

# ZEBRA TECHNOLOGIES CORP

Printer Model: (GX430t, GX420t and GX420d) with  
802.11b/g Module

Model: ZLANG-CA

04 March 2008

Report No.: SL07021303-ZBR-007 (15.247)( ZLANG-CA)  
(This report supersedes NONE)



Modifications made to the product : None

This Test Report is Issued Under the Authority of:

|                                 |                                                                                      |
|---------------------------------|--------------------------------------------------------------------------------------|
| Choon Sian Ooi                  |  |
| Choon Sian Ooi<br>Test Engineer | Leslie Bai<br>Engineering Reviewer                                                   |

This test report may be reproduced in full only.  
Test result presented in this test report is applicable to the representative sample only.

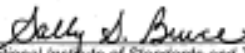
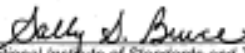
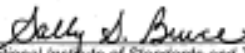
## EMC Test Report

To: FCC Part 15.247 & RSS210 Issue7: 2007

SIEMIC, INC.  
Accessing global markets



**SIEMIC ACREDITATION DETAILS: NVLAP Lab Code: 200729-0**

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                          |                                                                                     |                                                                                                                                                 |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>United States Department of Commerce<br/>National Institute of Standards and Technology</p> <p><b>NVLAP<sup>®</sup></b></p> <hr/> <p><b>Certificate of Accreditation to ISO/IEC 17025:2005</b></p> <hr/>                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                          |                                                                                     |                                                                                                                                                 |
| <p>NVLAP LAB CODE: 200729-0</p> <p><b>SIEMIC Laboratories</b><br/>San Jose, CA</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                          |                                                                                     |                                                                                                                                                 |
| <p><i>Is accredited by the National Voluntary Laboratory Accreditation Program for specific services,<br/>listed on the Scope of Accreditation, for:</i></p> <p><b>ELECTROMAGNETIC COMPATIBILITY AND TELECOMMUNICATIONS</b></p> <p><i>This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005.<br/>This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality<br/>management system (refer to joint ISO-ILAC-IAF Communiqué dated 18 June 2005).</i></p> |                                                                                                                                                                                                                                                                                          |                                                                                     |                                                                                                                                                 |
| <p>2008-01-01 through 2008-12-31<br/>Effective dates</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <table border="0"><tr><td></td><td><br/>For the National Institute of Standards and Technology</td></tr></table> |  | <br>For the National Institute of Standards and Technology |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <br>For the National Institute of Standards and Technology                                                                                                                                          |                                                                                     |                                                                                                                                                 |

**SIEMIC ACREDITATION DETAILS: FCC Registration No. 783147**

**FEDERAL COMMUNICATIONS COMMISSION**

Laboratory Division  
7435 Oakland Mills Road  
Columbia, MD 21046

January 27, 2005

Registration Number: 783147

SIEMIC Laboratories  
2206 Ringwood Avenue  
San Jose, CA 95131

Attention: Leslie Bai

Re: Measurement facility located at San Jose  
3 & 10 meter site  
Date of Renewal: January 27, 2005

Dear Sir or Madam:

Your request for renewal of the registration of the subject measurement facility has been received. The information submitted has been placed in your file and the registration has been renewed. The name of your organization will remain on the list of facilities whose measurement data will be accepted in conjunction with applications for Certification under Parts 15 or 18 of the Commission's Rules. Please note that the file must be updated for any changes made to the facility and the registration must be renewed at least every three years.

Measurement facilities that have indicated that they are available to the public to perform measurement services on a fee basis may be found on the FCC website [www.fcc.gov](http://www.fcc.gov) under E-Filing, OET Equipment Authorization Electronic Filing, Test Firms.

Sincerely,



Phyllis Parrish  
Information Technician

**SIEMIC ACREDITATION DETAILS: Industry of Canada Registration No. 4842-1**



April 28, 2006

OUR FILE: 46405-4842  
Submission No: 114591

Siemic Inc.  
2206 Ringwood Ave.,  
San Jose, CA 95131

Dear Sir/Madame:

The Bureau has received your application for the Alternate Test Site and the filing is satisfactory to Industry Canada.

Please reference to the file number (4842-1 ) in the body of all test reports containing measurements performed on the site.

Renewal of the filing is required every two years.

If you have any questions, you may contact the Bureau at the telephone number below or by e-mail at [certification.bureau@ic.gc.ca](mailto:certification.bureau@ic.gc.ca) Please reference our file number above for all correspondence.

Yours sincerely,



Robert Corey  
Manager Certification  
Certification and Engineering Bureau  
3701 Carling Ave., Building 94  
Ottawa, Ontario  
K2H 8S2  
Tel. No. (613) 990-3869

## SIEMIC ACREDITATION DETAILS: Japan VCCI Registration No. 2195



Voluntary Control Council for Interference  
by Information Technology Equipment  
1F NDA Bldg. 2-3-5, Azabudai,  
Minato-Ku, Tokyo, Japan, 106-0041  
Tel+81-3-5575-3138  
Fax+81-3-5575-3137  
<http://www.vccj.or.jp>

February 12 , 2004

TO: SIEMIC, INC.

Membership NO: 2195

We confirmed your payment for annual membership fee and admission fee. Thank you very much for your remitting.

Please find enclosed VCCI documents. As admission fee and annual membership fee were confirmed, your company registered as VCCI official member.

From now on, it is possible for your company to submit conformity verification report or/and application for registration of measurement facilities.

Please find necessary forms for your submission from VCCI web-site.  
[www.vccj.or.jp](http://www.vccj.or.jp)

When you submit conformity verification report, please submit to Ms. Yoko Inagaki / [inagaki@vccj.or.jp](mailto:inagaki@vccj.or.jp) and application for registration of measurement facilities, please submit to Mr. Masaru Denda / [denda@vccj.or.jp](mailto:denda@vccj.or.jp)

Their address, phone and fax number are absolutely same as I. Please refer address indicated on top right-hand corner of this page.

If you have any other questions regarding membership, feel free to contact me. Thank you very much.

Best Regards,

Naoko Hori (Ms.)  
VCCI  
[hori@vccj.or.jp](mailto:hori@vccj.or.jp)

Enclosure

**SIEMIC ACREDITATION DETAILS: Japan RF Technologies Accreditation No. MRF050927**

|                                                                                                                                                                                                                                                                                      |                                                                                                                                                     |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                                                                                                                                   |                                                                                                                                                     |
| <h1>Certificate</h1>                                                                                                                                                                                                                                                                 |                                                                                                                                                     |
| This is to certify that the<br>Quality Management System<br>of                                                                                                                                                                                                                       |                                                                                                                                                     |
| <b>SIEMIC , Inc.</b><br>2206 Ringwood Avenue<br>San Jose, California 95131 U.S.A                                                                                                                                                                                                     |                                                                                                                                                     |
| has been authorized to carry out Japan Specified Radio Equipment test by<br>order and under supervision of RF Technologies Co., Ltd. according to<br>Notification No.88 of Radio Law.                                                                                                |                                                                                                                                                     |
| An assessment of the laboratory was conducted according to the "Procedure and<br>Conditions for Appointments of 2.4GHz Band Low power data communications system<br>that Bluetooth and Wireless LAN test with reference to ISO/IEC 17025<br>by an RF Technologies Co., Ltd. auditor. |                                                                                                                                                     |
| <b>Audit Report No. MRF050927</b>                                                                                                                                                                                                                                                    |                                                                                                                                                     |
| <br>Kazuyuki Sarashina<br>Auditor<br>RF Technologies Co., Ltd.                                                                                                                                    | <br>Toshihiro Hiegami<br>President<br>RF Technologies Co., Ltd. |
| Audit Date<br>September 27th, 2005                                                                                                                                                                                                                                                   | Issued Date<br>October 5th, 2005                                                                                                                    |
| This Certificate is valid until <b>September 26<sup>th</sup> 2006 or next schedule audit.</b>                                                                                                                                                                                        |                                                                                                                                                     |
| No:006 Registered Certification Body<br>RF Technologies Co., Ltd.<br>472, Nippa-cho,Kohoku-ku, Yokohama, 223-0057, Japan                                                                                                                                                             |                                                                                                                                                     |
|                                                                                                                                                                                                 |                                                                                                                                                     |

**SIEMIC ACREDITATION DETAILS: Korea MIC Lab Code: KR0032**

## 시험기관지정서 *Certificate* *of Designated Testing Laboratory*

지정번호(No.) : KR0032

시험기관명 : (주)현대고정인증기술원

(Name of Lab.) (Humbi Calibration & Certification Technologies Co., Ltd)

주 소 : 경기도 이천시 부발읍 아미리 산136-1

(Address) (136-1, Ami-ni, Bubal-eup, Icheon-si, Kyunggi-Do, Korea)  
2206 Ringwood Avenue San Jose, CA, USA.

**시험분야 및 범위 : 유선(Telecommunication Part)**

(Area & Category) 무선 (Radio Communication Part)

전자파장해(EMI) : 미국지사 포함

전자파내성(EMS) : 미국지사 포함

### 전기 안전 (Safety)

### 전자파흡수율(SAR)

위 기관을 정보통신기기시험기관지정및관리등에관한규칙에 의해 정보통신기기시험기관으로 지정합니다.

*This is to certify that  
the above mentioned laboratory is designated  
as the testing laboratory in accordance with  
the Regulations on Designation of Testing Laboratory  
for Information and Communication Equipment.*

2005년 (Year) 7월 (Month) 5일 (Date)

전파연구소장

Director General of Radio Research Laboratory  
Ministry of Information and Communication  
Republic of Korea

**SIEMIC ACREDITATION DETAILS: Korea CAB ID: US0160**



**UNITED STATES DEPARTMENT OF COMMERCE**  
National Institute of Standards and Technology  
Gaithersburg, Maryland 20899

April 17, 2006

Mr. Leslie Bai  
SIEMIC Laboratories  
2206 Ringwood Avenue  
San Jose, CA 95131

Dear Mr. Bai:

I am pleased to inform you that your laboratory has been recognized by the Ministry of Information and Communication's Radio Research Laboratory (RRL) under the Asia Pacific Economic Cooperation (APEC) Mutual Recognition Arrangement (MRA). Your laboratory is now designated to act as a Conformity Assessment Body (CAB) under Appendix B, **Phase I** Procedures, of the APEC Tel MRA. The pertinent information about your laboratory's designation is as follows:

CAB Name: **SIEMIC Laboratories**  
Identification No.: **US0160**  
Scope:

| Coverage                        | Standards                                                                                                                                                                                                                                             | Date of Recognition |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|
| Electro Magnetic Interference   | 1. RRL Notice No. 2005-82: Technical Requirements for Electromagnetic Interference<br>2. Annex 8(KN-22), RRL Notice No. 2005-131: Conformity Assessment Procedure for Electromagnetic Interference                                                    | April 13, 2006      |
| Electro Magnetic Susceptibility | 1. RRL Notice No. 2005-130: Technical Requirements for Electromagnetic Susceptibility<br>2. Annex 1~7(KN-61000-4-2, -4-3, -4-4, -4-5, -4-6, -4-8, -4-11), RRL Notice No. 2005-132: Conformity Assessment Procedure for Electromagnetic Susceptibility | April 13, 2006      |

You may submit test data to RRL to verify that the equipment to be imported into Korea satisfies the applicable requirements. The designation of your organization will remain in force as long as its accreditation for the designated scope remains valid and comply with the designation requirements.

The names of all recognized CABs will be posted on the NIST website at <http://ts.nist.gov/mra>. If you have any questions please contact Mr. Jogindar (Joe) Dhillon at (301) 975-5521. We appreciate your continued interest in our international conformity assessment activities.

Sincerely,



David F. Alderman  
Group Leader, Standards Coordination and Conformity Group

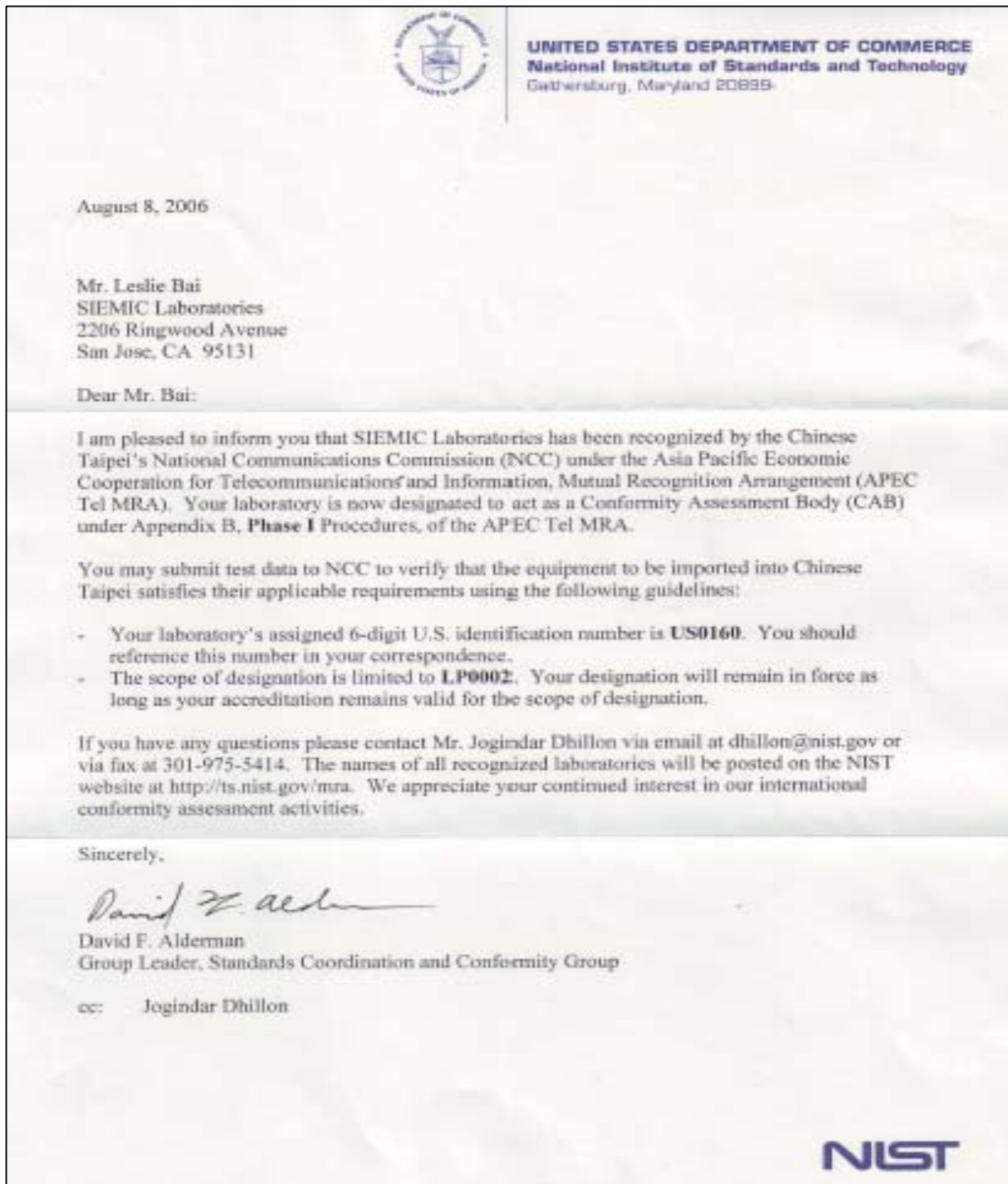
cc: Jogindar Dhillon



**SIEMIC ACREDITATION DETAILS: Taiwan BSMI Accreditation No. SL2-IN-E-1130R**

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                      |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <b>UNITED STATES DEPARTMENT OF COMMERCE</b><br><b>National Institute of Standards and Technology</b><br>Gaithersburg, Maryland 20885 |
| <p>May 3, 2006</p> <p>Mr. Leslie Bai<br/>SIEMIC Laboratories<br/>2206 Ringwood Avenue<br/>San Jose, CA 95131</p> <p>Dear Mr. Bai:</p> <p>I am pleased to inform you that your laboratory has been recognized by the Chinese Taipei's Bureau of Standards, Metrology, and Inspection (BSMI) under the Asia Pacific Economic Cooperation (APEC) Mutual Recognition Arrangement (MRA). Your laboratory is now designated to act as a Conformity Assessment Body (CAB) under Appendix B, Phase 1 Procedures, of the APEC Tel MRA. You may submit test data to BSMI to verify that the equipment to be imported into Chinese Taipei satisfies the applicable requirements. The designation of your organization will remain in force as long as its accreditation for the designated scope remains valid and comply with the designation requirements. The pertinent designation information is as follows:</p> <ul style="list-style-type: none"><li>- BSMI number: <b>SL2-IN-E-1130R</b> (Must be applied to the test reports)</li><li>- U.S Identification No: <b>US0160</b></li><li>- Scope of Designation: <b>CNS 13438</b></li><li>- Authorized signatory: <b>Mr. Leslie Bai</b></li></ul> <p>The names of all recognized CABs will be posted on the NIST website at <a href="http://ts.nist.gov/mra">http://ts.nist.gov/mra</a>. If you have any questions, please contact Mr. Dhillon at 301-975-5521. We appreciate your continued interest in our international conformity assessment activities.</p> <p>Sincerely,</p> <p></p> <p>David F. Alderman<br/>Group Leader, Standards Coordination and Conformity Group</p> <p>cc: Jogindar Dhillon</p> <p></p> |                                                                                                                                      |

**SIEMIC ACREDITATION DETAILS: Taiwan NCC CAB ID: US0160**



## SIEMIC ACREDITATION DETAILS: Mexico NOM Recognition

|                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <br>CAMARA NACIONAL<br>DE LA INDUSTRIA<br>ELECTRONICA, DE<br>TELECOMUNICACIONES<br>E INFORMATICA | <b>Laboratorio Valentín V. Rivero</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|                                                                                                                                                                                   | México D.F. a 16 de octubre de 2006.                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|                                                                                                                                                                                   | <b>LESLIE BAI<br/>DIRECTOR OF CERTIFICATION<br/>SIEMIC LABORATORIES, INC.<br/>ACCESSING GLOBAL MARKETS<br/>P R E S E N T E</b>                                                                                                                                                                                                                                                                                                                                                        |
|                                                                                                                                                                                   | En contestación a su escrito de fecha 5 de septiembre del año en curso, le comento que estamos muy interesados en su intención de firmar un Acuerdo de Reconocimiento Mutuo, para lo cual adjunto a este escrito encontrara el Acuerdo en idioma inglés y español prellenado de los cuales le pido sea revisado y en su caso corregido, para que si esta de acuerdo poder firmarlo para mandarlo con las autoridades Mexicanas para su visto bueno y así poder ejercer dicho acuerdo. |
|                                                                                                                                                                                   | Aprovecho este escrito para mencionarle que nuestro intermediario gestor será la empresa Isabel de México, S. A. de C. V., empresa que ha colaborado durante mucho tiempo con nosotros en lo relacionado a la evaluación de la conformidad y que cuenta con amplia experiencia en la gestoría de la certificación de cumplimiento con Normas Oficiales Mexicanas de producto en México.                                                                                               |
|                                                                                                                                                                                   | Me despido de usted enviándole un cordial saludo y esperando sus comentarios al Acuerdo que nos ocupa.                                                                                                                                                                                                                                                                                                                                                                                |
|                                                                                                                                                                                   | Atentamente:                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|                                                                                                                                                                                   | <br><b>Ing. Faustino Gómez González<br/>Gerente Técnico del Laboratorio de<br/>CANIETI.</b>                                                                                                                                                                                                                                                                                                        |
| Callejón 71<br>Hidráulico Condessa<br>06100 México, D.F.<br>Tel. 5264-6938 con 12 líneas<br>Fax 5264-0498<br>www.canieti.org                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |

**SIEMIC ACREDITATION DETAILS: Hong Kong OFTA Recognition No. D23/16V**

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                          |                                |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|--------------------------------|
| <br>電訊管理局                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Your Ref 來函編號 : D23/16 V | Telephone 電話 : (852) 2961 6320 |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Our Ref 本局編號 :           | Fax No 圖文傳真 : (852) 2838 5004  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                          | E-mail 電郵地址 : 20 July 2005     |
| <p>Mr. Leslie Bai<br/>Director of Certification,<br/>SIEMIC Laboratories<br/>2206 Ringwood Avenue<br/>San Jose, California 95131<br/>USA</p> <p>Dear Mr. Bai,</p> <p style="text-align: center;"><b>Application of Recognised Testing Agency (RTA)</b></p> <p>Referring your submission of 28 June 2005 in relation to the application of RTA, I am pleased to inform you that OFTA has appointed SIEMIC Laboratories (SIEMIC) as a Recognised Testing Agency (RTA) :</p> <p>Please note that, under the Hong Kong Telecommunications Equipment Evaluation and Certification (HKTEC) Scheme, SIEMIC is authorized to conduct evaluation tests on telecommunications equipment against the following HKTA specifications :</p> <p><u>Scope of recognition (HKTA Specifications) :</u><br/>1001, 1002, 1004, 1006, 1007, 1008<br/>1010, 1015, 1016<br/>1022, 1026, 1027, 1029<br/>1030, 1031, 1032, 1033, 1034, 1035, 1039<br/>1041, 1042, 1043, 1045, 1047, 1048<br/>2001</p> <p>You are requested to refer to and comply with the code of practice and guidelines for RTA as given in the Information Note OFTA I 411 "Recognised Testing Agency (RTA) for Conducting Evaluation Test of Telecommunications Equipment", which can be downloaded from OFTA's homepage at <a href="http://www.ofta.gov.hk/tec/information-notes.html">http://www.ofta.gov.hk/tec/information-notes.html</a>.</p> <p>If you have any queries, please do not hesitate to contact me.</p> <p style="text-align: right;">Yours sincerely,</p> <p style="text-align: right;"><br/>(K K Sin)<br/>for Director-General<br/>of Telecommunications</p> <p>Office of the Telecommunications Authority<br/>29/F Wu Chung House 213 Queen's Road East Wan Chai Hong Kong<br/>電訊管理局<br/>香港灣仔皇后大道東 213 號胡忠大廈 29 字樓</p> <p style="text-align: right;"><a href="http://www.ofta.gov.hk">http://www.ofta.gov.hk</a></p> |                          |                                |



## CONTENTS

|   |                                                     |     |
|---|-----------------------------------------------------|-----|
| 1 | EXECUTIVE SUMMARY & EUT INFORMATION .....           | 16  |
| 2 | TECHNICAL DETAILS.....                              | 17  |
| 3 | MODIFICATION.....                                   | 18  |
| 4 | TEST SUMMARY.....                                   | 19  |
| 5 | MEASUREMENTS, EXAMINATION AND DERIVED RESULTS ..... | 20  |
|   | ANNEX A. TEST INSTRUMENT & METHOD .....             | 97  |
|   | ANNEX B EUT AND TEST SETUP PHOTOGRAPHS.....         | 101 |
|   | ANNEX C. TEST SETUP AND SUPPORTING EQUIPMENT.....   | 101 |
|   | ANNEX D USER MANUAL, BLOCK & CIRCUIT DIAGRAM .....  | 105 |



## 1 Executive Summary & EUT information

The purpose of this test programme was to demonstrate compliance of the Zebra Technologies Corp , Printer Model: (GX430t, GX420t and GX420d) with 802.11b/g Module, and Model: ZLANG-CA against the current Stipulated Standards. The Printer Model: (GX430t, GX420t and GX420d) with 802.11b/g Module have demonstrated compliance with the FCC 15.247 2007.

### EUT Information

**EUT Description** : Zebra Technologies will only use the ZLANG-CA radio within Zebra Host Printer, primarily Printer (GX430t, GX420t and GX420d). Both the radio and the antenna will be mounted inside the product and will not be user accessible. 802.11b/g radios are designed to operate in the international ISM Band from 2.412 to 2.462 GHz.

**Model No** : ZLANG-CA

**Serial No** : 30A07360010, 32A07360010, 31A07360002 (Host Printer)

**Input Power** : 120 Vac

**Classification Per Stipulated Test Standard** : Spread Spectrum System / Device

## 2 TECHNICAL DETAILS

|                                        |                                                                                   |
|----------------------------------------|-----------------------------------------------------------------------------------|
| <b>Purpose</b>                         | Compliance testing of 802.11b/g Radio Module with stipulated standard             |
| <b>Applicant / Client</b>              | Zebra Technologies Corp                                                           |
| <b>Manufacturer</b>                    | Zebra Technologies Corp<br>333 Corporate Woods Parkway.<br>Vernon Hills, IL 60061 |
| <b>Laboratory performing the tests</b> | SIEMIC Laboratories                                                               |
| <b>Test report reference number</b>    | SL07021303-ZBR-007 (15.247)( ZLANG-CA)                                            |
| <b>Date EUT received</b>               | 19 December 2007                                                                  |
| <b>Standard applied</b>                | 47 CFR §15.247 (2007)                                                             |
| <b>Dates of test (from – to)</b>       | 18 February 2008 - 22 February 2008                                               |
| <b>No of Units:</b>                    | 1                                                                                 |
| <b>Equipment Category:</b>             | DTS                                                                               |
| <b>Trade Name:</b>                     | Zebra Technologies Corp                                                           |
| <b>Model :</b>                         | ZLANG-CA                                                                          |
| <b>RF Operating Frequency (ies)</b>    | 2412 to 2462 MHz                                                                  |
| <b>Number of Channels :</b>            | 11                                                                                |
| <b>Modulation :</b>                    | OFDM                                                                              |
| <b>FCC ID :</b>                        | I28-ZLANGCA                                                                       |
| <b>IC ID :</b>                         | 3798B- ZLANGCA                                                                    |

### 3 MODIFICATION

NONE

## 4 TEST SUMMARY

The product was tested in accordance with the following specifications. All Testing has been performed according to below product classification:

Spread Spectrum System / Device

### Test Results Summary

| Test Standard                                                                                     |                       | Description                      | Pass / Fail |
|---------------------------------------------------------------------------------------------------|-----------------------|----------------------------------|-------------|
| CFR 47 Part 15.247: 2007                                                                          | RSS 210 Issue 7: 2007 |                                  |             |
| 15.203                                                                                            |                       | Antenna Requirement              | Pass        |
| 15.205                                                                                            | RSS210(A8.5)          | Restricted Band of Operation     | Pass        |
| 15.207(a)                                                                                         | RSSGen(7.2.2)         | Conducted Emissions Voltage      | Pass        |
| 15.247(a)(1)                                                                                      | RSS210(A8.1)          | Channel Separation               | N/A         |
| 15.247(a)(1)                                                                                      | RSS210(A8.1)          | Occupied Bandwidth               | Pass        |
| 15.247(a)(2)                                                                                      | RSS210 (A8.2)         | Bandwidth                        | Pass        |
| 15.247(a)(1)                                                                                      | RSS210(A8.1)          | Number of Hopping Channels       | N/A         |
| 15.247(a)(1)                                                                                      | RSS210(A8.1)          | Time of Occupancy                | N/A         |
| 15.247(b)                                                                                         | RSS210(A8.4)          | Output Power                     | Pass        |
| 15.247(c)                                                                                         | RSS210(A8.4)          | Antenna Gain > 6 dBi             | Pass        |
| 15.247(d)                                                                                         | RSS210(A8.5)          | Conducted Spurious Emissions     | Pass        |
| 15.209; 15.247(d)                                                                                 | RSS210(A8.5)          | Radiated Spurious Emissions      | Pass        |
| 15.247(e)                                                                                         | RSS210(A8.3)          | Power Spectral Density           | Pass        |
| 15.247(f)                                                                                         | RSS210(A8.3)          | Hybrid System Requirement        | N/A         |
| 15.247(g)                                                                                         | RSS210(A8.1)          | Hopping Capability               | N/A         |
| 15.247(h)                                                                                         | RSS210(A8.1)          | Hopping Coordination Requirement | N/A         |
| 15.247(i)                                                                                         | RSSGen(5.5)           | RF Exposure requirement          | Pass        |
|                                                                                                   | RSSGen(4.8)           | Receiver Spurious Emissions      | Pass        |
| ANSI C63.4: 2003/ RSS-Gen Issue 2: 2007                                                           |                       |                                  |             |
| PS: All measurement uncertainties are not taken into consideration for all presented test result. |                       |                                  |             |

## **5 MEASUREMENTS, EXAMINATION AND DERIVED RESULTS**

### **5.1 Antenna Requirement**

**Requirement(s):** 47 CFR §15.203

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

Antenna requirement must meet at least one of the following:

- a) Antenna must be permanently attached to the device.
- b) Antenna must use a unique type of connector to attach to the device.
- c) Device must be professionally installed. Installer shall be responsible for ensuring that the correct antenna is employed with the device.

The antenna is an integral antenna. Antenna maximum gain is 0 dBi for 2.400–2.500 GHz band.

## 5.2 Conducted Emissions Voltage

Requirement :

| Frequency of emission (MHz) | Conducted limit (dBμV) |           |
|-----------------------------|------------------------|-----------|
|                             | Quasi-peak             | Average   |
| 0.15–0.5                    | 66 to 56*              | 56 to 46* |
| 0.5–5                       | 56                     | 46        |
| 5–30                        | 60                     | 50        |

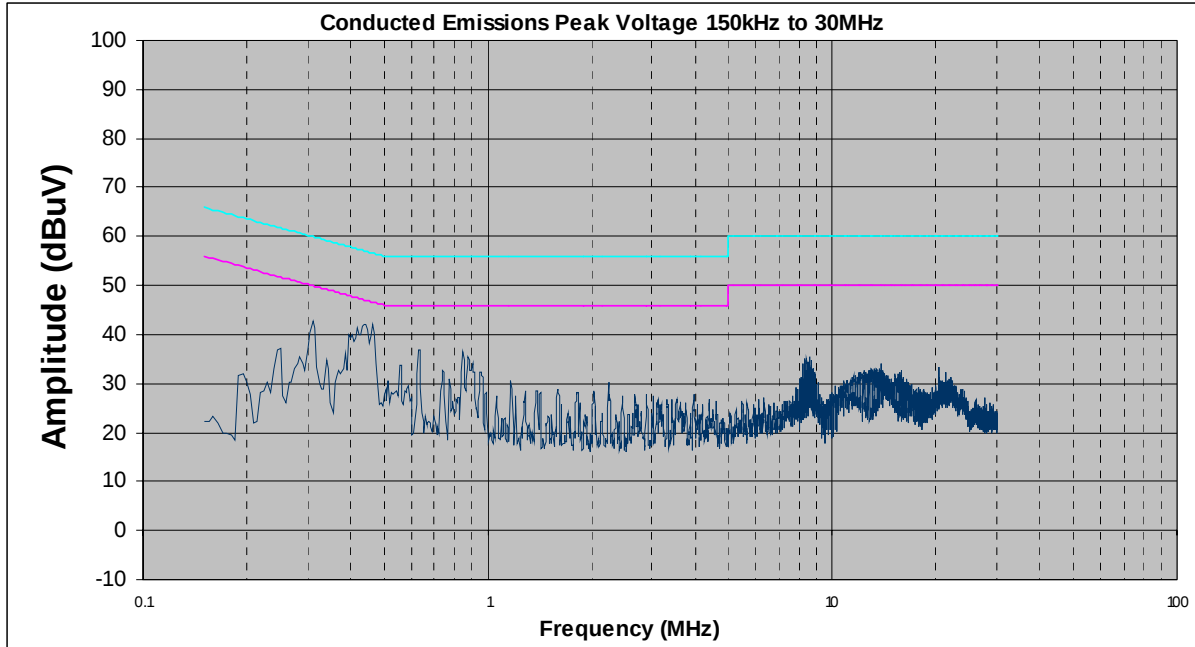
\*Decreases with the logarithm of the frequency.

### Procedures:

1. All possible modes of operation were investigated. Only the 6 worst case emissions measured, using the correct CISPR and Average detectors, are reported. All other emissions were relatively insignificant.
2. A "-ve" margin indicates a PASS as it refers to the margin present below the limit line at the particular frequency.
3. Conducted Emissions Measurement Uncertainty  
All test measurements carried out are traceable to national standards. The uncertainty of the measurement at a confidence level of approximately 95% (in the case where distributions are normal), with a coverage factor of 2, in the range 9kHz – 30MHz (Average & Quasi-peak) is  $\pm 3.5\text{dB}$ .
4. Environmental Conditions      Temperature      23°C  
                                                  Relative Humidity      50%  
                                                  Atmospheric Pressure      1019mbar  
      Test Date : February 18-22 2008  
      Tested By :Choon Sian Ooi

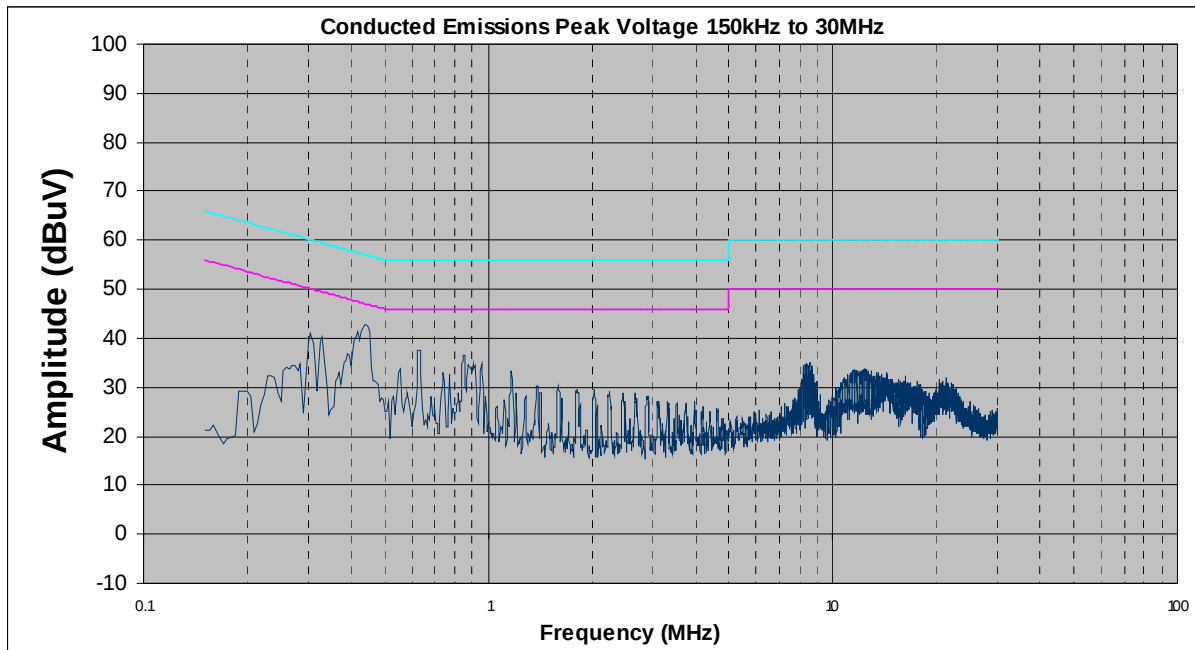
### Results:

Results:      Note –      Average Limit      Quasi-Peak Limit



**Phase Line Plot at 120Vac, 60Hz**

| Line Under Test | Freq. (MHz) | Corrected Amplitude (dBuV) | Limit (dBuV) QP | Margin (dB) QP | Corrected Amplitude (dBuV) | Limit (dBuV) AVG | Margin (dB) AVG |
|-----------------|-------------|----------------------------|-----------------|----------------|----------------------------|------------------|-----------------|
| Neutral         | 0.31        | 42.59                      | 59.97           | -17.38         | 42.59                      | 49.97            | -7.38           |
| Neutral         | 0.47        | 41.90                      | 56.60           | -14.70         | 41.90                      | 46.60            | -4.70           |
| Neutral         | 0.45        | 41.90                      | 56.97           | -15.07         | 41.90                      | 46.97            | -5.07           |
| Neutral         | 0.64        | 37.00                      | 56.00           | -19.00         | 37.00                      | 46.00            | -9.00           |
| Neutral         | 8.59        | 36.60                      | 60.00           | -23.40         | 36.60                      | 50.00            | -13.40          |
| Neutral         | 2.25        | 29.60                      | 56.00           | -26.40         | 29.60                      | 46.00            | -16.40          |



**Neutral Line Plot at 120Vac, 60Hz**

| Line Under Test | Freq.<br>(MHz) | Corrected Amplitude<br>(dBuV) QP | Limit<br>(dBuV) QP | Margin<br>(dB) QP | Corrected Amplitude<br>(dBuV) AVG | Limit<br>(dBuV) AVG | Margin<br>(dB) AVG |
|-----------------|----------------|----------------------------------|--------------------|-------------------|-----------------------------------|---------------------|--------------------|
| Line            | 0.35           | 41.00                            | 58.96              | -17.96            | 41.00                             | 48.96               | -7.86              |
| Line            | 0.33           | 40.20                            | 59.45              | -19.25            | 40.20                             | 49.45               | -13.85             |
| Line            | 0.45           | 42.40                            | 56.88              | -14.48            | 42.40                             | 46.88               | -10.08             |
| Line            | 0.64           | 37.50                            | 56.00              | -18.50            | 37.50                             | 46.00               | -8.10              |
| Line            | 0.86           | 36.40                            | 56.00              | -19.60            | 36.40                             | 46.00               | -7.30              |
| Line            | 8.69           | 34.30                            | 60.00              | -25.70            | 34.30                             | 50.00               | -10.20             |

## 5.3 6dB & 99% Occupied Bandwidth

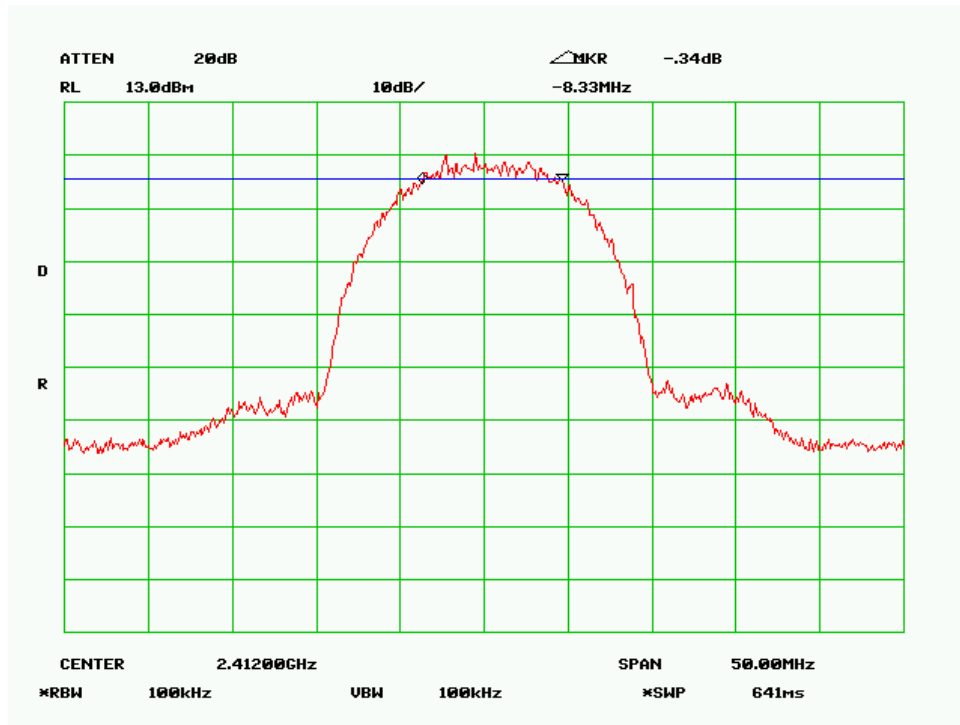
1. Conducted Measurement  
EUT was set for low , mid, high channel with modulated mode and highest RF output power.  
The spectrum analyzer was connected to the antenna terminal.
- 2 Environmental Conditions                      Temperature                      23°C  
                                                                         Relative Humidity                      50%  
                                                                         Atmospheric Pressure                      1019mbar
- 3 Conducted Emissions Measurement Uncertainty  
All test measurements carried out are traceable to national standards. The uncertainty of the measurement at a confidence level of approximately 95% (in the case where distributions are normal), with a coverage factor of 2, in the range 30MHz – 40GHz is ±1.5dB.
- 4 Test Date : February 18-22 2008  
Tested By :Choon Sian Ooi

**Requirement(s):** 47 CFR §15.247(a)(1)

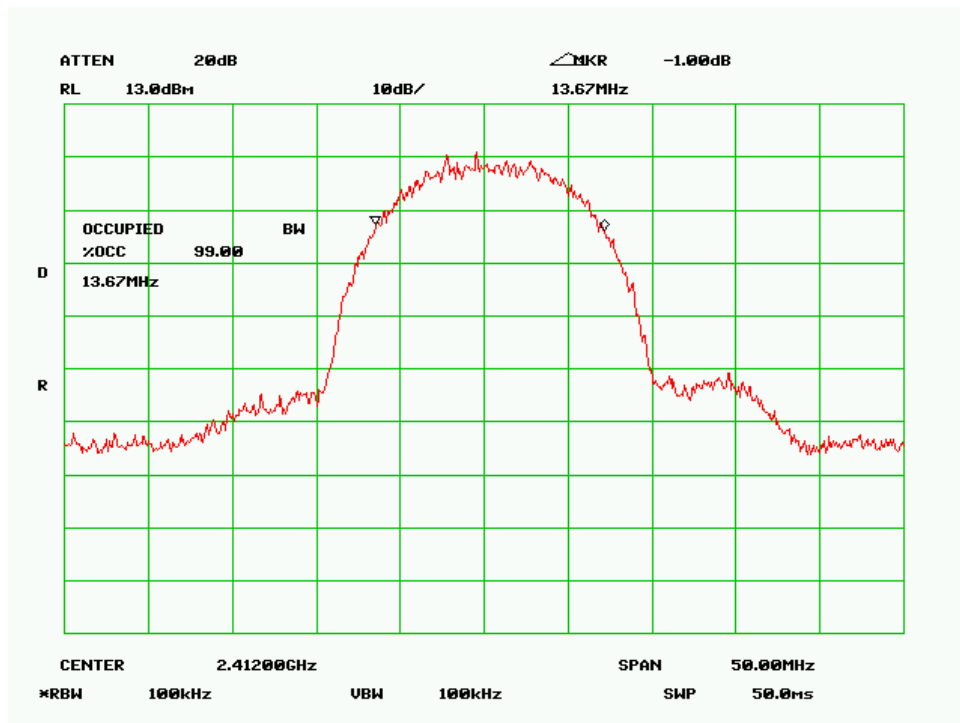
**Procedures:** The 6dB bandwidths were measured conducted using a spectrum analyzer at low, mid, and hi channels. 6 dB Bandwidth Limit: > 500 kHz.

| Protocol | Channel | Channel Frequency (MHz) | 6 dB Channel Bandwidth (MHz) | 99% Channel Bandwidth (MHz) | 6 dB Occupied Bandwidth Limit (MHz) |
|----------|---------|-------------------------|------------------------------|-----------------------------|-------------------------------------|
| 802.11b  | Low     | 2412                    | 8.33                         | 13.67                       | >0.5                                |
| 802.11b  | Mid     | 2437                    | 9.08                         | 13.92                       | >0.5                                |
| 802.11b  | High    | 2462                    | 9.33                         | 13.75                       | >0.5                                |
| 802.11g  | Low     | 2412                    | 16.67                        | 16.67                       | >0.5                                |
| 802.11g  | Mid     | 2437                    | 16.67                        | 16.75                       | >0.5                                |
| 802.11g  | High    | 2462                    | 16.75                        | 16.75                       | >0.5                                |

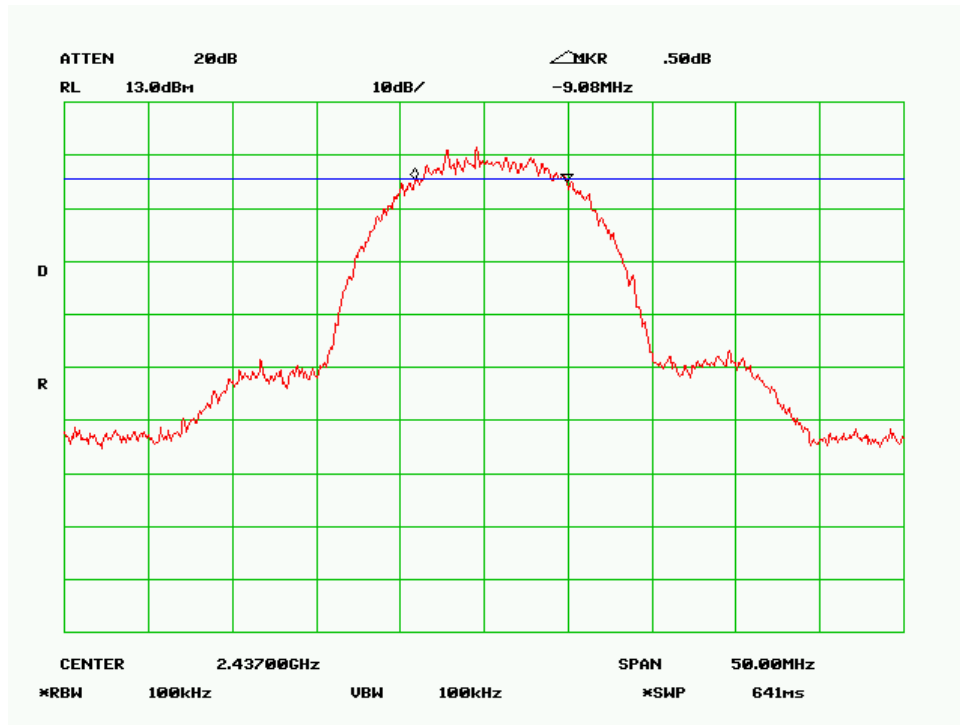
Refer to the attached plots.



