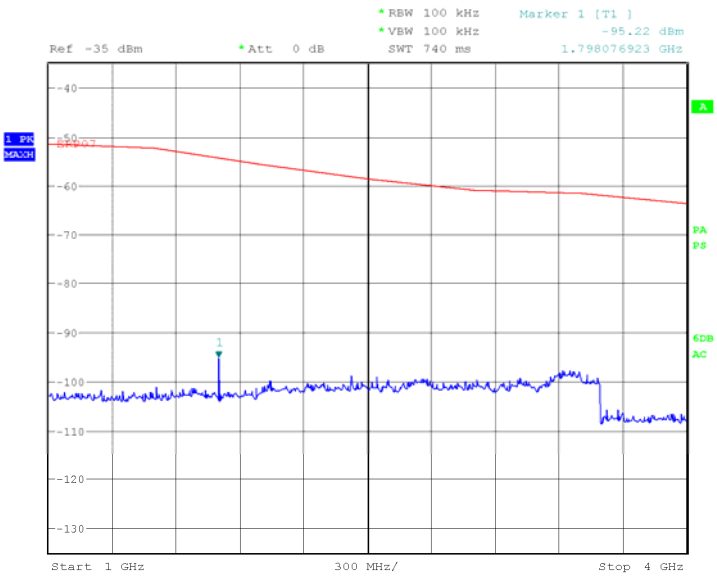
1GHz to 4GHz

Vertical



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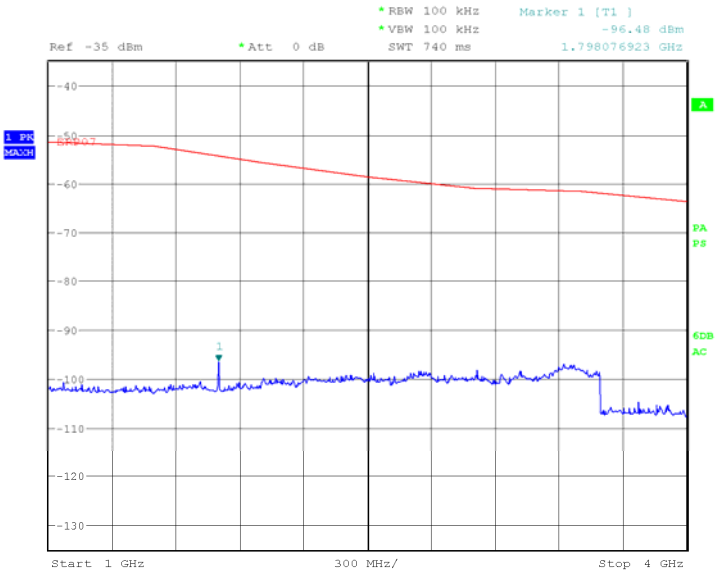

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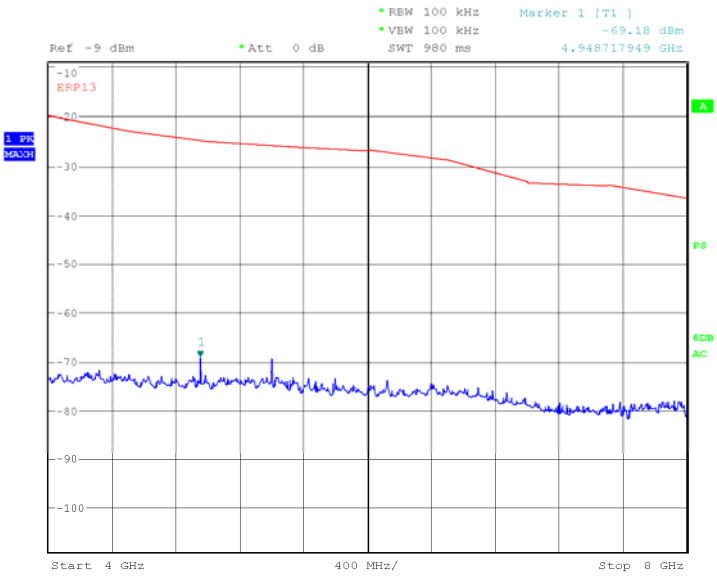
4GHz to 8GHz

Vertical



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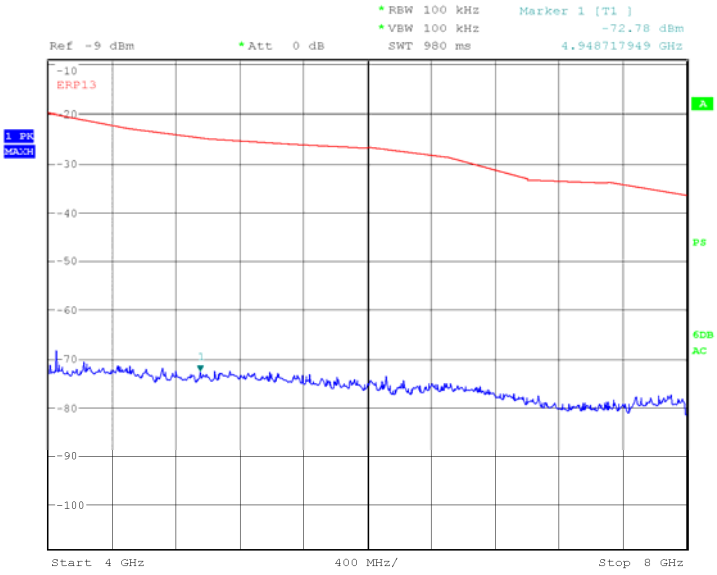

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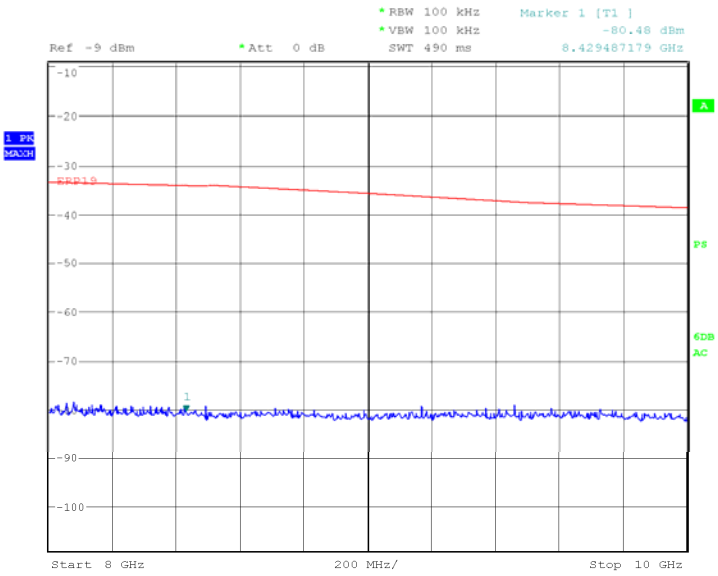
8GHz to 10GHz

Vertical



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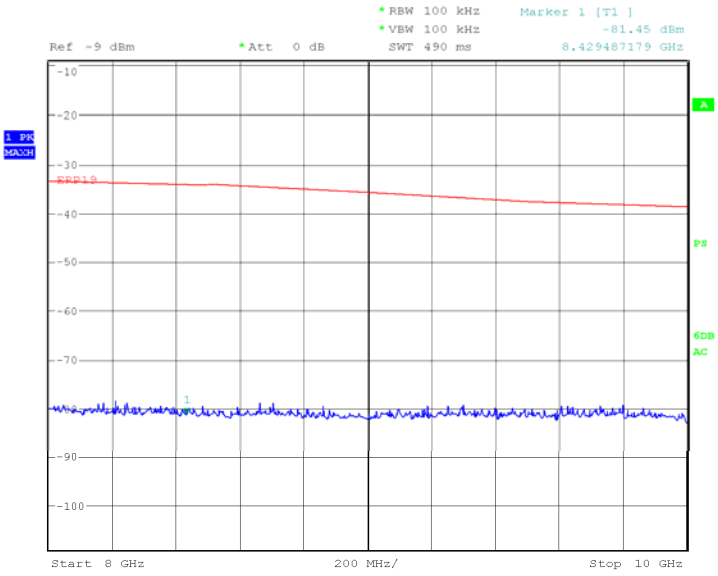

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Configuration 1 - Mode 2

30MHz to 1GHz

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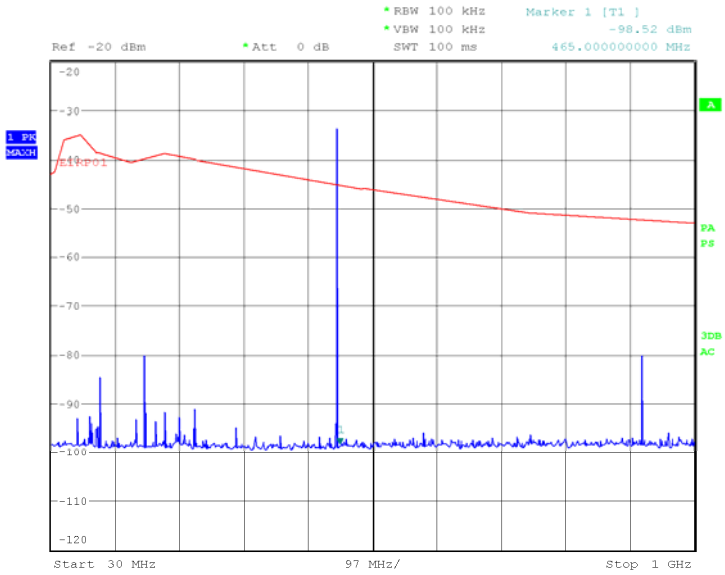

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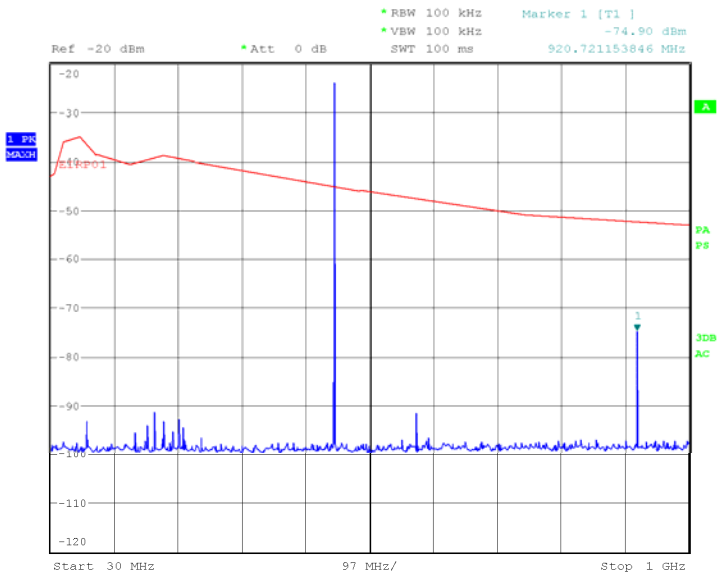

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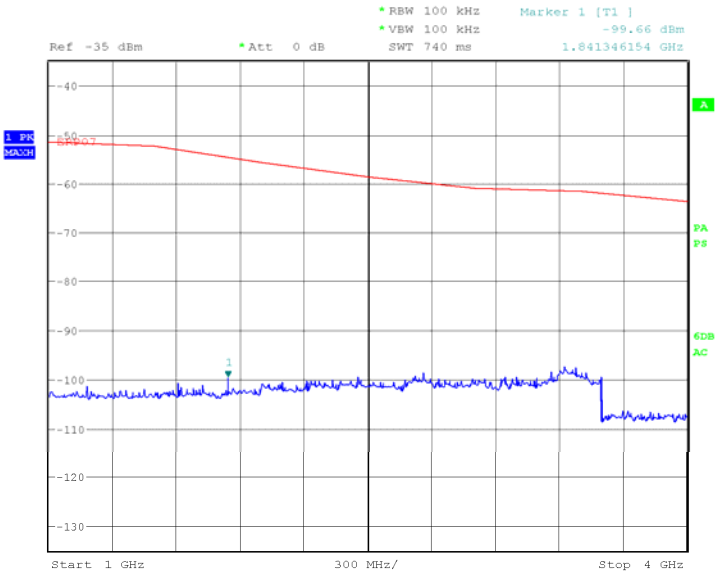
1GHz to 4GHz

Vertical



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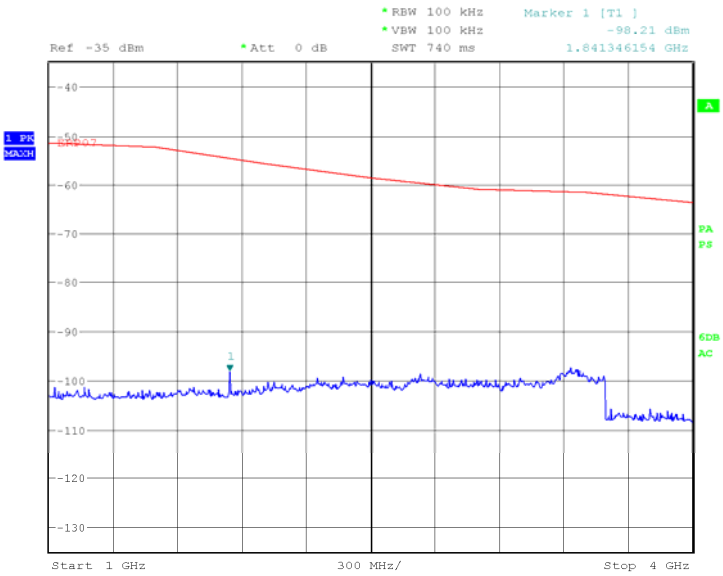

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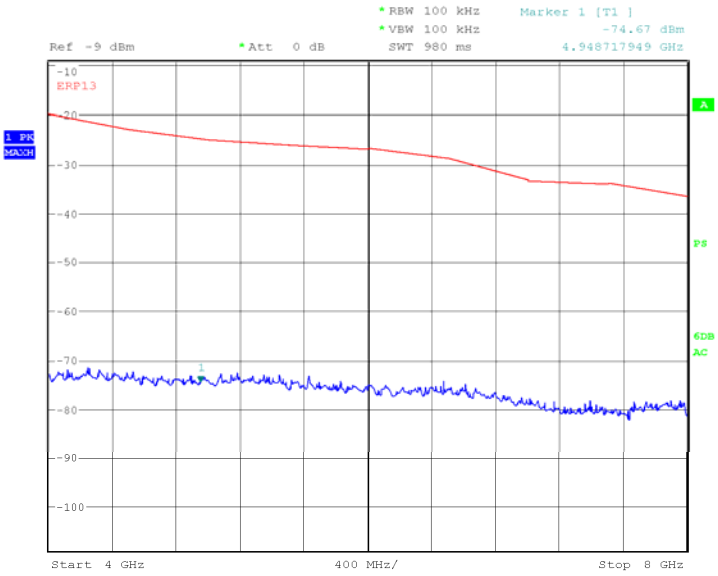
4GHz to 8GHz

