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Report On

FCC Testing of the
ip.access Ltd 239B E16 3G Enterprise Access Point (Bands 2 & 5)
In accordance with FCC CFR 47 Part 2 and FCC CFR 47 Part 22

COMMERCIAL-IN-CONFIDENCE

FCC ID: QGGIPA239B

Document 75918441 Report 02 Issue 1 August 2012

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REPORT ON

FCC Testing of the
ip.access Ltd 239B E16 3G Enterprise Access Point (Bands 2 & 5)
In accordance with FCC CFR 47 Part 2 and FCC CFR 47 Part 22

Document 75918441 Report 02 Issue 1

August 2012

PREPARED FOR

ip.access Ltd
Building 2020
Cambourne Business Park
Cambourne
Cambridge
CB23 6DW

PREPARED BY

Natalie Bennett
Senior Administrator (Technical)

APPROVED BY

Ryan Henley
Authorised Signatory

DATED 13 August 2012

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 22. The sample tested was found to comply with the requirements defined in the applied rules.

Test Engineer(s);

G Lawler

Product Service

CONTENTS

Product Service

SECTION 1

REPORT SUMMARY

FCC Testing of the
ip.access Ltd 239B E16 3G Enterprise Access Point (Bands 2 & 5)
In accordance with FCC CFR 47 Part 2 and FCC CFR 47 Part 22

1.1 INTRODUCTION

The information contained in this report is intended to show verification of the FCC Testing of the ip.access Ltd 239B E16 3G Enterprise Access Point (Bands 2 & 5) to the requirements of FCC CFR 47 Part 2 and FCC CFR 47 Part 22.

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	ip.access Ltd
Model Number(s)	239B
Serial Number(s)	000295-0000105698
Number of Samples Tested	1
Test Specification/Issue/Date	FCC CFR 47 Part 2 (2011) FCC CFR 47 Part 22 (2011)
Incoming Release Date	Application Form 27 June 2012
Disposal Reference Number Date	Held Pending Disposal Not Applicable Not Applicable
Order Number Date	PO30803 06 July 2012
Start of Test	15 July 2012
Finish of Test	30 July 2012
Name of Engineer(s)	G Lawler
Related Document(s)	ANSI C63.4: 2009

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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 22 is shown below.

Section	Spec Clause		Test Description	Result	Comments/Base Standard
	Pt 2	Pt 22			
Transmit - with 12V AC/DC Adapter					
2.1	2.1051	22.905	Spurious Emissions at Band Edge	Pass	
2.2	-	22.913 (a)	Effective Radiated Power	Pass	
2.3	2.1046	22.913 (a)	Maximum Peak Output Power - Conducted	Pass	
2.4	-	22.917	Emission Limitations for Cellular Equipment	Pass	
2.5	2.1055	22.917 (a)	Conducted Spurious Emissions	Pass	
2.6	2.1049 (h)	22.917 (b)	Occupied Bandwidth	Pass	
2.7	2.1047 (d)	-	Modulation Characteristics	-	Customer Declaration
2.8	2.1055	22.355	Frequency Stability	Pass	
Transmit - with Phihong POE Inserter					
2.2	-	22.913 (a)	Effective Radiated Power	Pass	
2.4	-	22.917	Emission Limitations for Cellular Equipment	Pass	
Transmit - with Microsemi POE Inserter					
2.2	-	22.913 (a)	Effective Radiated Power	Pass	
2.4	-	22.917	Emission Limitations for Cellular Equipment	Pass	

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1.3 APPLICATION FORM

APPLICANT'S DETAILS

COMPANY NAME :	IP Access Ltd
ADDRESS :	Building 2020 Cambourne Business Park Cambourne Cambridge CB23 6DW
NAME FOR CONTACT PURPOSES :	Costa Panayi
TELEPHONE NO: 01954 713721	FAX NO: 01954 713799 E-MAIL: costa.panayi@ipaccess.com

EQUIPMENT INFORMATION

Model name/number	E16 Enterprise Access Point	Identification/Part number	nano3G 239B (Bands 2 & 5)
Hardware Version	XA	Software Version	573.1
Manufacturer	IP Access Ltd	Country of Origin	UK
FCC ID	QGGIPA239B	Industry Canada ID	N/A

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

The 239B E16 Access Point is a 16 user 3G Basestation operating in Bands 2 & 5 for the US market.

Supply Voltage:

[X]	AC mains	State AC voltage	110 V	and AC frequency	60 Hz
[X] POE	DC (external)	State DC voltage	48 V	and DC current	0.25 A
[ ]	DC (internal)	State DC voltage	 V	and Battery type	.....

Frequency characteristics:

Transmitter Frequency range	869 MHz to 894 MHz	Channel spacing	200 kHz
	1930 MHz to 1990 MHz	(if channelized)	
Receiver Frequency range	824 MHz to 849 MHz	Channel spacing	200 kHz
(if different)	1850 MHz to 1910 MHz	(if channelized)	

Designated test frequencies:

Bottom:	871.4 MHz	Middle:	881.6 MHz	Top:	891.6 MHz
Bottom:	1932.4 MHz	Middle:	1960.0 MHz	Top:	1987.6 MHz

Intermediate Frequencies : N/A

Highest Internally Generated Frequency : 700 MHz

Power characteristics:

Maximum transmitter power	0.25 W (Band 2)	Minimum transmitter power	N/A
	0.02 W (Band 5)	(if variable)	
[X]	Continuous transmission		
[ ]	Intermittent transmission	State duty cycle	.....

If intermittent, can transmitter be set to continuous transmit test mode? Y/N

Antenna characteristics:

[ ]	Antenna connector	State impedance	..... ohm
[ ]	Temporary antenna connector	State impedance	..... ohm
[X]	Integral antenna	State gain	0 dBi

Modulation characteristics:

[X]	Amplitude	[ ]	Other
[ ]	Frequency	Details:	.....
[X]	Phase		

Can the transmitter operate un-modulated? No

ITU Class of emission: 5M00D1W

Battery/Power Supply

Model name/number	POE Power Supply	Identification/Part number	POE36U-1AT-R
Manufacturer	Phihong	Country of Origin	Taiwan
Model name/number	POE Single Port Midspan	Identification/Part number	PD-9001GR
Manufacturer	PowerDsine	Country of Origin	China
Model name/number	12VDC Power Adapter	Identification/Part number	PSC30R-120
Manufacturer	Phihong	Country of Origin	Taiwan

Extreme conditions:

Maximum temperature	45 °C	Minimum temperature	0 °C
Maximum supply voltage	 V	Minimum supply voltage	 V

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

Signature :	Held on file at TÜV SÜD Product Service Ltd
Name :	Costa Panayi
Position held :	Product Design and Development Engineer
Date :	27th June 2012

TÜV Product Service Ltd formally certifies that the manufacturer's declaration as typed out in this report, is a true and accurate record of the original received from the applicant.

Product Service

1.4 PRODUCT INFORMATION

1.4.1 Technical Description

The Equipment Under Test (EUT) was a ip.access Ltd 239B E16 3G Enterprise Access Point (Bands 2 & 5). 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 12 V DC supply.

FCC Accreditation
90987 Octagon House, Fareham Test Laboratory

1.6 DEVIATIONS FROM THE STANDARD

No deviations from the applicable test standard 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
ip.access Ltd 239B E16 3G Enterprise Access Point (Bands 2 & 5)
In accordance with FCC CFR 47 Part 2 and FCC CFR 47 Part 22

2.1 SPURIOUS EMISSIONS AT BAND EDGE

2.1.1 Specification Reference

FCC CFR 47 Part 2, Clause 2.1051
FCC CFR 47 Part 22, Clause 22.905

2.1.2 Equipment Under Test and Modification State

239B S/N: 000295-0000105698 - Modification State 0

2.1.3 Date of Test

23 July 2012

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

In accordance with 22.917(e), any emissions outside of the block edges shall be attenuated by at least 43 + 10 log (P). The measurements are shown to ±1 MHz from the block edges. The plots shown under the Spurious Emissions sections covers the required range of 9 kHz to 9 GHz.

The reference power and path losses of all channels used for testing in each frequency block were measured. Having entered the reference level offset, a limit line was displayed, showing the -13 dBm (43 + 10 log (P)), limit. The EUT was operated at maximum power WCDMA modulation schemes.

2.1.6 Environmental Conditions

Ambient Temperature	26.6°C
Relative Humidity	30.4%

Product Service

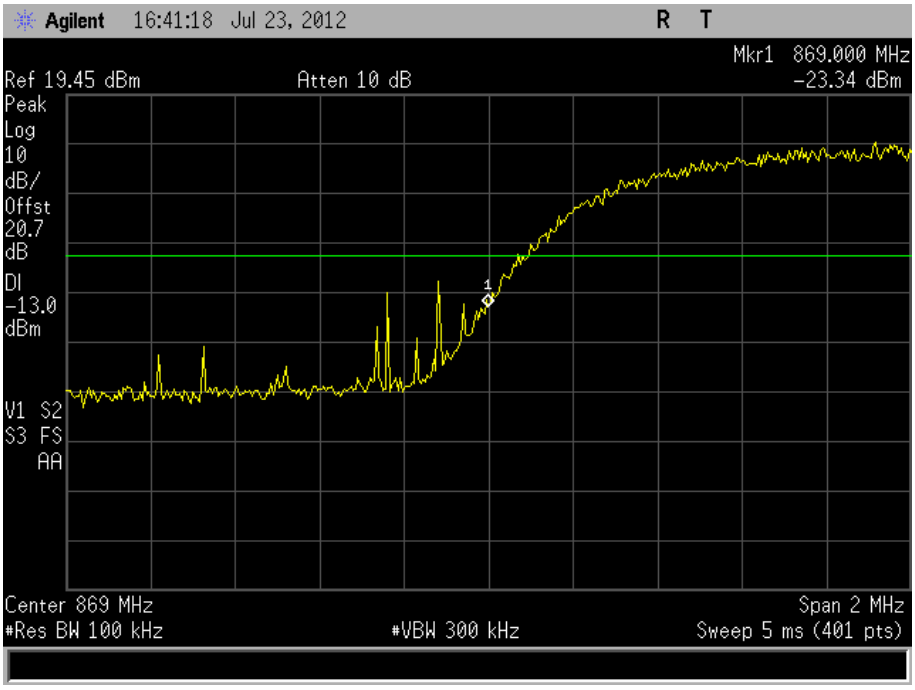
2.1.7 Test Results

Transmit - with 12V AC/DC Adapter

12 V DC Supply

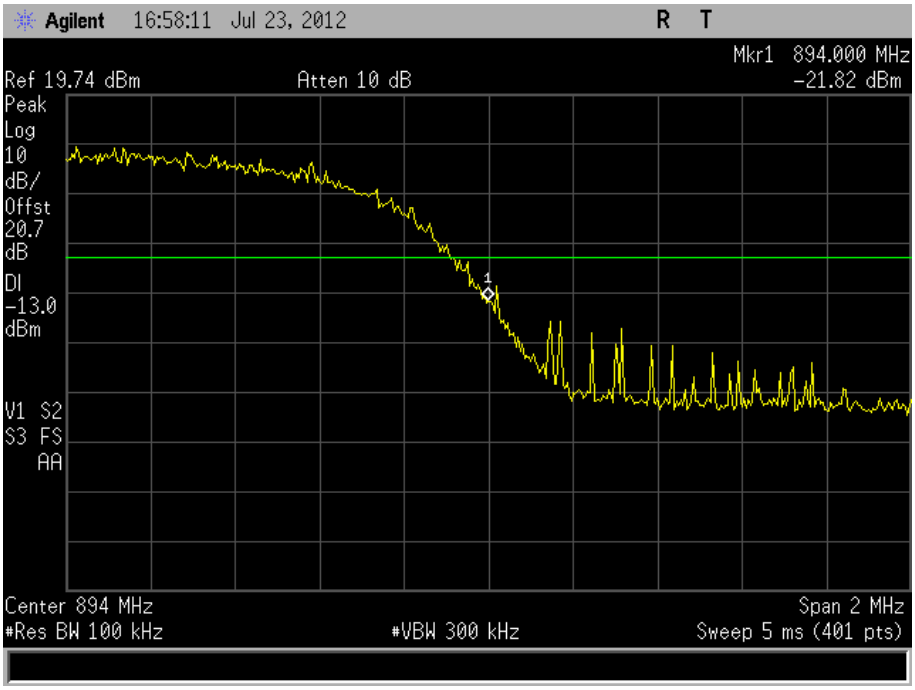
Frequency Block (MHz)	Mode	Lower Block Edge Test Channels/Frequencies	Upper Block Edge Test Channels/Frequencies
A :(824.0 – 835.0)	WCDMA	Channel : 4357 Frequency : 871.4 MHz	N/A
B :(846.5 – 849.0)	WCDMA	N/A	Channel : 4458 Frequency : 891.6MHz

Frequency Block A



Product Service

Frequency Block B



Limit Clause

-13 dBm at block edge.

2.2 EFFECTIVE RADIATED POWER

2.2.1 Specification Reference

FCC CFR 47 Part 22, Clause 22.913 (a)

2.2.2 Equipment Under Test and Modification State

239B S/N: 000295-0000105698 - Modification State 0

2.2.3 Date of Test

15 July 2012, 16 July 2012 & 30 July 2012

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

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.

