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Report On

FCC Testing of the
Sepura Ltd STP8080
In accordance with FCC CFR 47 Part 2 and FCC CFR 47 Part 90 (TETRA)

COMMERCIAL-IN-CONFIDENCE

FCC ID: XX6STP8080

Document 75915053 Report 01 Issue 2 October 2011

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REPORT ON

FCC Testing of the
Sepura Ltd STP8080
In accordance with FCC CFR 47 Part 2 and FCC CFR 47 Part 90 (TETRA)

Document 75915053 Report 01 Issue 2

October 2011

PREPARED FOR

Sepura Ltd
Radio House
St Andrews Road
Cambridge
CB4 1GR

PREPARED BY

Natalie Bennett
Senior Administrator

APPROVED BY

Mark Jenkins
Authorised Signatory

DATED 24 October 2011

This report has been up-issued to Issue 2 to amend clause numbers.

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 2 and FCC CFR 47 Part 90 (TETRA). The sample tested was found to comply with the requirements defined in the applied rules.

Test Engineer(s);

G Lawler B Airs R Henley S Bennett

UKAS TESTING 0141

Product Service

CONTENTS

Product Service

SECTION 1

REPORT SUMMARY

FCC Testing of the
Sepura Ltd STP8080
In accordance with FCC CFR 47 Part 2 and FCC CFR 47 Part 90 (TETRA)

1.1 INTRODUCTION

The information contained in this report is intended to show verification of the FCC Testing of the Sepura Ltd STP8080 to the requirements of FCC CFR 47 Part 2 and FCC CFR 47 Part 90 (TETRA).

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 Ltd
Model Number(s)	STP8080
Serial Number(s)	2PN601020G471E0
Number of Samples Tested	1
Test Specification/Issue/Date	FCC CFR 47 Part 2 and FCC CFR 47 Part 90 (TETRA) (2010 and 2010)
Incoming Release Date	Application Form 07 September 2011
Disposal Reference Number Date	Held Pending Disposal Not Applicable Not Applicable
Order Number Date	319138/T0201 10 August 2011
Start of Test	4 September 2011
Finish of Test	20 September 2011
Name of Engineer(s)	G Lawler B Airs R Henley S Bennett
Related Document(s)	ANSI C63.4: 2009

Product Service

1.2 BRIEF SUMMARY OF RESULTS

A brief summary of the tests carried out in accordance with FCC CFR 47 Part 2 and FCC CFR 47 Part 90 (TETRA) is shown below.

Section	Spec Clause	Test Description	Result	Comments/Base Standard
Tetra - Band 1				
2.1	2.1046 and 90.205 (k)	Effective Radiated Power	Pass	
2.2	2.1047 and 90.207	Type of Emissions	Pass	
2.3	2.1049 and 90.209	Bandwidth Limitations	Pass	
2.4	2.1046 and 90.210	Power and Antenna Height Limits	Pass	
2.5	2.1051 and 90.210 (g)(1)(2)	Emission Mask	Pass	
2.6	2.1055 and 90.213	Frequency Stability	Pass	
Tetra - Band 1 with car kit and accessories				
2.1	2.1046 and 90.205 (k)	Effective Radiated Power	Pass	
2.5	2.1051 and 90.210 (g)(1)(2)	Emission Mask	Pass	

Product Service

Section	Spec Clause	Test Description	Result	Comments/Base Standard
Tetra - Band 2				
2.1	2.1046 and 90.205 (k)	Effective Radiated Power	Pass	
2.2	2.1047 and 90.207	Type of Emissions	Pass	
2.3	2.1049 and 90.209	Bandwidth Limitations	Pass	
2.4	2.1046 and 90.210	Power and Antenna Height Limits	Pass	
2.5	2.1051 and 90.210 (g)(1)(2)	Emission Mask	Pass	
2.6	2.1055 and 90.213	Frequency Stability	Pass	
Tetra - Band 2 with car kit and accessories				
2.1	2.1046 and 90.205 (k)	Effective Radiated Power	Pass	
2.5	2.1051 and 90.210 (g)(1)(2)	Emission Mask	Pass	

Product Service

1.3 APPLICATION FORM

APPLICANT'S DETAILS	
COMPANY NAME :	**SEPURA plc**
ADDRESS :	**Radio House** **St Andrews Road** **Cambridge** **CB4 1GR**
NAME FOR CONTACT PURPOSES : **Bob Allen**	
TELEPHONE NO **01223 877291**	FAX NO: …… E-MAIL **bob.allen@sepura.com**

EQUIPMENT INFORMATION

Model name/number	**STP8000**	Identification/Part number	**STP8080**
Hardware Version	Revision B	Software Version	V10
Manufacturer	Plexus Melexs	Country of Origin	Romania Austria
FCC ID	**XX6STP8080**	Industry Canada ID	……..……

Technical description (a brief description of the intended use and operation)

Tetra hand portable for TMO, DMO and repeater use. Fitted with Bluetooth and GPS Modules

Supply Voltage:

[ ]	AC mains	State AC voltage …… V	and AC frequency …… Hz
[ ]	DC (external)	State DC voltage …… V	and DC current …….. A
[X]	DC (internal)	State DC voltage **7.4 V**	and Battery type **LI Polymer**

Frequency characteristics:

Transmitter Frequency range **809 MHz to 824 MHz** Channel spacing **25KHz**
854 MHz to 869 MHz (if channelized)

Receiver Frequency range **854 MHz to 869 MHz** Channel spacing **25KHz**
(if different)
(if channelized)

Designated TX test frequencies:
Bottom: **809.025 MHz** Middle: **816.525 MHz** Top: **823.975 MHz**

Designated TX test frequencies:
Bottom: **854.025 MHz** Middle: **861.525 MHz** Top: **868.975 MHz**

Designated RX test frequencies:
Bottom: **854.025 MHz** Middle: **861.525 MHz** Top: **868.975 MHz**

Intermediate Frequencies : **69.25 MHz**
Highest Internally Generated Frequency : **3144.84 MHz on GPS Chip**

Power characteristics:
Maximum transmitter power **1.8W** Minimum transmitter power …… W
(if variable)

[ ] Continuous transmission
[X] Intermittent transmission (**Continuous transmission 1 slot in 4 transmission)**
If intermittent, can transmitter be set to continuous transmit test mode?
Yes with care at 4 slots in 4, for emission mask only

Antenna characteristics:

[X]	Antenna connector		State impedance **50 ohm**
[ ]	Temporary antenna connector		State impedance …… ohm
[ ]	Integral antenna		State gain …… dBi

Product Service

Modulation characteristics:			
[ ]	Amplitude	**[X]**	Other
[ ]	Frequency	Details:	**Pi/4DQPSK**
[ ]	Phase		(GMSK, QSPK etc)
Can the transmitter operate un-modulated?		**Yes simulated**	
ITU Class of emission:	**25K0Q1D**		
Battery/Power Supply			
Model name/number	……..	Identification/Part number	……..
Manufacturer	……..	Country of Origin	……..
Ancillaries (if applicable)	**See Attached Sheet**		
Model name/number	……..	Identification/Part number	……..
Manufacturer	……..	Country of Origin	……..
Extreme conditions:			
Maximum temperature	**55ºC**	Minimum temperature	**-20ºC**
Maximum supply voltage	**7.4V**	Minimum supply voltage	**6.4 V**

I hereby declare that I am entitled to sign on behalf of the applicant and that the information supplied is correct and complete.

Signature :

Name : Bob Allen

Position held : Test Authority

Date : 07 September 2011

1.4 PRODUCT INFORMATION

1.4.1 Technical Description

The Equipment Under Test (EUT) was a Sepura Ltd STP8080. A full technical description can be found in the manufacturer's documentation.

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.

The EUT was powered from a 7.4 V DC supply.

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

Modification 0 - No modifications were made to the test sample during testing.

Product Service

SECTION 2

TEST DETAILS

FCC Testing of the
Sepura Ltd STP8080
In accordance with FCC CFR 47 Part 2 and FCC CFR 47 Part 90 (TETRA)

2.1 EFFECTIVE RADIATED POWER

2.1.1 Specification Reference

FCC CFR 47 Part 2 and FCC CFR 47 Part 90 (TETRA), Clause 2.1046 and 90.205 (k)

2.1.2 Equipment Under Test and Modification State

STP8080 S/N: 2PN601020G471E0 - Modification State 0

2.1.3 Date of Test

5 September 2011 & 6 September 2011

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 Procedure

Measurements of the fundamental from the EUT were obtained with the Measurement Antenna in both Horizontal and Vertical Polarisations. The fundamental frequency was maximised by adjusting the antenna height, antenna polarisation and turntable azimuth. A peak detector was used with the trace set to max hold. The maximum result was recorded.

The EUT was then removed from the chamber and replaced with a substitution antenna. Using a signal generator the level was adjusted to achieve the same value on the measuring instrument as previously recorded with the EUT. The final result (ERP) was determined by a calculation using the signal generator level, antenna gain and cable loss.

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

2.1.6 Environmental Conditions

Ambient Temperature	22.4 - 22.5°C
Relative Humidity	46.0 - 53.0%

Product Service

2.1.7 Test Results

Tetra - Band 1

7.4 V DC

Frequency	Result (dBm)	Result (W)
809.025 MHz	37.3	5.37
816.525 MHz	37.0	5.01
823.975 MHz	36.8	4.79

Limit

The maximum output power of the transmitter for mobile stations is 100 watts (20 dBw).

Tetra - Band 2

7.4 V DC

Frequency	Result (dBm)	Result (W)
854.025 MHz	37.9	6.17
861.525 MHz	38.0	6.31
868.975 MHz	38.0	6.31

Limit

The maximum output power of the transmitter for mobile stations is 100 watts (20 dBw).

Tetra - Band 1 with car kit and accessories

7.4 V DC

Frequency	Result (dBm)	Result (W)
809.025 MHz	30.6	1.15
816.525 MHz	31.2	1.32
823.975 MHz	29.8	0.95

Limit

The maximum output power of the transmitter for mobile stations is 100 watts (20 dBw).

Tetra - Band 2 with car kit and accessories

7.4 V DC

Frequency	Result (dBm)	Result (W)
854.025 MHz	31.3	1.35
861.525 MHz	30.9	1.23
868.975 MHz	30.5	1.12

Limit

The maximum output power of the transmitter for mobile stations is 100 watts (20 dBw).

2.2 TYPE OF EMISSIONS

2.2.1 Specification Reference

FCC CFR 47 Part 2 and FCC CFR 47 Part 90 (TETRA), Clause 2.1047 and 90.207

2.2.2 Equipment Under Test and Modification State

STP8080 S/N: 2PN601020G471E0 - Modification State 0

2.2.3 Date of Test

5 September 2011

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 Procedure

Using a spectrum analyser and attenuator(s), the output power of the EUT was measured at the antenna terminals.

The EUT supports WCDMA and was tested in this mode of operation.

2.2.6 Environmental Conditions

Ambient Temperature	21.9°C
Relative Humidity	55.5%

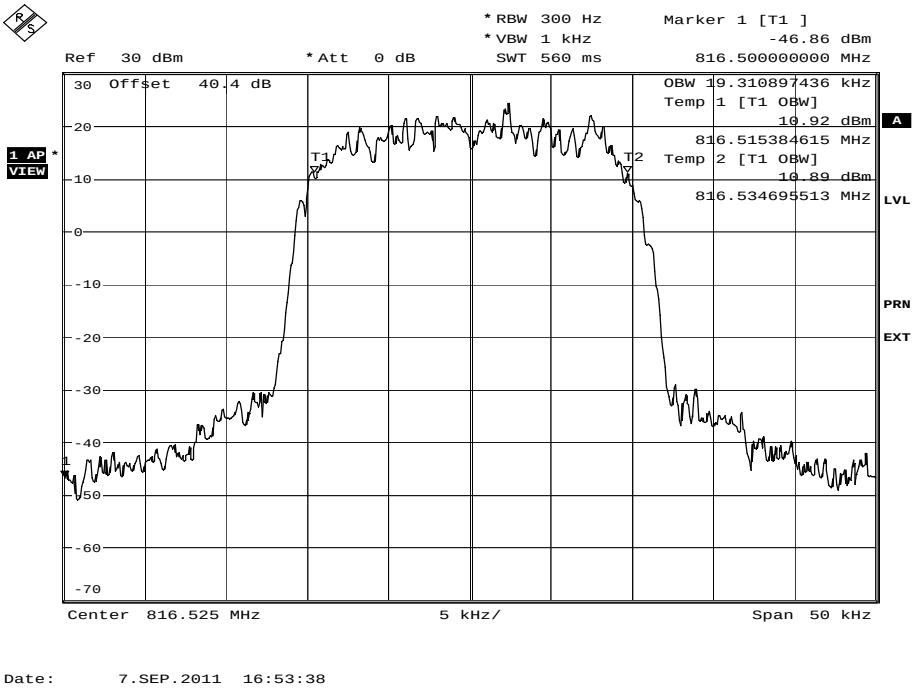
Product Service

2.2.7 Test Results

Tetra - Band 1

7.4 V DC Supply

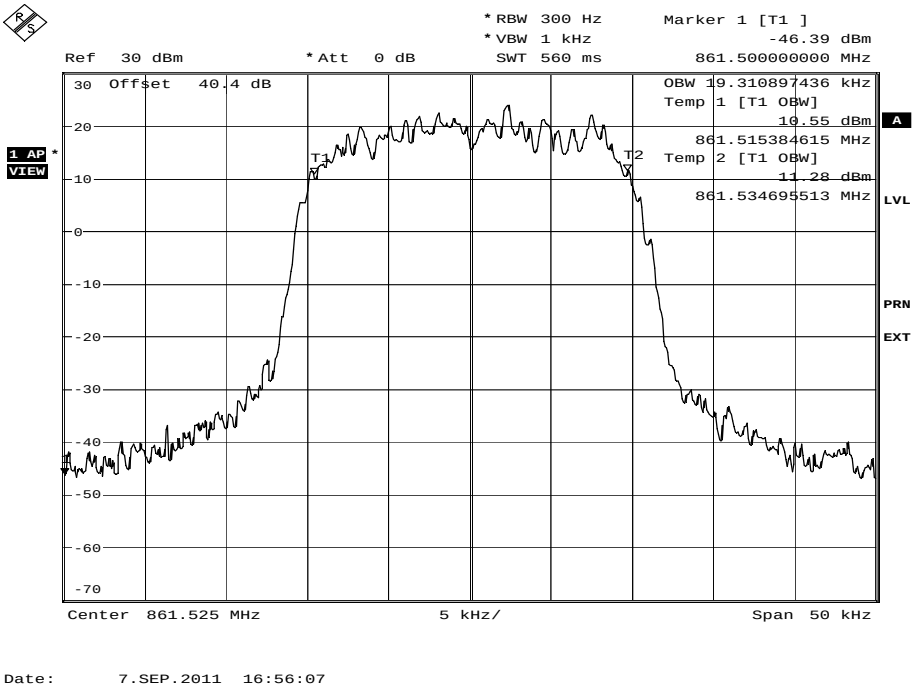
816.525 MHz



Tetra - Band 2

7.4 V DC Supply

861.525 MHz



2.3 BANDWIDTH LIMITATIONS

2.3.1 Specification Reference

FCC CFR 47 Part 2 and FCC CFR 47 Part 90 (TETRA), Clause 2.1049 and 90.209

2.3.2 Equipment Under Test and Modification State

STP8080 S/N: 2PN601020G471E0 - Modification State 0

2.3.3 Date of Test

5 September 2011 & 8 September 2011

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

The EUT was transmitting at maximum power, with modulation. Using a resolution bandwidth of 10 kHz and a video bandwidth of 30 kHz, the -26 dBc points were established and the emission bandwidth determined.

The plot of the following pages shows the resultant display from the Spectrum Analyser.

2.3.6 Environmental Conditions

Ambient Temperature	21.9°C
Relative Humidity	52.5 - 55.5%

Product Service

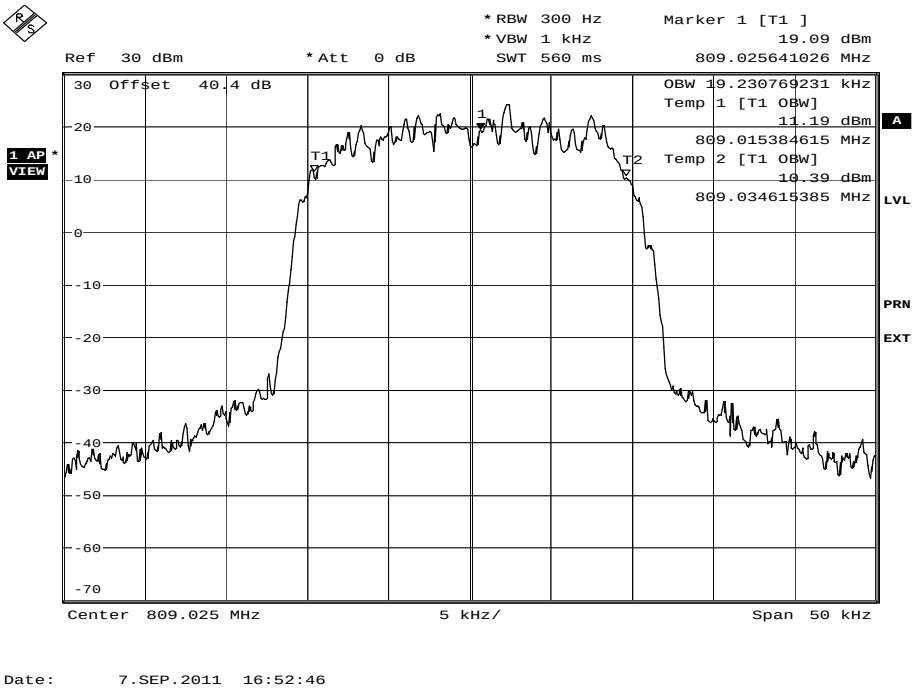
2.3.7 Test Results

Tetra - Band 1

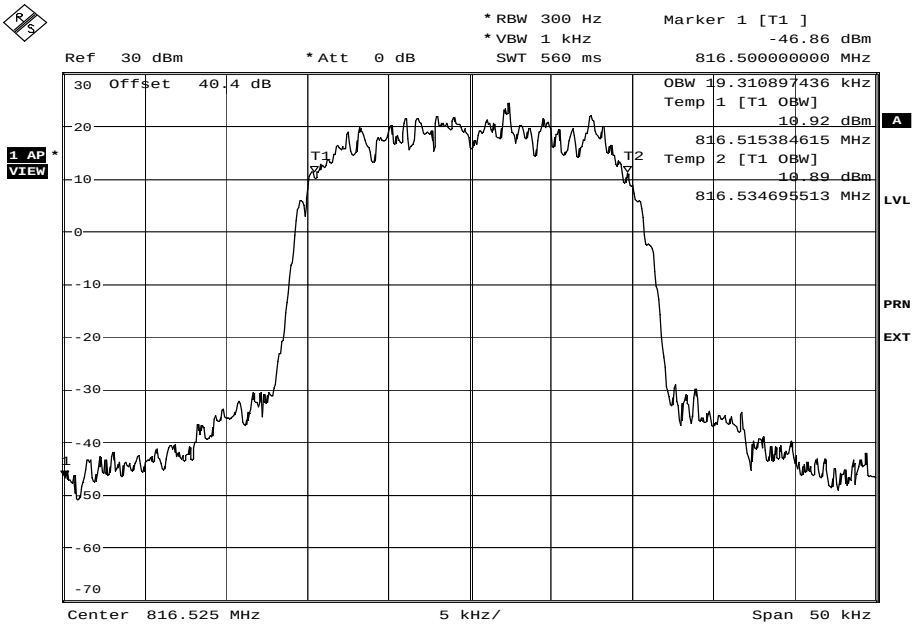
7.4 V DC Supply

Frequency	Occupied Bandwidth (kHz)
809.025 MHz	19.230765
816.525 MHz	19.310897
823.975 MHz	19.310897