Vertical



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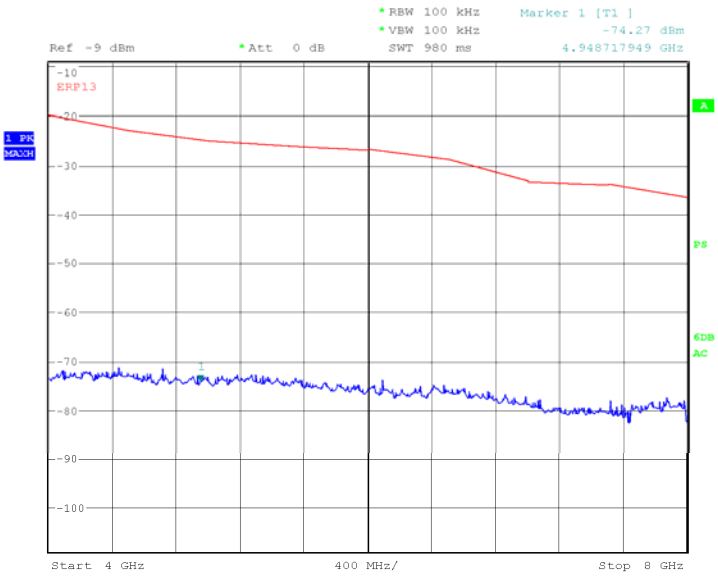

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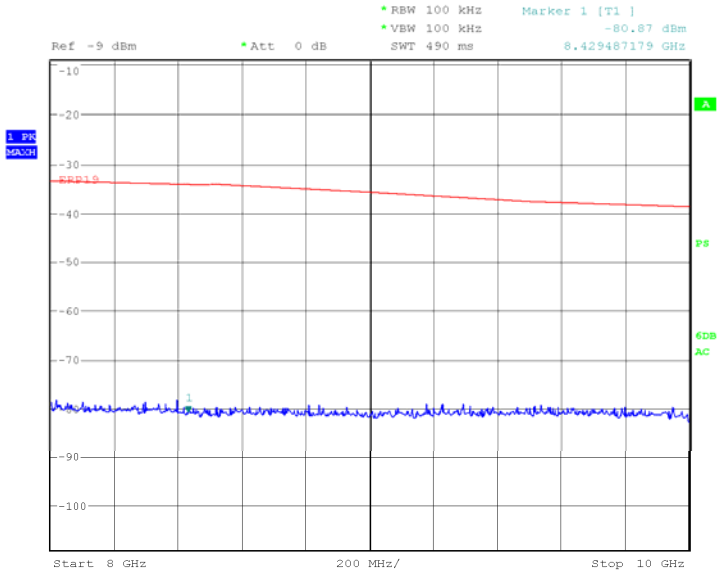
8GHz to 10GHz

Vertical



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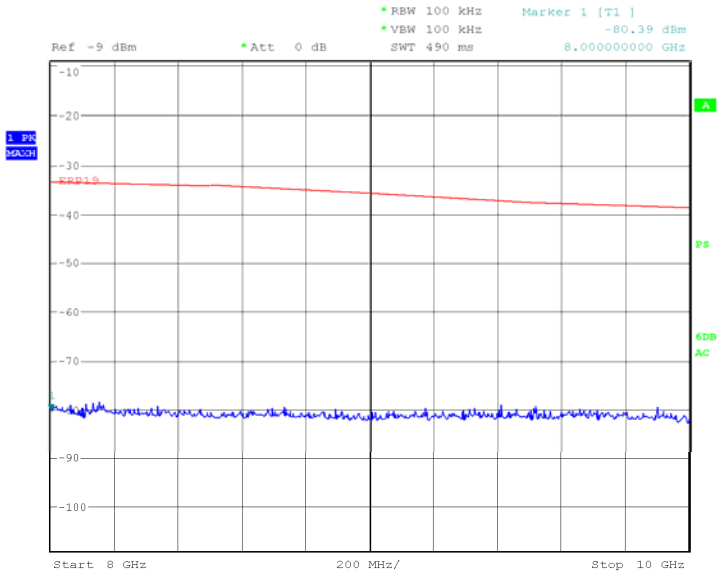

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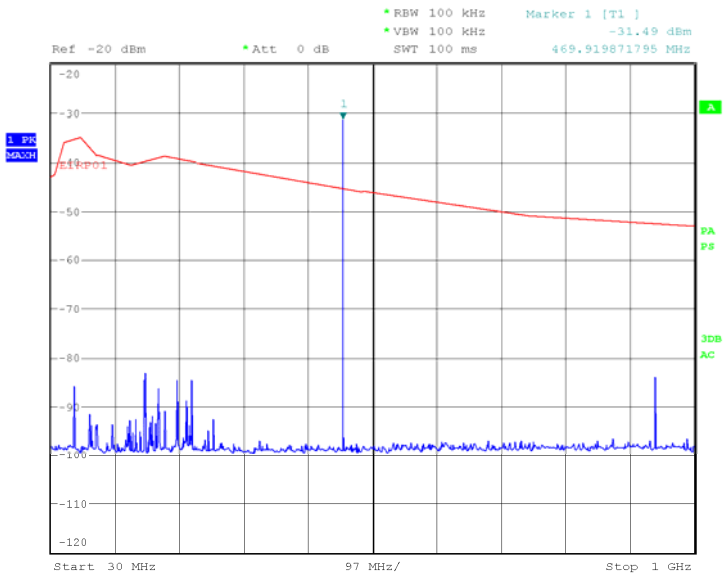
Configuration 1 - Mode 3

30MHz to 1GHz

Vertical



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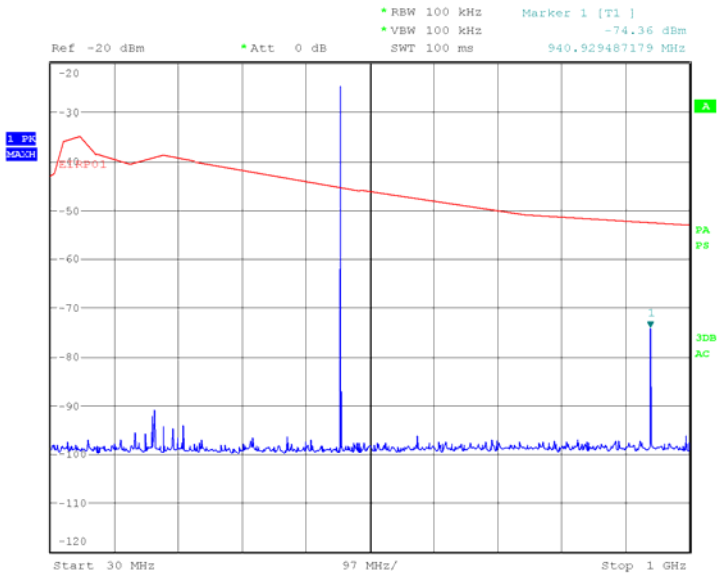

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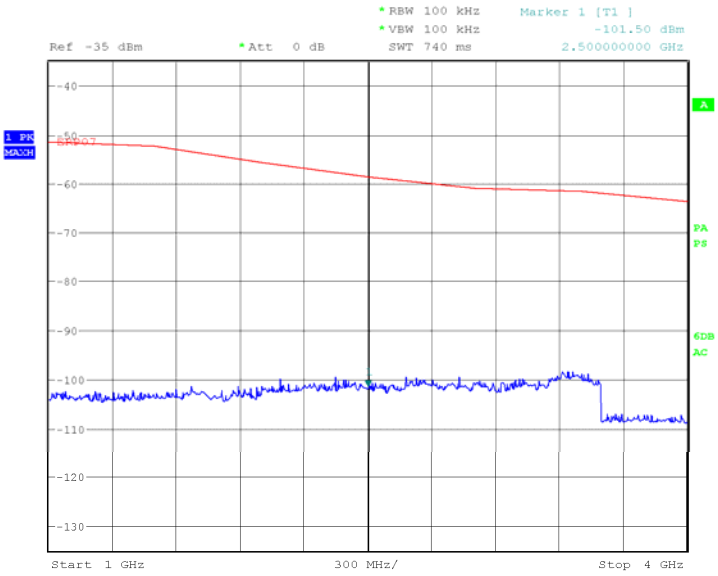
1GHz to 4GHz

Vertical



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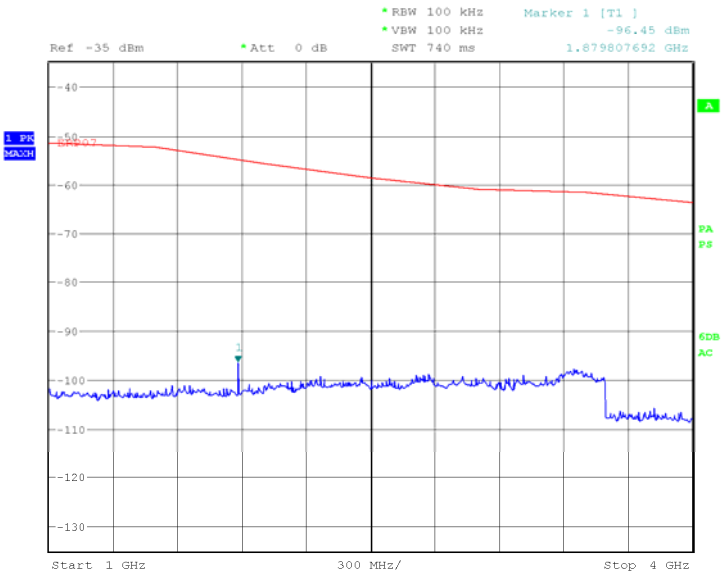

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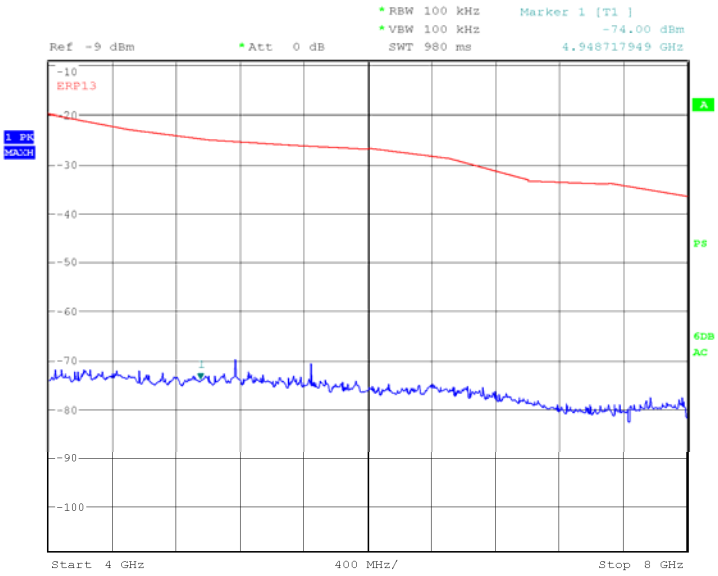
4GHz to 8GHz

Vertical



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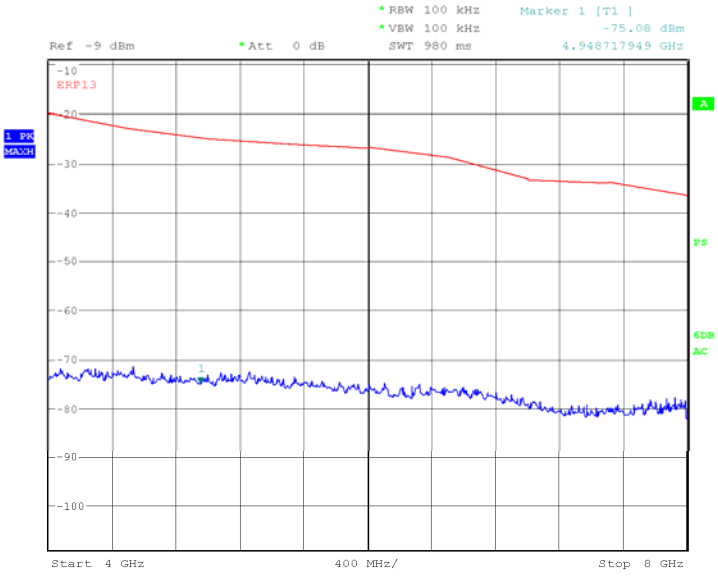

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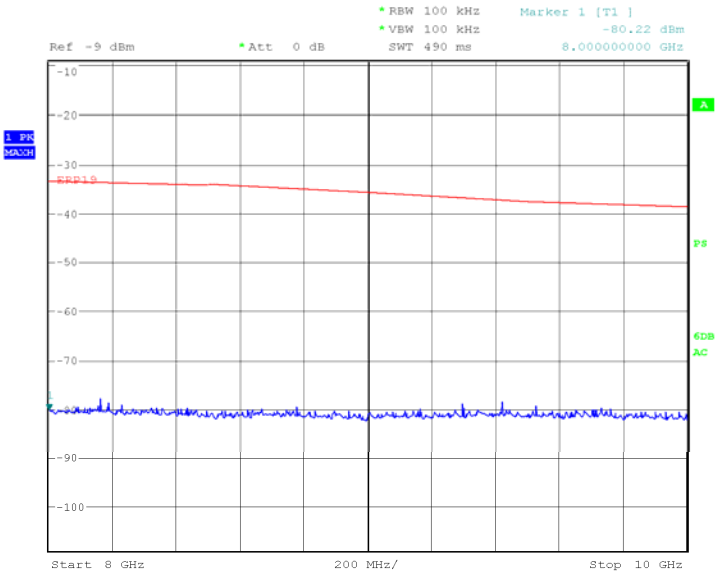
8GHz to 10GHz

Vertical



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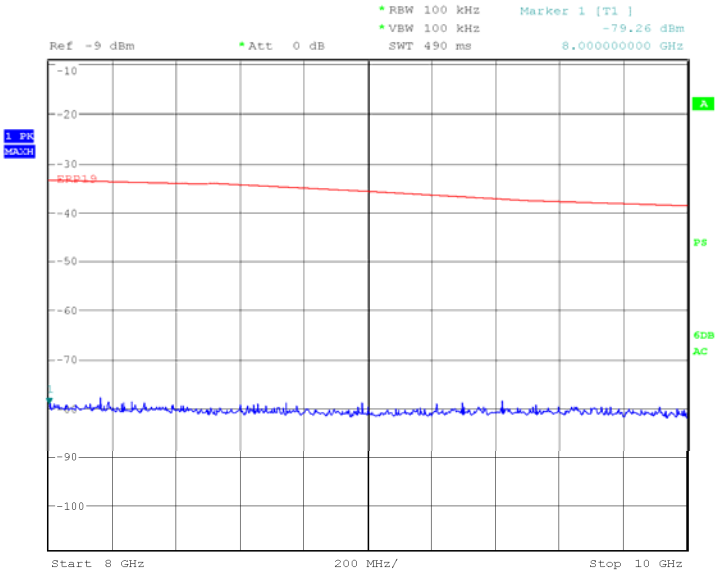

