

ZEBRA TECHNOLOGIES CORP

HOST PRINTER MODEL: (110XIII, ZM400, ZM600, S4M) WITH
ZLANG-VH 802.11b/g Module

Model: ZLANG-VH

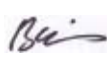
28 January 2008

Report No.: SL07112905-ZBR-067 (15.247)(ZLANG-VH)
(This report supersedes NONE)



Modifications made to the product : None

This Test Report is Issued Under the Authority of:

	
Choon Sian Ooi Test Engineer	Leslie Bai 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.

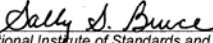
EMC Test Report

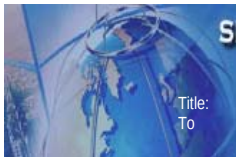
To: FCC Part 15.247 & RSS210 Issue7: 2007

SIEMIC, INC.
Accessing global markets



SIEMIC ACREDITATION DETAILS: NVLAP Lab Code: 200729-0

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



SIEMIC, Inc.

Accessing global markets

Title: RF Test Report Zebra Technologies Corp , model : ZLANG-VH
To: FCC 15.247 2007, RSS 210 Issue 7: 2007

Serial# SL07112905-ZBR-067 (15.247)(ZLANG-VH)
Issue Date 28 January 2008
Page 3 of 140
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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 under E-Filing, OET Equipment Authorization Electronic Filing, Test Firms.

Sincerely,



Rhylis 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 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 NOA 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

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

Enclosure

SIEMIC ACREDITATION DETAILS: Japan RF Technologies Accreditation No. MRF050927

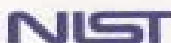
RFT	
Certificate	
This is to certify that the Quality Management System of	
SIEMIC , Inc. 2206 Ringwood Avenue San Jose, California 95131 U.S.A	
has been authorized to carry out Japan Specified Radio Equipment test by order and under supervision of RF Technologies Co., Ltd. according to Notification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

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

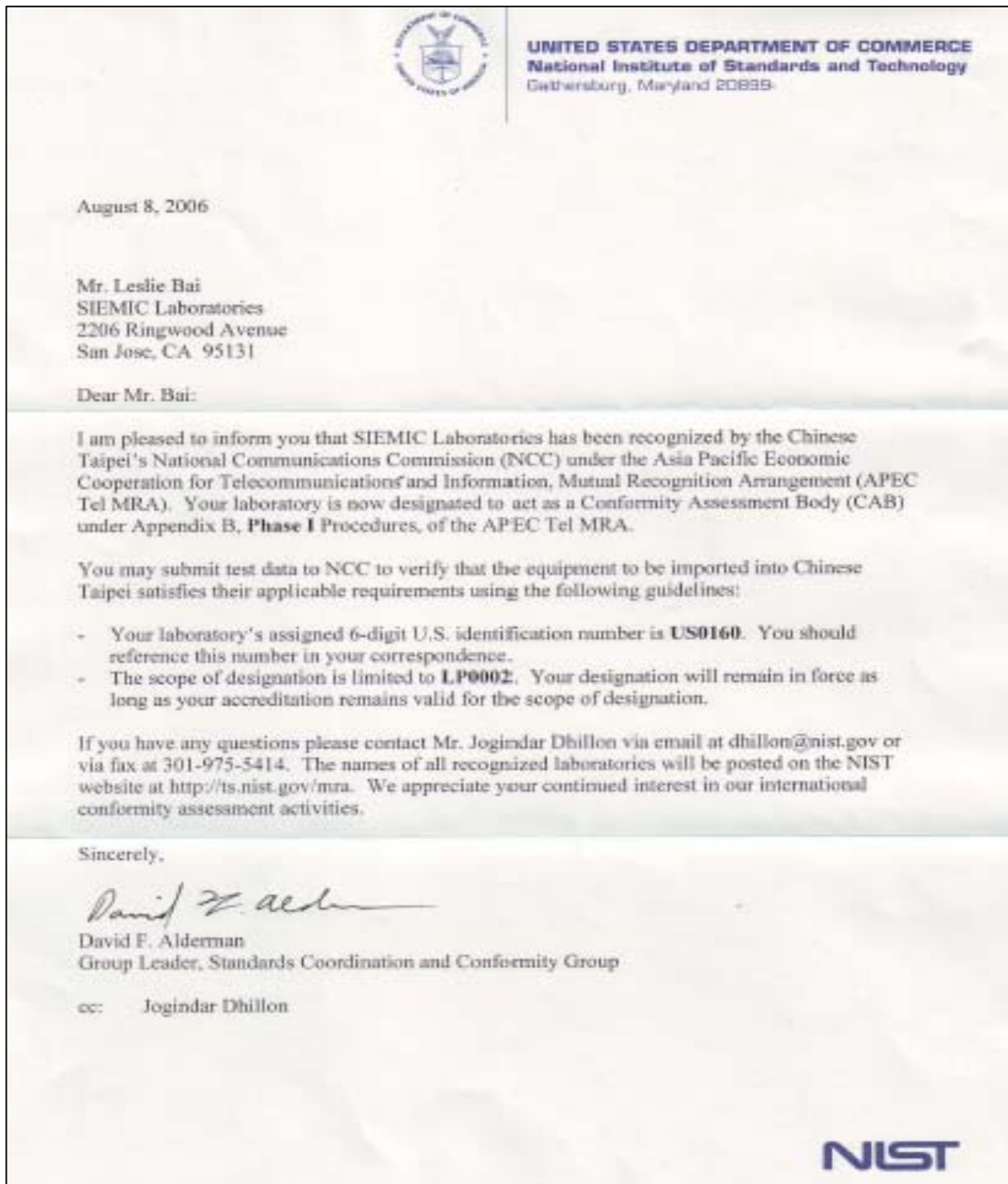
SIEMIC ACREDITATION DETAILS: Korea CAB ID: US0160

		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 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 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

	UNITED STATES DEPARTMENT OF COMMERCE National Institute of Standards and Technology Gaithersburg, Maryland 20885
May 3, 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 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: - BSMI number: SL2-IN-E-1130R (Must be applied to the test reports) - U.S Identification No: US0160 - Scope of Designation: CNS 13438 - Authorized signatory: Mr. Leslie Bai 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. 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 NCC CAB ID: US0160



SIEMIC ACREDITATION DETAILS: Mexico NOM Recognition

 CANIETI CAMARA NACIONAL DE LA INDUSTRIA ELECTRONICA, DE TELECOMUNICACIONES E INFORMATICA	Laboratorio Valentín V. Rivero
	México D.F. a 16 de octubre de 2006.

LESLIE BAI
DIRECTOR OF CERTIFICATION
SIEMIC LABORATORIES, INC.
ACCESSING GLOBAL MARKETS
P R E S E N T E

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 gestión 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:


Ing. Faustino Gómez González
Gerente Técnico del Laboratorio de
CANIETI.

Calle 71
Hidráulica Condasa
06100 México, D.F.
Tel. 5264-0908 con 12 líneas
Fax 5264-0498
www.canieti.org

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

 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
Mr. Leslie Bai Director of Certification, SIEMIC Laboratories 2206 Ringwood Avenue San Jose, California 95131 USA Dear Mr. Bai, Application of Recognised Testing Agency (RTA) 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) : 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 : <u>Scope of recognition (HKTA Specifications) :</u> 1001, 1002, 1004, 1006, 1007, 1008 1010, 1015, 1016 1022, 1026, 1027, 1029 1030, 1031, 1032, 1033, 1034, 1035, 1039 1041, 1042, 1043, 1045, 1047, 1048 2001 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 http://www.ofta.gov.hk/tec/information-notes.html. If you have any queries, please do not hesitate to contact me. Yours sincerely,  (K K Sin) for Director-General of Telecommunications Office of the Telecommunications Authority 29/F Wu Chung House 213 Queen's Road East Wan Chai Hong Kong 電訊管理局 香港灣仔皇后大道東 213 號胡忠大廈 29 字樓 http://www.ofta.gov.hk		

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1 Executive Summary & EUT information

The purpose of this test programme was to demonstrate compliance of the Zebra Technologies Corp , Host Printer Model: (110XiIII, ZM400, ZM600, S4M) with ZLANG-VH 802.11b/g Module, and Model: ZLANG-VH against the current Stipulated Standards. The Host Printer Model: (110XiIII, ZM400, ZM600, S4M) with ZLANG-VH 802.11b/g Module have demonstrated compliance with the FCC 15.247 2007.

EUT Information

EUT Description : Zebra Technologies will only use the ZLANG-VH radio within Zebra Host Printer, primarily Printer (110XiIII, ZM400, ZM600, S4M). The radio will be installed inside the product and will not be user accessible. The antenna is an external antenna and will uses special connector to connect to the product. 802.11b/g radios are designed to operate in the international ISM Band from 2.412 to 2.462 GHz.

Model No : ZLANG-VH

Serial No : 601461-00T

Input Power : 120 Vac

Classification Per Stipulated Test Standard : Spread Spectrum System / Device

2 TECHNICAL DETAILS

Purpose	Compliance testing of 802.11b/g Radio Module with stipulated standard
Applicant / Client	Zebra Technologies Corp
Manufacturer	Zebra Technologies Corp 333 Corporate Woods Parkway. Vernon Hills, IL 60061
Laboratory performing the tests	SIEMIC Laboratories
Test report reference number	SL07112905-ZBR-067 (15.247)(ZLANG-VH)
Date EUT received	19 December 2007
Standard applied	47 CFR §15.247 (2007)
Dates of test (from – to)	21 January 2008 - 25 January 2008
No of Units:	1
Equipment Category:	DTS
Trade Name:	Zebra Technologies Corp
Model :	ZLANG-VH
RF Operating Frequency (ies)	2412 to 2462 MHz
Number of Channels :	11
Modulation :	CCK & OFDM
FCC ID :	I28-ZLANGVH
IC ID :	3798B- ZLANGVH

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 connector is SMA Reverse SMA connector type. Antenna maximum gain is -9.49dBi 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 ±3.5dB.
4. Environmental Conditions Temperature 23°C
 Relative Humidity 50%
 Atmospheric Pressure 1019mbar

 Test Date : January 21-25 2008
 Tested By :Choon Sian Ooi

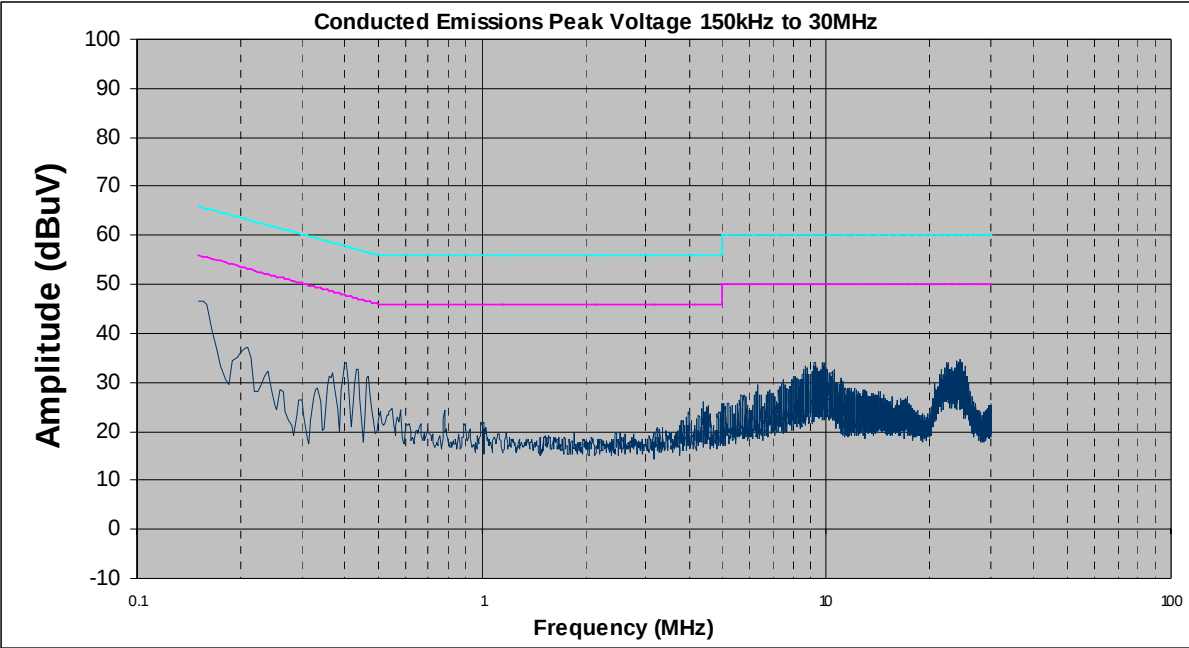
Results:

Results:

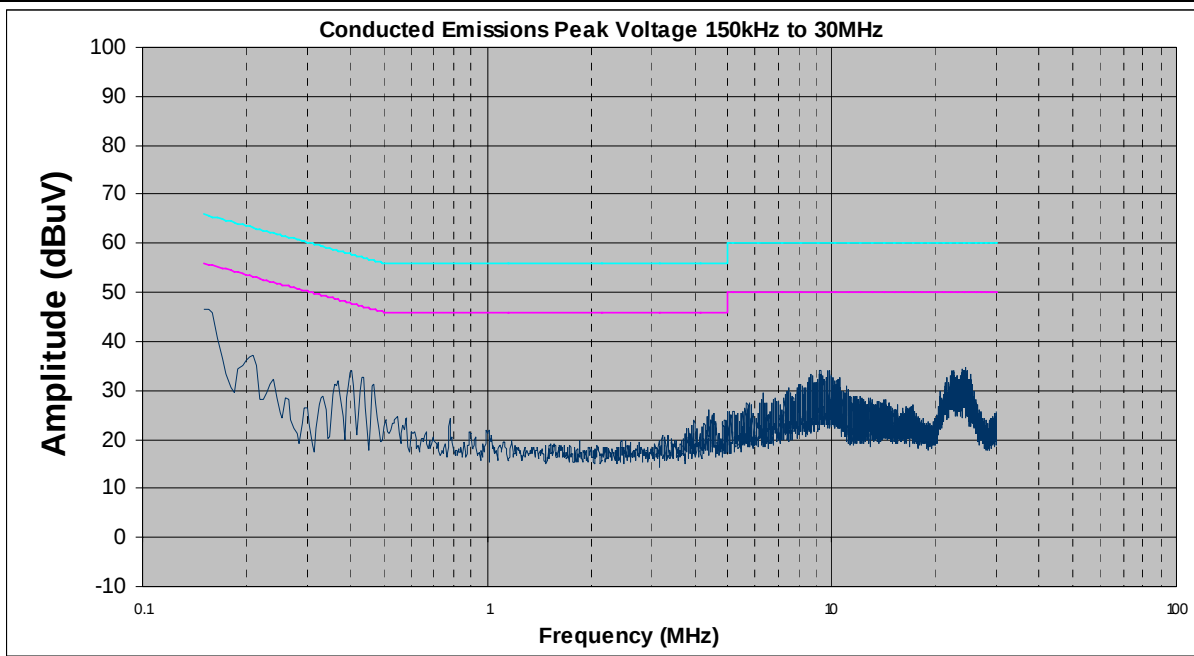
Note –

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	0.16	46.00	65.46	-19.46	46.00	55.46	-9.46
Neutral	0.21	37.09	63.21	-26.12	37.09	53.21	-16.12
Neutral	0.41	34.09	57.75	-23.66	34.09	47.75	-13.66
Neutral	0.44	32.70	57.06	-24.36	32.70	47.06	-14.36
Neutral	0.37	31.89	58.50	-26.61	31.89	48.50	-16.61
Neutral	24.77	33.90	60.00	-26.10	33.90	50.00	-16.10