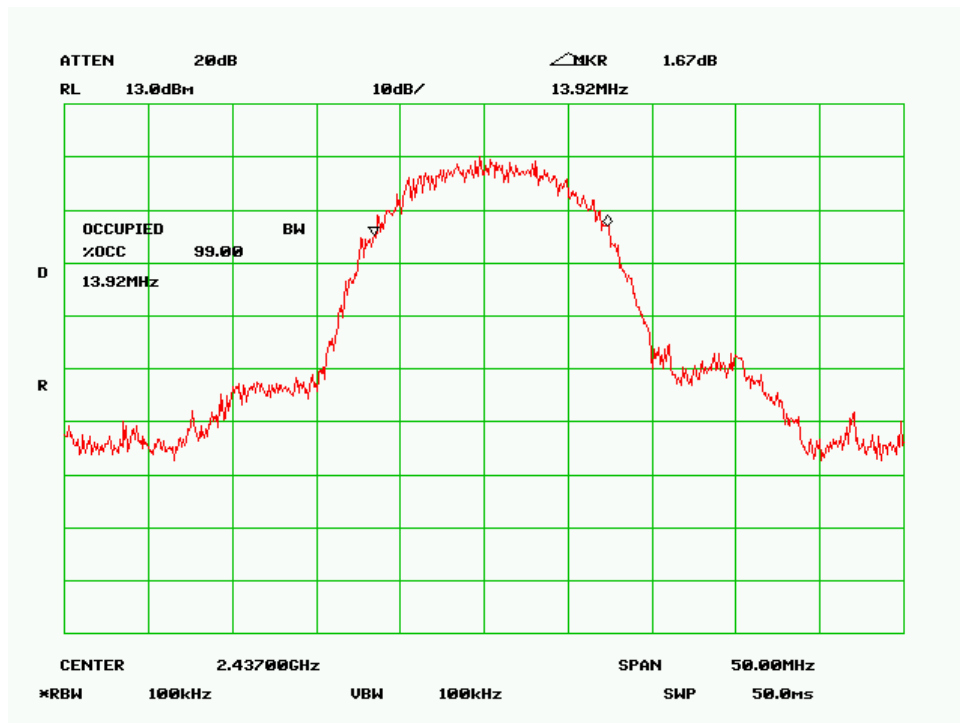
6 dB Bandwidth - Low Channel (802.11b)



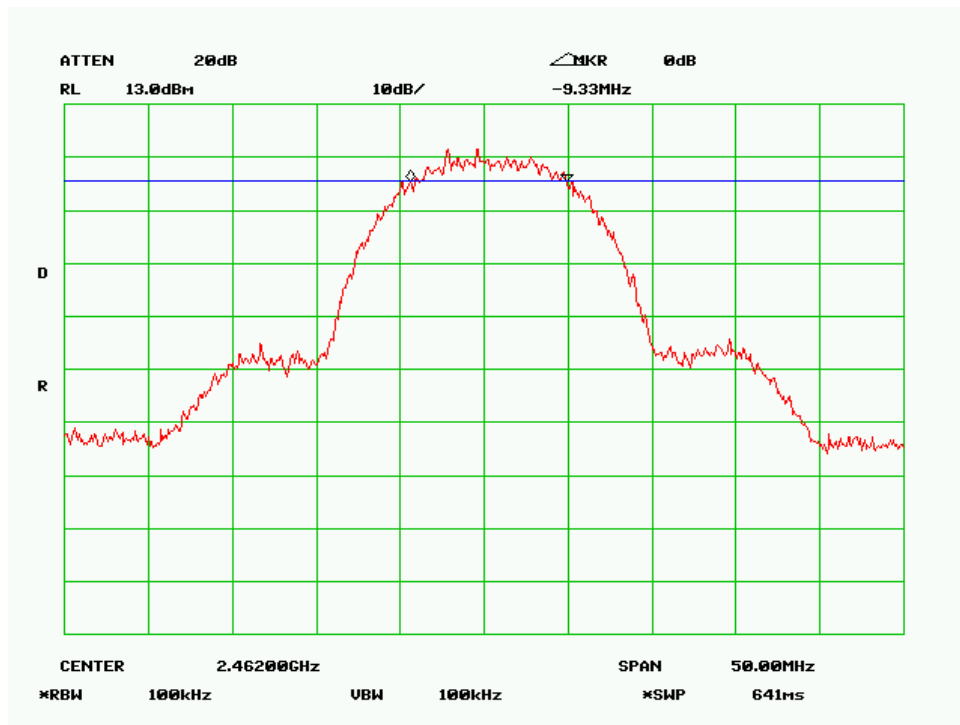
99% Bandwidth - Low Channel (802.11b)



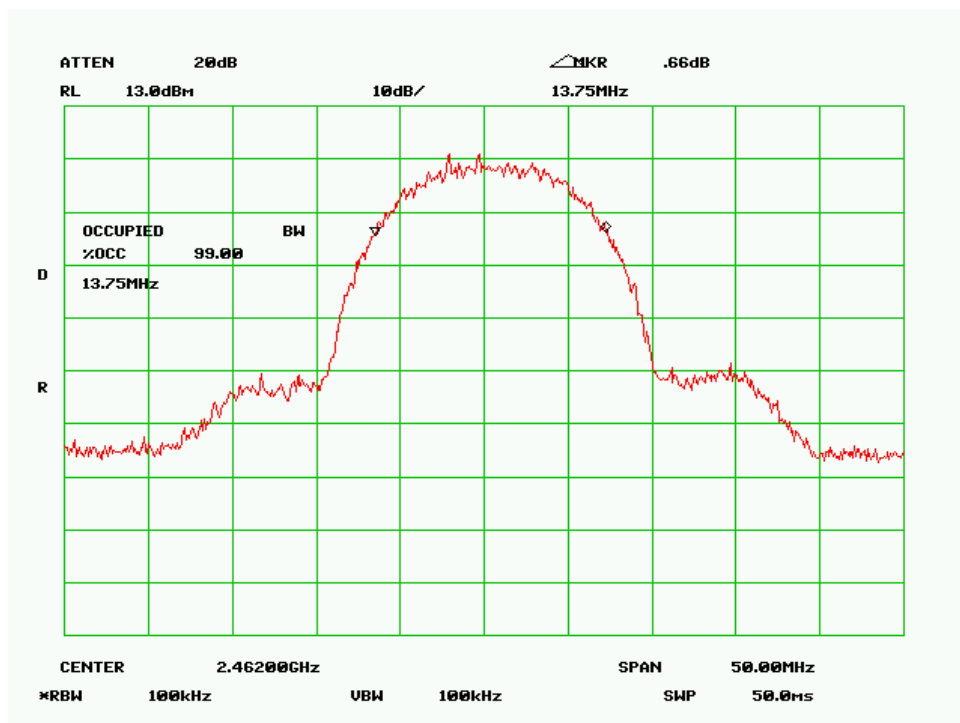
6 dB Bandwidth - Mid Channel (802.11b)



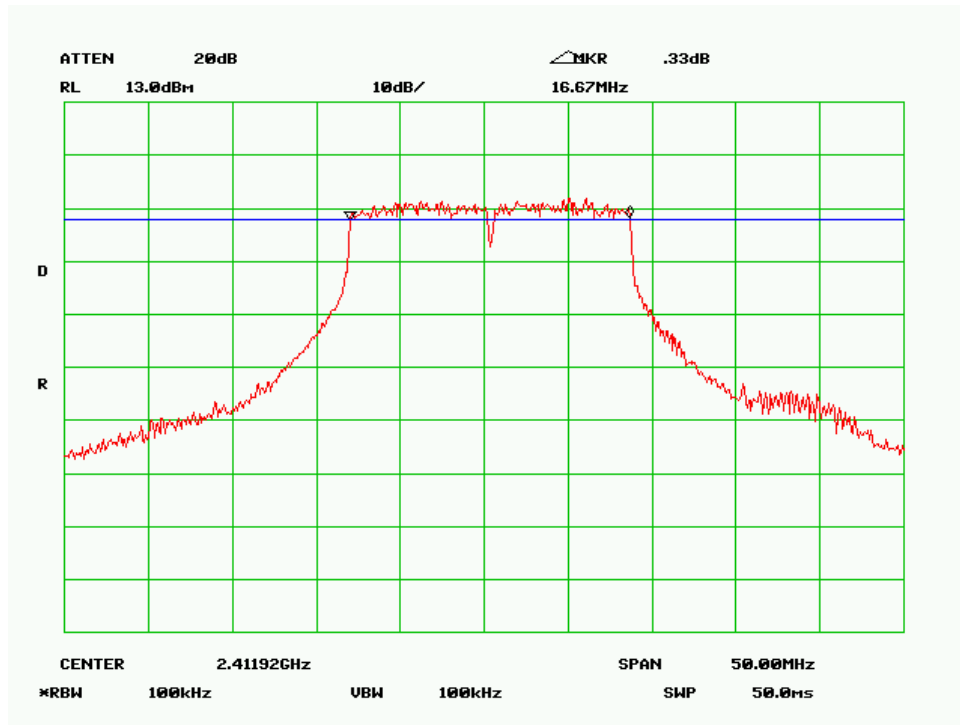
99% Bandwidth - Mid Channel (802.11b)



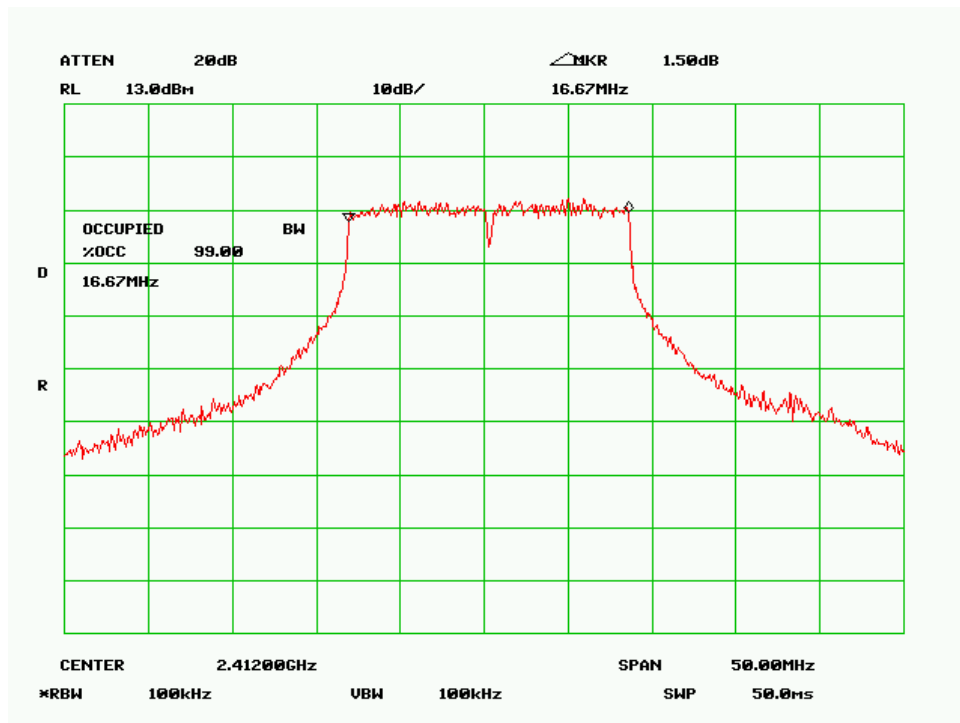
6 dB Bandwidth – High Channel (802.11b)



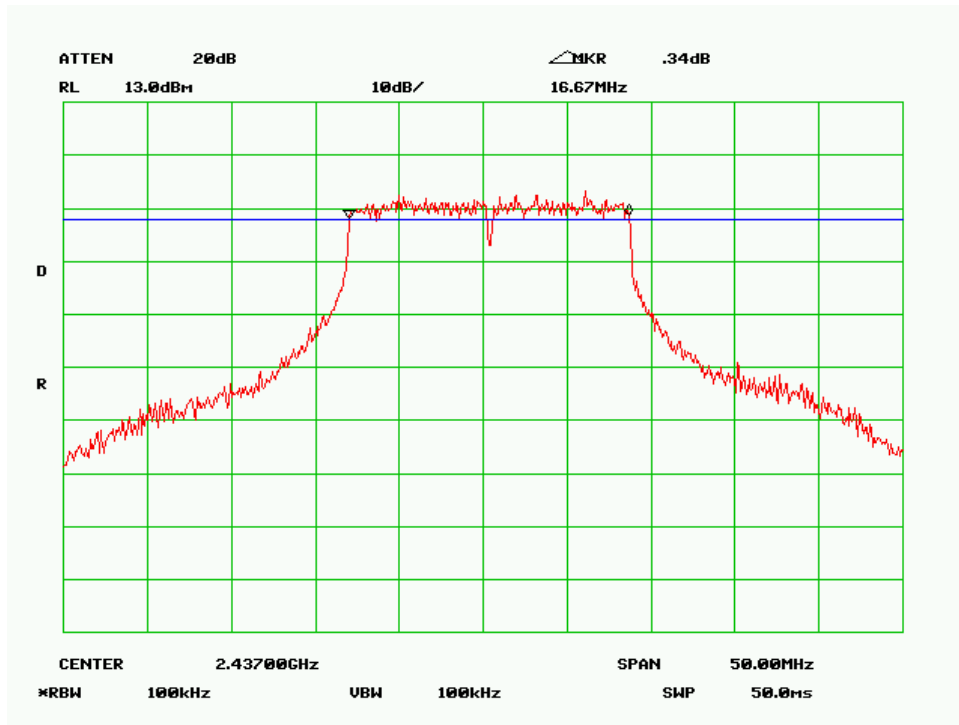
99% Bandwidth - High Channel (802.11b)



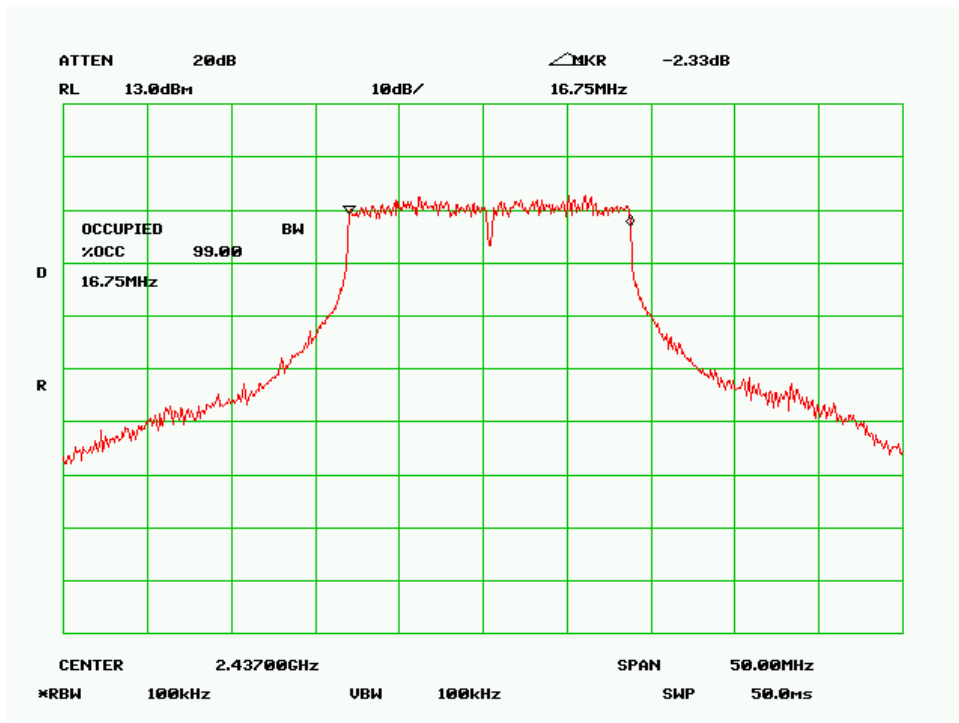
6 dB Bandwidth - Low Channel (802.11g)



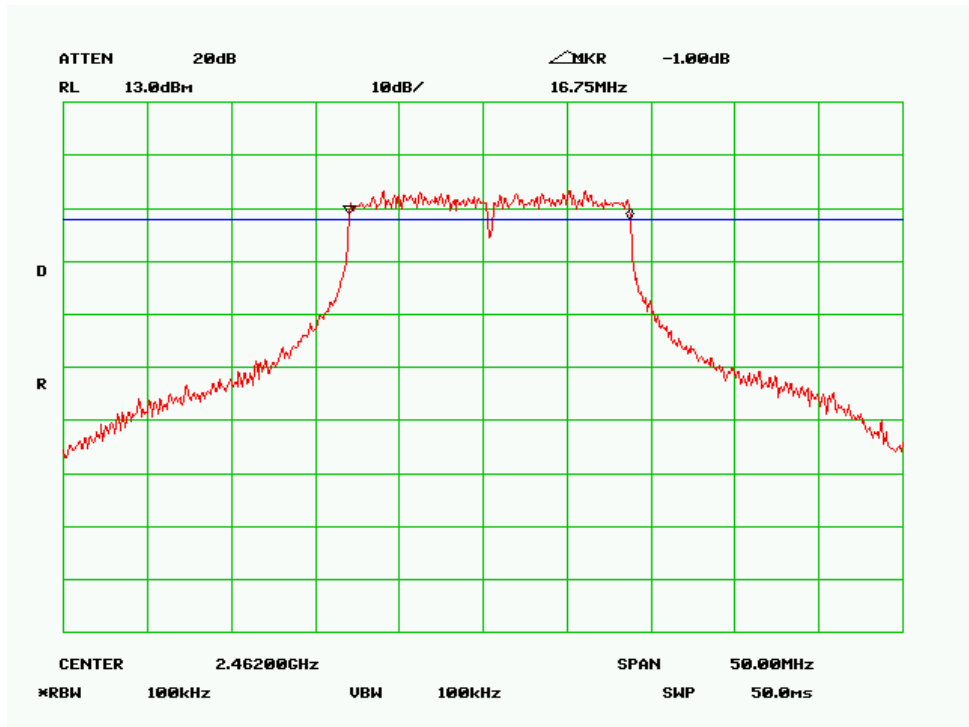
99% Bandwidth - Low Channel (802.11g)



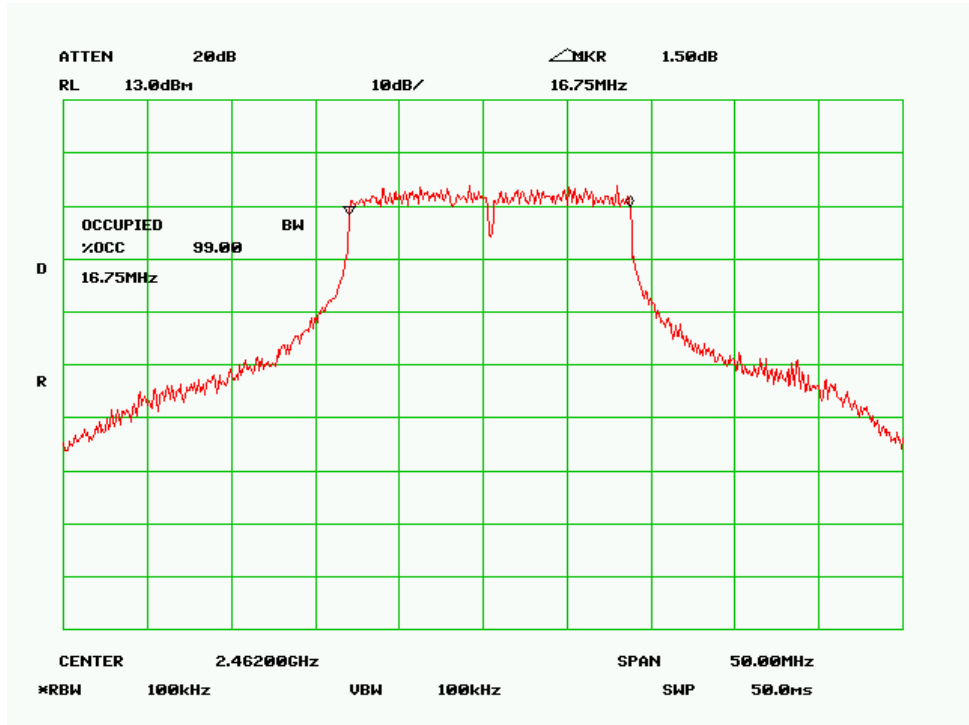
6 dB Bandwidth - Mid Channel (802.11g)



99% Bandwidth - Mid Channel (802.11g)



6 dB Bandwidth – High Channel (802.11g)



99% Bandwidth – High Channel (802.11g)

## 5.4 Peak Spectral Density

1. Conducted Measurement  
EUT was set for low , mid, high channel with modulated mode and highest RF output power.  
The spectrum analyzer was connected to the antenna terminal.
2. Conducted Emissions Measurement Uncertainty  
All test measurements carried out are traceable to national standards. The uncertainty of the measurement at a confidence level of approximately 95% (in the case where distributions are normal), with a coverage factor of 2, in the range 30MHz – 40GHz is  $\pm 1.5\text{dB}$ .
3. Environmental Conditions
 

|                      |          |
|----------------------|----------|
| Temperature          | 23°C     |
| Relative Humidity    | 50%      |
| Atmospheric Pressure | 1019mbar |
4. Test Date : February 18-22 2008  
Tested By :Choon Sian Ooi

**Standard Requirement :** 47 CFR §15.247(e)

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission

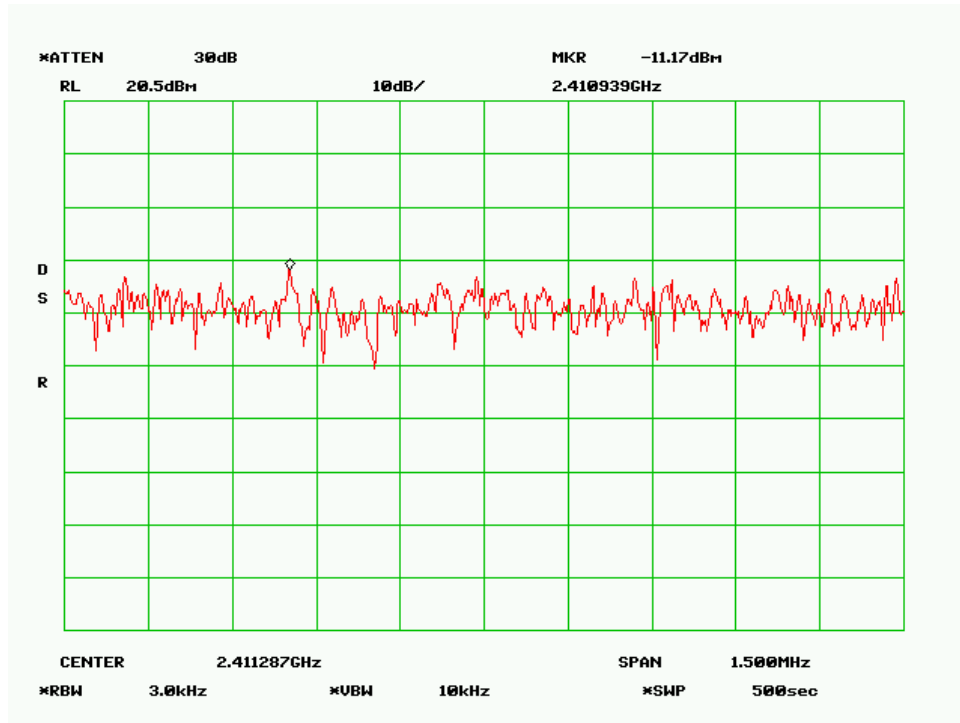
**Procedures:** The Peak Spectral density measurement was taken conducted using a spectrum analyzer.

RBW=3KHz, VBW > RBW , Sweep time to SPAN/RBW (sec)

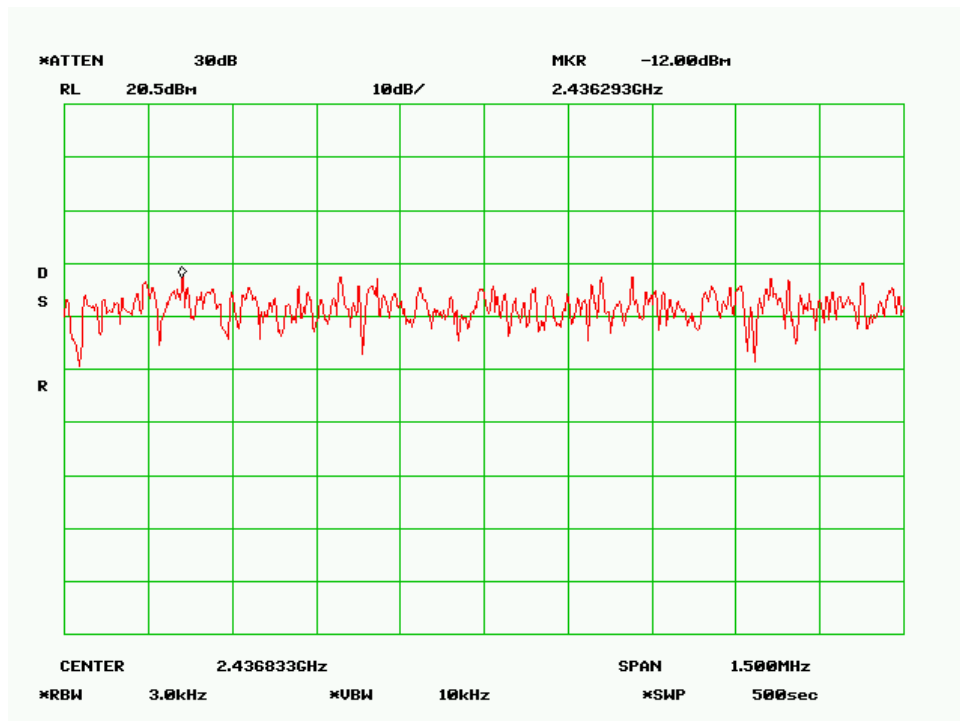
**Test Result :**

| Protocol | Channel | Channel Frequency (MHz) | Peak Spectral Density Limit (dBm/3KHz) | Peak Spectral Density (dBm/3KHz) |
|----------|---------|-------------------------|----------------------------------------|----------------------------------|
| 802.11b  | Low     | 2412                    | 8.00                                   | -11.70                           |
| 802.11b  | Mid     | 2437                    | 8.00                                   | -12.00                           |
| 802.11b  | High    | 2462                    | 8.00                                   | -11.50                           |
| 802.11g  | Low     | 2412                    | 8.00                                   | -17.17                           |
| 802.11g  | Mid     | 2437                    | 8.00                                   | -16.67                           |
| 802.11g  | High    | 2462                    | 8.00                                   | -17.00                           |

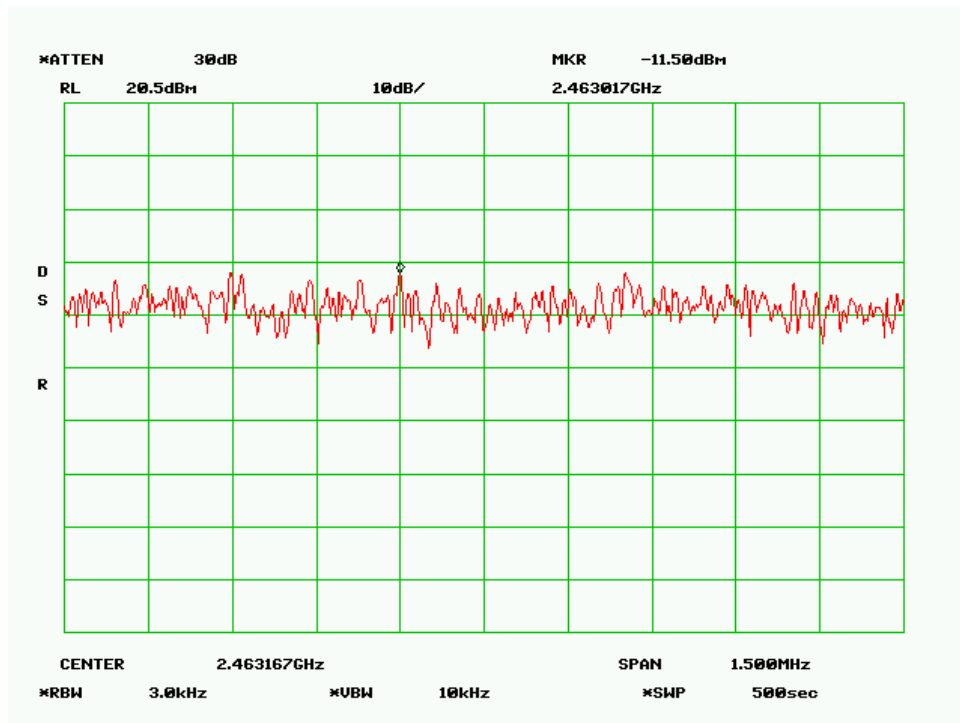
Refer to the attached plots.



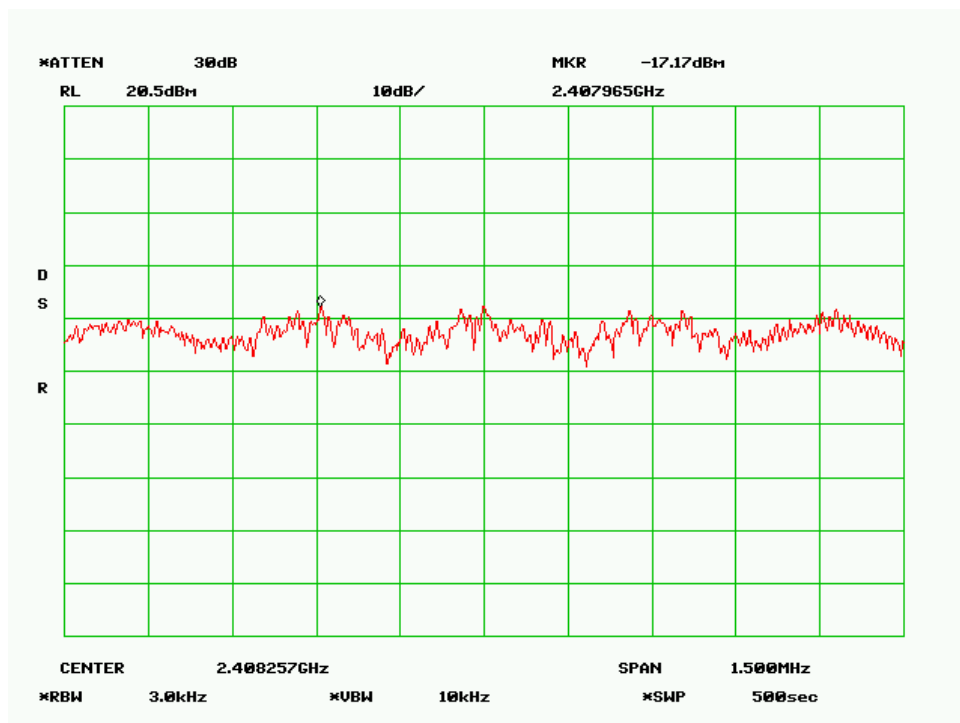
PSD Low Channel (802.11b)



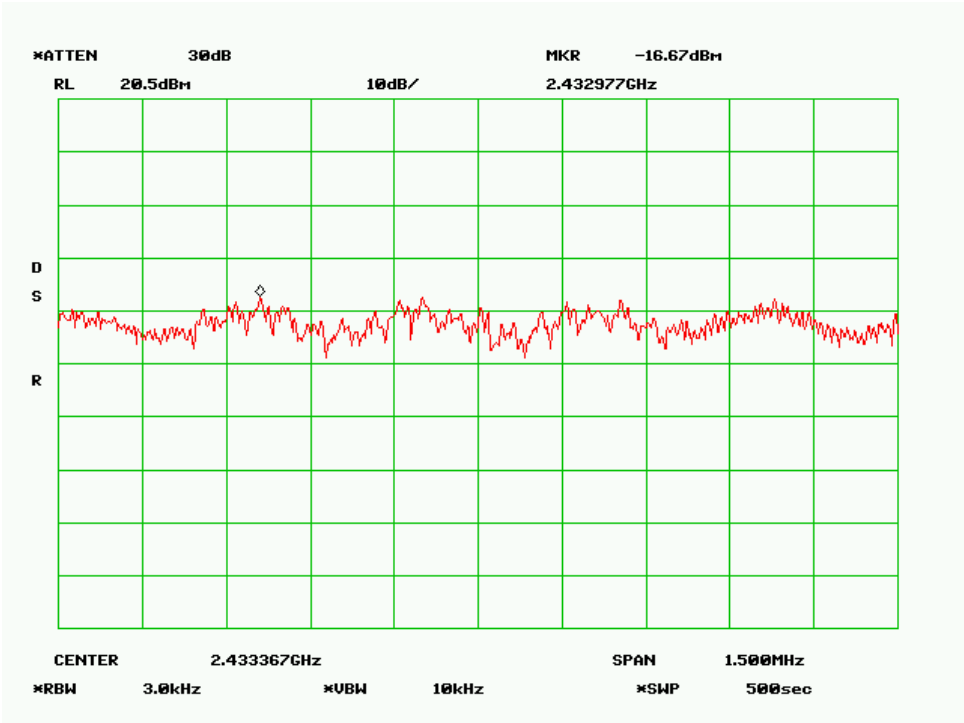
PSD Mid Channel (802.11b)



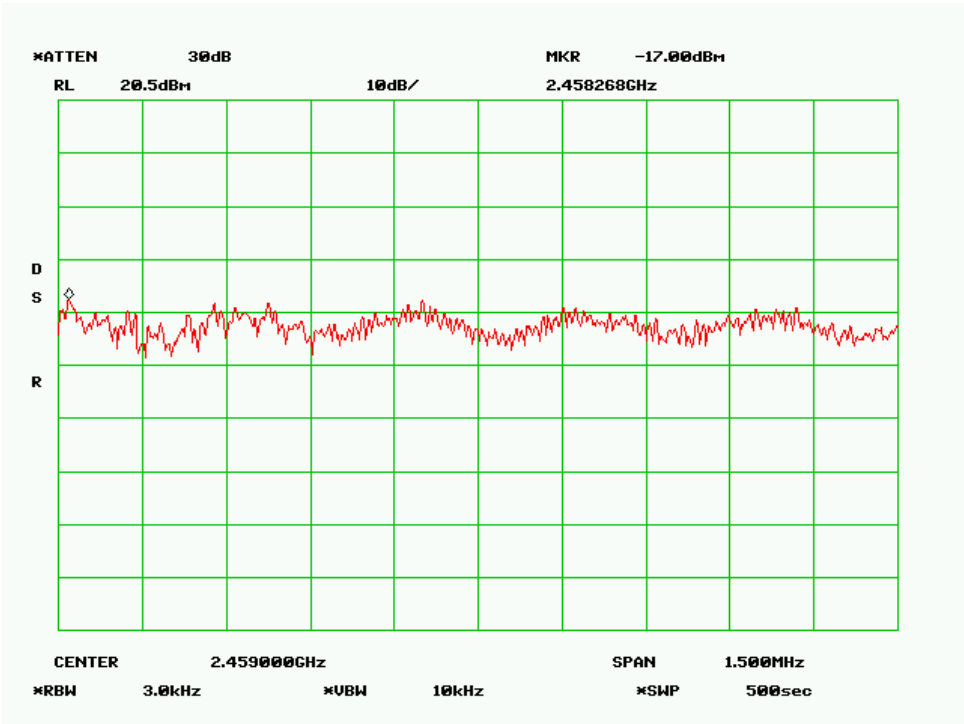
PSD High Channel (802.11b)



PSD Low Channel (802.11g)



PSD Mid Channel (802.11g)



PSD High Channel (802.11g)

## 5.10 Peak Output Power

1. Conducted Measurement  
EUT was set for low , mid, high channel with modulated mode and highest RF output power. The spectrum analyzer was connected to the antenna terminal.
2. Conducted Emissions Measurement Uncertainty  
All test measurements carried out are traceable to national standards. The uncertainty of the measurement at a confidence level of approximately 95% (in the case where distributions are normal), with a coverage factor of 2, in the range 30MHz – 40GHz is  $\pm 1.5\text{dB}$ .
3. Environmental Conditions
 

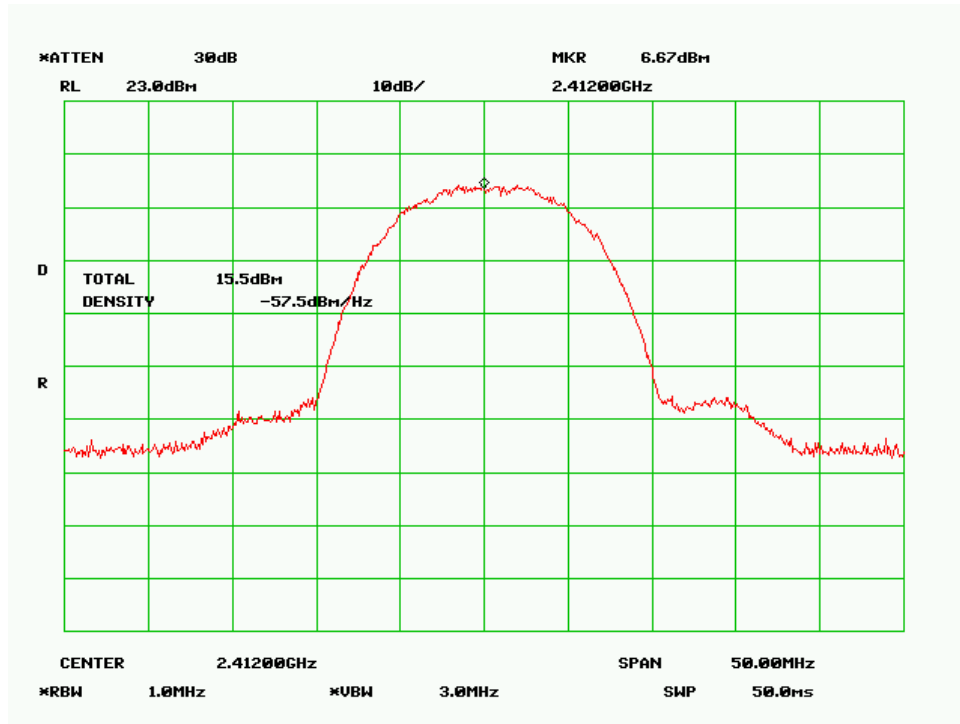
|                      |          |
|----------------------|----------|
| Temperature          | 23°C     |
| Relative Humidity    | 50%      |
| Atmospheric Pressure | 1019mbar |
4. Test Date : February 18-22 2008  
Tested By :Choon Sian Ooi

Standard Requirement : 47 CFR §15.247(b)

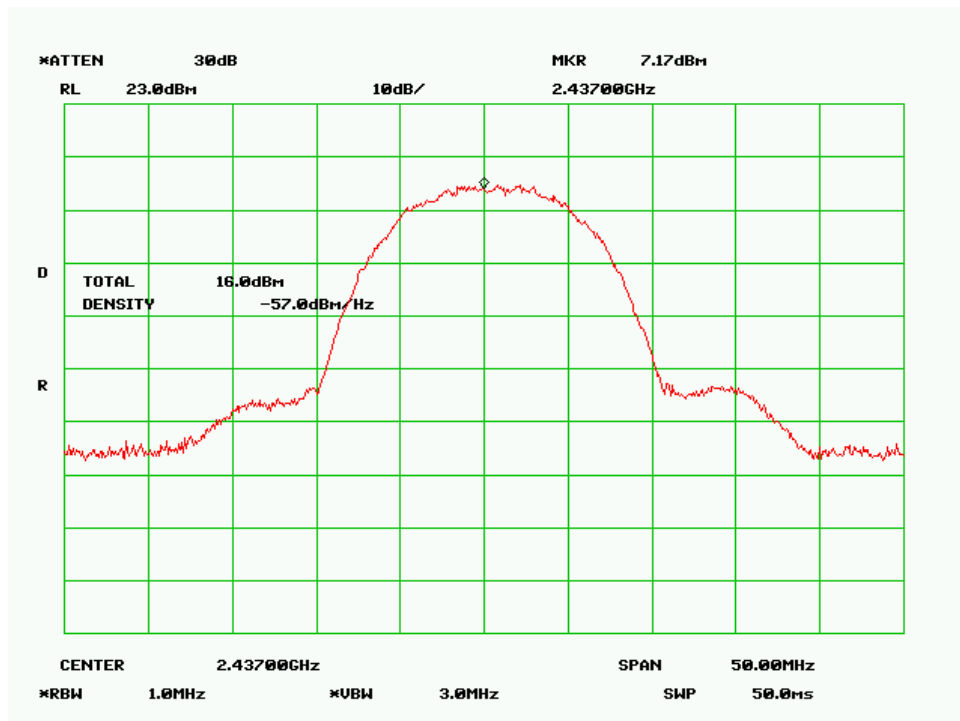
**Procedures:** The peak output power was measured conducted using a spectrum analyzer at low, mid, and hi channels. Peak detector was set to measure the power output. The power is converted from watt to dBm, therefore, 1 watt = 30 dBm. The highest antenna gain that will be used is 3 dBi.