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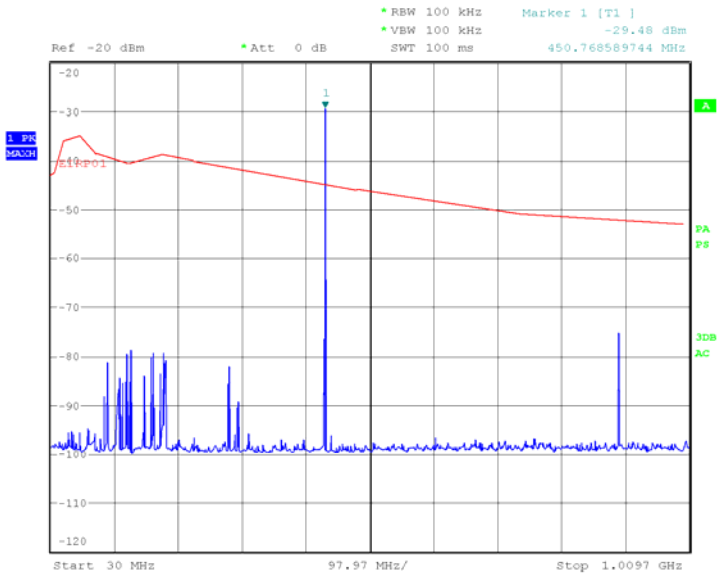
Configuration 2 - Mode 1

30MHz to 1GHz

Vertical



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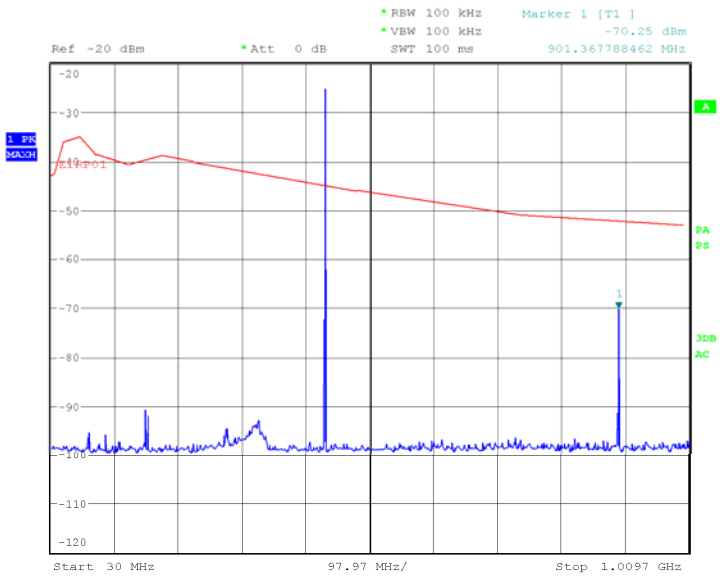

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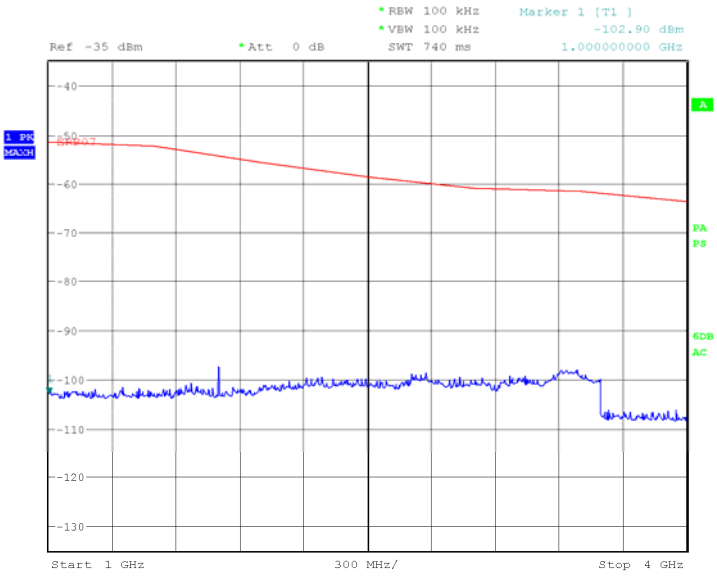
1GHz to 4GHz

Vertical



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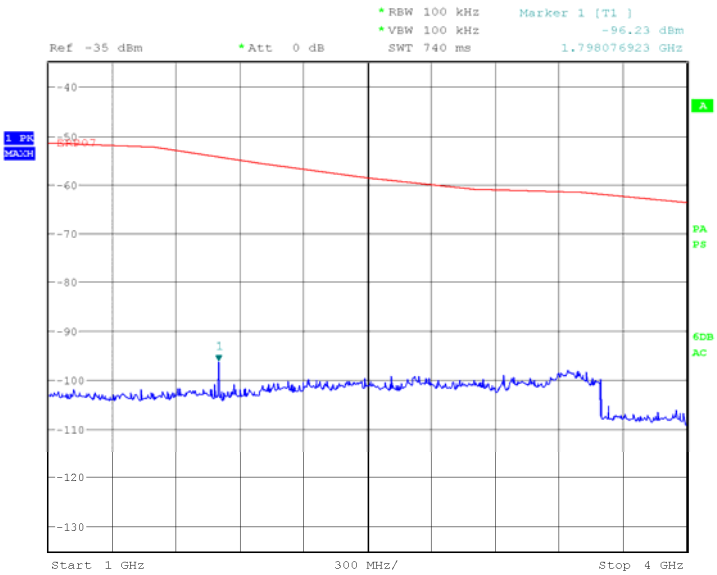

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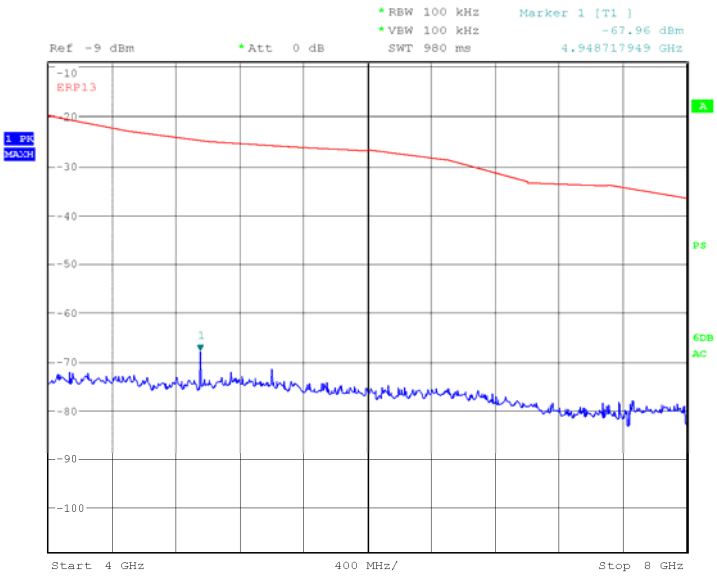
4GHz to 8GHz

Vertical



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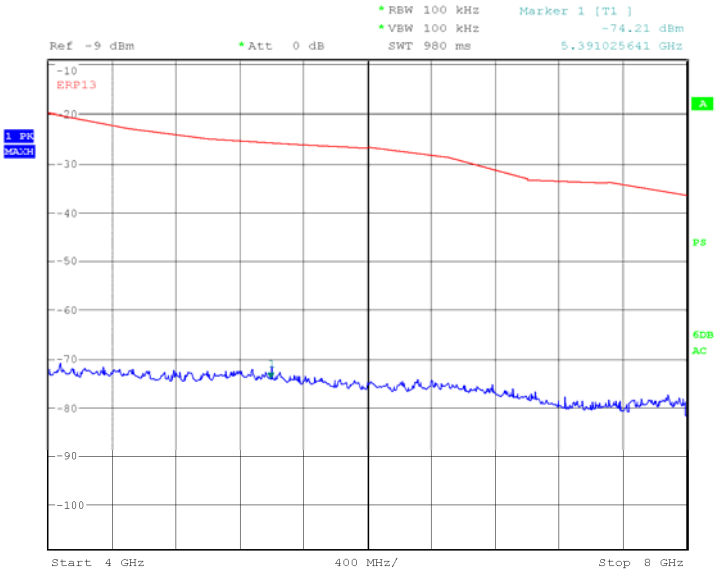

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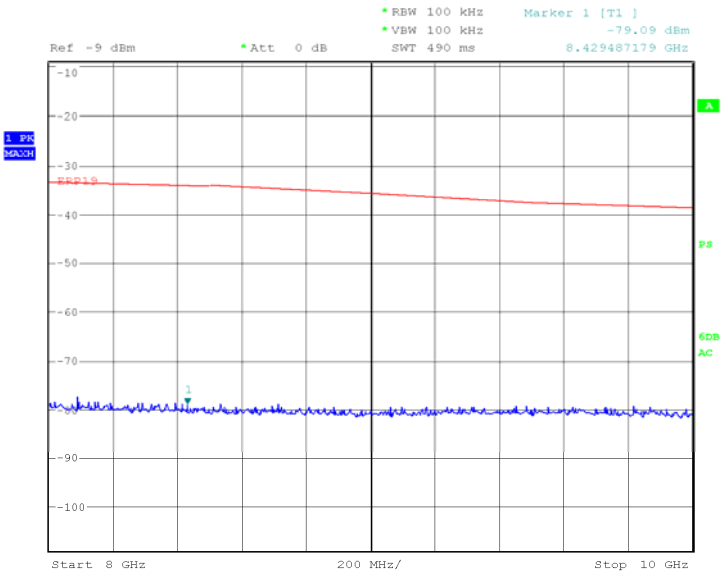
8GHz to 10GHz

Vertical



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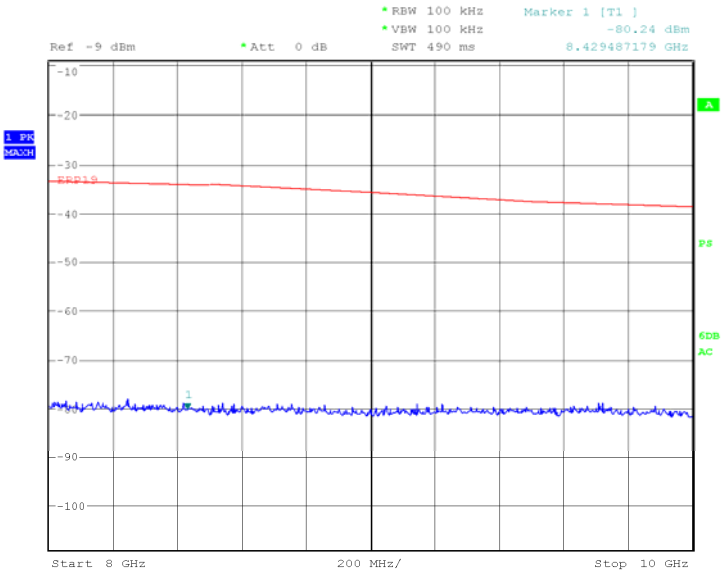

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Configuration 2 - Mode 2

30MHz to 1GHz

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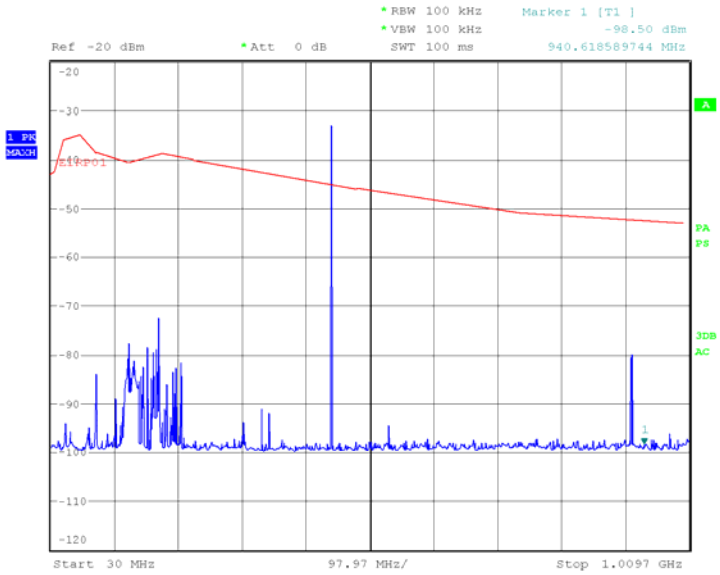

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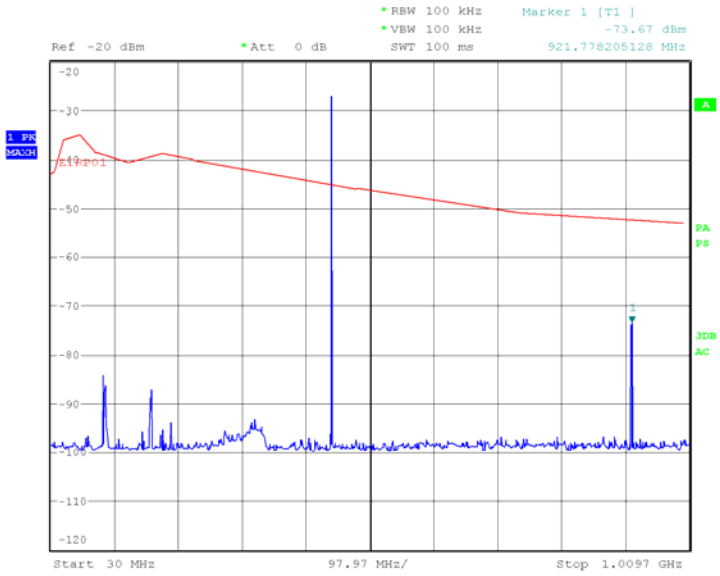

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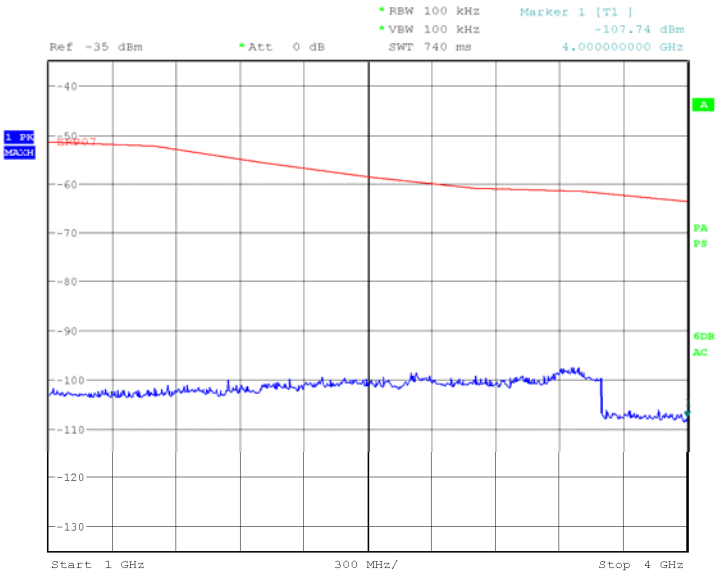
1GHz to 4GHz