Neutral Line Plot at 120Vac, 60Hz

Line Under Test	Freq. (MHz)	Corrected Amplitude (dBuV) QP	Limit (dBuV) QP	Margin (dB) QP	Corrected Amplitude (dBuV) AVG	Limit (dBuV) AVG	Margin (dB) AVG
Line	0.16	46.00	65.46	-19.46	46.00	55.46	-9.46
Line	0.21	37.09	63.21	-26.12	37.09	53.21	-16.12
Line	0.41	34.09	57.75	-23.66	34.09	47.75	-13.66
Line	0.44	32.70	57.06	-24.36	32.70	47.06	-14.36
Line	0.37	31.89	58.50	-26.61	31.89	48.50	-16.61
Line	24.77	33.90	60.00	-26.10	33.90	50.00	-16.10

5.3 6dB & 99% Occupied Bandwidth

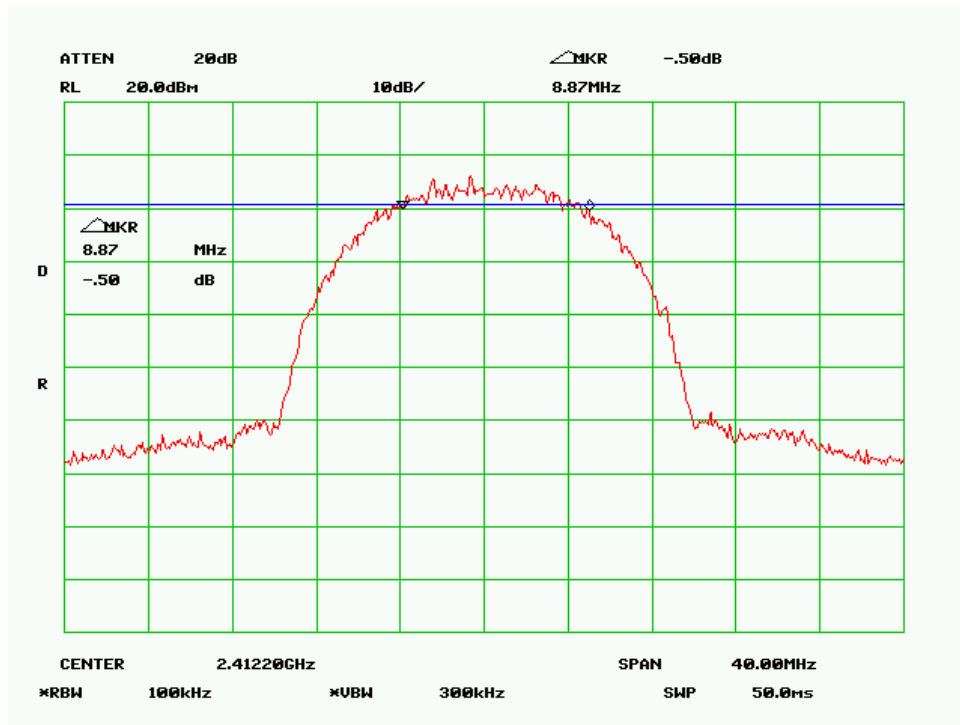
1. Conducted Measurement
EUT was set for low , mid, high channel with modulated mode and highest RF output power.
The spectrum analyzer was connected to the antenna terminal.
- 2 Environmental Conditions Temperature 23^oC
 Relative Humidity 50%
 Atmospheric Pressure 1019mbar
- 3 Conducted Emissions Measurement 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 : January 21-25 2008
Tested By :Choon Sian Ooi

Requirement(s): 47 CFR §15.247(a)(1)

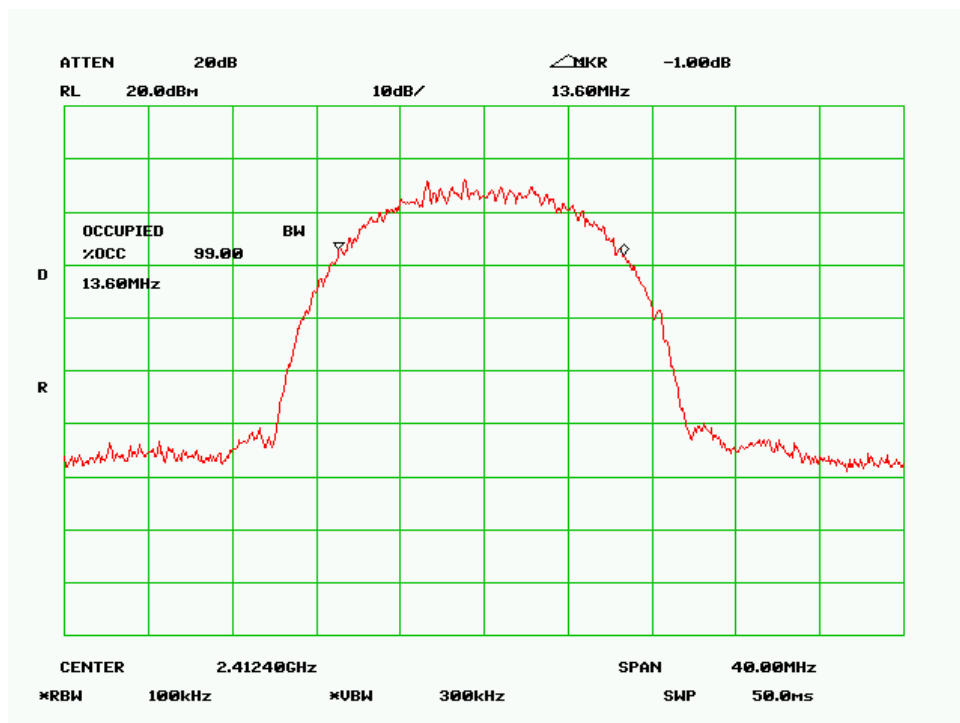
Procedures: The 6dB bandwidths were measured conducted using a spectrum analyzer at low, mid, and hi channels. 6 dB Bandwidth Limit: > 500 kHz.

Protocol	Channel	Channel Frequency (MHz)	6 dB Channel Bandwidth (MHz)	99% Channel Bandwidth (MHz)	6 dB Occupied Bandwidth Limit (MHz)
802.11b	Low	2412	8.87	13.60	0.5
802.11b	Mid	2437	9.00	13.73	0.5
802.11b	High	2462	9.00	13.73	0.5
802.11g	Low	2412	16.73	16.67	0.5
802.11g	Mid	2437	16.87	16.73	0.5
802.11g	High	2462	17.07	16.67	0.5

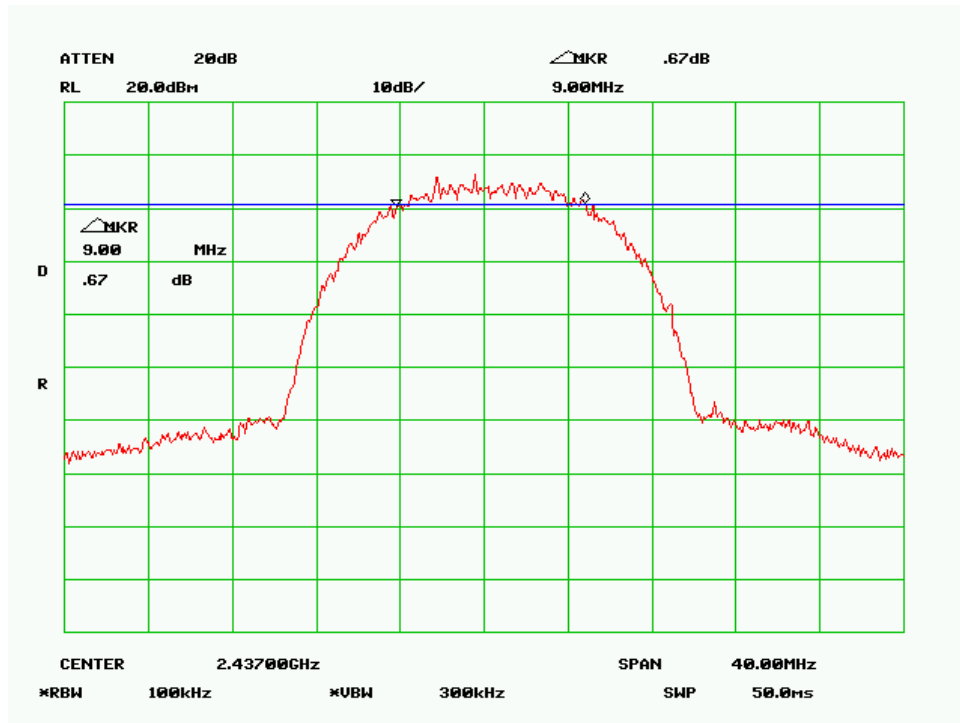
Refer to the attached plots.



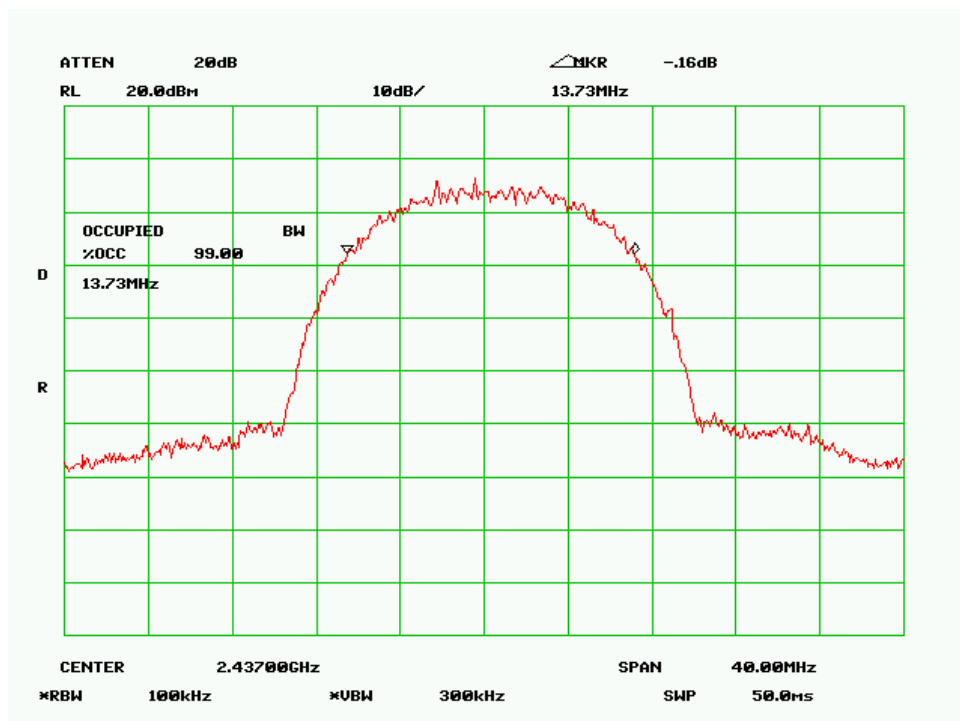
6 dB Bandwidth - Low Channel (802.11b)



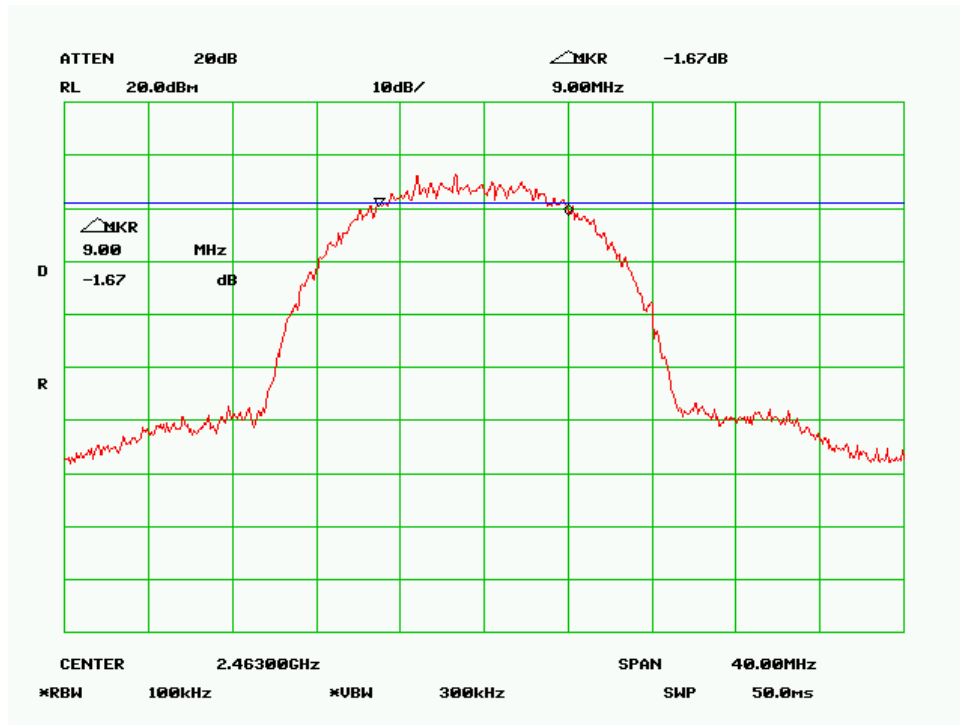
99% Bandwidth - Low Channel (802.11b)



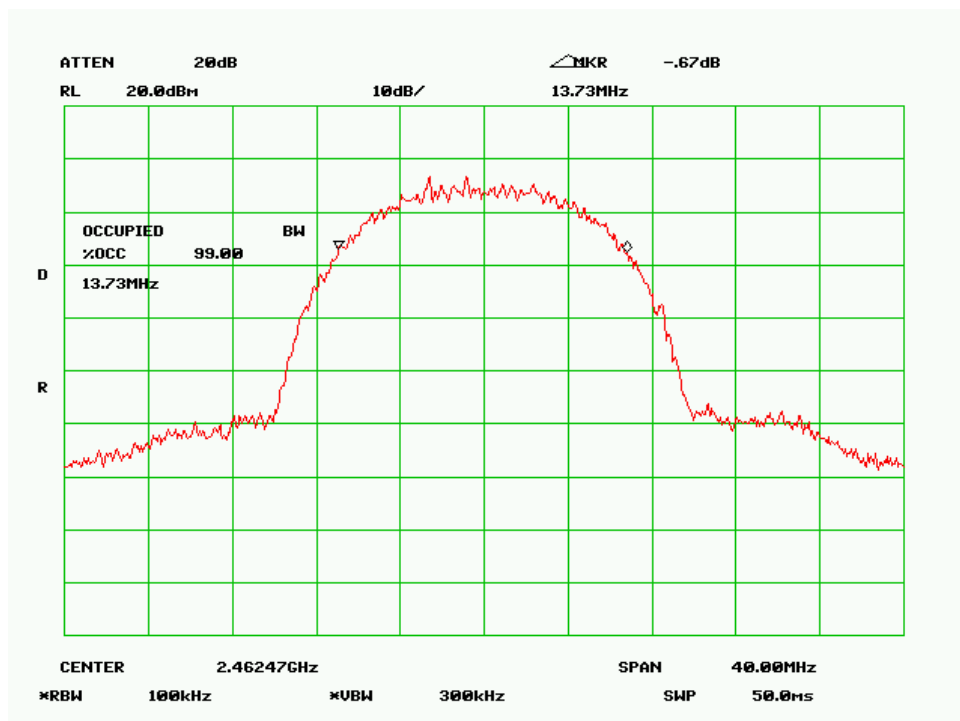
6 dB Bandwidth - Mid Channel (802.11b)