### Test Result :

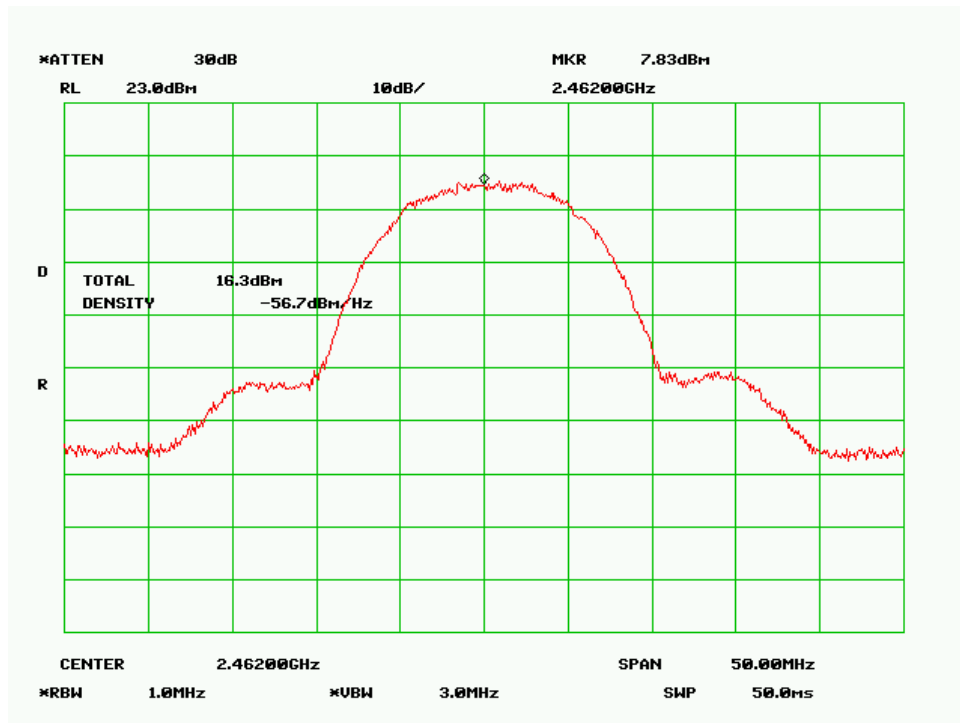
| Protocol | Channel | Channel Frequency (MHz) | Peak Output Power Limit (dBm) | Measured Output Power(dBm) |
|----------|---------|-------------------------|-------------------------------|----------------------------|
| 802.11b  | Low     | 2412                    | 30                            | 15.50                      |
| 802.11b  | Mid     | 2437                    | 30                            | 16.00                      |
| 802.11b  | High    | 2462                    | 30                            | 16.30                      |
| 802.11g  | Low     | 2412                    | 30                            | 10.9                       |
| 802.11g  | Mid     | 2437                    | 30                            | 11.1                       |
| 802.11g  | High    | 2462                    | 30                            | 11.4                       |



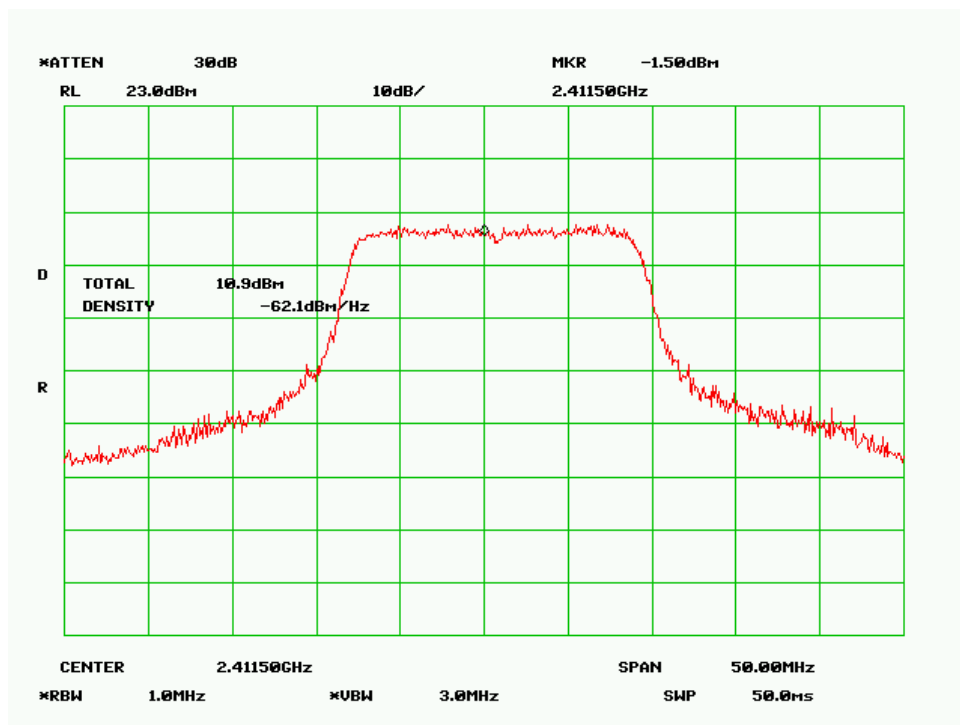
Output Power Low Channel (802.11b)



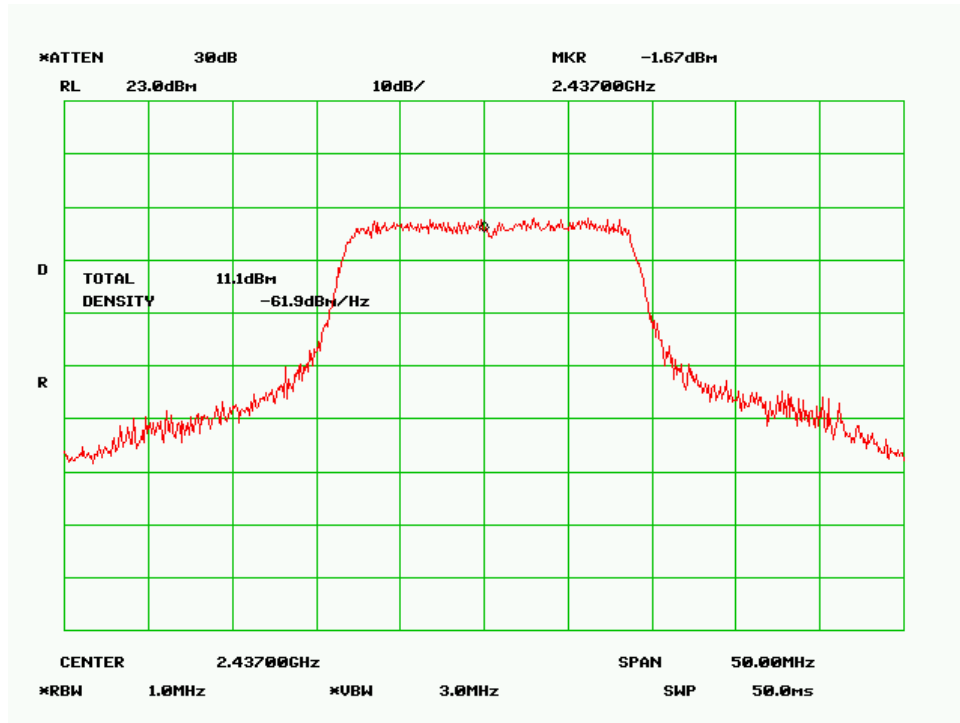
Output Power Mid Channel (802.11b)



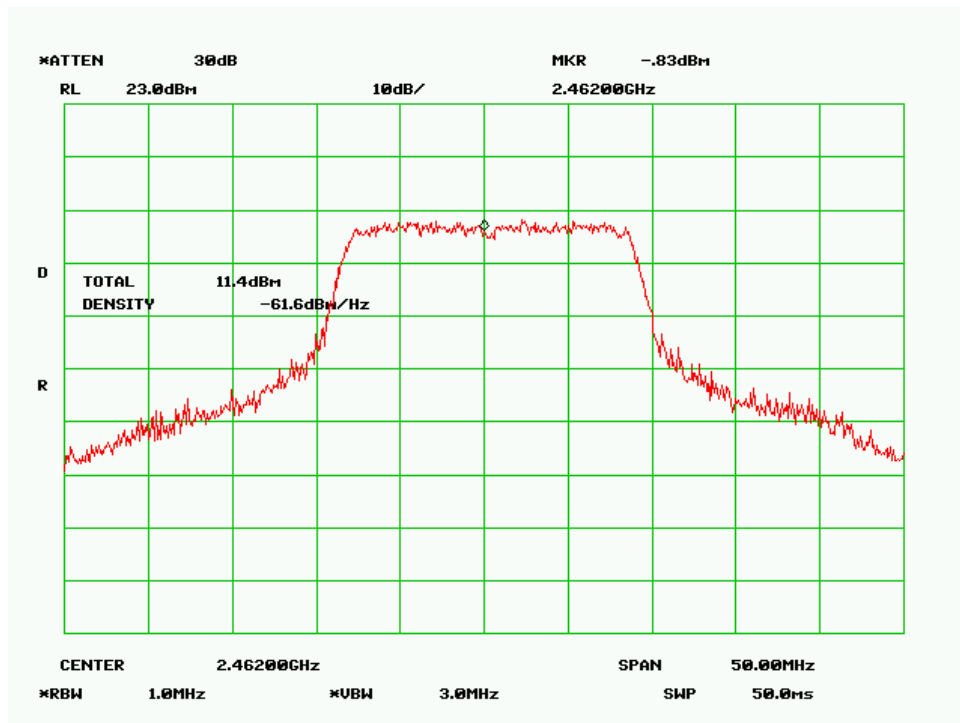
Output Power High Channel (802.11b)



Output Power Low Channel (802.11g)



Output Power Mid Channel (802.11g)



Output Power High Channel (802.11g)

## 5.10 Antenna Port Emission

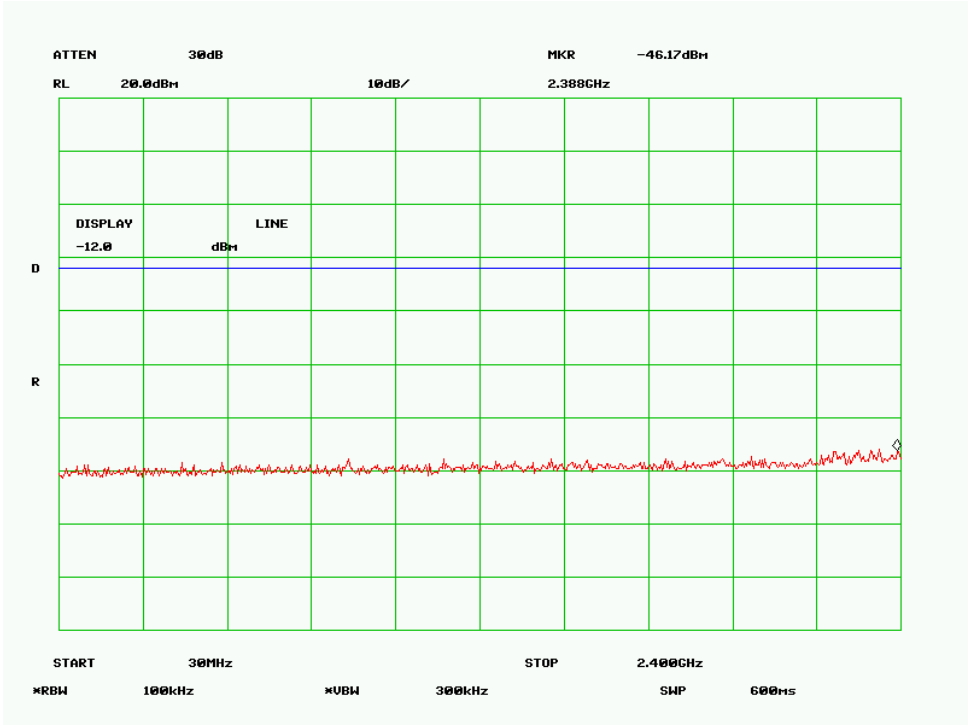
1. Conducted Measurement  
EUT was set for low , mid, high channel with modulated mode and highest RF output power.  
The spectrum analyzer was connected to the antenna terminal.
2. Conducted Emissions Measurement Uncertainty  
All test measurements carried out are traceable to national standards. The uncertainty of the measurement at a confidence level of approximately 95% (in the case where distributions are normal), with a coverage factor of 2, in the range 30MHz – 40GHz is  $\pm 1.5\text{dB}$ .
3. Environmental Conditions

|                      |          |
|----------------------|----------|
| Temperature          | 23°C     |
| Relative Humidity    | 50%      |
| Atmospheric Pressure | 1019mbar |
4. Test Date : February 18-22 2008  
Tested By :Choon Sian Ooi

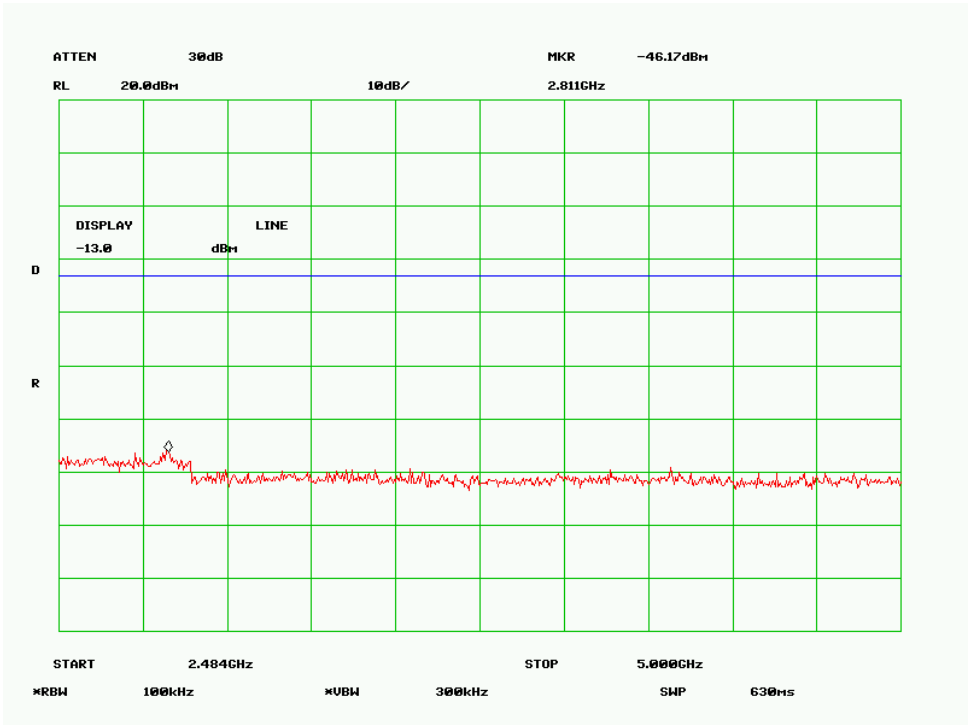
**Standard Requirement :** 47 CFR §15.247(d)

**Procedures:** The conducted spurious emissions were measured conducted using a spectrum analyzer at low, mid, and hi channels. The limit was determined by attenuating 20 dB of the RF peak power output