809.025 MHz



816.525 MHz



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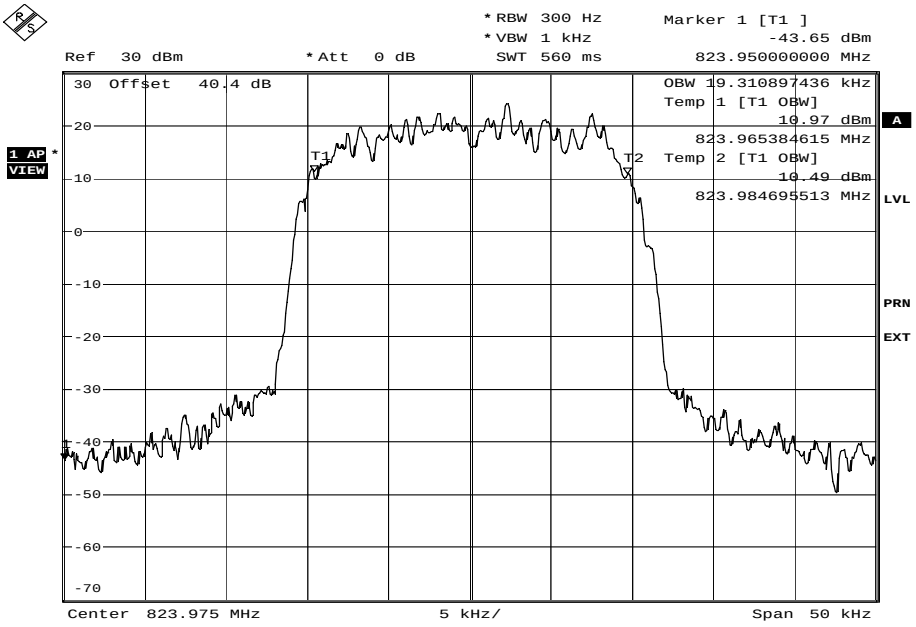
823.975 MHz



Date: 7.SEP.2011 16:54:29

Limit

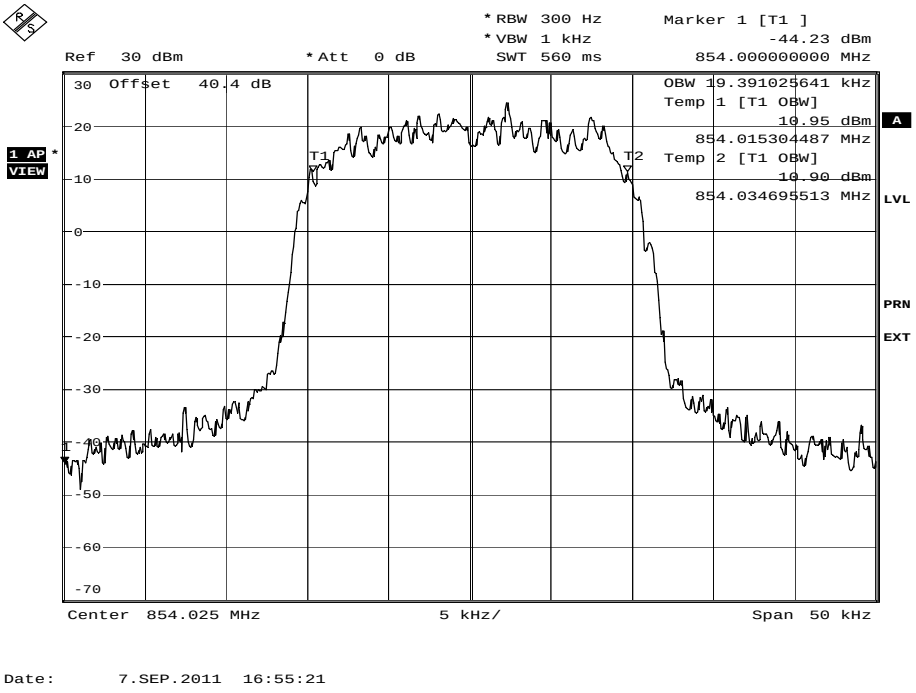
The authorised bandwidth shall not exceed 20 kHz.

Tetra - Band 2

7.4 V DC Supply

Frequency	Occupied Bandwidth (kHz)
854.025 MHz	19.391026
861.525 MHz	19.310897
868.975 MHz	19.391026

854.025 MHz



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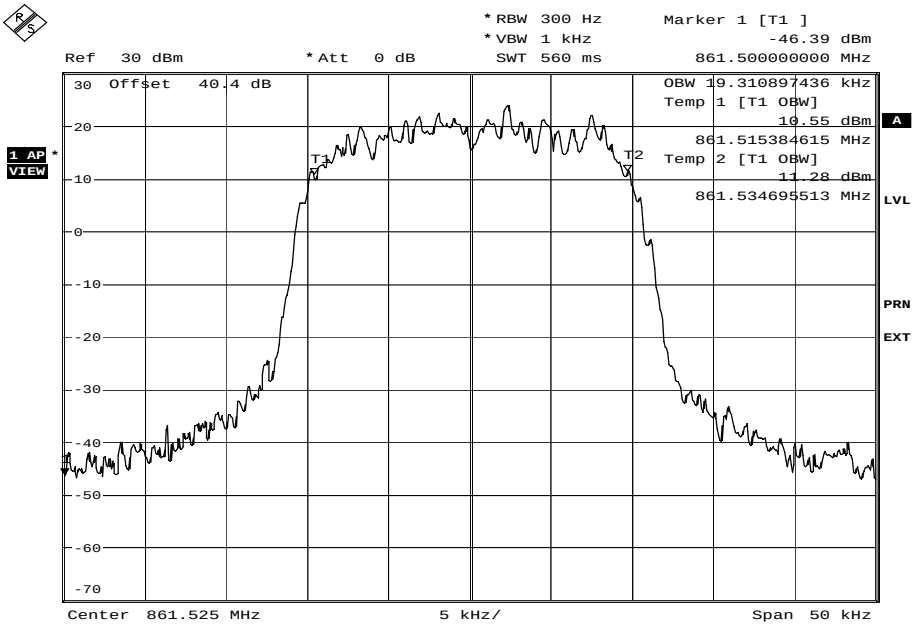
861.525 MHz



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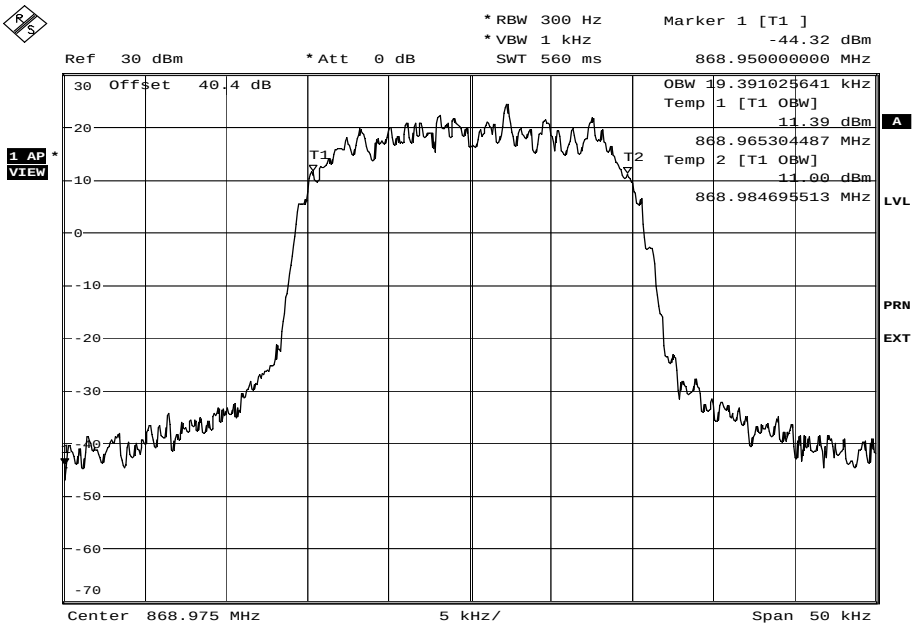
868.975 MHz



Date: 7.SEP.2011 16:57:00

Limit

The authorised bandwidth shall not exceed 20 kHz.

2.4 POWER AND ANTENNA HEIGHT LIMITS

2.4.1 Specification Reference

FCC CFR 47 Part 2 and FCC CFR 47 Part 90 (TETRA), Clause 2.1046 and 90.210

2.4.2 Equipment Under Test and Modification State

STP8080 S/N: 2PN601020G471E0 - Modification State 0

2.4.3 Date of Test

6 September 2011

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 Procedure

Using a spectrum analyser and attenuator(s), the output power of the EUT was measured at the antenna terminals.

The EUT supports WCDMA and was tested in this mode of operation.

2.4.6 Environmental Conditions

Ambient Temperature	22.0°C
Relative Humidity	64.0%

Product Service

2.4.7 Test Results

Tetra - Band 1

7.4 V DC
809.025 MHz

Result (dBm)	Result (W)
32.66	1.845

816.525 MHz

Result (dBm)	Result (W)
32.57	1.807

823.975 MHz

Result (dBm)	Result (W)
32.48	1.770

Limit

	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 39 dBu 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.

Tetra - Band 2

7.4 V DC

854.025 MHz

Result (dBm)	Result (W)
32.55	1.799

861.525 MHz

Result (dBm)	Result (W)
32.55	1.799

868.975 MHz

Result (dBm)	Result (W)
32.53	1.791

Limit

	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 39 dBu 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.

2.5 EMISSION MASK

2.5.1 Specification Reference

FCC CFR 47 Part 2 and FCC CFR 47 Part 90 (TETRA), Clause 2.1051 and 90.210 (g)(1)(2)

2.5.2 Equipment Under Test and Modification State

STP8080 S/N: 2PN601020G471E0 - Modification State 0

2.5.3 Date of Test

4 September 2011, 5 September 2011, 6 September 2011 & 14 September 2011

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

Using a spectrum analyser and attenuator(s), the output power of the EUT was measured at the antenna terminals.

The EUT supports WCDMA and was tested in this mode of operation.

2.5.6 Environmental Conditions

Ambient Temperature	22.0 - 23.0°C
Relative Humidity	42.5 - 65.2%

Product Service

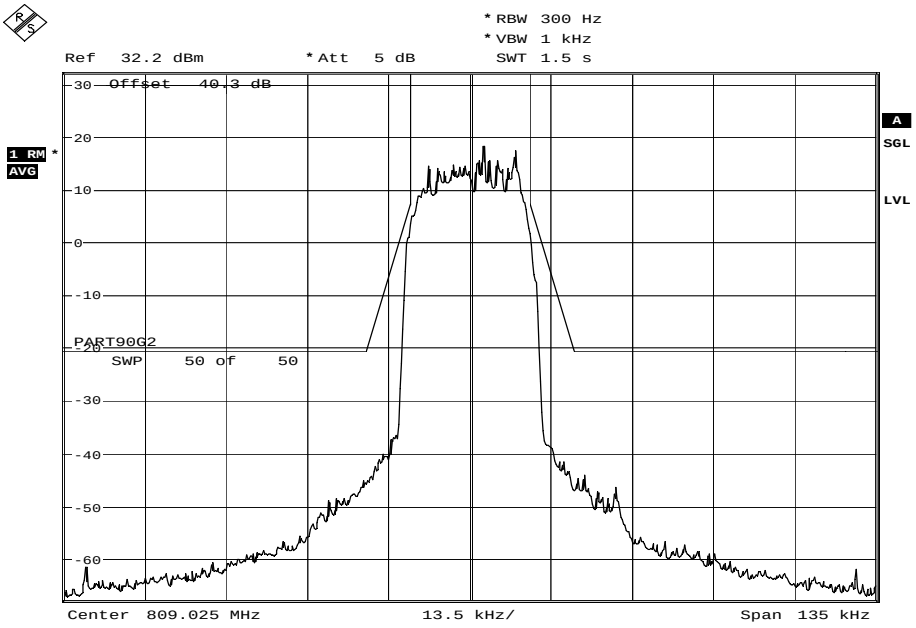
2.5.7 Test Results

Tetra - Band 1

7.4 V DC

Conducted

809.025 MHz



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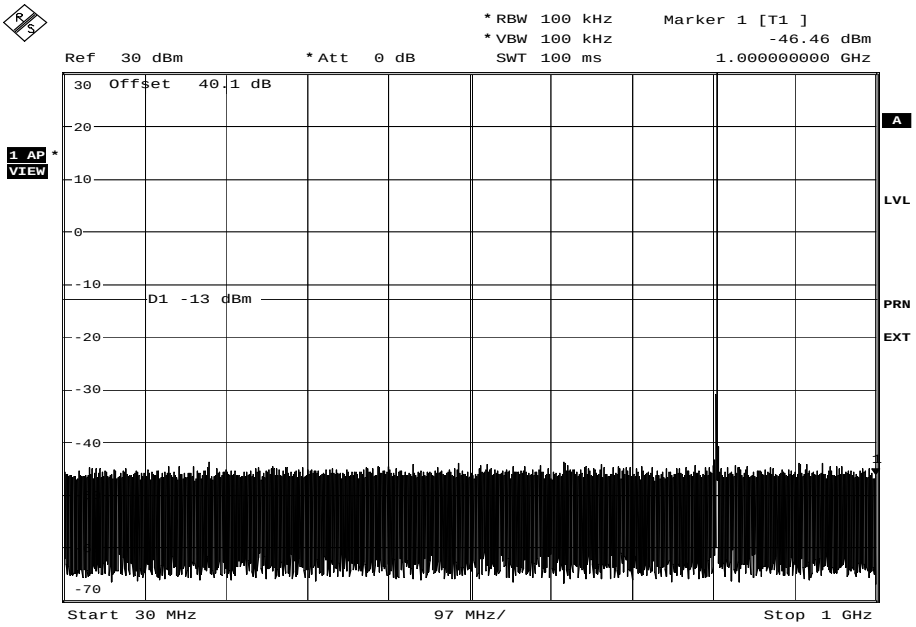
30 MHz to 1 GHz



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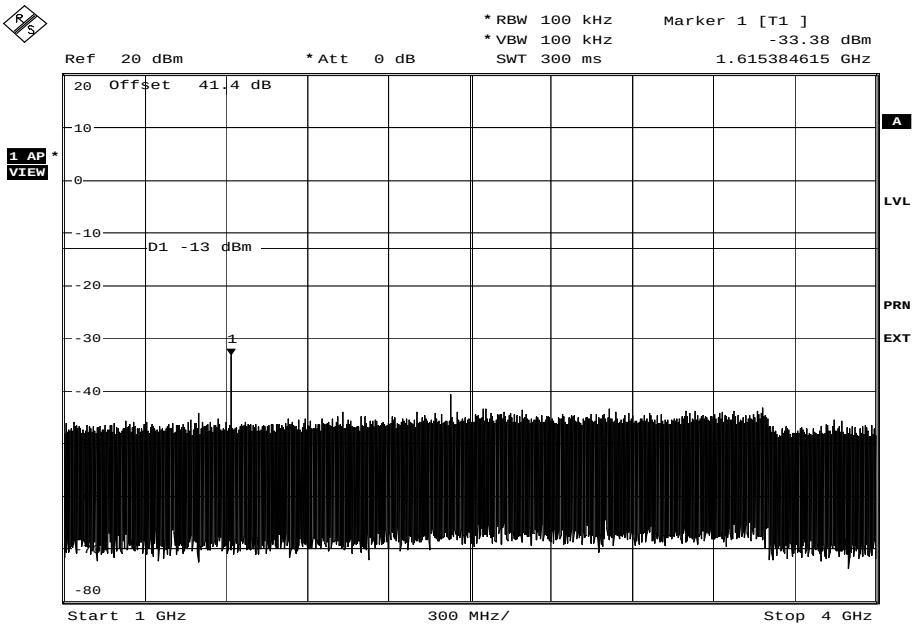
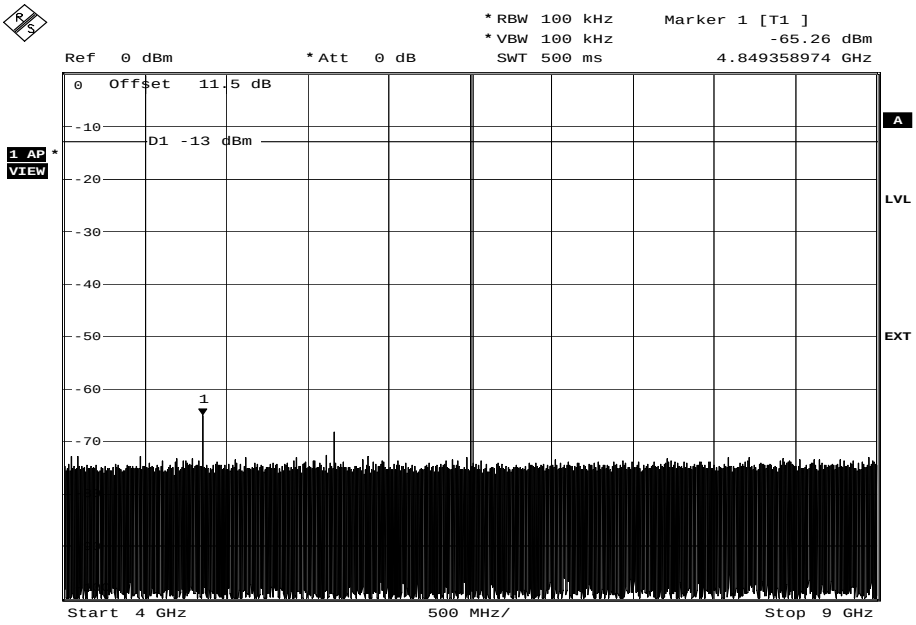
1 GHz to 4 GHz



Date: 6.SEP.2011 16:53:03

4 GHz to 9 GHz



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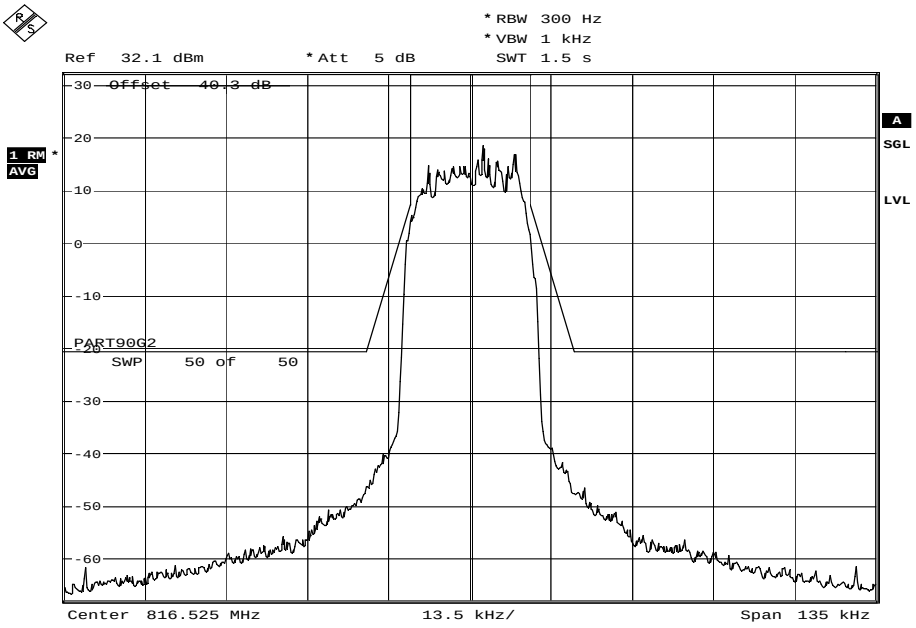
816.525 MHz



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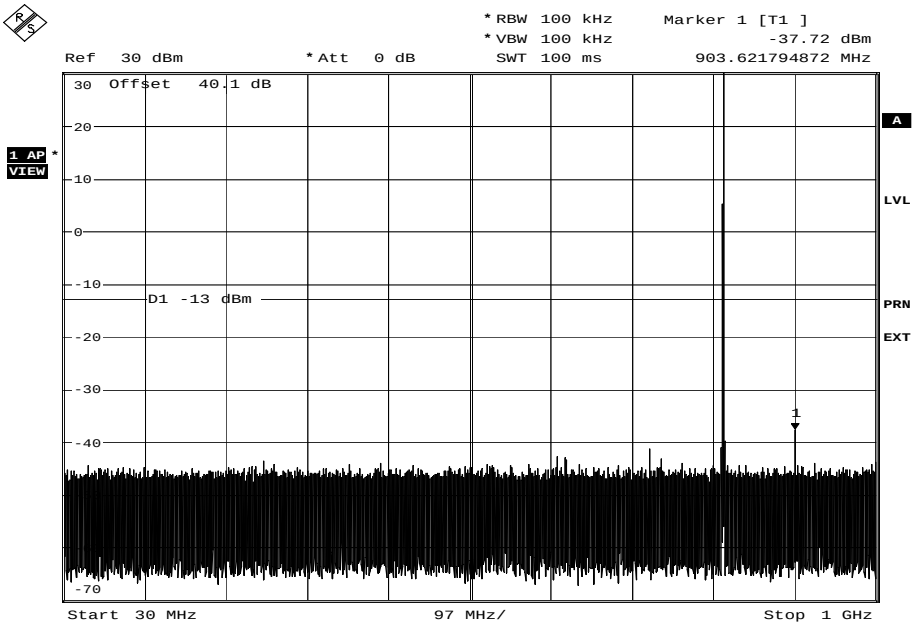
30 MHz to 1 GHz