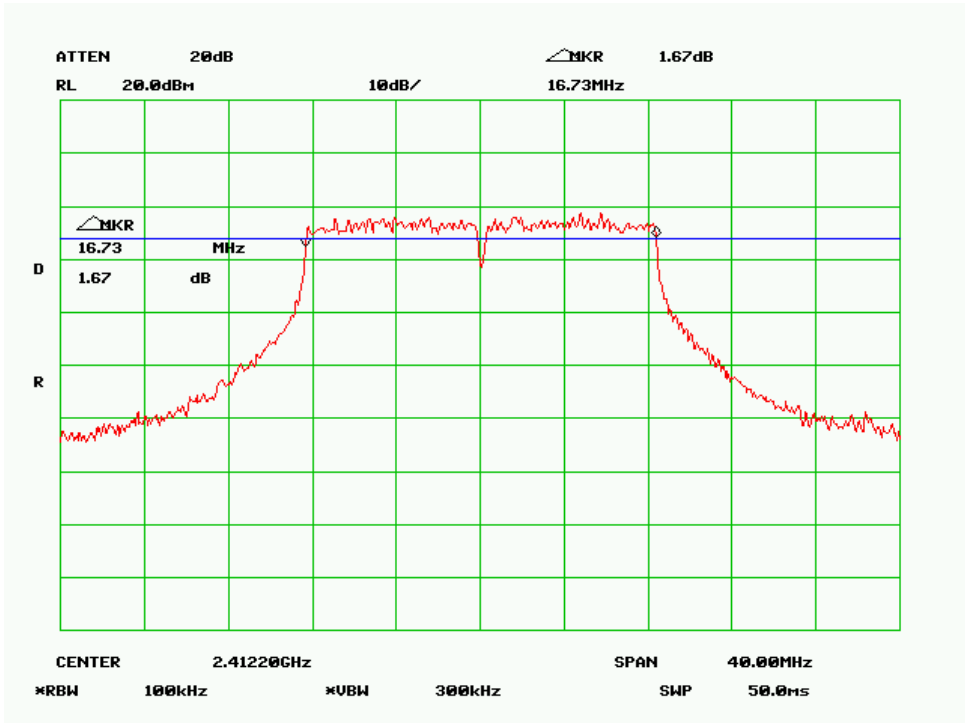
99% Bandwidth - Mid Channel (802.11b)



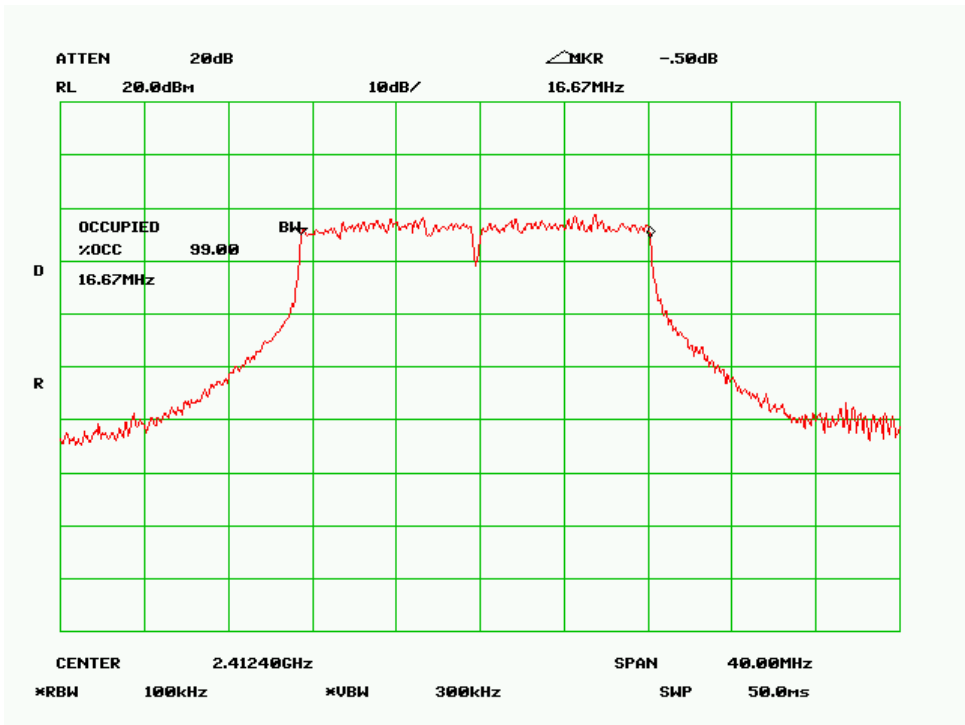
6 dB Bandwidth – High Channel (802.11b)



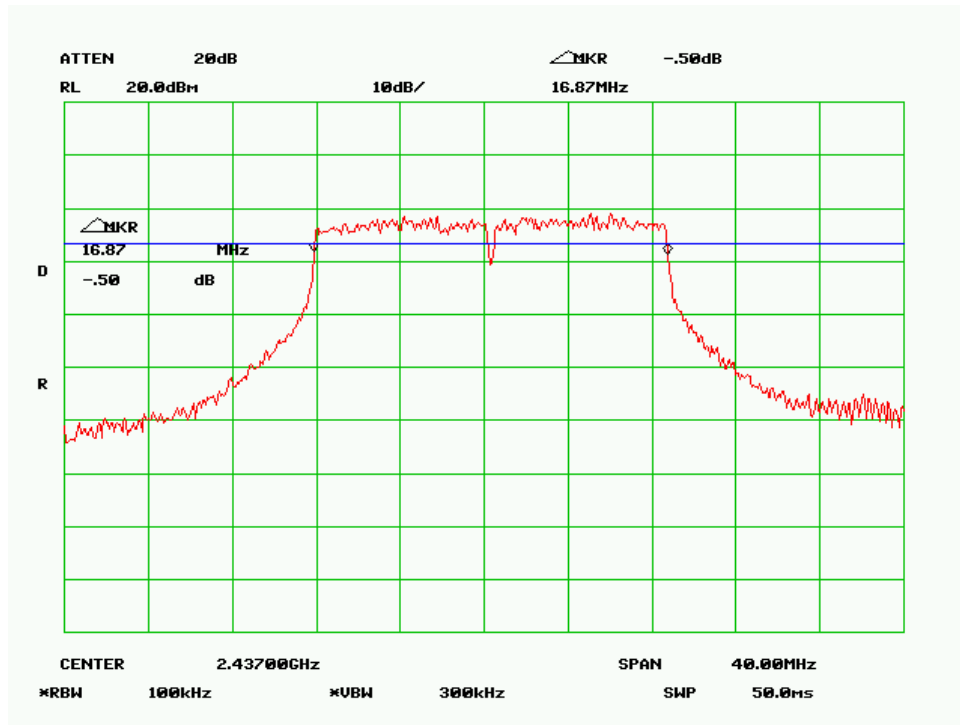
99% Bandwidth - High Channel (802.11b)



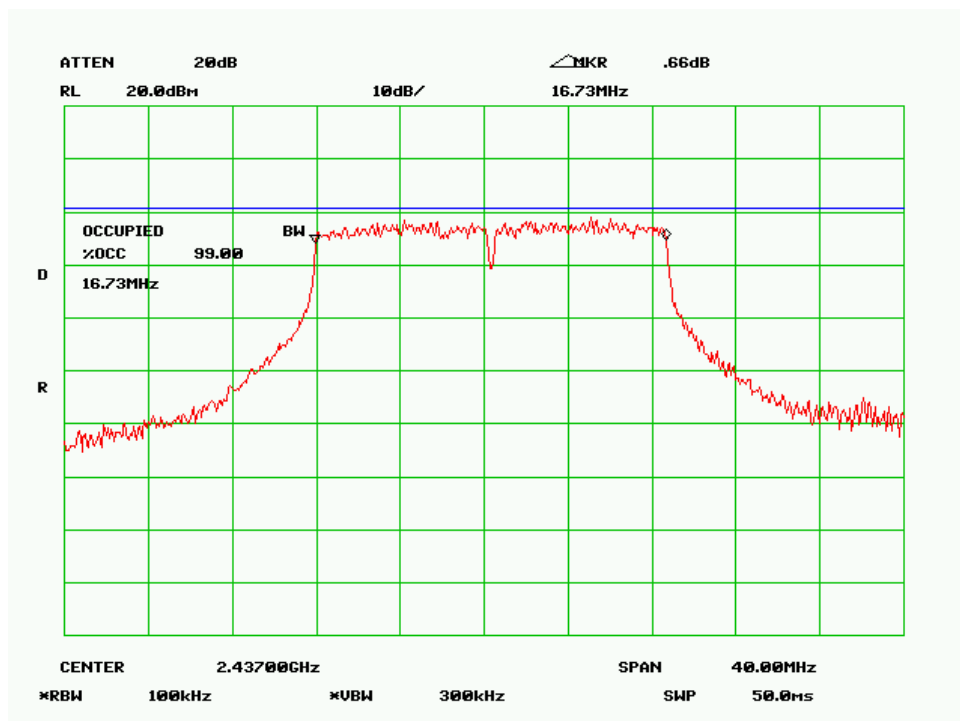
6 dB Bandwidth - Low Channel (802.11g)



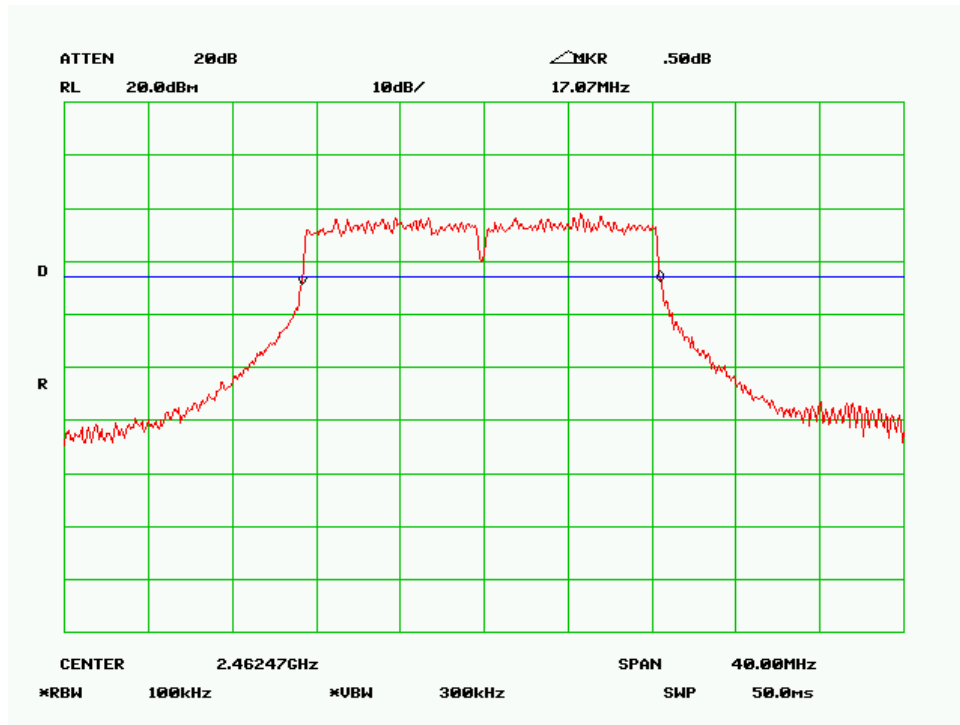
99% Bandwidth - Low Channel (802.11g)



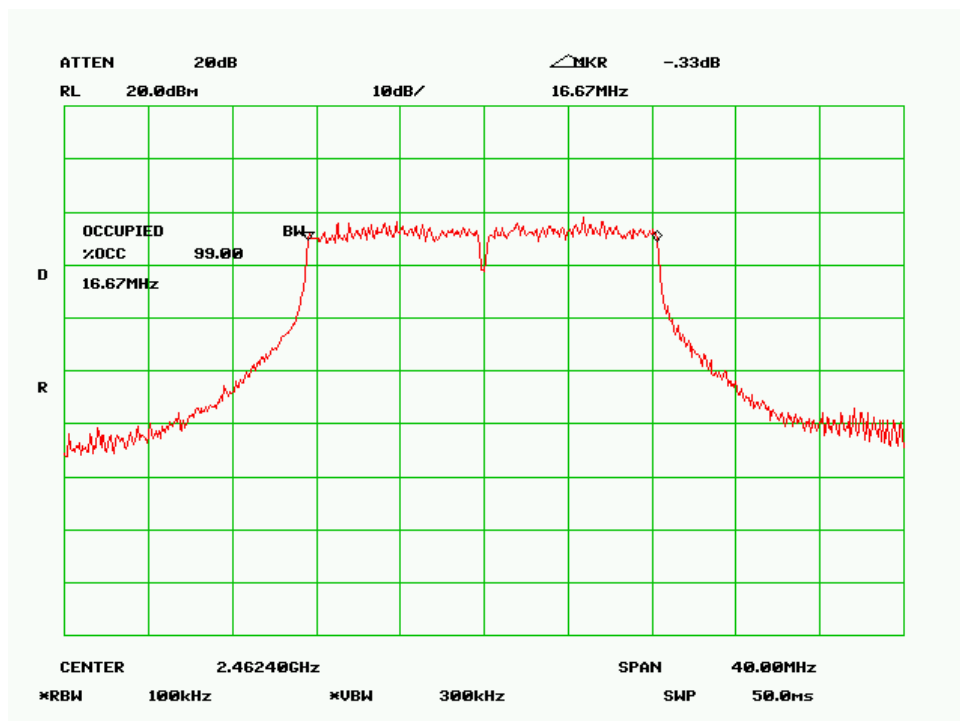
6 dB Bandwidth - Mid Channel (802.11g)



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 : January 21-25 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

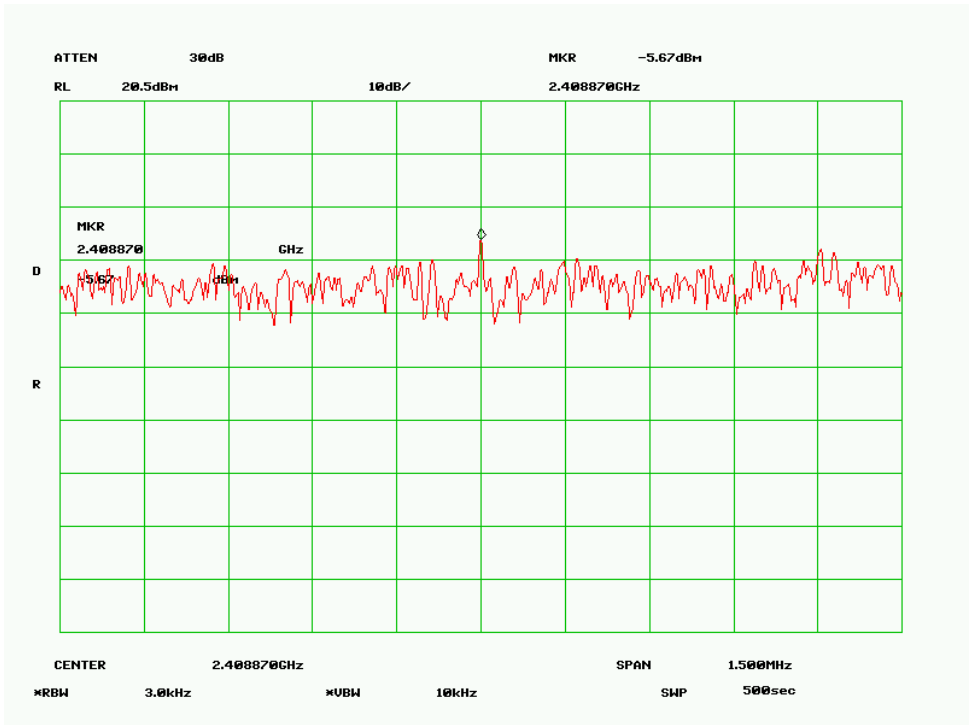
Procedures: The Peak Spectral density measurement was taken conducted using a spectrum analyzer.