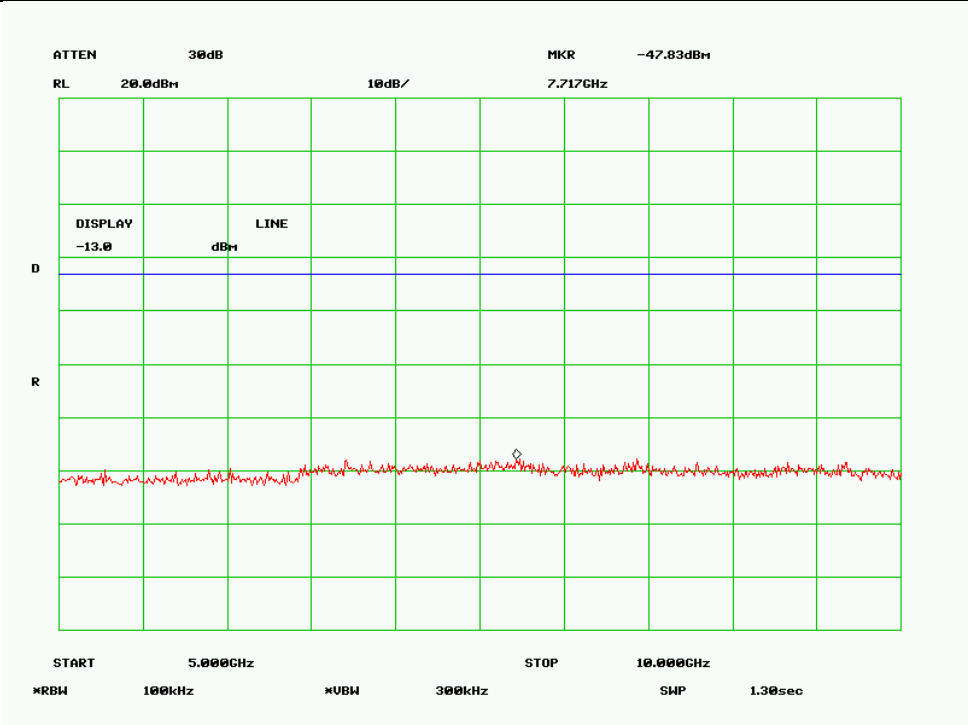
**Test Result:**



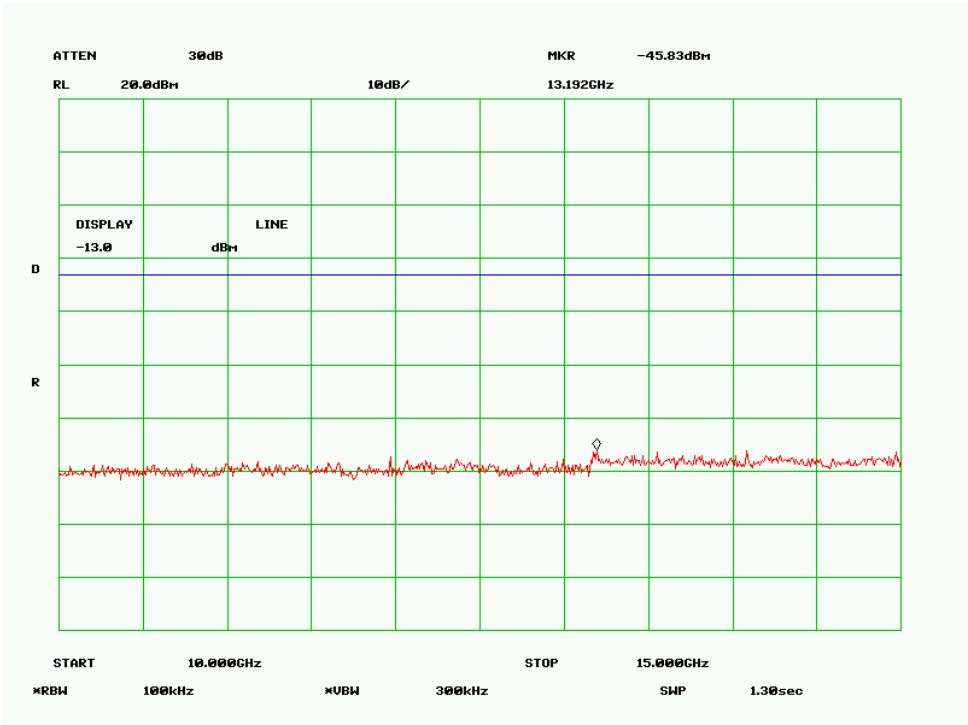
802.11b Low Channel -1



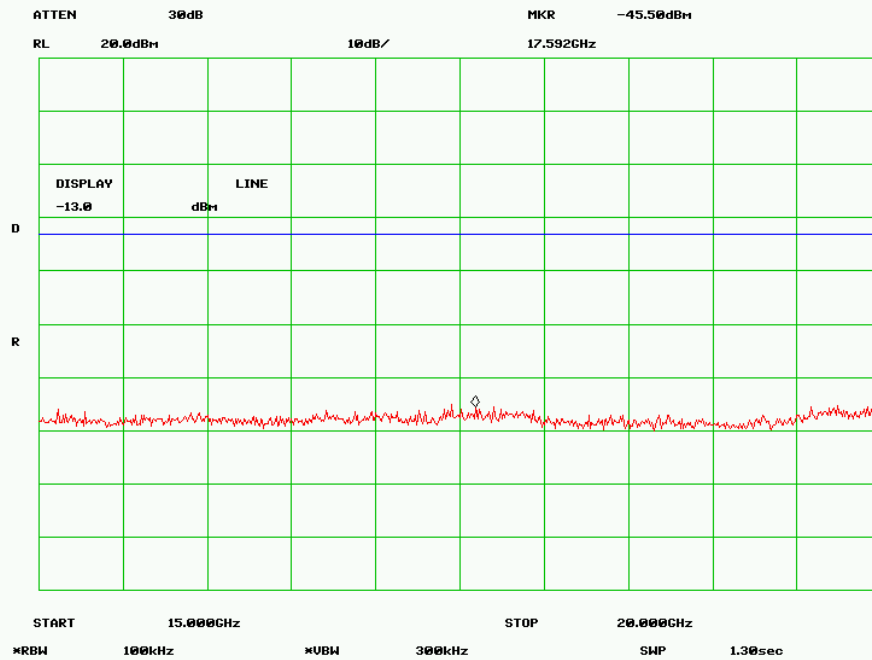
802.11b Low Channel -2



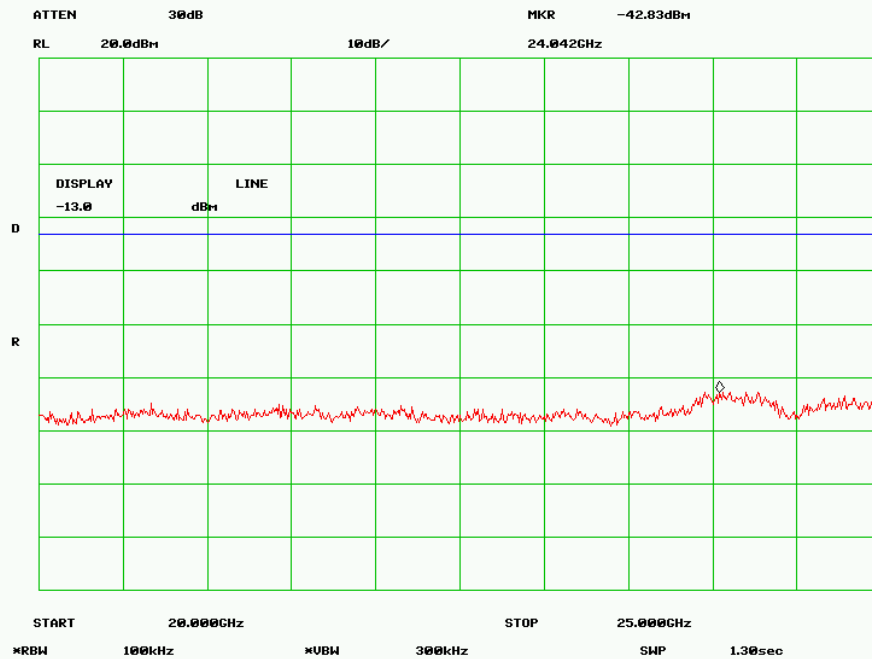
802.11b Low Channel -3



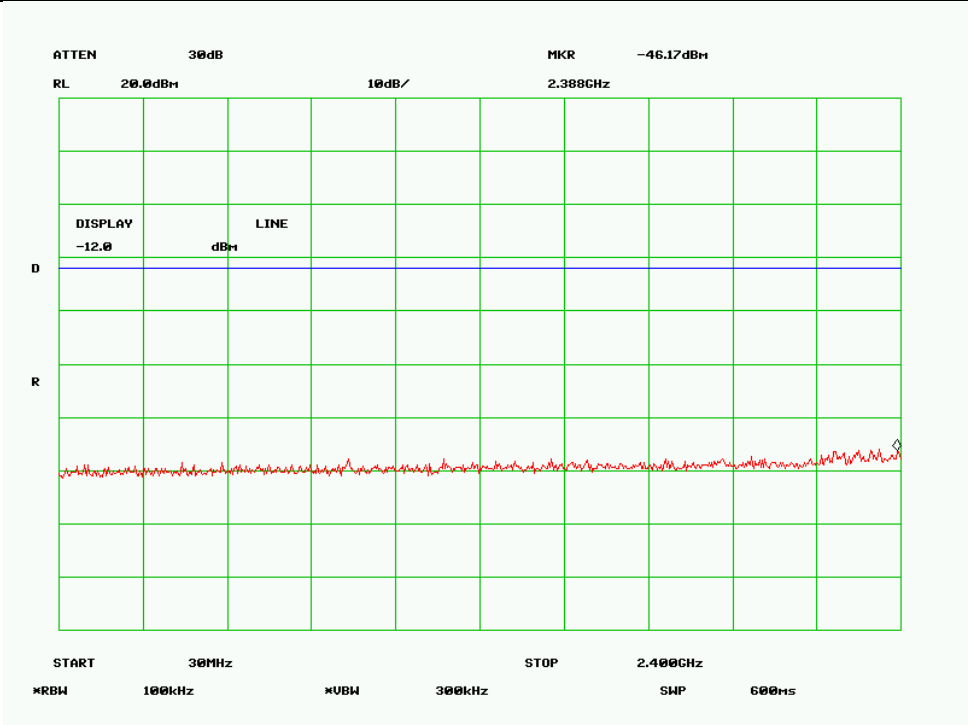
802.11b Low Channel -4



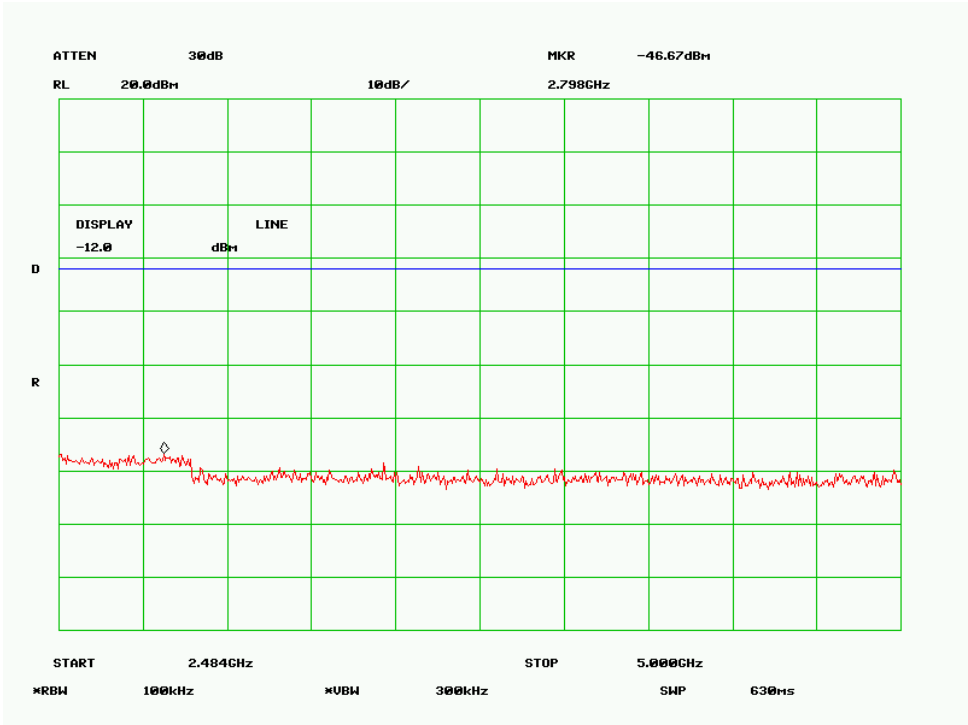
802.11b Low Channel -5



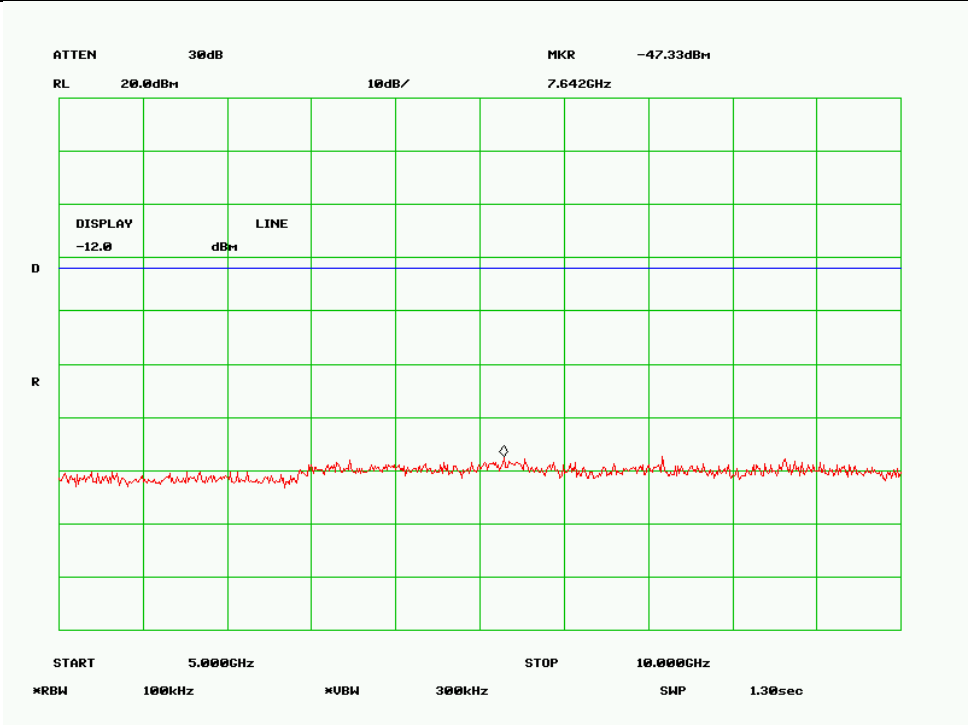
802.11b Low Channel -6



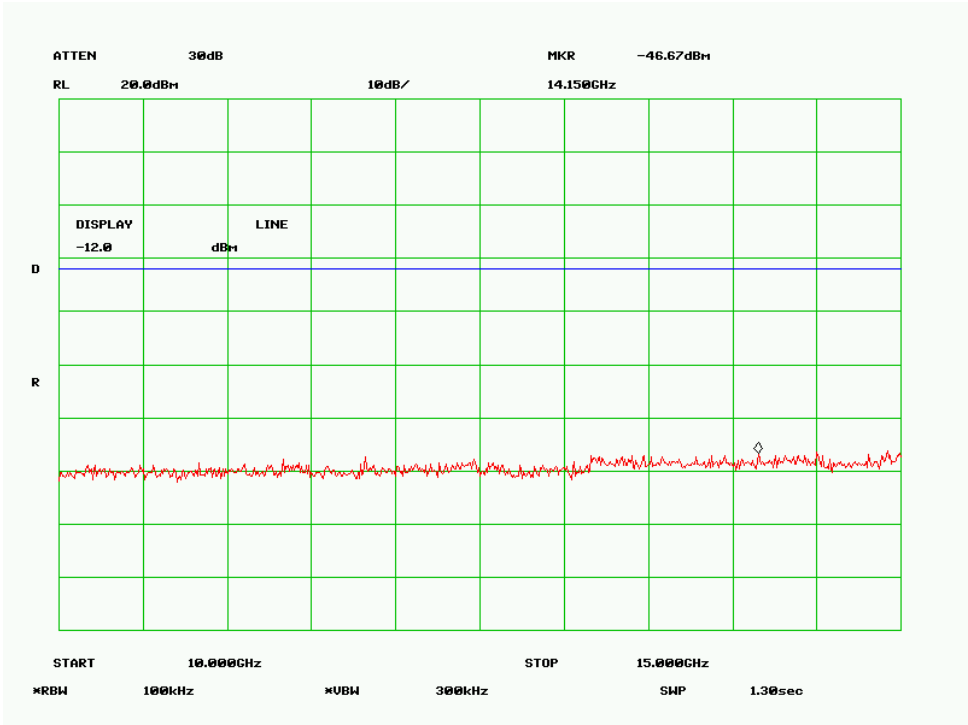
802.11b Mid Channel -1



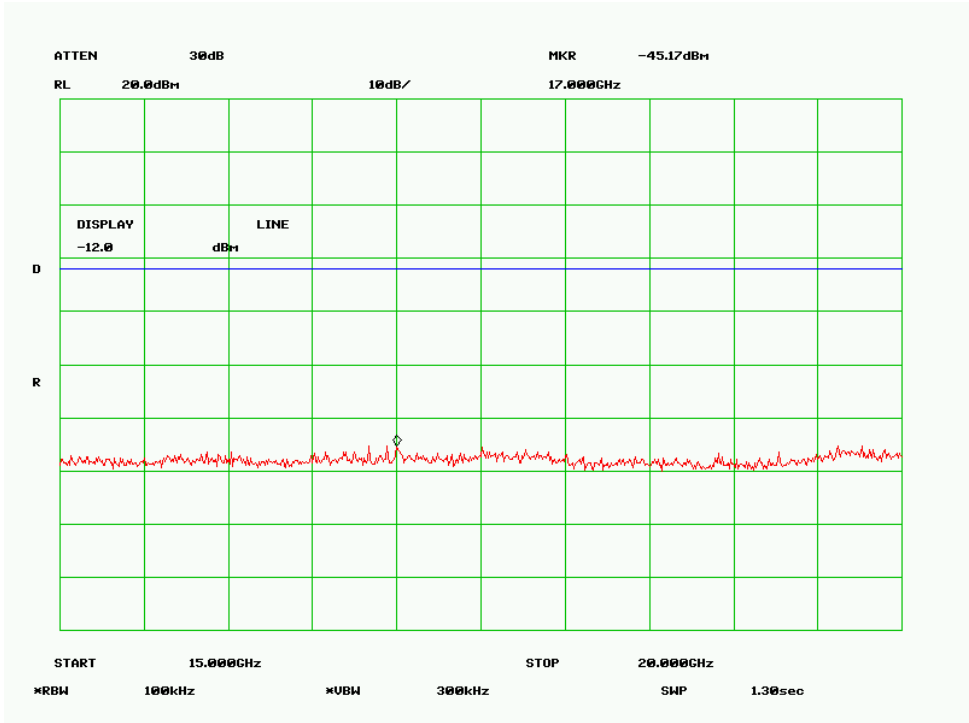
802.11b Mid Channel -2



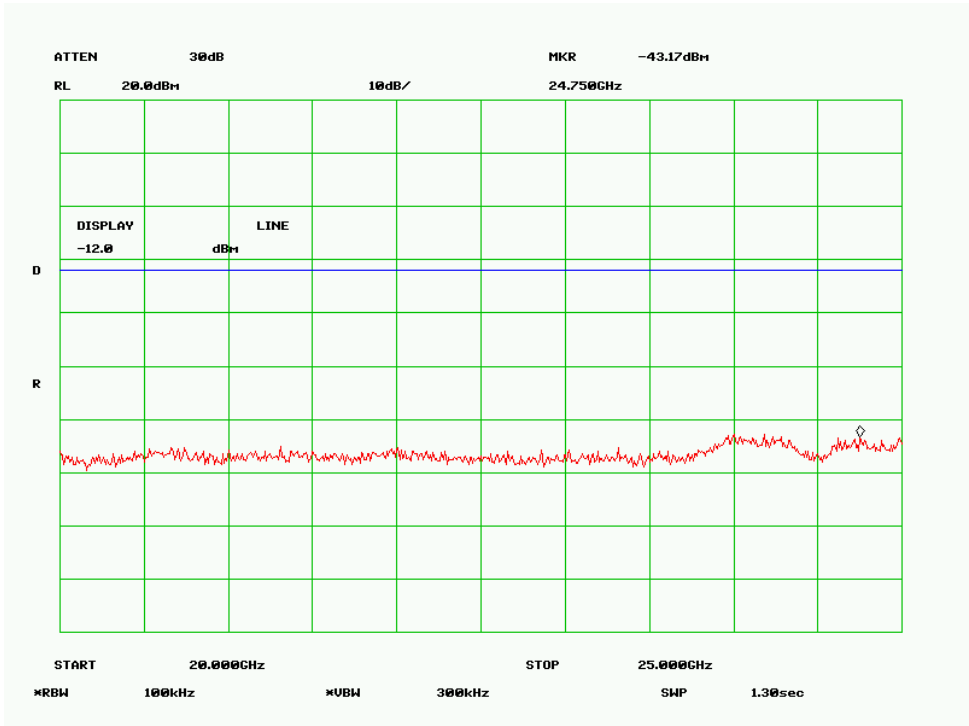
802.11b Mid Channel -3



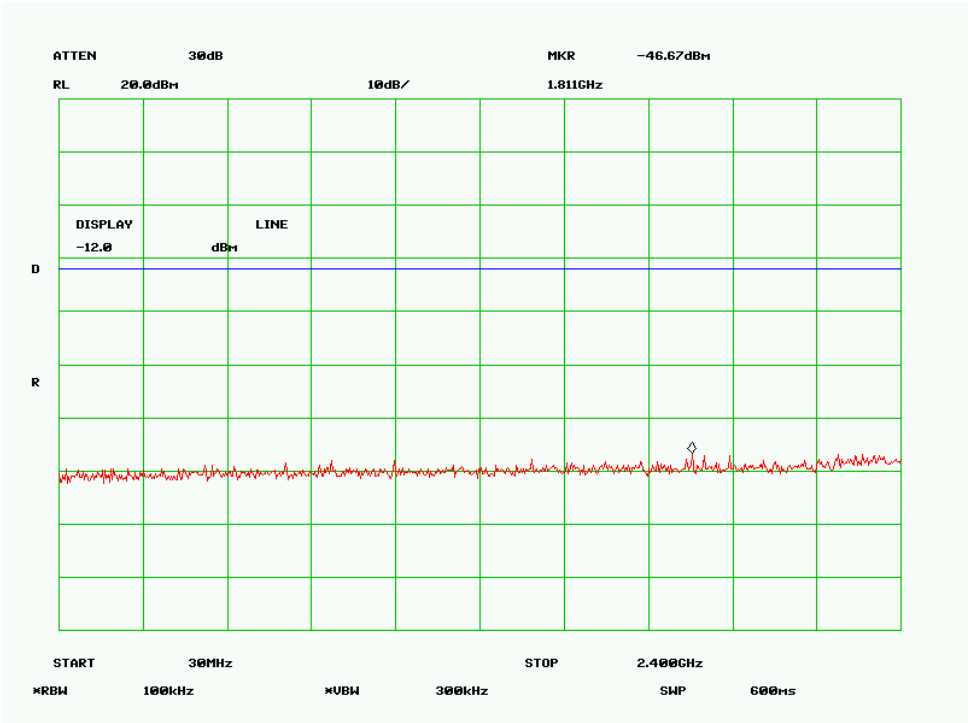
802.11b Mid Channel -4



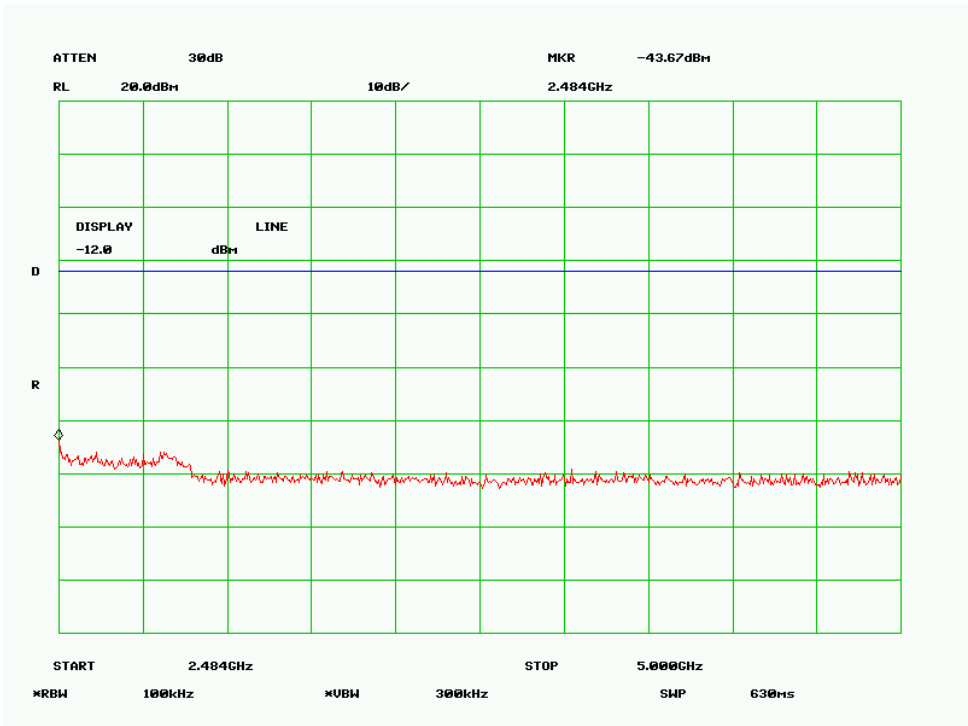
802.11b Mid Channel -5



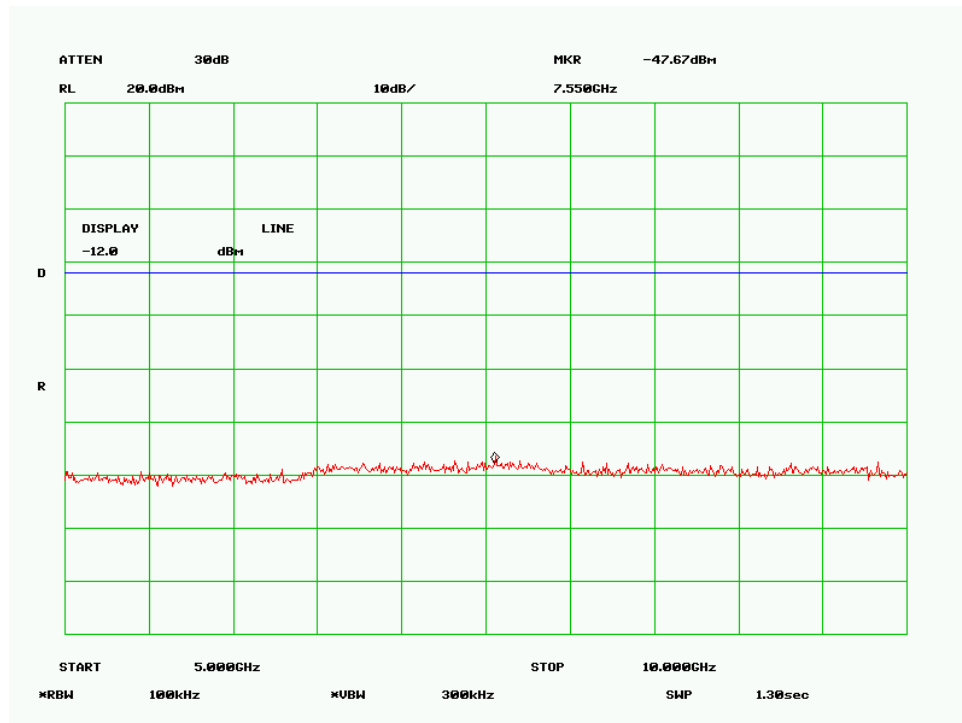
802.11b Mid Channel -6



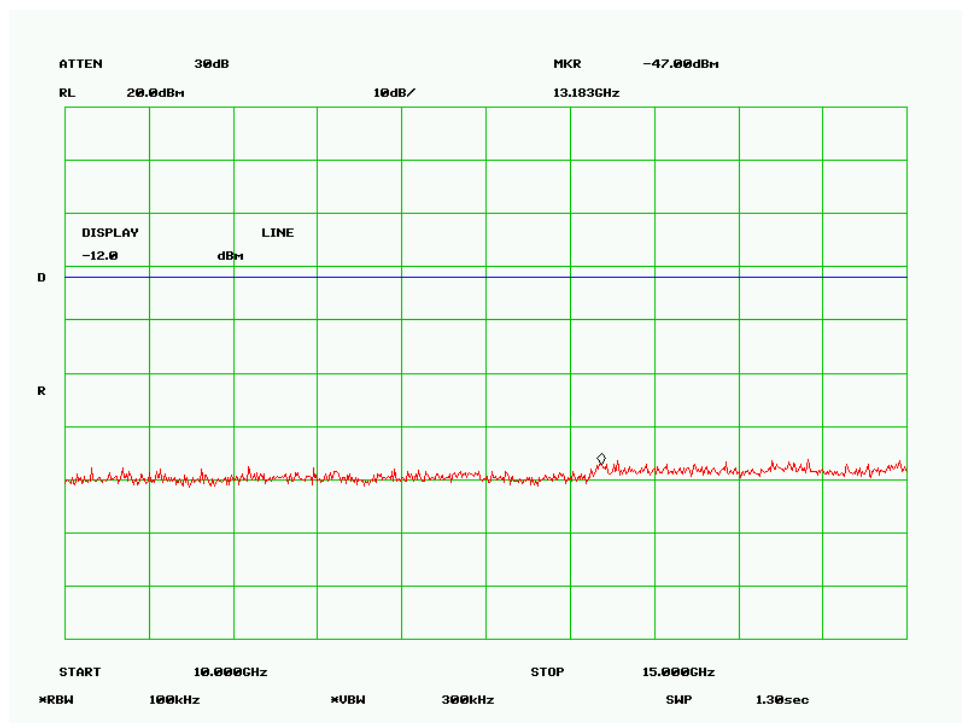
802.11b High Channel -1



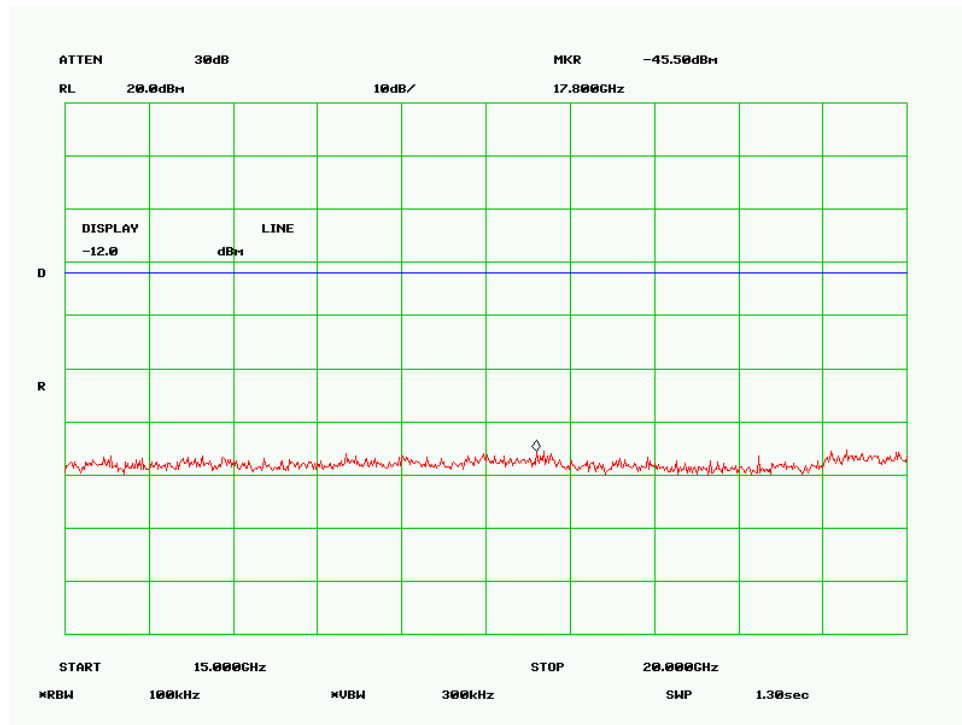
802.11b High Channel -2



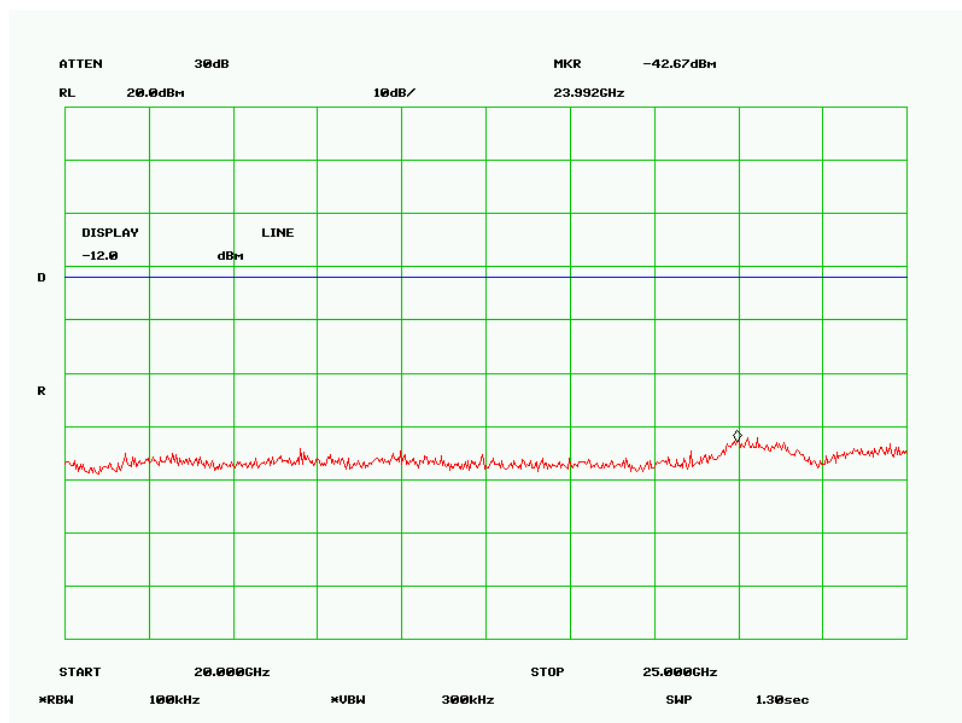
802.11b High Channel -3



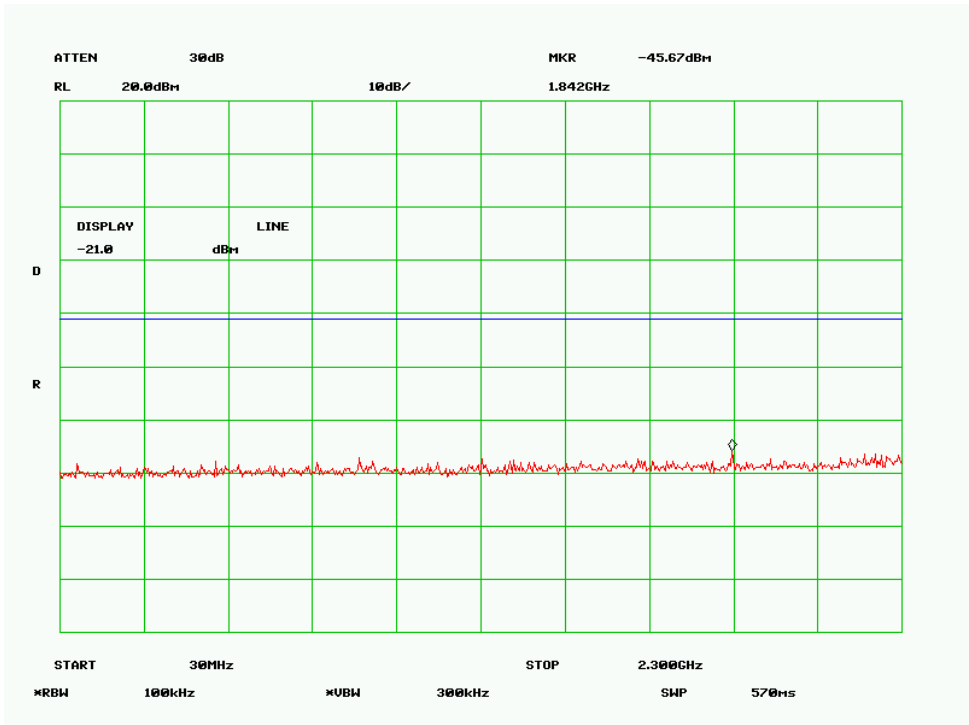
802.11b High Channel -4



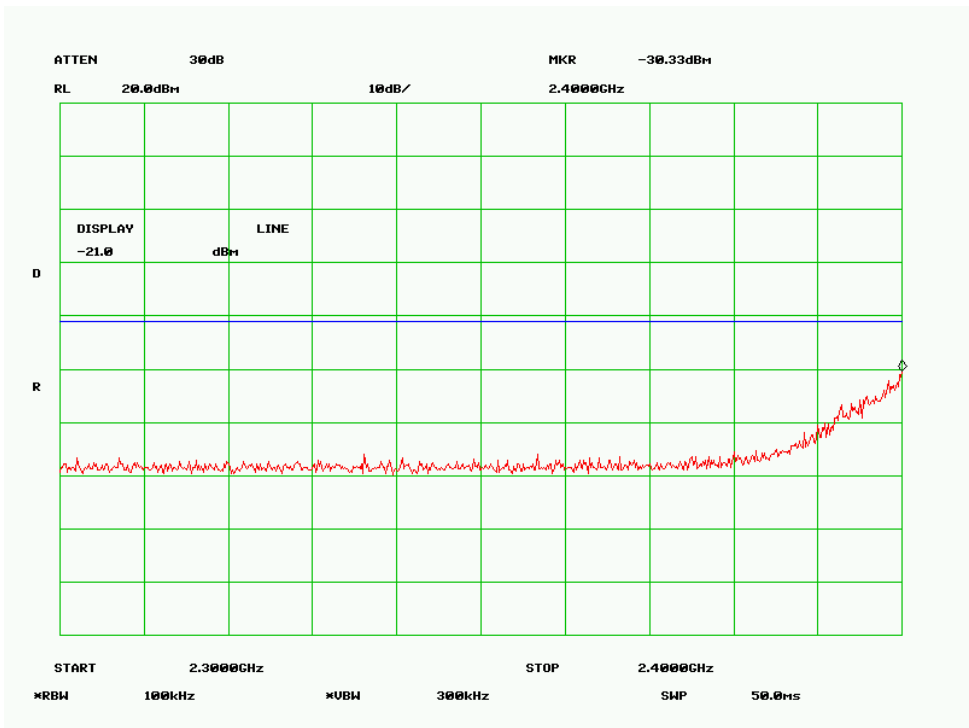
802.11b High Channel -5



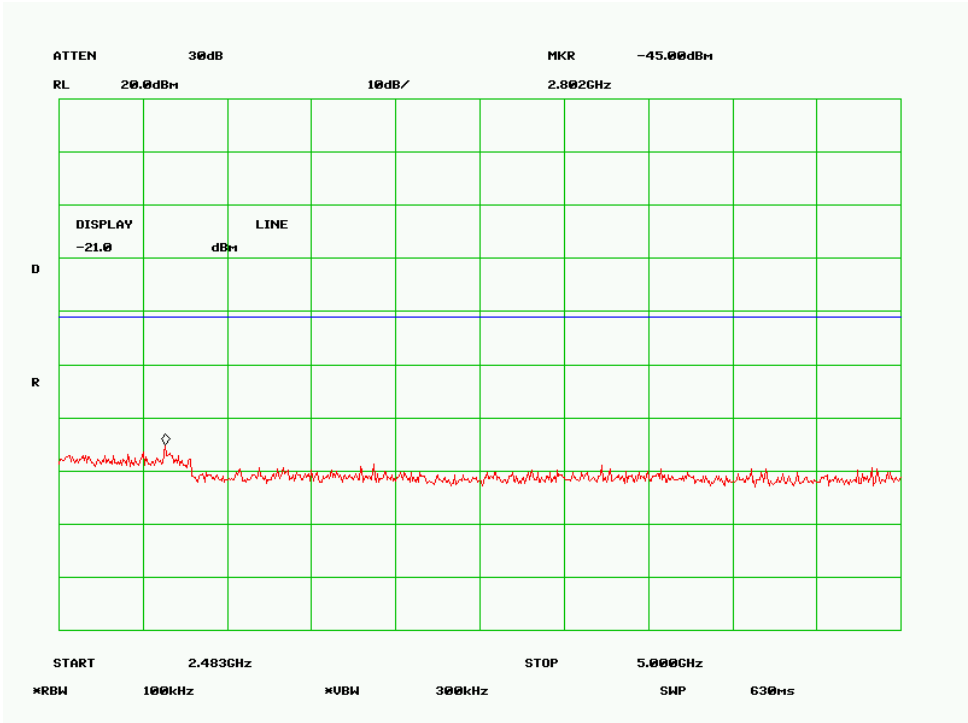
802.11b High Channel -6



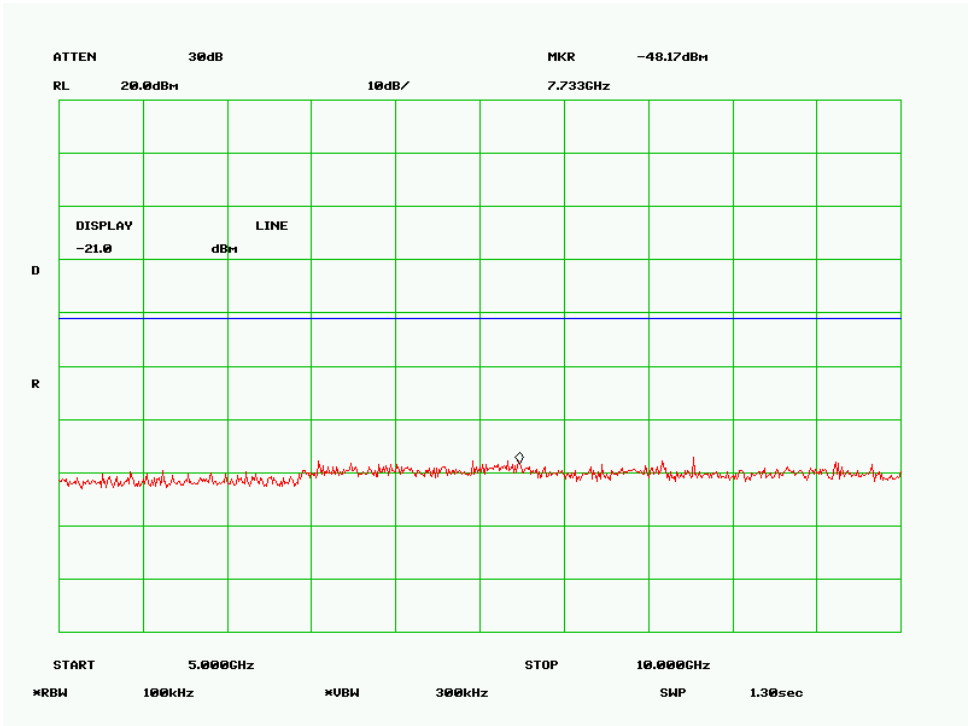
802.11g Low Channel -1



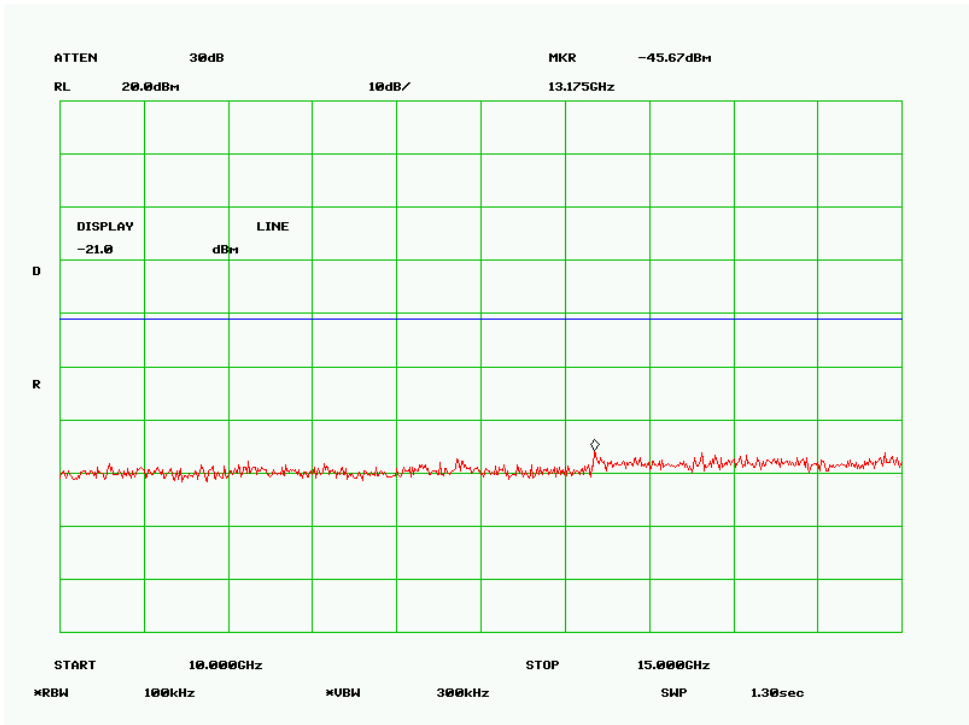
802.11g Low Channel -2



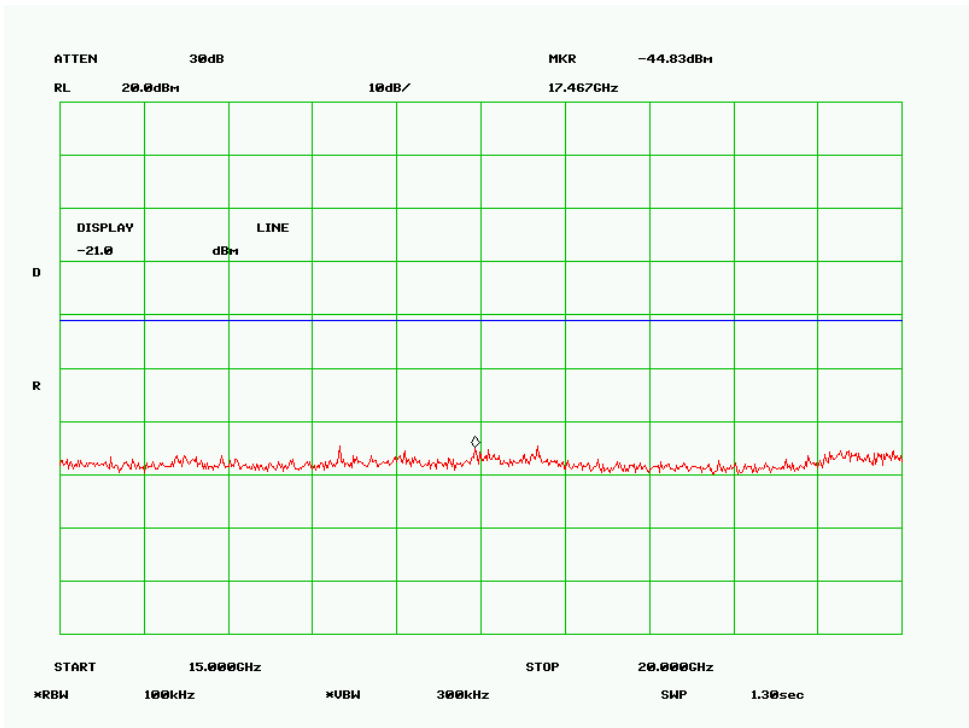
802.11g Low Channel -3



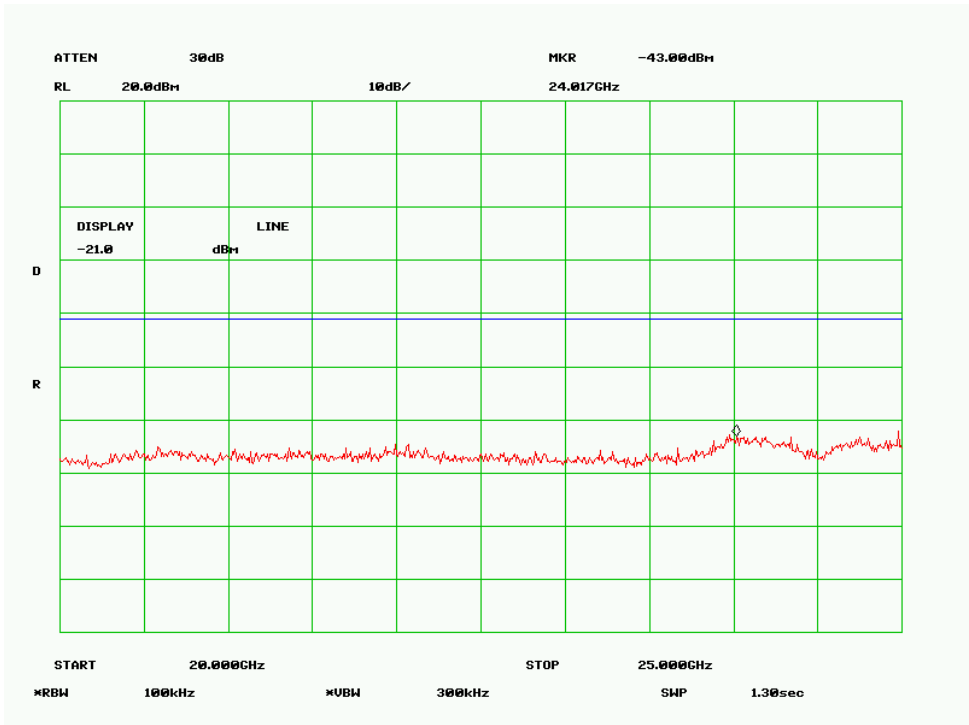
802.11g Low Channel -4



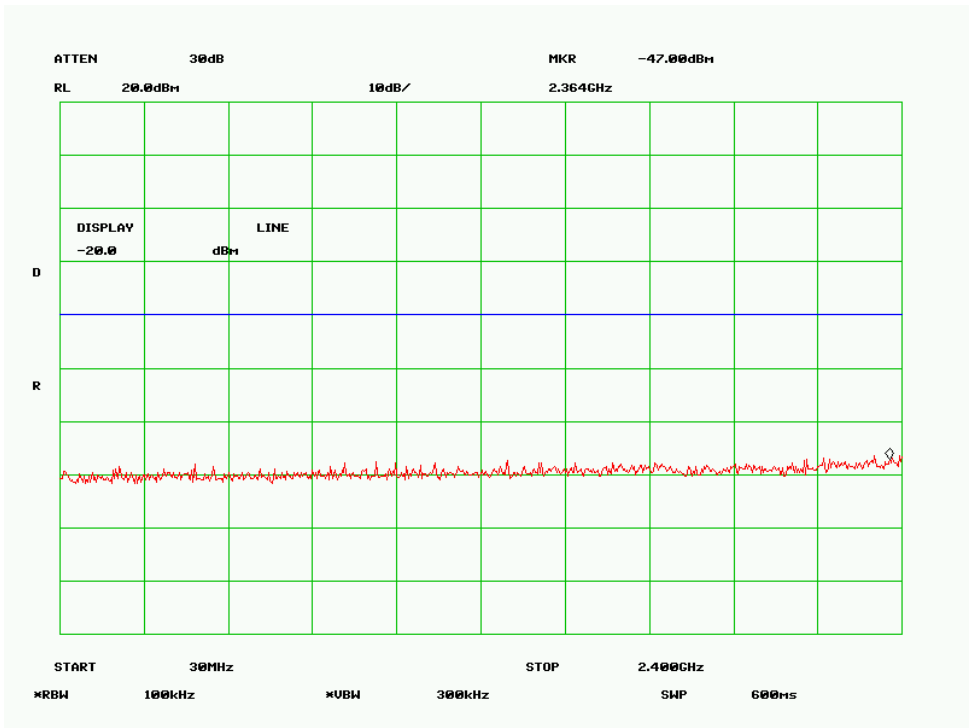
802.11g Low Channel -5



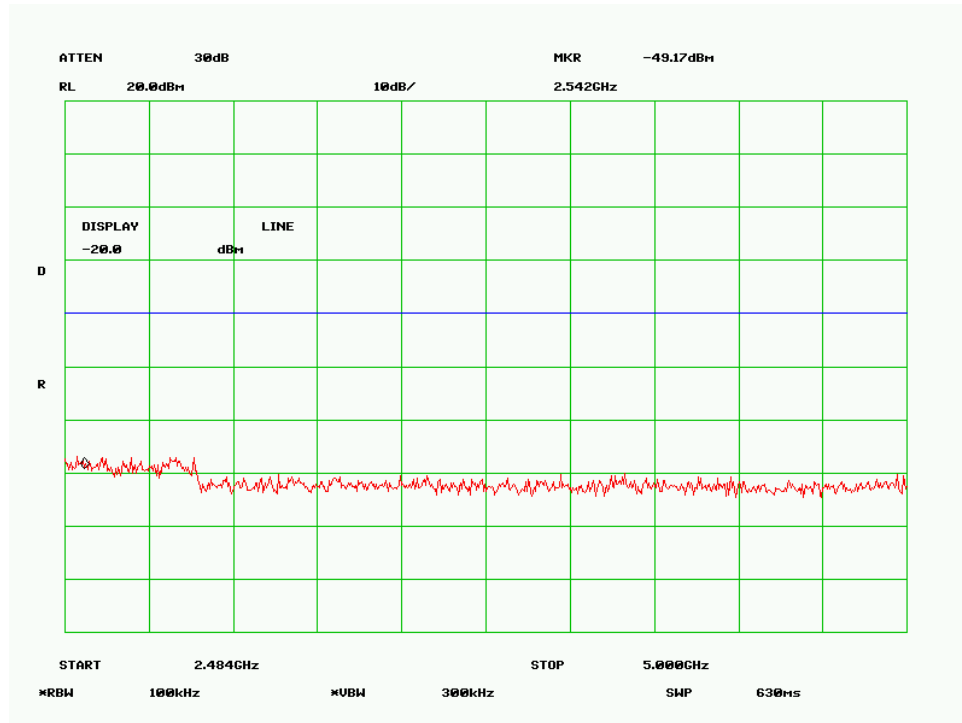
802.11g Low Channel -6



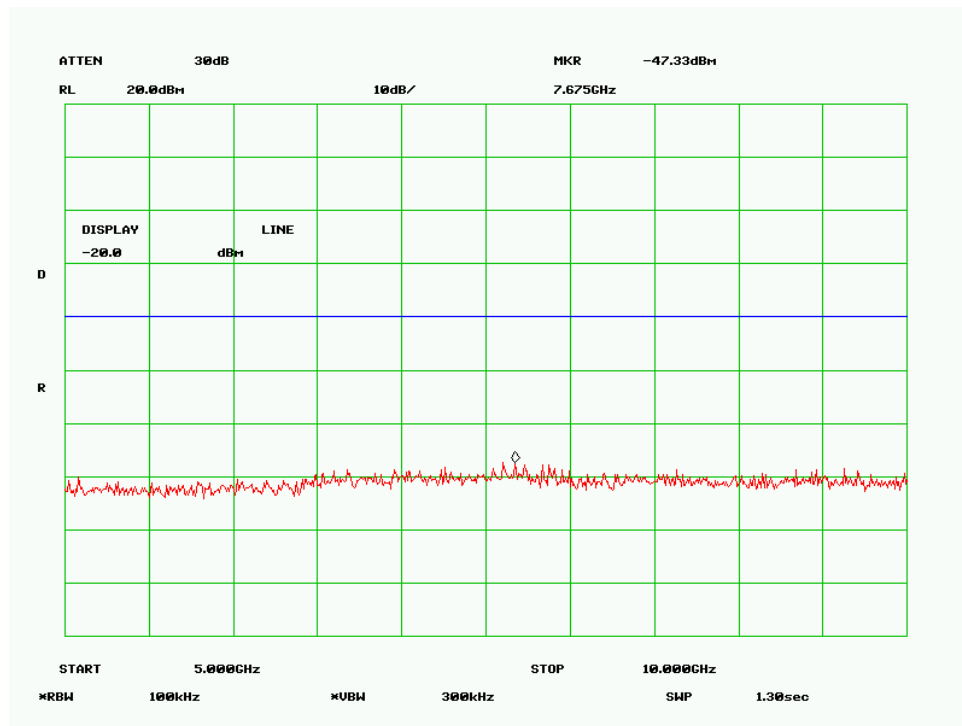
802.11g Low Channel -7



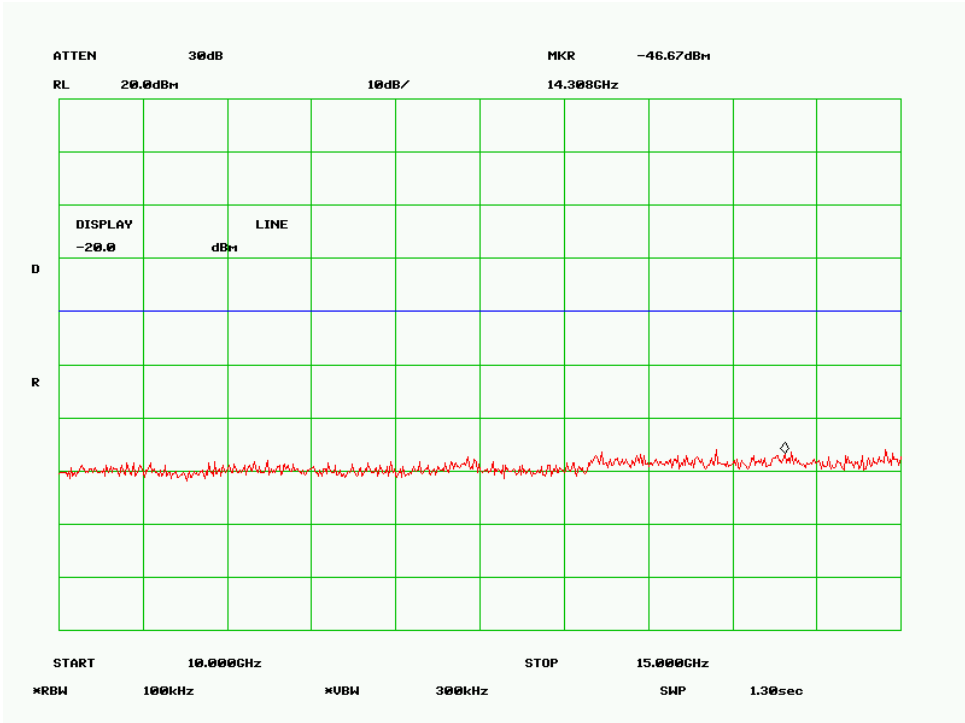
802.11g Mid Channel -1



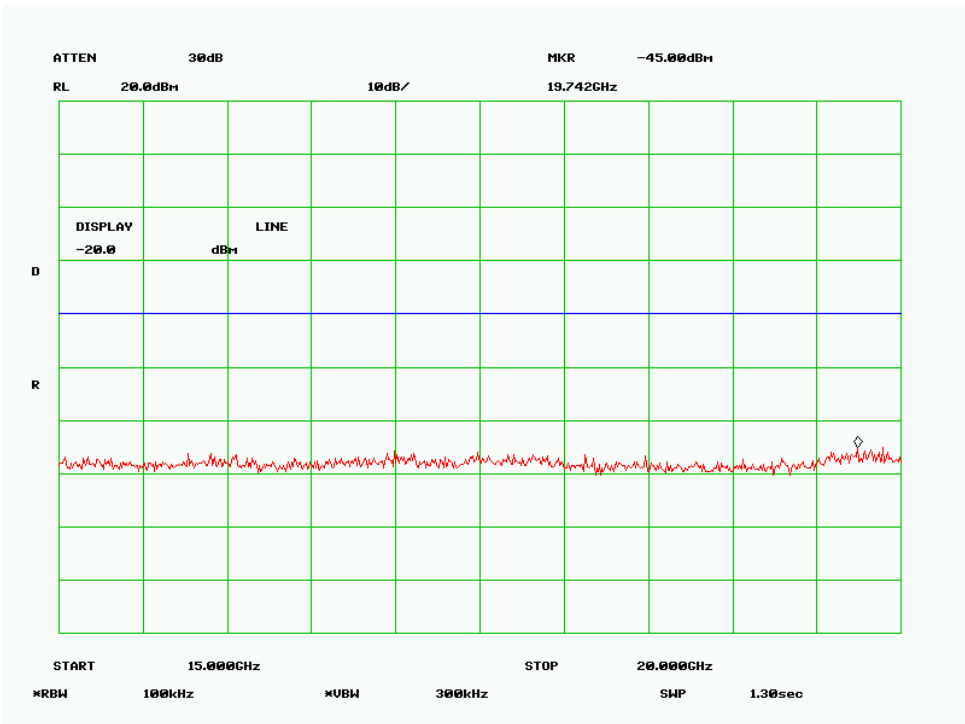
802.11g Mid Channel -2



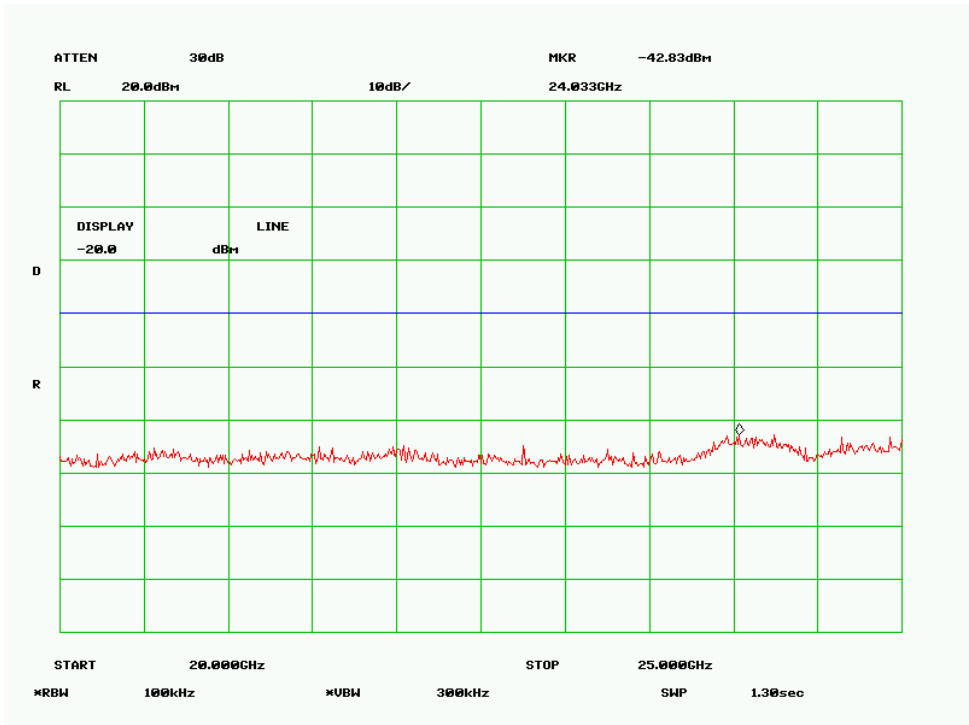
802.11g Mid Channel -3



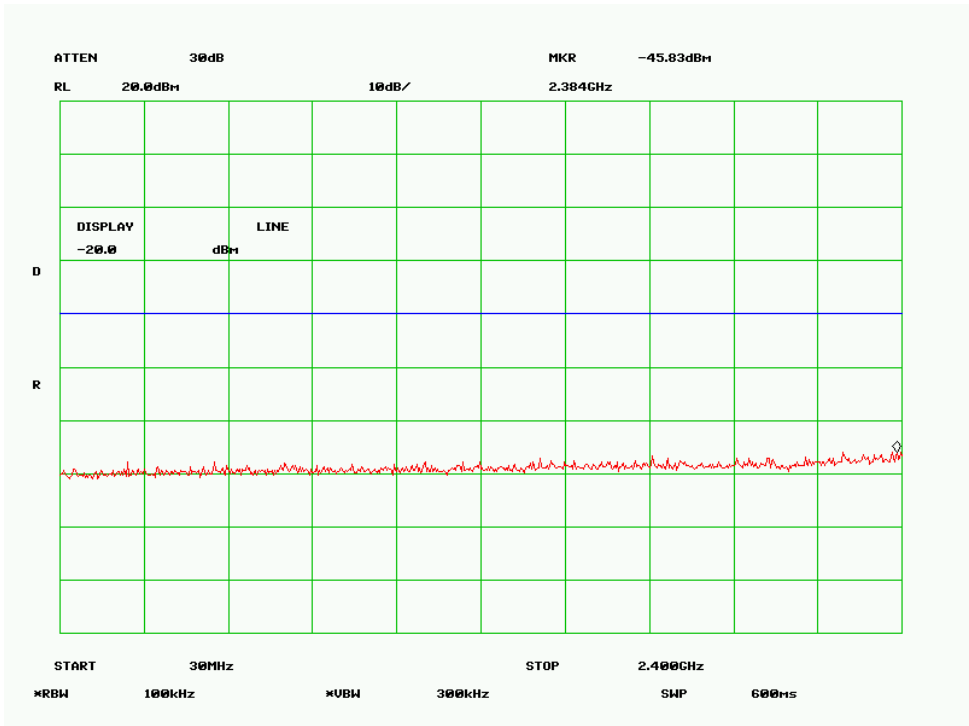
802.11g Mid Channel -4



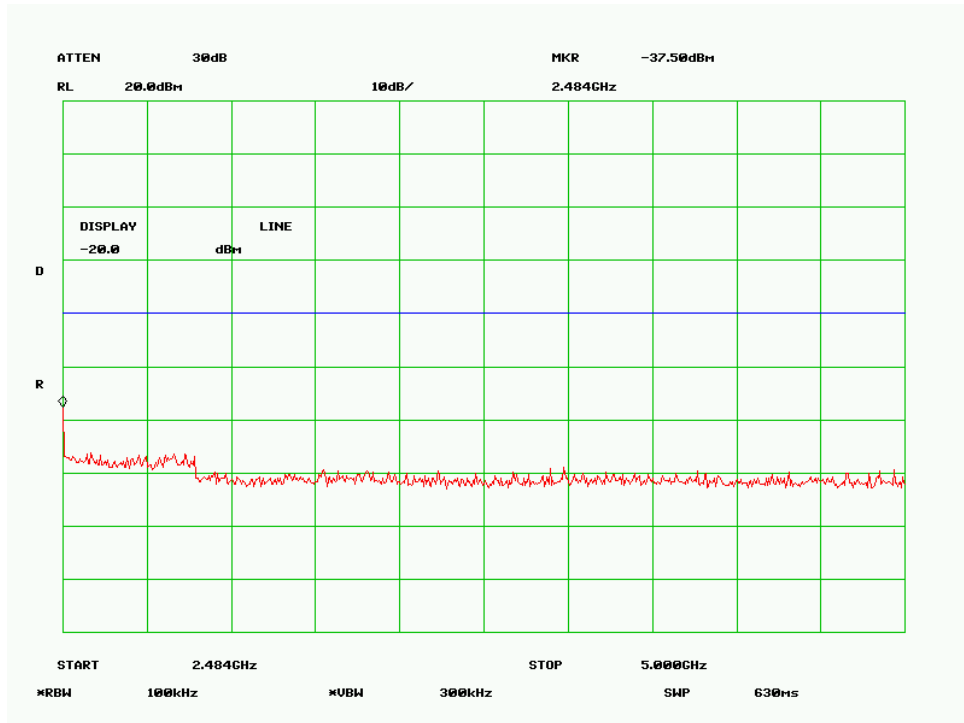
802.11g Mid Channel -5



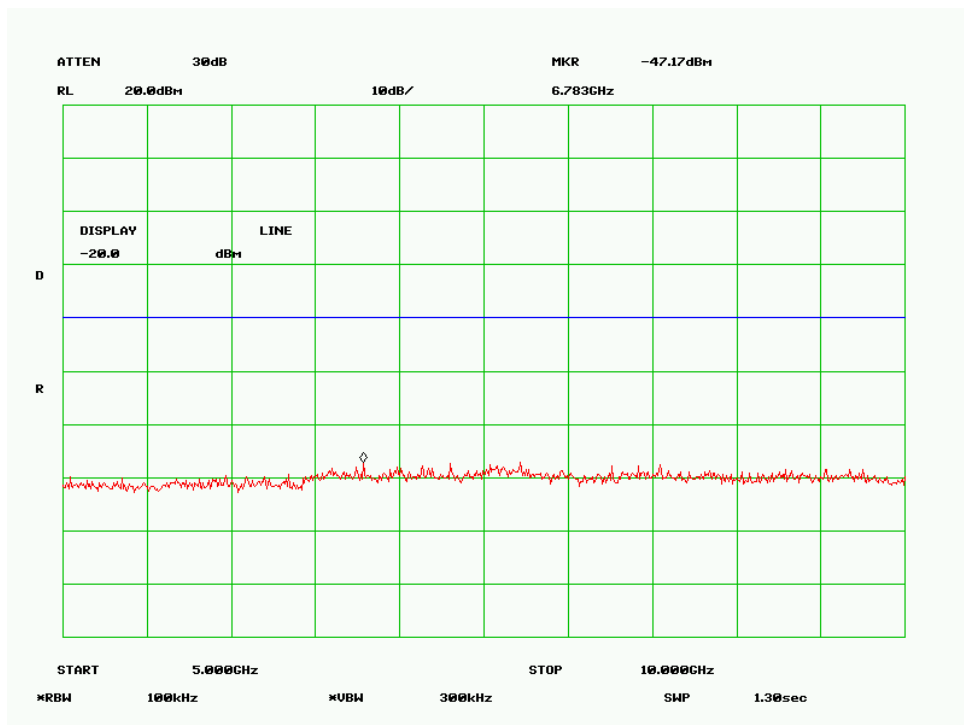
802.11g Mid Channel -6



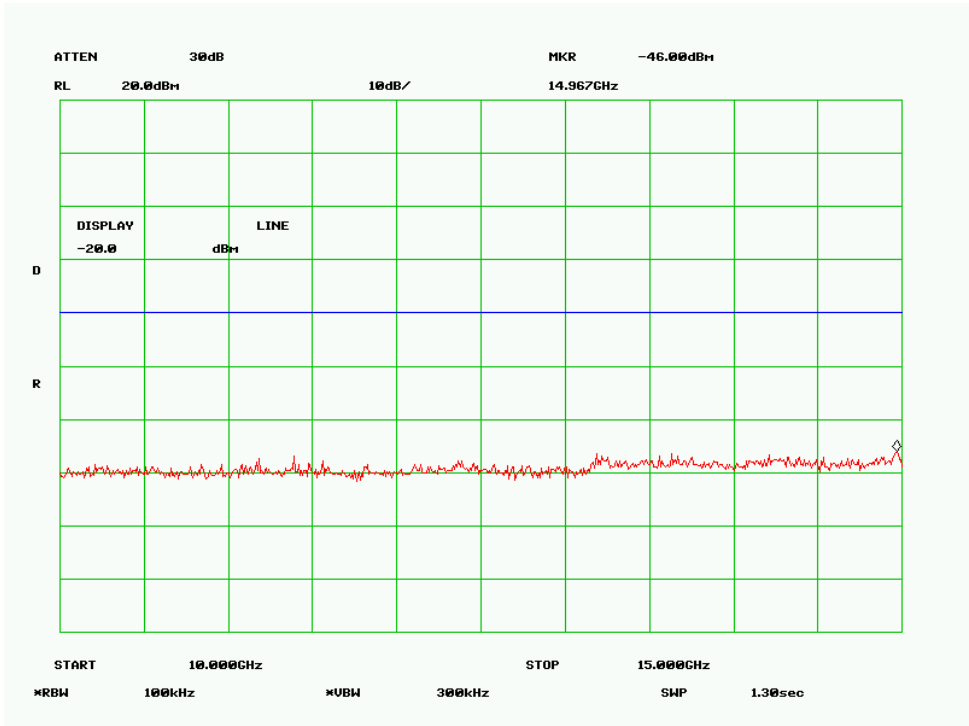
802.11g High Channel -1



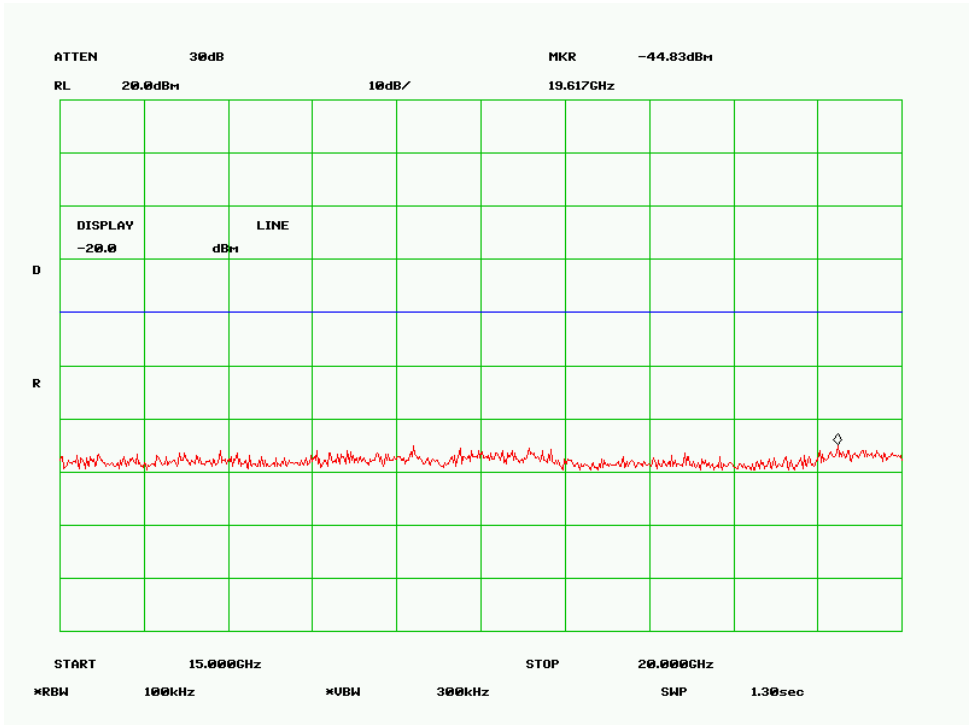
802.11g High Channel -2



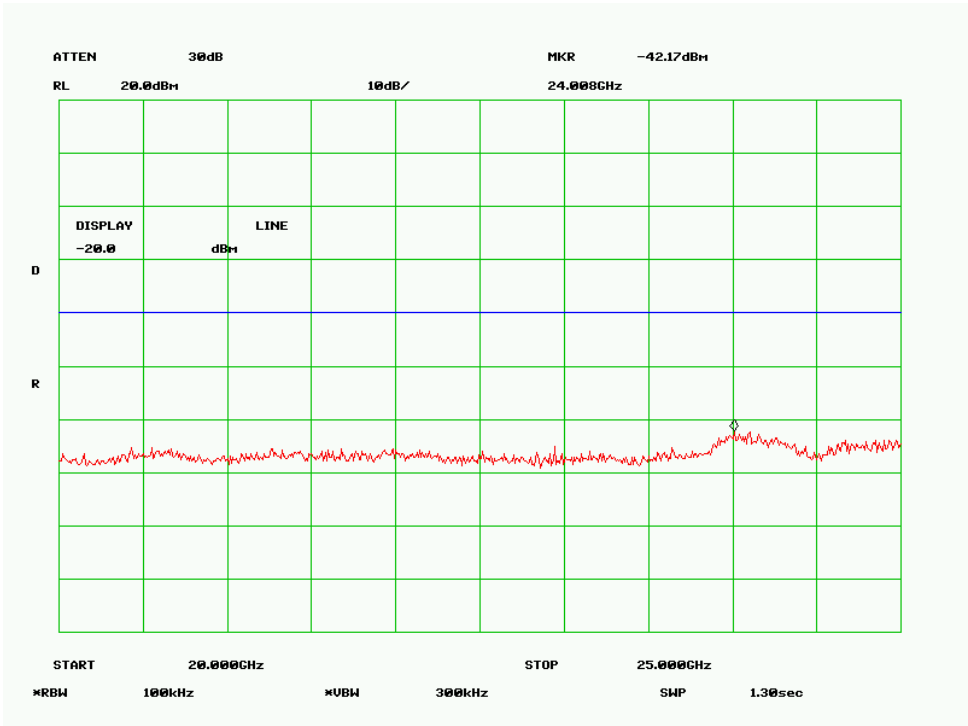
802.11g High Channel -3



802.11g High Channel -4



802.11g High Channel -5



802.11g High Channel -6

## 5.10 Radiated Spurious Emission < 1GHz

1. All possible modes of operation were investigated. Only the 6 worst case emissions measured, using the correct CISPR detectors, are reported. All other emissions were relatively insignificant.
2. A "-ve" margin indicates a PASS as it refers to the margin present below the limit line at the particular frequency.
3. Radiated Emissions Measurement Uncertainty  
All test measurements carried out are traceable to national standards. The uncertainty of the measurement at a confidence level of approximately 95% (in the case where distributions are normal), with a coverage factor of 2, in the range 30MHz – 1GHz (QP only @ 3m & 10m) is +5.6dB/-4.5dB (for EUTs < 0.5m X 0.5m X 0.5m).
4. Environmental Conditions      Temperature      23°C  
                                                  Relative Humidity      50%  
                                                  Atmospheric Pressure      1019mbar  
  
     Test Date : February 18-22 2008  
     Tested By :Choon Sian Ooi

**Standard Requirement :** 47 CFR §15.247(d)

**Procedures:** Radiated emissions were measured according to ANSI C63.4. The EUT was set to transmit at the highest output power. The EUT was set to transmit at mid channel. Note that setting the channel other than mid, the spurious emissions are the same.

The limit is converted from microvolts/meter to decibel microvolts/meter.

Sample Calculation: Corrected Amplitude = Raw Amplitude(dBμV/m) + ACF(dB) + Cable Loss(dB)

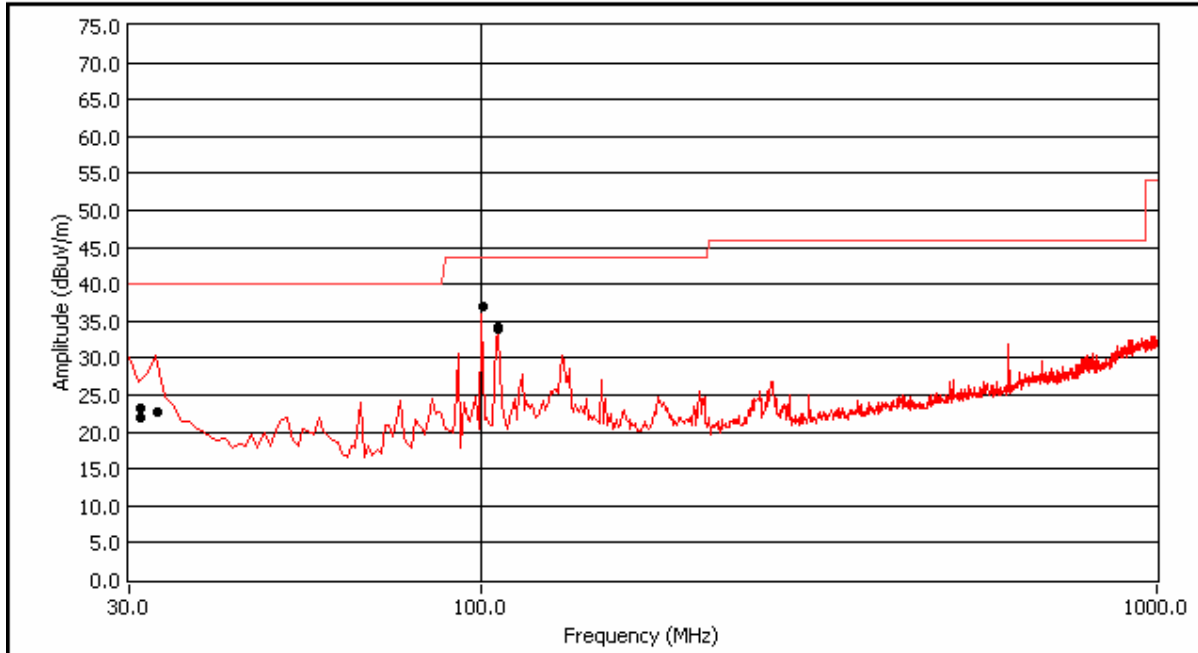
**Test Result:**

## Radiated Emission Plot (Transmit Mode)

Host EUT: GX430t

### Test Data

### Final Plot for 3m Distance Result



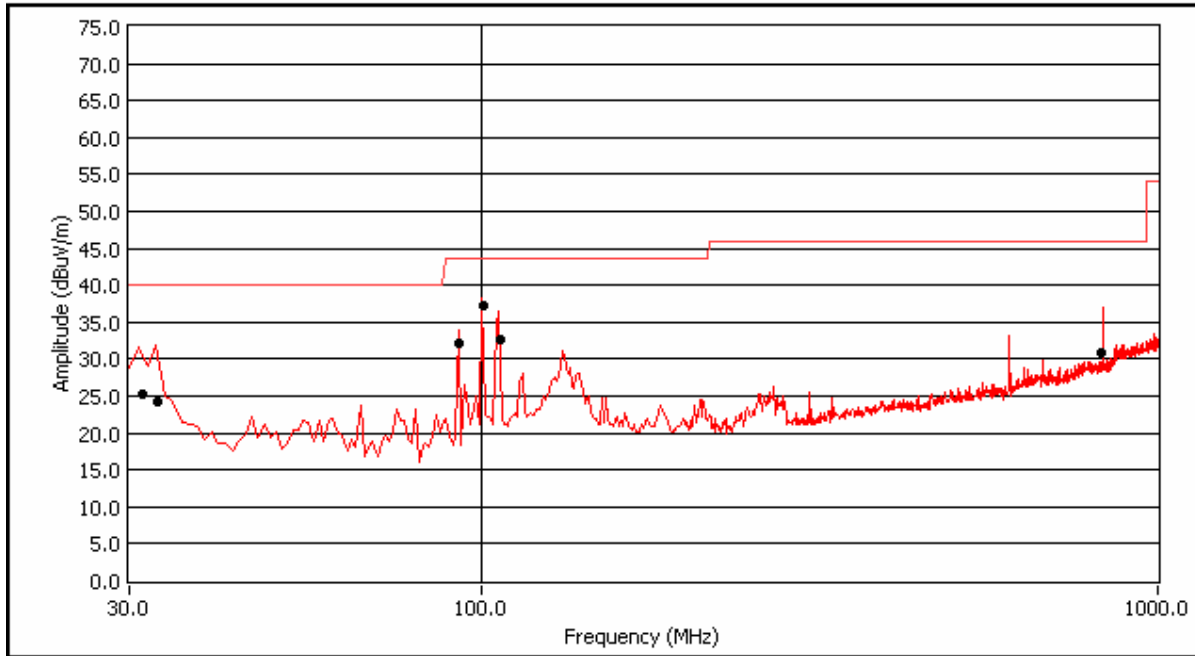
| Frequency (MHz) | Quasi-Peak (dBµV/m) | Antenna height (cm) | Polarity | Turntable position (deg) | Limit (dBµV/m) | Margin (dB) |
|-----------------|---------------------|---------------------|----------|--------------------------|----------------|-------------|
| 99.98           | 36.91               | 100.00              | H        | 244.00                   | 43.50          | -6.59       |
| 32.92           | 22.69               | 100.00              | V        | 163.00                   | 40.00          | -17.31      |
| 30.00           | 21.86               | 100.00              | V        | 153.00                   | 40.00          | -18.14      |
| 105.82          | 33.95               | 100.00              | V        | 164.00                   | 43.50          | -9.55       |
| 104.84          | 34.13               | 100.00              | V        | 325.00                   | 43.50          | -9.37       |
| 31.94           | 23.29               | 250.00              | V        | 193.00                   | 40.00          | -16.71      |

## Radiated Emission Plot (Receive Mode)

Host EUT: GX430t

### Test Data

### Final Plot for 3m Distance Result



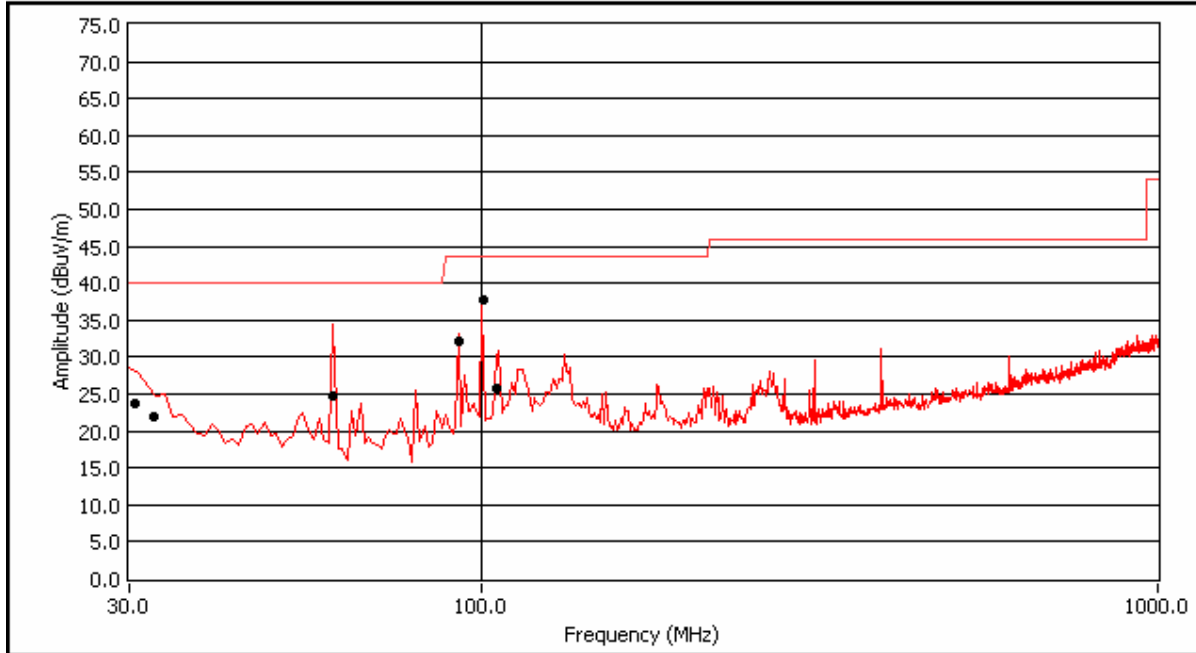
| Frequency (MHz) | Quasi-Peak (dBμV/m) | Antenna height (cm) | Polarity | Turntable position (deg) | Limit (dBμV/m) | Margin (dB) |
|-----------------|---------------------|---------------------|----------|--------------------------|----------------|-------------|
| 99.98           | 37.26               | 100.00              | V        | 305.00                   | 43.50          | -6.24       |
| 105.82          | 32.80               | 100.00              | H        | 195.00                   | 43.50          | -10.70      |
| 32.92           | 24.24               | 100.00              | V        | 132.00                   | 40.00          | -15.76      |
| 31.47           | 25.31               | 100.00              | V        | 132.00                   | 40.00          | -14.69      |
| 830.90          | 30.92               | 100.00              | H        | 240.00                   | 46.00          | -15.08      |
| 92.30           | 32.02               | 100.00              | H        | 195.00                   | 43.50          | -11.48      |

## Radiated Emission Plot (Transmit Mode)

Host EUT: GX420t

### Test Data

### Final Plot for 3m Distance Result



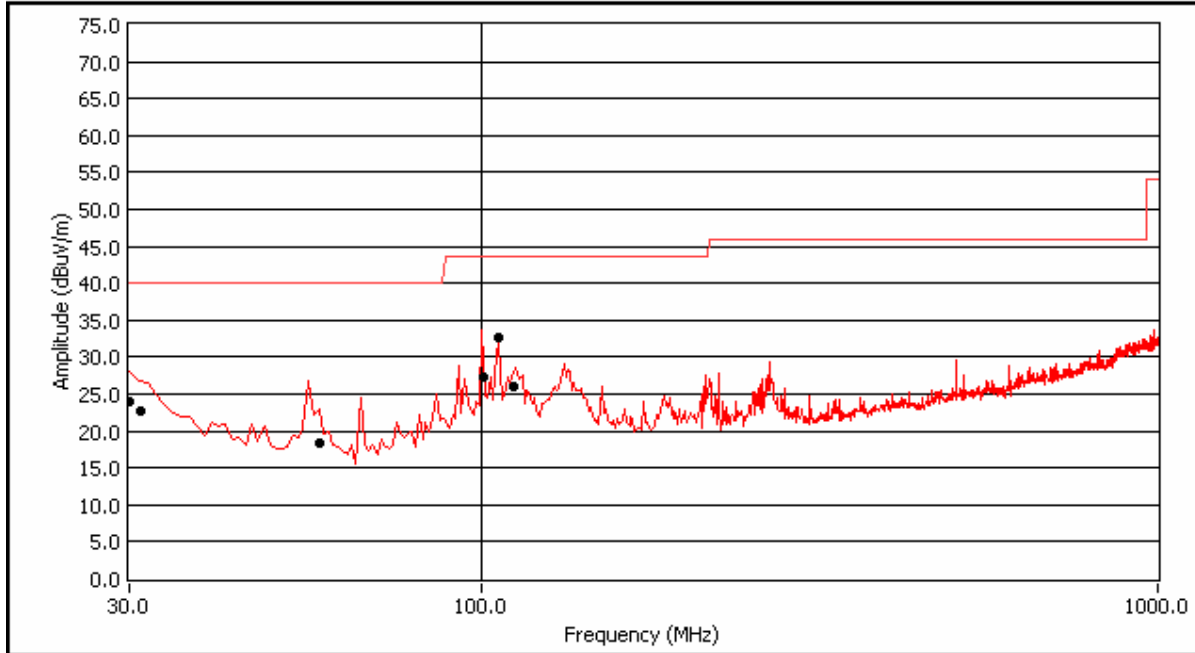
| Frequency (MHz) | Quasi-Peak (dBμV/m) | Antenna height (cm) | Polarity | Turntable position (deg) | Limit (dBμV/m) | Margin (dB) |
|-----------------|---------------------|---------------------|----------|--------------------------|----------------|-------------|
| 60.13           | 24.73               | 100.00              | V        | 353.00                   | 40.00          | -15.27      |
| 99.98           | 37.80               | 100.00              | V        | 163.00                   | 43.50          | -5.70       |
| 92.21           | 32.27               | 100.00              | V        | 2.00                     | 43.50          | -11.23      |
| 32.60           | 21.92               | 100.00              | V        | 242.00                   | 40.00          | -18.08      |
| 30.67           | 21.94               | 242.00              | H        | 242.00                   | 40.00          | -18.06      |
| 105.82          | 25.90               | 100.00              | V        | 153.00                   | 43.50          | -17.60      |

## Radiated Emission Plot (Receive Mode)

Host EUT: GX420t

### Test Data

### Final Plot for 3m Distance Result



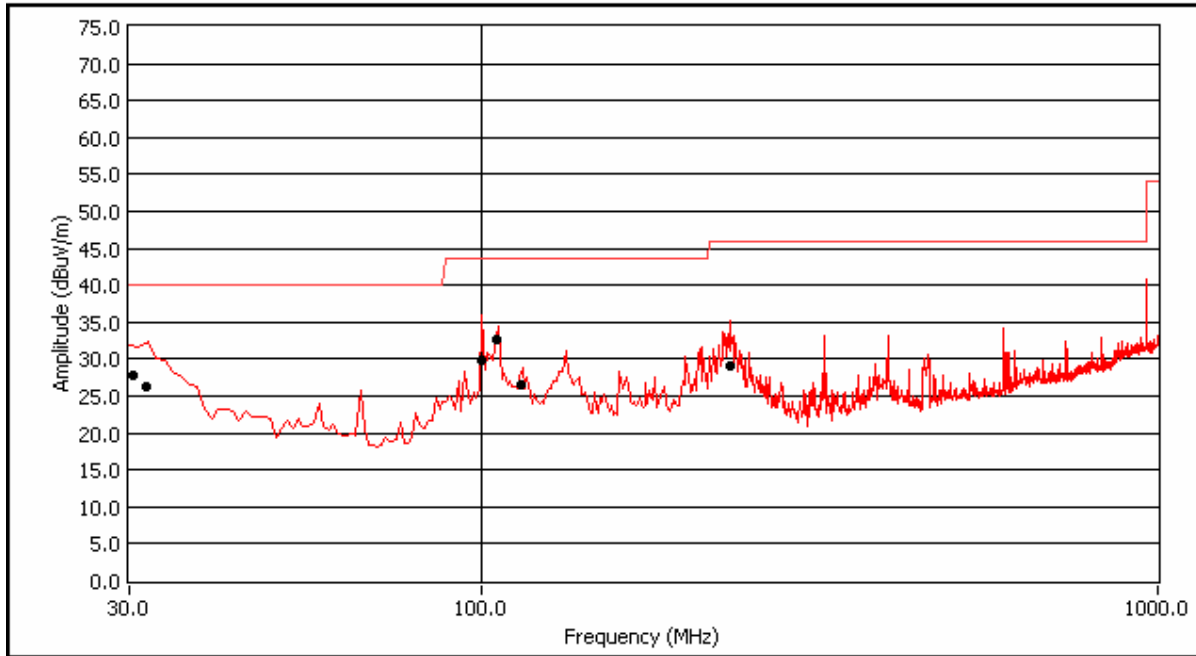
| Frequency (MHz) | Quasi-Peak (dBμV/m) | Antenna height (cm) | Polarity | Turntable position (deg) | Limit (dBμV/m) | Margin (dB) |
|-----------------|---------------------|---------------------|----------|--------------------------|----------------|-------------|
| 99.98           | 27.32               | 100.00              | V        | 205.00                   | 43.50          | -16.18      |
| 111.22          | 26.01               | 100.00              | V        | 205.00                   | 43.50          | -17.49      |
| 30.00           | 24.82               | 100.00              | V        | 143.00                   | 40.00          | -15.18      |
| 31.27           | 22.76               | 100.00              | V        | 294.00                   | 40.00          | -17.24      |
| 105.74          | 32.72               | 100.00              | V        | 195.00                   | 43.50          | -10.78      |
| 57.27           | 18.46               | 100.00              | V        | 133.00                   | 40.00          | -21.54      |

## Radiated Emission Plot (Transmit Mode)

Host EUT: GX420d

### Test Data

### Final Plot for 3m Distance Result



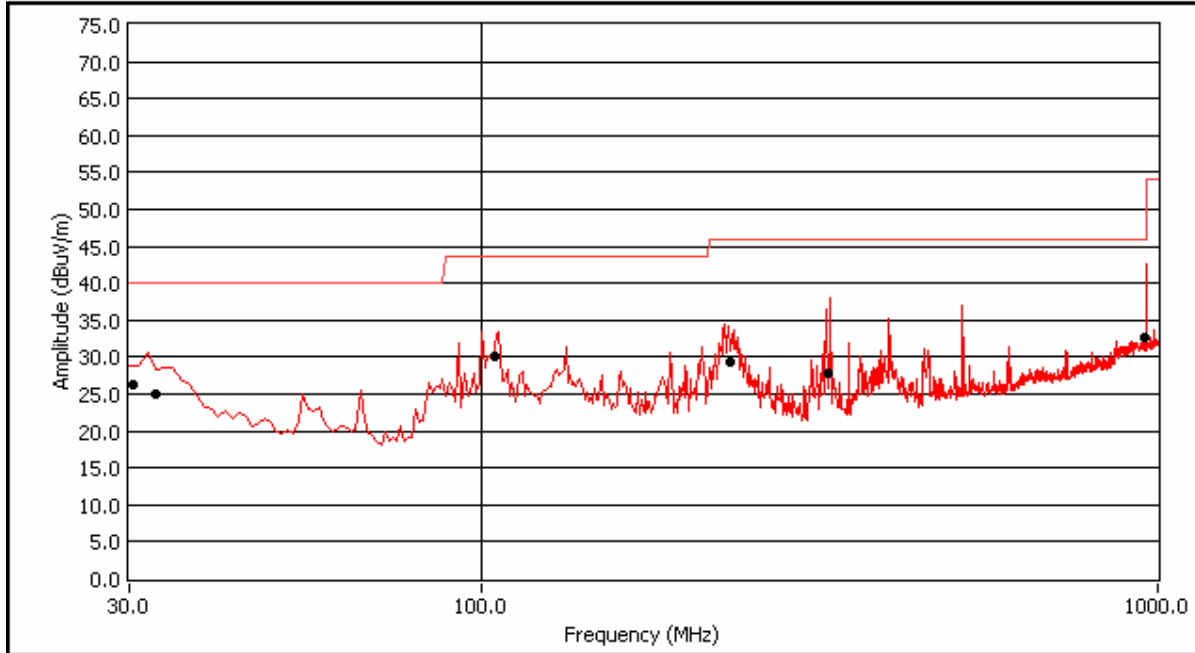
| Frequency (MHz) | Quasi-Peak (dBμV/m) | Antenna height (cm) | Polarity | Turntable position (deg) | Limit (dBμV/m) | Margin (dB) |
|-----------------|---------------------|---------------------|----------|--------------------------|----------------|-------------|
| 99.98           | 29.89               | 100.00              | H        | 33.00                    | 43.50          | -13.30      |
| 114.14          | 26.58               | 100.00              | V        | 163.00                   | 43.50          | -18.19      |