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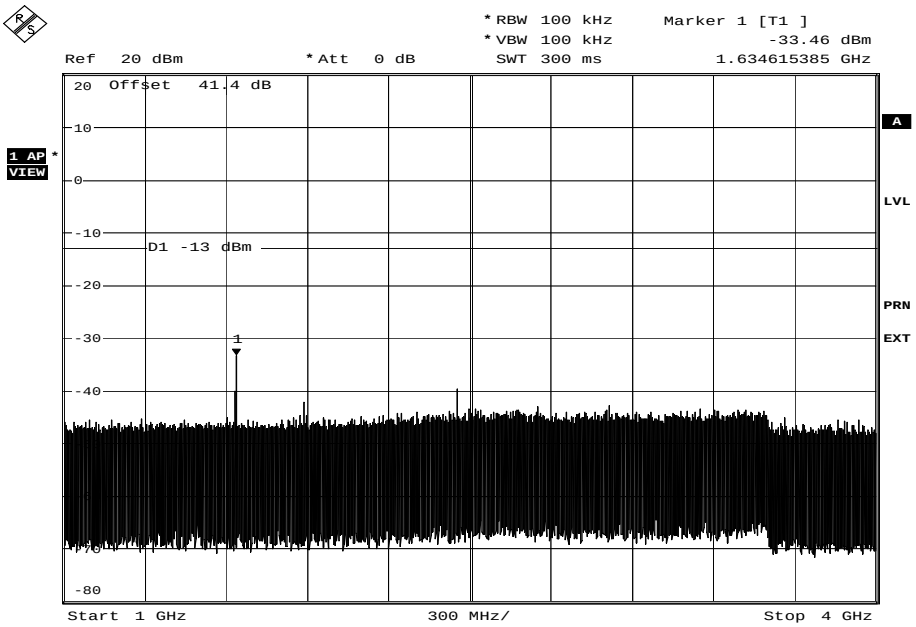
1 GHz to 4 GHz



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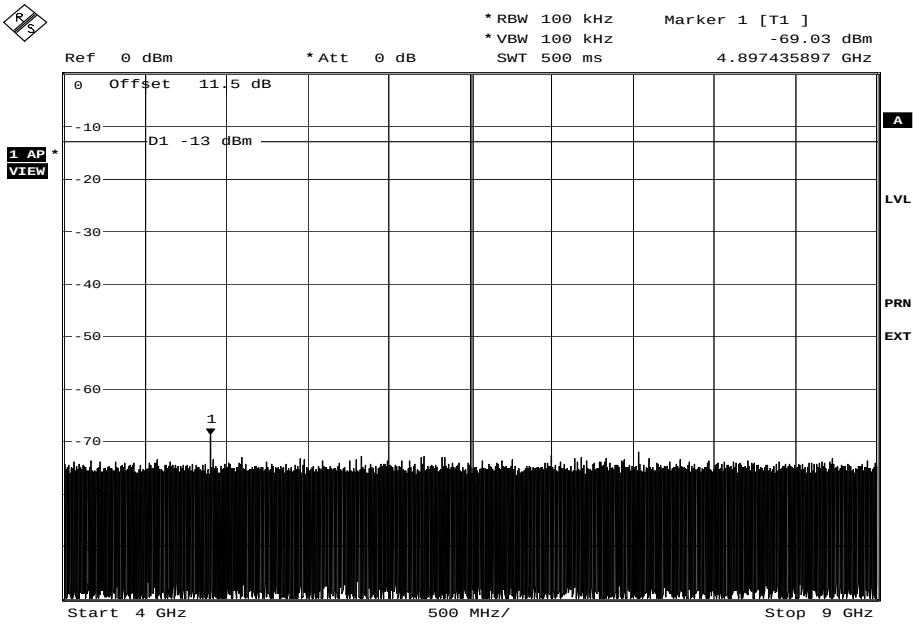
4 GHz to 9 GHz



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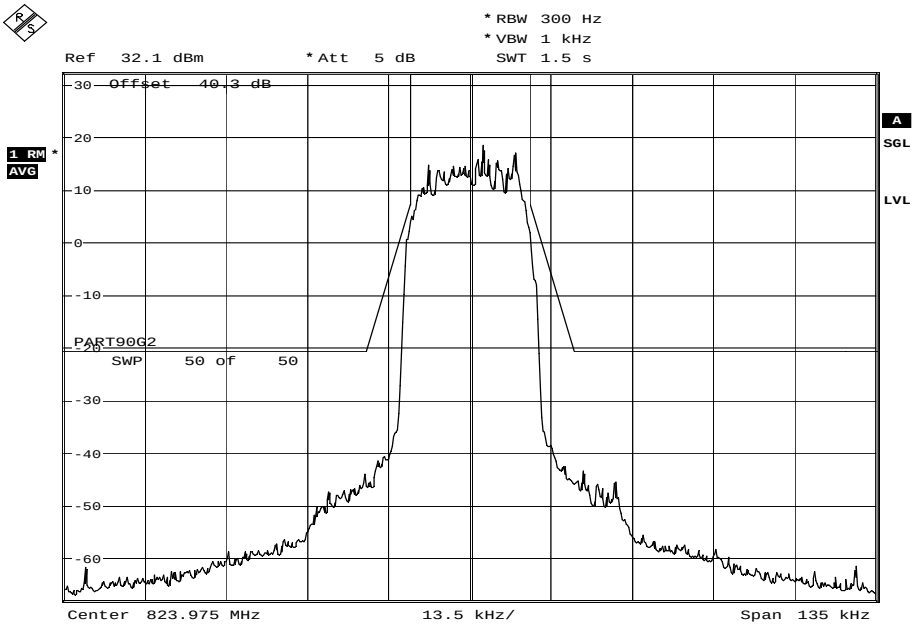
823.975 MHz



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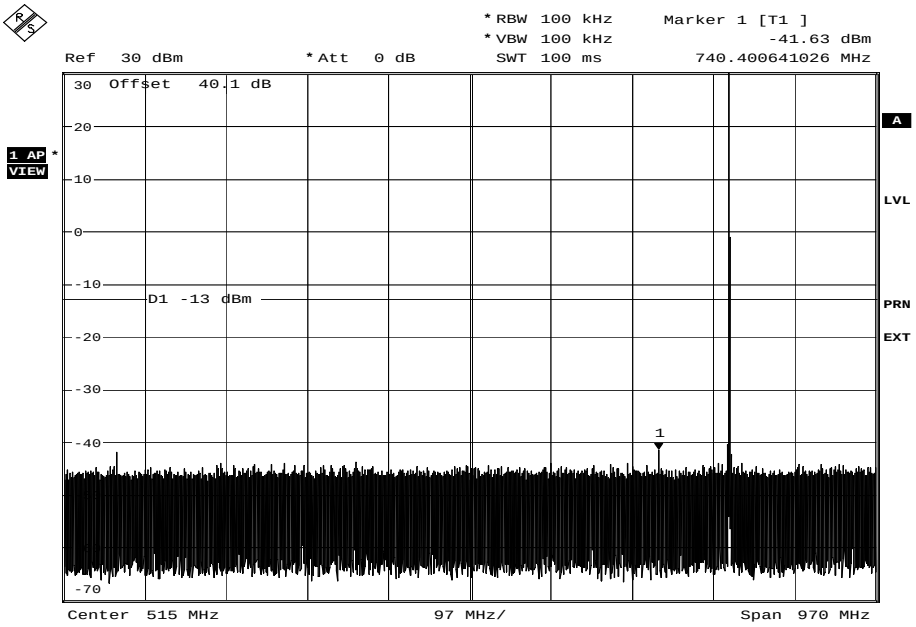
30 MHz to 1 GHz



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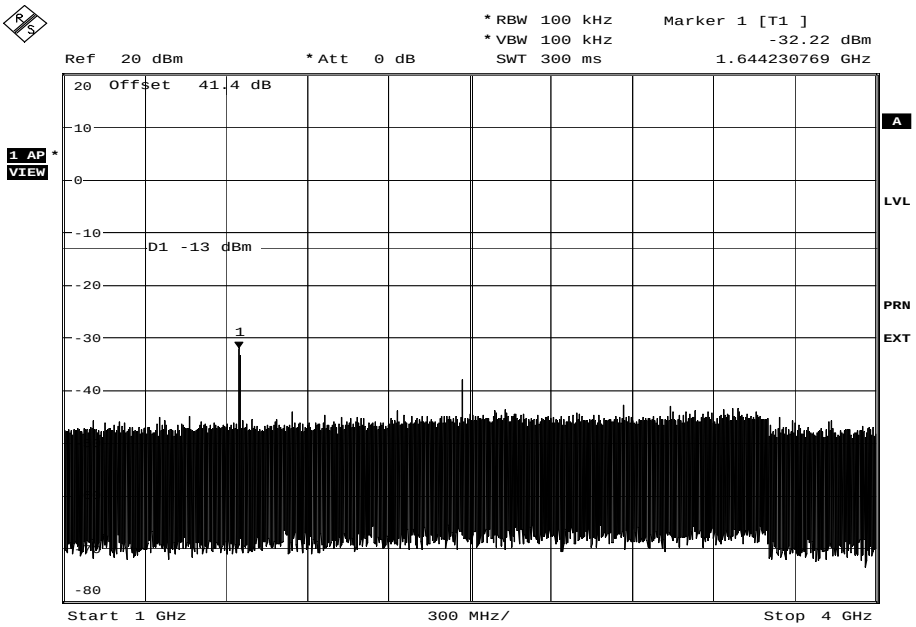
1 GHz to 4 GHz



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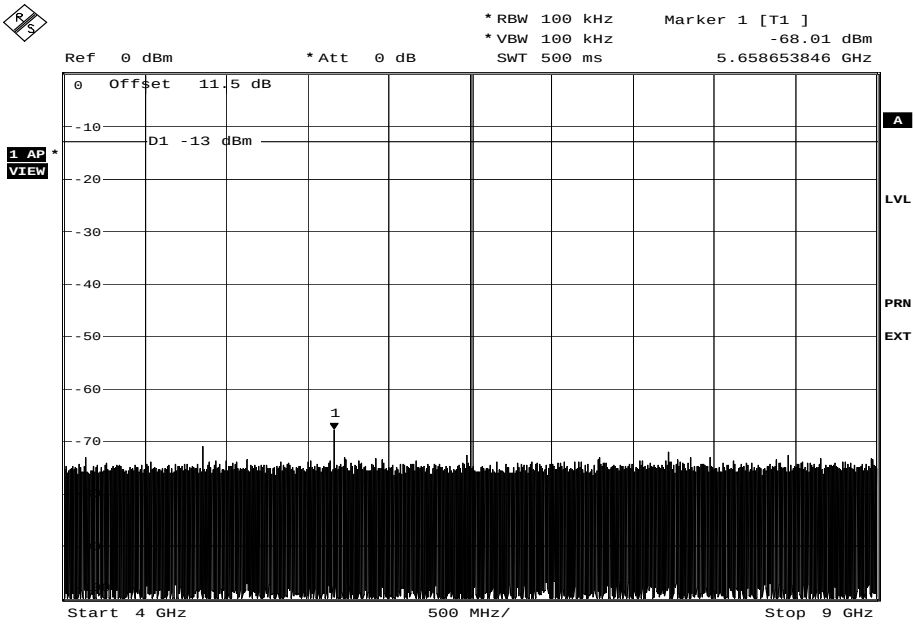
4 GHz to 9 GHz



Date: 6.SEP.2011 16:18:05

Limit

Emission Mask G. For transmitters that are not equipped with an audio low-pass filter, the power of any emission must be attenuated below the unmodulated carrier power (P) as follows:

(1) On any frequency removed from the center of the authorized bandwidth by a displacement frequency (fd in kHz) of more than 10 kHz, but no more than 250 percent of the authorized bandwidth: At least 116 log (fd/6.1) dB, or 50 + 10 log (P) dB, or 70 dB, whichever is the lesser attenuation;

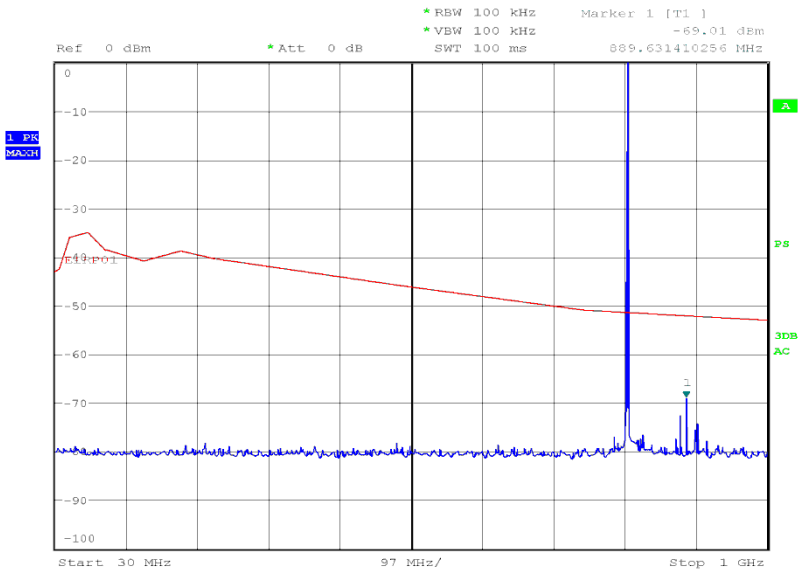
(2) On any frequency removed from the center of the authorized bandwidth by more than 250 percent of the authorized bandwidth: At least 43 + 10 log (P) dB.