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

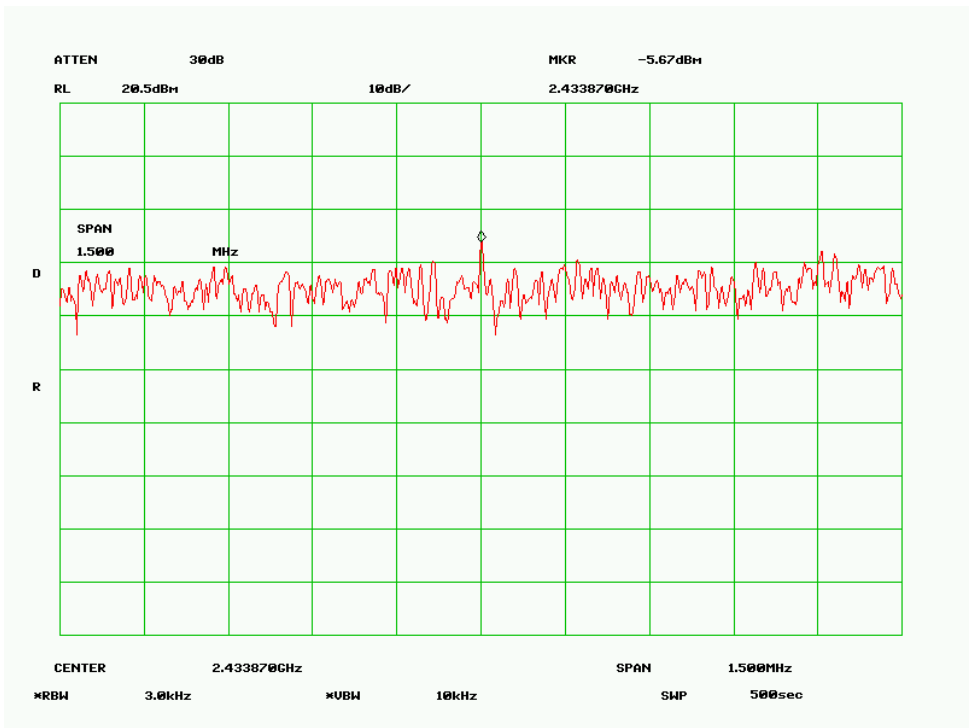
Test Result :

Protocol	Channel	Channel Frequency (MHz)	Peak Spectral Density Limit (dBm/3KHz)	Peak Spectral Density (dBm/3KHz)
802.11b	Low	2412	8	-5.67
802.11b	Mid	2437	8	-5.67
802.11b	High	2462	8	-4.83
802.11g	Low	2412	8	-14.83
802.11g	Mid	2437	8	-14.83
802.11g	High	2462	8	-15.17

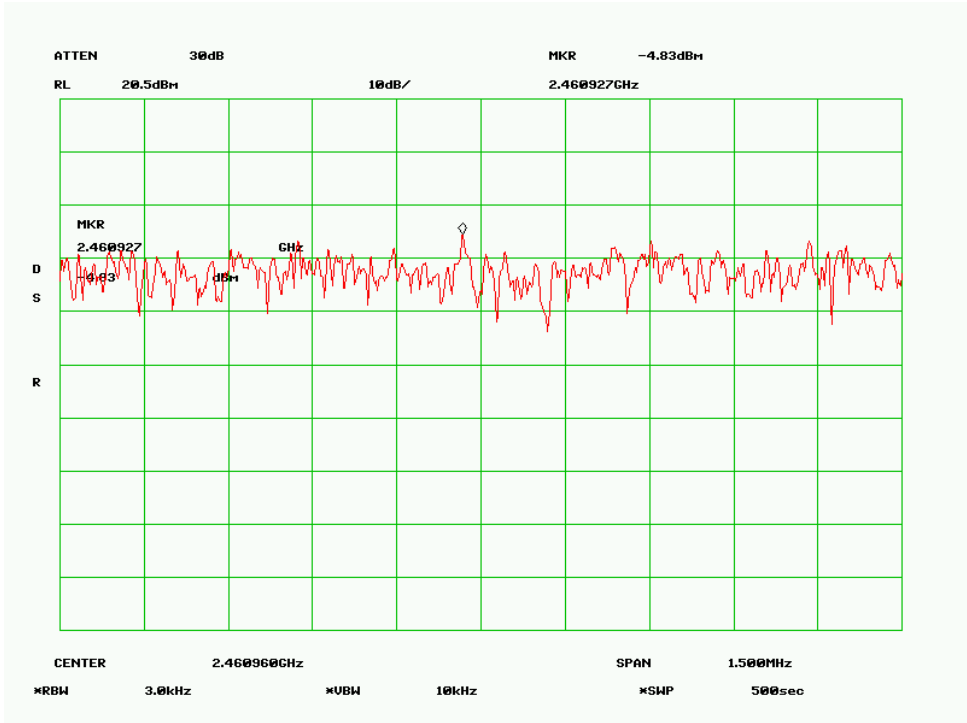
Refer to the attached plots.



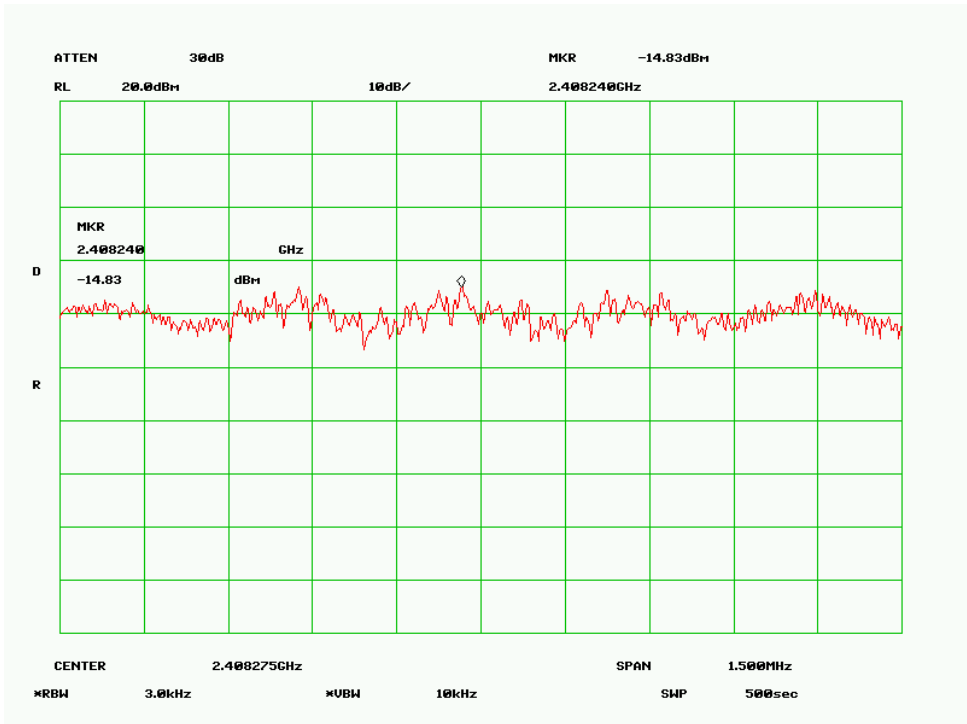
PSD Low Channel (802.11b)



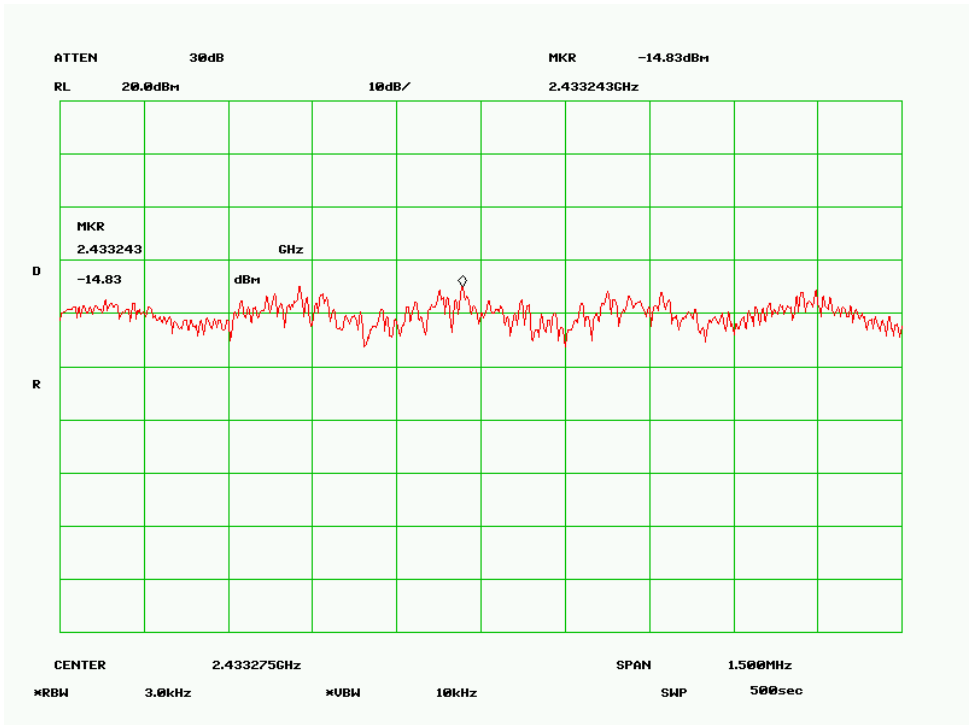
PSD Mid Channel (802.11b)



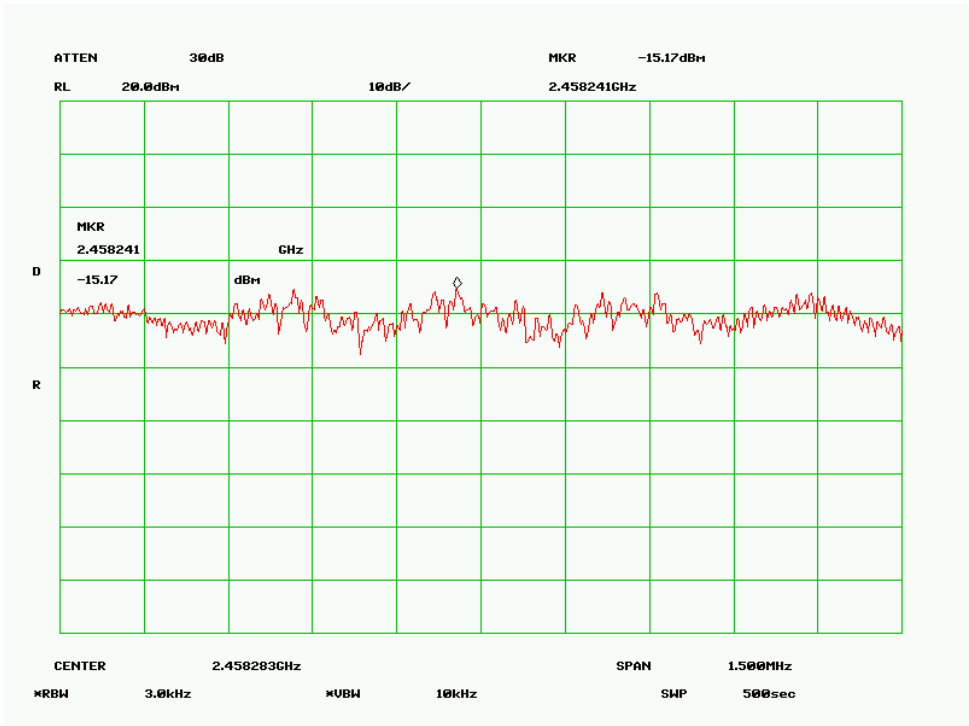
PSD High Channel (802.11b)



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

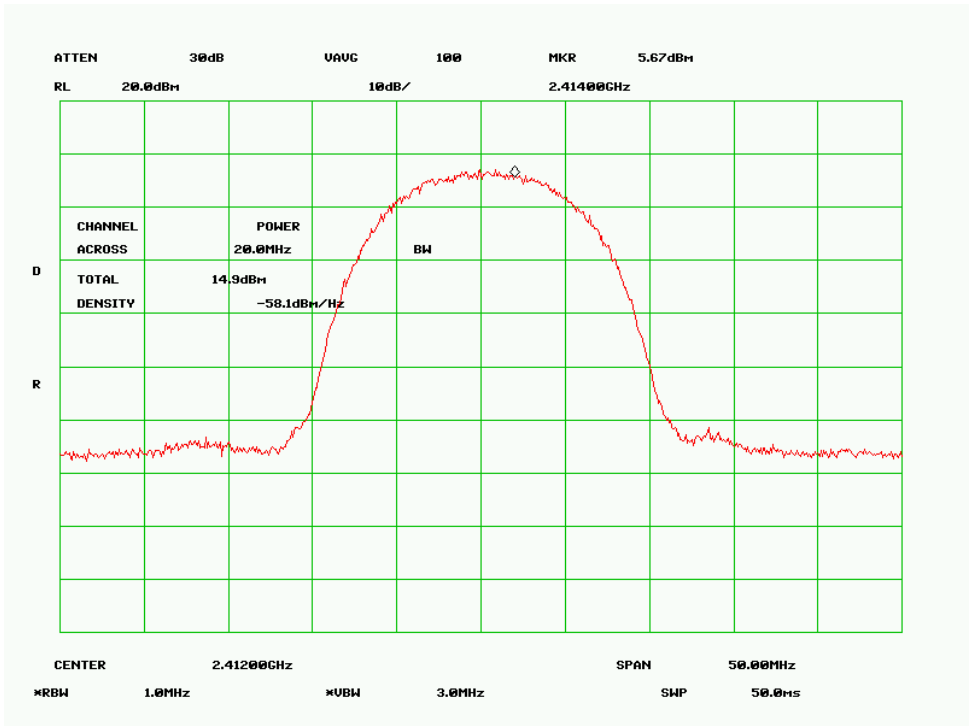
Temperature	23°C
Relative Humidity	50%
Atmospheric Pressure	1019mbar
4. Test Date : January 21-25 2008
Tested By :Choon Sian Ooi

Standard Requirement : 47 CFR §15.247(b)

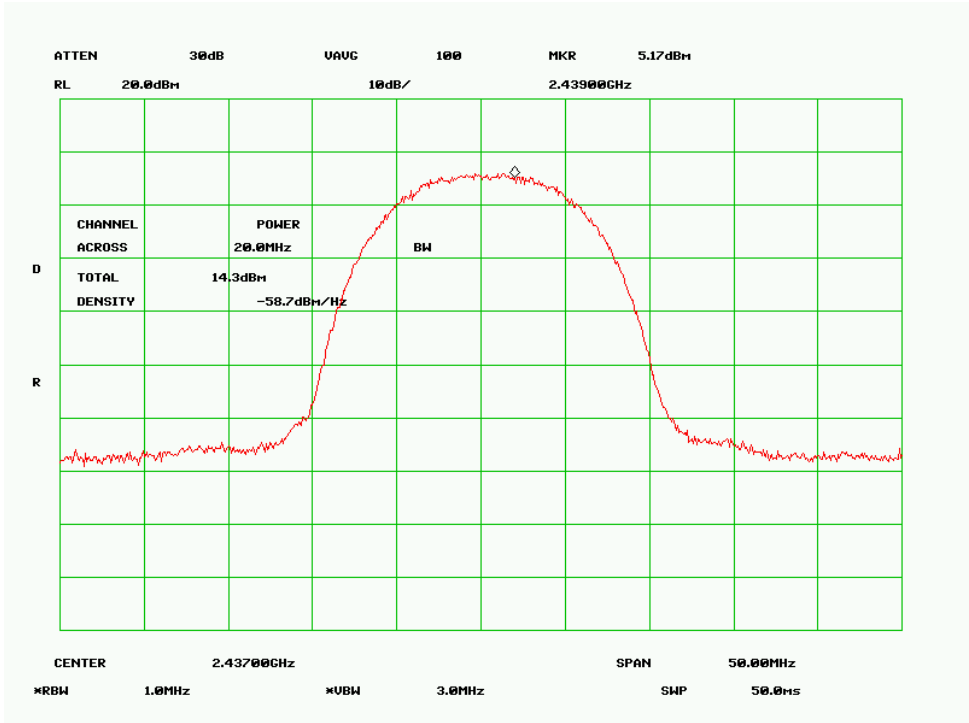
Procedures: The peak output power was measured conducted using a spectrum analyzer at low, mid, and hi channels. Peak detector was set to measure the power output. The power is converted from watt to dBm, therefore, 1 watt = 30 dBm. The highest antenna gain that will be used is -9.49 dBi.