| 30.40           | 27.88               | 100.00              | V        | 82.00                    | 40.00          | -13.70      |
| 31.90           | 26.37               | 100.00              | V        | 122.00                   | 40.00          | -14.99      |
| 105.82          | 32.74               | 100.00              | V        | 104.00                   | 43.50          | -13.34      |
| 232.72          | 29.17               | 100.00              | V        | 163.00                   | 46.00          | -14.20      |

## Radiated Emission Plot (Receive Mode)

Host EUT: GX420d

### Test Data

### Final Plot for 3m Distance Result



| Frequency (MHz) | Quasi-Peak (dBμV/m) | Antenna height (cm) | Polarity | Turntable position (deg) | Limit (dBμV/m) | Margin (dB) |
|-----------------|---------------------|---------------------|----------|--------------------------|----------------|-------------|
| 956.43          | 32.70               | 100.00              | H        | 260.00                   | 46.00          | -13.30      |
| 325.06          | 27.81               | 100.00              | V        | 142.00                   | 46.00          | -18.19      |
| 30.47           | 26.30               | 100.00              | H        | 78.00                    | 40.00          | -13.70      |
| 32.84           | 25.01               | 100.00              | V        | 133.00                   | 40.00          | -14.99      |
| 104.32          | 30.16               | 100.00              | V        | 285.00                   | 43.50          | -13.34      |
| 232.80          | 29.30               | 100.00              | H        | 124.00                   | 46.00          | -16.70      |

## 5.10 Radiated Spurious Emissions > 1GHz & Band Edge

- All possible modes of operation were investigated. Only the 6 worst case emissions measured, using the correct CISPR detectors, are reported. All other emissions were relatively insignificant.
- A "-ve" margin indicates a PASS as it refers to the margin present below the limit line at the particular frequency.
- Radiated Emissions Measurement Uncertainty  
All test measurements carried out are traceable to national standards. The uncertainty of the measurement at a confidence level of approximately 95% (in the case where distributions are normal), with a coverage factor of 2, in the range 1GHz – 40GH is +5.6dB/-4.5dB (for EUTs < 0.5m X 0.5m X 0.5m).
- |                          |                      |          |
|--------------------------|----------------------|----------|
| Environmental Conditions | Temperature          | 23°C     |
|                          | Relative Humidity    | 50%      |
|                          | Atmospheric Pressure | 1019mbar |

Test Date : February 18-22 2008  
Tested By :Choon Sian Ooi

Standard Requirement : 47 CFR §15.247(d)

**Procedures:** Equipment was setup in a semi-anechoic chamber. For measurements above 1 GHz an average measurement was taken with a 10Hz video bandwidth. The EUT was tested at low, mid and high with the highest output power. Investigated up to 10<sup>th</sup> harmonic of the operating frequency.

Sample Calculation:

EUT Field Strength = Raw Amplitude(dBμV/m) – Amplifier Gain(dB) + Antenna Factor(dB) + Cable Loss(dB)  
+ Filter Attenuation(dB, if used)

**Test Result:**

## Host EUT :GX430t

### 802.11b @ 2412MHz @ 3 Meter

| Frequency | Reading  | Direction | Height | Polar | Antenna Loss | Cable loss | Corrected Reading |                |        |          |
|-----------|----------|-----------|--------|-------|--------------|------------|-------------------|----------------|--------|----------|
| GHz       | (dBuV/m) | Degree    | Meter  | H / V | (dB)         | (dB)       | (dBuV/m)          | Limit (dBuV/m) | Margin | Detector |
| 4.824     | 24.61    | 180       | 155    | v     | 33           | 4.13       | 61.74             | 74             | -12.26 | Peak     |
| 4.824     | 23.5     | 180       | 155    | h     | 33           | 4.13       | 60.63             | 74             | -13.37 | Peak     |
| 4.824     | 11.10    | 180       | 155    | v     | 33           | 4.13       | 48.23             | 54             | -5.77  | Ave      |
| 4.824     | 10.90    | 180       | 155    | h     | 33           | 4.13       | 48.03             | 54             | -5.97  | Ave      |

Emission was scanned up to 25GHz.

### 802.11b @ 2437MHz @ 3 Meter

| Frequency | Reading  | Direction | Height | Polar | Antenna Loss | Cable loss | Corrected Reading |                |        |          |
|-----------|----------|-----------|--------|-------|--------------|------------|-------------------|----------------|--------|----------|
| GHz       | (dBuV/m) | Degree    | Meter  | H / V | (dB)         | (dB)       | (dBuV/m)          | Limit (dBuV/m) | Margin | Detector |
| 4.874     | 24.51    | 180       | 155    | v     | 33           | 4.13       | 61.64             | 74             | -12.36 | Peak     |
| 4.874     | 23.3     | 180       | 155    | h     | 33           | 4.13       | 60.43             | 74             | -13.57 | Peak     |
| 4.874     | 11.30    | 180       | 155    | v     | 33           | 4.13       | 48.43             | 54             | -5.57  | Ave      |
| 4.874     | 11.20    | 180       | 155    | h     | 33           | 4.13       | 48.33             | 54             | -5.67  | Ave      |

Emission was scanned up to 25GHz.

### 802.11b @ 2462MHz @ 3 Meter

| Frequency | Reading  | Direction | Height | Polar | Antenna Loss | Cable loss | Corrected Reading |                |        |          |
|-----------|----------|-----------|--------|-------|--------------|------------|-------------------|----------------|--------|----------|
| GHz       | (dBuV/m) | Degree    | Meter  | H / V | (dB)         | (dB)       | (dBuV/m)          | Limit (dBuV/m) | Margin | Detector |
| 4.924     | 24.45    | 180       | 155    | v     | 33           | 4.13       | 61.58             | 74             | -12.42 | Peak     |
| 4.924     | 23.34    | 180       | 155    | h     | 33           | 4.13       | 60.47             | 74             | -13.53 | Peak     |
| 4.924     | 11.80    | 180       | 155    | v     | 33           | 4.13       | 48.93             | 54             | -5.07  | Ave      |
| 4.924     | 11.60    | 180       | 155    | h     | 33           | 4.13       | 48.73             | 54             | -5.27  | Ave      |

Emission was scanned up to 25GHz.

### 802.11g @ 2412MHz @ 3 Meter

| Frequency | Reading  | Direction | Height | Polar | Antenna Loss | Cable loss | Corrected Reading |                |        |          |
|-----------|----------|-----------|--------|-------|--------------|------------|-------------------|----------------|--------|----------|
| GHz       | (dBuV/m) | Degree    | Meter  | H / V | (dB)         | (dB)       | (dBuV/m)          | Limit (dBuV/m) | Margin | Detector |
| 4.824     | 24.31    | 180       | 155    | v     | 33           | 4.13       | 61.44             | 74             | -12.56 | Peak     |
| 4.824     | 23.1     | 180       | 155    | h     | 33           | 4.13       | 60.23             | 74             | -13.77 | Peak     |
| 4.824     | 11.30    | 180       | 155    | v     | 33           | 4.13       | 48.43             | 54             | -5.57  | Ave      |
| 4.824     | 10.70    | 180       | 155    | h     | 33           | 4.13       | 47.83             | 54             | -6.17  | Ave      |

Emission was scanned up to 25GHz.

### 802.11g @ 2437MHz @ 3 Meter

| Frequency | Reading  | Direction | Height | Polar | Antenna Loss | Cable loss | Corrected Reading |                |        |          |
|-----------|----------|-----------|--------|-------|--------------|------------|-------------------|----------------|--------|----------|
| GHz       | (dBuV/m) | Degree    | Meter  | H / V | (dB)         | (dB)       | (dBuV/m)          | Limit (dBuV/m) | Margin | Detector |
| 4.874     | 24.82    | 180       | 155    | v     | 33           | 4.13       | 61.95             | 74             | -12.05 | Peak     |
| 4.874     | 23.36    | 180       | 155    | h     | 33           | 4.13       | 60.49             | 74             | -13.51 | Peak     |
| 4.874     | 10.80    | 180       | 155    | v     | 33           | 4.13       | 47.93             | 54             | -6.07  | Ave      |
| 4.874     | 10.50    | 180       | 155    | h     | 33           | 4.13       | 47.63             | 54             | -6.37  | Ave      |

Emission was scanned up to 25GHz.

### 802.11g @ 2462MHz @ 3 Meter

| Frequency | Reading  | Direction | Height | Polar | Antenna Loss | Cable loss | Corrected Reading |                |        |          |
|-----------|----------|-----------|--------|-------|--------------|------------|-------------------|----------------|--------|----------|
| GHz       | (dBuV/m) | Degree    | Meter  | H / V | (dB)         | (dB)       | (dBuV/m)          | Limit (dBuV/m) | Margin | Detector |
| 4.924     | 24.45    | 180       | 155    | v     | 33           | 4.13       | 61.58             | 74             | -12.42 | Peak     |
| 4.924     | 23.34    | 180       | 155    | h     | 33           | 4.13       | 60.47             | 74             | -13.53 | Peak     |
| 4.924     | 11.30    | 180       | 155    | v     | 33           | 4.13       | 48.43             | 54             | -5.57  | Ave      |
| 4.924     | 11.10    | 180       | 155    | h     | 33           | 4.13       | 48.23             | 54             | -5.77  | Ave      |

Emission was scanned up to 25GHz.