Vertical



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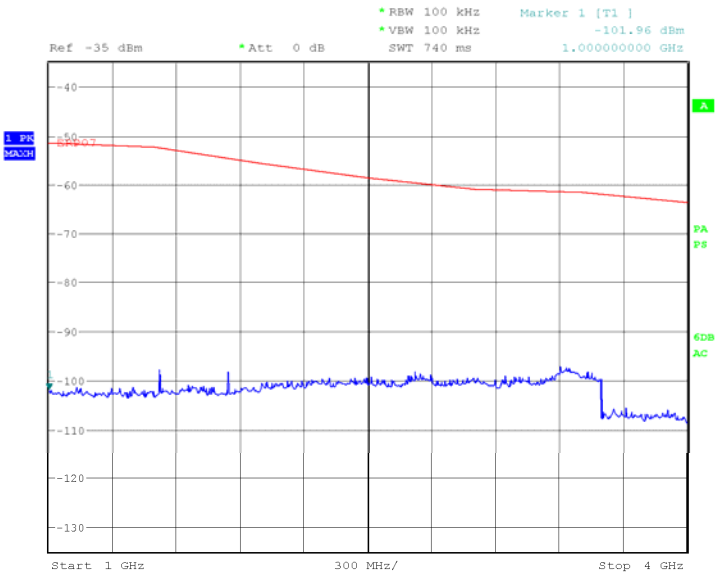

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4GHz to 8GHz

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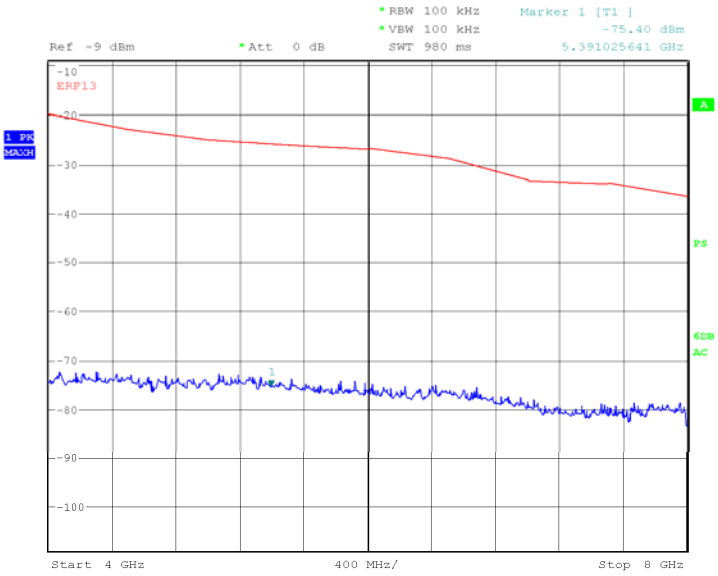

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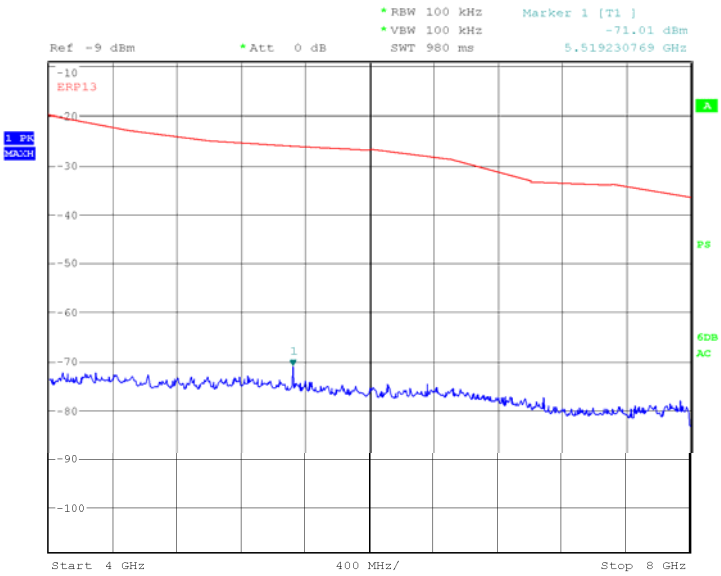
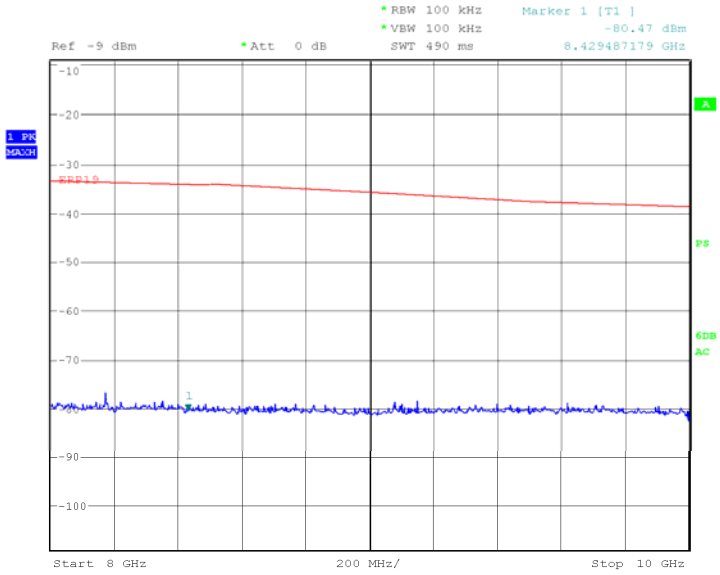


Date: 3.JAN.2010 15:55:56

8GHz to 10GHz

Vertical



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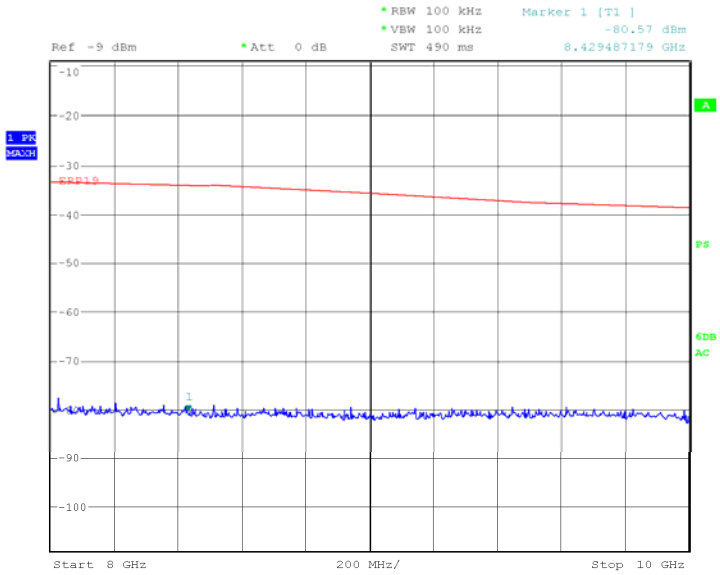
Horizontal

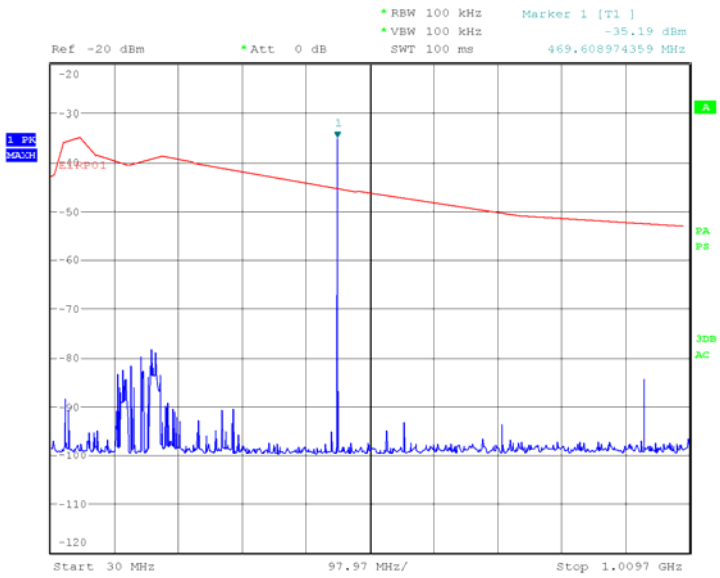


Date: 3.JAN.2010 14:52:23

Configuration 2 - Mode 3

30MHz to 1GHz

Vertical



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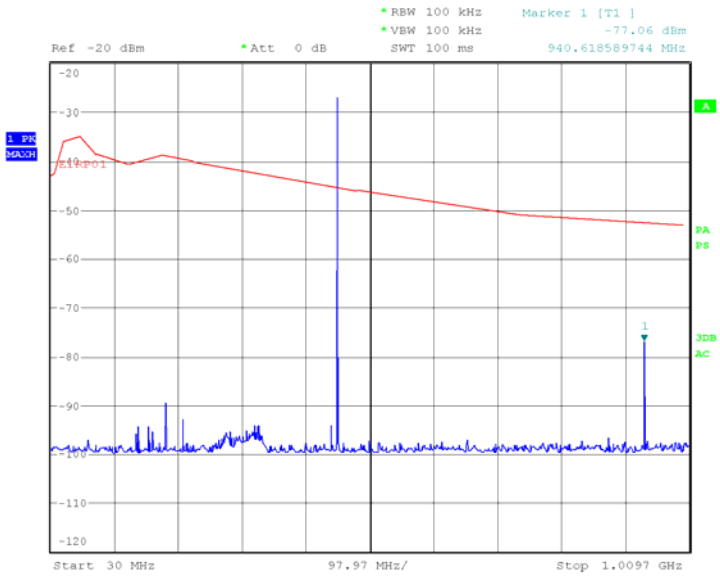
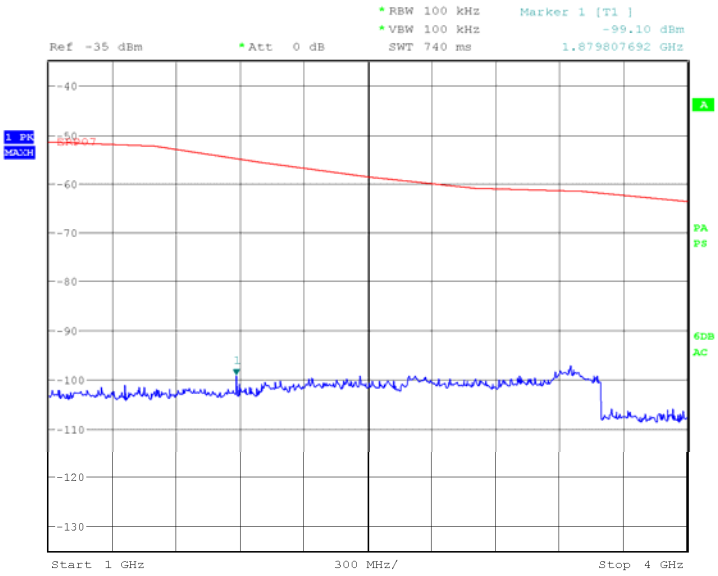
Horizontal



Date: 3.JAN.2010 16:38:17

1GHz to 4GHz

Vertical



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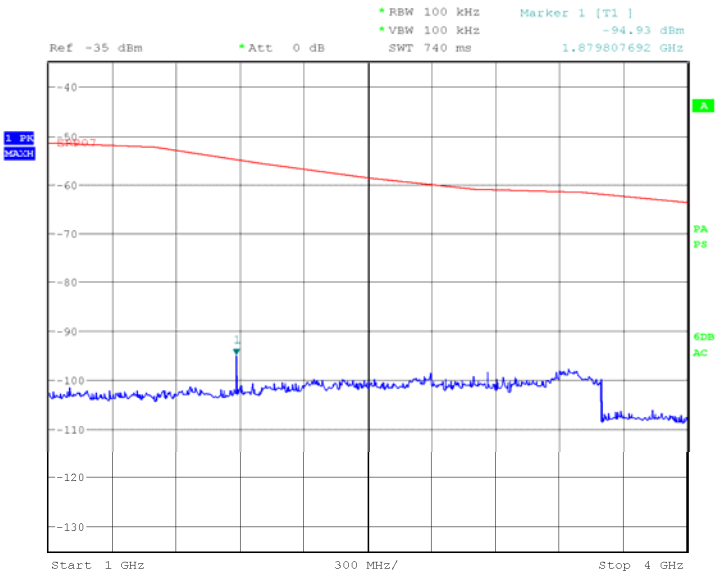

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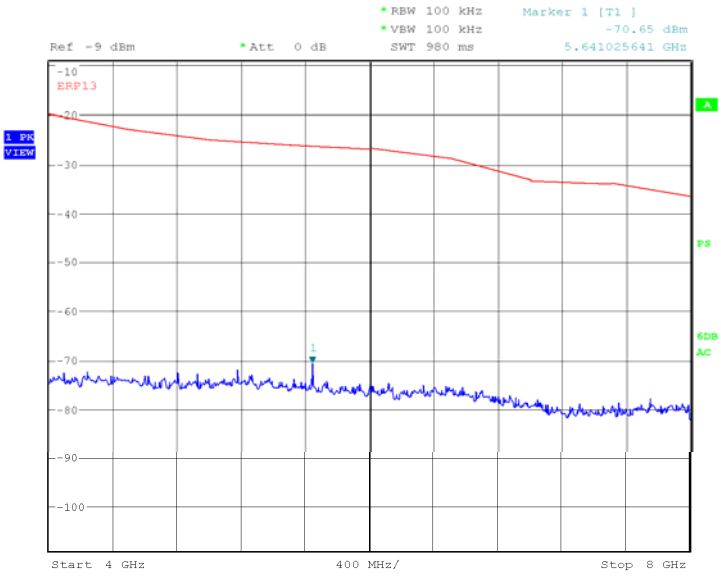
4GHz to 8GHz