2.2.6 Environmental Conditions

Ambient Temperature	21.0 - 26.0°C
Relative Humidity	38.8 - 54.0%

Product Service

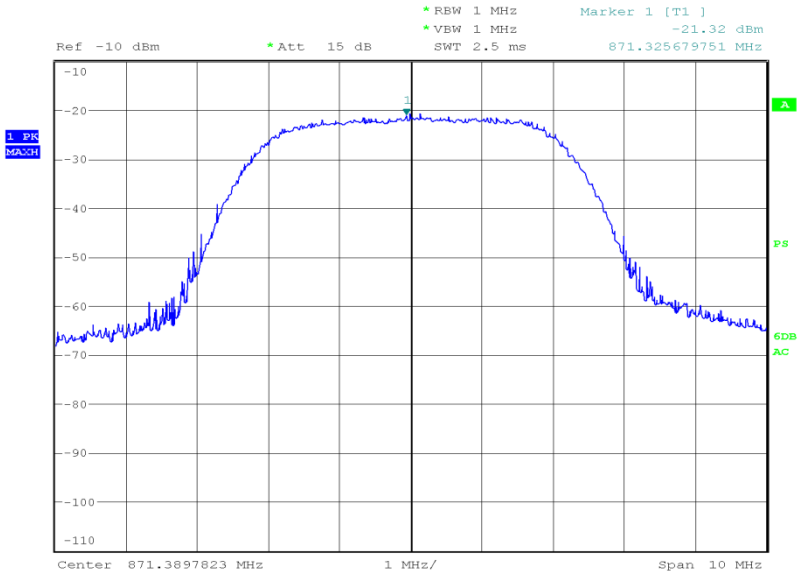
2.2.7 Test Results

Transmit - with 12V AC/DC Adapter

12 V DC Supply

871.4 MHz

Result (dBm)	Result (W)
15.73	0.037

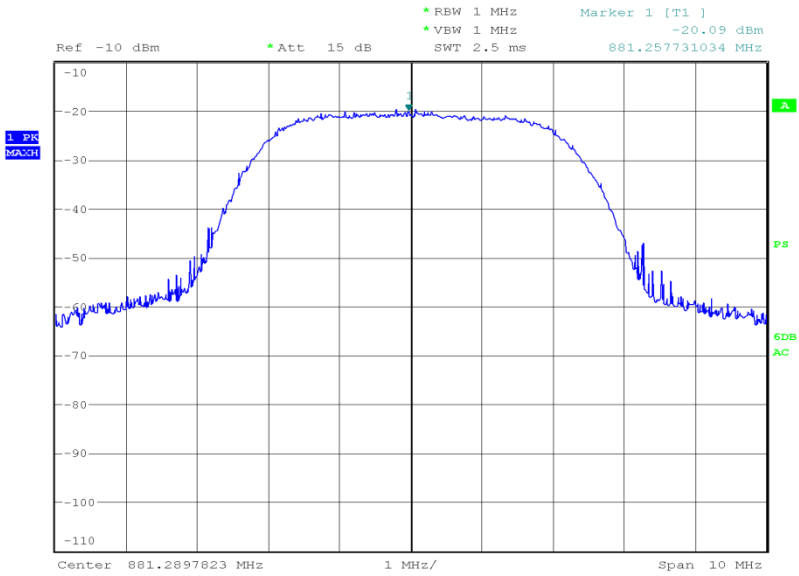


Date: 14.JUL.2012 17:34:22

Product Service

881.6 MHz

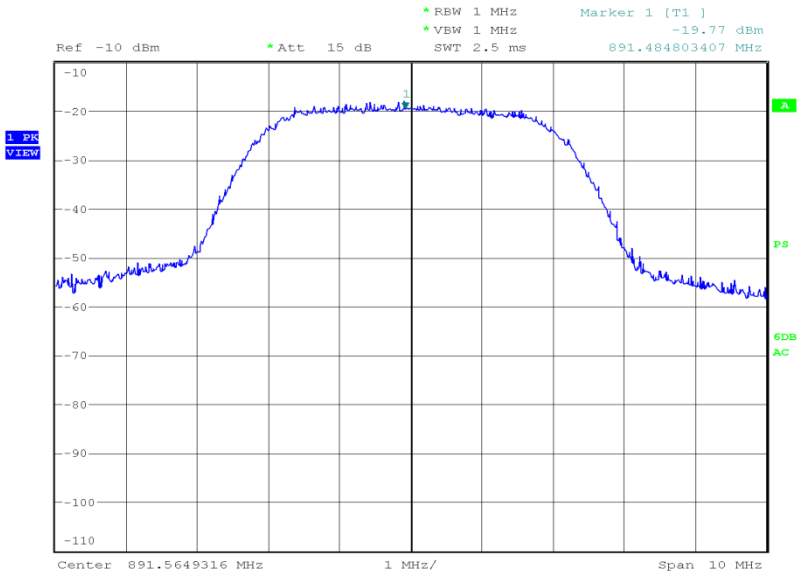
Result (dBm)	Result (W)
16.63	0.046



Product Service

891.6 MHz

Result (dBm)	Result (W)
17.39	0.055



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Limit Clause

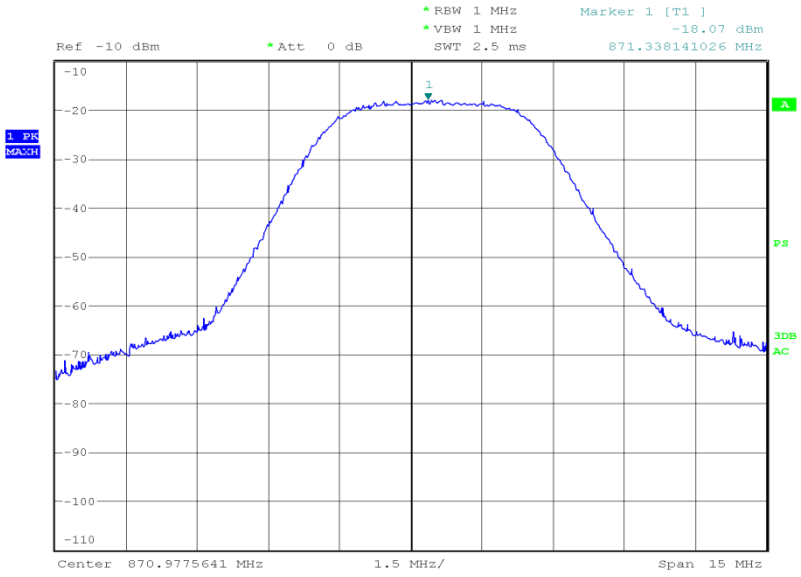
Mobile – 7 W or 38.45 dBm
Base Stations – 500 W or 57 dBm

Transmit - with Microsemi POE Inserter

48 V DC Supply

871.4 MHz

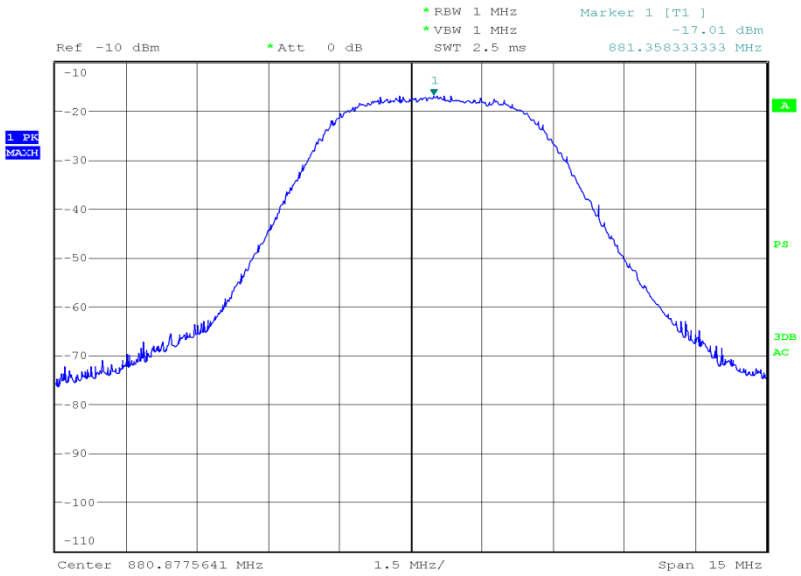
Result (dBm)	Result (W)
19.31	0.085



Date: 16.JUL.2012 18:46:16

881.6 MHz

Result (dBm)	Result (W)
20.77	0.119



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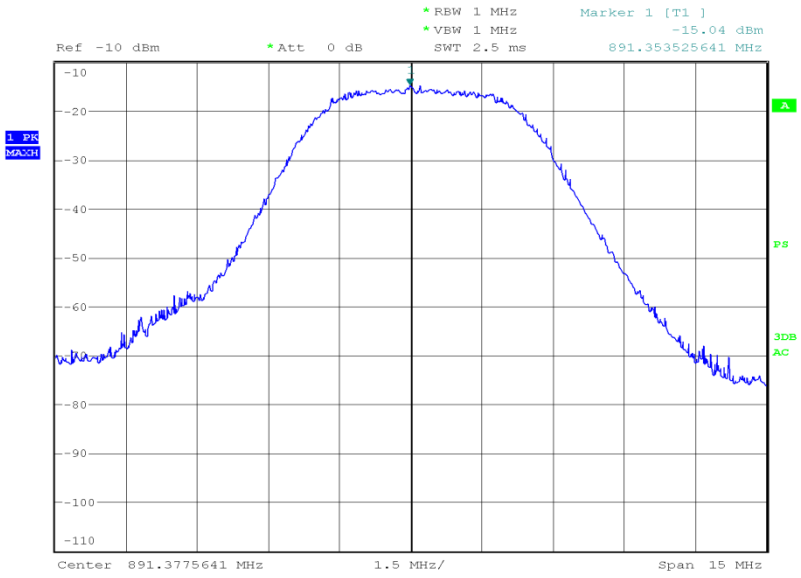
891.6 MHz

Result (dBm)	Result (W)
22.48	0.177



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Limit Clause

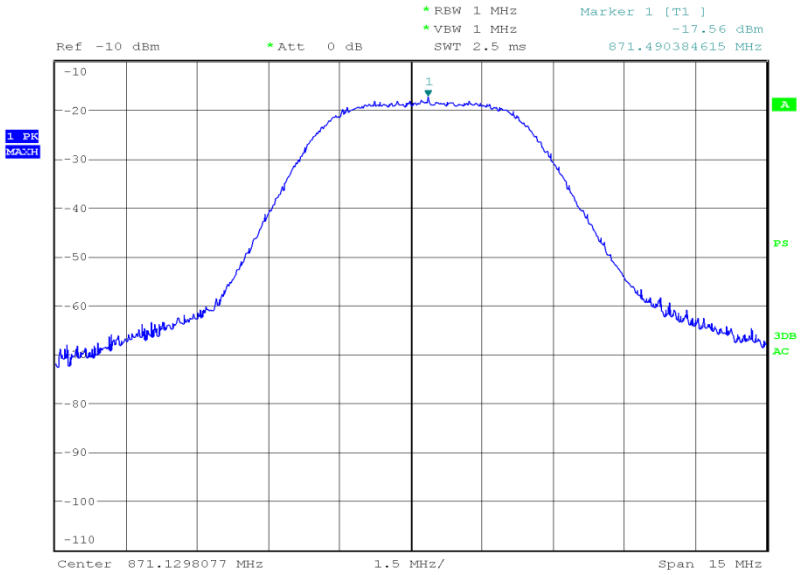
Mobile – 7 W or 38.45 dBm
Base Stations – 500 W or 57 dBm

Transmit - with Phihong POE Inserter

48 V DC Supply

871.4 MHz

Result (dBm)	Result (W)
19.82	0.096



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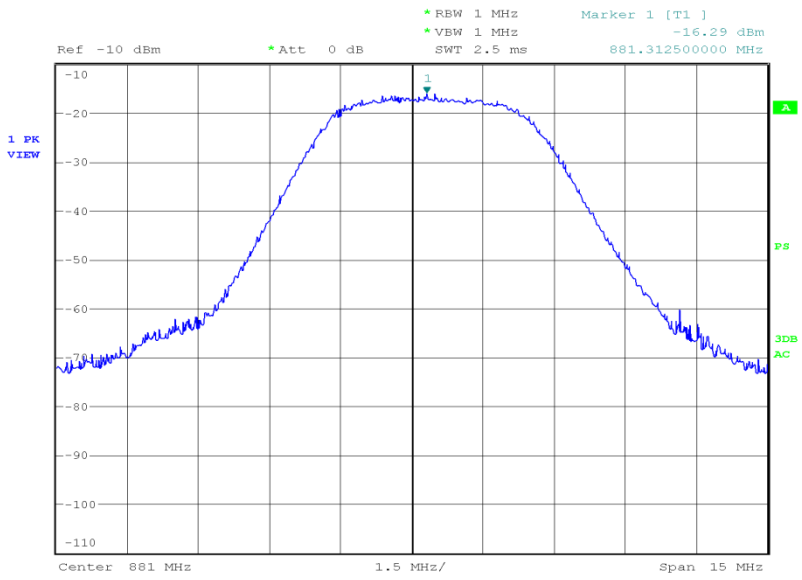
881.6 MHz

Result (dBm)	Result (W)
21.51	0.141



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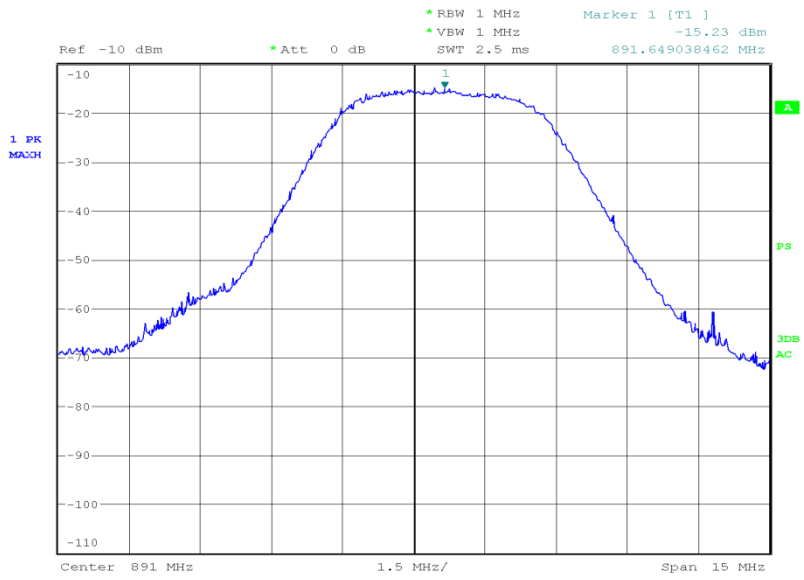
891.6 MHz

Result (dBm)	Result (W)
22.29	0.169



Date: 16.JUL.2012 20:51:00

Limit Clause

Mobile – 7 W or 38.45 dBm
Base Stations – 500 W or 57 dBm

2.3 MAXIMUM PEAK OUTPUT POWER - CONDUCTED

2.3.1 Specification Reference

FCC CFR 47 Part 2, Clause 2.1046
FCC CFR 47 Part 22, Clause 22.913 (a)

2.3.2 Equipment Under Test and Modification State

239B S/N: 000295-0000105698 - Modification State 0

2.3.3 Date of Test

30 July 2012

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

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. .

2.3.6 Environmental Conditions

Ambient Temperature	18.2°C
Relative Humidity	43.8%

Product Service

2.3.7 Test Results

Transmit - with 12V AC/DC Adapter

12 V DC Supply

871.4 MHz

Mode	Result (dBm)	Result (W)
WCDMA	23.71	0.23

881.6 MHz

Mode	Result (dBm)	Result (W)
WCDMA	23.74	0.24

891.6 MHz

Mode	Result (dBm)	Result (W)
WCDMA	23.64	0.23

Limit Clause

Mobile – 7 W or 38.45 dBm
Base Stations – 500 W or 57 dBm

Product Service

2.4 EMISSION LIMITATIONS FOR CELLULAR EQUIPMENT

2.4.1 Specification Reference

FCC CFR 47 Part 22, Clause 22.917

2.4.2 Equipment Under Test and Modification State

239B S/N: 000295-0000105698 - Modification State 0

2.4.3 Date of Test

15 July 2012, 16 July 2012 & 17 July 2012

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

A preliminary profile of the Spurious Radiated Emissions was obtained up to the 10th harmonic by operating the EUT on a remotely controlled turntable within a semi-anechoic chamber. Measurements of emissions from the EUT were obtained with the Measurement Antenna in both Horizontal and Vertical Polarisations. The profiling produced a list of the worst-case emissions together with the EUT azimuth and antenna polarisation.

Using the information from the preliminary profiling of the EUT, the list of emissions was then confirmed or updated under Alternative Open Site conditions. Emission levels were maximised by adjusting the antenna height, antenna polarisation and turntable azimuth.

The EUT was set to transmit on maximum power with modulation. The EUT was tested on bottom, middle and top channels at maximum power.

For any emissions found 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 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.