### Host EUT :GX420t

#### 802.11b @ 2412MHz @ 3 Meter

| Frequency | Reading  | Direction | Height | Polar | Antenna Loss | Cable loss | Corrected Reading |                |        |          |
|-----------|----------|-----------|--------|-------|--------------|------------|-------------------|----------------|--------|----------|
| GHz       | (dBuV/m) | Degree    | Meter  | H / V | (dB)         | (dB)       | (dBuV/m)          | Limit (dBuV/m) | Margin | Detector |
| 4.824     | 24.81    | 180       | 155    | v     | 33           | 4.13       | 61.94             | 74             | -12.06 | Peak     |
| 4.824     | 23.50    | 180       | 155    | h     | 33           | 4.13       | 60.63             | 74             | -13.37 | Peak     |
| 4.824     | 10.50    | 180       | 155    | v     | 33           | 4.13       | 47.63             | 54             | -6.37  | Ave      |
| 4.824     | 10.10    | 180       | 155    | h     | 33           | 4.13       | 47.23             | 54             | -6.77  | Ave      |

Emission was scanned up to 25GHz.

#### 802.11b @ 2437MHz @ 3 Meter

| Frequency | Reading  | Direction | Height | Polar | Antenna Loss | Cable loss | Corrected Reading |                |        |          |
|-----------|----------|-----------|--------|-------|--------------|------------|-------------------|----------------|--------|----------|
| GHz       | (dBuV/m) | Degree    | Meter  | H / V | (dB)         | (dB)       | (dBuV/m)          | Limit (dBuV/m) | Margin | Detector |
| 4.874     | 24.72    | 180       | 155    | v     | 33           | 4.13       | 61.85             | 74             | -12.15 | Peak     |
| 4.874     | 23.06    | 180       | 155    | h     | 33           | 4.13       | 60.19             | 74             | -13.81 | Peak     |
| 4.874     | 10.71    | 180       | 155    | v     | 33           | 4.13       | 47.84             | 54             | -6.16  | Ave      |
| 4.874     | 10.31    | 180       | 155    | h     | 33           | 4.13       | 47.44             | 54             | -6.56  | Ave      |

Emission was scanned up to 25GHz.

#### 802.11b @ 2462MHz @ 3 Meter

| Frequency | Reading  | Direction | Height | Polar | Antenna Loss | Cable loss | Corrected Reading |                |        |          |
|-----------|----------|-----------|--------|-------|--------------|------------|-------------------|----------------|--------|----------|
| GHz       | (dBuV/m) | Degree    | Meter  | H / V | (dB)         | (dB)       | (dBuV/m)          | Limit (dBuV/m) | Margin | Detector |
| 4.924     | 24.85    | 180       | 155    | v     | 33           | 4.13       | 61.98             | 74             | -12.02 | Peak     |
| 4.924     | 23.44    | 180       | 155    | h     | 33           | 4.13       | 60.57             | 74             | -13.43 | Peak     |
| 4.924     | 11.10    | 180       | 155    | v     | 33           | 4.13       | 48.23             | 54             | -5.77  | Ave      |
| 4.924     | 10.80    | 180       | 155    | h     | 33           | 4.13       | 47.93             | 54             | -6.07  | Ave      |

Emission was scanned up to 25GHz.

### 802.11g @ 2412MHz @ 3 Meter

| Frequency | Reading  | Direction | Height | Polar | Antenna Loss | Cable loss | Corrected Reading |                |        |          |
|-----------|----------|-----------|--------|-------|--------------|------------|-------------------|----------------|--------|----------|
| GHz       | (dBuV/m) | Degree    | Meter  | H / V | (dB)         | (dB)       | (dBuV/m)          | Limit (dBuV/m) | Margin | Detector |
| 4.824     | 24.91    | 180       | 155    | v     | 33           | 4.13       | 62.04             | 74             | -11.96 | Peak     |
| 4.824     | 23.65    | 180       | 155    | h     | 33           | 4.13       | 60.78             | 74             | -13.22 | Peak     |
| 4.824     | 10.70    | 180       | 155    | v     | 33           | 4.13       | 47.83             | 54             | -6.17  | Ave      |
| 4.824     | 10.47    | 180       | 155    | h     | 33           | 4.13       | 47.6              | 54             | -6.4   | Ave      |

Emission was scanned up to 25GHz.

### 802.11g @ 2437MHz @ 3 Meter

| Frequency | Reading  | Direction | Height | Polar | Antenna Loss | Cable loss | Corrected Reading |                |        |          |
|-----------|----------|-----------|--------|-------|--------------|------------|-------------------|----------------|--------|----------|
| GHz       | (dBuV/m) | Degree    | Meter  | H / V | (dB)         | (dB)       | (dBuV/m)          | Limit (dBuV/m) | Margin | Detector |
| 4.874     | 24.87    | 180       | 155    | v     | 33           | 4.13       | 62                | 74             | -12.00 | Peak     |
| 4.874     | 23.32    | 180       | 155    | h     | 33           | 4.13       | 60.45             | 74             | -13.55 | Peak     |
| 4.874     | 10.51    | 180       | 155    | v     | 33           | 4.13       | 47.64             | 54             | -6.36  | Ave      |
| 4.874     | 10.23    | 180       | 155    | h     | 33           | 4.13       | 47.36             | 54             | -6.64  | Ave      |

Emission was scanned up to 25GHz.

### 802.11g @ 2462MHz @ 3 Meter

| Frequency | Reading  | Direction | Height | Polar | Antenna Loss | Cable loss | Corrected Reading |                |        |          |
|-----------|----------|-----------|--------|-------|--------------|------------|-------------------|----------------|--------|----------|
| GHz       | (dBuV/m) | Degree    | Meter  | H / V | (dB)         | (dB)       | (dBuV/m)          | Limit (dBuV/m) | Margin | Detector |
| 4.924     | 24.74    | 180       | 155    | v     | 33           | 4.13       | 61.87             | 74             | -12.13 | Peak     |
| 4.924     | 23.51    | 180       | 155    | h     | 33           | 4.13       | 60.64             | 74             | -13.36 | Peak     |
| 4.924     | 10.80    | 180       | 155    | v     | 33           | 4.13       | 47.93             | 54             | -6.07  | Ave      |
| 4.924     | 10.20    | 180       | 155    | h     | 33           | 4.13       | 47.33             | 54             | -6.67  | Ave      |

Emission was scanned up to 25GHz.

### Host EUT :GX420d

#### 802.11b @ 2412MHz @ 3 Meter

| Frequency | Reading  | Direction | Height | Polar | Antenna Loss | Cable loss | Corrected Reading |                |        |          |
|-----------|----------|-----------|--------|-------|--------------|------------|-------------------|----------------|--------|----------|
| GHz       | (dBuV/m) | Degree    | Meter  | H / V | (dB)         | (dB)       | (dBuV/m)          | Limit (dBuV/m) | Margin | Detector |
| 4.824     | 24.79    | 180       | 155    | v     | 33           | 4.13       | 61.92             | 74             | -12.08 | Peak     |
| 4.824     | 23.59    | 180       | 155    | h     | 33           | 4.13       | 60.72             | 74             | -13.28 | Peak     |
| 4.824     | 10.69    | 180       | 155    | v     | 33           | 4.13       | 47.82             | 54             | -6.18  | Ave      |
| 4.824     | 10.6     | 180       | 155    | h     | 33           | 4.13       | 47.73             | 54             | -6.27  | Ave      |

Emission was scanned up to 25GHz.

#### 802.11b @ 2437MHz @ 3 Meter

| Frequency | Reading  | Direction | Height | Polar | Antenna Loss | Cable loss | Corrected Reading |                |        |          |
|-----------|----------|-----------|--------|-------|--------------|------------|-------------------|----------------|--------|----------|
| GHz       | (dBuV/m) | Degree    | Meter  | H / V | (dB)         | (dB)       | (dBuV/m)          | Limit (dBuV/m) | Margin | Detector |
| 4.874     | 24.88    | 180       | 155    | v     | 33           | 4.13       | 62.01             | 74             | -11.99 | Peak     |
| 4.874     | 23.67    | 180       | 155    | h     | 33           | 4.13       | 60.8              | 74             | -13.2  | Peak     |
| 4.874     | 10.74    | 180       | 155    | v     | 33           | 4.13       | 47.87             | 54             | -6.13  | Ave      |
| 4.874     | 10.54    | 180       | 155    | h     | 33           | 4.13       | 47.67             | 54             | -6.33  | Ave      |

Emission was scanned up to 25GHz.

#### 802.11b @ 2462MHz @ 3 Meter

| Frequency | Reading  | Direction | Height | Polar | Antenna Loss | Cable loss | Corrected Reading |                |        |          |
|-----------|----------|-----------|--------|-------|--------------|------------|-------------------|----------------|--------|----------|
| GHz       | (dBuV/m) | Degree    | Meter  | H / V | (dB)         | (dB)       | (dBuV/m)          | Limit (dBuV/m) | Margin | Detector |
| 4.924     | 24.61    | 180       | 155    | v     | 33           | 4.13       | 61.74             | 74             | -12.26 | Peak     |
| 4.924     | 23.35    | 180       | 155    | h     | 33           | 4.13       | 60.48             | 74             | -13.52 | Peak     |
| 4.924     | 10.54    | 180       | 155    | v     | 33           | 4.13       | 47.67             | 54             | -6.33  | Ave      |
| 4.924     | 10.38    | 180       | 155    | h     | 33           | 4.13       | 47.51             | 54             | -6.49  | Ave      |

Emission was scanned up to 25GHz.

### 802.11g @ 2412MHz @ 3 Meter

| Frequency | Reading  | Direction | Height | Polar | Antenna Loss | Cable loss | Corrected Reading |                |        |          |
|-----------|----------|-----------|--------|-------|--------------|------------|-------------------|----------------|--------|----------|
| GHz       | (dBuV/m) | Degree    | Meter  | H / V | (dB)         | (dB)       | (dBuV/m)          | Limit (dBuV/m) | Margin | Detector |
| 4.824     | 24.01    | 180       | 155    | v     | 33           | 4.13       | 61.14             | 74             | -12.86 | Peak     |
| 4.824     | 23.34    | 180       | 155    | h     | 33           | 4.13       | 60.47             | 74             | -13.53 | Peak     |
| 4.824     | 10.46    | 180       | 155    | v     | 33           | 4.13       | 47.59             | 54             | -6.41  | Ave      |
| 4.824     | 10.23    | 180       | 155    | h     | 33           | 4.13       | 47.36             | 54             | -6.64  | Ave      |

Emission was scanned up to 25GHz.

### 802.11g @ 2437MHz @ 3 Meter

| Frequency | Reading  | Direction | Height | Polar | Antenna Loss | Cable loss | Corrected Reading |                |        |          |
|-----------|----------|-----------|--------|-------|--------------|------------|-------------------|----------------|--------|----------|
| GHz       | (dBuV/m) | Degree    | Meter  | H / V | (dB)         | (dB)       | (dBuV/m)          | Limit (dBuV/m) | Margin | Detector |
| 4.874     | 24.91    | 180       | 155    | v     | 33           | 4.13       | 62.04             | 74             | -11.96 | Peak     |
| 4.874     | 23.47    | 180       | 155    | h     | 33           | 4.13       | 60.6              | 74             | -13.4  | Peak     |
| 4.874     | 10.44    | 180       | 155    | v     | 33           | 4.13       | 47.57             | 54             | -6.43  | Ave      |
| 4.874     | 10.31    | 180       | 155    | h     | 33           | 4.13       | 47.44             | 54             | -6.56  | Ave      |

Emission was scanned up to 25GHz.

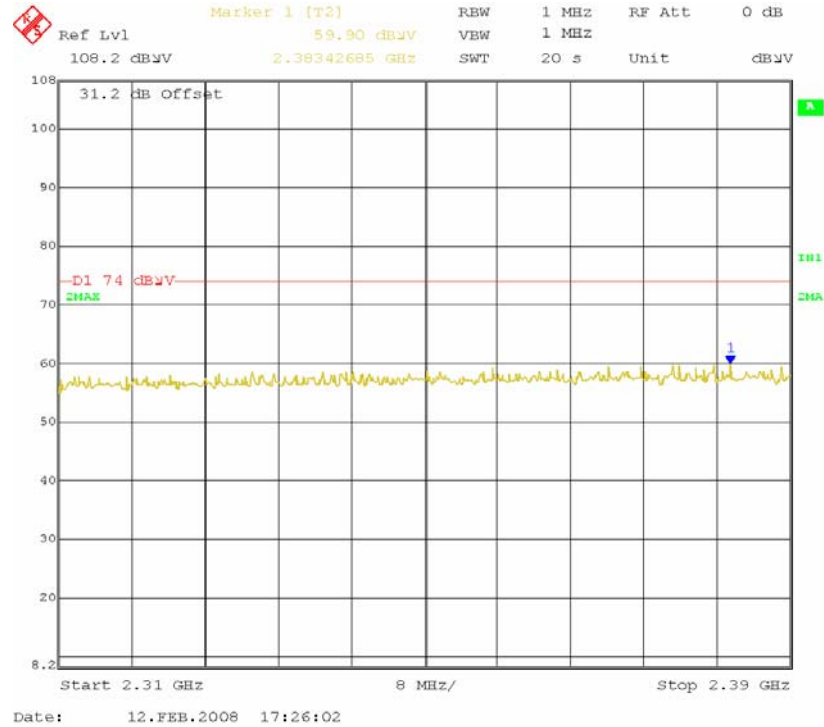
### 802.11g @ 2462MHz @ 3 Meter

| Frequency | Reading  | Direction | Height | Polar | Antenna Loss | Cable loss | Corrected Reading |                |        |          |
|-----------|----------|-----------|--------|-------|--------------|------------|-------------------|----------------|--------|----------|
| GHz       | (dBuV/m) | Degree    | Meter  | H / V | (dB)         | (dB)       | (dBuV/m)          | Limit (dBuV/m) | Margin | Detector |
| 4.924     | 24.81    | 180       | 155    | v     | 33           | 4.13       | 61.94             | 74             | -12.06 | Peak     |
| 4.924     | 23.55    | 180       | 155    | h     | 33           | 4.13       | 60.68             | 74             | -13.32 | Peak     |
| 4.924     | 10.67    | 180       | 155    | v     | 33           | 4.13       | 47.8              | 54             | -6.20  | Ave      |
| 4.924     | 10.61    | 180       | 155    | h     | 33           | 4.13       | 47.74             | 54             | -6.26  | Ave      |

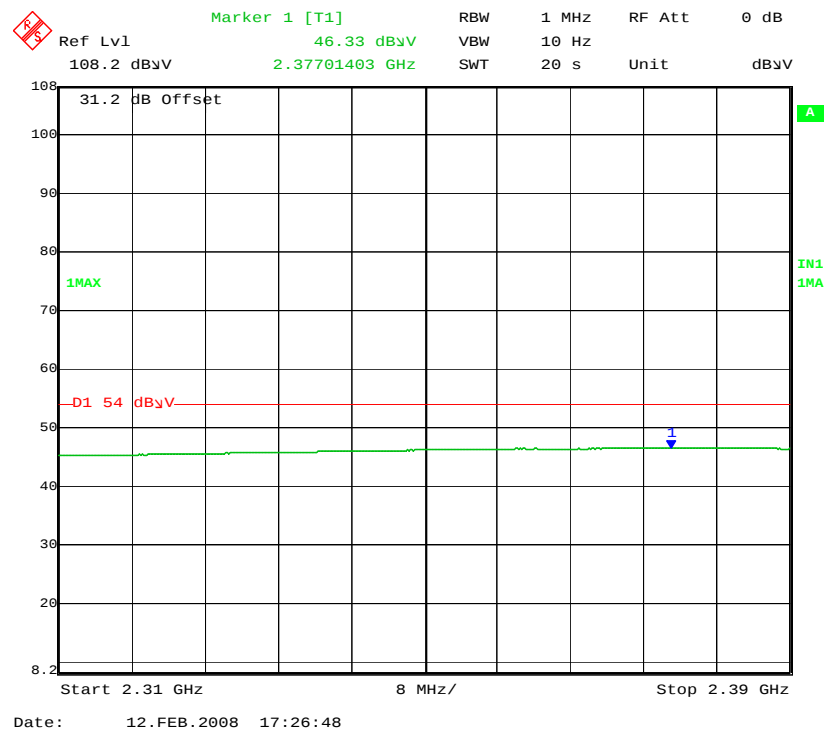
Emission was scanned up to 25GHz.

## Band Edge Plots

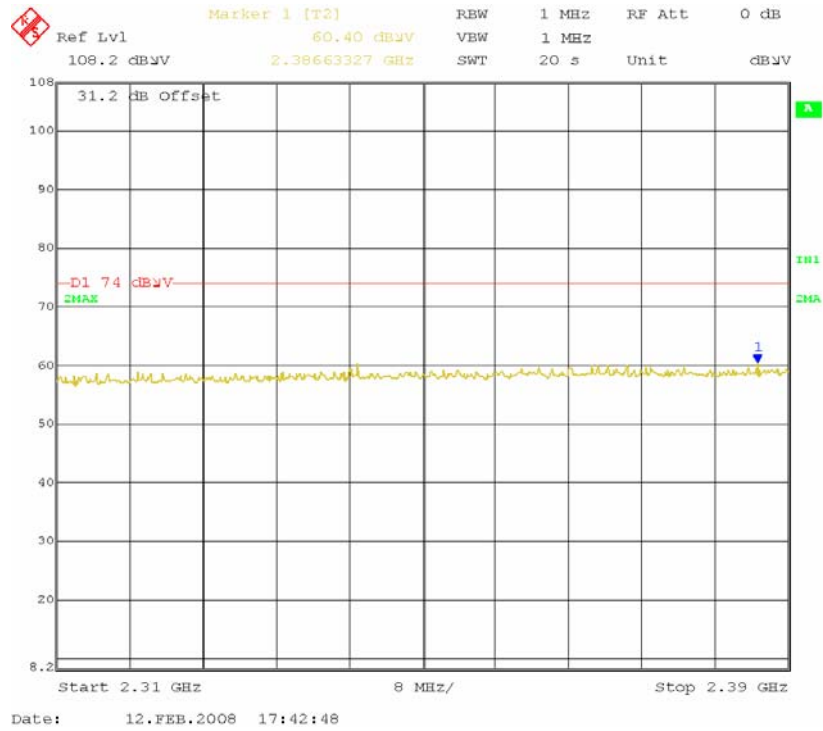
Host EUT: **GX430t**



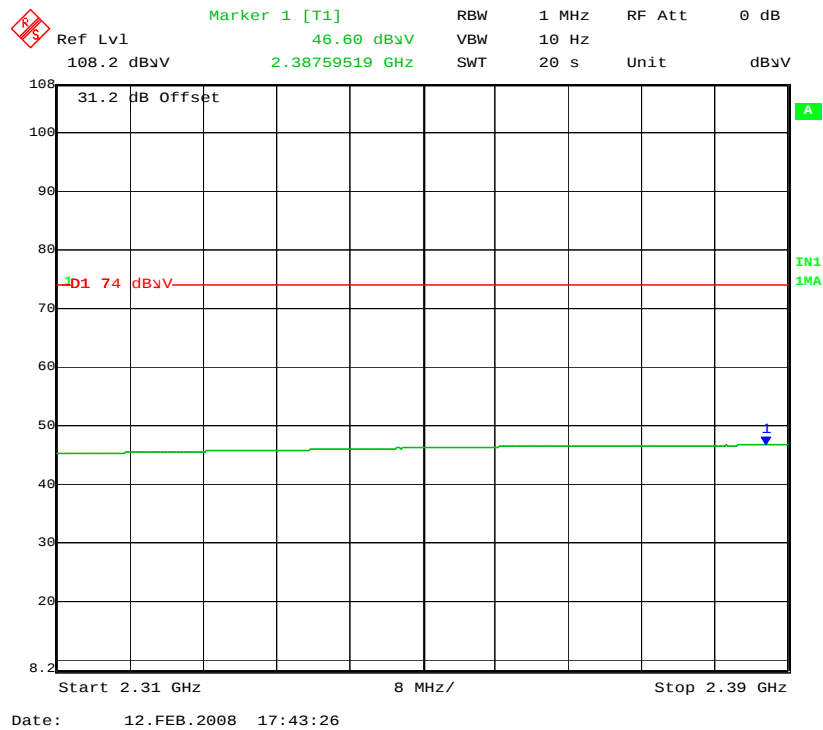
## 802.11b Low Channel-Vertical Polarity -Peak



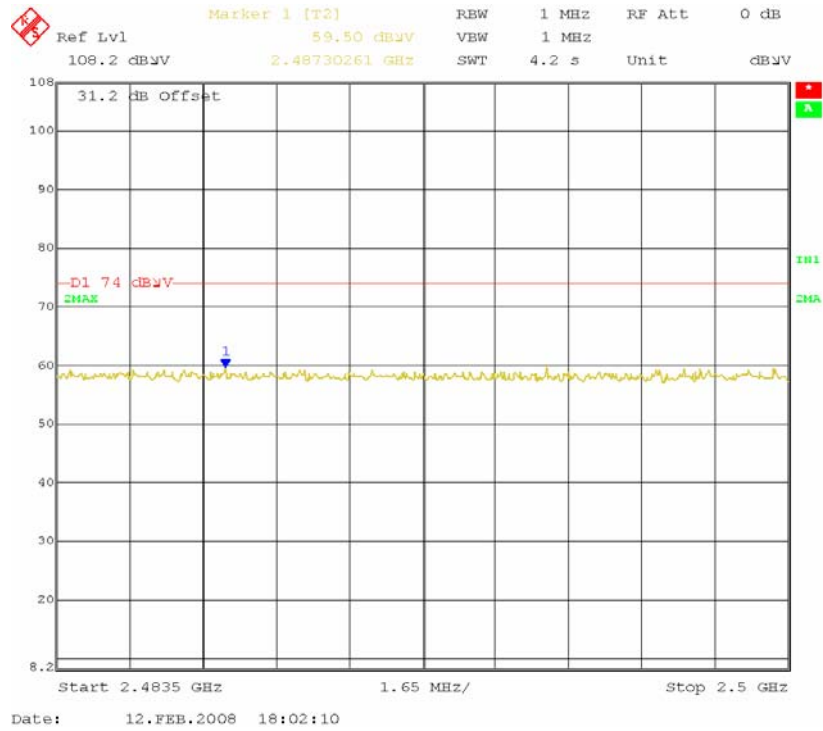
## 802.11b Low Channel-Vertical Polarity –Average



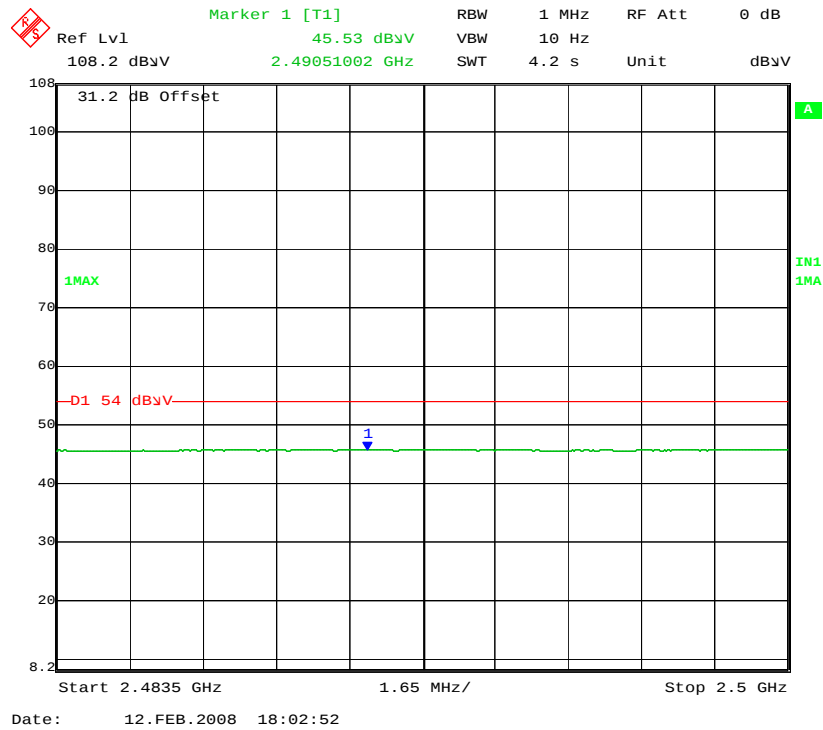
802.11b Low Channel-Horizontal Polarity –Peak



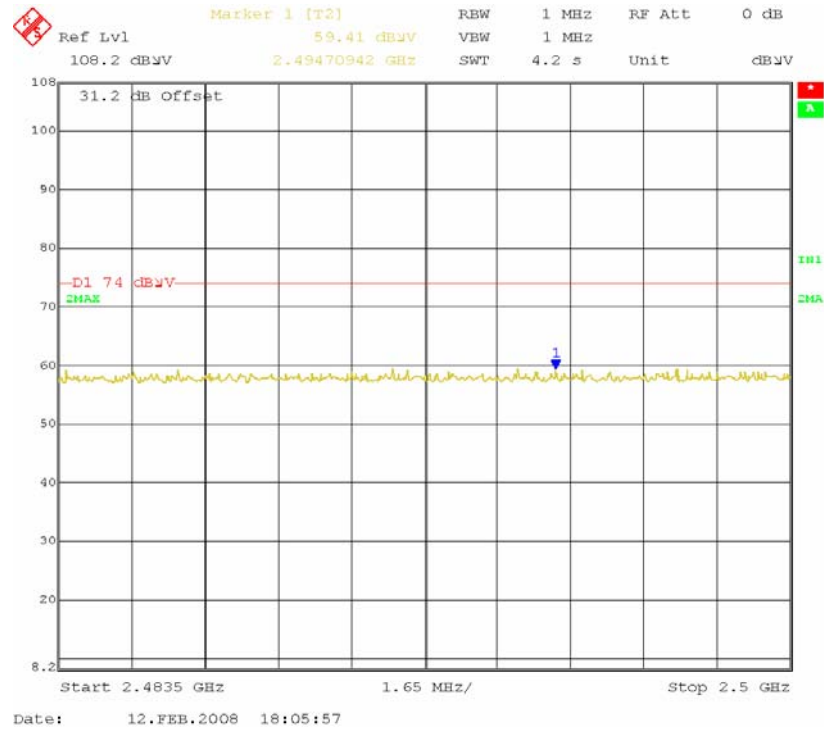
802.11b Low Channel-Horizontal Polarity -Average



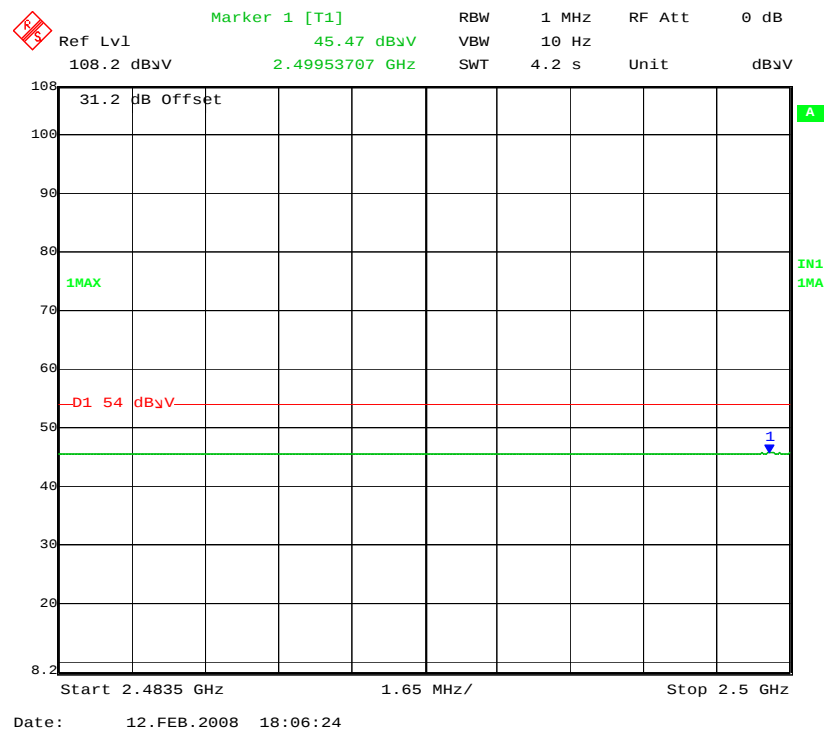
### 802.11b High Channel-Horizontal Polarity –Peak



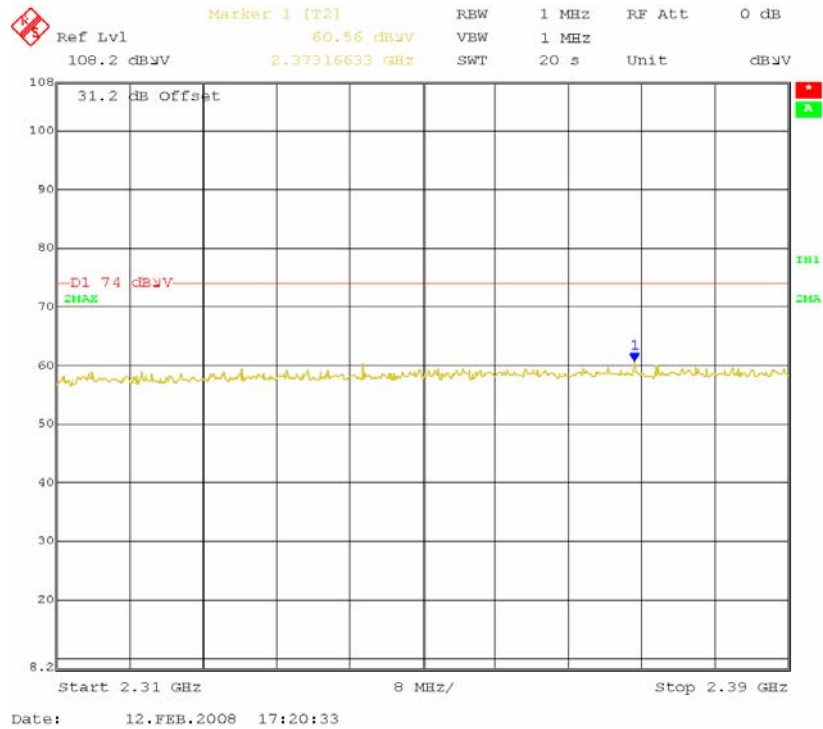
### 802.11b High Channel-Horizontal Polarity –Average



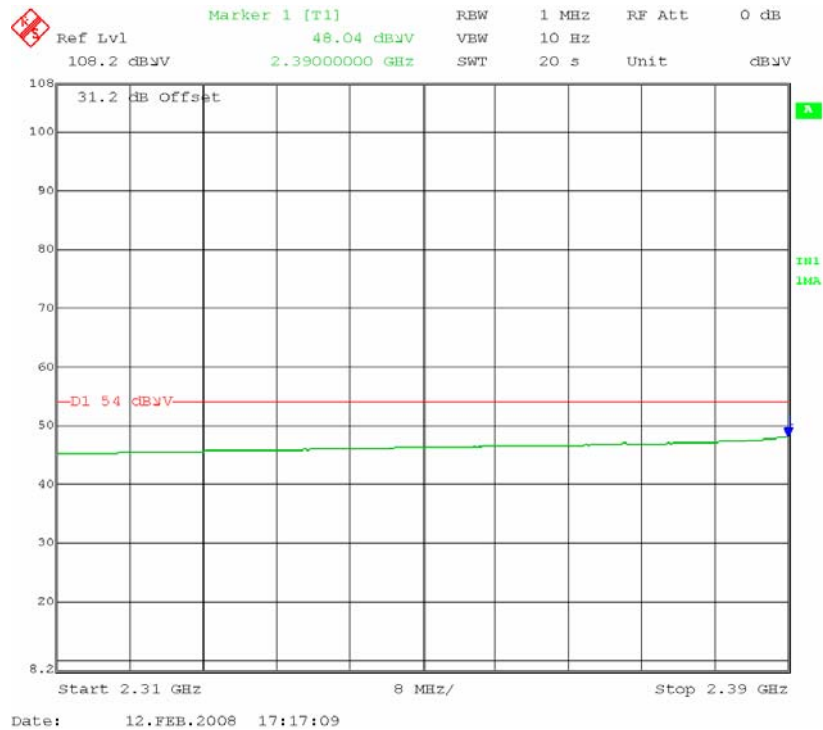
802.11b High Channel-Vertical Polarity –Peak



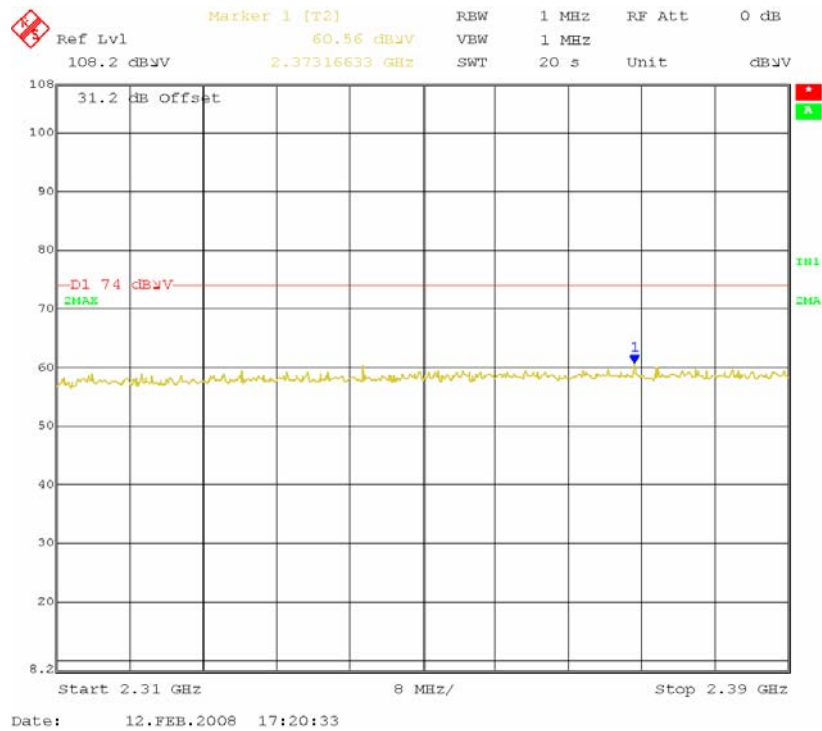
802.11b High Channel-Vertical Polarity –Average



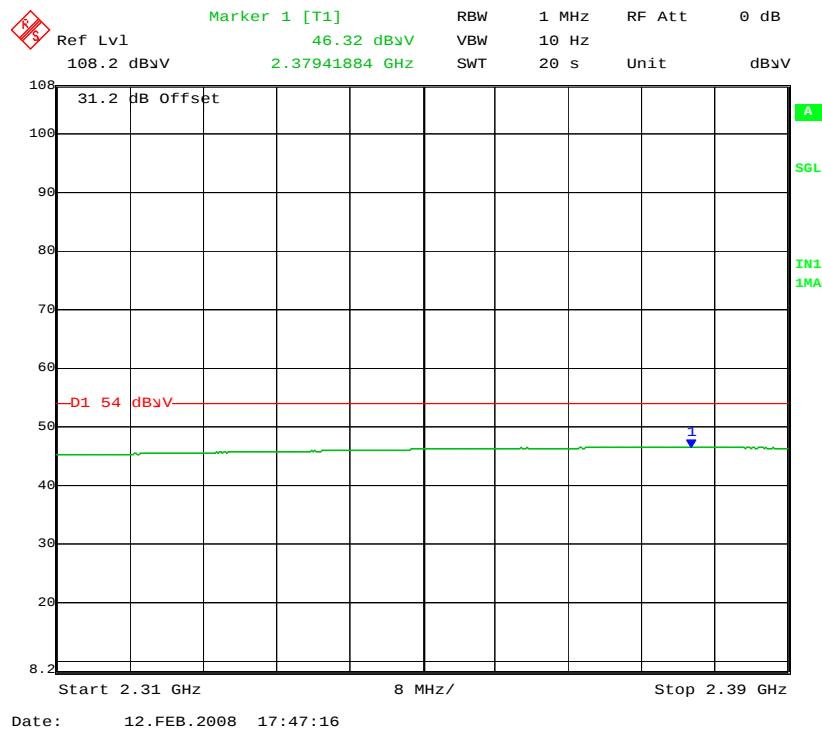
### 802.11g Low Channel-Horizontal Polarity –Peak



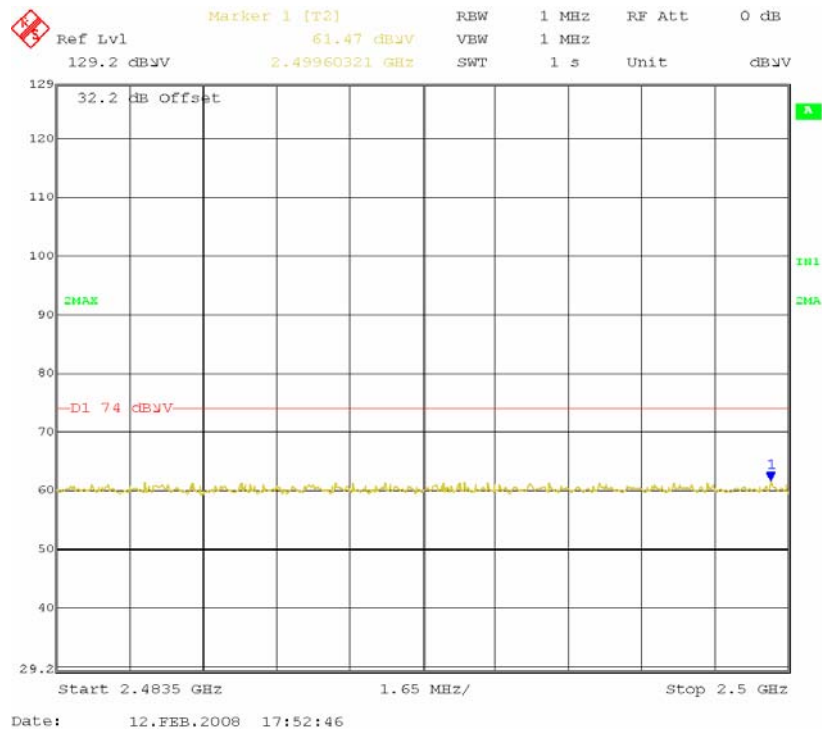
### 802.11g Low Channel-Horizontal Polarity –Average



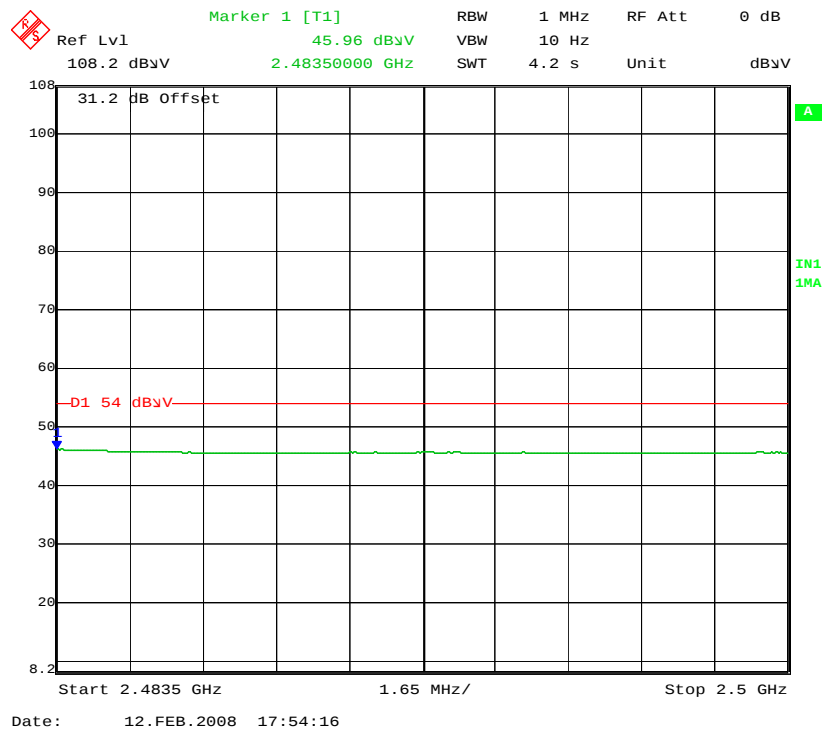
### 802.11g Low Channel-Vertical Polarity –Peak



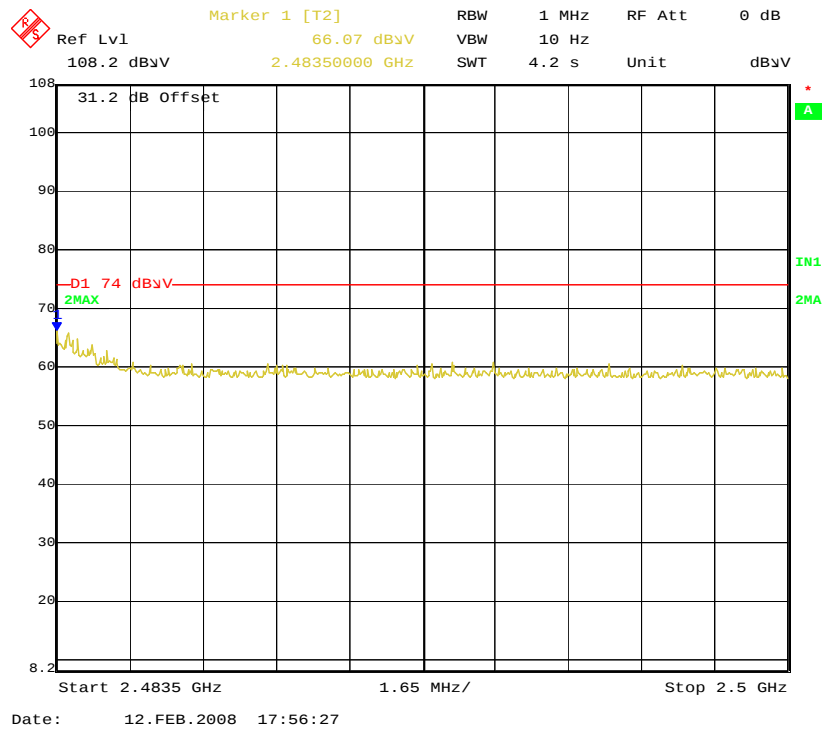
### 802.11g Low Channel-Vertical Polarity –Average