Vertical



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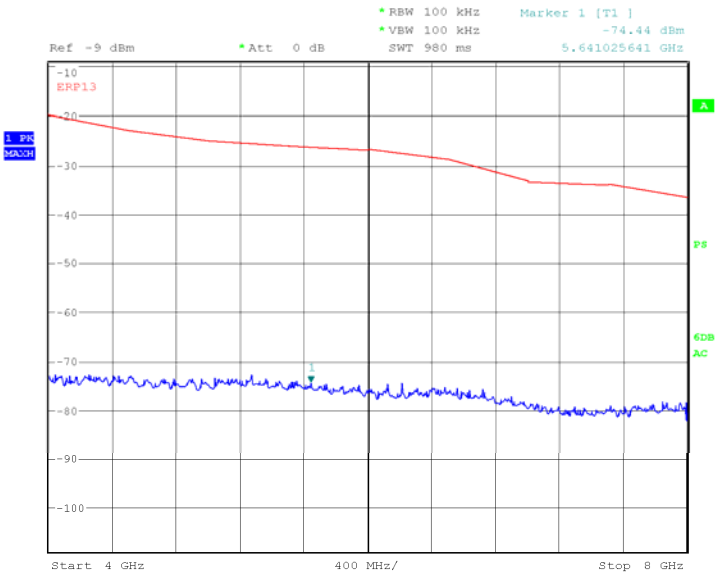

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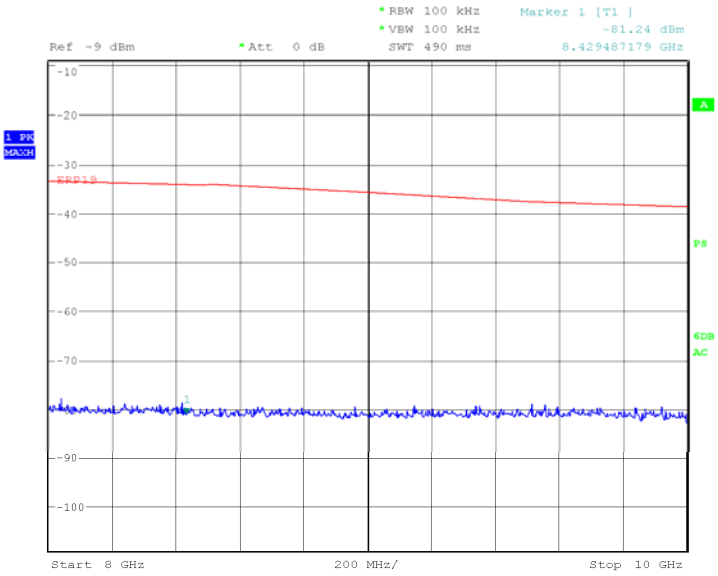
8GHz to 10GHz

Vertical



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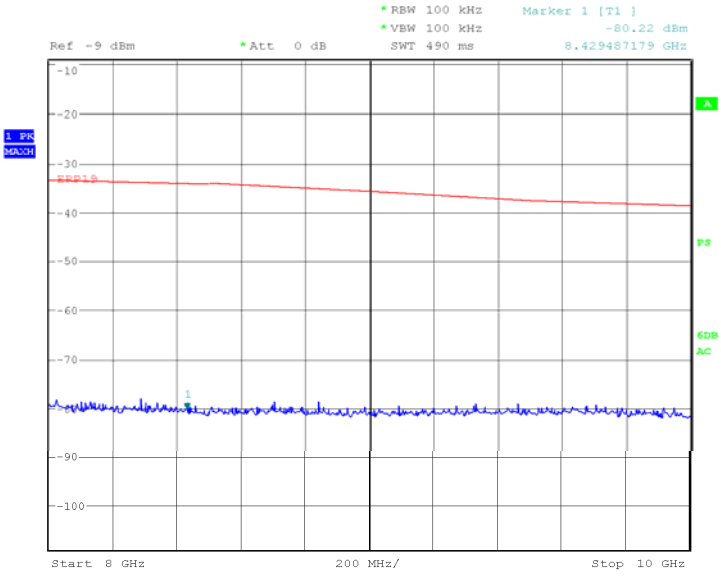


Date: 3.JAN.2010 14:57:45

2.2 EFFECTIVE RADIATED POWER

2.2.1 Specification Reference

FCC CFR 47 Part 90, Clause 90.205 (h)

2.2.2 Equipment Under Test

SRG3900 Vehicle Mounted Tetra Radio, S/N: 2PN000219VA

2.2.3 Date of Test and Modification State

04 March 2010 - Modification State 0

2.2.4 Test Equipment Used

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

2.2.5 Test Method and Operating Modes

The test was applied in accordance with the test method requirements of FCC CFR 47 Part 90.

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

Configuration 1 - Mode 1
- Mode 2
- Mode 3

Configuration 2 - Mode 1
- Mode 2
- Mode 3

2.2.6 Environmental Conditions

	04 March 2010
Ambient Temperature	20.3°C
Relative Humidity	22%
Atmospheric Pressure	1009mbar

2.2.7 Test Results

For the period of test the EUT met the requirements of FCC CFR 47 Part 90 for Effective Radiated Power.

The test results are shown below.

Configuration 1 - Mode 1, 2 & 3 – Antenna AQHB

Frequency	Result (dBm)	Result (W)
450.025	+37.74	5.94
460.025	+36.56	4.53
469.975	+36.51	4.48

Configuration 2 - Mode 1, 2 & 3– Antenna AQHB

Frequency	Result (dBm)	Result (W)
450.025	+37.36	5.45
460.025	+36.82	4.81
469.975	+35.56	3.60

Configuration 1 - Mode 1, 2 & 3 – Antenna ACUHB

Frequency	Result (dBm)	Result (W)
450.025	+40.78	11.97
460.025	+38.72	7.45
469.975	+38.3	6.76

Configuration 2 - Mode 1, 2 & 3 – Antenna ACUB

Frequency	Result (dBm)	Result (W)
450.025	+40.85	12.16
460.025	+38.24	6.67
469.975	+38.42	6.95

Limit Clause

There is not an RF power limit for mobile devices under Part 90 in the 450-470 MHz band. The limit will be based on compliance with SAR requirements. This could range from 200 mW up to 5 watts depending upon the design used to meet SAR limits. But this is not an RF power limit by rule, but it is a limit by circumstance

2.3 POWER AND ANTENNA HEIGHT LIMITS

2.3.1 Specification Reference

FCC CFR 47 Part 90, Clause 90.205 and 2.1046

2.3.2 Equipment Under Test

SRG3900 Vehicle Mounted Tetra Radio, S/N: 2PN000219VA

2.3.3 Date of Test and Modification State

17 December 2009 – 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 Procedure

Test Performed in accordance with FCC CFR 47 Part 90.

The EUT was connected to a spectrum analyser via a 30dB attenuator and cable. The path loss between the EUT and power sensor was measured and used as an offset in the measuring equipment. The average power was measured with an RMS detector and average trace over 200 sweeps. The EUT was set to a TETRA continuous burst on maximum power.

2.3.6 Environmental Conditions

	17 December 2009
Ambient Temperature	23.4°C
Relative Humidity	23.6%

2.3.7 Test Results

Frequency (MHz)	Average Power	
	dBm	W
450.025	39.08	8.091
460.025	39.13	8.185
469.975	39.19	8.299

Limit Clause

	Service Area Radius (km)									
	3	8	13	16	24	32	40	48	64	80
Maximum ERP (W)[1]	2	100	[2]500	[2]500	[2]500	[2]500	[2]500	[2]500	[2]500	[2]500
Up to reference HAAT (m)[3]	15	15	15	27	63	125	250	410	950	2700

[1] Maximum ERP indicated provides for a 39dBu signal strength at the edge of the service area per FCC Report R-6602, Fig.29 (see §73.699, Fig 10b).
[2] Maximum ERP of 500 watts allowed. Signal strength at the service area contour may be less than 39 dBu.
[3] When the actual antenna HAAT is greater than the reference HAAT, the allowable ERP will be reduced in accordance with the following equation: $ERP_{allow} = ERP_{max} \times (HAAT_{ref} HAAT_{actual})^2$.
[4] Applications for this service area radius may be granted upon specific request with justification and must include a technical demonstration that the signal strength at the edge of the service area does not exceed 39 dBu.

2.4 TYPES OF EMISSION / TYPES OF MODULATION

2.4.1 Specification Reference

FCC CFR 47 Part 90, Clause 90.207, 2.1047

2.4.2 Equipment Under Test

SRG3900 Vehicle Mounted Tetra Radio, S/N: 2PN000219VA

2.4.3 Date of Test and Modification State

15 December 2009 – Modification State 0

2.4.4 Test Procedure

Test Performed in accordance with FCC CFR 47 Part 90.

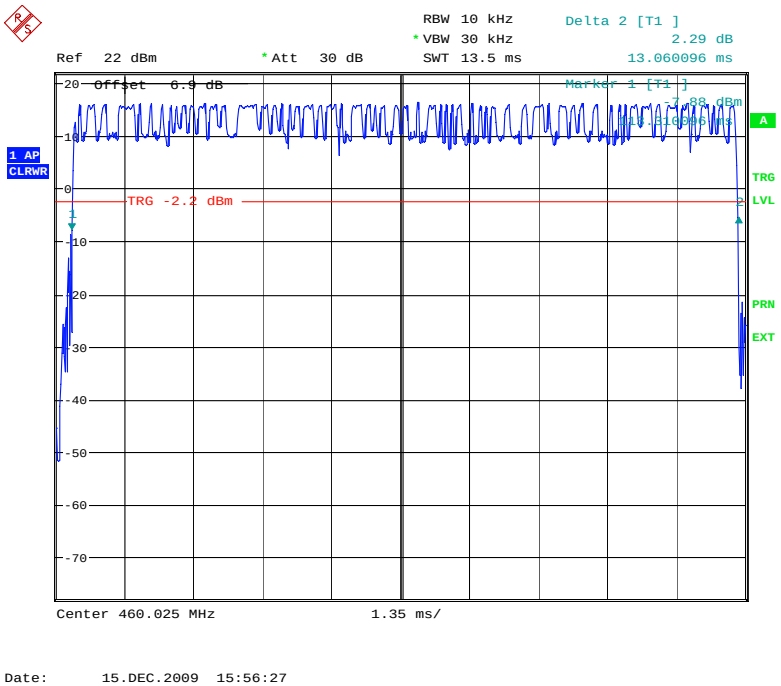
Modulation Type: pi/4DQPSK

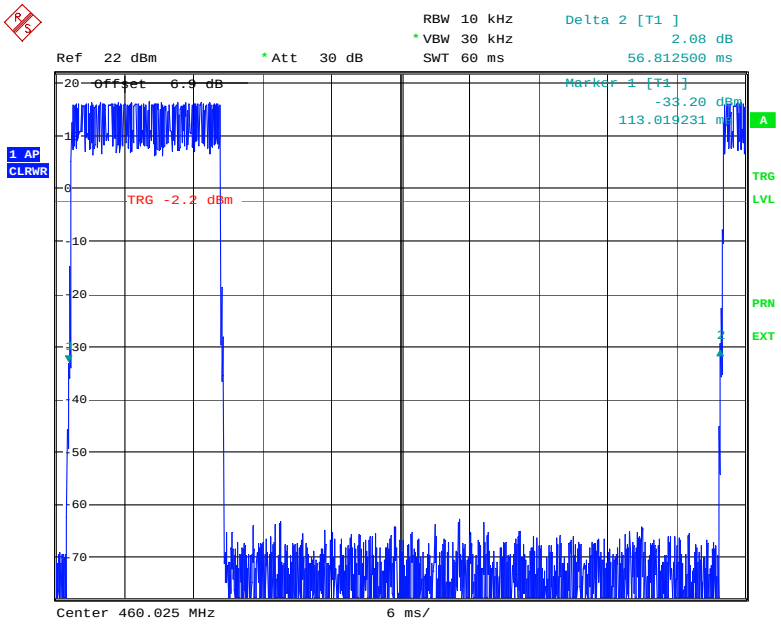
Emission Designator: 25K0Q1D

2.4.5 Environmental Conditions

	15 December 2009
Ambient Temperature	24.3°C
Relative Humidity	25.6%

2.4.6 Test Results





Date: 15.DEC.2009 15:58:17

2.5 BANDWIDTH LIMITATIONS

2.5.1 Specification Reference

FCC CFR 47 Part 90, Clause 90.209, 2.1049

2.5.2 Equipment Under Test

SRG3900 Vehicle Mounted Tetra Radio, S/N: 2PN000219VA

2.5.3 Date of Test and Modification State

09 December 2009 – 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 Procedure

Test Performed in accordance with FCC CFR 47 Part 90.

The EUT was connected to a spectrum analyser using a 40dB attenuator and cable. The resolution and video bandwidths were set to 300Hz and 1kHz respectively. The path loss was entered with the spectrum analyser as a reference level offset. The EUT was set to transmit on maximum power using the function of the spectrum analyser.

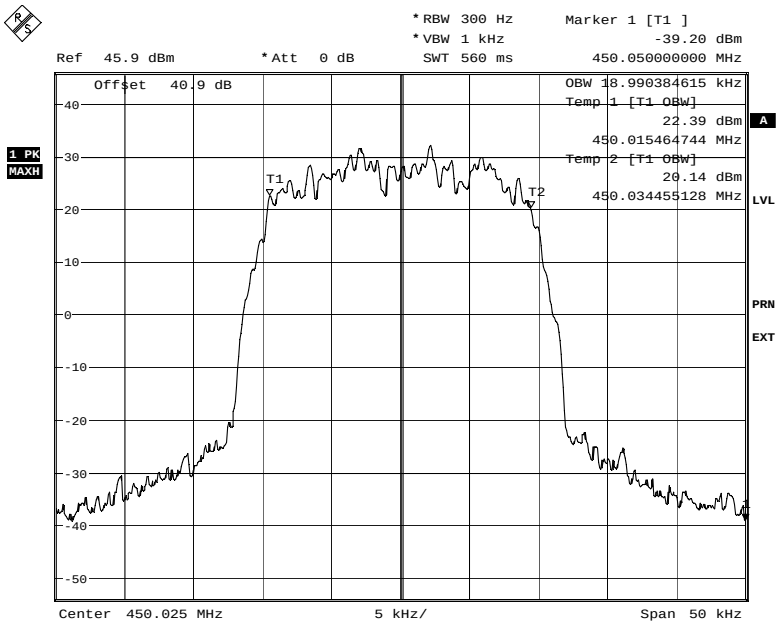
2.5.6 Environmental Conditions

	09 December 2009
Ambient Temperature	24.6°C
Relative Humidity	42.2%

2.5.7 Test Results

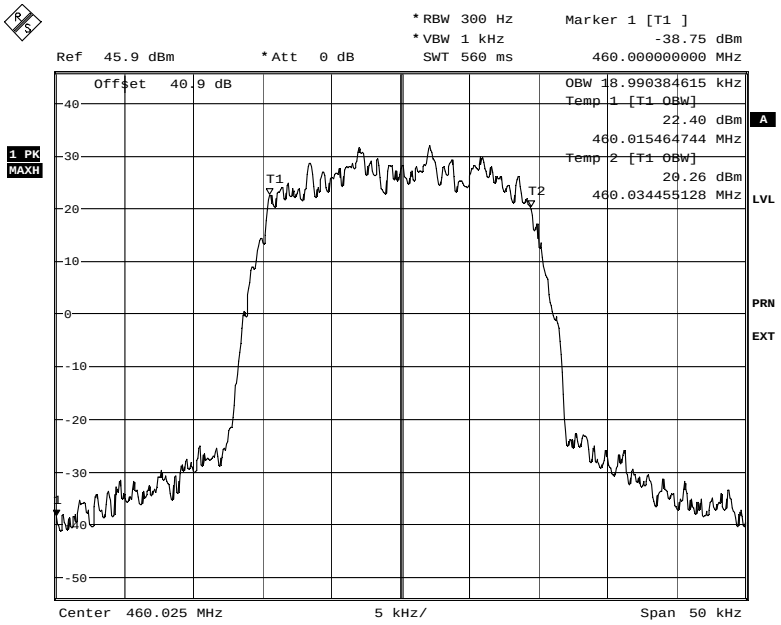
Frequency (MHz)	Occupied Bandwidth (99%)
450.025	18.990kHz
460.025	18.990kHz
469.975	18.910kHz