2.4.6 Environmental Conditions

Ambient Temperature	20.4 - 22.1°C
Relative Humidity	48.0 - 63.0%

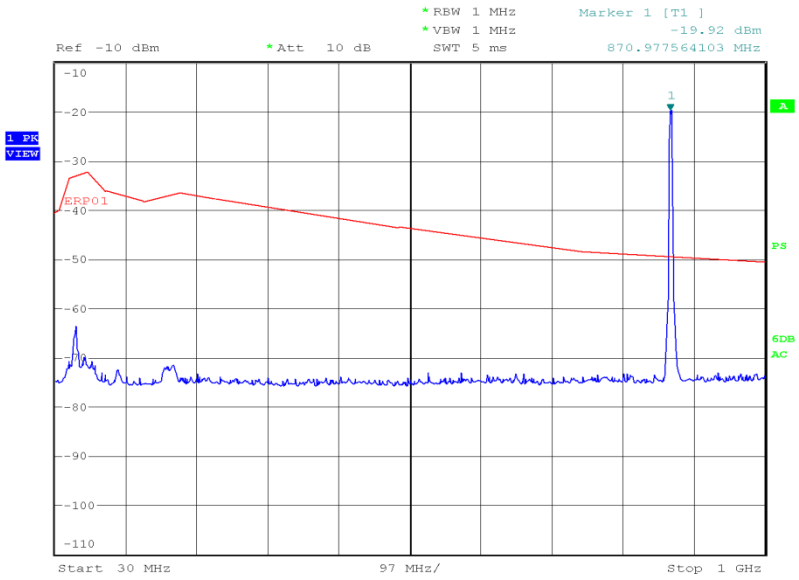
Product Service

2.4.7 Test Results

Transmit - with 12V AC/DC Adapter

871.4 MHz

30 MHz to 1 GHz



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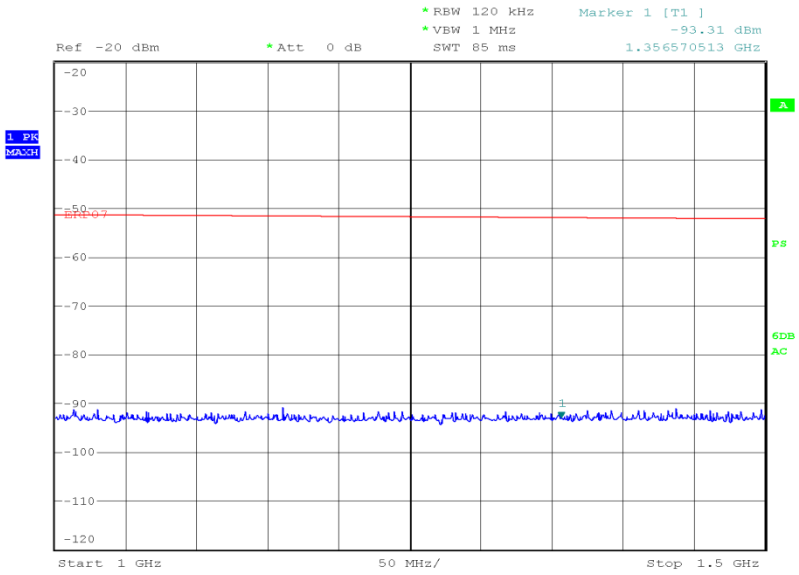
1 GHz to 1.5 GHz



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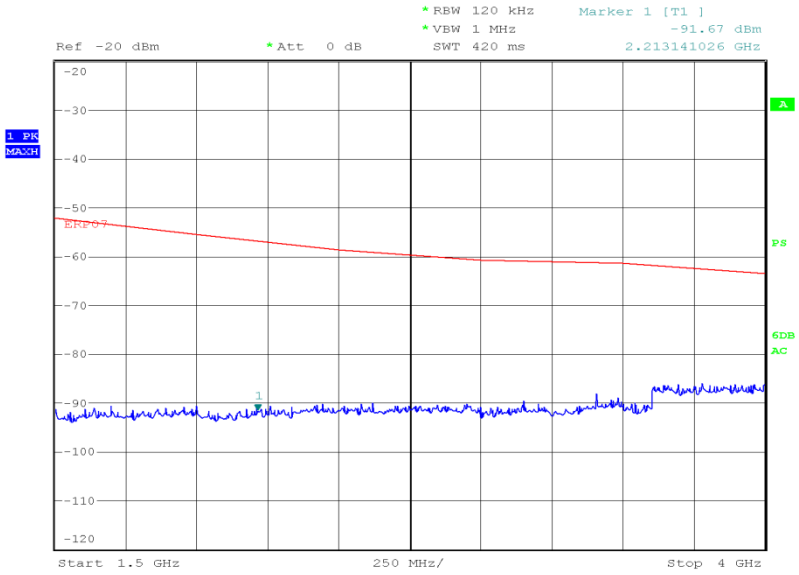
Product Service

1.5 GHz to 5 GHz



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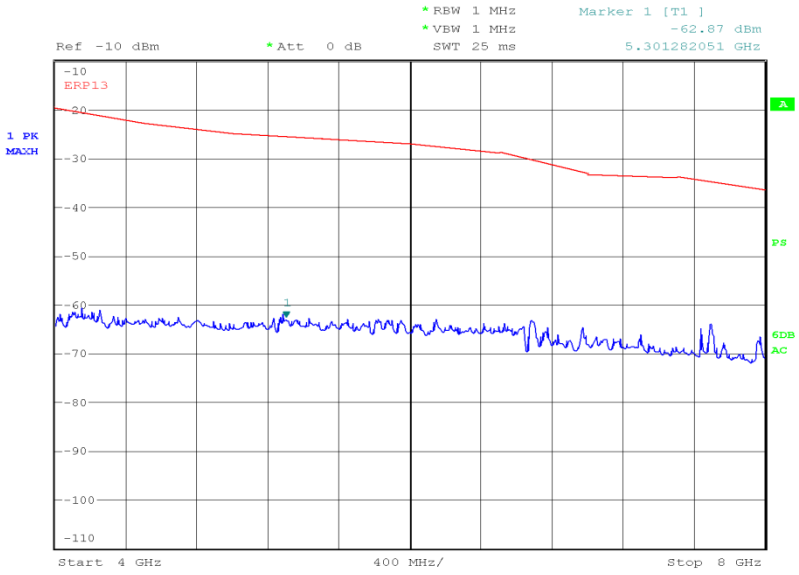
5 GHz to 8 GHz



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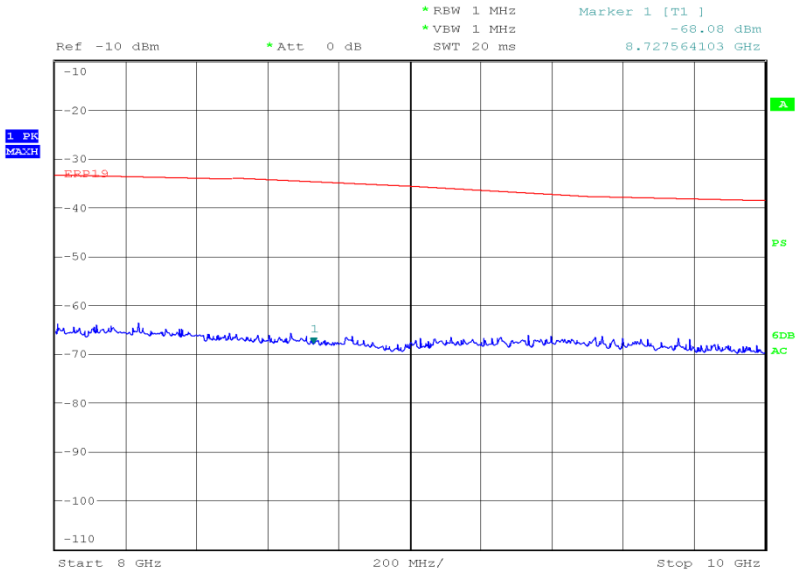
Product Service

8 GHz to 10 GHz



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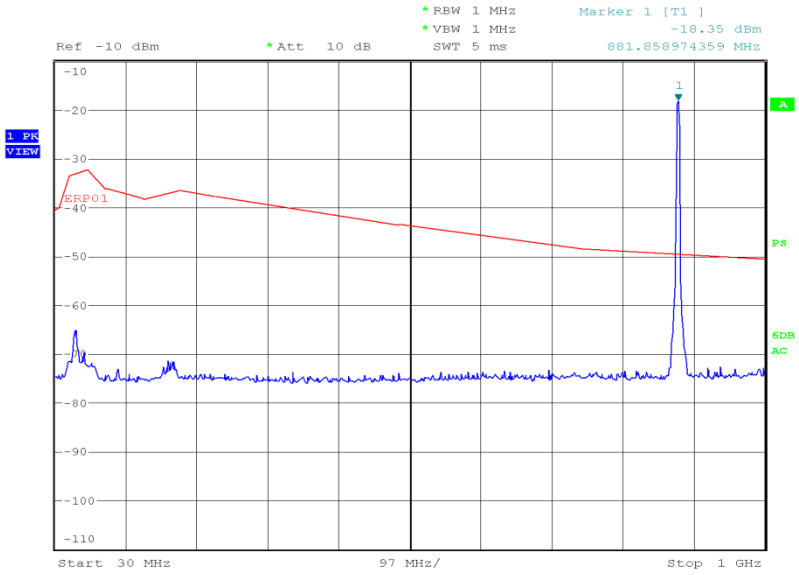
881.6 MHz

30 MHz to 1 GHz



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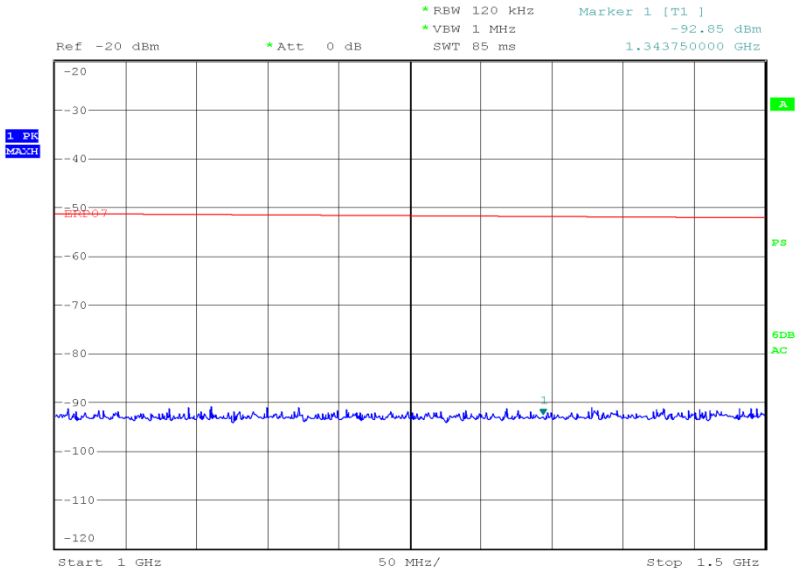
1 GHz to 1.5 GHz



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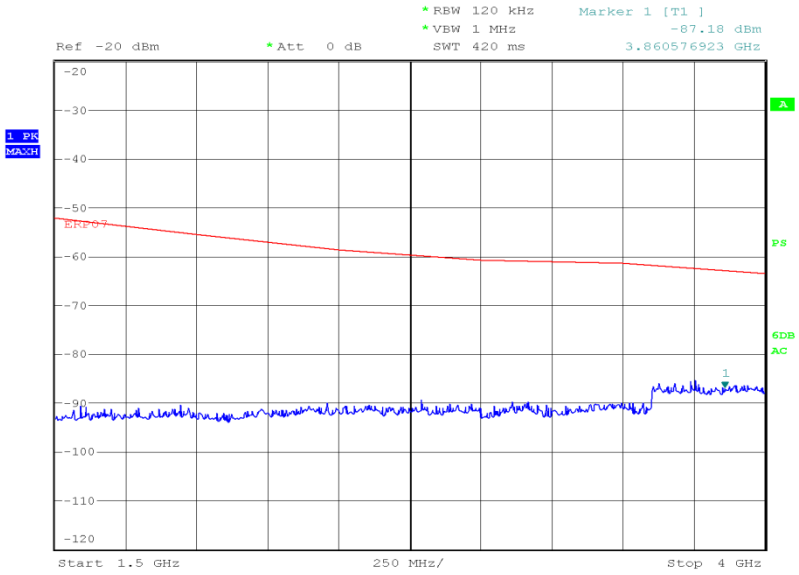
Product Service

1.5 GHz to 5 GHz



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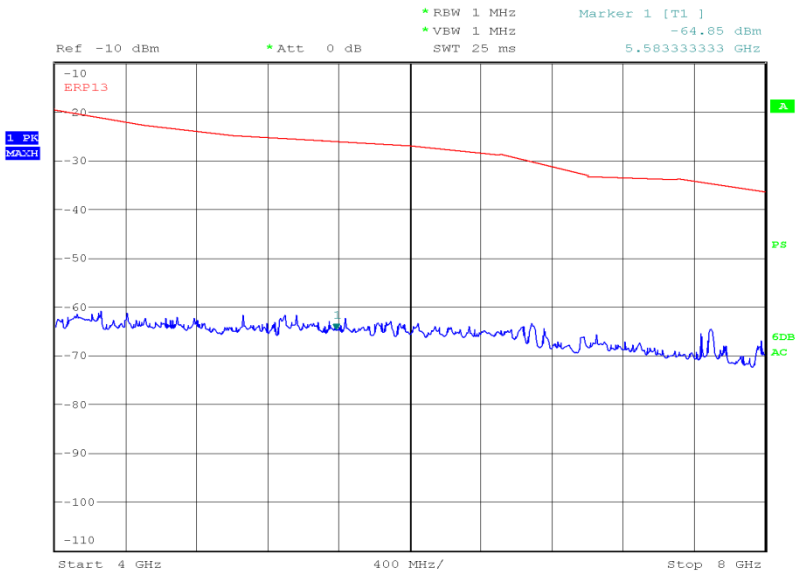
5 GHz to 8 GHz



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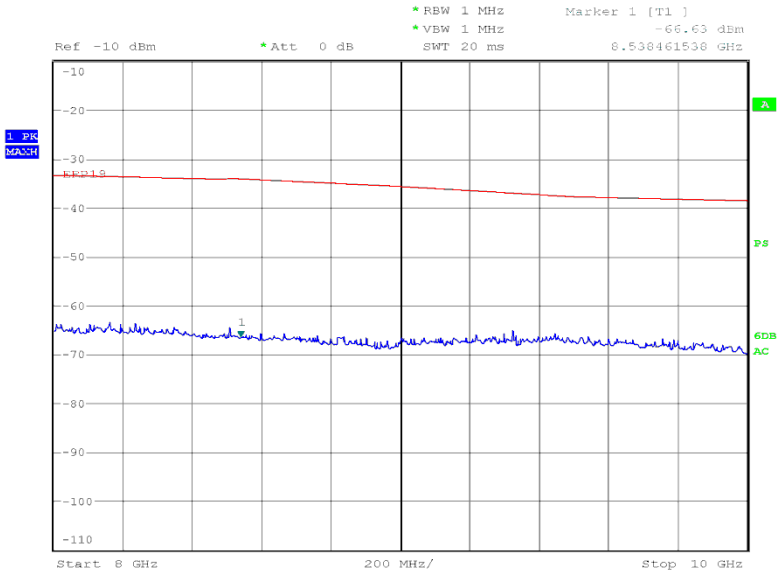
Product Service