Product Service

Radiated

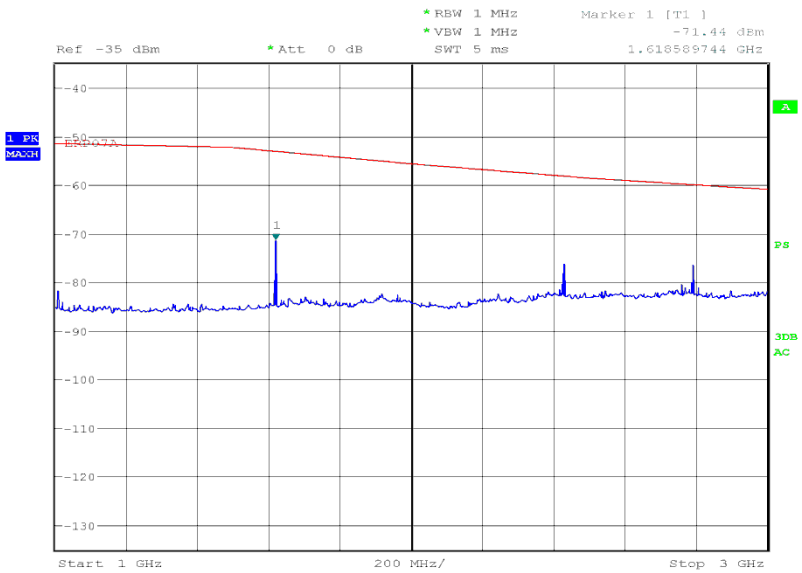
809.025 MHz

30 MHz to 1GHz



Date: 5.SEP.2011 18:31:25

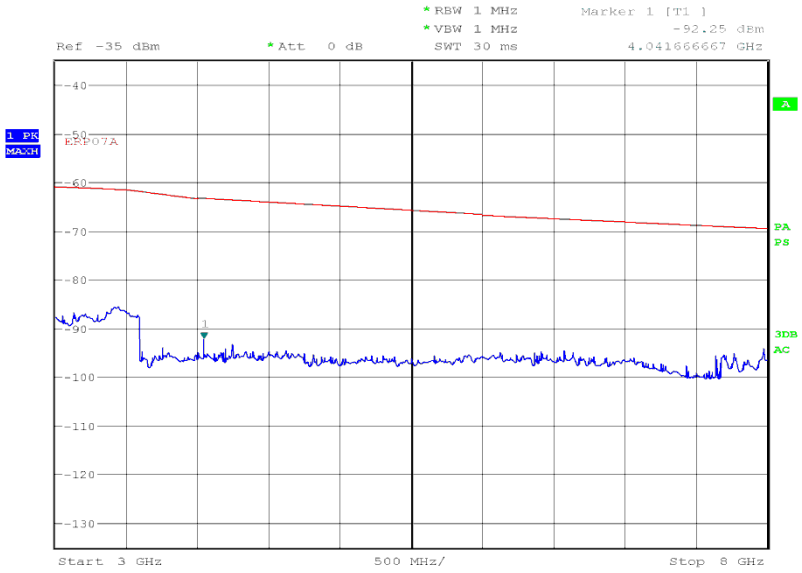
1 GHz to 3 GHz



Date: 5.SEP.2011 22:10:50

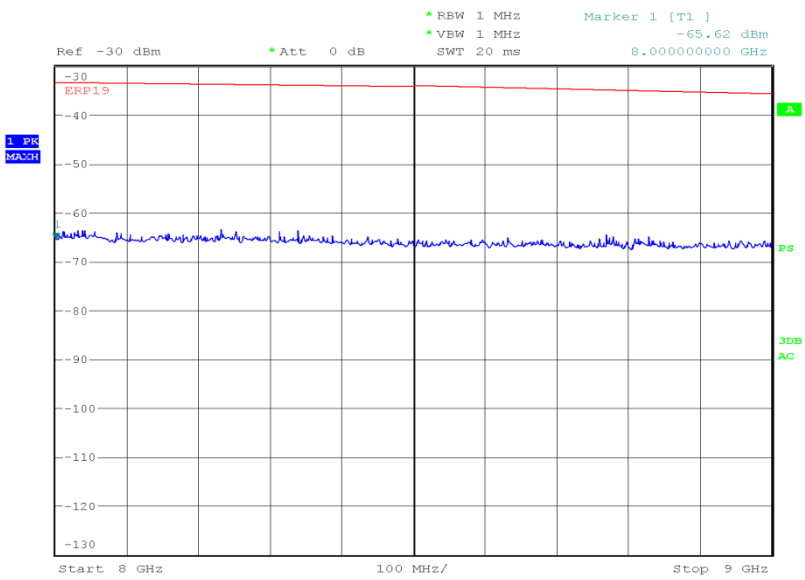
Product Service

3 GHz to 8 GHz



Date: 5.SEP.2011 22:02:56

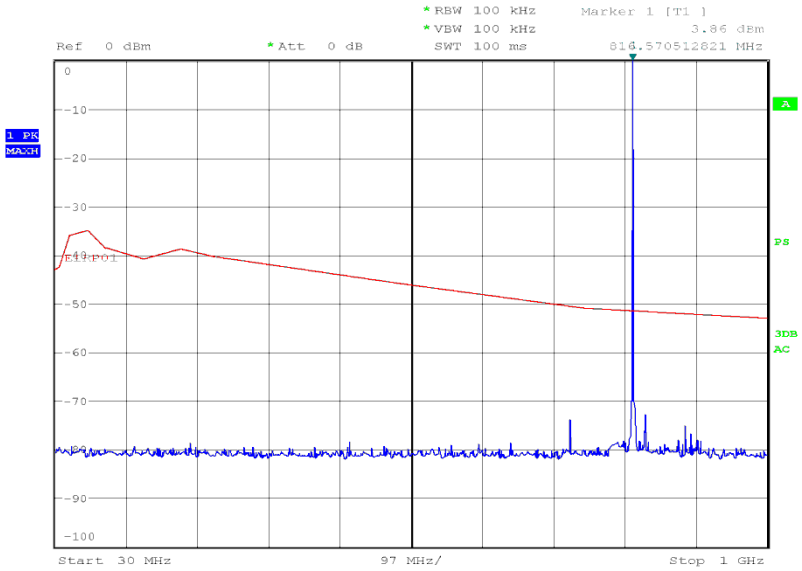
8 GHz to 9 GHz



Date: 5.SEP.2011 23:45:51

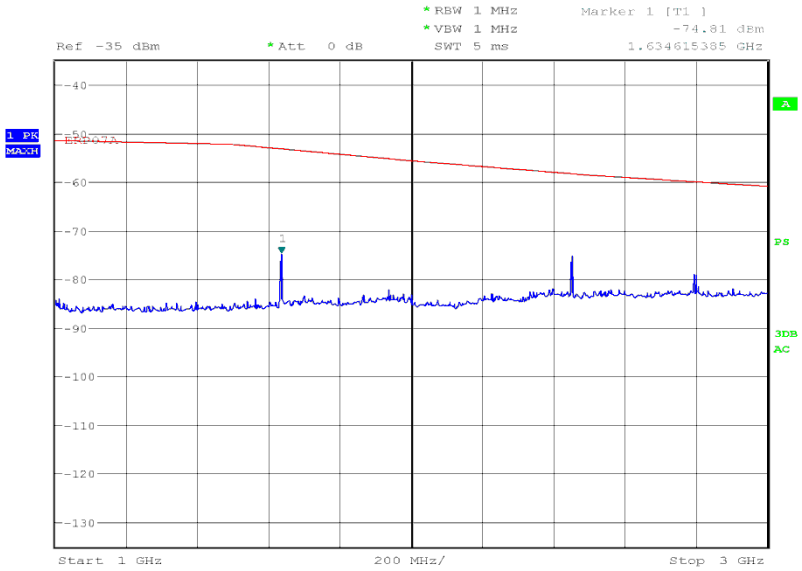
816.525 MHz

30 MHz to 1GHz



Date: 5.SEP.2011 19:06:19

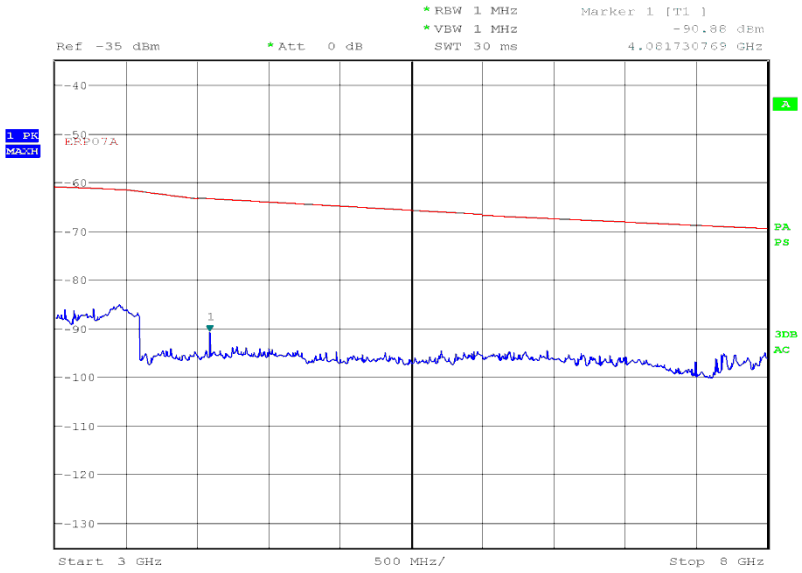
1 GHz to 3 GHz



Date: 5.SEP.2011 22:14:49

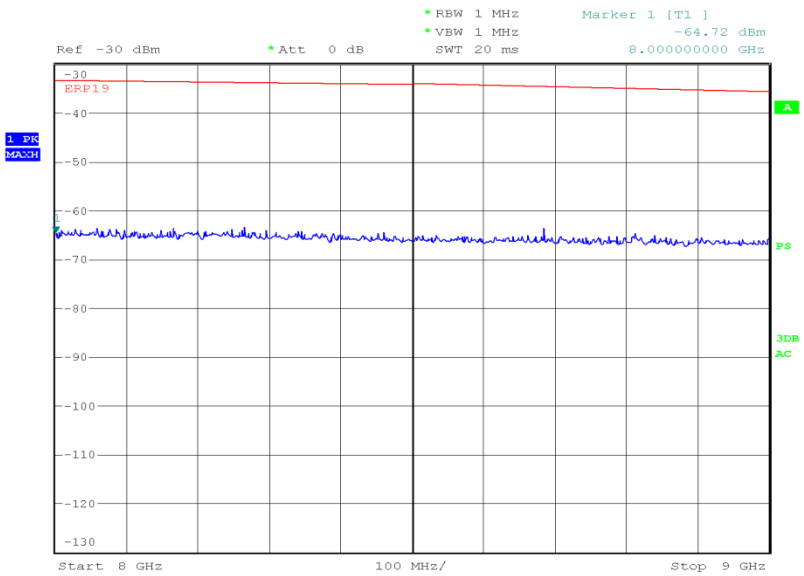
Product Service

3 GHz to 8 GHz



Date: 5.SEP.2011 22:18:58

8 GHz to 9 GHz

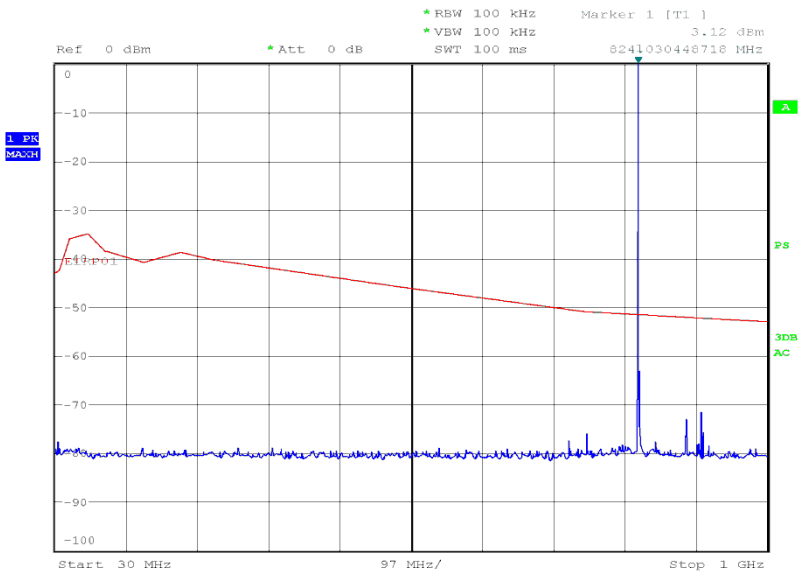


Date: 5.SEP.2011 23:48:44

Product Service

823.975 MHz

30 MHz to 1 GHz



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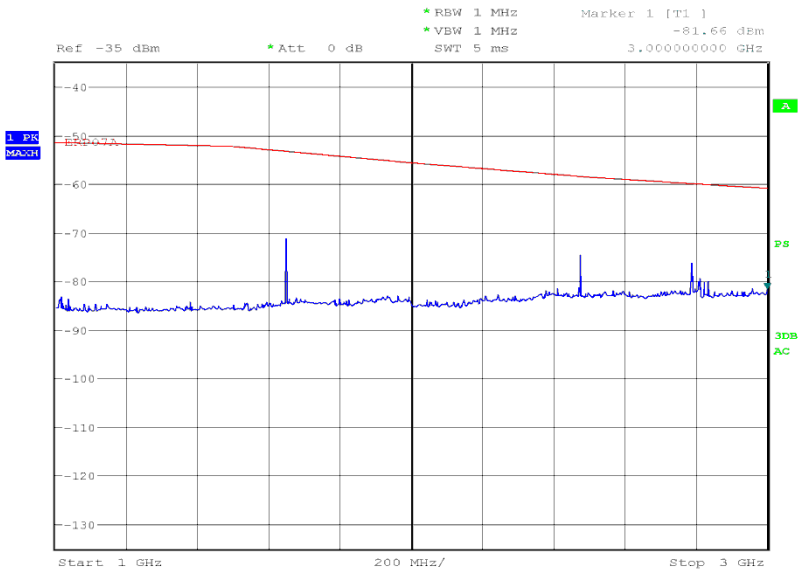
1 GHz to 3 GHz



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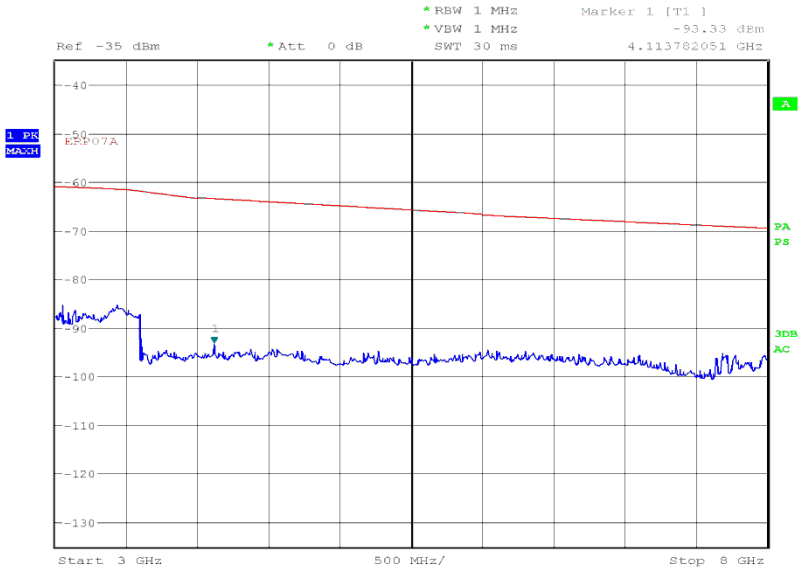
3 GHz to 8 GHz



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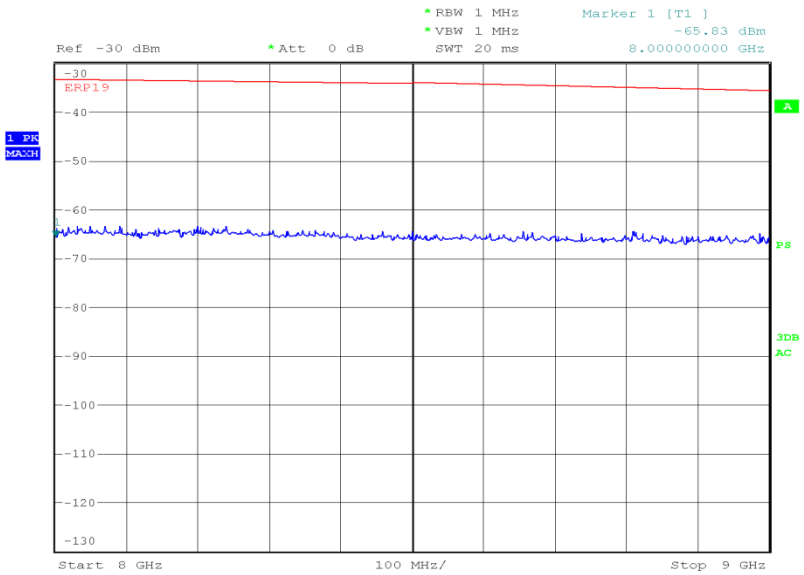
8 GHz to 9 GHz



Date: 5.SEP.2011 23:53:24

Limit

Emission Mask G. For transmitters that are not equipped with an audio low-pass filter, the power of any emission must be attenuated below the unmodulated carrier power (P) as follows:

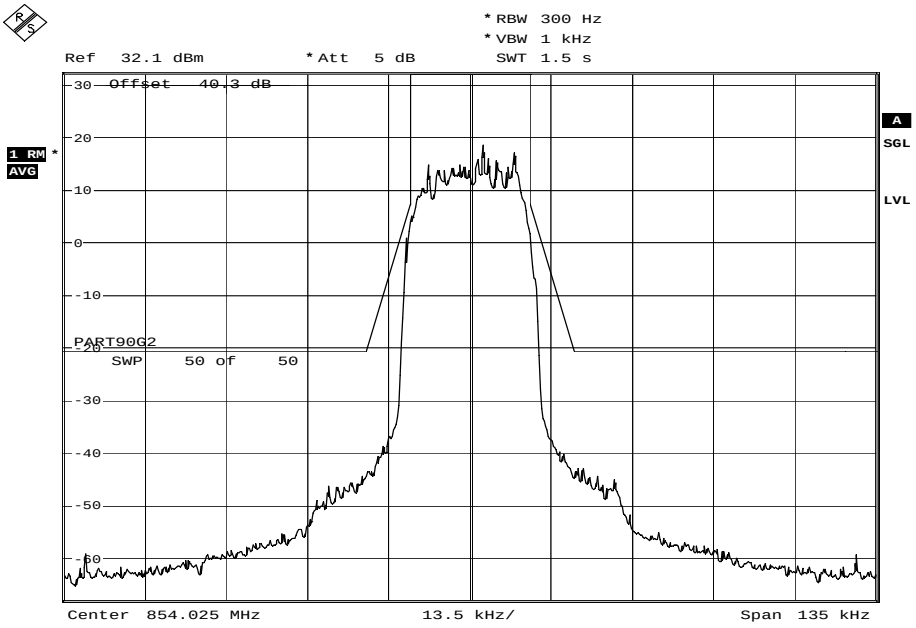
(2) On any frequency removed from the center of the authorized bandwidth by more than 250 percent of the authorized bandwidth: At least 43 + 10 log (P) dB.

Tetra - Band 2

7.4 V DC

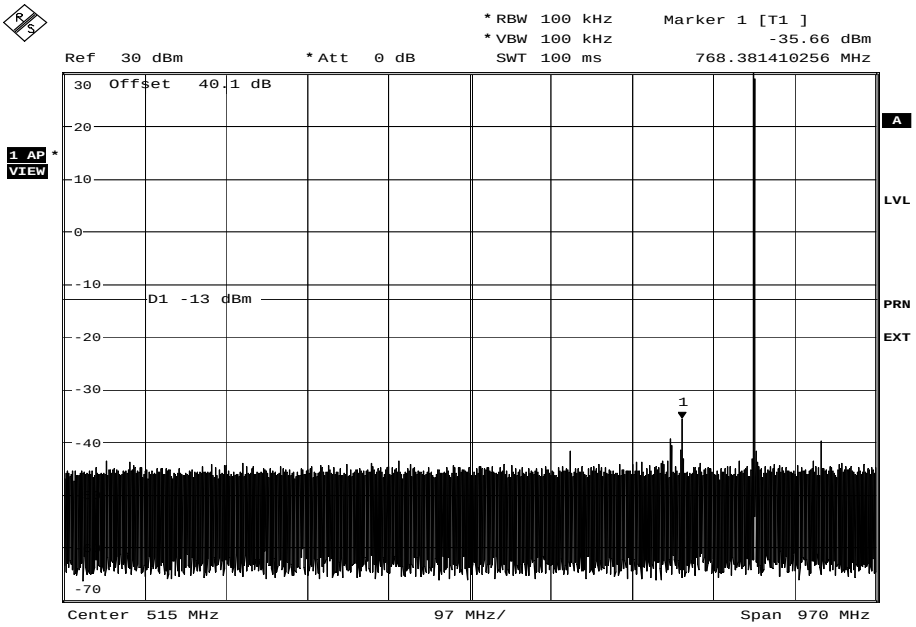
Conducted

854.025 MHz



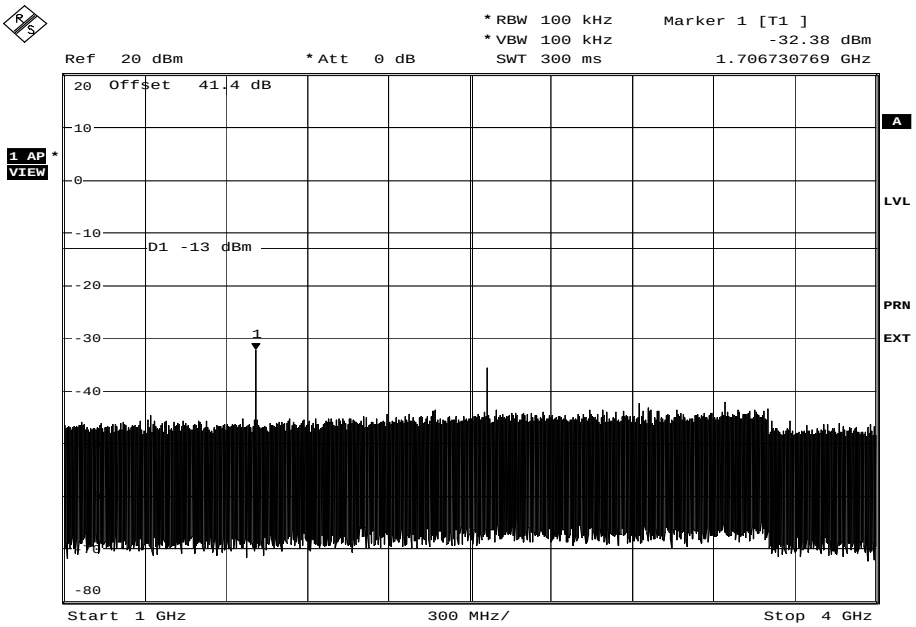
Date: 14.SEP.2011 11:12:41

30 MHz to 1GHz



Date: 6.SEP.2011 16:42:21

1 GHz to 4 GHz



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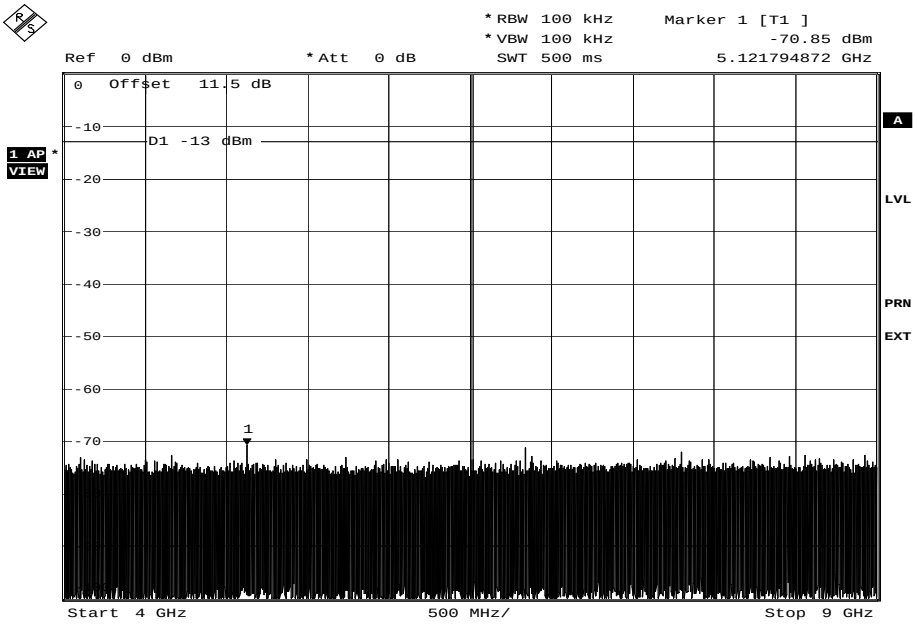
4 GHz to 9 GHz



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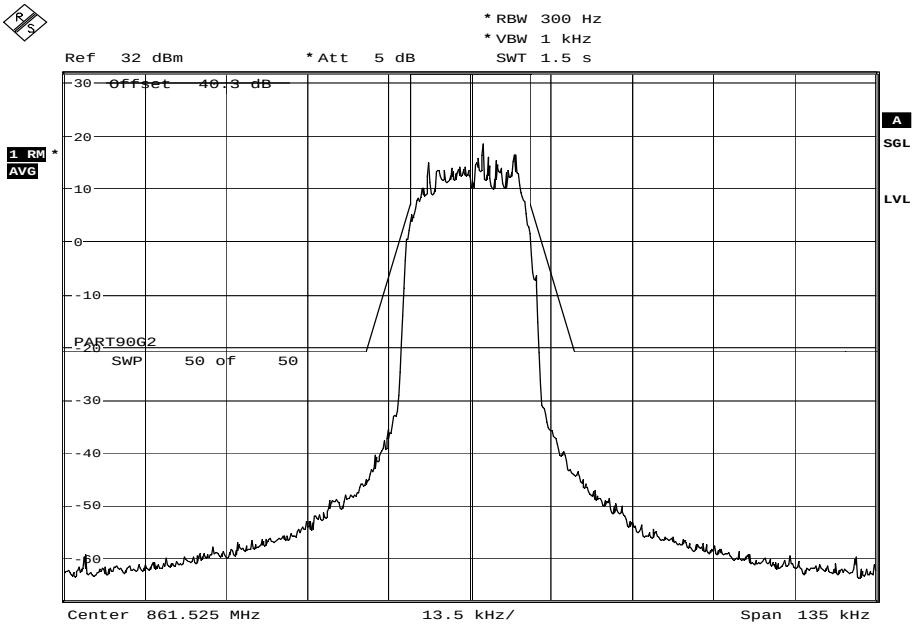
861.525 MHz