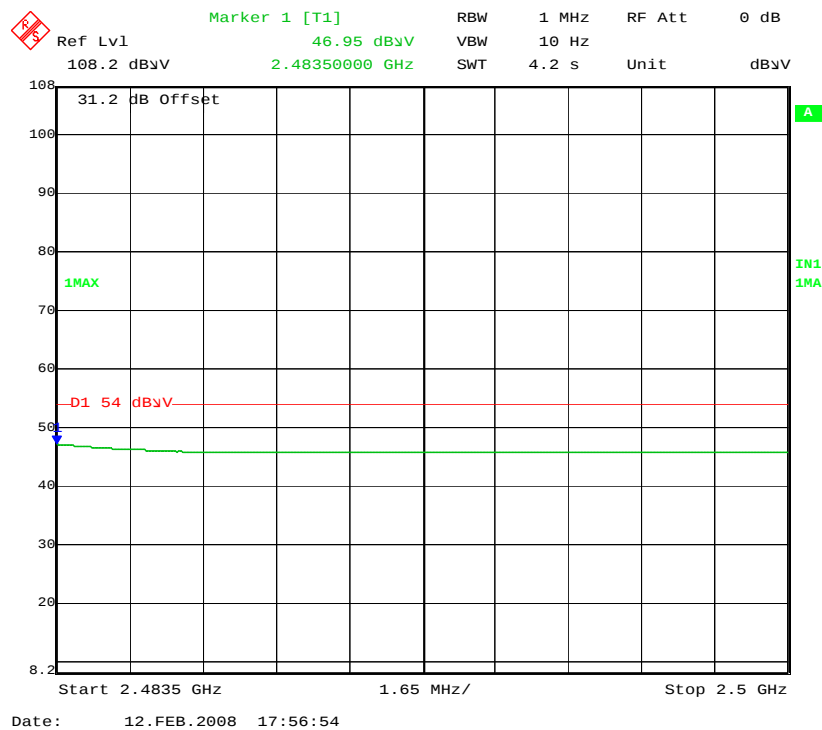
### 802.11g High Channel-Vertical Polarity –Peak



### 802.11g High Channel-Vertical Polarity –average

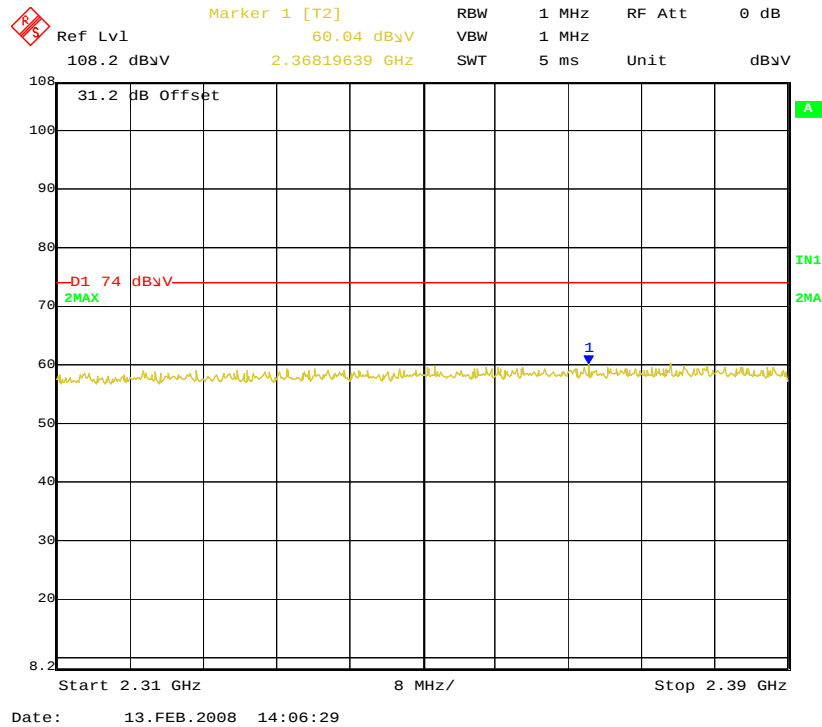


### 802.11g High Channel-Horizontal Polarity –Peak

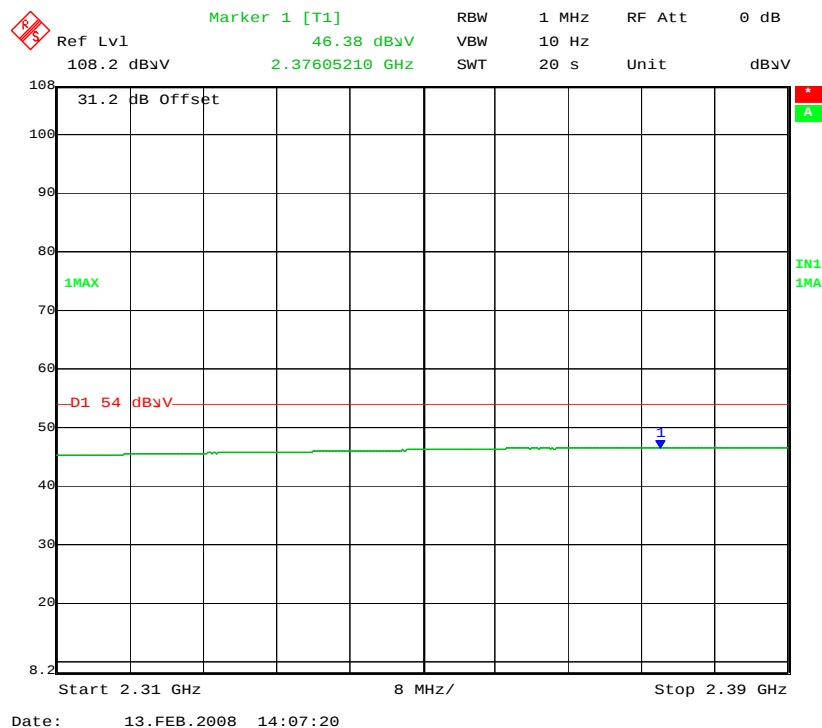


### 802.11g High Channel-Horizontal Polarity –Average

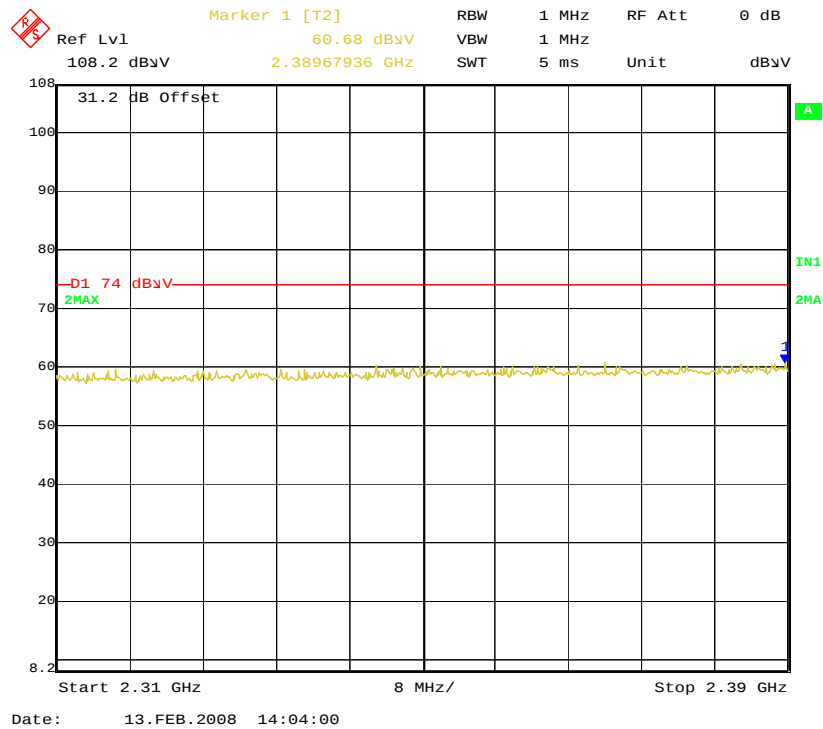
Host EUT: **GX420t**



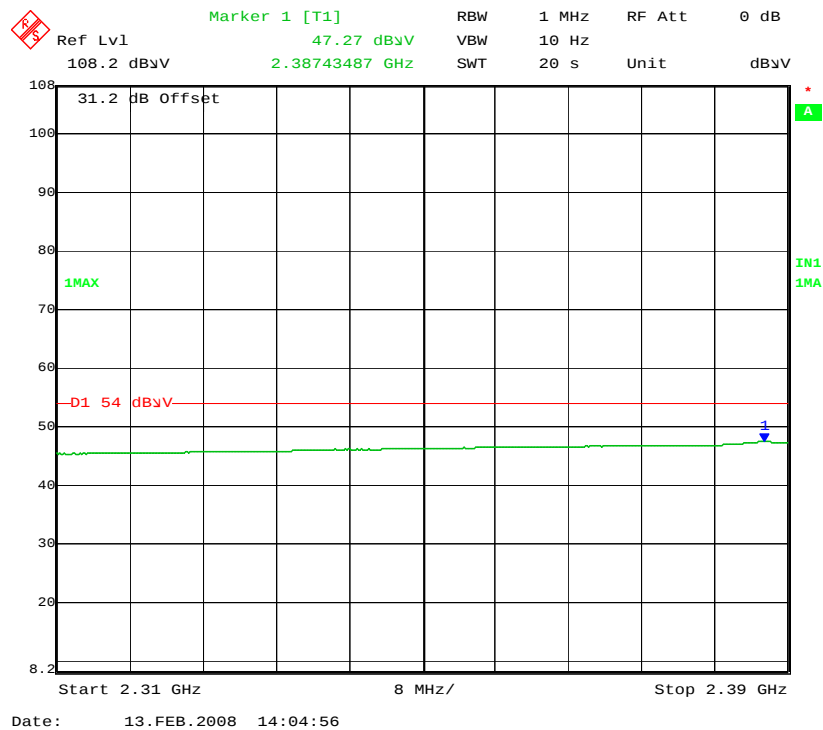
### 802.11b Low Channel-Vertical Polarity -Peak



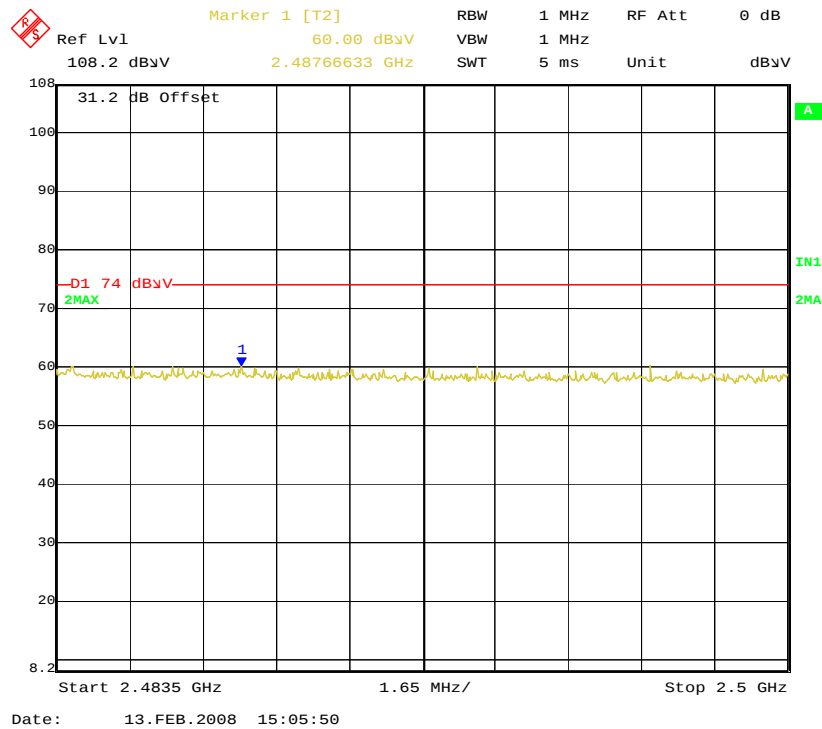
### 802.11b Low Channel-Vertical Polarity -Average



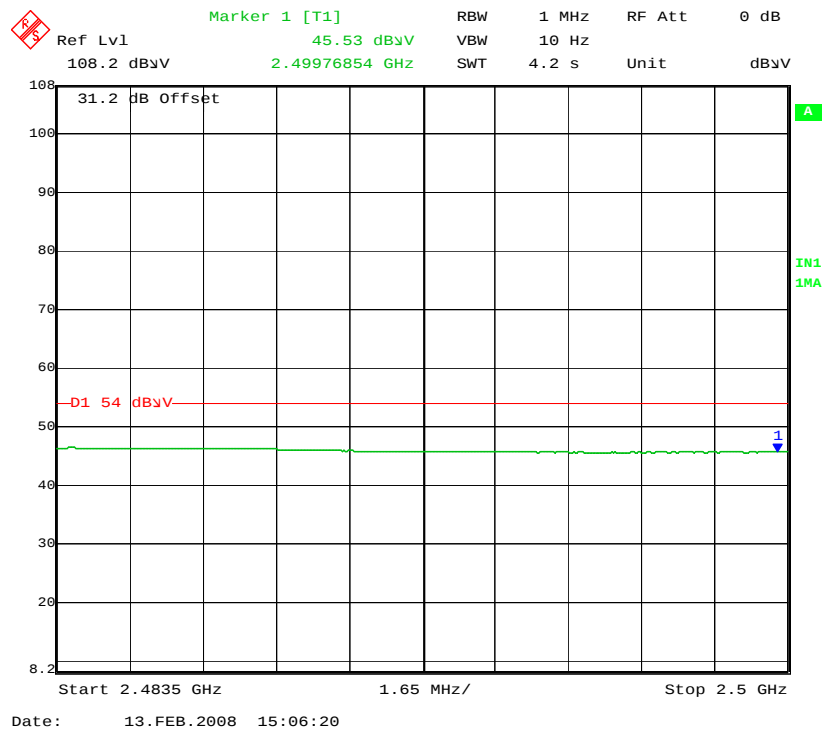
### 802.11b Low Channel-Horizontal Polarity –Peak



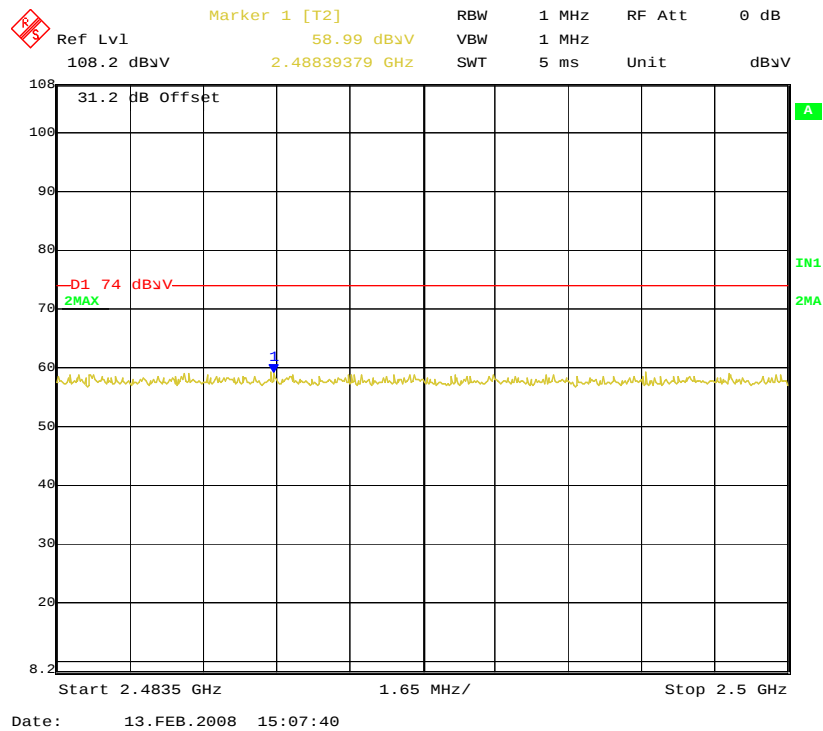
### 802.11b Low Channel-Horizontal Polarity -Average



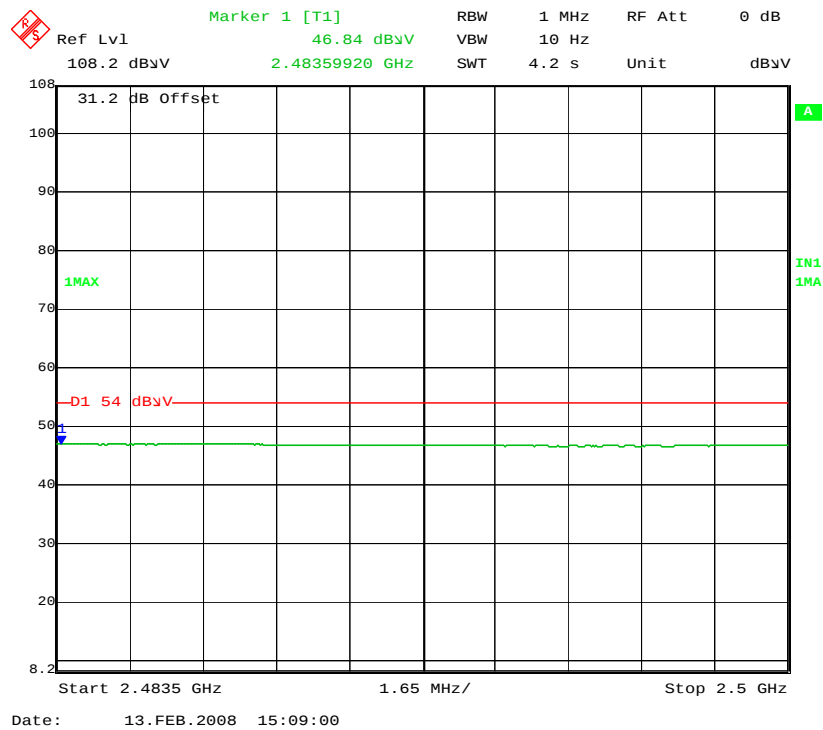
### 802.11b High Channel-Horizontal Polarity –Peak



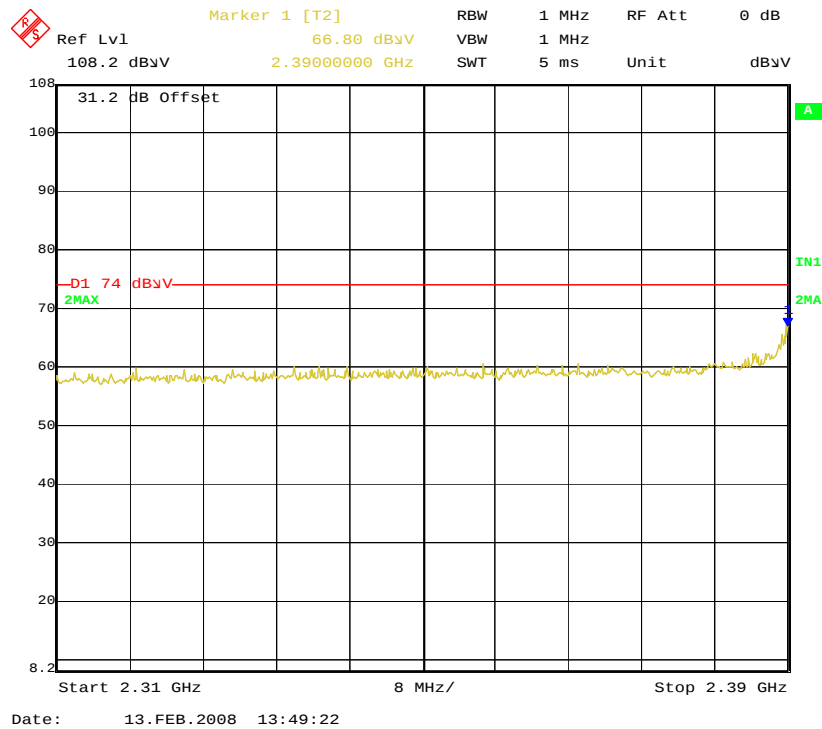
### 802.11b High Channel-Horizontal Polarity –Average



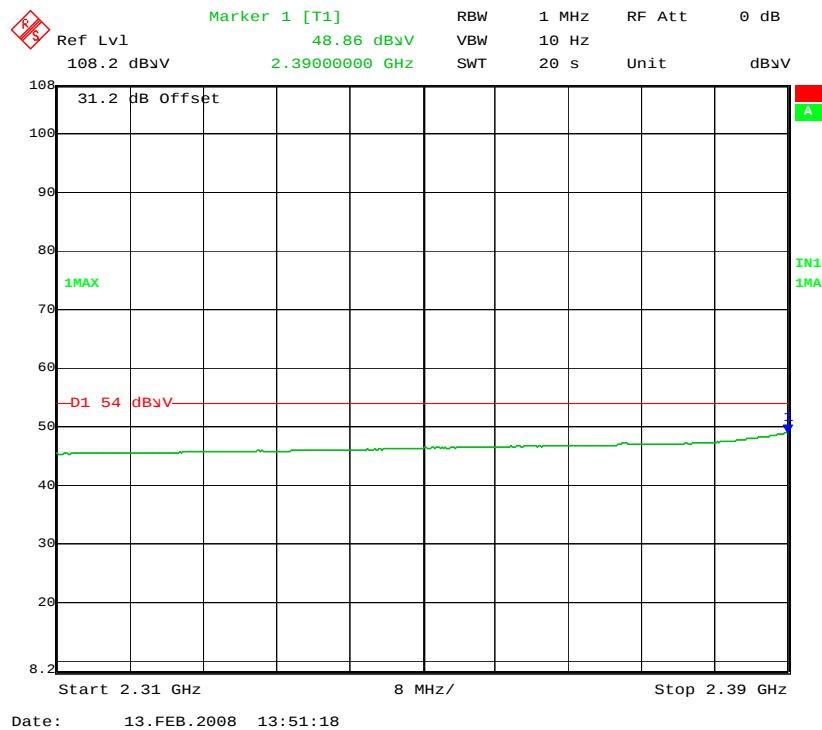
### 802.11b High Channel-Vertical Polarity –Peak



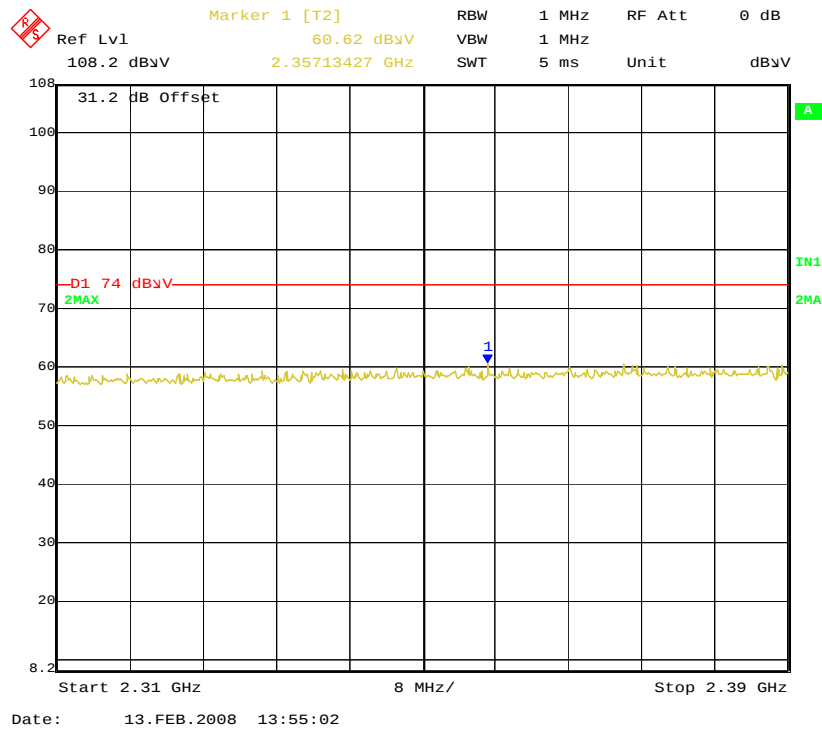
### 802.11b High Channel-Vertical Polarity –Average



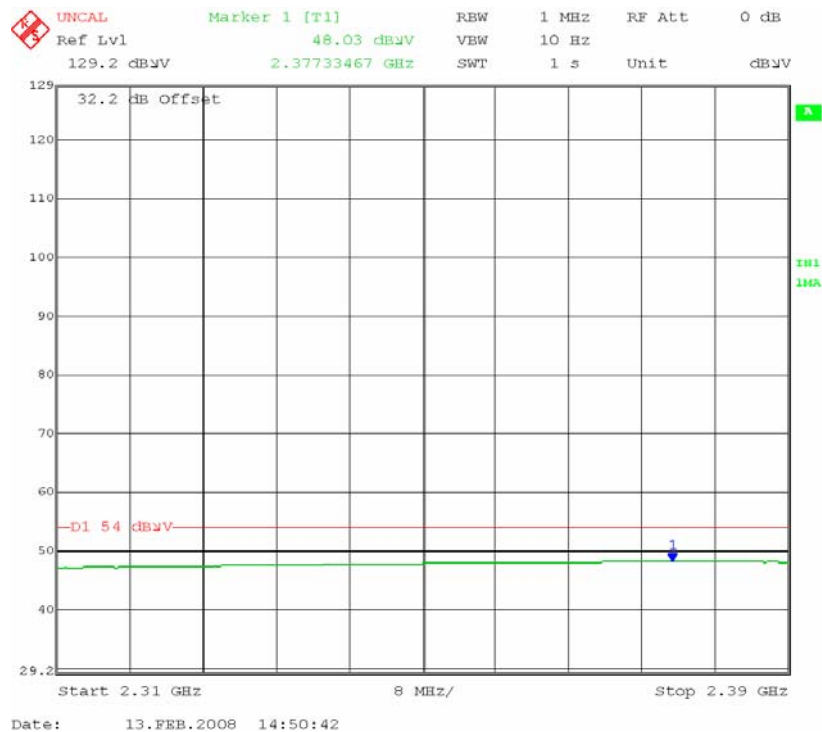
### 802.11g Low Channel-Horizontal Polarity –Peak



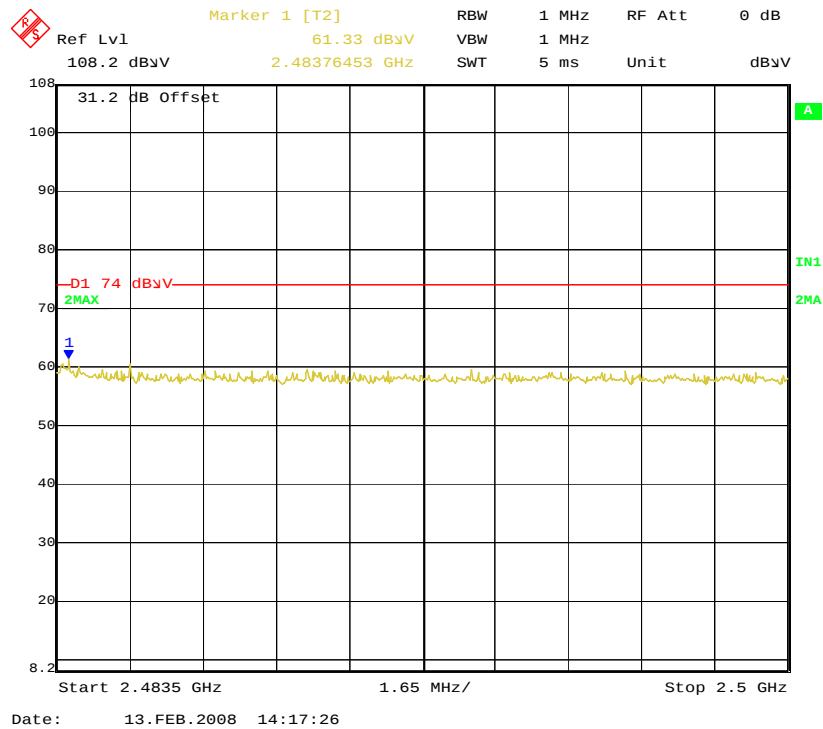
### 802.11g Low Channel-Horizontal Polarity –Average



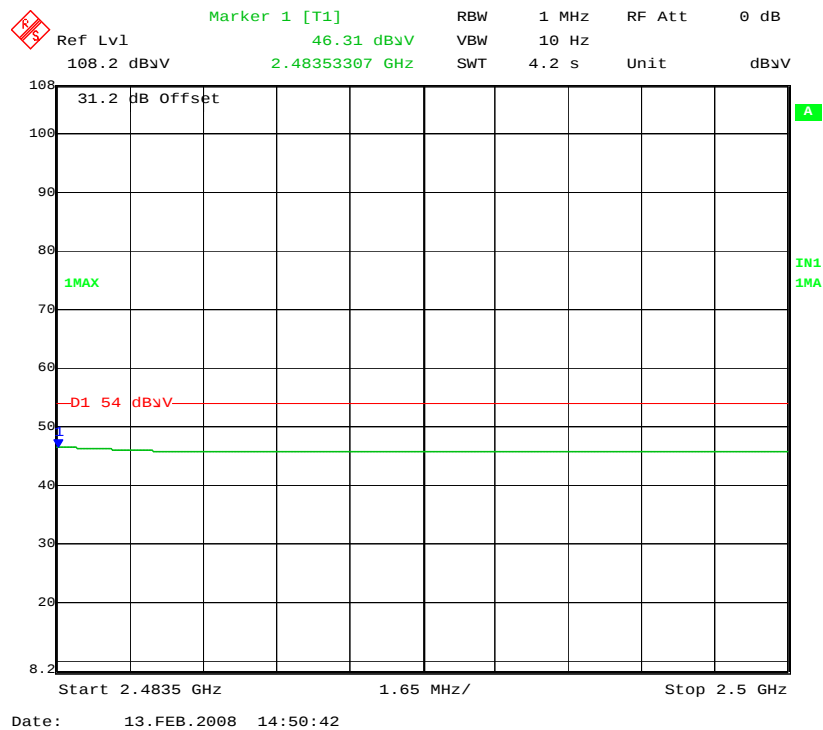
### 802.11g Low Channel-Vertical Polarity –Peak



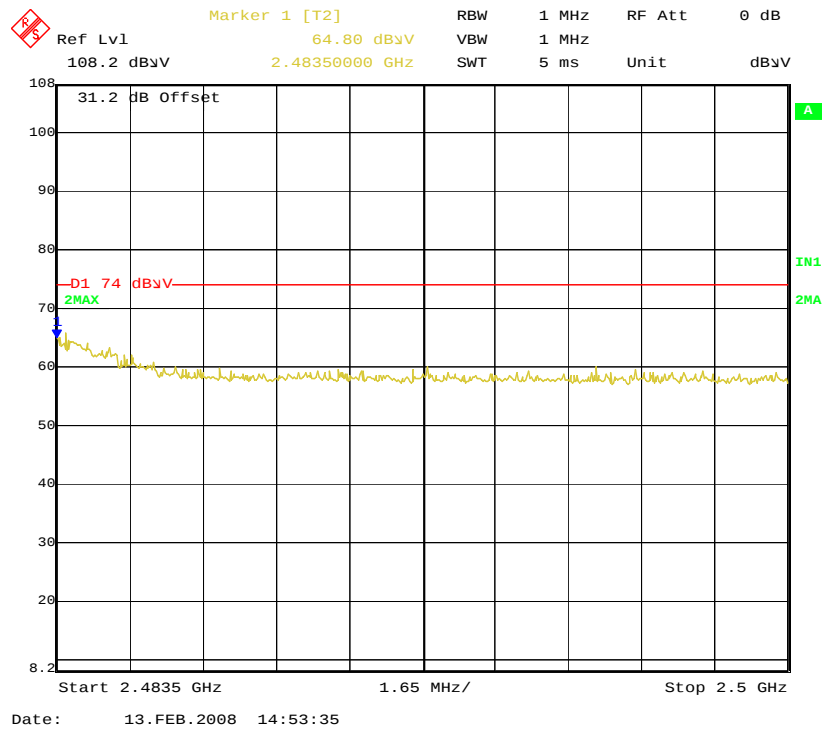
### 802.11g Low Channel-Vertical Polarity –Average



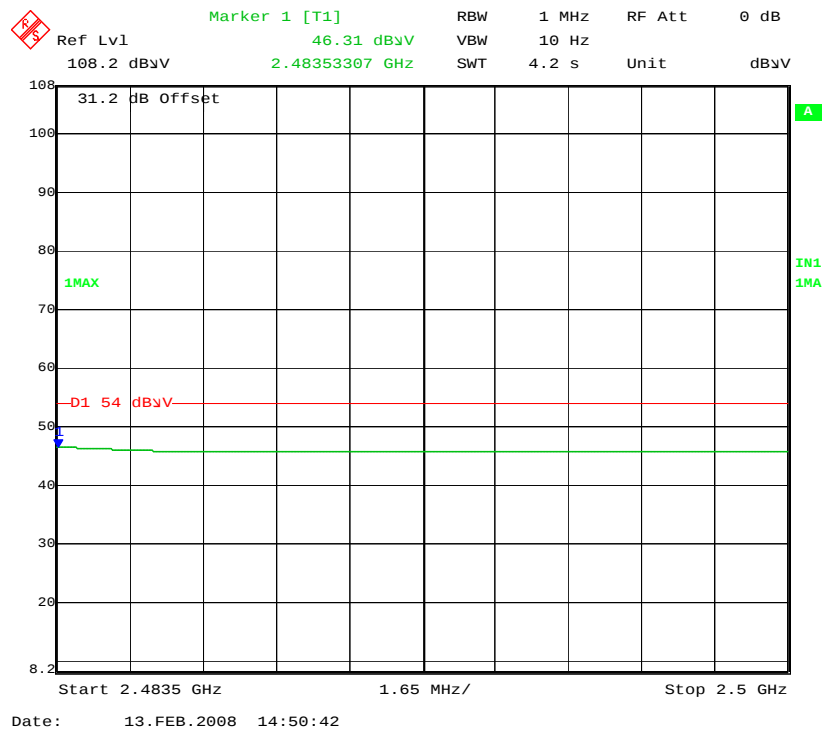
### 802.11g High Channel-Vertical Polarity –Peak



### 802.11g High Channel-Vertical Polarity –average

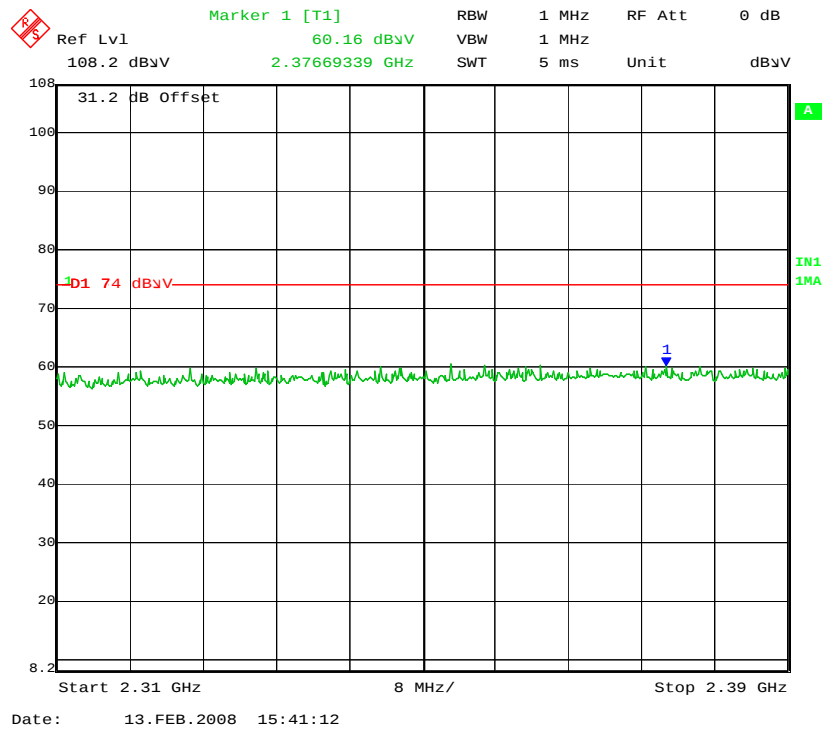


### 802.11g High Channel-Horizontal Polarity –Peak

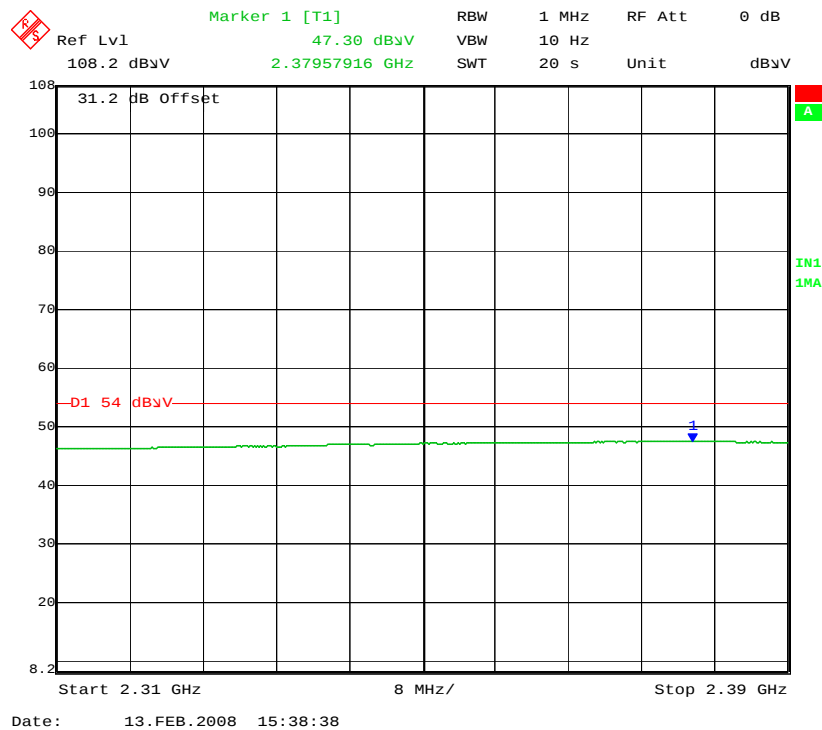


### 802.11g High Channel-Horizontal Polarity –Average

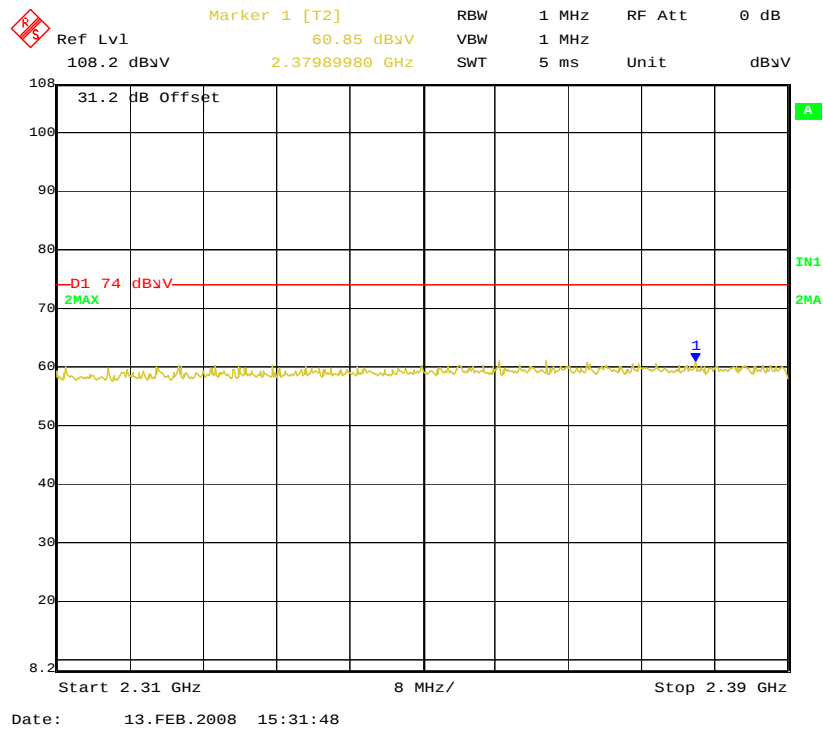
Host EUT: **GX420d**



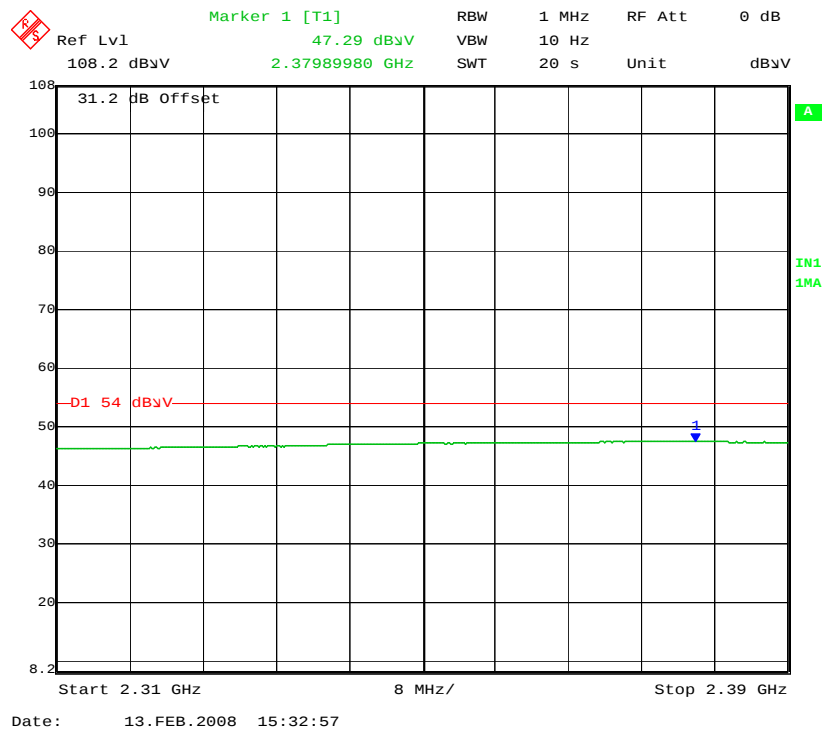
### 802.11b Low Channel-Vertical Polarity -Peak