8 GHz to 10 GHz



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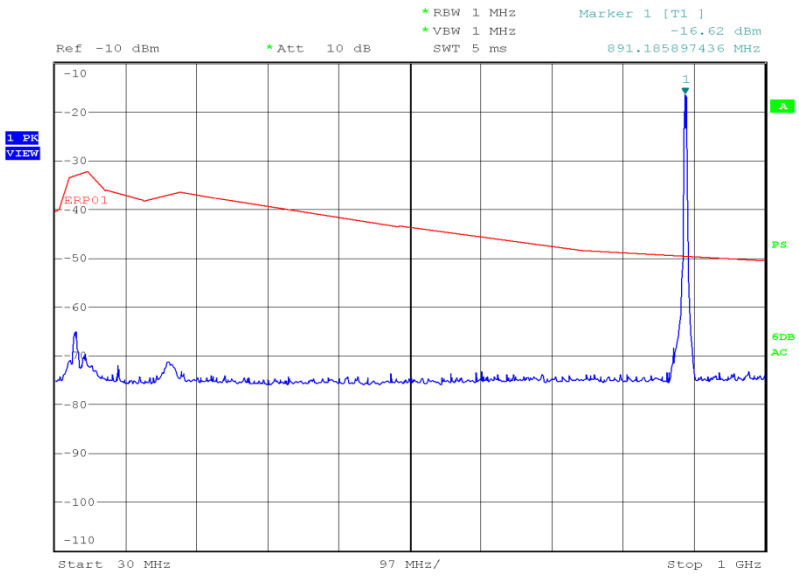
Product Service

891.6 MHz

30 MHz to 1 GHz



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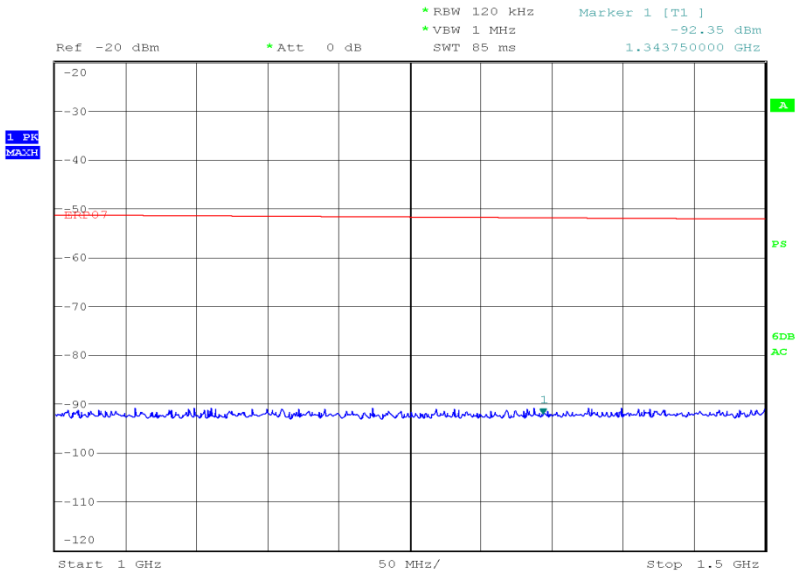
1 GHz to 1.5 GHz



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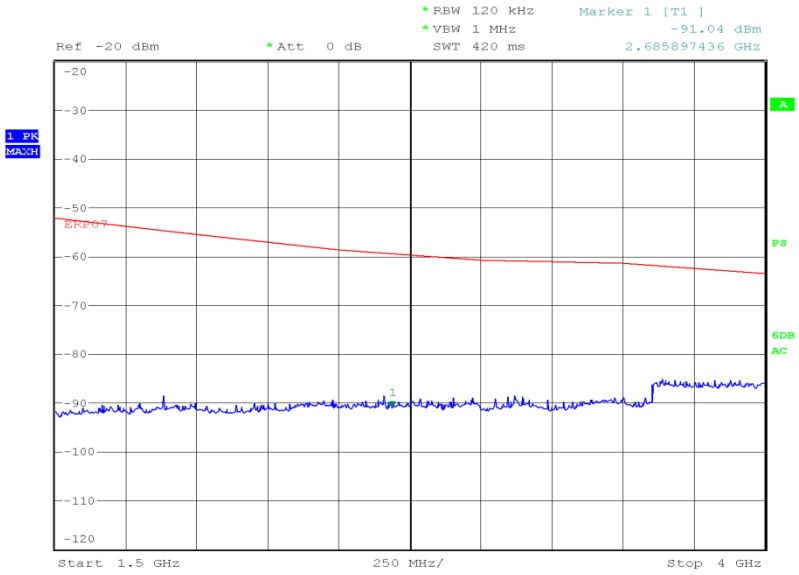
Product Service

1.5 GHz to 5 GHz



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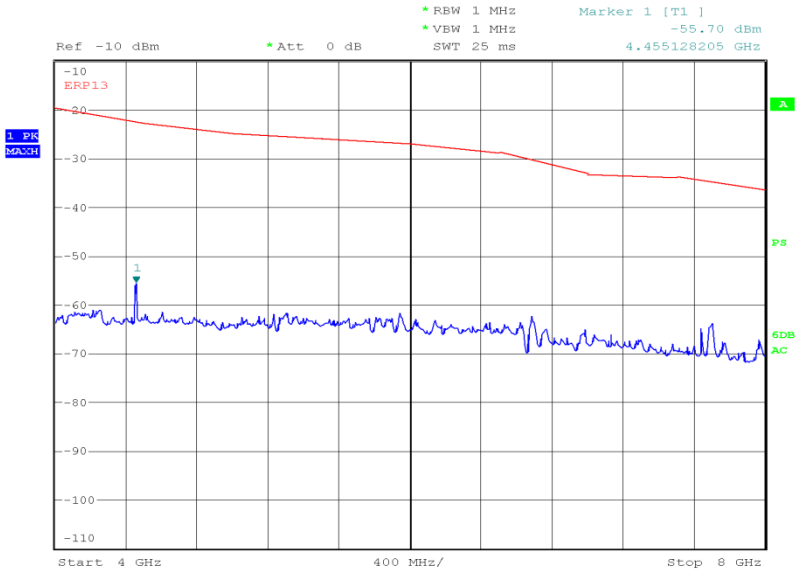
5 GHz to 8 GHz



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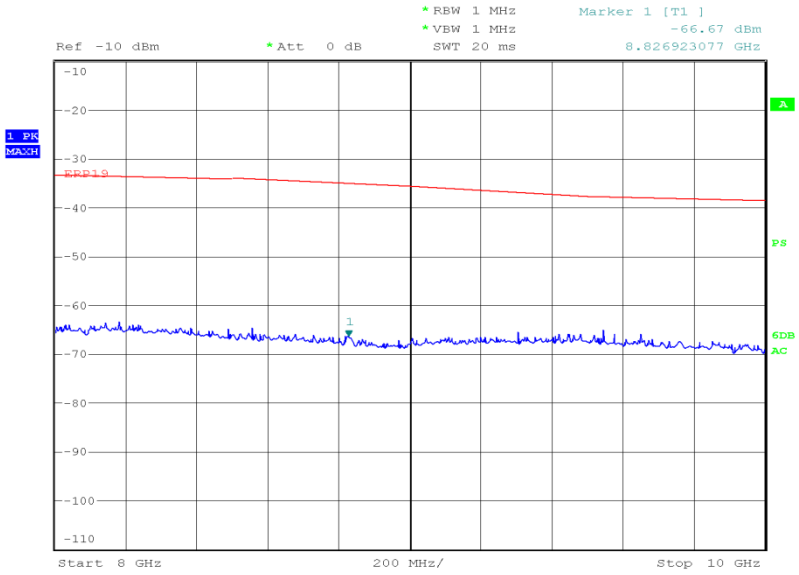
Product Service