450.025 MHz



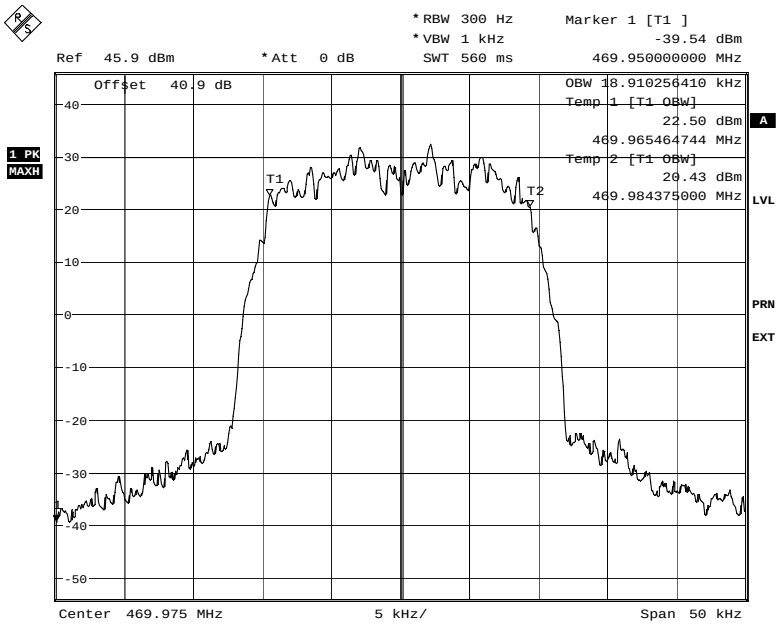
Date: 9.DEC.2009 15:42:18

460.025 MHz



Date: 9.DEC.2009 15:44:48

469.975 MHz



Date: 9.DEC.2009 15:47:53

2.6 EMISSION MASK

2.6.1 Specification Reference

FCC CFR 47 Part 90, Clause 90.210, 2.1051

2.6.2 Equipment Under Test

SRG3900 Vehicle Mounted Tetra Radio, S/N: 2PN000219VA

2.6.3 Date of Test and Modification State

09 December 2009 – 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 Procedure

Test Performed in accordance with FCC CFR 47 Part 90.

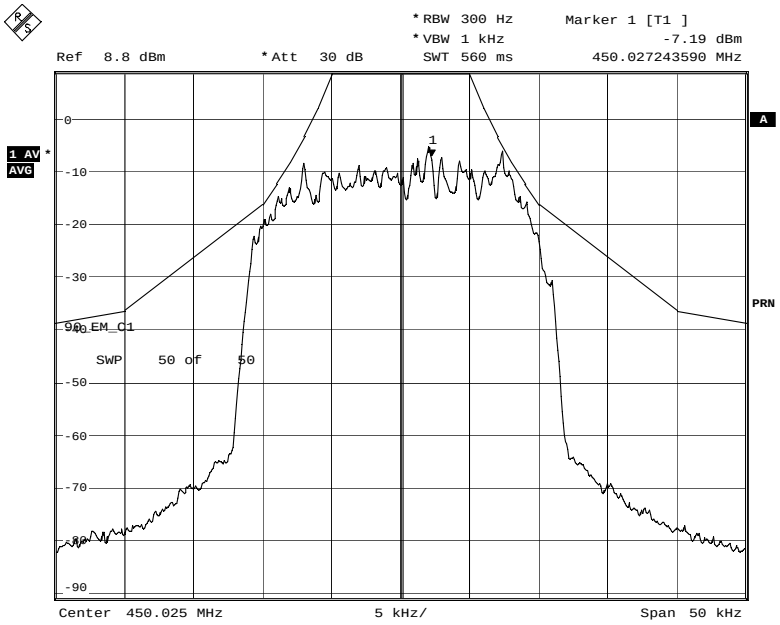
The EUT was connected to the spectrum analyser via a 40dB attenuator and a cable. In accordance with the specification, the emission mask C was using a resolution and video bandwidth of 300Hz and 1kHz respectively. For out of band emissions a resolution bandwidth of 100kHz and video bandwidth of 300kHz was used below 1GHz. Above 1GHz the resolution and video bandwidth was set to 1MHz and 3MHz respectively. The EUT was set to transmit on maximum power.

2.6.6 Environmental Conditions

	09 December 2009
Ambient Temperature	24.2°C
Relative Humidity	42.1%

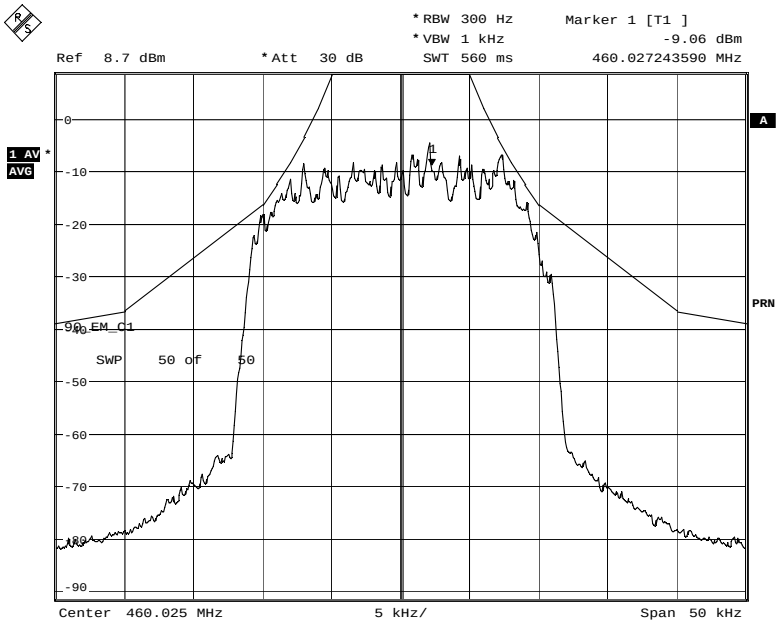
2.6.7 Test Results

450.025 MHz



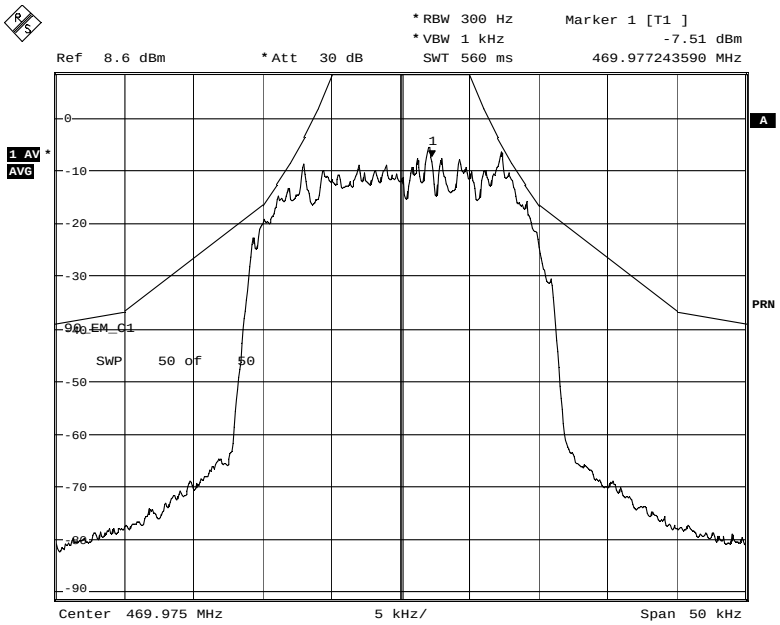
Date: 3.DEC.2009 14:07:55

460.025 MHz



Date: 3.DEC.2009 14:10:42

469.975 MHz



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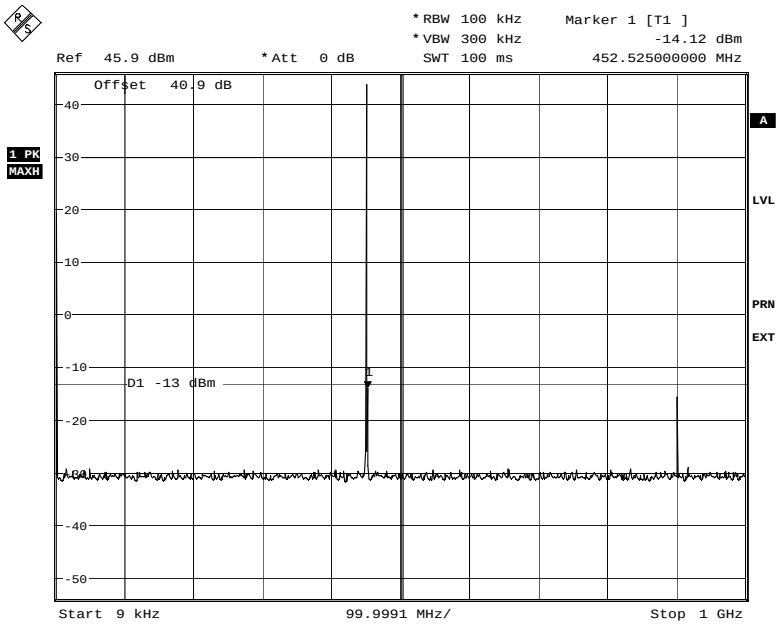
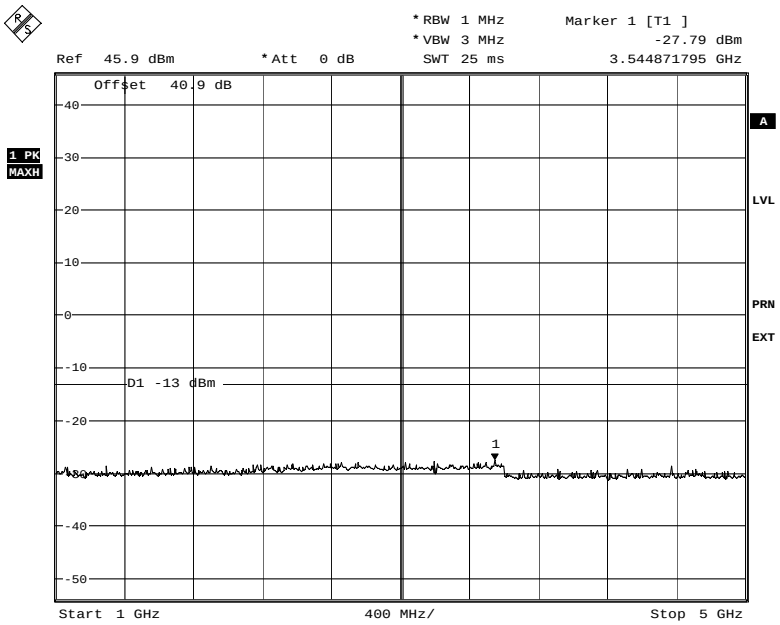
450.025 MHz



Date: 9.DEC.2009 14:52:12

450.025 MHz



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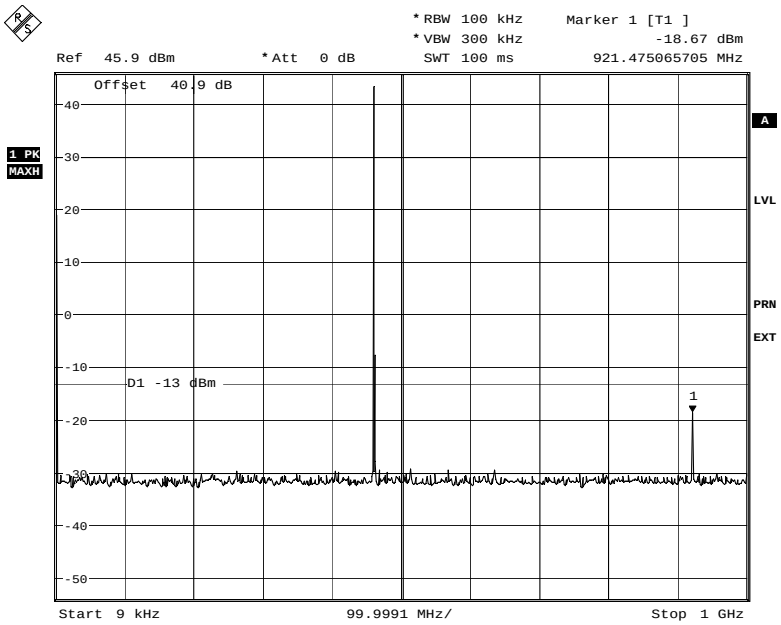
460.025 MHz



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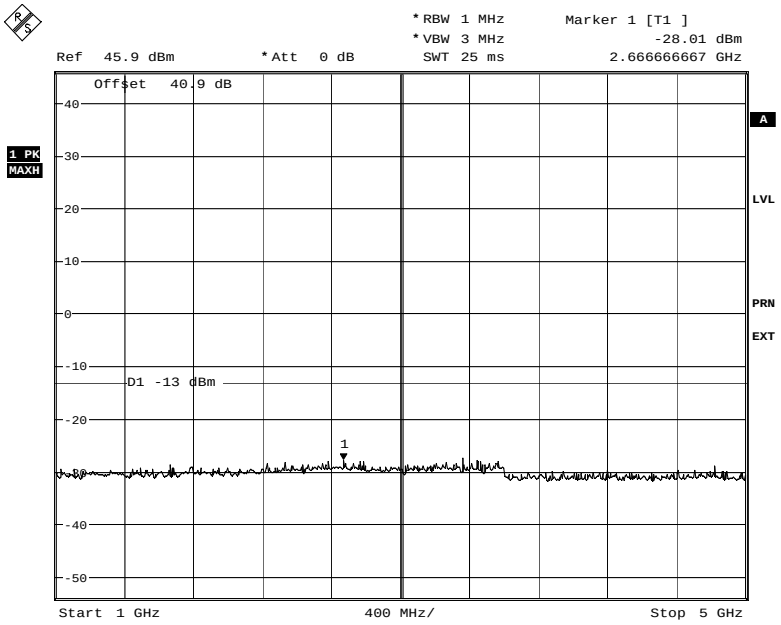
460.025 MHz