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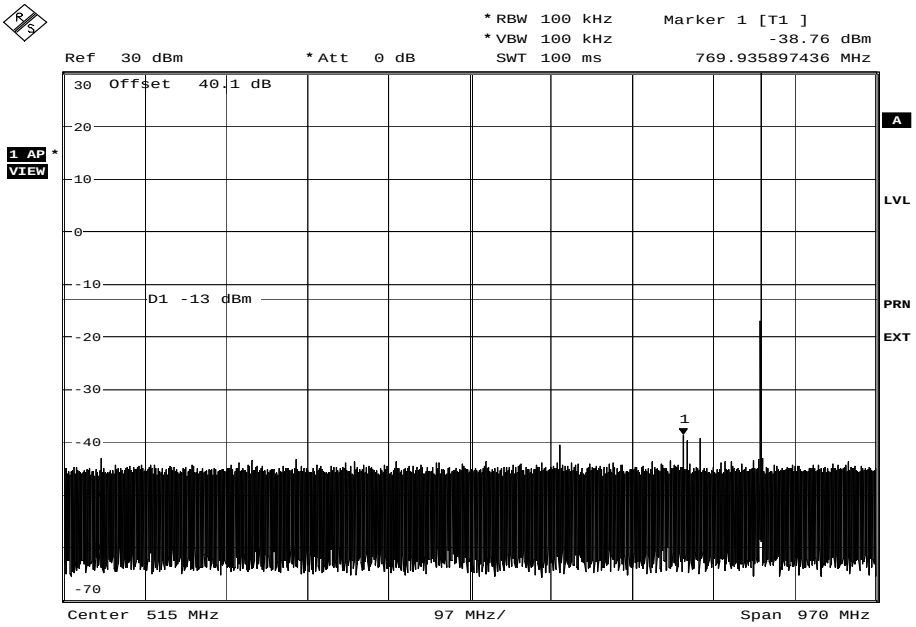
30 MHz to 1GHz



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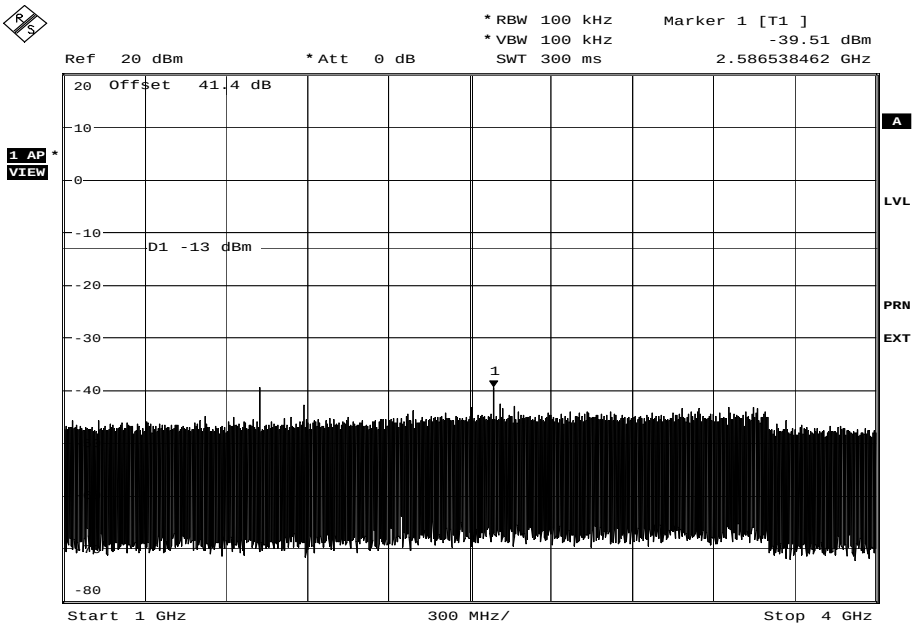
1 GHz to 4 GHz



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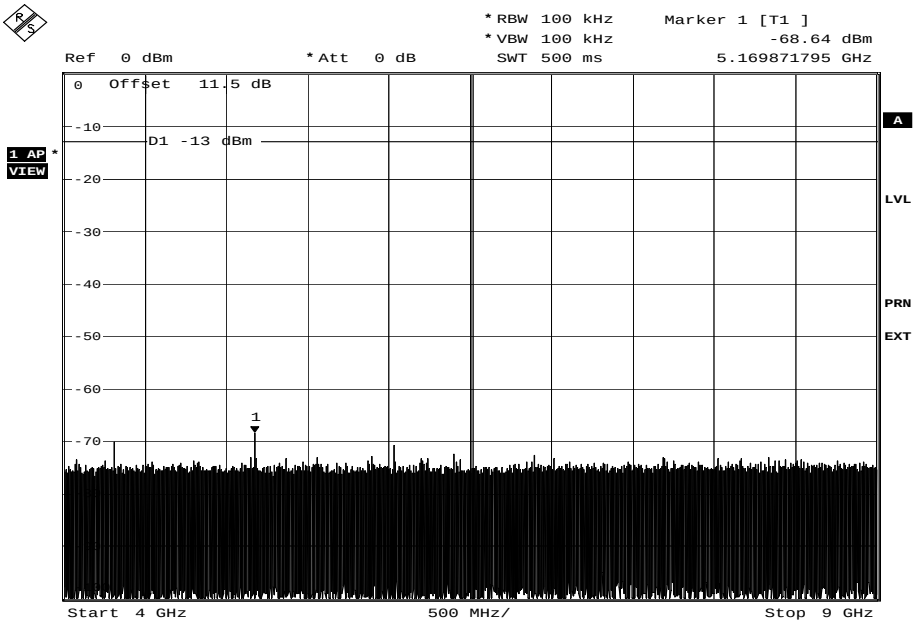
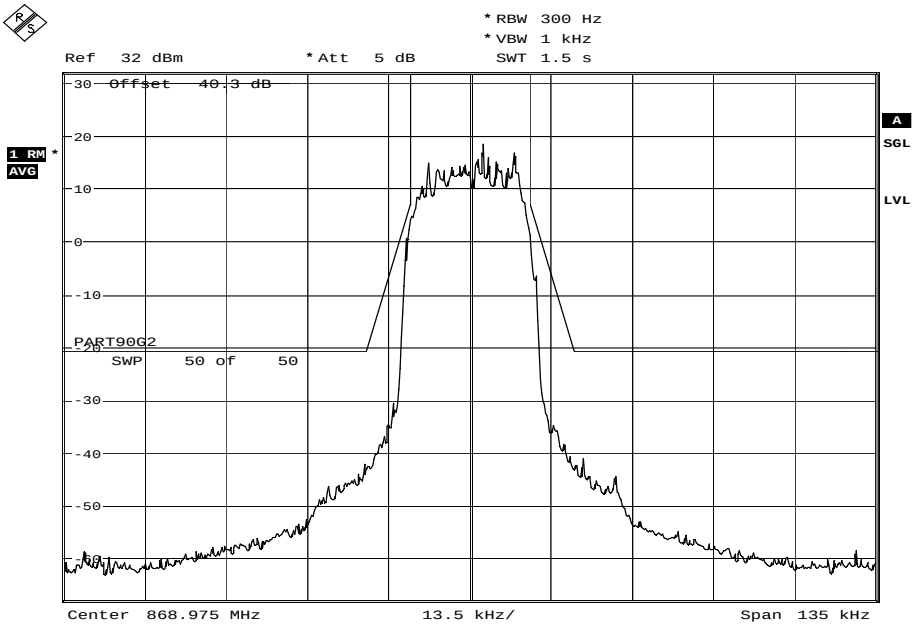
4 GHz to 9 GHz



Date: 6.SEP.2011 16:28:04

868.975 MHz



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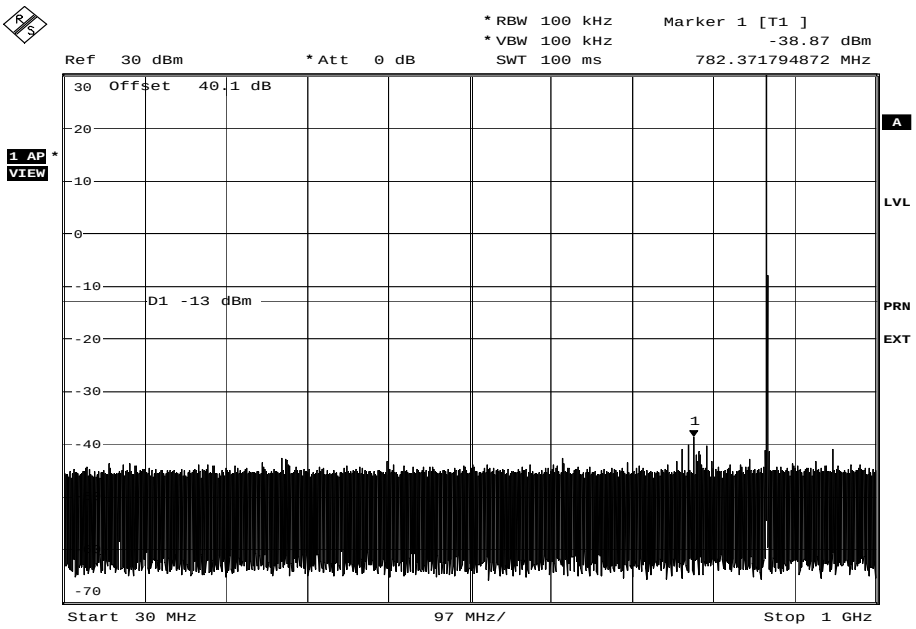
30 MHz to 1GHz



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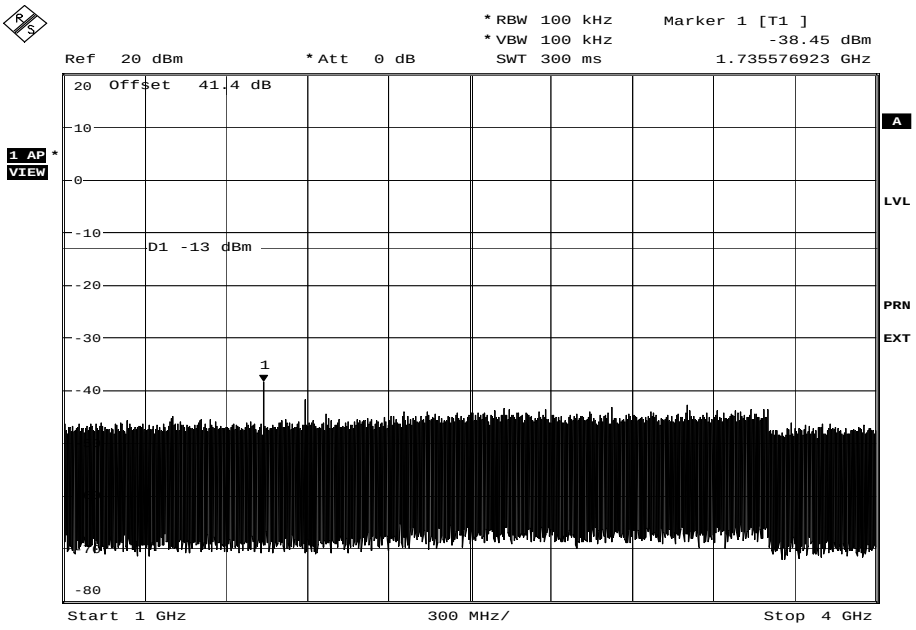
1 GHz to 4 GHz



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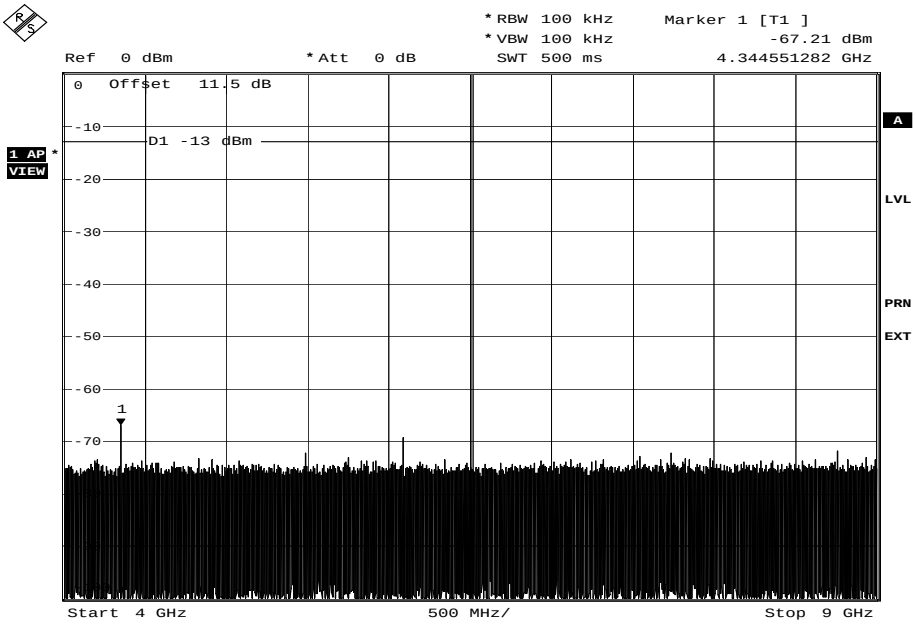
4 GHz to 9 GHz



Limit

Emission Mask G. For transmitters that are not equipped with an audio low-pass filter, the power of any emission must be attenuated below the unmodulated carrier power (P) as follows:

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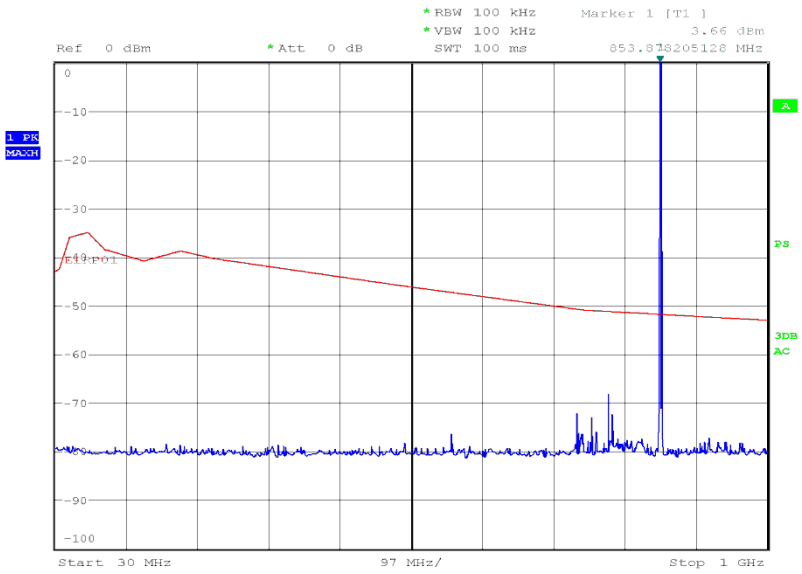
(2) On any frequency removed from the center of the authorized bandwidth by more than 250 percent of the authorized bandwidth: At least 43 + 10 log (P) dB.

Radiated

854.025 MHz

30 MHz to 1 GHz



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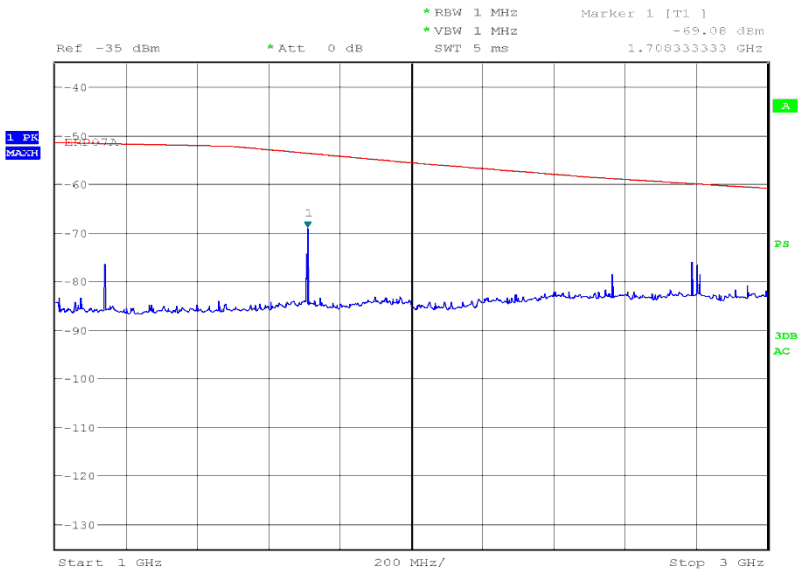
1 GHz to 3 GHz



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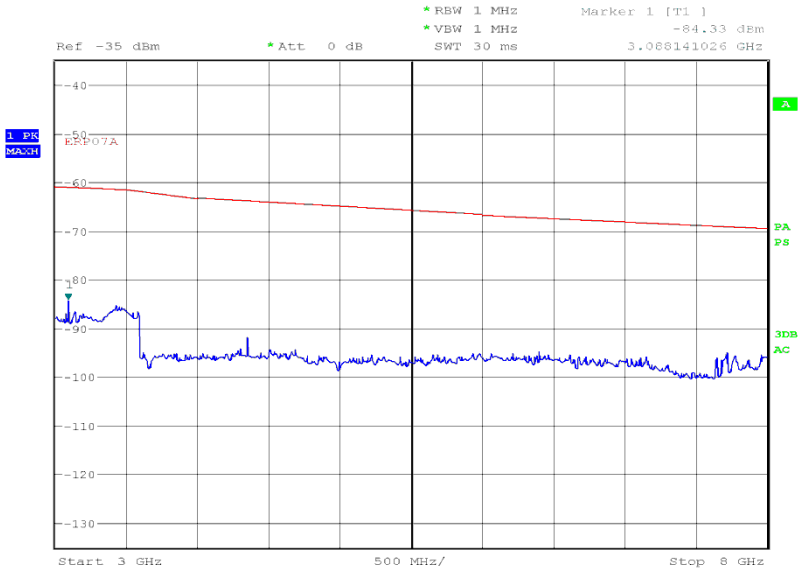
Product Service

3 GHz to 8 GHz



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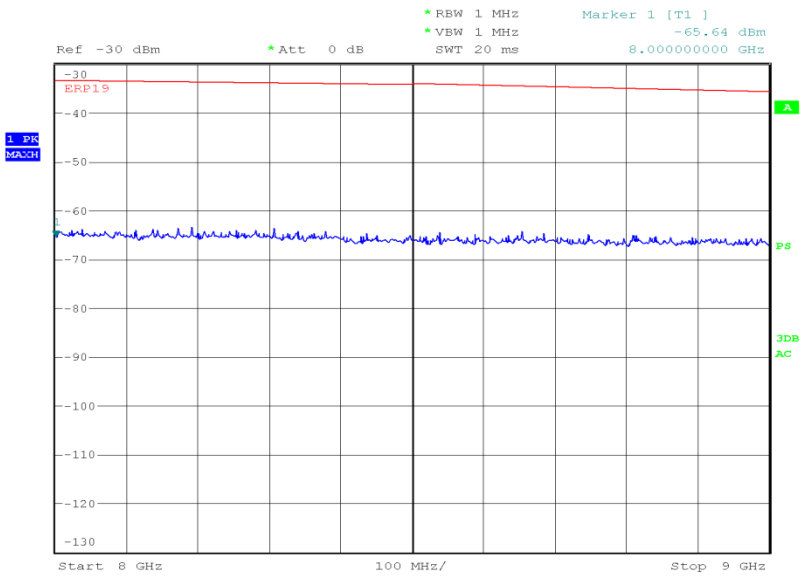
8 GHz to 9 GHz