Test Result :

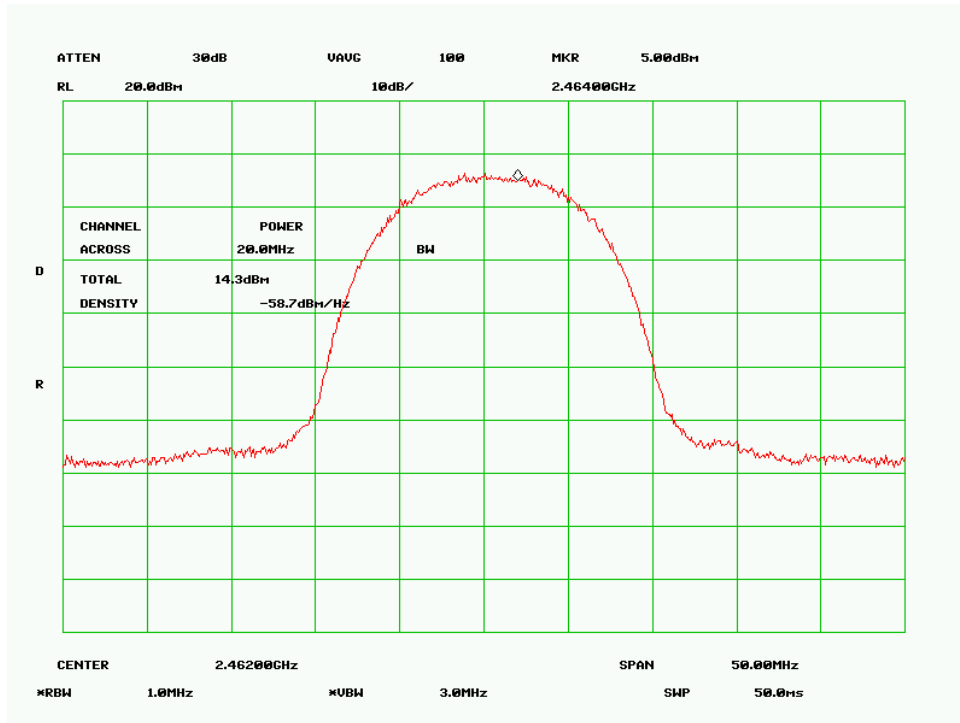
Protocol	Channel	Channel Frequency (MHz)	Peak Output Power Limit (dBm)	Measured Output Power(dBm)
802.11b	Low	2412	30	14.9
802.11b	Mid	2437	30	14.3
802.11b	High	2462	30	14.3
802.11g	Low	2412	30	8.5
802.11g	Mid	2437	30	8.4
802.11g	High	2462	30	8.2



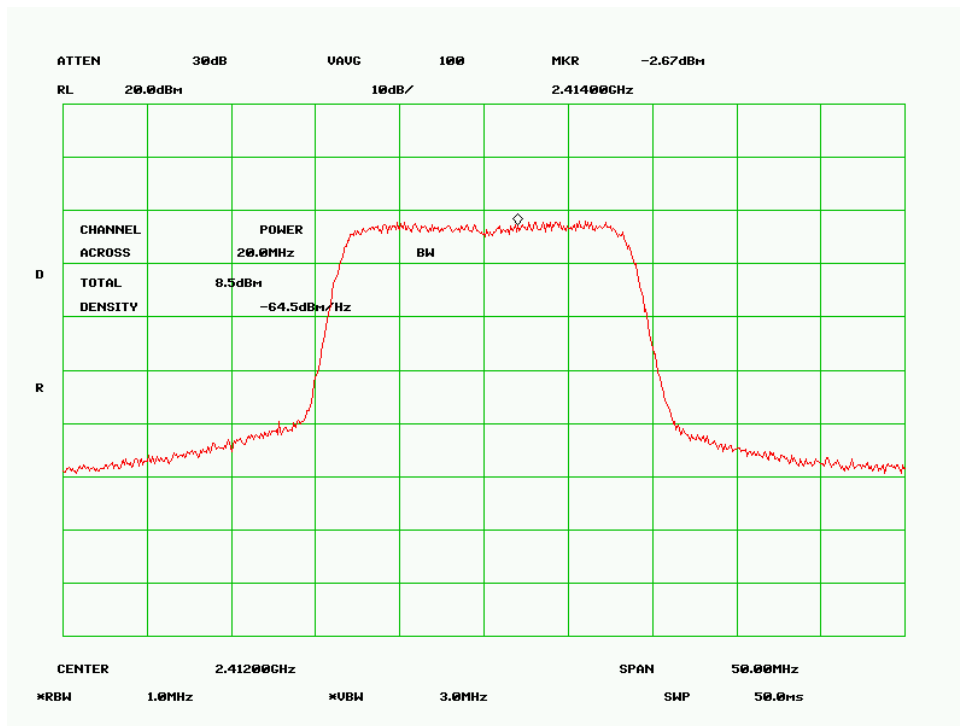
Output Power Low Channel (802.11b)



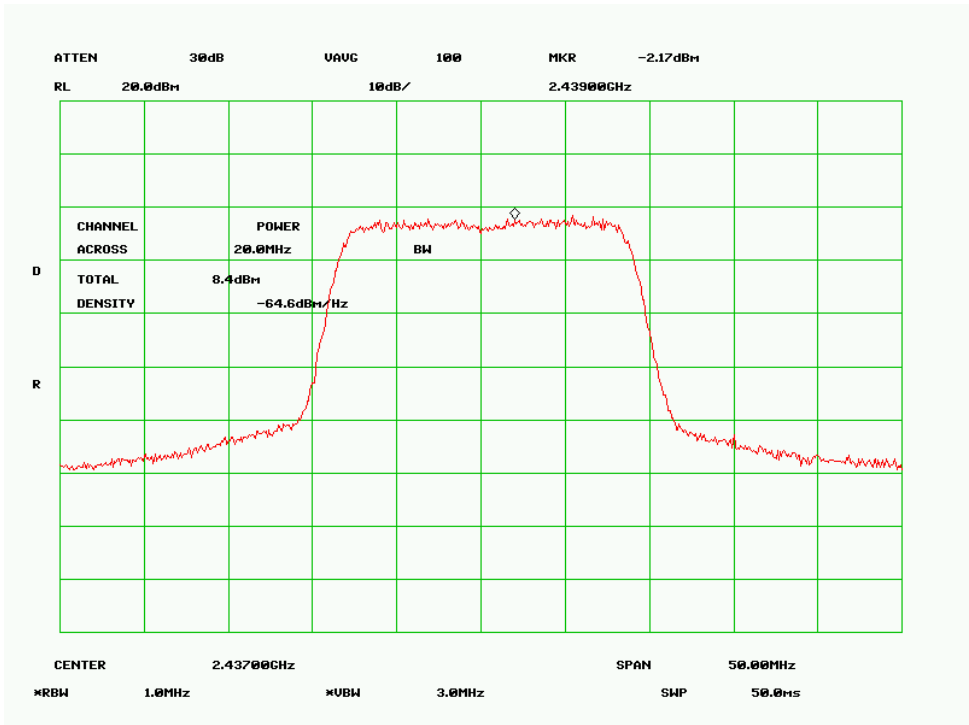
Output Power Mid Channel (802.11b)



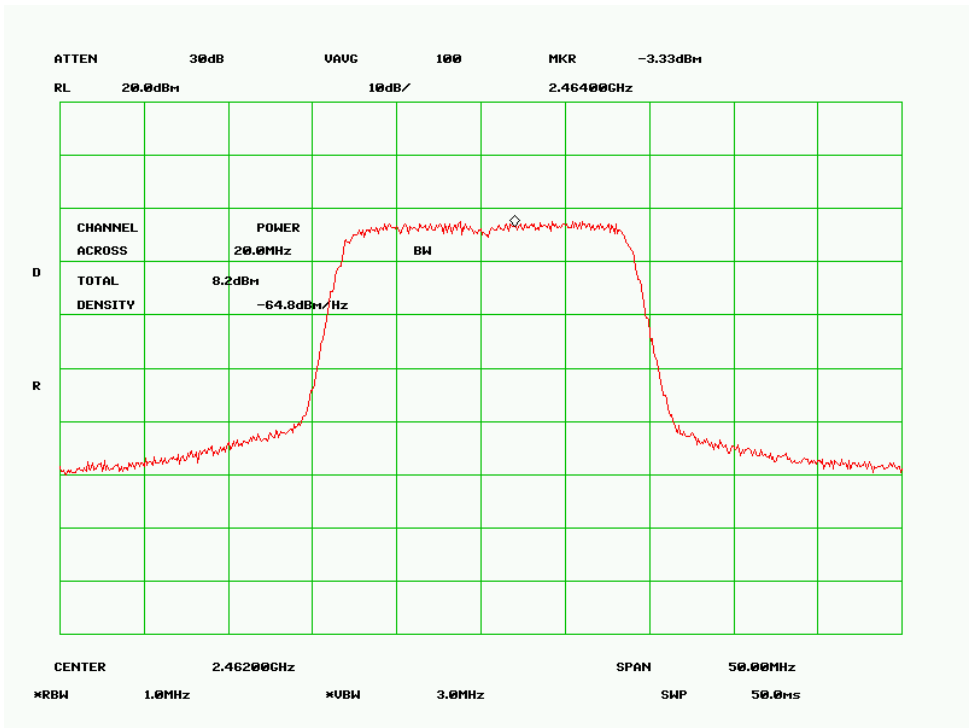
Output Power High Channel (802.11b)



Output Power Low Channel (802.11g)



Output Power Mid Channel (802.11g)



Output Power High Channel (802.11g)

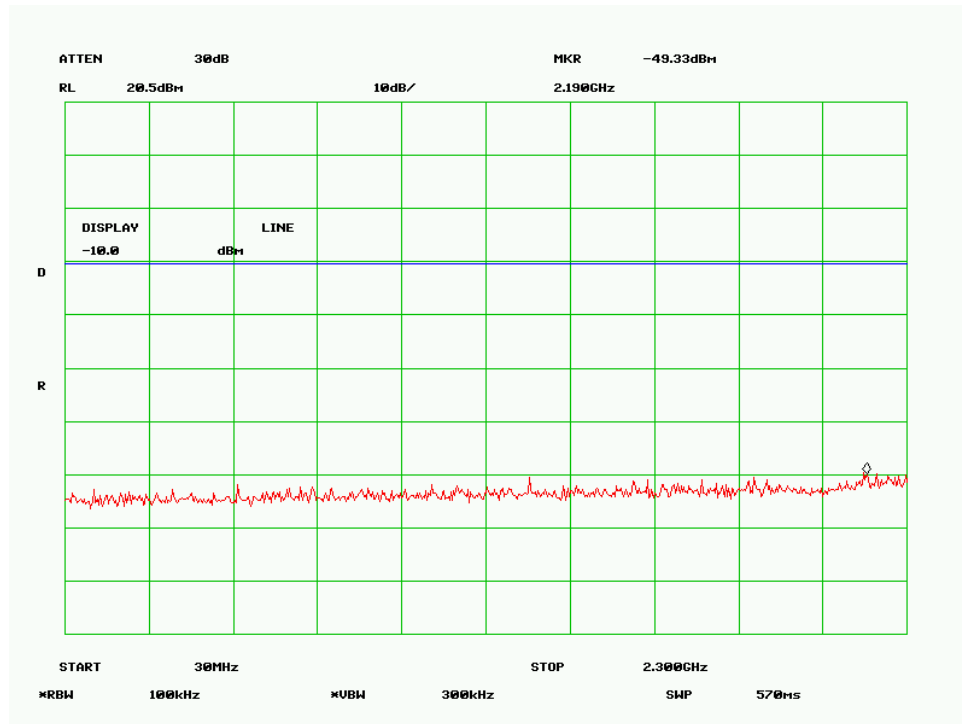
5.10 Antenna Port Emission

- 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.
- 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 $\pm 1.5\text{dB}$.
- | | | |
|--------------------------|----------------------|----------|
| Environmental Conditions | Temperature | 23°C |
| | Relative Humidity | 50% |
| | Atmospheric Pressure | 1019mbar |
- Test Date : January 21-25 2008
Tested By :Choon Sian Ooi

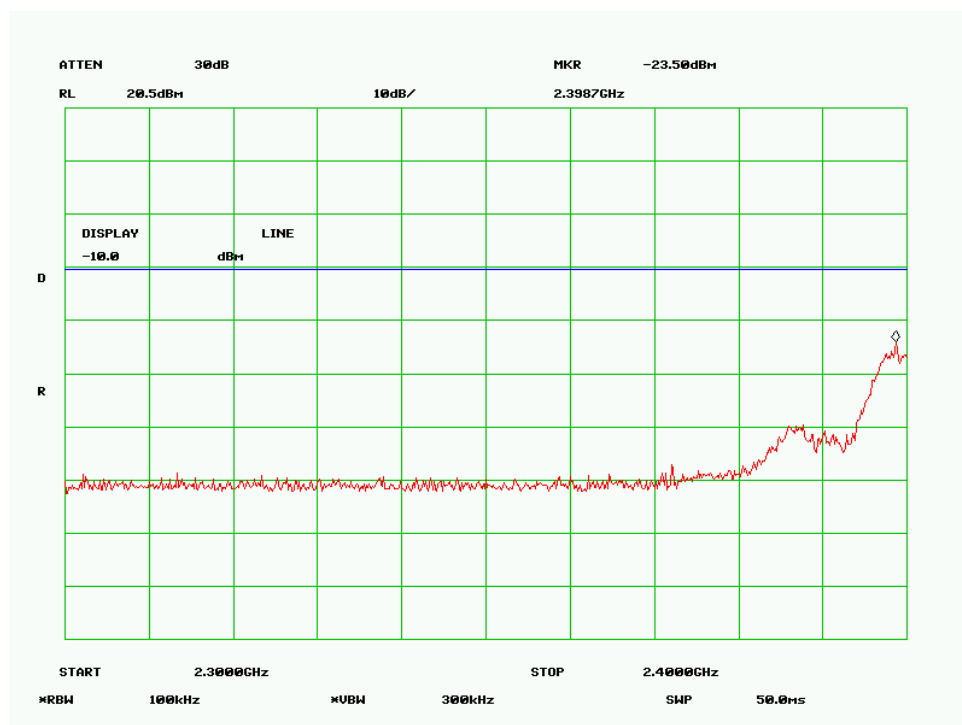
Standard Requirement : 47 CFR §15.247(d)