8 GHz to 10 GHz



Date: 15.JUL.2012 12:54:33

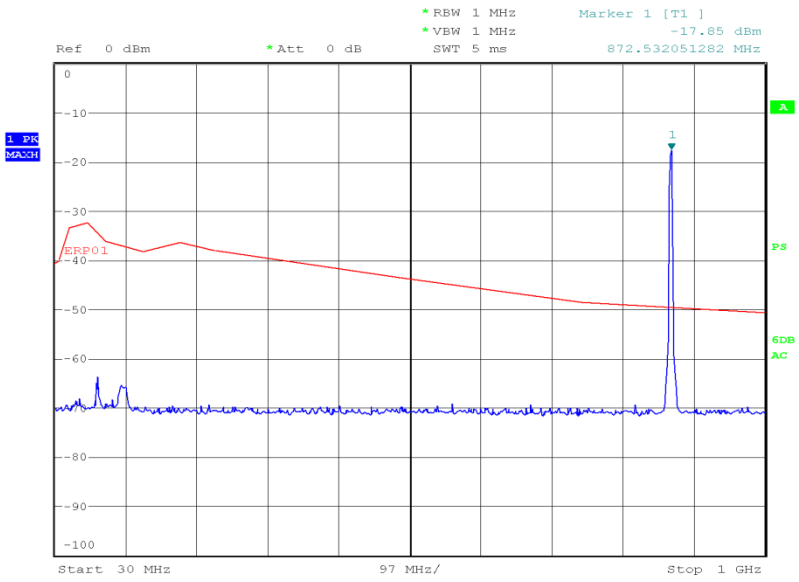
Limit Clause

43+10log(P) or -13 dBm

Transmit - with Microsemi POE Inserter

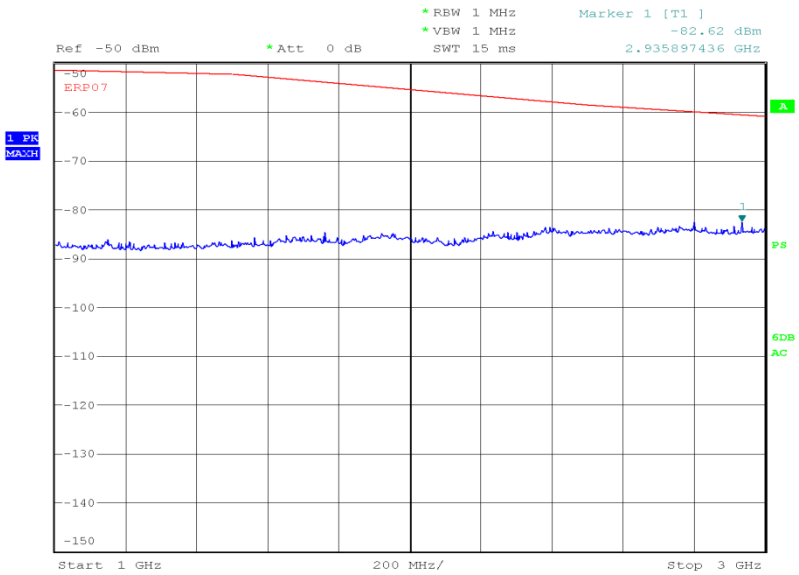
871.4 MHz

30 MHz to 1 GHz



Date: 16.JUL.2012 18:06:59

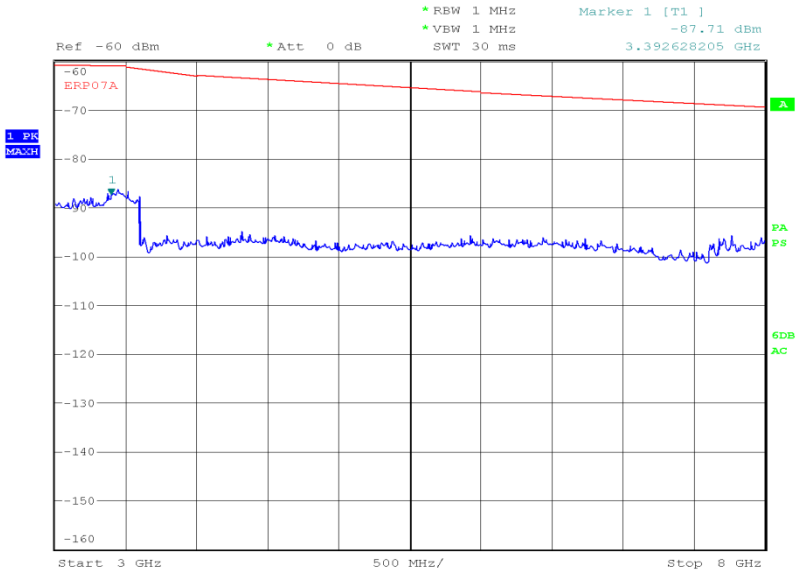
1 GHz to 3 GHz



Date: 16.JUL.2012 22:06:16

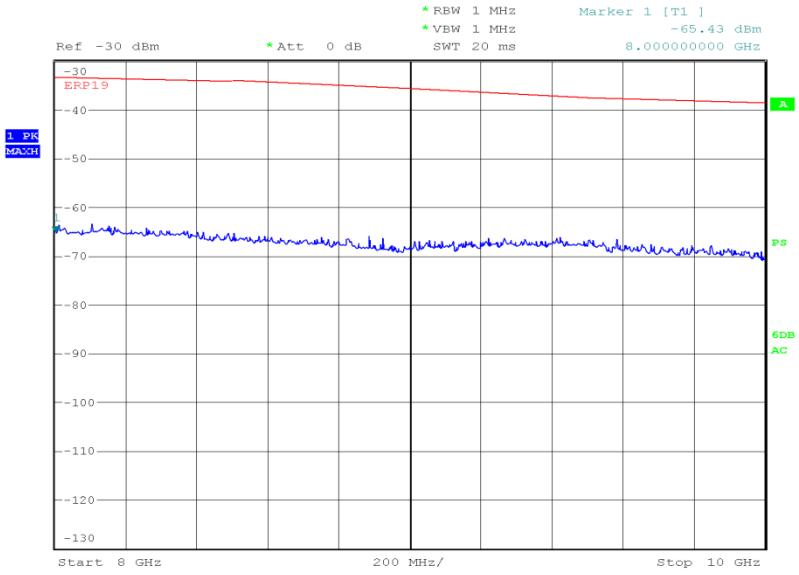
Product Service

3 GHz to 8 GHz



Date: 16.JUL.2012 21:58:22

8 GHz to 10 GHz

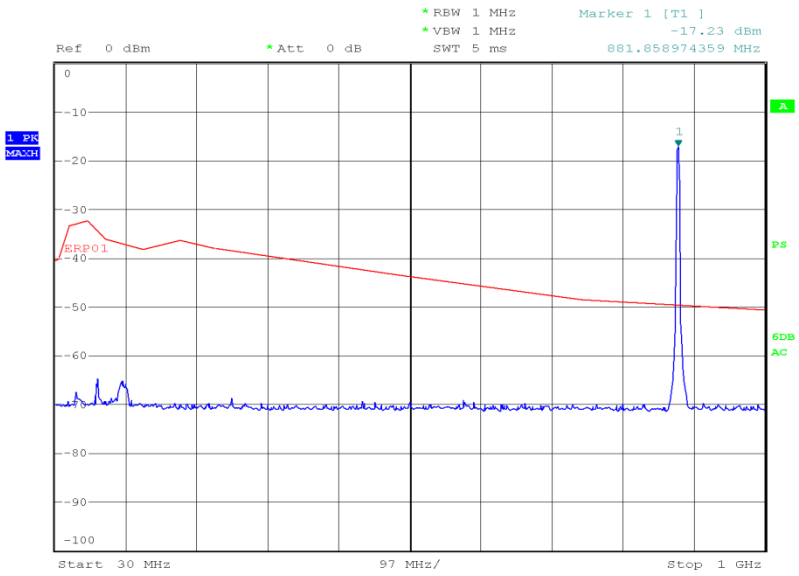


Date: 17.JUL.2012 15:28:25

Product Service

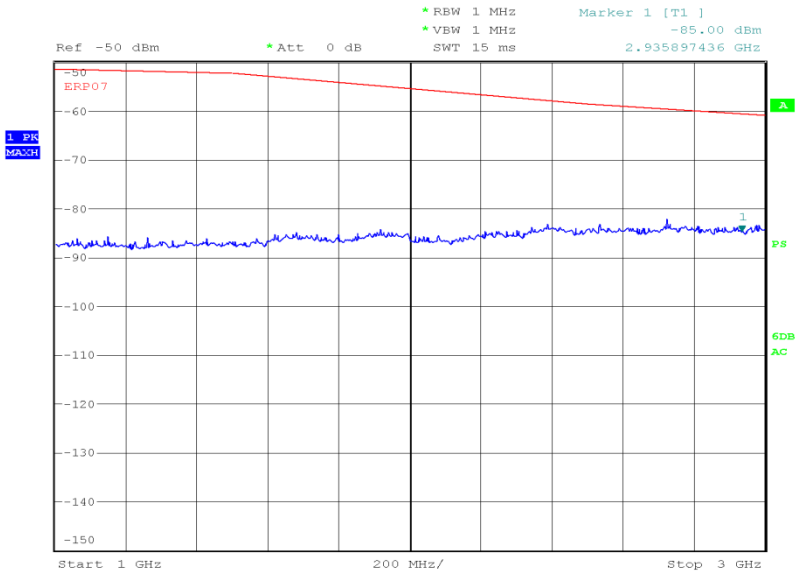
881.6 MHz

30 MHz to 1 GHz



Date: 16.JUL.2012 18:03:20

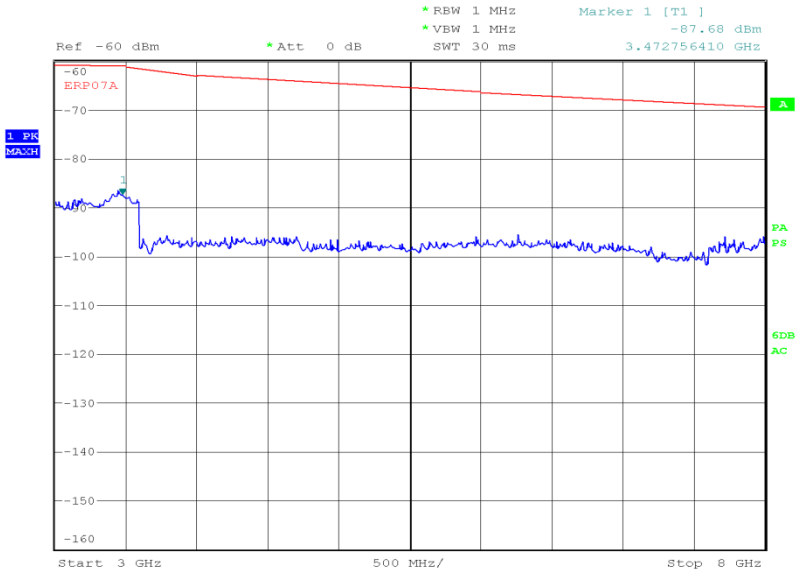
1 GHz to 3 GHz



Date: 16.JUL.2012 22:08:27

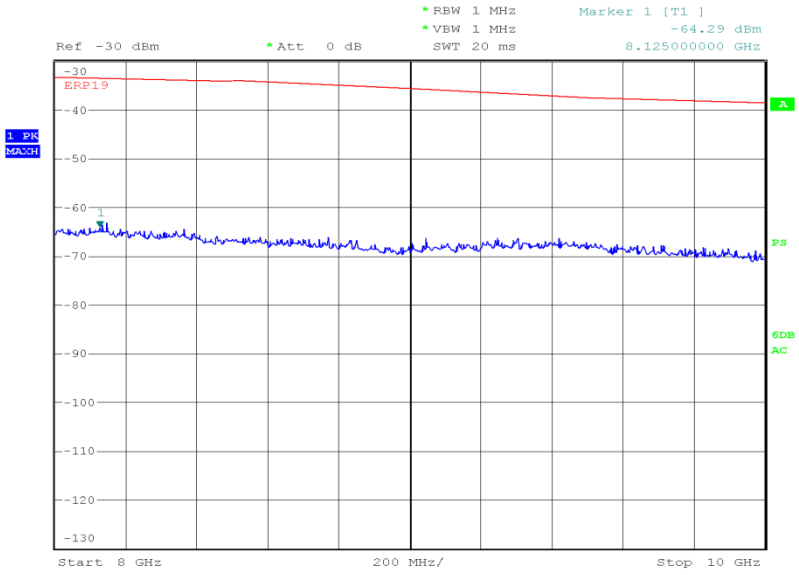
Product Service

3 GHz to 8 GHz



Date: 16.JUL.2012 22:00:11

8 GHz to 10 GHz

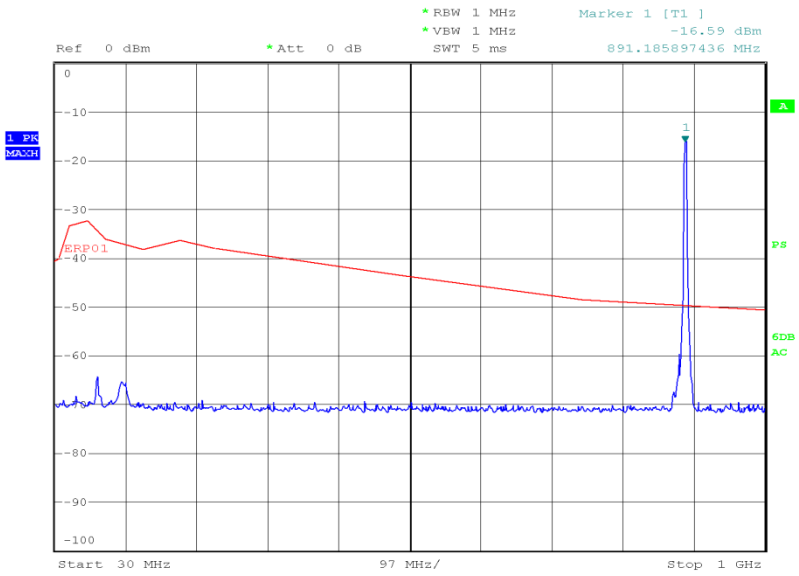


Date: 17.JUL.2012 15:30:14

Product Service

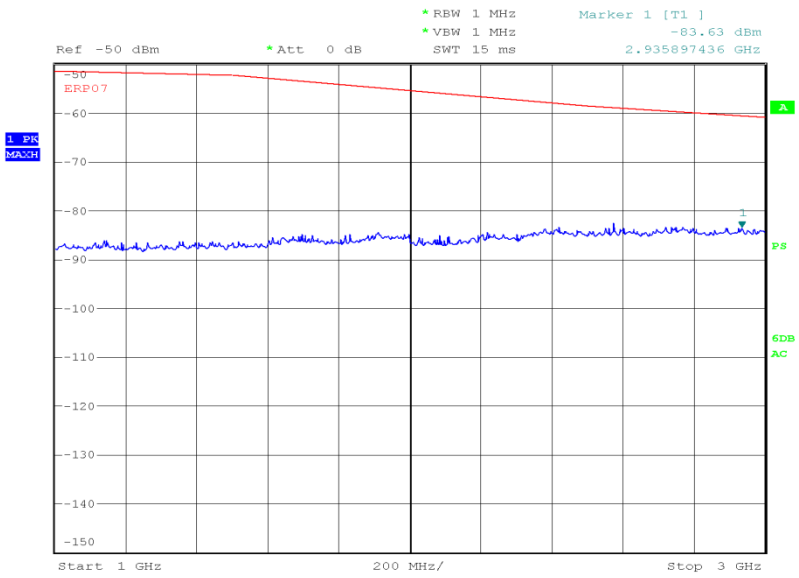
891.6 MHz

30 MHz to 1 GHz



Date: 16.JUL.2012 17:58:50

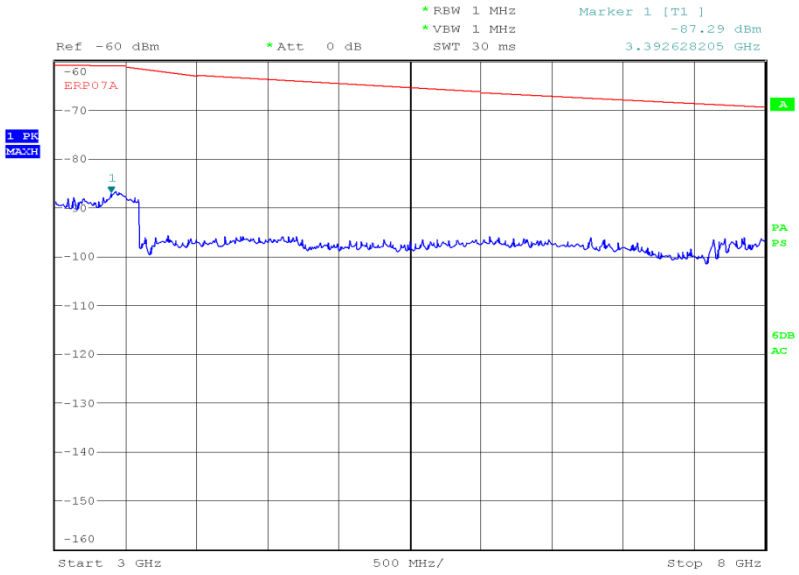
1 GHz to 3 GHz



Date: 16.JUL.2012 22:10:37

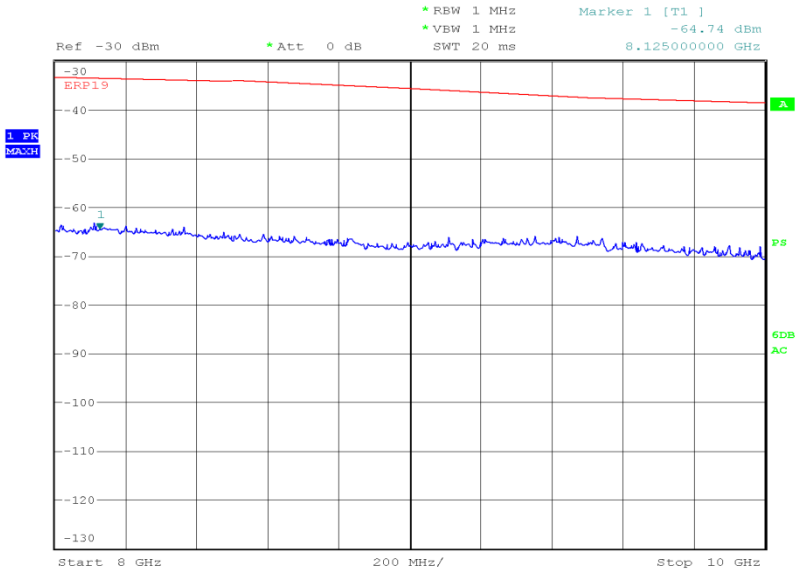
Product Service

3 GHz to 8 GHz



Date: 16.JUL.2012 22:03:03

8 GHz to 10 GHz



Date: 17.JUL.2012 15:39:31

Limit Clause

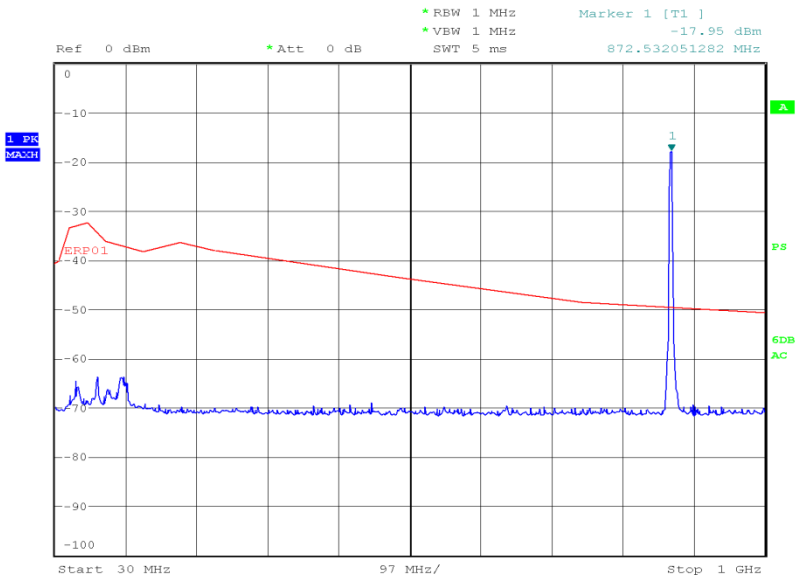
43+10log(P) or -13 dBm

Product Service

Transmit - with Phihong POE Inserter

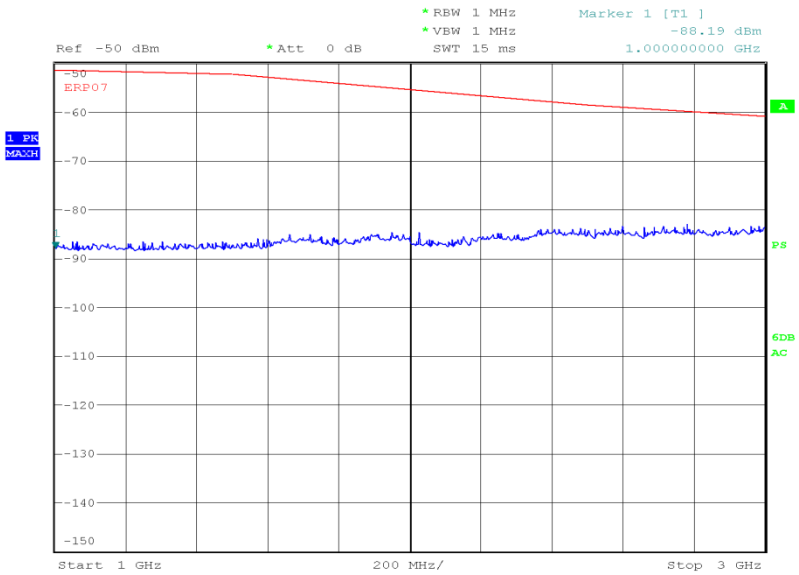
871.4 MHz

30 MHz to 1 GHz



Date: 16.JUL.2012 16:38:16

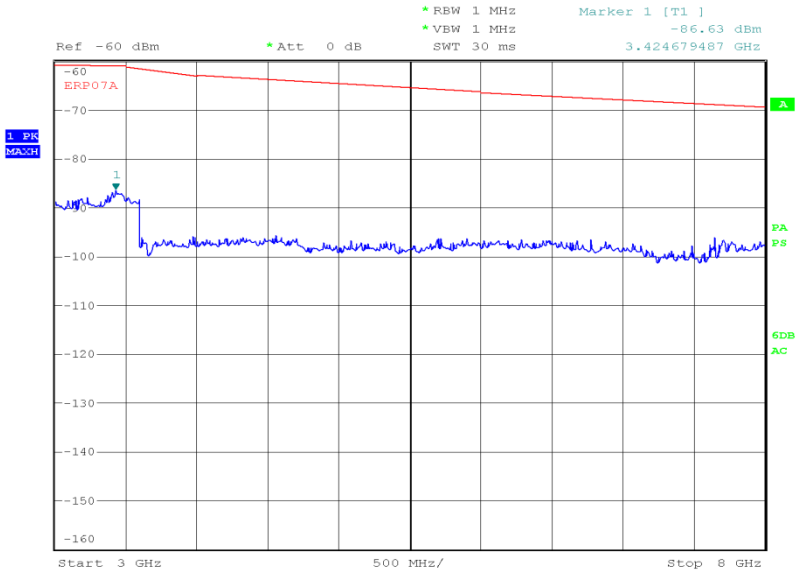
1 GHz to 3 GHz



Date: 16.JUL.2012 20:58:22

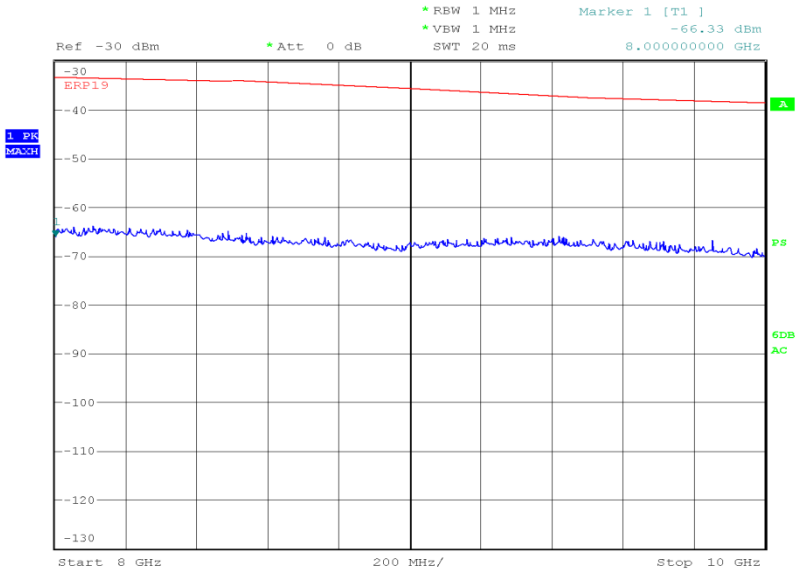
Product Service

3 GHz to 8 GHz



Date: 16.JUL.2012 22:34:23

8 GHz to 10 GHz