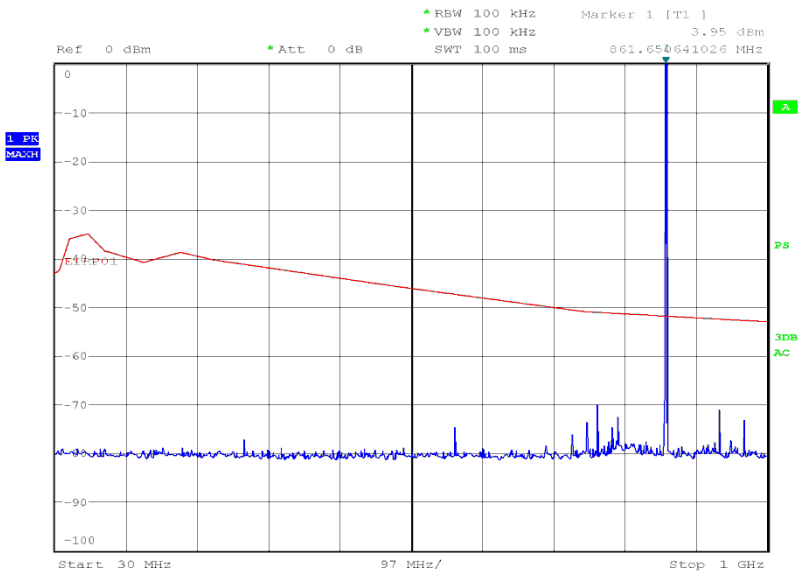


Date: 5.SEP.2011 23:41:06

Product Service

861.525 MHz

30 MHz to 1 GHz



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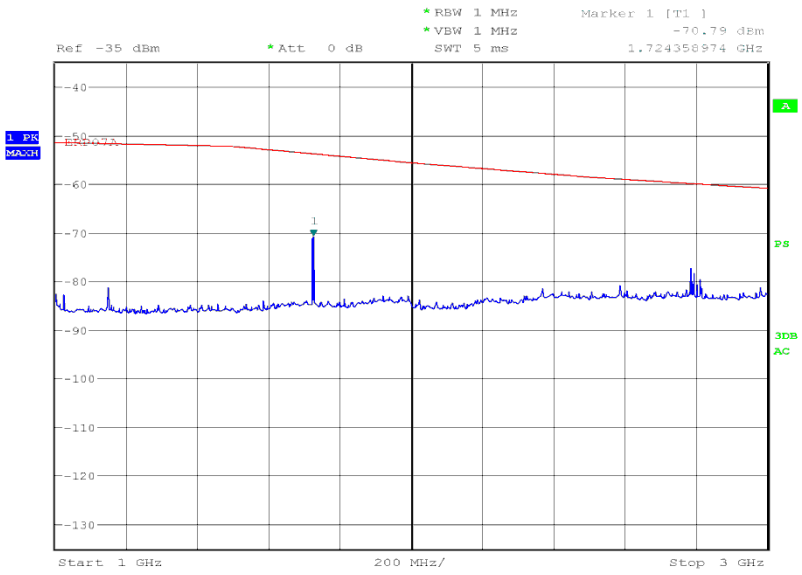
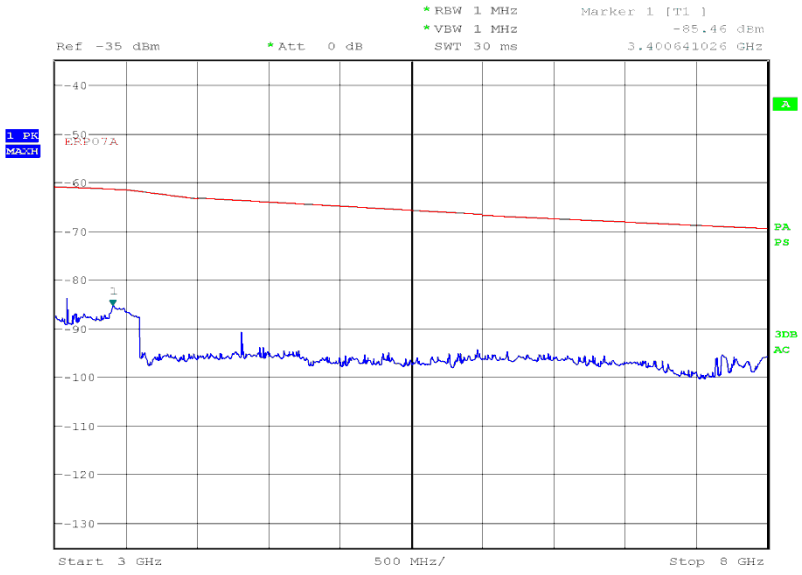
1 GHz to 3 GHz



Date: 5.SEP.2011 23:20:04

Product Service

3 GHz to 8 GHz



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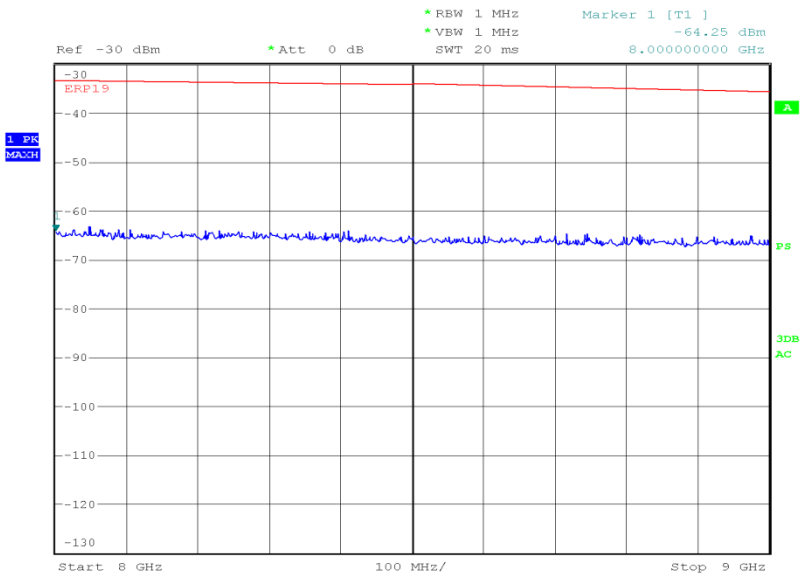
8 GHz to 9 GHz



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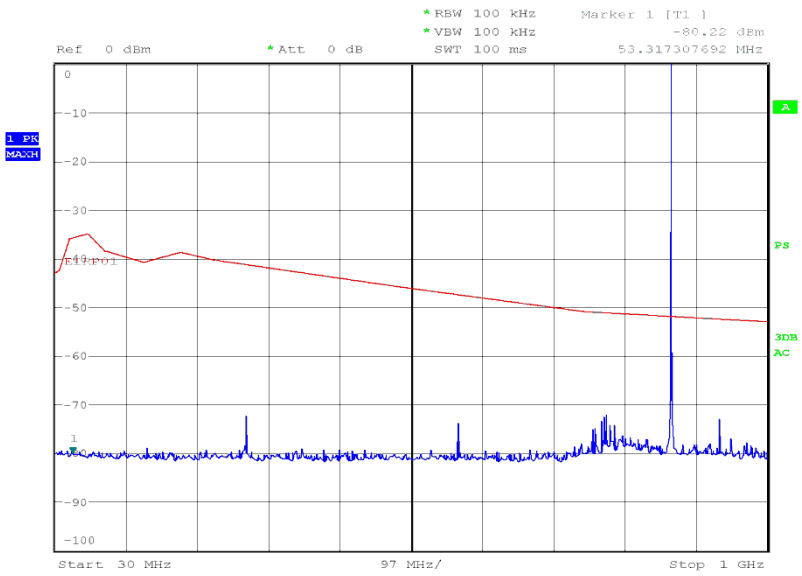
868.975 MHz

30 MHz to 1 GHz



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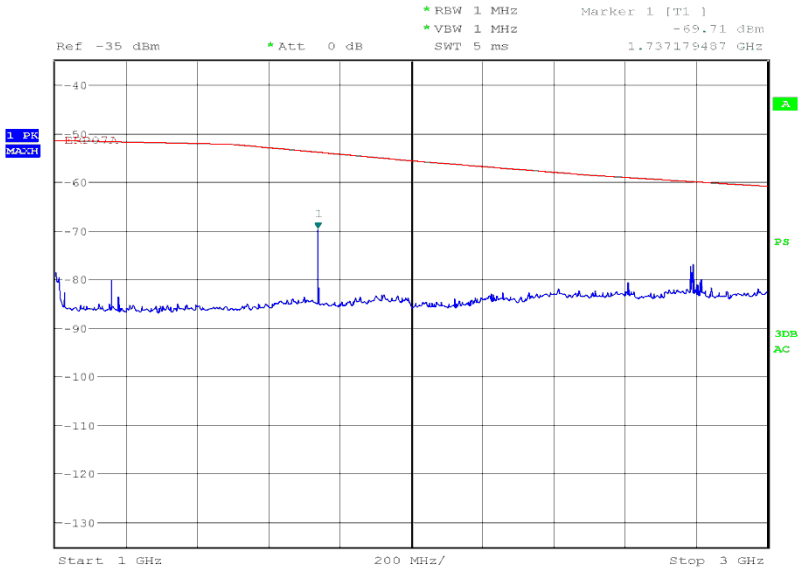
1 GHz to 3 GHz



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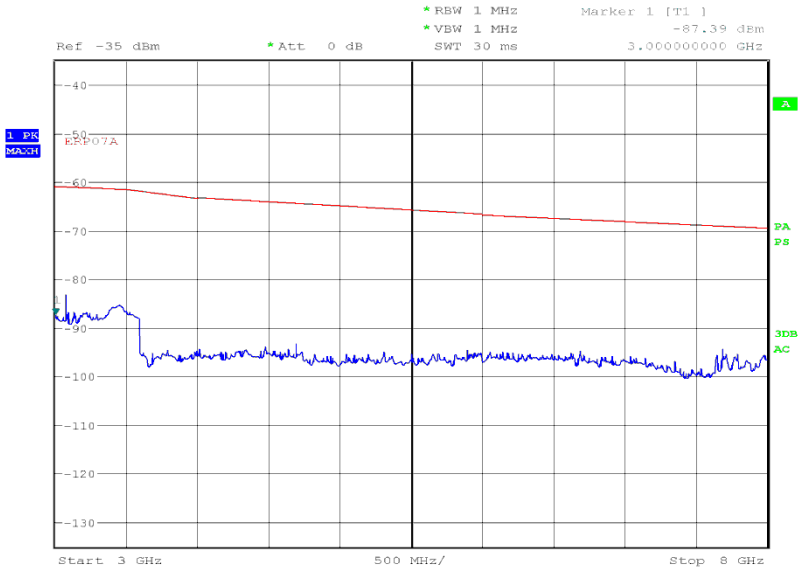
3 GHz to 8 GHz



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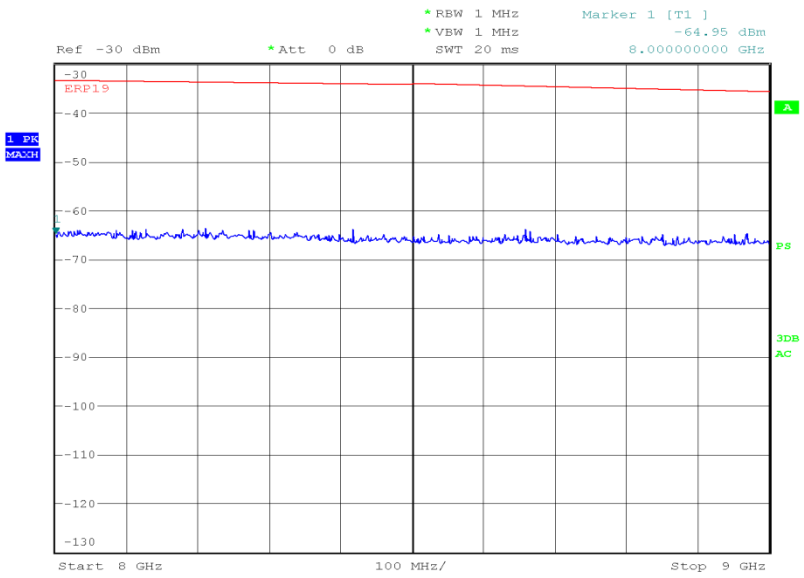
8 GHz to 9 GHz



Date: 5.SEP.2011 23:35:57

Limit

Emission Mask G. For transmitters that are not equipped with an audio low-pass filter, the power of any emission must be attenuated below the unmodulated carrier power (P) as follows:

(2) On any frequency removed from the center of the authorized bandwidth by more than 250 percent of the authorized bandwidth: At least 43 + 10 log (P) dB.

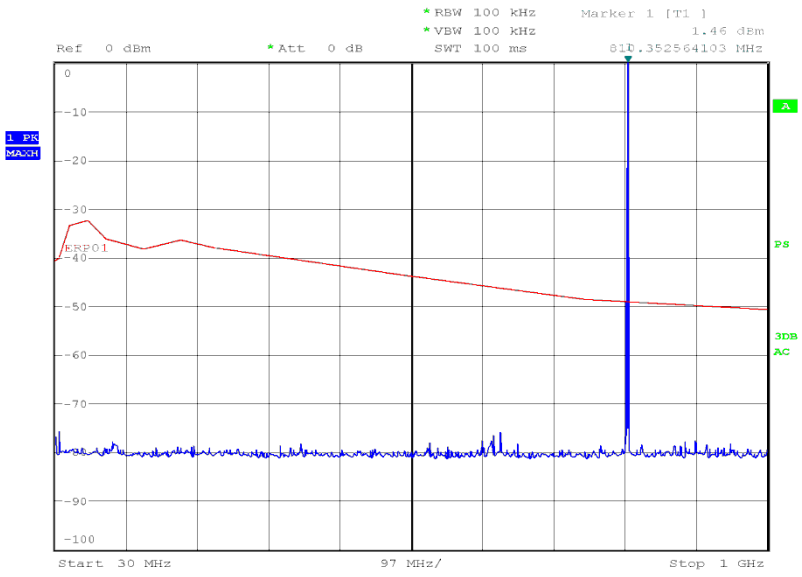
Tetra - Band 1 with car kit and accessories

7.4 V DC

Radiated

809.025 MHz

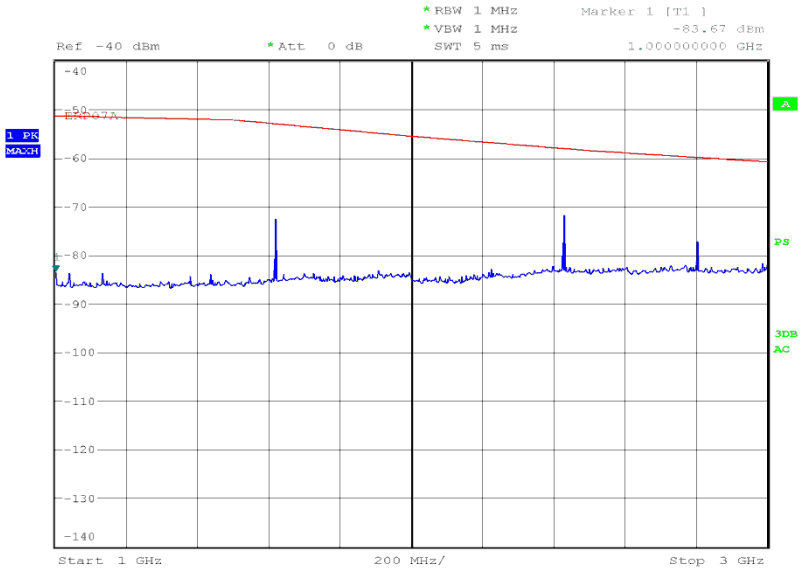
30 MHz to 1 GHz



Date: 6.SEP.2011 21:03:30

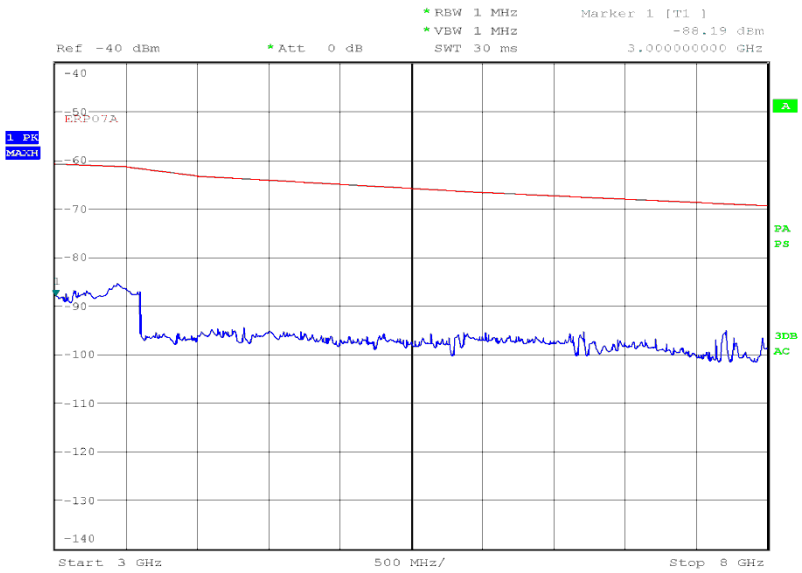
Product Service

1 GHz to 3 GHz



Date: 6.SEP.2011 21:56:47

3 GHz to 8 GHz



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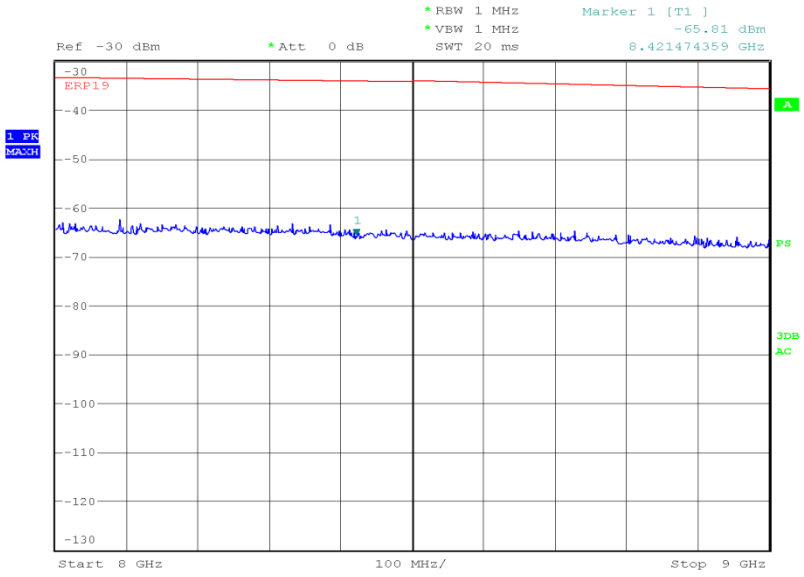
Product Service