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

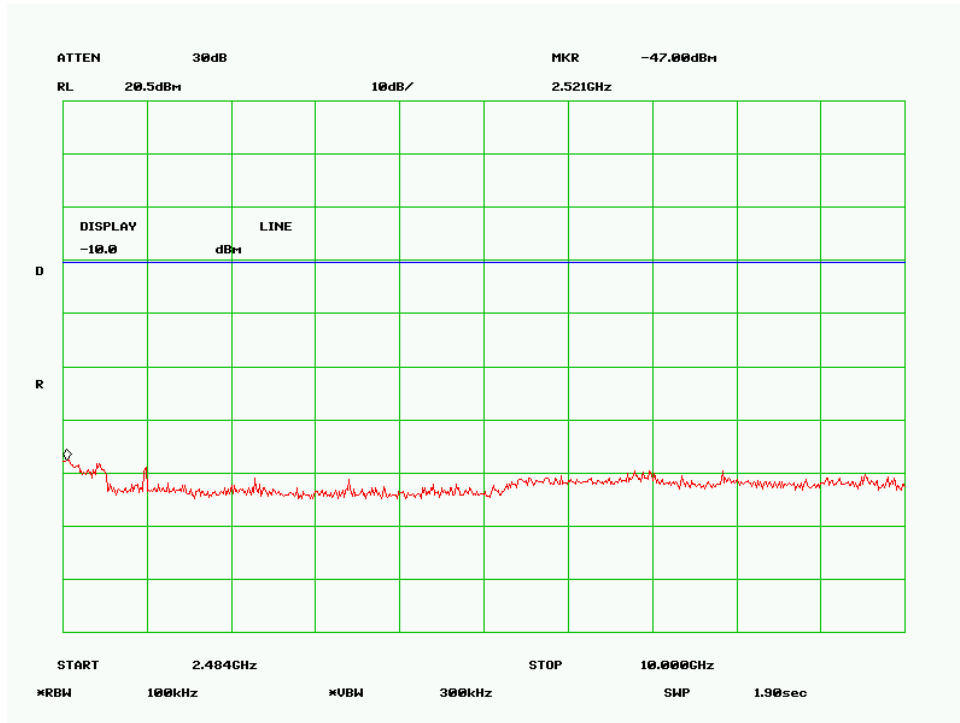
Test Result:



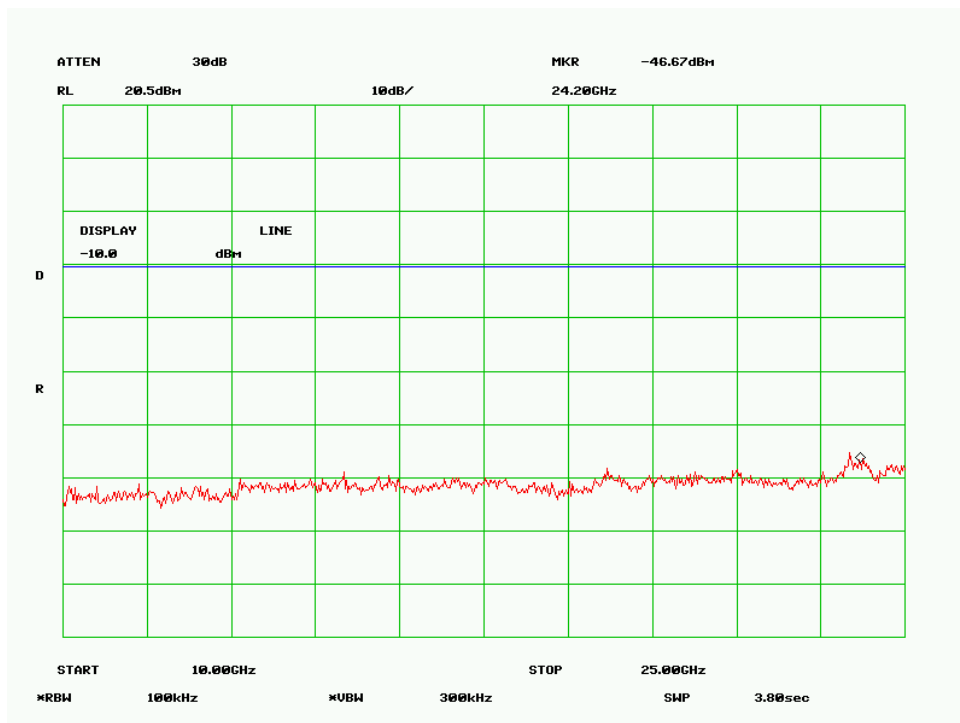
802.11b Low Channel -1



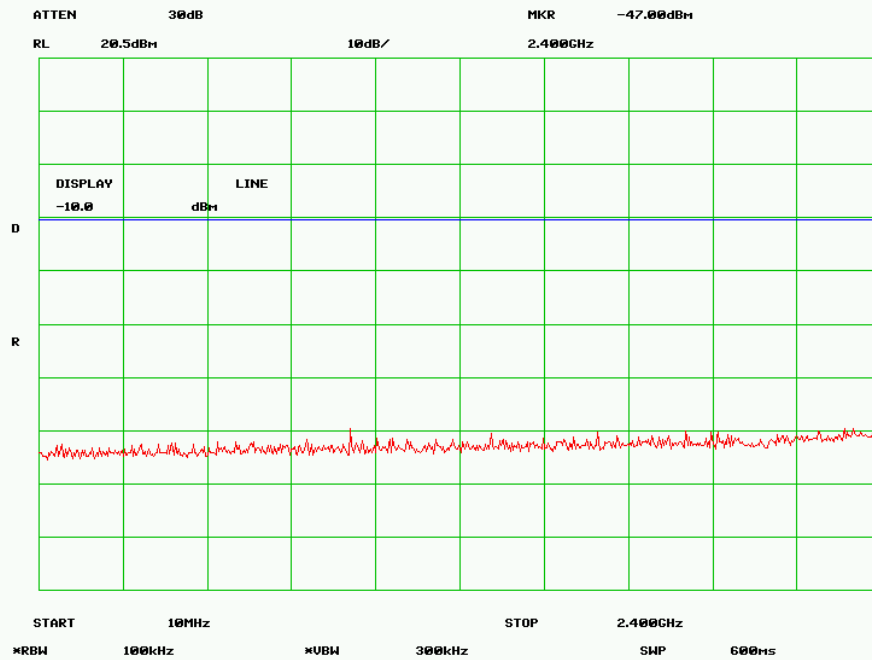
802.11b Low Channel -2



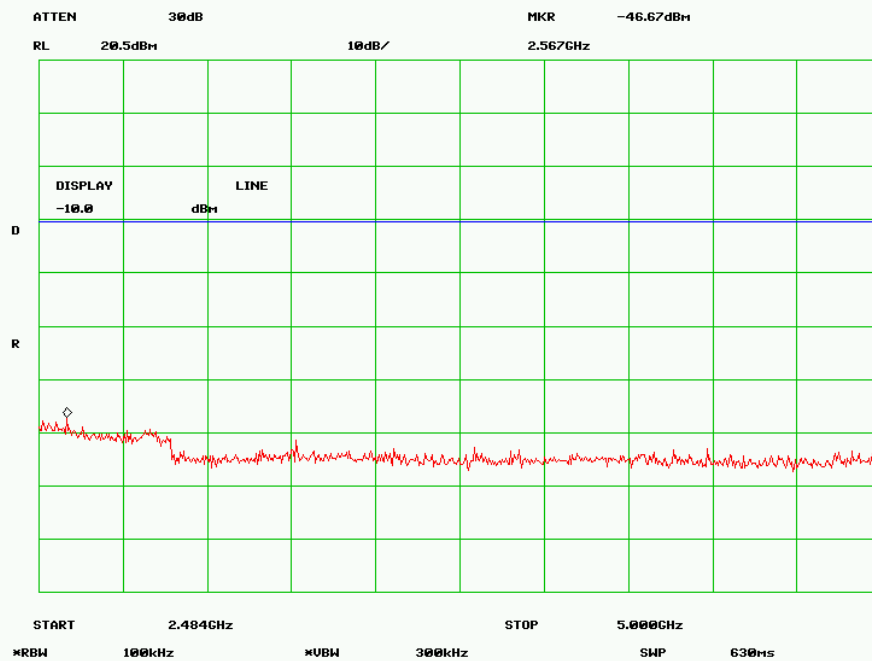
802.11b Low Channel -3



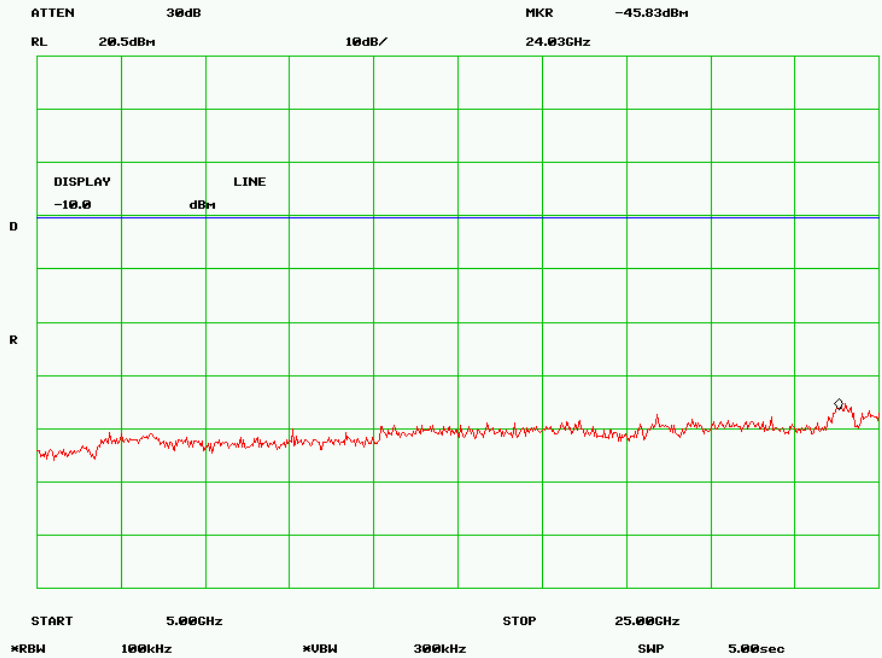
802.11b Low Channel -4



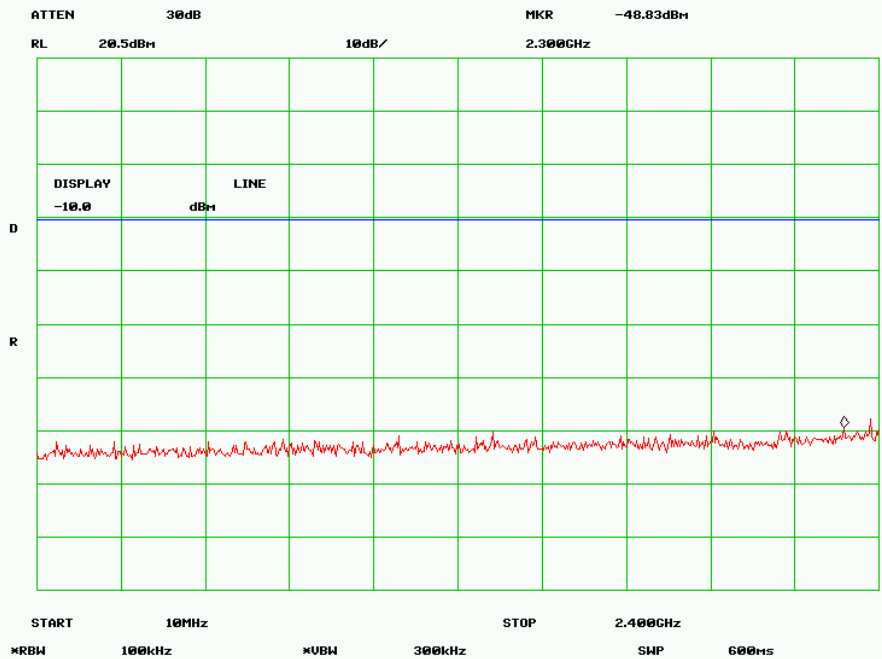
802.11b Mid Channel -1



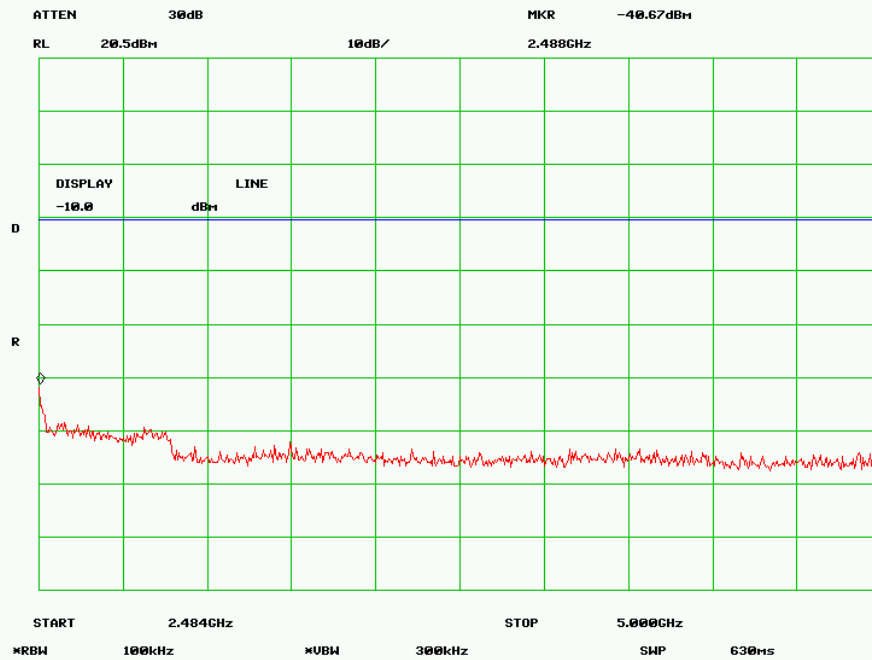
802.11b Mid Channel -2



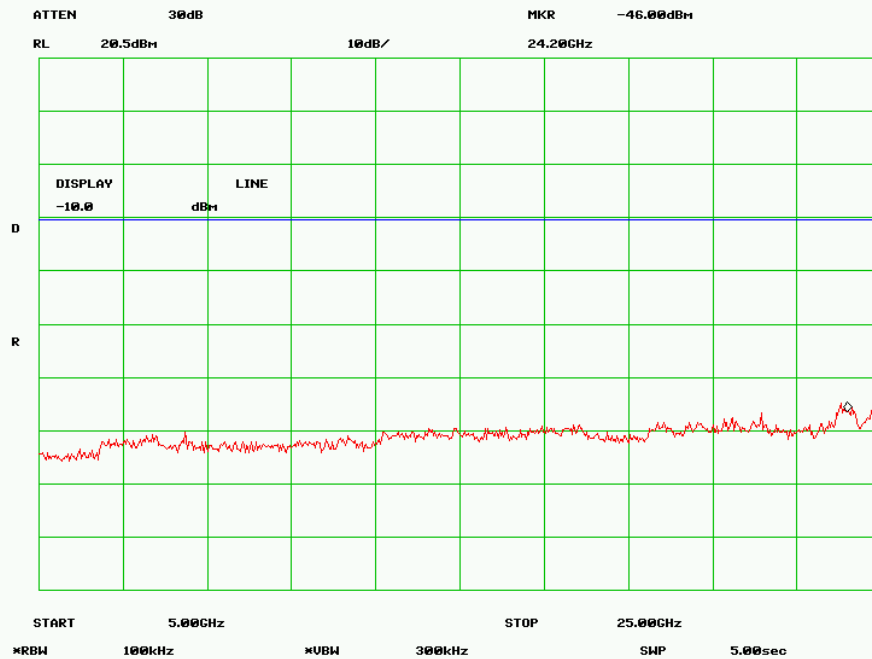
802.11b Mid Channel -3



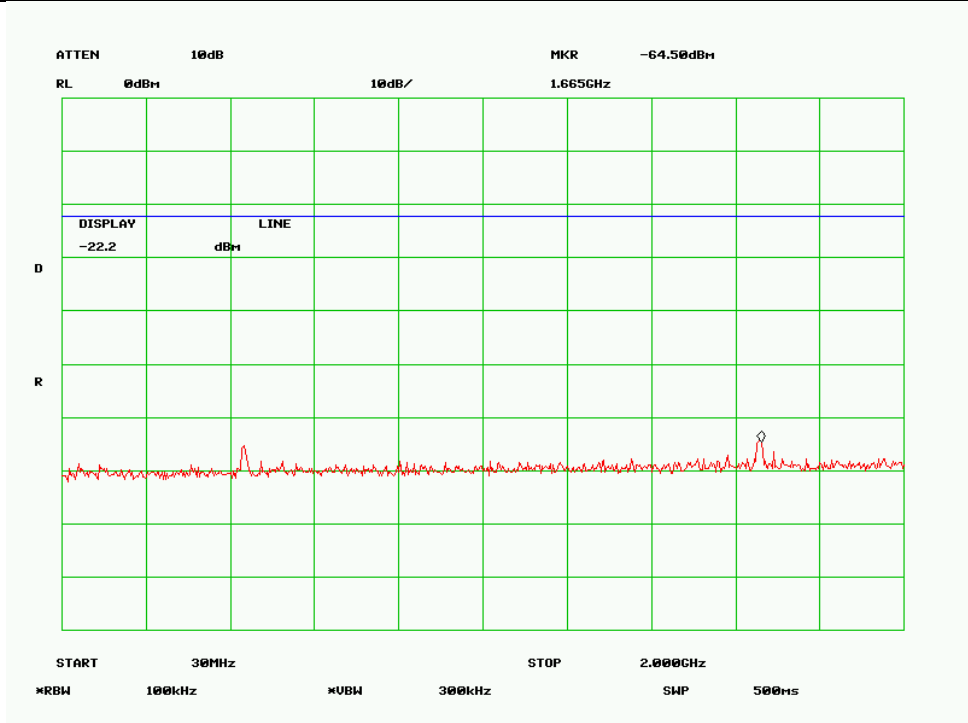
802.11b High Channel -1



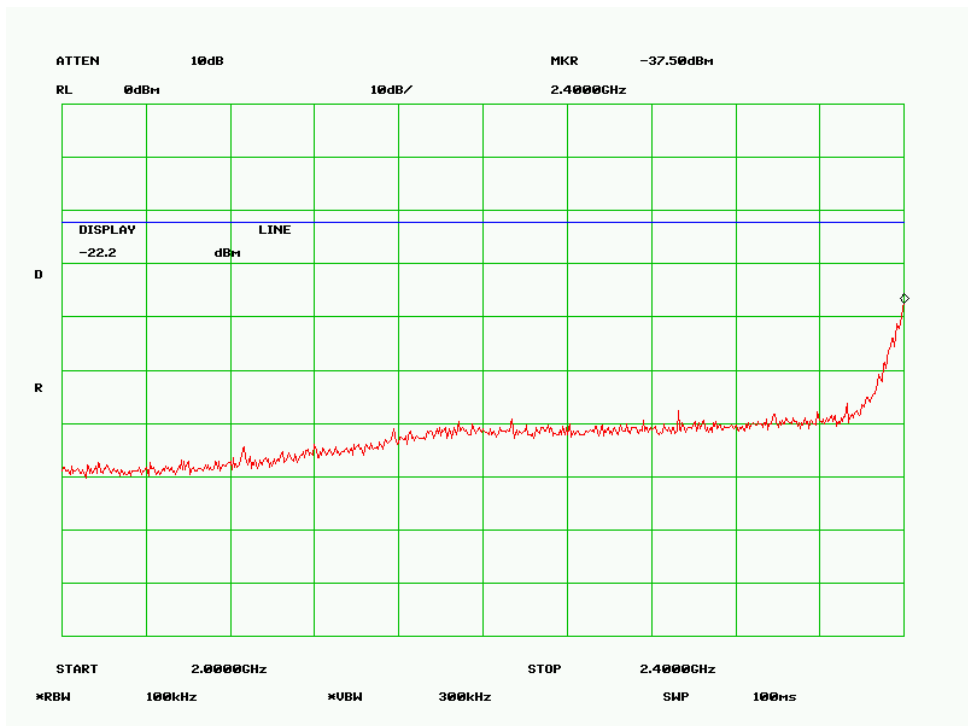
802.11b High Channel -2



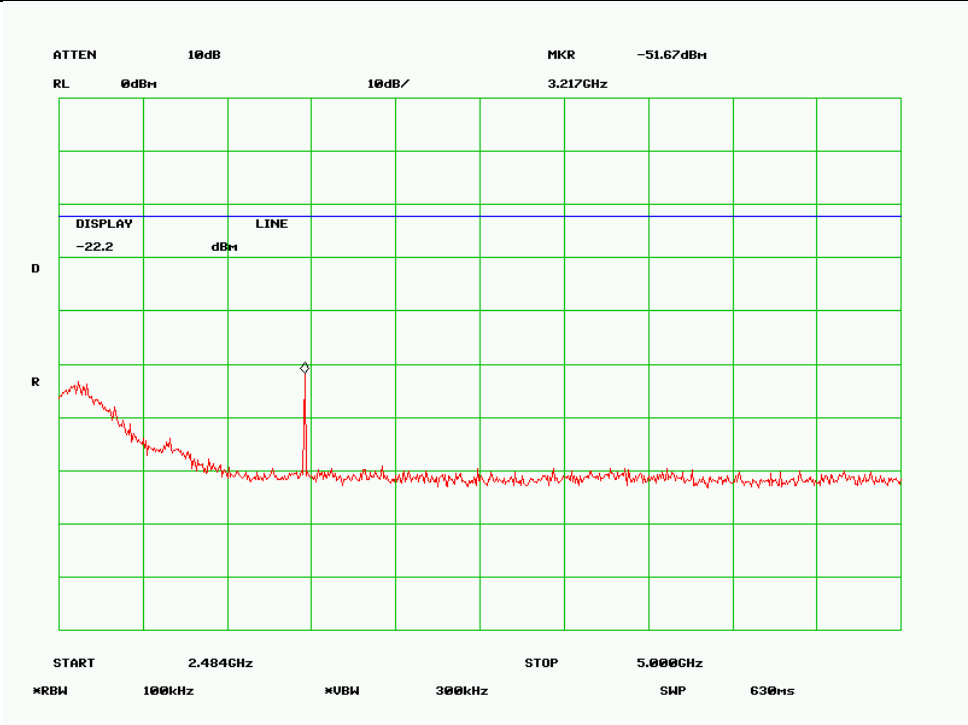
802.11b High Channel -3



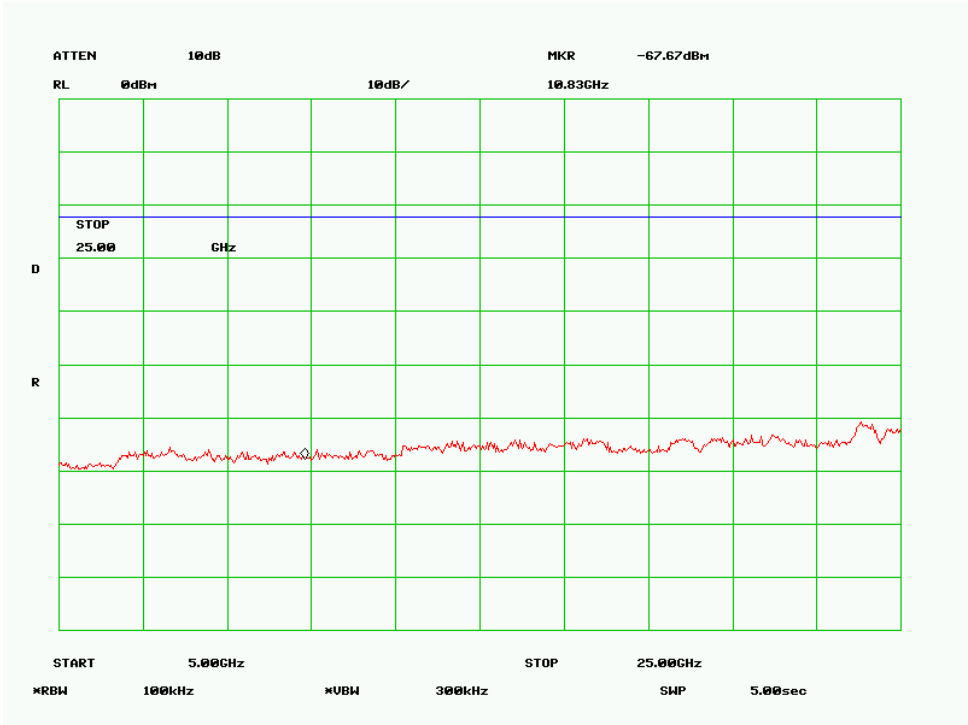
802.11g Low Channel -1



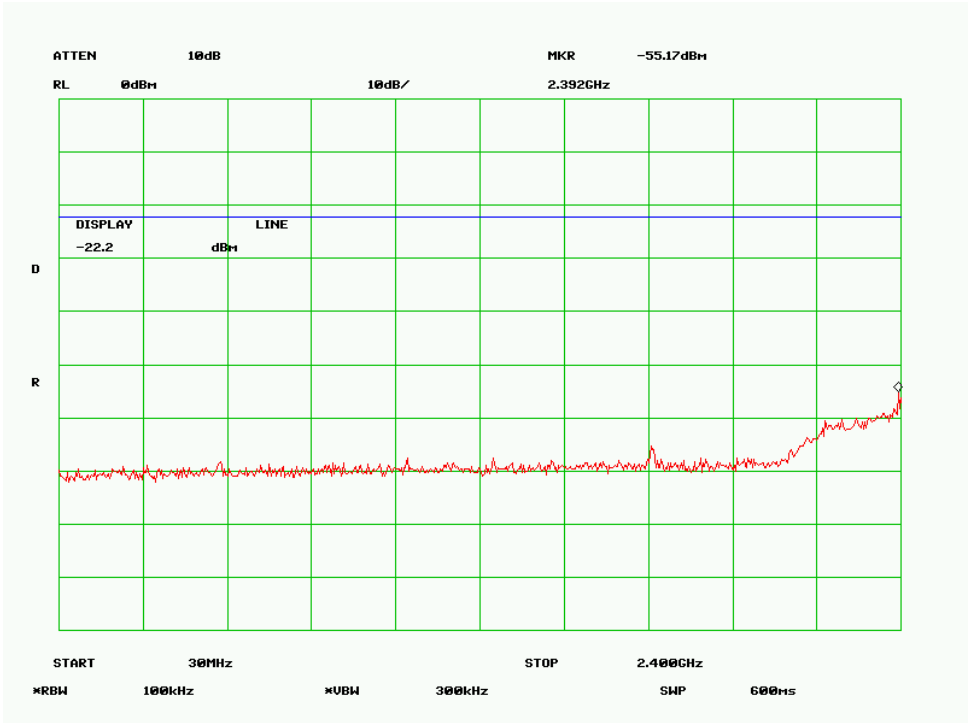
802.11g Low Channel -2



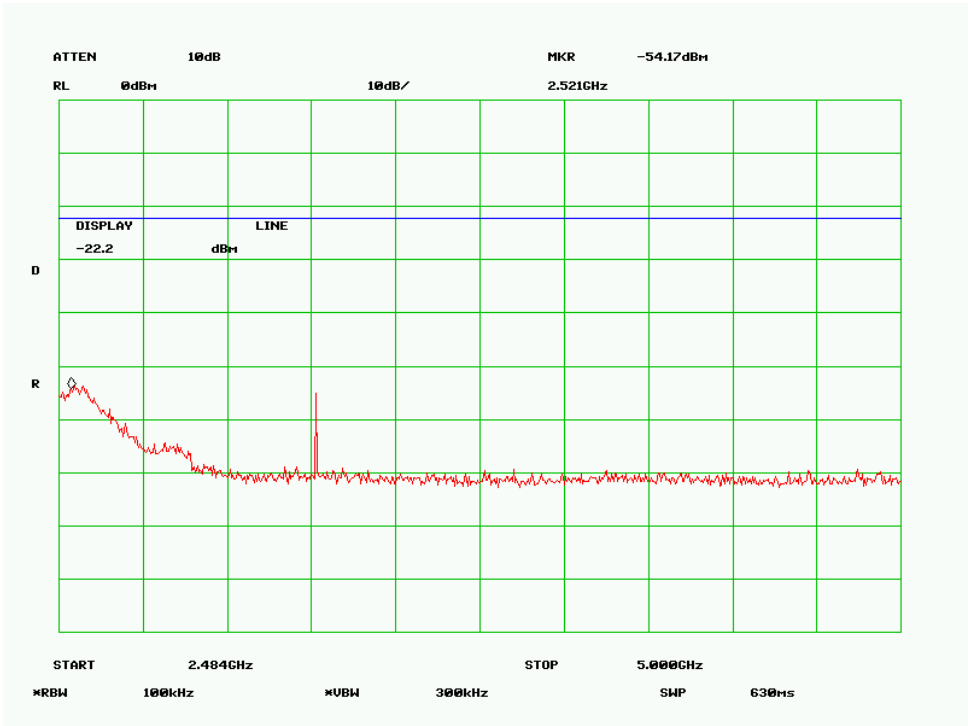
802.11g Low Channel -3



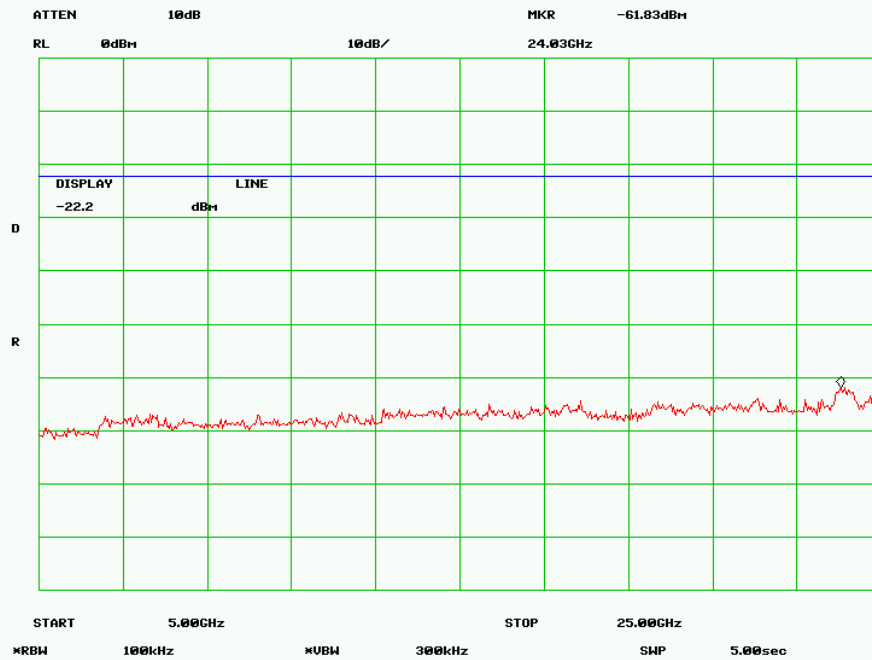
802.11g Low Channel -4



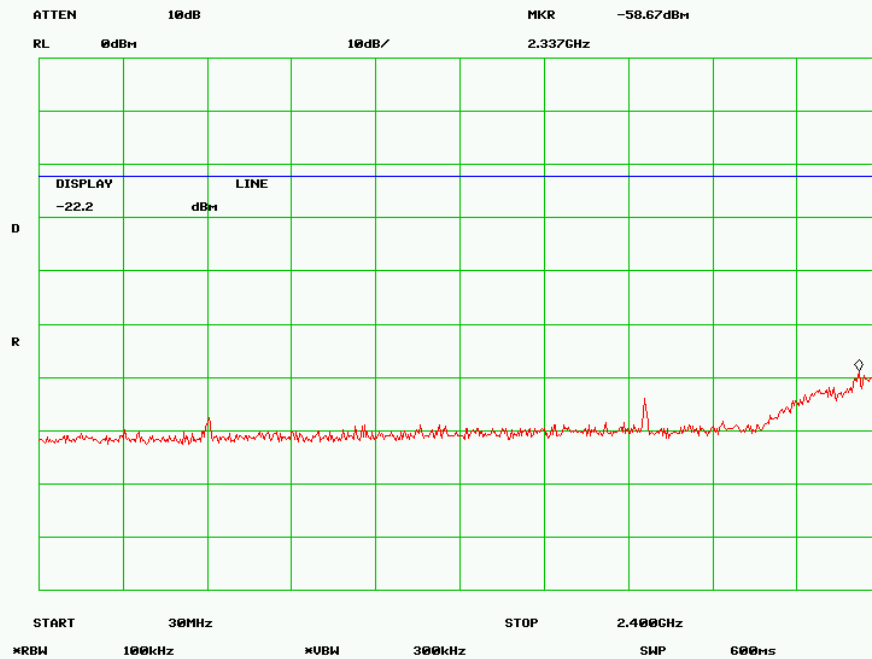
802.11g Mid Channel -1



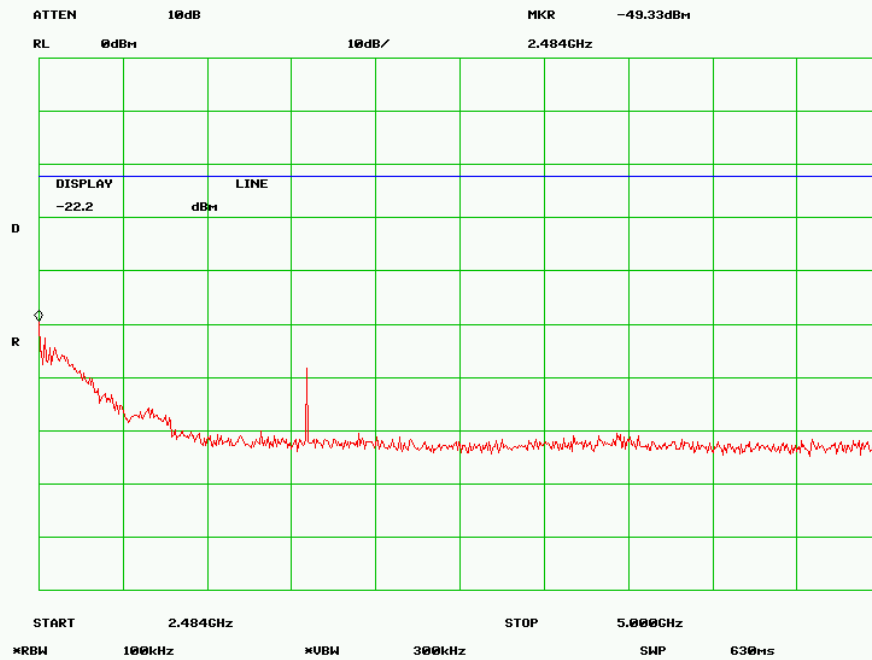
802.11g Mid Channel -2



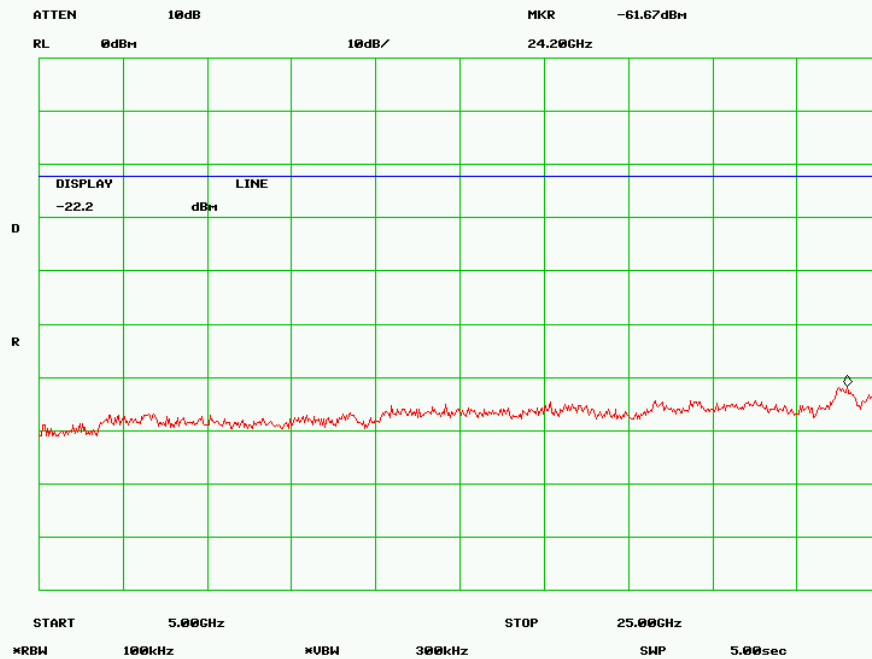
802.11g Mid Channel -3



802.11g High Channel -1



802.11g High Channel -2



802.11g High Channel -3

5.10 Radiated Spurious Emission < 1GHz