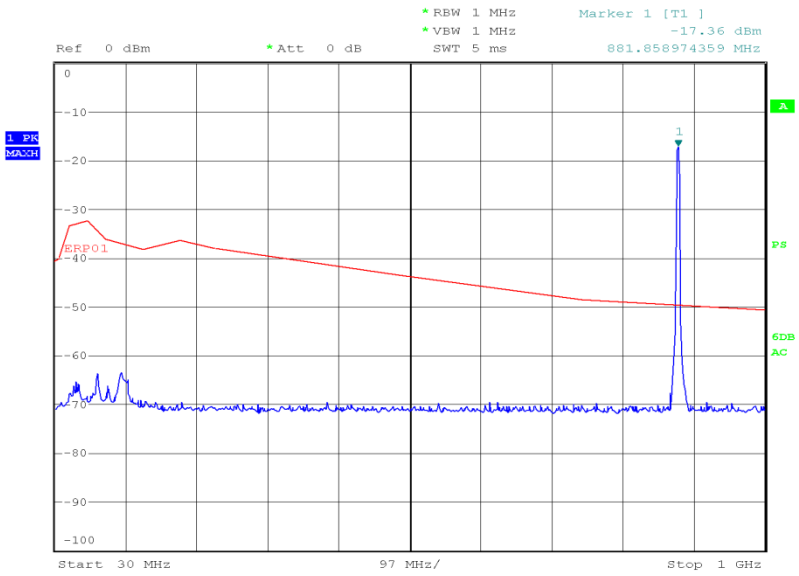


Date: 17.JUL.2012 16:14:24

Product Service

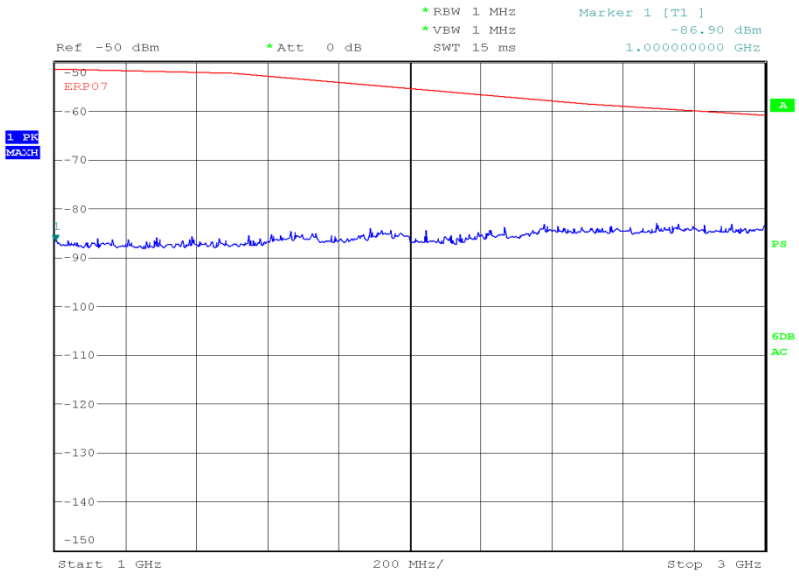
881.6 MHz

30 MHz to 1 GHz



Date: 16.JUL.2012 16:35:40

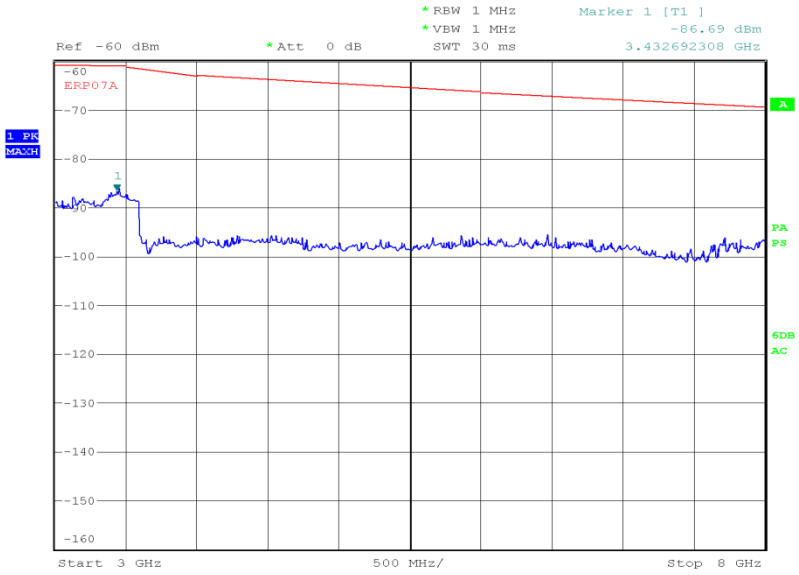
1 GHz to 3 GHz



Date: 16.JUL.2012 21:00:23

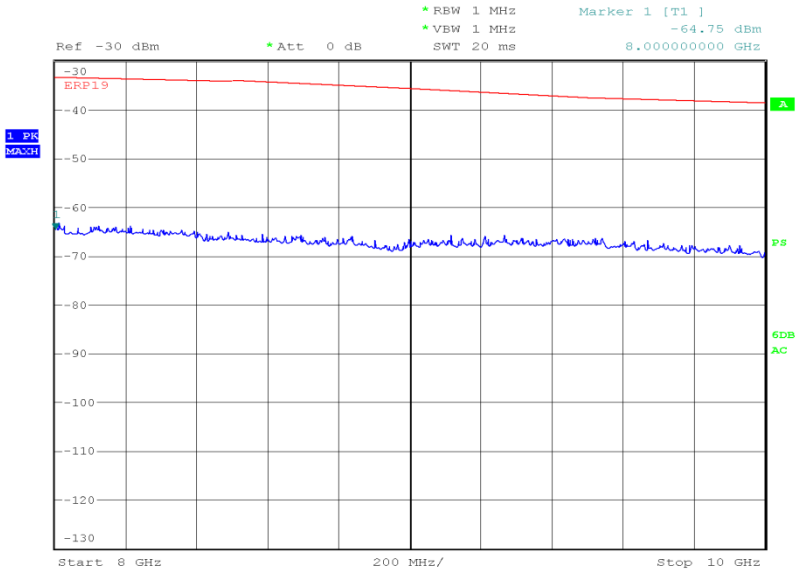
Product Service

3 GHz to 8 GHz



Date: 16.JUL.2012 22:37:00

8 GHz to 10 GHz

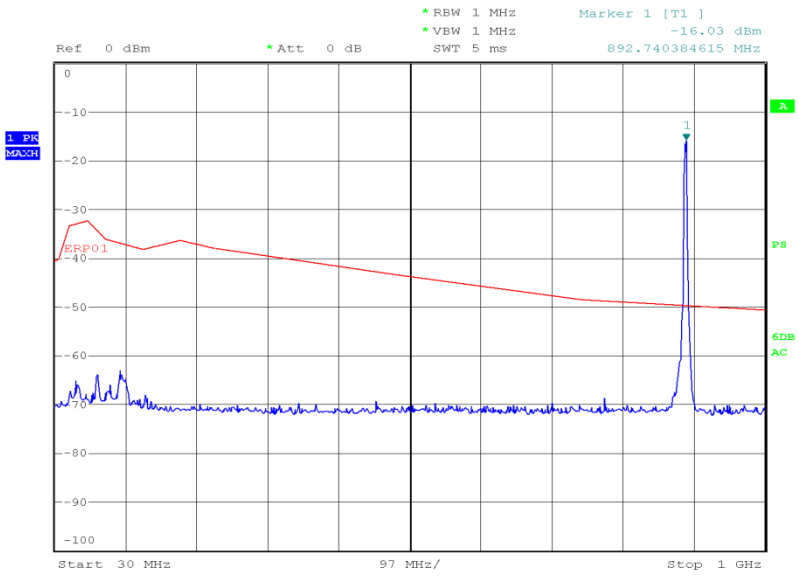


Date: 17.JUL.2012 16:21:32

Product Service

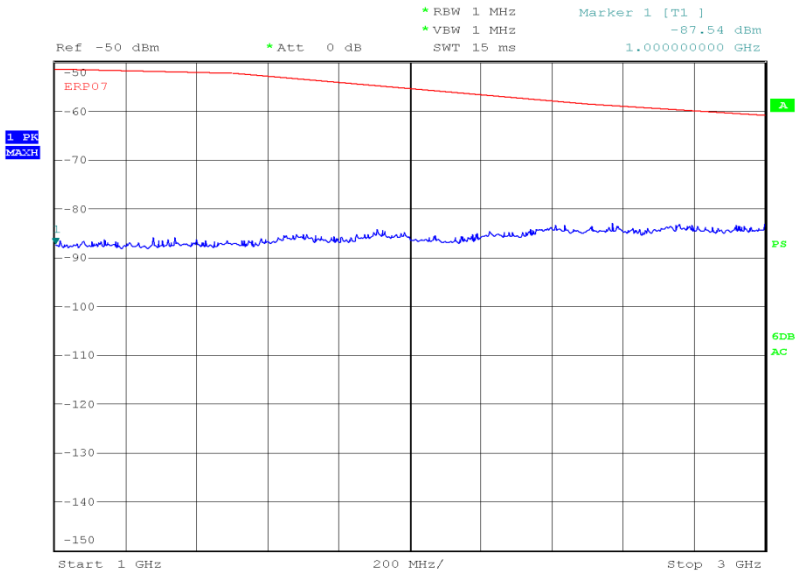
891.6 MHz

30 MHz to 1 GHz



Date: 16.JUL.2012 16:45:12

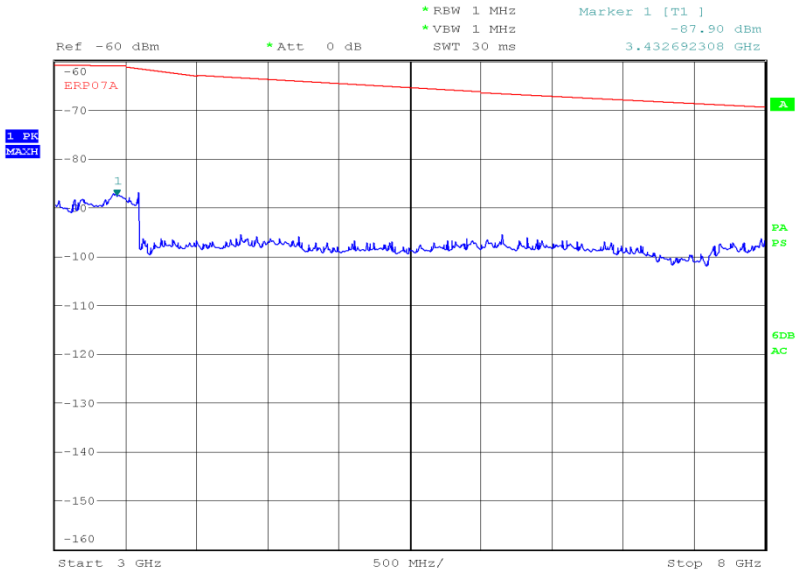
1 GHz to 3 GHz



Date: 16.JUL.2012 21:02:30

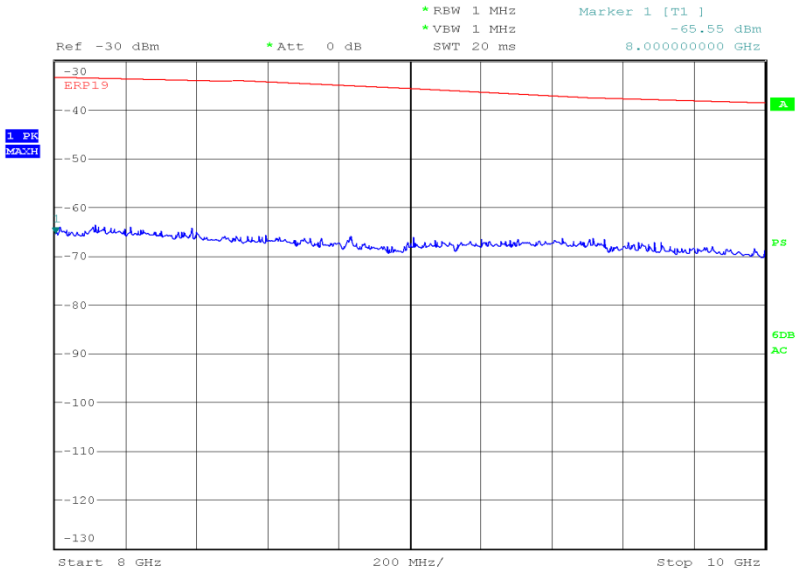
Product Service

3 GHz to 8 GHz



Date: 16.JUL.2012 22:38:09

8 GHz to 10 GHz



Date: 17.JUL.2012 16:25:15

Limit Clause

43+10log(P) or -13 dBm

2.5 CONDUCTED SPURIOUS EMISSIONS

2.5.1 Specification Reference

FCC CFR 47 Part 2, Clause 2.1051
FCC CFR 47 Part 22, Clause 22.917 (a)

2.5.2 Equipment Under Test and Modification State

239B S/N: 000295-0000105698 - Modification State 0

2.5.3 Date of Test

23 July 2012

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

In accordance with Part 2.1051, the spurious emissions from the antenna terminal were measured. The transmitter output power was attenuated using a combination of filters and attenuators and the frequency spectrum investigated from 9 kHz to the 10th harmonic. The EUT was set to transmit on full power with modulation. The EUT was tested on Bottom, Middle and Top channels for maximum power. The resolution and video bandwidths were set to 1 MHz and 3 MHz thus meeting the requirements of Part 22.917(b). The spectrum analyser detector was set to max hold.