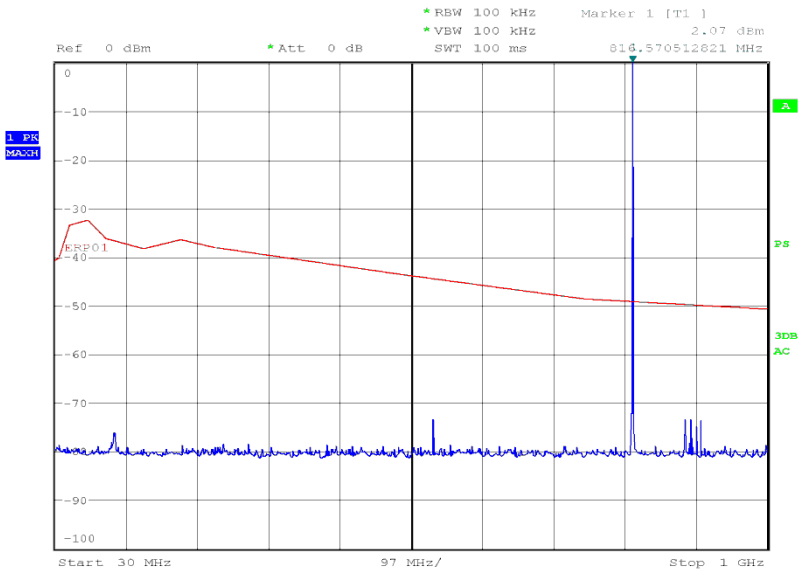
8 GHz to 9 GHz



Date: 6.SEP.2011 22:50:10

816.525 MHz

30 MHz to 1 GHz



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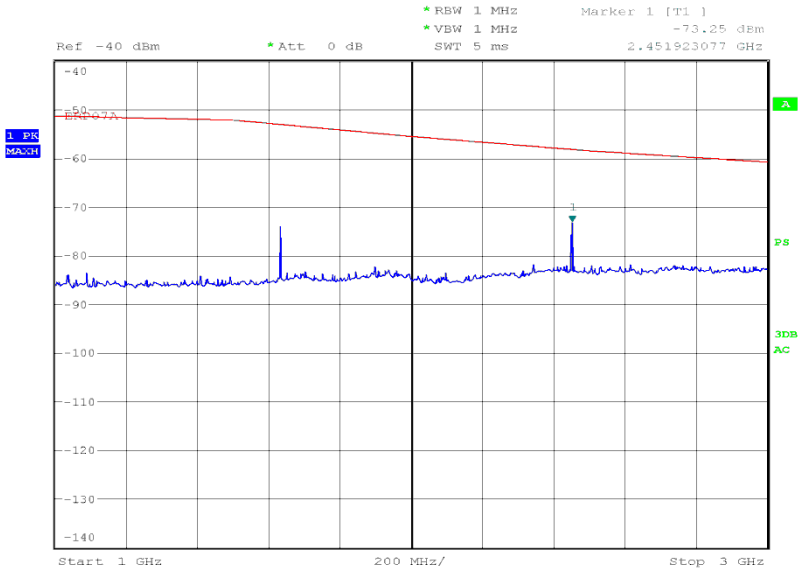
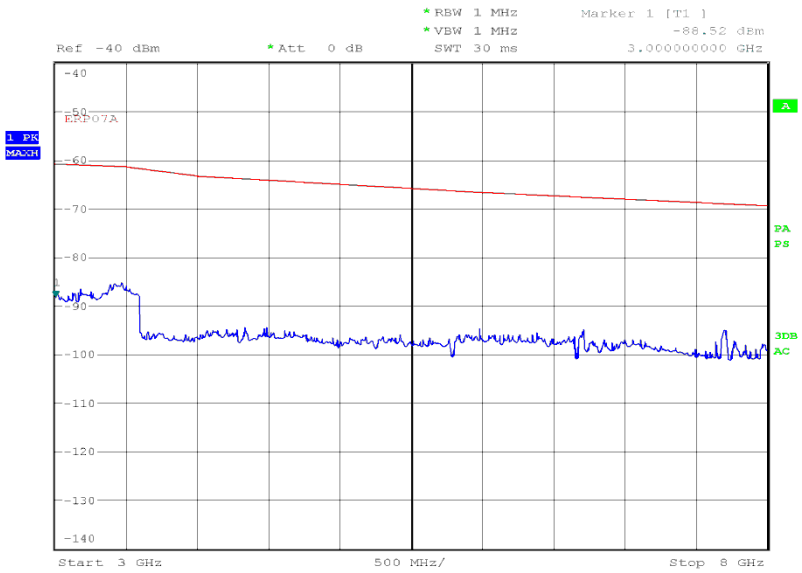
Product Service

1 GHz to 3 GHz



Date: 6.SEP.2011 22:00:29

3 GHz to 8 GHz



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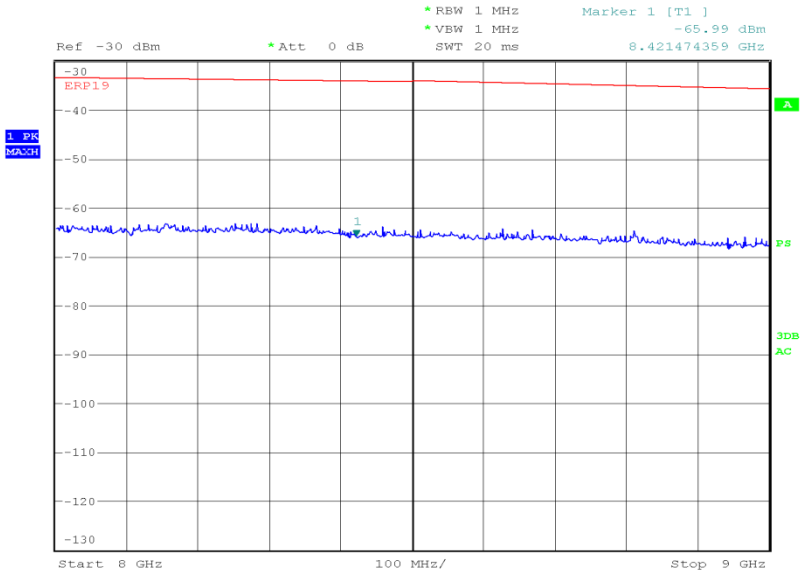
Product Service

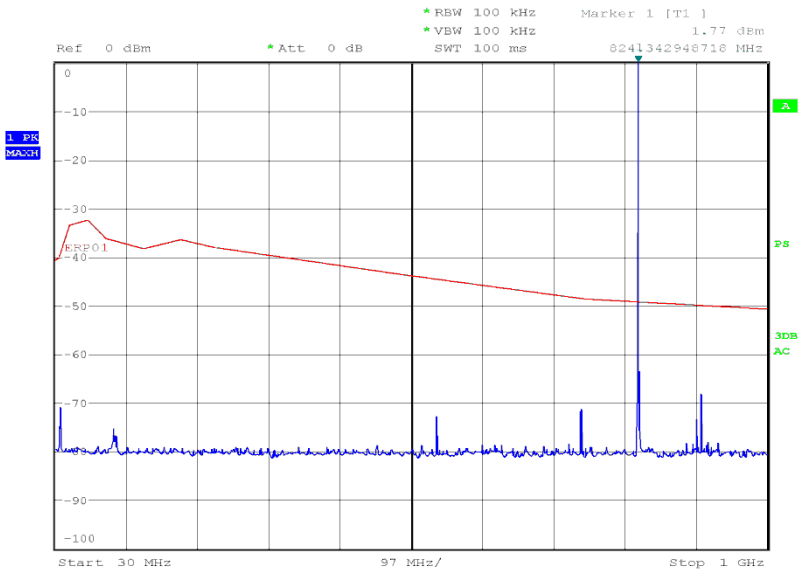
8 GHz to 9 GHz



Date: 6.SEP.2011 22:46:18

823.975 MHz

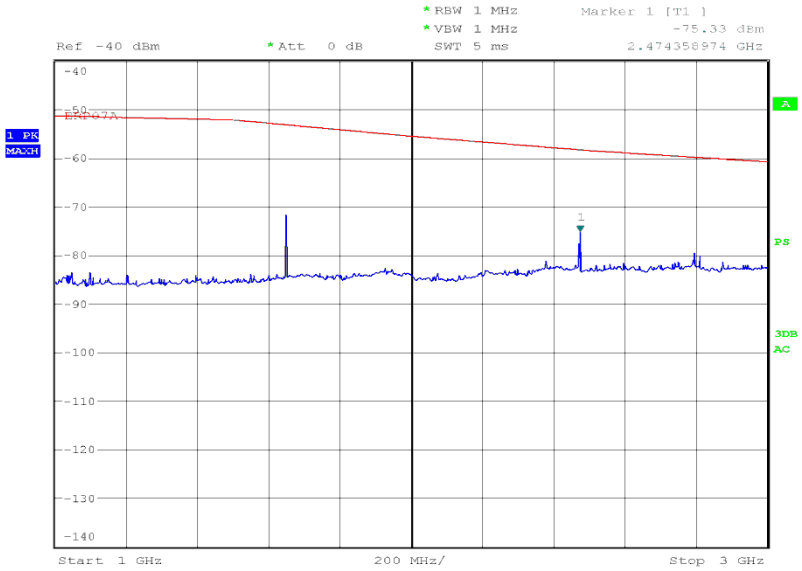
30 MHz to 1 GHz



Date: 6.SEP.2011 21:09:51

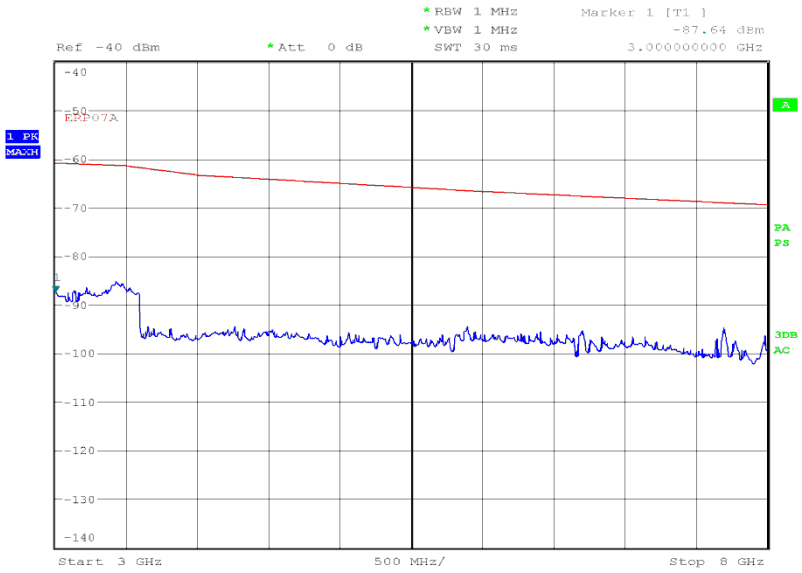
Product Service

1 GHz to 3 GHz



Date: 6.SEP.2011 22:13:21

3 GHz to 8 GHz



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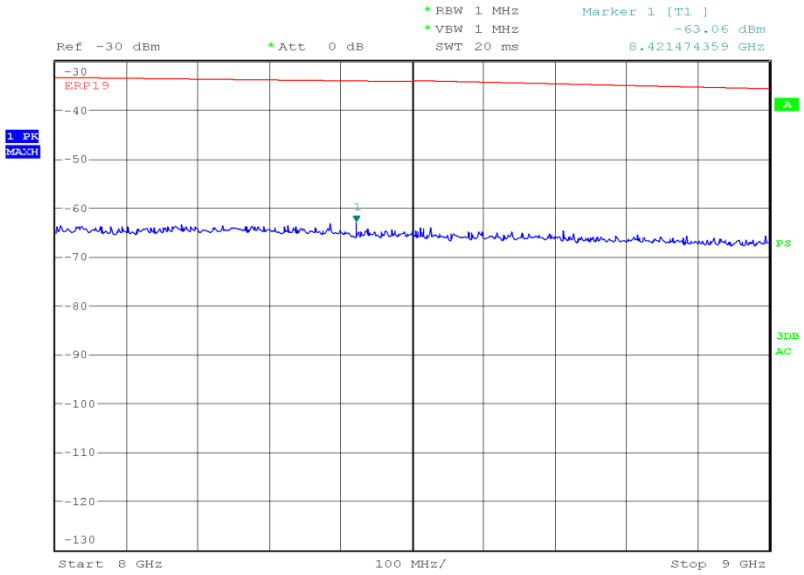
Product Service

8 GHz to 9 GHz



Date: 6.SEP.2011 22:42:20

Limit

Emission Mask G. For transmitters that are not equipped with an audio low-pass filter, the power of any emission must be attenuated below the unmodulated carrier power (P) as follows:

(2) On any frequency removed from the center of the authorized bandwidth by more than 250 percent of the authorized bandwidth: At least 43 + 10 log (P) dB.

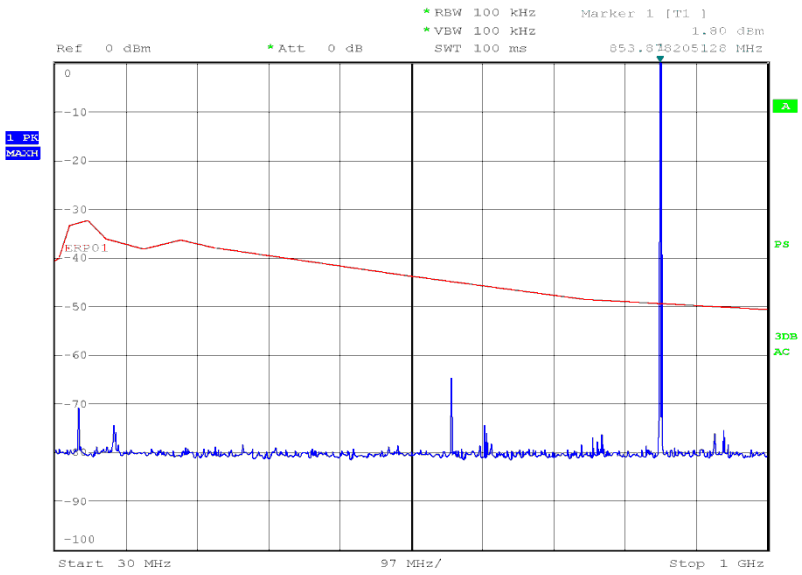
Tetra - Band 2 with car kit and accessories