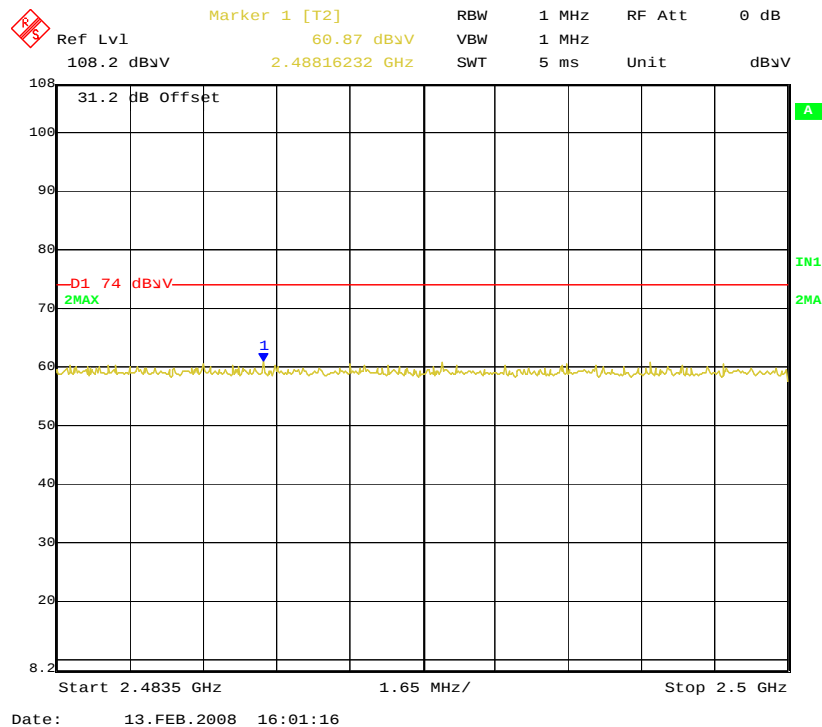
### 802.11b Low Channel-Vertical Polarity -Average



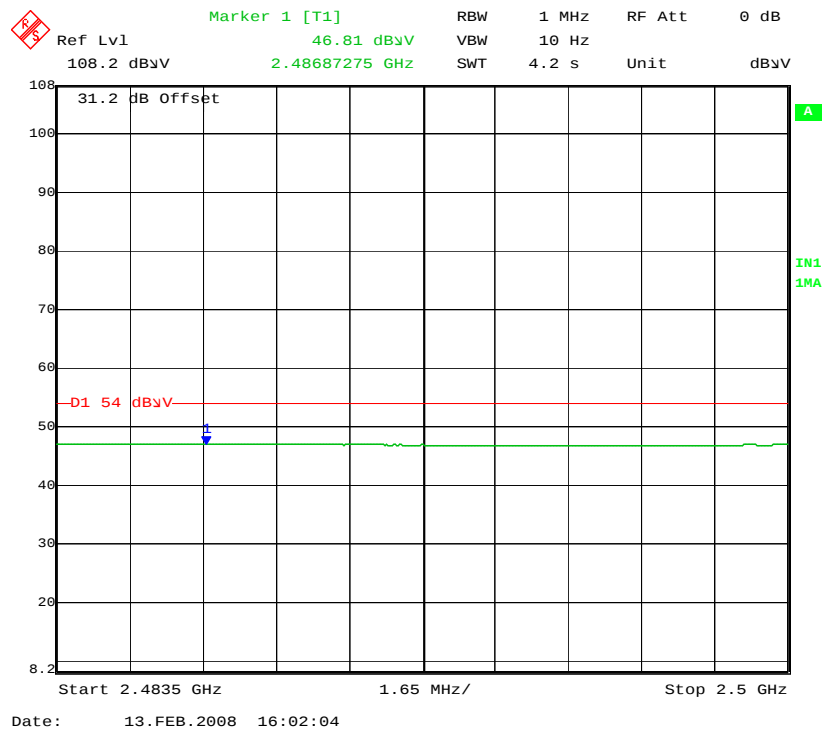
### 802.11b Low Channel-Horizontal Polarity –Peak



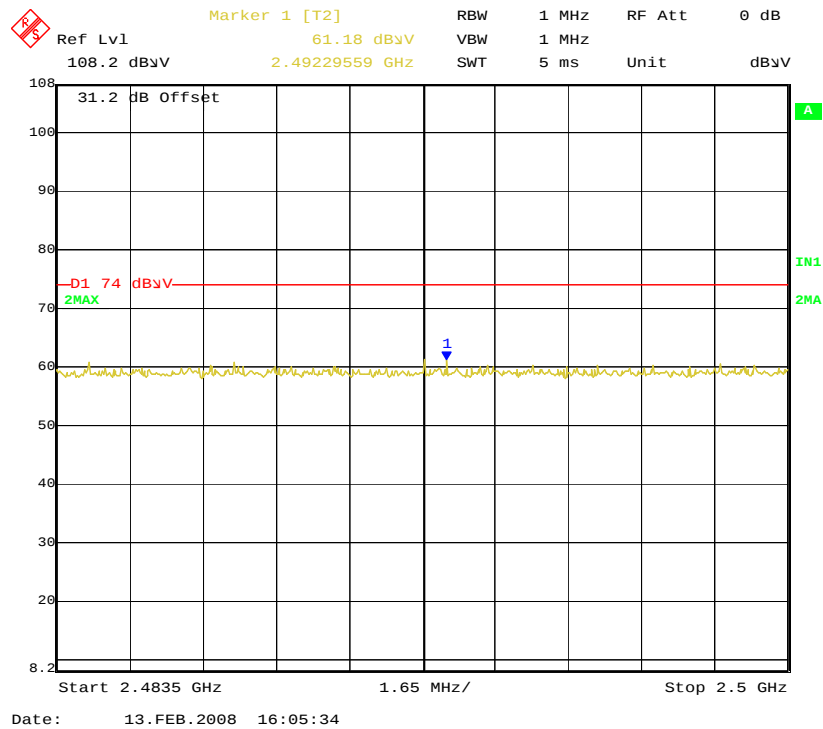
### 802.11b Low Channel-Horizontal Polarity -Average



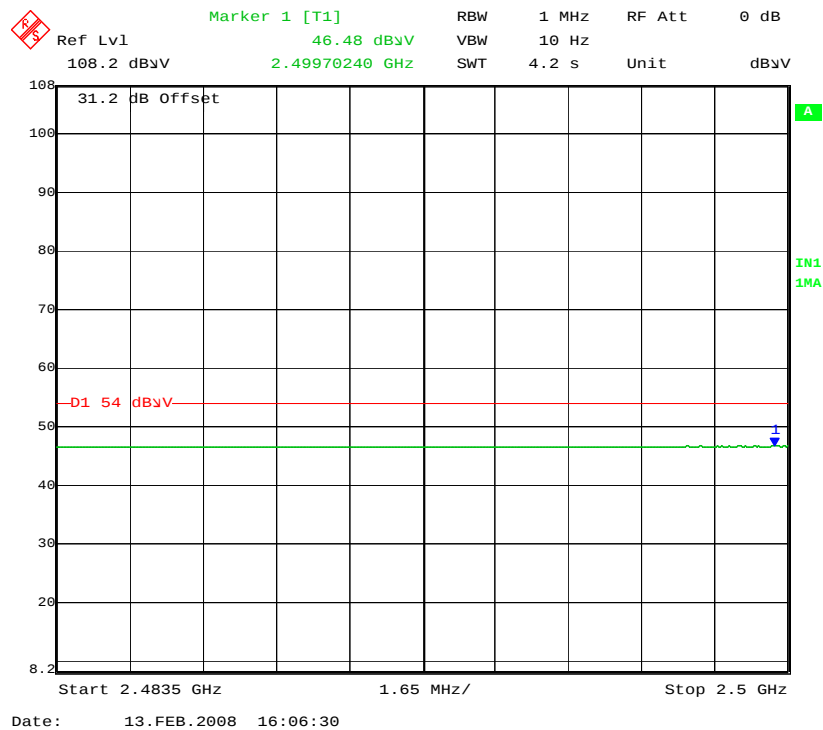
### 802.11b High Channel-Horizontal Polarity –Peak



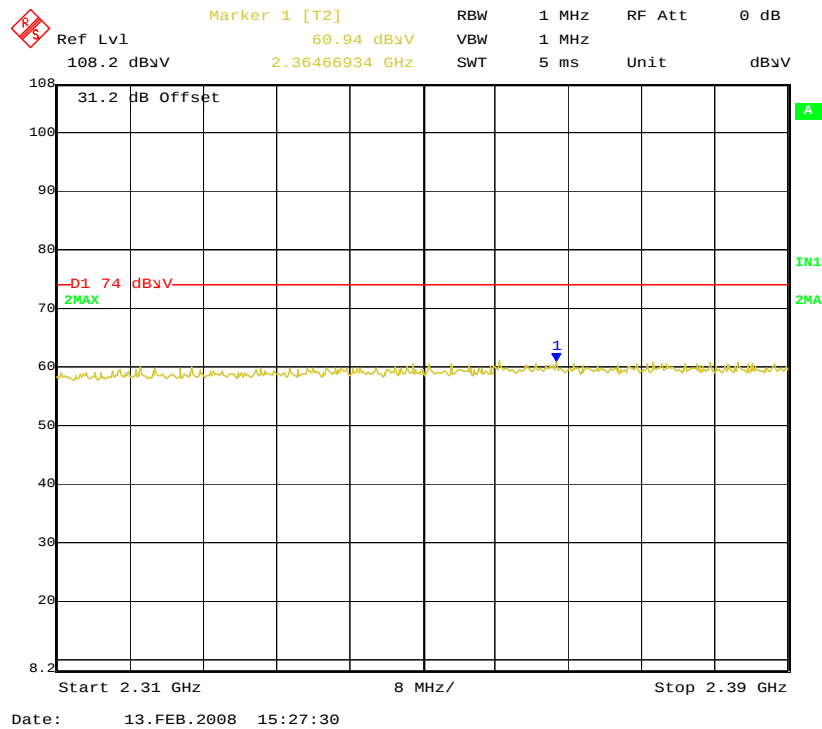
### 802.11b High Channel-Horizontal Polarity –Average



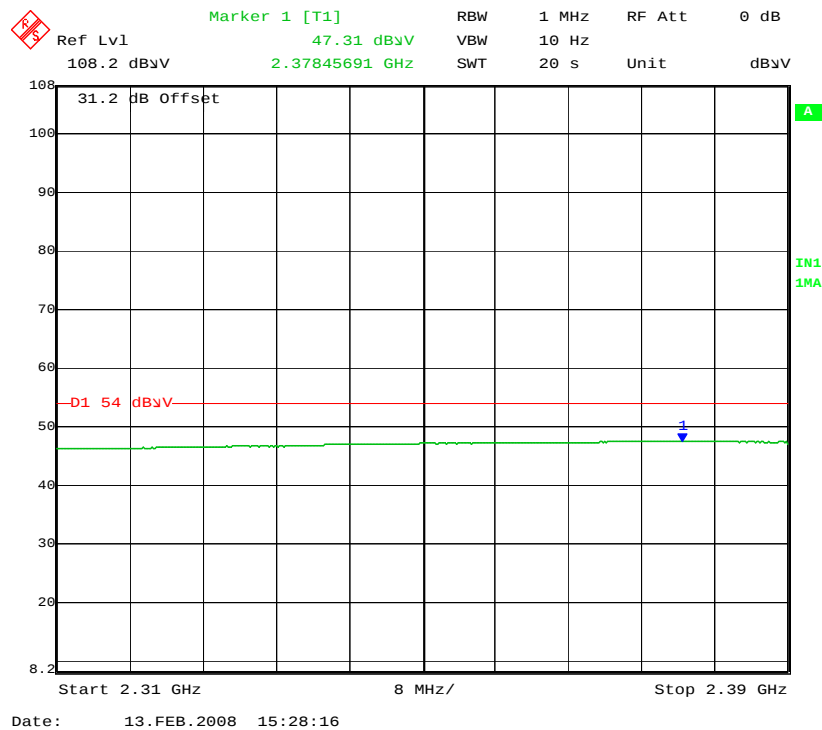
### 802.11b High Channel-Vertical Polarity –Peak



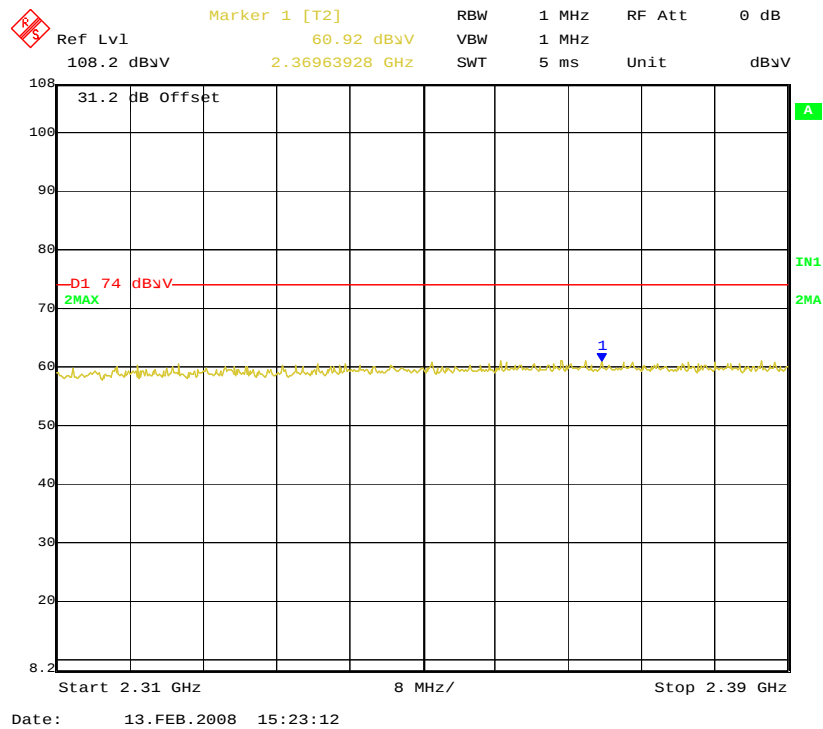
### 802.11b High Channel-Vertical Polarity –Average



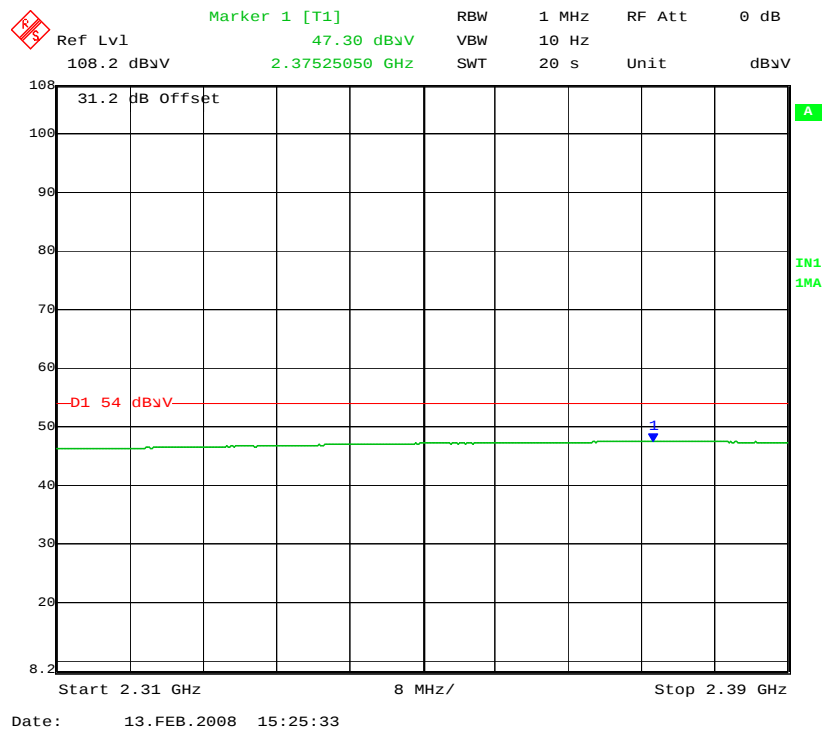
### 802.11g Low Channel-Horizontal Polarity –Peak



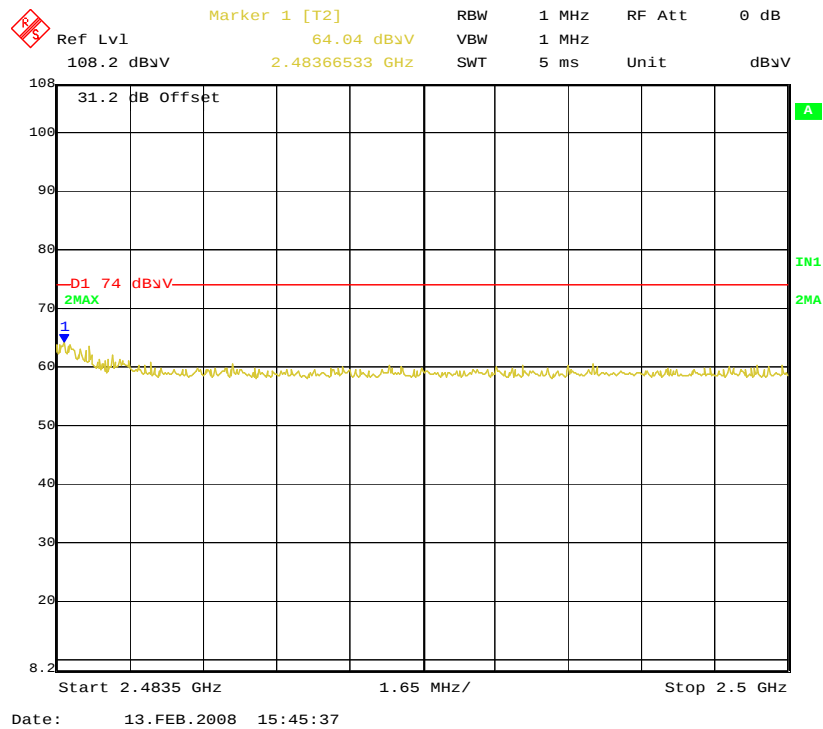
### 802.11g Low Channel-Horizontal Polarity –Average



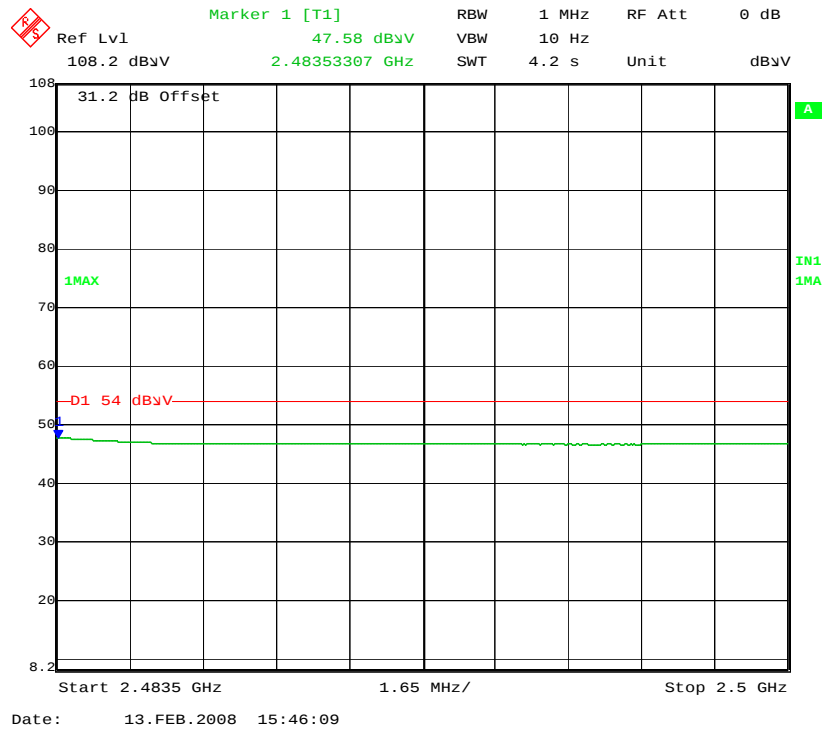
### 802.11g Low Channel-Vertical Polarity –Peak



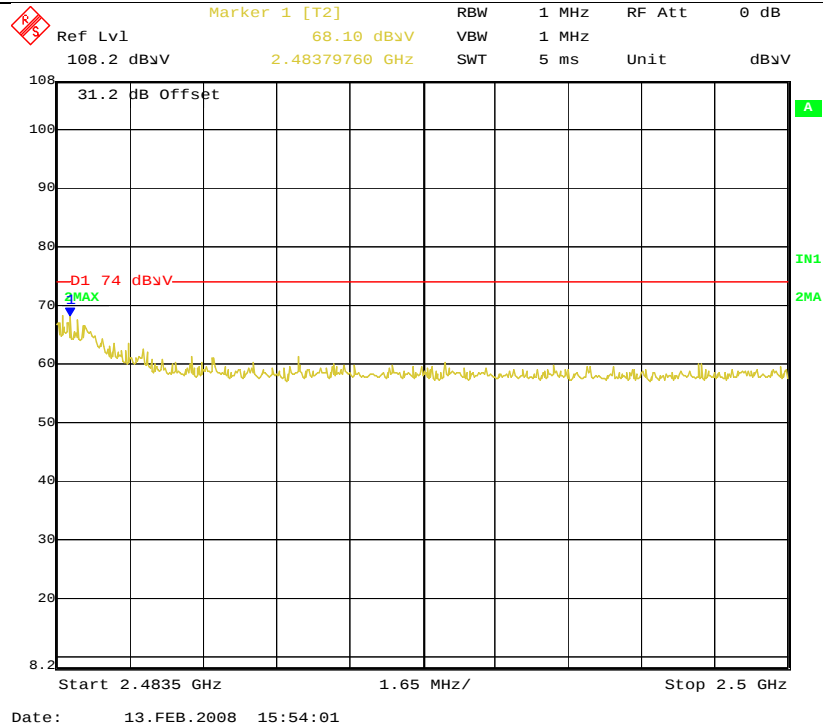
### 802.11g Low Channel-Vertical Polarity –Average



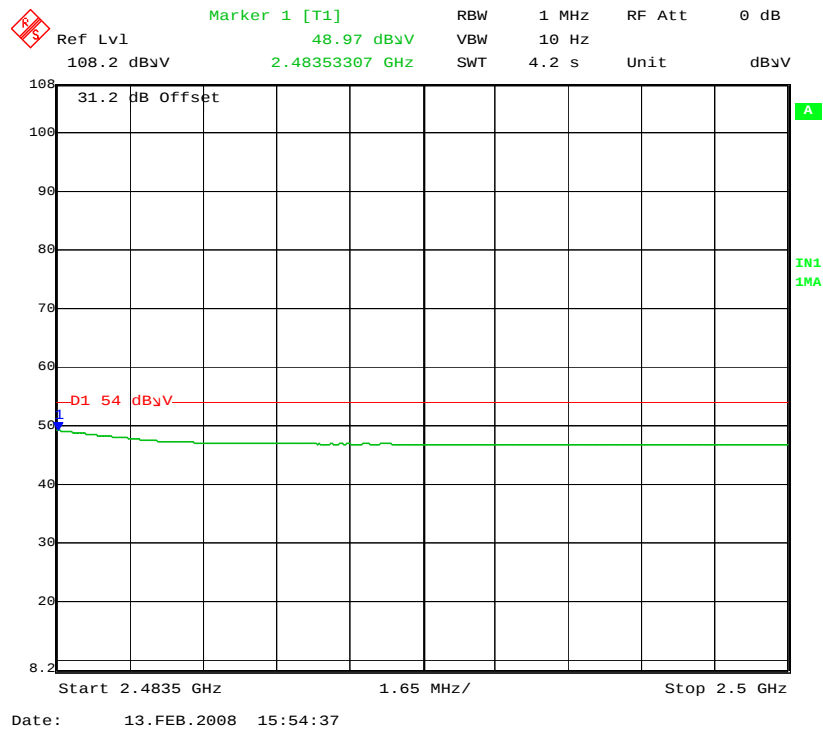
### 802.11g High Channel-Vertical Polarity –Peak



### 802.11g High Channel-Vertical Polarity –average



802.11g High Channel-Horizontal Polarity –Peak



802.11g High Channel-Horizontal Polarity –Average

## Annex A. TEST INSTRUMENT & METHOD

### Annex A.i. TEST INSTRUMENTATION & GENERAL PROCEDURES

| Instrument                      | Manufacturer    | Model     | CAL Due Date |
|---------------------------------|-----------------|-----------|--------------|
| Spectrum Analyzer               | HP              | 8564E     | 05/01/2008   |
| EMI Receiver                    | Rohde & Schwarz | ESIB 40   | 04/07/2008   |
| R&S LISN                        | R&S             | ESH2-Z5   | 04/27/2008   |
| CHASE LISN                      | Chase           | MN2050B   | 04/26/2008   |
| Antenna(1 ~18GHz)               | Emco            | 3115      | 08/17/2008   |
| Antenna<br>(30MHz~2GHz)         | Sunol Sciences  | JB1       | 10/04/2008   |
| Chamber                         | Lingren         | 3m        | 09/28/2008   |
| Pre-Amplifier(1 ~<br>26GHz)     | HP              | 8449      | 05/01/2008   |
| DMM                             | Fluke           | 73III     | 05/01/2008   |
| Variac                          | KRM             | AEEC-2090 | See Note     |
| DMM                             | Fluke           | 51II      | See Note     |
| Horn Antenna<br>(18~40GHz)      | Com Power       | AH-840    | 5/21/2008    |
| Microwave Pre-Amp<br>(18~40GHz) | Com Power       | PA-840    | 5/21/2008    |

Note: No calibration required.

## Annex A.ii. CONDUCTED EMISSIONS TEST DESCRIPTION

### Test Set-up

1. The EUT and supporting equipment were set up in accordance with the requirements of the standard on top of a 1.5m x 1m x 0.8m high, non-metallic table, as shown in Annex B.
2. The power supply for the EUT was fed through a  $50\Omega/50\mu\text{H}$  EUT LISN, connected to filtered mains.
3. The RF OUT of the EUT LISN was connected to the EMI test receiver via a low-loss coaxial cable.
4. All other supporting equipments were powered separately from another main supply.

### Test Method

1. The EUT was switched on and allowed to warm up to its normal operating condition.
2. A scan was made on the NEUTRAL line (for AC mains) or Earth line (for DC power) over the required frequency range using an EMI test receiver.
3. High peaks, relative to the limit line, were then selected.
4. The EMI test receiver was then tuned to the selected frequencies and the necessary measurements made with a receiver bandwidth setting of 10 KHz. For FCC tests, only Quasi-peak measurements were made; while for CISPR/EN tests, both Quasi-peak and Average measurements were made.
5. Steps 2 to 4 were then repeated for the LIVE line (for AC mains) or DC line (for DC power).

### Sample Calculation Example

|                                                                                                            |                                                     |
|------------------------------------------------------------------------------------------------------------|-----------------------------------------------------|
| At 20 MHz                                                                                                  | limit = $250\ \mu\text{V}$ = 47.96 dB $\mu\text{V}$ |
| Transducer factor of LISN, pulse limiter & cable loss at 20 MHz = 11.20 dB                                 |                                                     |
| Q-P reading obtained directly from EMI Receiver = 40.00 dB $\mu\text{V}$<br>(Calibrated for system losses) |                                                     |
| Therefore, Q-P margin = $47.96 - 40.00 = 7.96$                                                             | i.e. <b>7.96 dB below limit</b>                     |

## Annex A. iii RADIATED EMISSIONS TEST DESCRIPTION

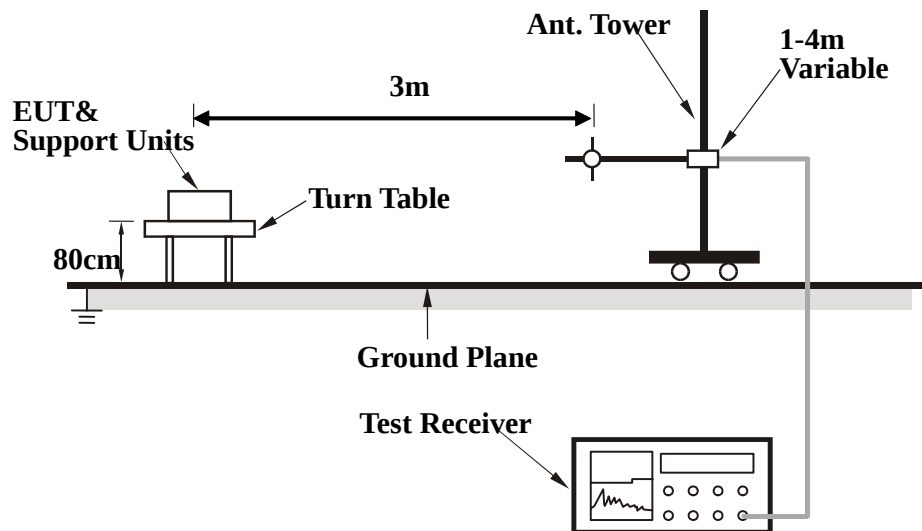
### EUT Characterisation

EUT characterisation, over the frequency range from 30MHz to 10<sup>th</sup> Harmonic , was done in order to minimise radiated emissions testing time while still maintaining high confidence in the test results.

The EUT was placed in the chamber, at a height of about 0.8m on a turntable. Its radiated emissions frequency profile was observed, using a spectrum analyzer /receiver with the appropriate broadband antenna placed 3m away from the EUT. Radiated emissions from the EUT were maximised by rotating the turntable manually, changing the antenna polarisation and manipulating the EUT cables while observing the frequency profile on the spectrum analyzer / receiver. Frequency points at which maximum emissions occurred, clock frequencies and operating frequencies were then noted for the formal radiated emissions test at the Open Area Test Site (OATS).

### Test Set-up

1. The EUT and supporting equipment were set up in accordance with the requirements of the standard on top of a 1.5m X 1.0m X 0.8m high, non-metallic table.
2. The filtered power supply for the EUT and supporting equipment were tapped from the appropriate power sockets located on the turntable.
3. The relevant broadband antenna was set at the required test distance away from the EUT and supporting equipment boundary.



## **Test Method**

The following procedure was performed to determine the maximum emission axis of EUT:

1. With the receiving antenna is H polarization, rotate the EUT in turns with three orthogonal axes to determine the axis of maximum emission.
2. With the receiving antenna is V polarization, rotate the EUT in turns with three orthogonal axes to determine the axis of maximum emission.
3. Compare the results derived from above two steps. So, the axis of maximum emission from EUT was determined and the configuration was used to perform the final measurement.

### **Final Radiated Emission Measurement**

1. Setup the configuration according to figure 1. Turn on EUT and make sure that it is in normal function.
2. For emission frequencies measured below 1 GHz, a pre-scan is performed in a shielded chamber to determine the accurate frequencies of higher emissions will be checked on a open test site. As the same purpose, for emission frequencies measured above 1 GHz, a pre-scan also be performed with a 1 meter measuring distance before final test.
3. For emission frequencies measured below and above 1 GHz, set the spectrum analyzer on a 100 kHz and 1 MHz resolution bandwidth respectively for each frequency measured in step 2.
4. The search antenna is to be raised and lowered over a range from 1 to 4 meters in horizontally polarized orientation. Position the highness when the highest value is indicated on spectrum analyzer, then change the orientation of EUT on test table over a range from 0 ° to 360 ° with a speed as slow as possible, and keep the azimuth that highest emission is indicated on the spectrum analyzer. Vary the antenna position again and record the highest value as a final reading.
5. Repeat step 4 until all frequencies need to be measured were complete.
6. Repeat step 5 with search antenna in vertical polarized orientations.

During the radiated emission test, the Spectrum Analyzer was set with the following configurations:

| Frequency Band (MHz) | Function | Resolution bandwidth | Video Bandwidth |
|----------------------|----------|----------------------|-----------------|
| 30 to 1000           | Peak     | 100 kHz              | 100 kHz         |
| Above 1000           | Peak     | 1 MHz                | 1 MHz           |
|                      | Average  | 1 MHz                | 10 Hz           |

## **Sample Calculation Example**

The field strength is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain (if any) from the measured reading. For the limit is employed average value, therefore the peak value can be transferred to average value by subtracting the duty factor. The basic equation with a sample calculation is as follows:

$$\text{Peak} = \text{Reading} + \text{Corrected Factor}$$

where

Corr. Factor = Antenna Factor + Cable Factor - Amplifier Gain (if any)

And the average value is

$$\text{Average} = \text{Peak Value} + \text{Duty Factor or}$$

$$\text{Set RBW} = 1\text{MHz, VBW} = 10\text{Hz.}$$

Note :

If the measured frequencies are fall in the restricted frequency band, the limit employed must be quasi peak value when frequencies are below or equal to 1 GHz. And the measuring instrument is set to quasi peak detector function.

## **Annex B EUT AND TEST SETUP PHOTOGRAPHS**

**Please see the attachment**

## **Annex C. TEST SETUP AND SUPPORTING EQUIPMENT**

### **EUT TEST CONDITIONS**

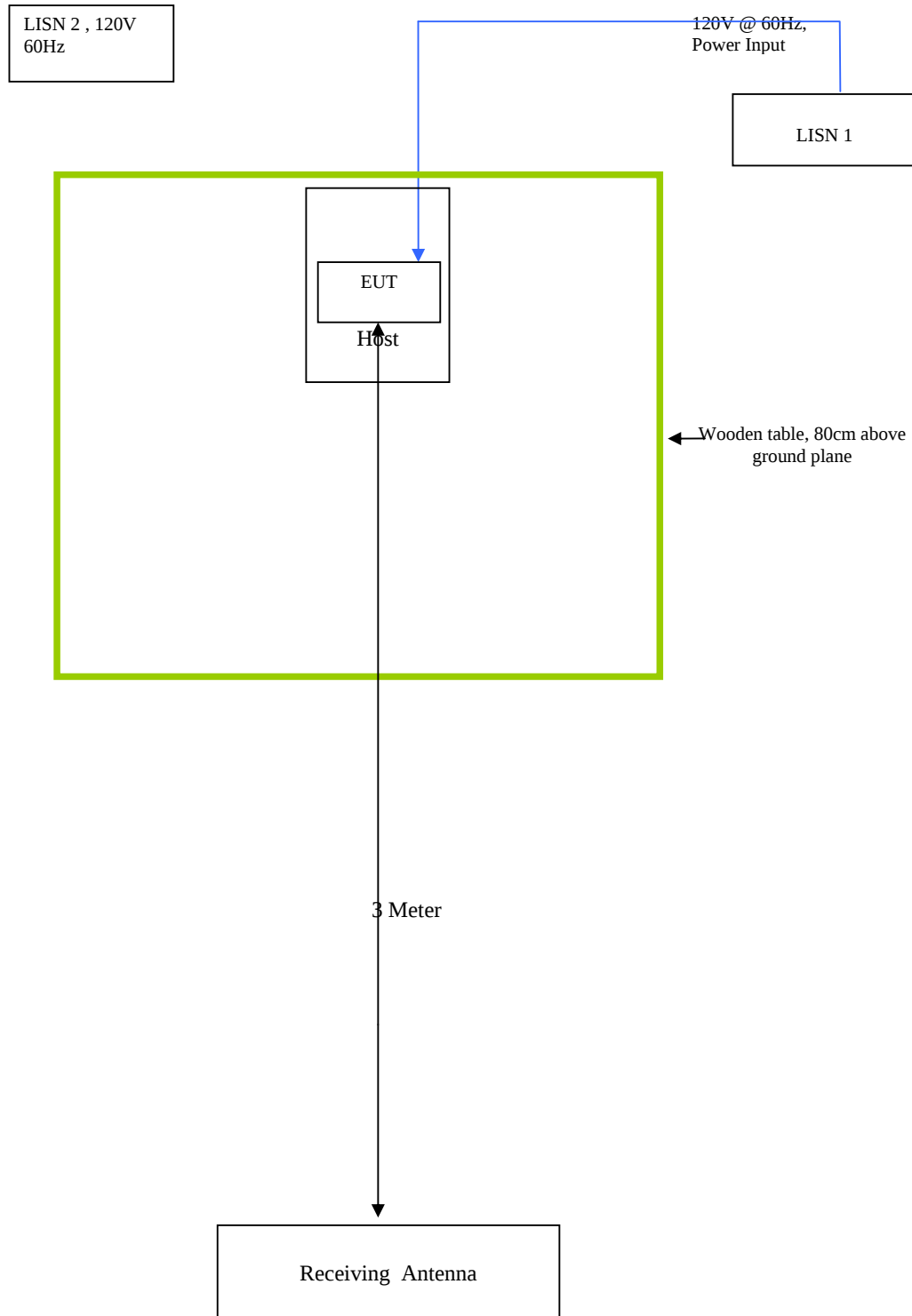
#### **Annex C. i. SUPPORTING EQUIPMENT DESCRIPTION**

The following is a description of supporting equipment and details of cables used with the EUT.

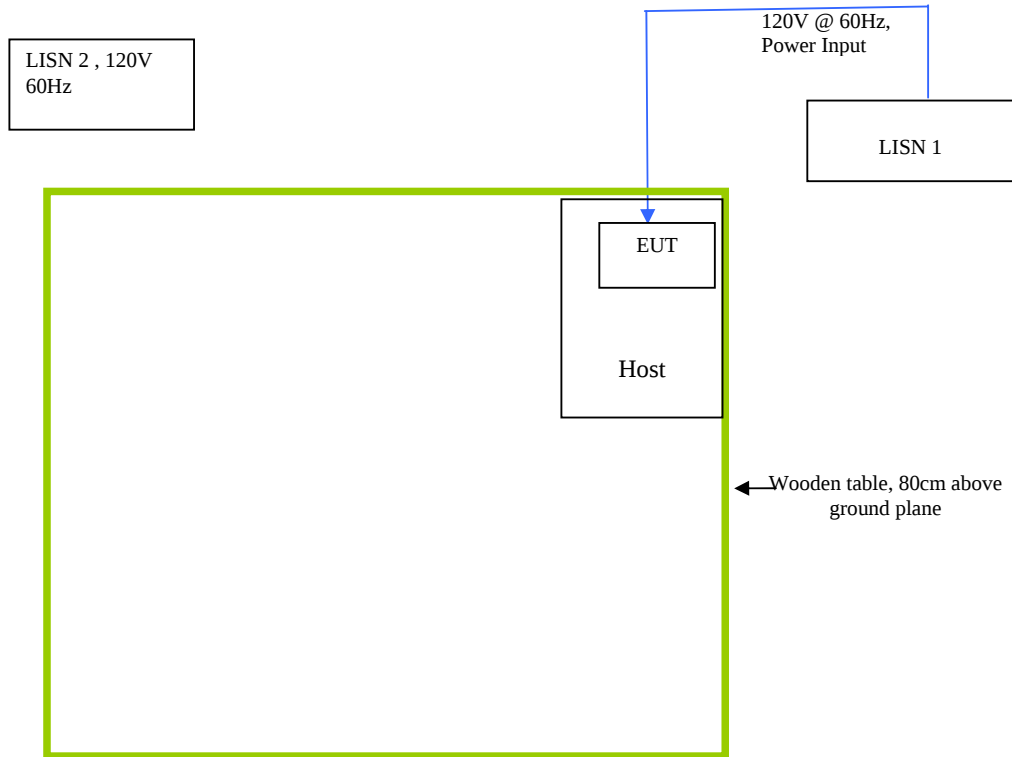
| Equipment Description<br>(Including Brand Name) | Model & Serial Number | Cable Description<br>(List Length, Type & Purpose) |
|-------------------------------------------------|-----------------------|----------------------------------------------------|
| N/A                                             | N/A                   | N/A                                                |
|                                                 |                       |                                                    |

Remarks: The device does not have any supporting equipment, but it is controlled by itself when performing the compliance evaluations.

## Block Configuration Diagram for Radiated Emission



## Block Configuration Diagram for Conducted Emission



## **Annex C.ii. EUT OPERATING CONDITIONS**

The following is the description of how the EUT is exercised during testing.

| Test              | Description Of Operation                                       |
|-------------------|----------------------------------------------------------------|
| Emissions Testing | The EUT was controlled by itself Using manufacturer's program. |
| Others Testing    | TX mode is normal mode with full power.                        |

## **Annex D USER MANUAL, BLOCK & CIRCUIT DIAGRAM**

**Please see attachment**