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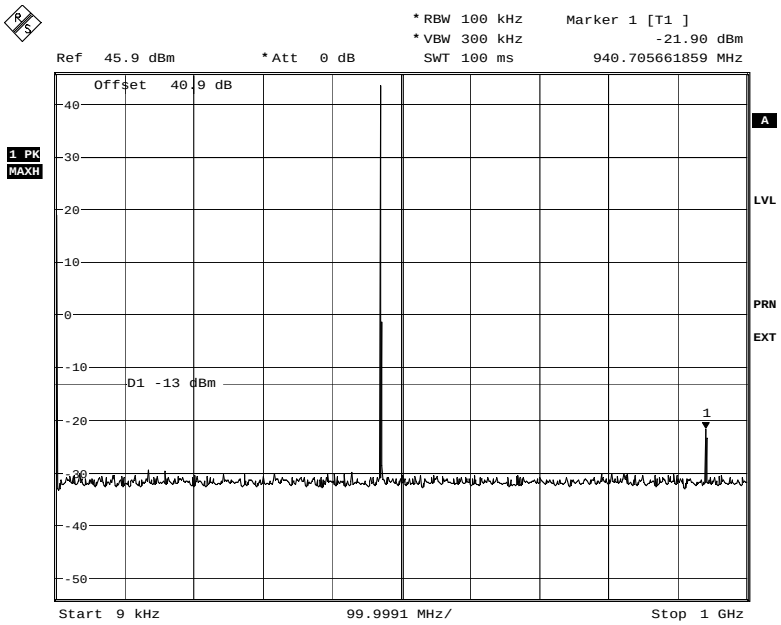
469.975 MHz



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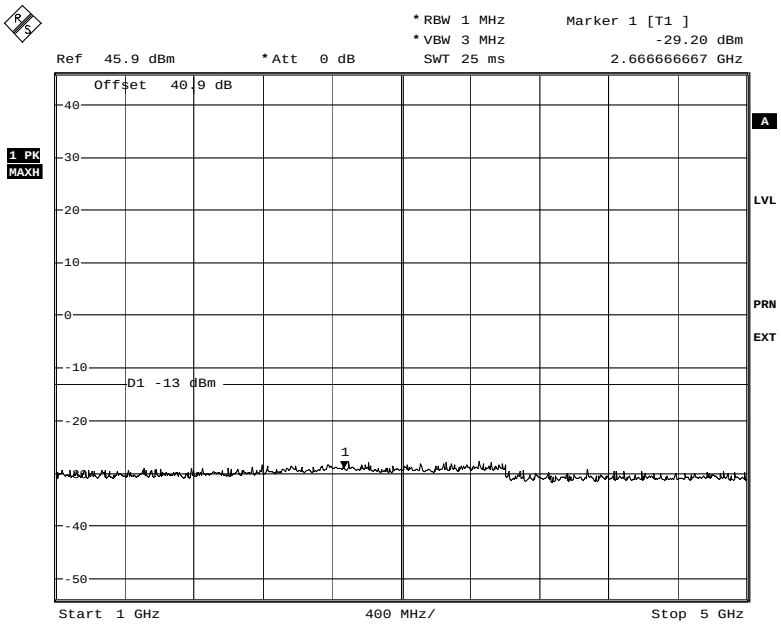
469.975 MHz



Date: 9.DEC.2009 15:18:23

2.7 FREQUENCY STABILITY

2.7.1 Specification Reference

FCC CFR 47 Part 90, Clause 90.213, 2.1055

2.7.2 Equipment Under Test

SRG3900 Vehicle Mounted Tetra Radio, S/N: 2PN000219VA

2.7.3 Date of Test and Modification State

16 December 2009 – 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 Procedure

Test Performed in accordance with FCC CFR 47 Part 90

Supply voltage 13.2 V DC
Maximum rated output power as stated by the manufacturer: 10W

2.7.6 Environmental Conditions

	16 December 2009
Ambient Temperature	20.3°C
Relative Humidity	20.9%

2.7.7 Test Results

Temperature Interval	Supply Voltage	Frequency (MHz)		
		450.025 MHz	460.025 MHz	469.975 MHz
-30°C	11.22 V DC	450.025086	460.025072	469.975058
	13.2 V DC	450.025084	460.025074	469.975060
	15.8 V DC	450.025081	460.025064	469.975049
-20°C	11.22 V DC	450.025070	460.025062	469.975048
	13.2 V DC	450.025058	460.025056	469.975047
	15.8 V DC	450.025072	460.025064	469.975054
-10°C	11.22 V DC	450.025207	460.025199	469.975188
	13.2 V DC	450.025191	460.025188	469.975185
	15.8 V DC	450.025209	460.025199	469.975184
0°C	11.22 V DC	450.025333	460.025327	469.975325
	13.2 V DC	450.025316	460.025308	469.975306
	15.8 V DC	450.025332	460.025323	469.975316
+10°C	11.22 V DC	450.025477	460.025482	469.975483
	13.2 V DC	450.025498	460.025492	469.975486
	15.8 V DC	450.025501	460.025502	469.975507
+20°C	11.22 V DC	450.025601	460.025607	469.975607
	13.2 V DC	450.025595	460.025596	469.975597
	15.8 V DC	450.025601	460.025601	469.975600
-30°C	11.22 V DC	450.025588	460.025590	469.975591
	13.2 V DC	450.025591	460.025592	469.975591
	15.8 V DC	450.025592	460.025591	469.975586
+40°C	11.22 V DC	450.025557	460.025558	469.975561
	13.2 V DC	450.025560	460.025554	469.975554
	15.8 V DC	450.025556	460.025556	469.975552
+50°C	11.22 V DC	450.025548	460.026545	469.975548
	13.2 V DC	450.025553	460.026550	469.975549
	15.8 V DC	450.025555	460.026556	469.975551
+55°C	11.22 V DC	450.025558	460.026558	469.975554
	13.2 V DC	450.025567	460.026563	469.975557
	15.8 V DC	450.025568	460.026566	469.975568
Maximum Frequency Error (kHz)		+ 601 (+1.34 ppm)	+ 607 (+1.32 ppm)	+ 607 (+1.29 ppm)
Measurement Uncertainty (Hz)		± 11		

Limit Clause

The frequency error shall not exceed 5ppm

2.8 TRANSIENT FREQUENCY BEHAVIOUR

2.8.1 Specification Reference

FCC CFR 47 Part 90, Clause 90.214

2.8.2 Equipment Under Test

SRG3900 Vehicle Mounted Tetra Radio, S/N: 2PN000219VA

2.8.3 Date of Test and Modification State

10 December 2009 – 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 Procedure

Test Performed in accordance with FCC CFR 47 Part 90.

2.8.6 Environmental Conditions

	10 December 2009
Ambient Temperature	23.8°C
Relative Humidity	32.3%

2.8.7 Test Results

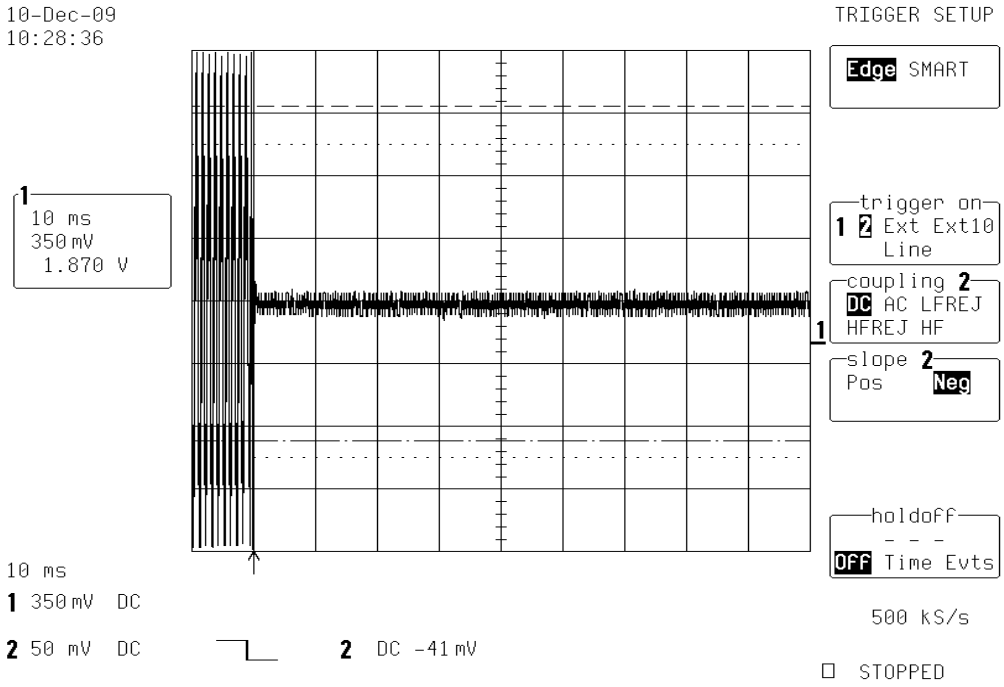
Transient Period	Frequency Difference (kHz)		
	450.025 MHz	460.025 MHz	469.975 MHz
T_1	0	0	0
T_2	0	0	0
T_3	0	0	0
Measurement Uncertainty (Hz)	± 0.2		

Limit Clause

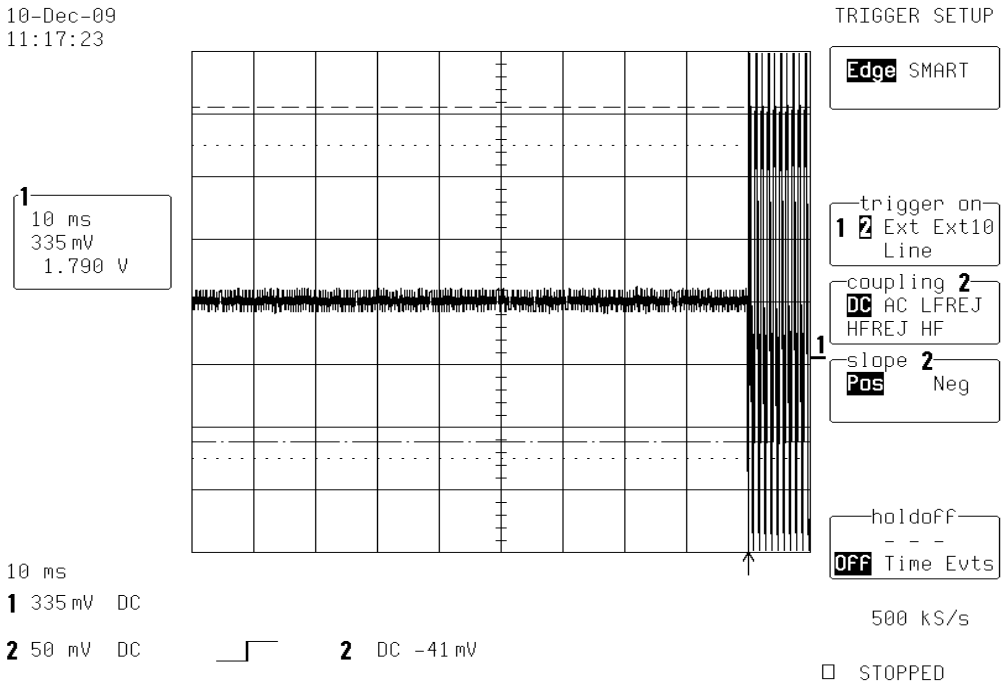
Time Interval	Maximum Frequency Difference	421 to 512MHz, 25kHz Channels
T_1	± 25.0KHz	10.0ms
T_2	± 12.5kHz	25.0ms
T_3	± 25.0kHz	10.0ms