7.4 V DC

Radiated

854.025 MHz

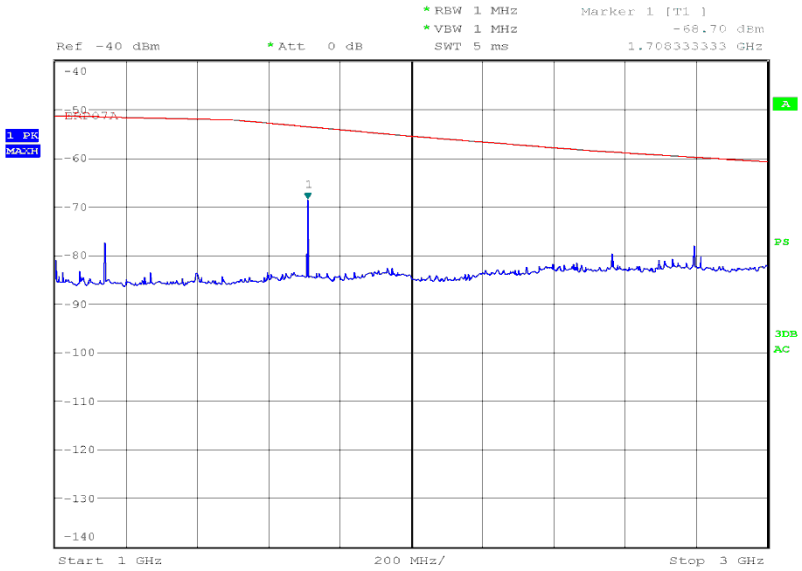
30 MHz to 1 GHz



Date: 6.SEP.2011 21:13:59

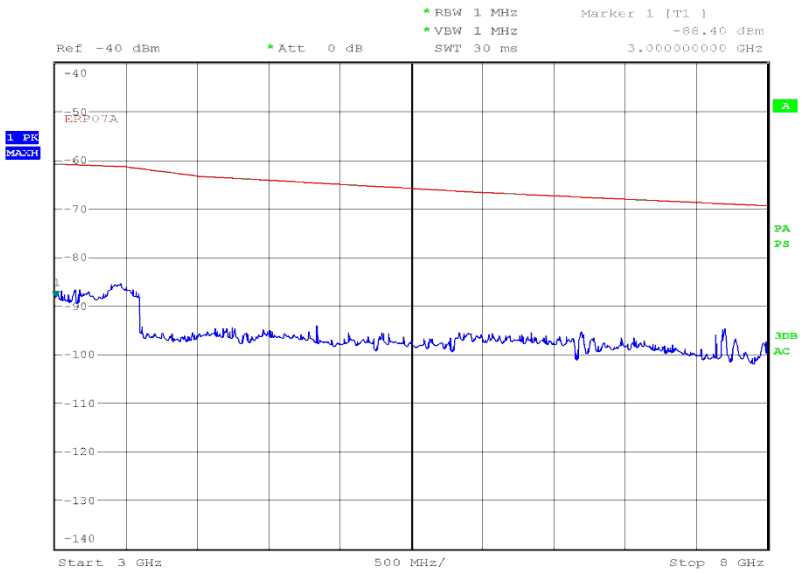
Product Service

1 GHz to 3 GHz



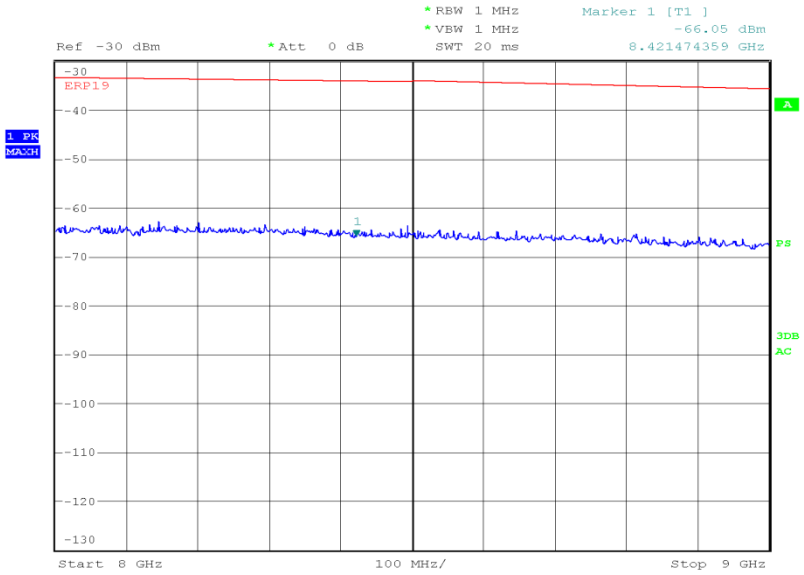
Date: 6.SEP.2011 21:46:39

3 GHz to 8 GHz



Date: 6.SEP.2011 21:48:57

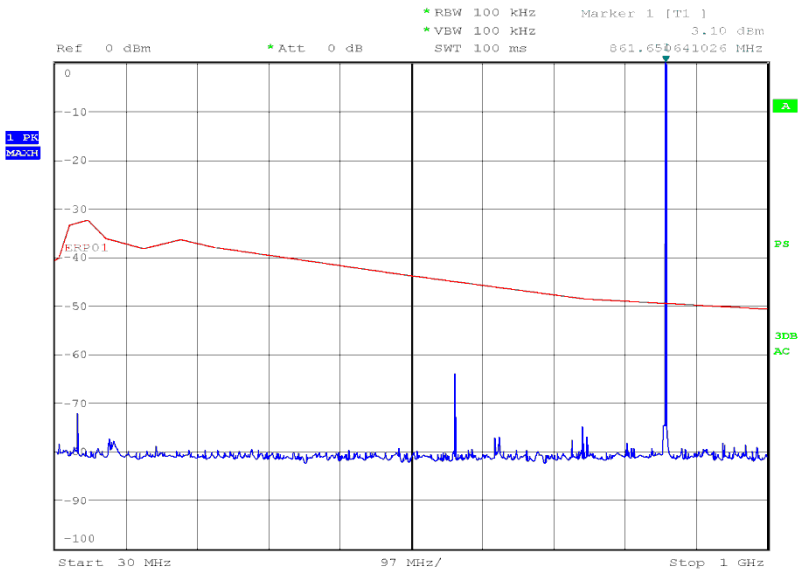
8 GHz to 9 GHz



Date: 6.SEP.2011 23:00:33

861.525 MHz

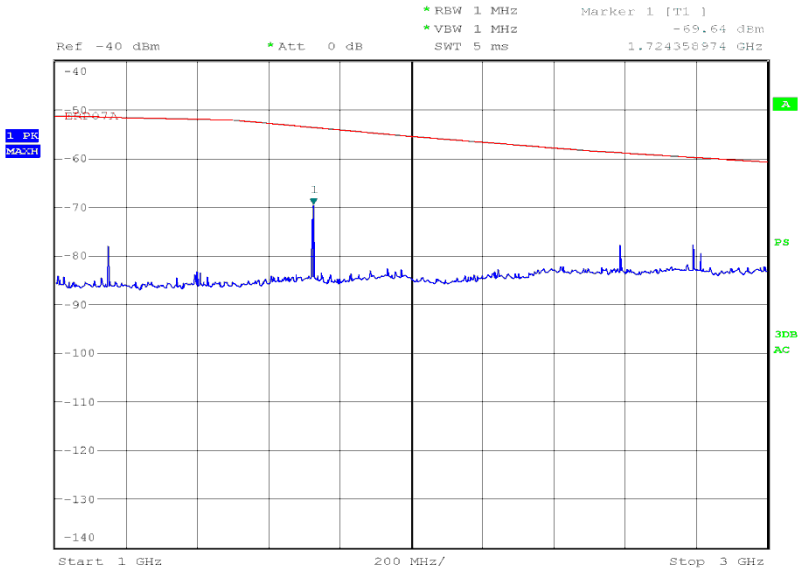
30 MHz to 1 GHz



Date: 6.SEP.2011 21:17:03

Product Service

1 GHz to 3 GHz



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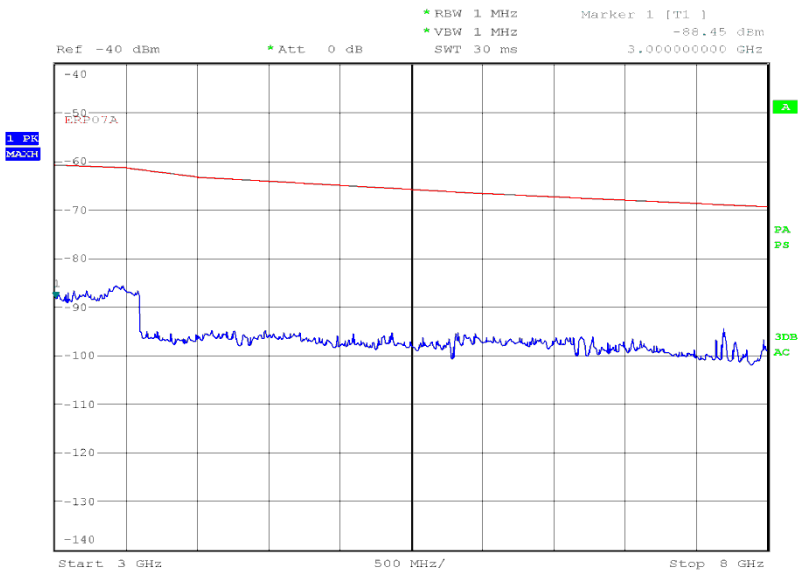
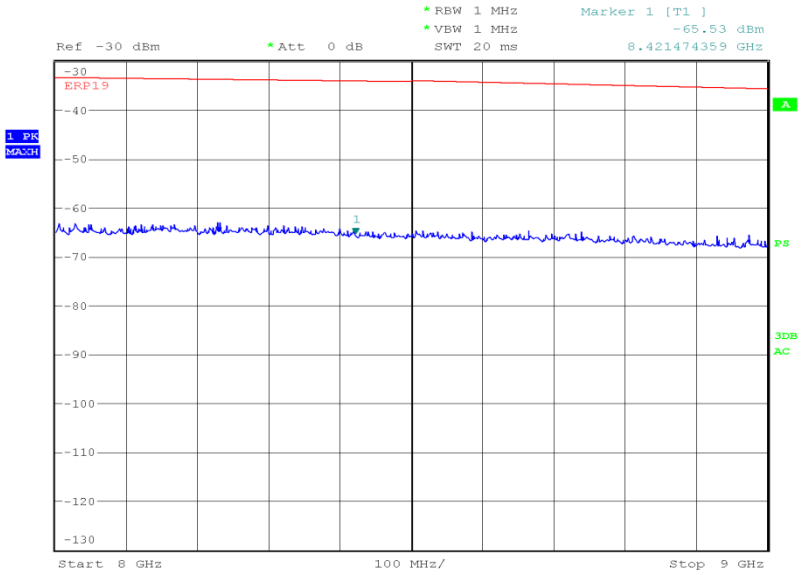
3 GHz to 8 GHz



Date: 6.SEP.2011 21:36:59

Product Service

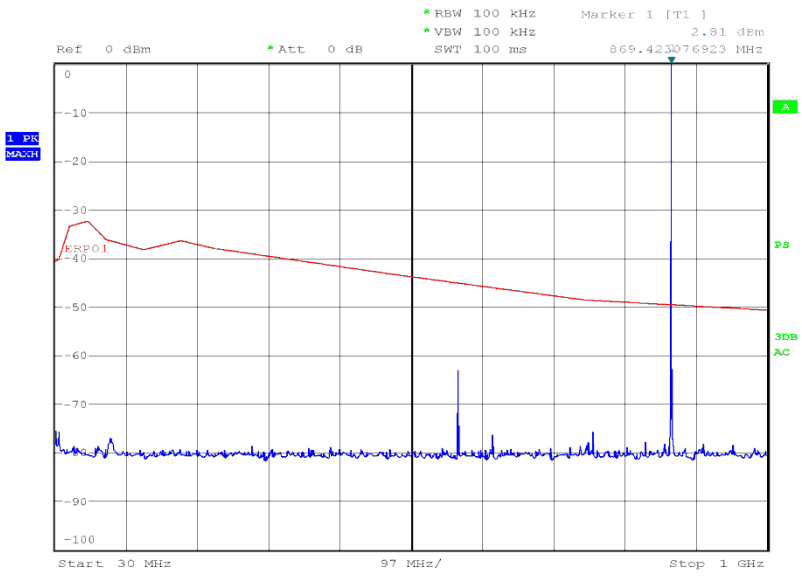
8 GHz to 9 GHz



Date: 6.SEP.2011 23:03:02

868.975 MHz

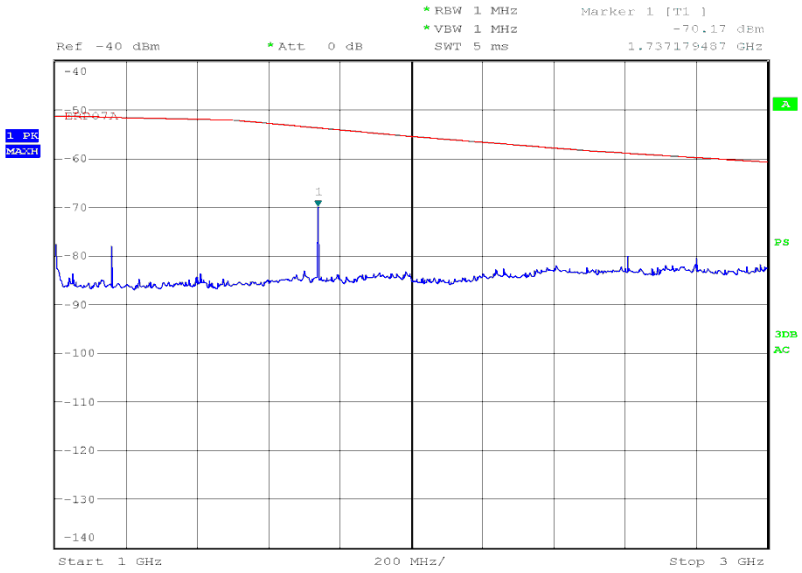
30 MHz to 1 GHz



Date: 6.SEP.2011 21:21:26

Product Service

1 GHz to 3 GHz



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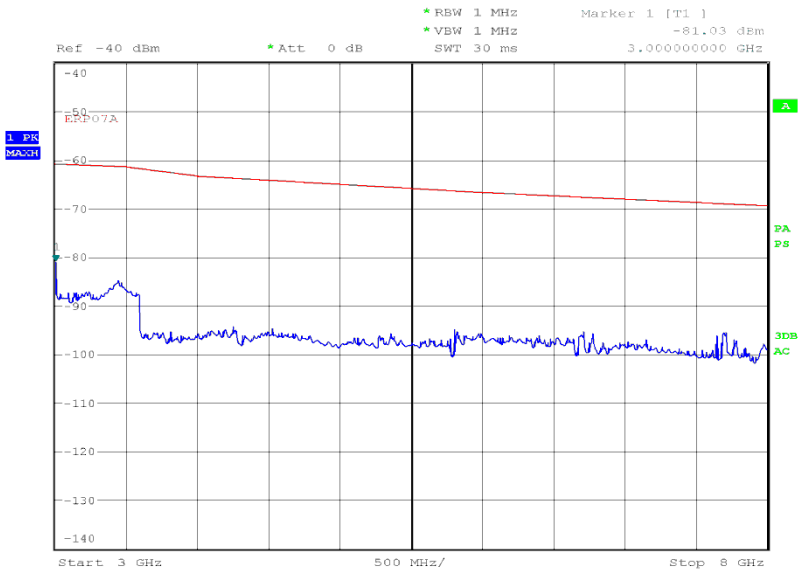
3 GHz to 8 GHz



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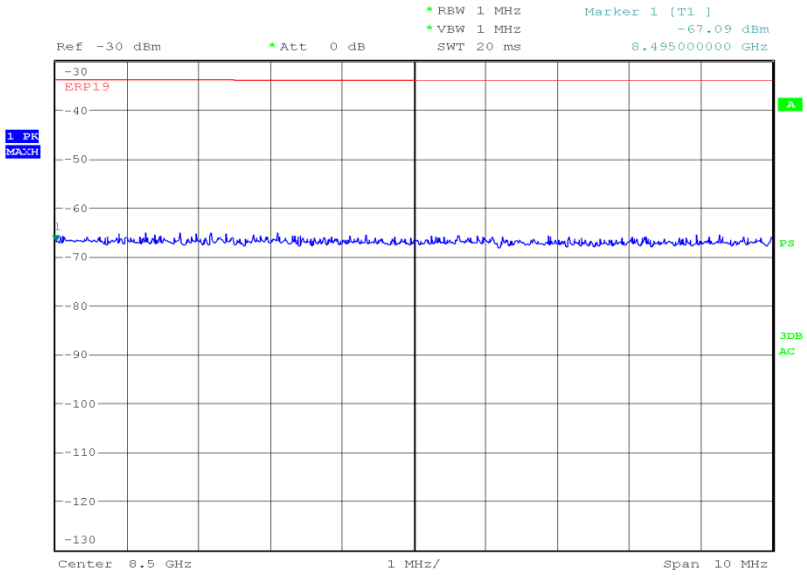
Product Service

8 GHz to 9 GHz



Date: 6.SEP.2011 23:10:11

Limit

Emission Mask G. For transmitters that are not equipped with an audio low-pass filter, the power of any emission must be attenuated below the unmodulated carrier power (P) as follows:

(2) On any frequency removed from the center of the authorized bandwidth by more than 250 percent of the authorized bandwidth: At least 43 + 10 log (P) dB.

2.6 FREQUENCY STABILITY

2.6.1 Specification Reference

FCC CFR 47 Part 2 and FCC CFR 47 Part 90 (TETRA), Clause 2.1055 and 90.213

2.6.2 Equipment Under Test and Modification State

STP8080 S/N: 2PN601020G471E0 - Modification State 0

2.6.3 Date of Test

16 September 2011, 19 September 2011 & 20 September 2011

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

The EUT was set to transmit on maximum power with test model 1. In accordance with 2.1055, the temperature was varied from -30°C to +50° in 10° steps. Testing was performed on bottom, middle and top channels.

2.6.6 Environmental Conditions

Ambient Temperature	23.1 - 24.9°C
Relative Humidity	40.1 - 55.1%

Product Service

2.6.7 Test Results

Tetra - Band 1

7.4 V DC

Temperature Interval	Supply Voltage	Frequency (Hz)		
		809.025 MHz	816.525 MHz	823.975 MHz
-30°C	7.4 V DC	-226	-217	-195
	6.4 V DC	N/A	N/A	N/A
-20°C	7.4 V DC	-31	-33	-32
	6.4 V DC	N/A	N/A	N/A
-10°C	7.4 V DC	-38	-31	-21
	6.4 V DC	N/A	N/A	N/A
0°C	7.4 V DC	-20	-19	-27
	6.4 V DC	N/A	N/A	N/A
+10°C	7.4 V DC	-46	-17	-24
	6.4 V DC	N/A	N/A	N/A
+20°C	7.4 V DC	-7	-24	-42
	6.4 V DC	-47	-58	-70
-30°C	7.4 V DC	-112	-127	-136
	6.4 V DC	N/A	N/A	N/A
+40°C	7.4 V DC	-131	-138	-152
	6.4 V DC	N/A	N/A	N/A
+50°C	7.4 V DC	-212	-228	-206
	6.4 V DC	N/A	N/A	N/A
+55°C	7.4 V DC	N/A	N/A	N/A
	6.4 V DC	N/A	N/A	N/A
Maximum Frequency Error (Hz)		-226	-228	-206

Limit

The frequency error shall not exceed 5ppm or	4.05 kHz for 809.025 MHz
	4.08 kHz for 816.525 MHz
	4.12 kHz for 823.975 MHz

Tetra - Band 2

7.4 V DC

Temperature Interval	Supply Voltage	Frequency (Hz)		
		854.025 MHz	861.525 MHz	868.975 MHz
-30°C	7.4 V DC	-196	-218	-240
	6.4 V DC	N/A	N/A	N/A
-20°C	7.4 V DC	-22	-13	-12
	6.4 V DC	N/A	N/A	N/A
-10°C	7.4 V DC	-16	-35	-76
	6.4 V DC	N/A	N/A	N/A
0°C	7.4 V DC	-20	-29	-24
	6.4 V DC	N/A	N/A	N/A
+10°C	7.4 V DC	-24	-23	-21
	6.4 V DC	N/A	N/A	N/A
+20°C	7.4 V DC	-48	-52	-54
	6.4 V DC	-71	-72	-39
-30°C	7.4 V DC	-108	-112	-115
	6.4 V DC	N/A	N/A	N/A
+40°C	7.4 V DC	-154	-157	-157
	6.4 V DC	N/A	N/A	N/A
+50°C	7.4 V DC	-192	-193	-194
	6.4 V DC	N/A	N/A	N/A
+55°C	7.4 V DC	N/A	N/A	N/A
	6.4 V DC	N/A	N/A	N/A
Maximum Frequency Error (Hz)		-196	-218	-240

Limit

The frequency error shall not exceed 5ppm or	4.05 kHz for 809.025 MHz
	4.08 kHz for 816.525 MHz
	4.12 kHz for 823.975 MHz

Product Service

SECTION 3

TEST EQUIPMENT USED

Product Service

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 –Effective Radiated Power					
Antenna (Double Ridge Guide, 1GHz-18GHz)	EMCO	3115	234	12	12-Nov-2011
Screened Room (5)	Rainford	Rainford	1545	36	3-Feb-2014
Mast Controller	Inn-Co GmbH	CO 1000	1606	-	TU
Antenna (Bilog)	Chase	CBL6143	2904	24	12-May-2013
Signal Generator: 10MHz to 20GHz	Rohde & Schwarz	SMR20	3475	12	20-Dec-2011
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	9-Sep-2011
7m Armoured RF Cable	SSI Cable Corp.	1501-13-13-7m WA(-)	3600	-	TU
9m RF Cable (N Type)	Rhophase	NPS-2303-9000-NPS	3791	12	26-Aug-2012
Tilt Antenna Mast	maturo Gmbh	TAM 4.0-P	3916	-	TU
Mast Controller	maturo Gmbh	NCD	3917	-	TU
Section 2.2 and 2.3 – Types of Emissions and Bandwidth Limitations					
Dual Power Supply Unit	Hewlett Packard	6253A	84	-	O/P Mon
Multimeter	Fluke	79 Series III	611	12	5-Aug-2012
Signal Generator	Rohde & Schwarz	SMY 01	1109	12	23-Dec-2011
GPS Frequency Standard	Rapco	GPS-804/3	1312	6	11-Sep-2011
Spectrum Analyser	Rohde & Schwarz	FSU26	2747	12	12-Nov-2011
Hygrometer	Rotronic	I-1000	2891	12	3-May-2012
Attenuator (10dB, 20W)	Lucas Weinschel	1	3225	12	13-Oct-2011
'N' - 'N' RF Cable (1m)	Rhophase	NPS-1803-1000-NPS	3701	12	11-Jan-2012
DC - 8 GHz Attenuator	Lucas Weinschel	24-30-33	3963	12	24-Jun-2012
Section 2.4 - Power and Antenna Height Limits					
Dual Power Supply Unit	Hewlett Packard	6253A	84	-	O/P Mon
Multimeter	Fluke	79 Series III	611	12	5-Aug-2012
Signal Generator	Rohde & Schwarz	SMY 01	1109	12	23-Dec-2011
GPS Frequency Standard	Rapco	GPS-804/3	1312	6	11-Sep-2011
Spectrum Analyser	Rohde & Schwarz	FSU26	2747	12	12-Nov-2011
Hygrometer	Rotronic	I-1000	2891	12	3-May-2012
Attenuator (10dB, 20W)	Lucas Weinschel	1	3225	12	13-Oct-2011
DC - 8 GHz Attenuator	Lucas Weinschel	24-30-33	3963	12	24-Jun-2012

Instrument	Manufacturer	Type No.	TE No.	Calibration Period (months)	Calibration Due
Section 2.5- Emission Mask					
Dual Power Supply Unit	Hewlett Packard	6253A	84	-	O/P Mon
Antenna (Double Ridge Guide, 1GHz-18GHz)	EMCO	3115	234	12	12-Nov-2011
Antenna (Double Ridge Guide, 1GHz-18GHz)	EMCO	3115	235	12	12-Nov-2011
Antenna (Bilog)	Schaffner	CBL6143	287	24	19-Jan-2012
DC Power Supply Unit	Hewlett Packard	6267B	294	-	O/P Mon
Multimeter	Fluke	79 Series III	611	12	5-Aug-2012
Signal Generator	Rohde & Schwarz	SMY 01	1109	12	23-Dec-2011
GPS Frequency Standard	Rapco	GPS-804/3	1312	6	11-Sep-2011*
Pre-Amplifier	Phase One	PS04-0086	1533	12	15-Sep-2011
Screened Room (5)	Rainford	Rainford	1545	36	3-Feb-2014
Mast Controller	Inn-Co GmbH	CO 1000	1606	-	TU
Spectrum Analyser	Rohde & Schwarz	FSU26	2747	12	12-Nov-2011
High Pass Filter (4GHz)	RLC Electronics	F-100-4000-5-R	2773	12	6-Sep-2011*
Hygrometer	Rotronic	I-1000	2891	12	3-May-2012
Antenna (Bilog)	Chase	CBL6143	2904	24	12-May-2013
Attenuator (10dB, 20W)	Lucas Weinschel	1	3225	12	13-Oct-2011
Signal Generator: 10MHz to 20GHz	Rohde & Schwarz	SMR20	3475	12	20-Dec-2011
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	9-Sep-2011*
3 GHz High Pass Filter	K&L Microwave	11SH10-3000/X18000-O/O	3552	12	14-Apr-2012
7m Armoured RF Cable	SSI Cable Corp.	1501-13-13-7m WA(-)	3600	-	TU
9m RF Cable (N Type)	Rhophase	NPS-2303-9000-NPS	3791	12	26-Aug-2012
Tilt Antenna Mast	maturo Gmbh	TAM 4.0-P	3916	-	TU
Mast Controller	maturo Gmbh	NCD	3917	-	TU
DC - 8 GHz Attenuator	Lucas Weinschel	24-30-33	3963	12	24-Jun-2012
Section 2.6 - Frequency Stability					
Climatic Chamber	Votsch	VT4002	161	-	O/P Mon
DC Power Supply Unit	Hewlett Packard	6267B	294	-	O/P Mon
Multimeter	Fluke	79 Series III	611	12	5-Aug-2012
GPS Frequency Standard	Rapco	GPS-804/3	1312	6	13-Mar-2012
Spectrum Analyser	Rohde & Schwarz	FSU26	2747	12	12-Nov-2011
Hygrometer	Rotronic	I-1000	2891	12	3-May-2012
Climatic Chamber	TAS	Micro 225	2892	-	O/P Mon
Thermocouple Thermometer	Fluke	51	3172	12	23-Jul-2012
Attenuator (10dB, 20W)	Lucas Weinschel	1	3225	12	13-Oct-2011
DC - 8 GHz Attenuator	Lucas Weinschel	24-30-33	3963	12	24-Jun-2012

TU – Traceability Unscheduled
O/P MON – Output Monitored with Calibrated Equipment

* In calibration at time of use.

3.2 MEASUREMENT UNCERTAINTY

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

Test Discipline	MU
Effective Radiated Power	30MHz to 1GHz: ± 5.1 dB 1GHz to 40GHz: ± 6.3 dB
Power and Antenna Height Limits	± 0.70 dB
Frequency Stability	± 42.47 Hz
Emission Mask	Radiated: ± 3.08 dB Conducted: ± 3.454 dB
Type of Emissions	N/A
Bandwidth Limitations	± 16.74 kHz

Product Service

SECTION 4

ACCREDITATION, DISCLAIMERS AND COPYRIGHT

Product Service

4.1 ACCREDITATION, DISCLAIMERS AND COPYRIGHT

UKAS TESTING 0141

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).