From 9 kHz to 4 GHz, an attenuator was used. For measuring the range 1.5 GHz to 9 GHz an attenuator and high pass filter were used. This was to reduce saturation effects in the spectrum analyser.

The maximum path loss across the measurement bands were used as reference level offsets to ensure worst case.

2.5.6 Environmental Conditions

Ambient Temperature	26.6°C
Relative Humidity	30.4%

Product Service

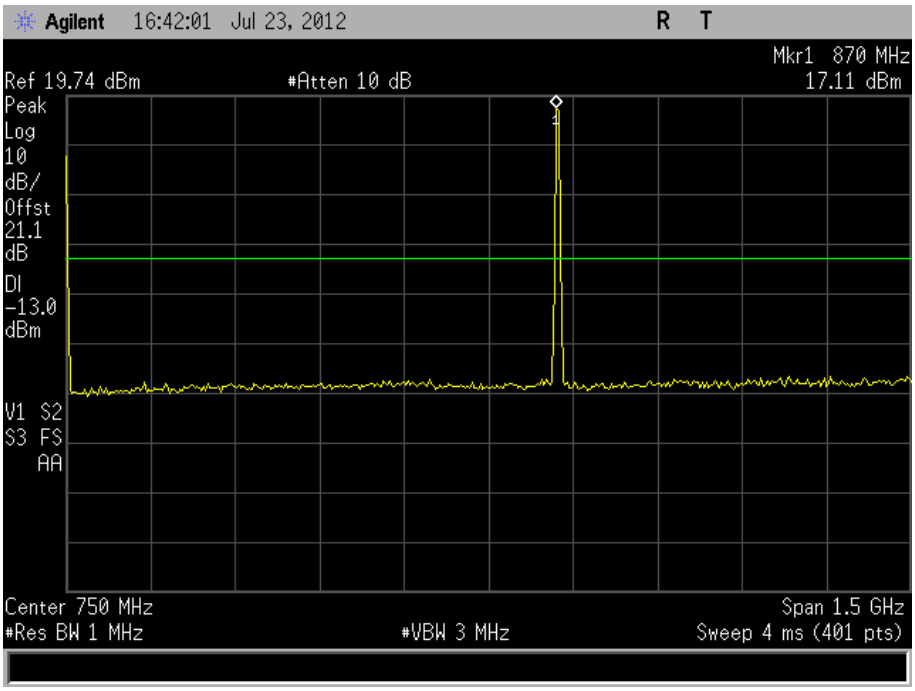
2.5.7 Test Results

Transmit - with 12V AC/DC Adapter

12 V DC Supply

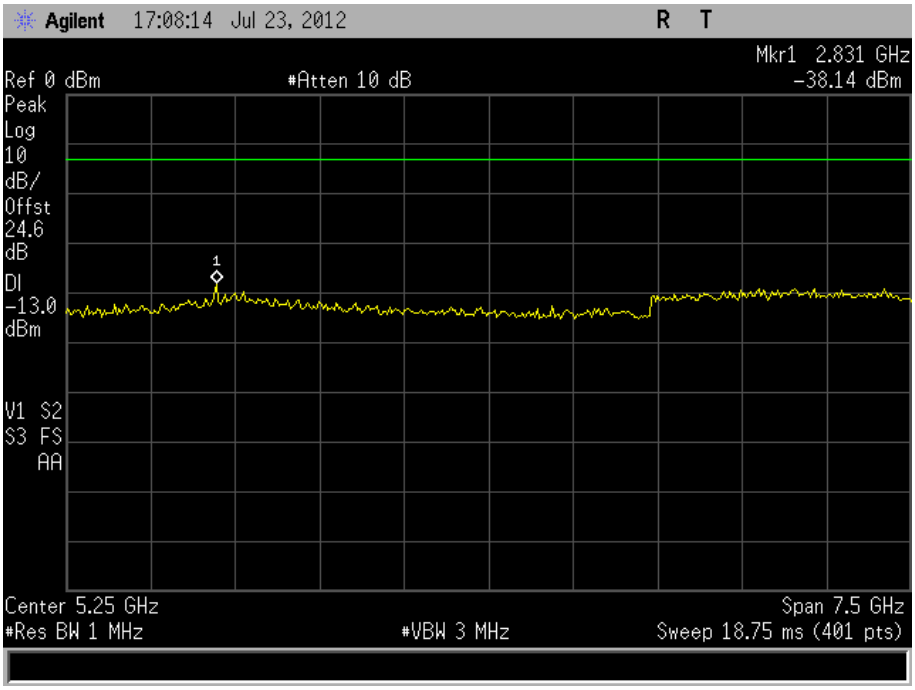
871.4 MHz

9 kHz to 1.5 GHz



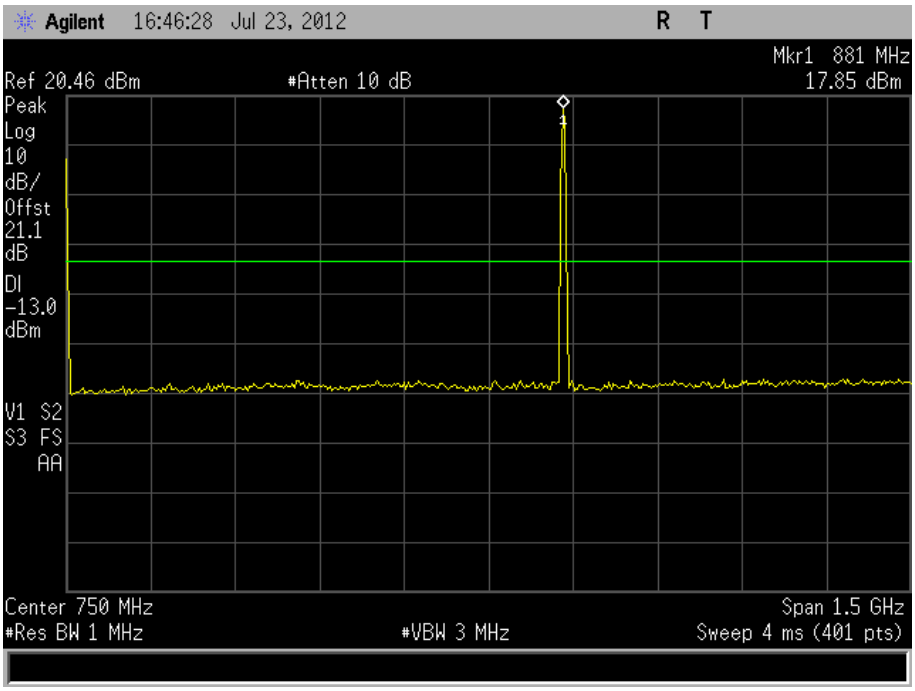
Product Service

1.5 GHz to 9 GHz



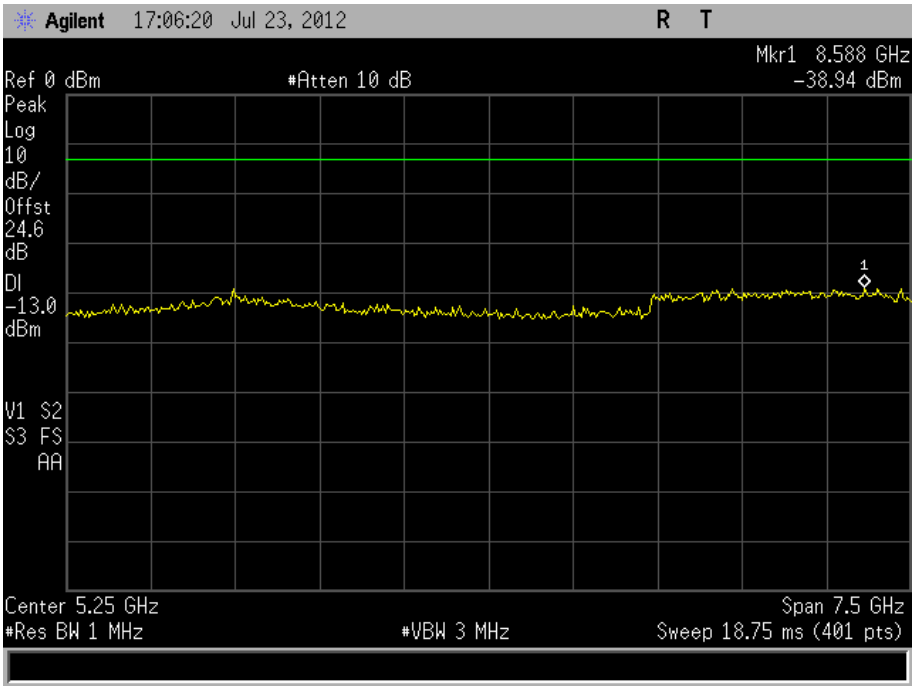
881.6 MHz

9 kHz to 1.5 GHz



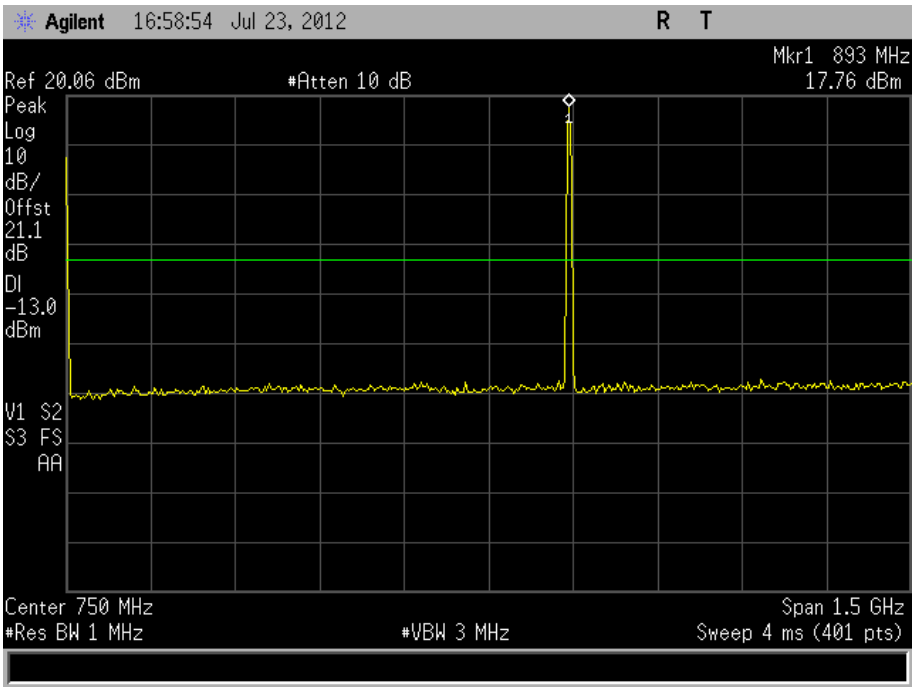
Product Service

1.5 GHz to 9 GHz



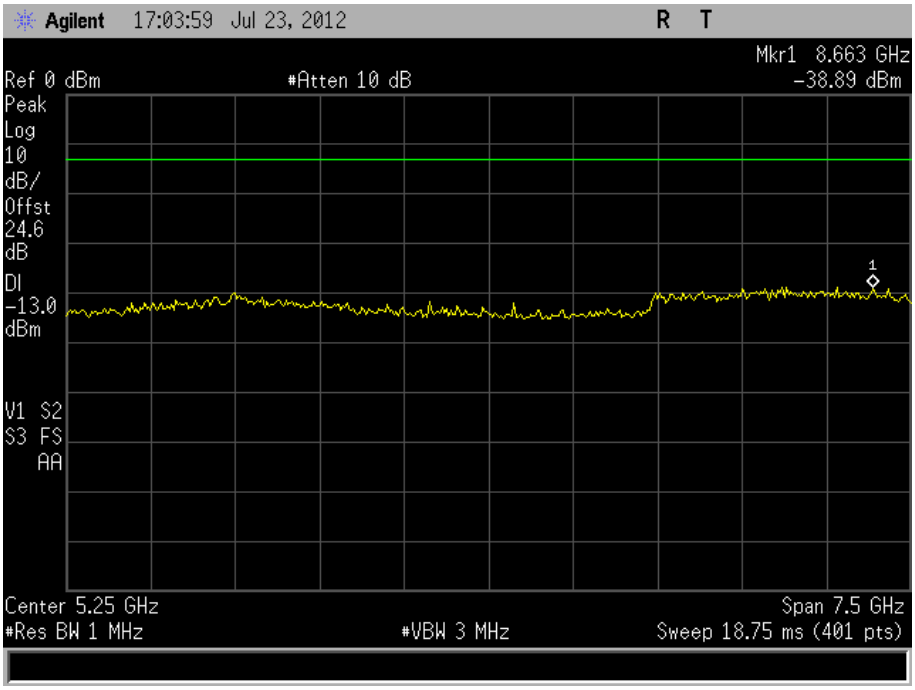
891.6 MHz

9 kHz to 1.5 GHz



Product Service

1.5 GHz to 9 GHz



Limit Clause

43+10log(P) or -13 dBm

2.6 OCCUPIED BANDWIDTH

2.6.1 Specification Reference

FCC CFR 47 Part 2, Clause 2.1049 (h)
FCC CFR 47 Part 22, Clause 22.917 (b)

2.6.2 Equipment Under Test and Modification State

239B S/N: 000295-0000105698 - Modification State 0

2.6.3 Date of Test

23 July 2012

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 transmitting at maximum power, with modulation. Using a resolution bandwidth of 30 kHz and a video bandwidth of 100 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.