450.025 MHz

$T_{1 \text{ and } 2}$

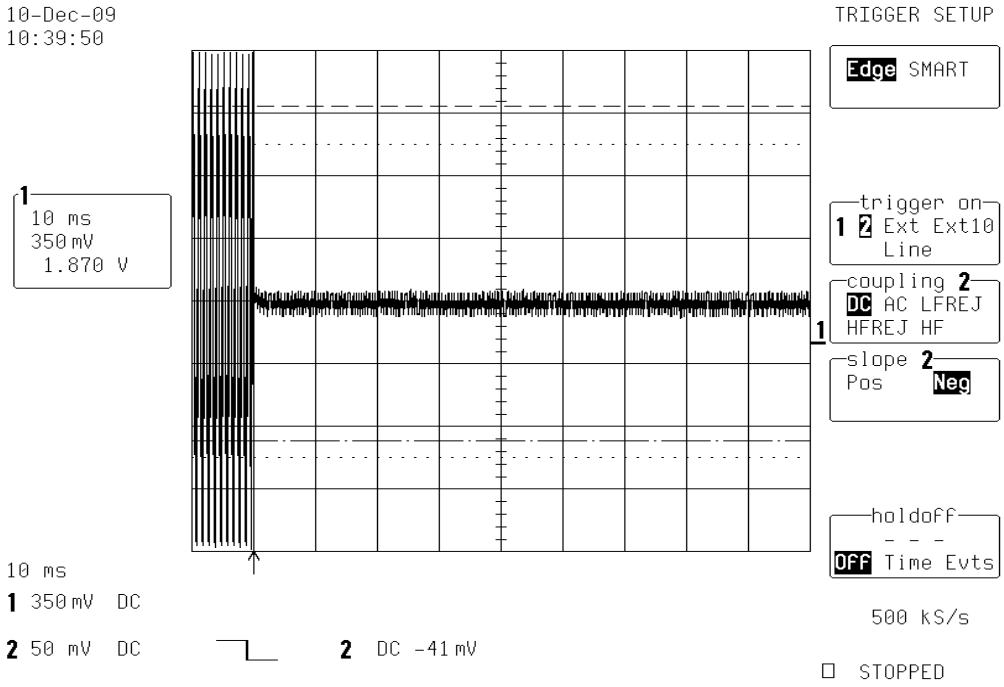


T_3



460.025 MHz

$T_{1 \text{ and } 2}$



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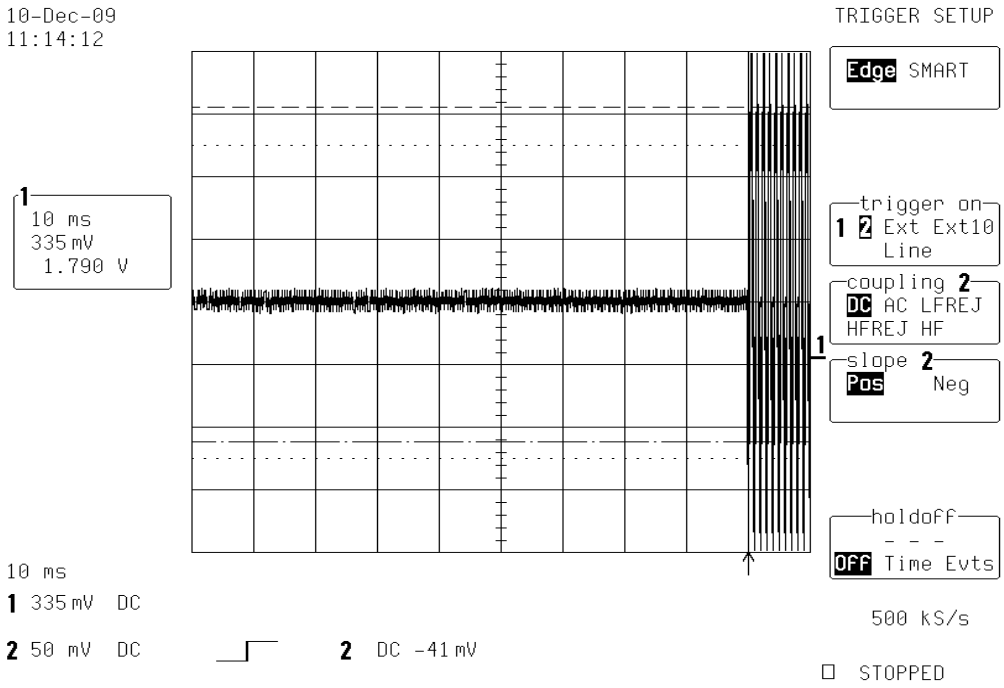
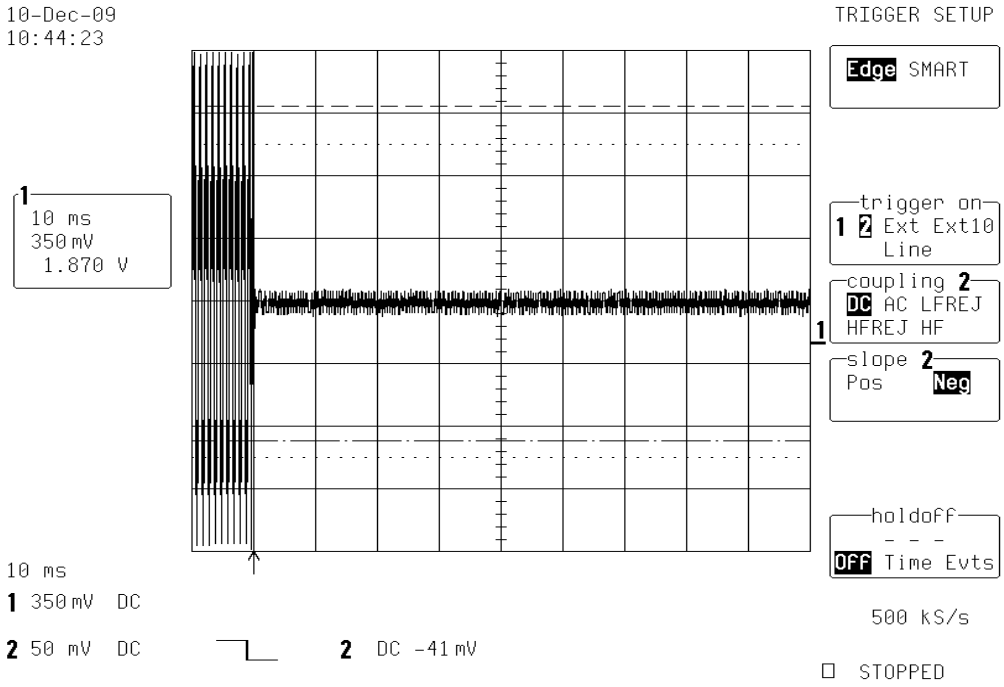
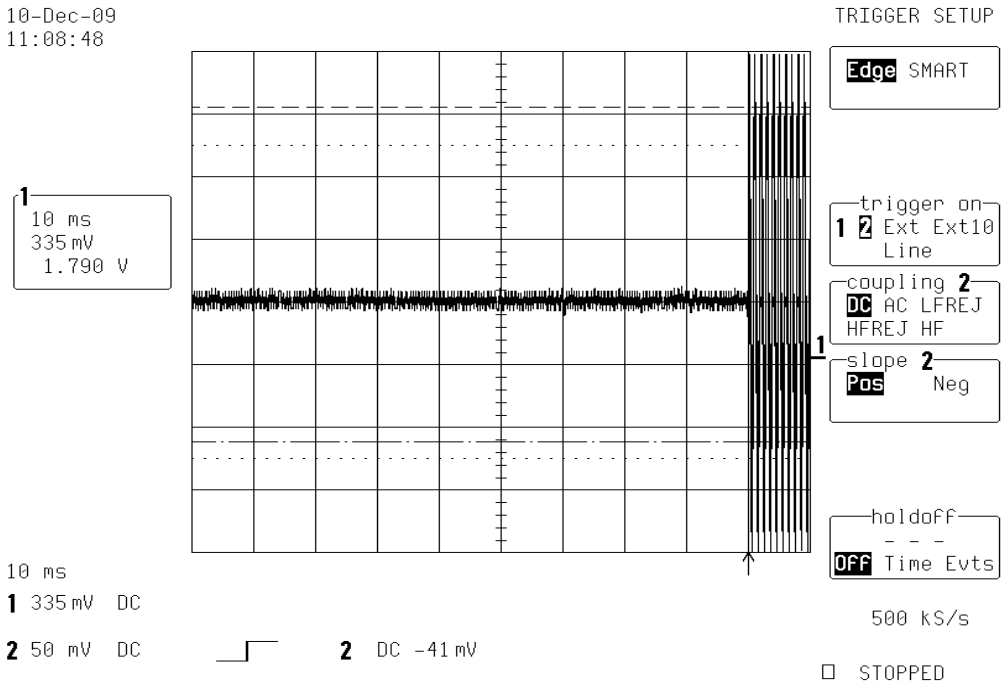


469.975 MHz

$T_{1 \text{ and } 2}$



T_3



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.	TE No.	Calibration Period (months)	Calibration Due
Section 2.1 and 2.2 Emission Masks and Effective Radiated Power					
Load	Diamond Antenna	DL-30N	218	12	22-Jun-2010
Antenna (Double Ridge Guide, 1GHz-18GHz)	EMCO	3115	235	12	12-Oct-2010
Antenna (Bilog)	Schaffner	CBL6143	287	24	21-Jan-2010
Pre-Amplifier	Phase One	PS04-0085	1532	12	16-Sep-2010
Pre-Amplifier	Phase One	PS04-0086	1533	12	17-Sep-2010
Screened Room (5)	Rainford	Rainford	1545	36	11-Feb-2011
Turntable/Mast Controller	EMCO	2090	1610	-	TU
4GHz HPF	Sematron	F-100-4000-5-R	2245	-	TU
Cable (2m, SMA(m) - SMA(m))	Reynolds	262-0248-2000	2401	12	TU
Antenna (Bilog)	Chase	CBL6143	2904	24	4-Dec-2011
Antenna (Log Periodic)	Schaffner	UPA6108	3108	12	4-Apr-2010
Signal Generator (10MHz to 40GHz)	Rohde & Schwarz	SMR40	3171	12	4-Aug-2010
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	1-Sep-2010
Turntable	EMCO	1060-04	3693	-	TU
Section 2.3 - Power Characteristics					
Peak Power Analyser	Hewlett Packard	8990A	107	12	2-Feb-2010
True RMS Multimeter	Fluke	79 Series III	411	12	24-Jul-2010
GPS Frequency Standard	Rapco	GPS-804/3	1312	6	4-Mar-2010
Programmable Power Supply	Iso-tech	IPS 2010	2437	-	O/P Mon
Power Supply	Iso-tech	IPS 2010	2439	-	O/P Mon
Power Sensor	Hewlett Packard	84812A	2743	-	TU
Spectrum Analyser	Rohde & Schwarz	FSU26	2747	12	2-Nov-2010
Hygrometer	Rotronic	I-1000	2891	12	17-Apr-2010
Attenuator (30dB, 150W)	Narda	769-30	3369	12	19-May-2010
Network Analyser	Rohde & Schwarz	ZVA 40	3548	12	13-Feb-2010
Section 2.4- Residual Modulation					
True RMS Multimeter	Fluke	79 Series III	411	12	24-Jul-2010
Attenuator (10dB, 10W)	Texscan	HFP-50N	468	12	24-Jun-2010
GPS Frequency Standard	Rapco	GPS-804/3	1312	6	4-Mar-2010
Cable (1m, sma(m) - sma(m)	Reynolds	262-0248-1000	2406	12	15-Oct-2010
Power Supply	Iso-tech	IPS 2010	2439	-	O/P Mon
Spectrum Analyser	Rohde & Schwarz	FSU26	2747	12	2-Nov-2010
Hygrometer	Rotronic	I-1000	2891	12	17-Apr-2010
Attenuator (30dB, 150W)	Narda	769-30	3369	12	19-May-2010
Section 2.5 - Occupied Bandwidth					
True RMS Multimeter	Fluke	79 Series III	411	12	24-Jul-2010
Attenuator (10dB, 10W)	Texscan	HFP-50N	468	12	24-Jun-2010
Cable (1m, sma(m) - sma(m)	Reynolds	262-0248-1000	2406	12	15-Oct-2010
Programmable Power Supply	Iso-tech	IPS 2010	2437	-	O/P Mon
Spectrum Analyser	Rohde & Schwarz	FSU26	2747	12	2-Nov-2010
Hygrometer	Rotronic	I-1000	2891	12	17-Apr-2010
Attenuator (30dB, 150W)	Narda	769-30	3369	12	19-May-2010

Instrument	Manufacturer	Type No.	TE No.	Calibration Period (months)	Calibration Due
Section 2.6 - Emission Mask					
True RMS Multimeter	Fluke	79 Series III	411	12	24-Jul-2010
Attenuator (10dB, 10W)	Texscan	HFP-50N	468	12	24-Jun-2010
Attenuator (10dB, 10W)	Bird	8343-100	478	12	28-Nov-2010
Attenuator (10dB/100W)	Bird	8343-100	495	12	8-Sep-2010
GPS Frequency Standard	Rapco	GPS-804/3	1312	6	4-Mar-2010
Programmable Power Supply	Iso-tech	IPS 2010	2437	-	O/P Mon
Spectrum Analyser	Rohde & Schwarz	FSU26	2747	12	2-Nov-2010
Filter (Hi Pass)	Mini-Circuits	NHP-800	2842	12	17-Nov-2010
Hygrometer	Rotronic	I-1000	2891	12	17-Apr-2010
Attenuator (30dB, 150W)	Narda	769-30	3369	12	19-May-2010
Network Analyser	Rohde & Schwarz	ZVA 40	3548	12	13-Feb-2010
Section 2.7 - Frequency Stability					
True RMS Multimeter	Fluke	79 Series III	411	12	24-Jul-2010
Attenuator (10dB, 10W)	Texscan	HFP-50N	468	12	24-Jun-2010
GPS Frequency Standard	Rapco	GPS-804/3	1312	6	4-Mar-2010
Digital Temperature Indicator	Fluke	51	1385	12	7-Sep-2010
Programmable Power Supply	Iso-tech	IPS 2010	2437	-	O/P Mon
Hygrometer	Rotronic	I-1000	2891	12	17-Apr-2010
Climatic Chamber	TAS	Micro 225	2892	-	O/P Mon
Attenuator (30dB, 150W)	Narda	769-30	3369	12	19-May-2010
Section 2.8 - Transient Frequency Behaviour					
Modulation Analyser	Rohde & Schwarz	FAM	119	-	TU
True RMS Multimeter	Fluke	79 Series III	411	12	24-Jul-2010
Crystal Detector	Hewlett Packard	8470B	484	-	O/P Mon
Power Splitter	Weinschel	1506A	607	-	TU
Signal Generator	Rohde & Schwarz	SMY 01	1109	12	16-Dec-2009
GPS Frequency Standard	Rapco	GPS-804/3	1312	6	4-Mar-2010
Cable (1m, sma(m) - sma(m)	Reynolds	262-0248-1000	2406	12	15-Oct-2010
Programmable Power Supply	Iso-tech	IPS 2010	2437	-	O/P Mon
Oscilloscope	Lecroy	9370	2832	12	20-Oct-2010
Hygrometer	Rotronic	I-1000	2891	12	17-Apr-2010
Attenuator (30dB, 150W)	Narda	769-30	3369	12	19-May-2010

TU – Traceability Unscheduled
OP/Mon – Output monitored using calibrated equipment

3.2 MEASUREMENT UNCERTAINTY

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

Test Discipline	Frequency / Parameter	MU
Radiated Emissions, Bilog Antenna, AOATS	30MHz to 1GHz Amplitude	5.1dB*
Radiated Emissions, Horn Antenna, AOATS	1GHz to 40GHz Amplitude	6.3dB*
Conducted Emissions, LISN	150kHz to 30MHz Amplitude	3.2dB*
Conducted Emissions, ISN	150kHz to 30MHz Amplitude	2.1dB
Substitution Antenna, Radiated Field	30MHz to 18GHz Amplitude	2.6dB
Discontinuous Interference	150kHz to 30MHz Amplitude	3.0dB*
Interference Power	30MHz to 300MHz Amplitude	3.0dB*
Radiated E-Field Susceptibility	26MHz to 2.5GHz Test Amplitude	1.4dB†
Conducted Susceptibility	100kHz to 250MHz Amplitude	1.8dB†
DC Input Ripple Immunity	Current Voltage	0.45% 0.91%
Power Frequency Magnetic Field	50Hz/60Hz Amplitude	0.45%
Magnetic Emissions	9kHz to 30MHz Amplitude	3.4dB*
Magnetic Field/Flux iaw EN 50366	10Hz to 400kHz	2.64%
Harmonics and Flicker	The test was applied using proprietary equipment that meets the requirements of EN 61000-3-2 and EN 61000-3-3	—
Mains Voltage Variations and Interrupts	The test was applied using proprietary equipment that meets the requirements of EN 61000-4-11	—
Fast Transient Burst	The test was applied using proprietary equipment that meets the requirements of EN 61000-4-4	—
Electrostatic Discharge	The test was applied using proprietary equipment that meets the requirements of EN 61000-4-2	—
Surge	The test was applied using proprietary equipment that meets the requirements of EN 61000-4-5	—
Vehicle Transients	The test was applied using proprietary equipment that meets the requirements of ISO 7637-1 and 2	—
Compass Safe Distance	Azimuth Accuracy	0.10°

Worst case error for both Time and Frequency measurement 12 parts in 10^6.

* In accordance with CISPR 16-4
† In accordance with UKAS Lab 34
• In accordance with EN61000-4-6: 2009

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).