2.6.6 Environmental Conditions

Ambient Temperature	26.6°C
Relative Humidity	30.4%

Product Service

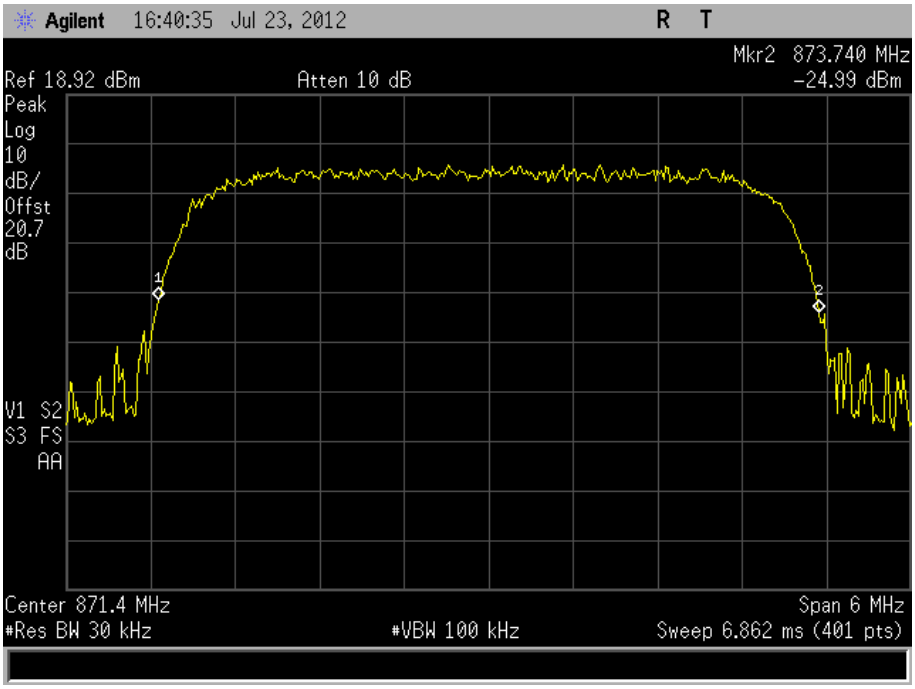
2.6.7 Test Results

Transmit - with 12V AC/DC Adapter

12 V DC Supply

871.4 MHz

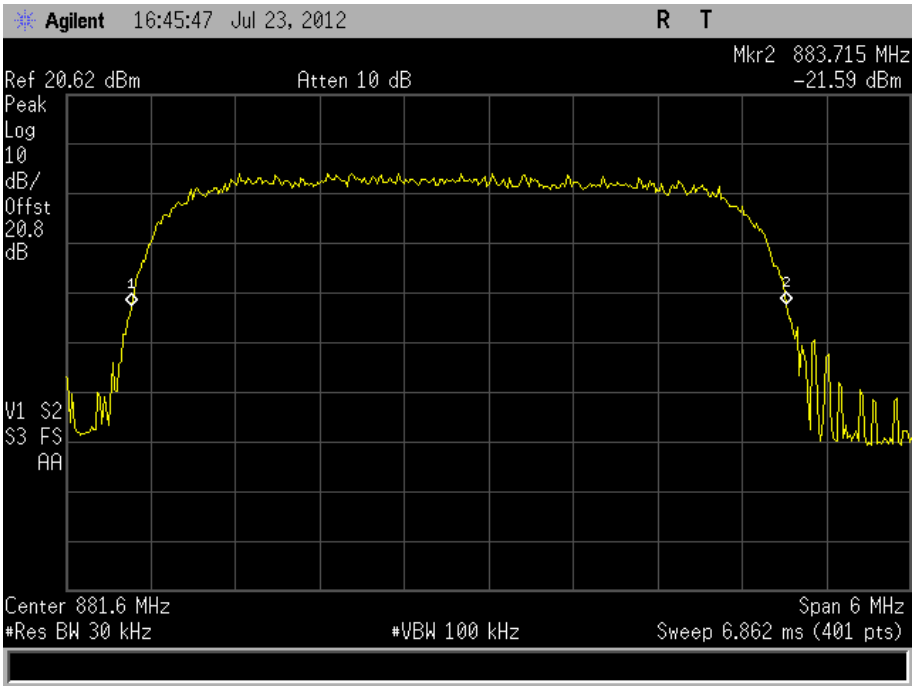
Mode	Occupied Bandwidth (kHz)
WCDMA	4680



Product Service

881.6 MHz

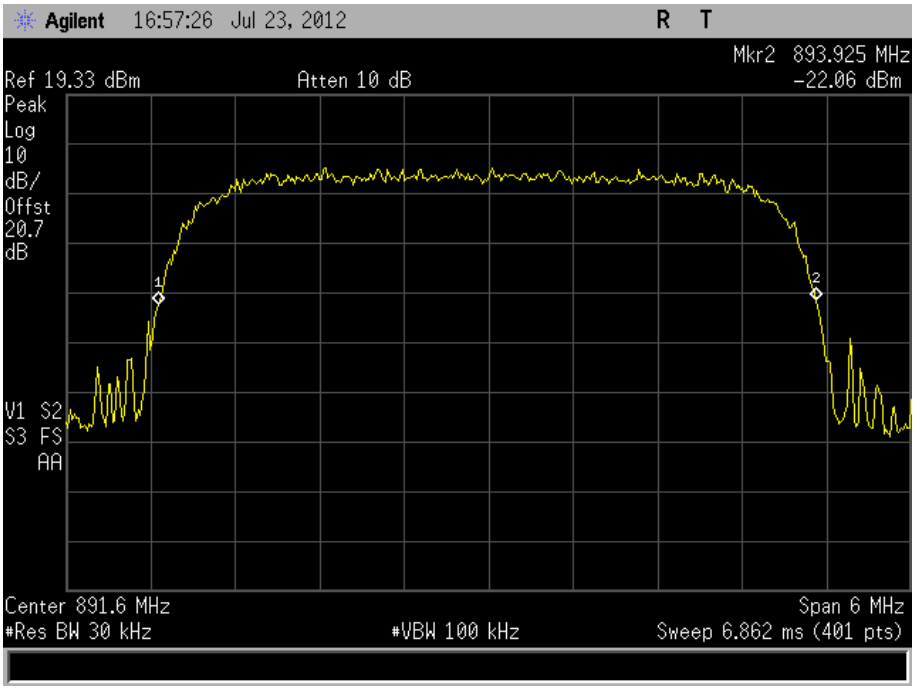
Mode	Occupied Bandwidth (kHz)
WCDMA	4650



Product Service

891.6 MHz

Mode	Occupied Bandwidth (kHz)
WCDMA	4665



Limit Clause

The occupied bandwidth, that is the frequency bandwidth such that, below is lower and above is upper frequency limits, the mean powers radiated are each equal to 0.5% of the total mean power radiated by a given emission.

Product Service

2.7 MODULATION CHARACTERISTICS

2.7.1 Specification Reference

FCC CFR 47 Part 2, Clause 2.1047 (d)

2.7.2 Equipment Under Test

239B

2.7.3 Test Results

Transmit - with 12V AC/DC Adapter

Customer Description

As shown in the Application Form in Section 1.3, the modulation type used is spread spectrum WCDMA.

Limit Clause

A curve or equivalent data which shows that the equipment will meet the modulation requirements of the rules under which the equipment is to be licensed.

2.8 FREQUENCY STABILITY

2.8.1 Specification Reference

FCC CFR 47 Part 2, Clause 2.1055
FCC CFR 47 Part 22, Clause 22.355

2.8.2 Equipment Under Test and Modification State

239B S/N: 000295-0000105698 - Modification State 0

2.8.3 Date of Test

29 July 2012 & 30 July 2012

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

The EUT was set to transmit on maximum power with modulation. A CMU 300 communications tester, was used to measure the frequency error. The maximum result was taken over 200 bursts. The temperature was adjusted between -30°C and +50°C in 10° steps as per 2.1055 and the frequency error was measured at each temperature.

2.8.6 Environmental Conditions

Ambient Temperature	21.0 - 26.0°C
Relative Humidity	38.8 - 51.0%

Product Service

2.8.7 Test Results

Transmit - with 12V AC/DC Adapter

12 V DC Supply

Under Temperature Variations

881.6 MHz

Temperature Interval (ºC)	Mode	Modulation	Deviation (ppm)
-30	WCDMA	Q-PSK	0.0510
-20	WCDMA	Q-PSK	0.0465
-10	WCDMA	Q-PSK	0.0420
0	WCDMA	Q-PSK	0.0386
+10	WCDMA	Q-PSK	0.0329
+20	WCDMA	Q-PSK	0.0272
+30	WCDMA	Q-PSK	0.0227
+40	WCDMA	Q-PSK	0.0193
+50	WCDMA	Q-PSK	0.0159

Limit Clause

Frequency Range (MHz)	Base, Fixed (ppm)	Mobile ≤ 3 watts (ppm)	Mobile ≤ 3 watts (ppm)
25 to 50	20	20	50
50 to 450	5	5	50
450 to 512	2.5	5	5
821 to 896	1.5	2.5	2.5
928 to 929	5.0	-	-
929 to 960	1.5	-	-
2110 to 2220	10	-	-

Under Voltage Variations

881.6 MHz

DC Voltage (V)	Mode	Modulation	Deviation (ppm)
12 V DC	WCDMA	Q-PSK	0.0283
12V DC via 93.5V AC	WCDMA	Q-PSK	0.0272
12V DC via 126.5V AC	WCDMA	Q-PSK	0.0295

Limit Clause

Frequency Range (MHz)	Base, Fixed (ppm)	Mobile ≤ 3 watts (ppm)	Mobile ≤ 3 watts (ppm)
25 to 50	20	20	50
50 to 450	5	5	50
450 to 512	2.5	5	5
821 to 896	1.5	2.5	2.5
928 to 929	5.0	n/a	n/a
929 to 960	1.5	n/a	n/a
2110 to 2220	10	n/a	n/a

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 - Spurious Emissions at Band Edge					
Attenuator (10dB, 10W)	Weinschel	23-10-34	470	12	27-Jun-2013
Attenuator (10dB)	Weinschel	47-10-34	481	12	27-Mar-2013
Spectrum Analyser	Hewlett Packard	E4407B	1154	12	17-Jul-2013
4GHz HPF	Sematron	F-100-4000-5-R	2245	-	TU
Filter	Daden Anthony Ass	MH-1500-7SS	2778	12	21-Dec-2012
'3.5mm' - '3.5mm' RF Cable (1m)	Rhophase	3PS-1803-1000-3PS	3697	12	27-Jan-2013
Section 2.2 and 2.3 - Effective Radiated Power and Maximum Peak Output Power - Conducted					
Signal Analyser	Rohde & Schwarz	FSQ 26	3545	12	9-May-2013
P-Series Power Meter	Agilent	N1911A	3980	12	12-Sep-2012
50 MHz-18 GHz Wideband Power Sensor	Agilent	N1921A	3982	12	12-Sep-2012
Section 2.4 - Emission Limitations for Cellular Equipment					
Antenna (Double Ridge Guide, 1GHz-18GHz)	EMCO	3115	234	12	8-Dec-2012
Antenna (Double Ridge Guide, 1GHz-18GHz)	EMCO	3115	235	12	14-Nov-2012
Dual Power Supply Unit	Thurlby	PL320	288	-	TU
Antenna (Double Ridge Guide)	Q-Par Angus Ltd	QSH 180K	1511	24	2-Aug-2012
Pre-Amplifier	Phase One	PS04-0086	1533	12	20-Sep-2012
Pre-Amplifier	Phase One	PSO4-0087	1534	12	26-Sep-2012
Screened Room (5)	Rainford	Rainford	1545	36	25-Dec-2013
Signal Generator (1GHz to 40GHz)	Rohde & Schwarz	SMR40	1589	12	11-Nov-2012
Mast Controller	Inn-Co GmbH	CO 1000	1606	-	TU
High Pass Filter (4GHz)	RLC Electronics	F-100-4000-5-R	2773	12	20-Sep-2012
Filter	Daden Anthony Ass	MH-1500-7SS	2778	12	21-Dec-2012
Antenna (Bilog)	Chase	CBL6143	2904	24	12-May-2013
Signal Generator (10MHz to 40GHz)	Rohde & Schwarz	SMR40	3171	12	22-Aug-2012
High Pass Filter (3GHz)	RLC Electronics	F-100-3000-5-R	3349	12	29-May-2013
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	29-Sep-2012
3 GHz High Pass Filter	K&L Microwave	11SH10-3000/X18000-O/O	3552	12	16-Apr-2013
7m Armoured RF Cable	SSI Cable Corp.	1501-13-13-7m WA(-)	3600	-	TU
'3.5mm' - '3.5mm' RF Cable (2m)	Rhophase	3PS-1803-2000-3PS	3702	12	27-Jan-2013
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
Low Noise Amplifier	Wright Technologies	APS04-0085	3969	-	TU

Instrument	Manufacturer	Type No.	TE No.	Calibration Period (months)	Calibration Due
Section 2.5 - Conducted Spurious Emissions					
Attenuator (10dB, 10W)	Weinschel	23-10-34	470	12	27-Jun-2013
Attenuator (10dB)	Weinschel	47-10-34	481	12	27-Mar-2013
Spectrum Analyser	Hewlett Packard	E4407B	1154	12	17-Jul-2013
4GHz HPF	Sematron	F-100-4000-5-R	2245	-	TU
Filter	Daden Anthony Ass	MH-1500-7SS	2778	12	21-Dec-2012
'3.5mm' - '3.5mm' RF Cable (1m)	Rhophase	3PS-1803-1000-3PS	3697	12	27-Jan-2013
Section 2.6 - Occupied Bandwidth					
Attenuator (10dB, 10W)	Weinschel	23-10-34	470	12	27-Jun-2013
Attenuator (10dB)	Weinschel	47-10-34	481	12	27-Mar-2013
Spectrum Analyser	Hewlett Packard	E4407B	1154	12	17-Jul-2013
4GHz HPF	Sematron	F-100-4000-5-R	2245	-	TU
Filter	Daden Anthony Ass	MH-1500-7SS	2778	12	21-Dec-2012
'3.5mm' - '3.5mm' RF Cable (1m)	Rhophase	3PS-1803-1000-3PS	3697	12	27-Jan-2013
Section 2.8 - Frequency Stability					
Mains Voltage Monitor	TUV	MVM1	1378	12	19-Aug-2012
Attenuator (20dB, 20W)	Weinschel	1	3032	-	TU
Variac Transformer	Zenith	Z-710-R	3169	-	O/P Mon
'3.5mm' - '3.5mm' RF Cable (2m)	Rhophase	3PS-1803-2000-3PS	3702	12	27-Jan-2013

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

Product Service

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
Spurious Emissions at Band Edge	30MHz to 1GHz: ± 5.1 dB 1GHz to 40GHz: ± 6.3 dB
Maximum Peak Output Power - Conducted	± 0.70 dB
Emission Limitations for Cellular Equipment	30MHz to 1GHz: ± 5.1 dB 1GHz to 40GHz: ± 6.3 dB
Conducted Spurious Emissions	± 3.454 dB
Occupied Bandwidth	± 16.74 kHz
Modulation Characteristics	-
Frequency Stability	± 46.70 Hz

Product Service

SECTION 4

ACCREDITATION, DISCLAIMERS AND COPYRIGHT

Product Service

4.1 ACCREDITATION, DISCLAIMERS AND COPYRIGHT

This report relates only to the actual item/items tested.

Our UKAS Accreditation does not cover opinions and interpretations and any expressed are outside the scope of our UKAS Accreditation.

Results of tests not covered by our UKAS Accreditation Schedule are marked NUA (Not UKAS Accredited).