- 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 30MHz – 1GHz (QP only @ 3m & 10m) 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 : January 21-25 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)

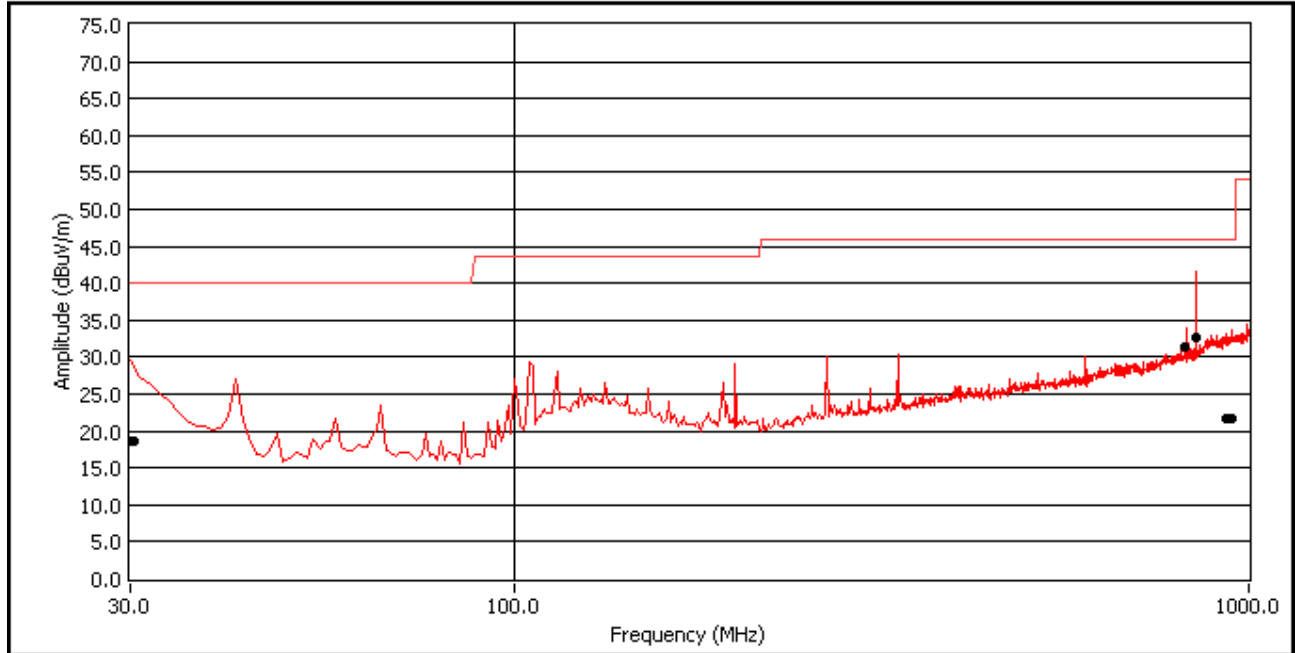
Test Result:

Radiated Emission Plot (Transmit Mode)

Host EUT: S4M

Test Data

Final Plot for 3m Distance Result



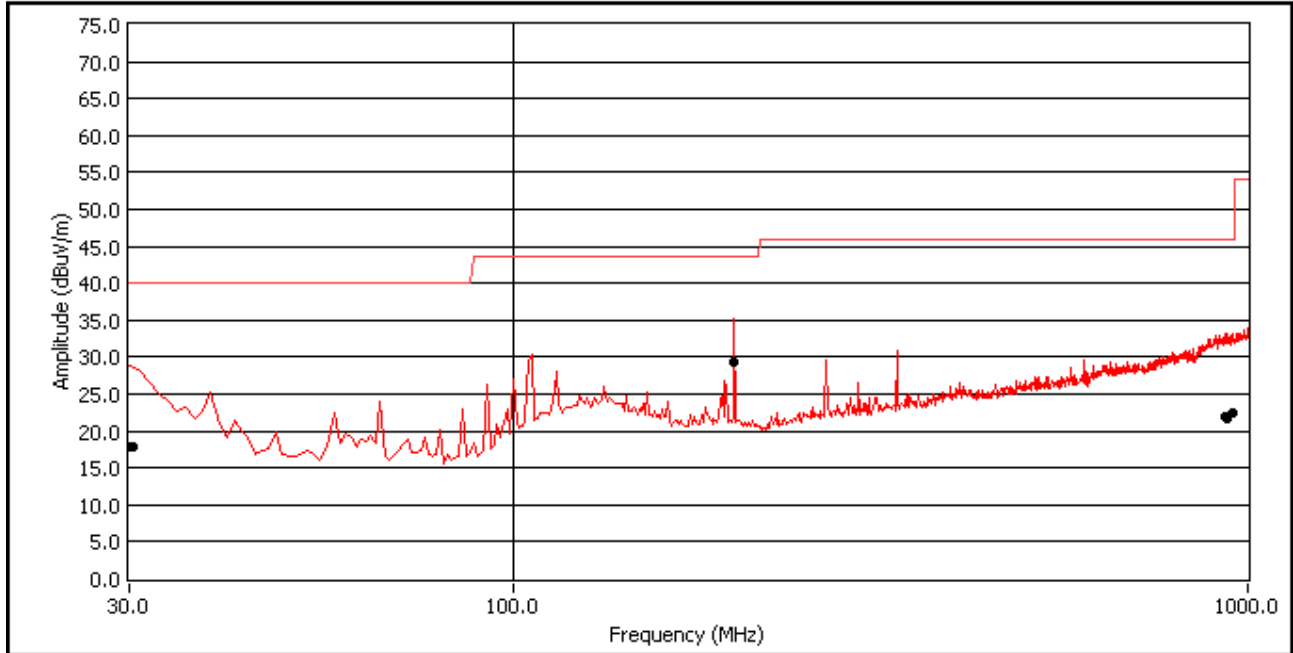
Frequency (MHz)	Quasi-Peak (dBμV/m)	Antenna height (cm)	Polarity	Turntable position (deg)	Limit (dBμV/m)	Margin (dB)
846.45	32.73	310.00	V	99.00	46.00	-13.27
30.00	18.51	294.00	H	99.00	40.00	-21.49
825.07	31.41	280.00	V	99.00	46.00	-14.59
949.48	22.08	212.00	V	397.00	46.00	-23.92
30.97	18.51	304.00	H	248.00	40.00	-21.49
933.93	21.74	161.00	H	397.00	46.00	-24.26

Radiated Emission Plot (Receive Mode)

Host EUT: S4M

Test Data

Final Plot for 3m Distance Result



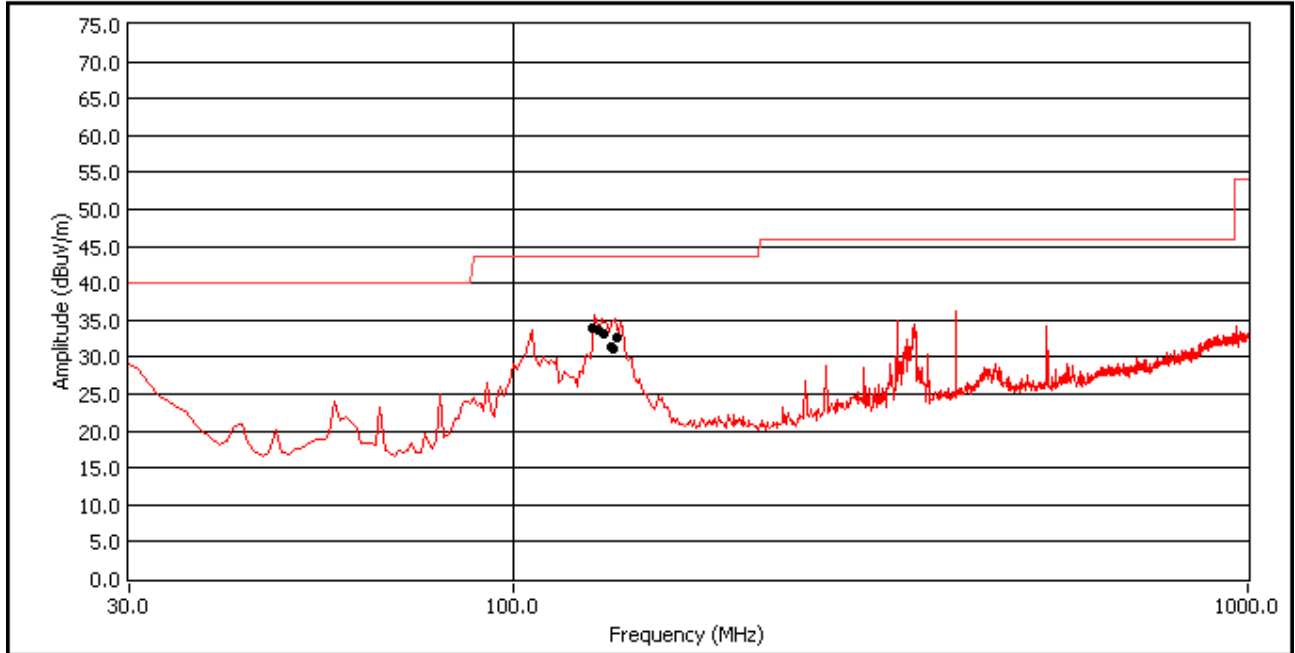
Frequency (MHz)	Quasi-Peak (dBμV/m)	Antenna height (cm)	Polarity	Turntable position (deg)	Limit (dBμV/m)	Margin (dB)
200.10	29.42	227.00	H	100.00	43.50	-14.08
30.00	17.98	12.00	H	248.00	40.00	-22.02
30.97	17.98	305.00	H	248.00	40.00	-22.02
955.32	22.45	182.00	H	397.00	46.00	-23.55
933.93	21.86	262.00	H	397.00	46.00	-24.14
937.82	21.76	91.00	H	102.00	46.00	-24.24

Radiated Emission Plot (Transmit Mode)

Host EUT: ZM600

Test Data

Final Plot for 3m Distance Result



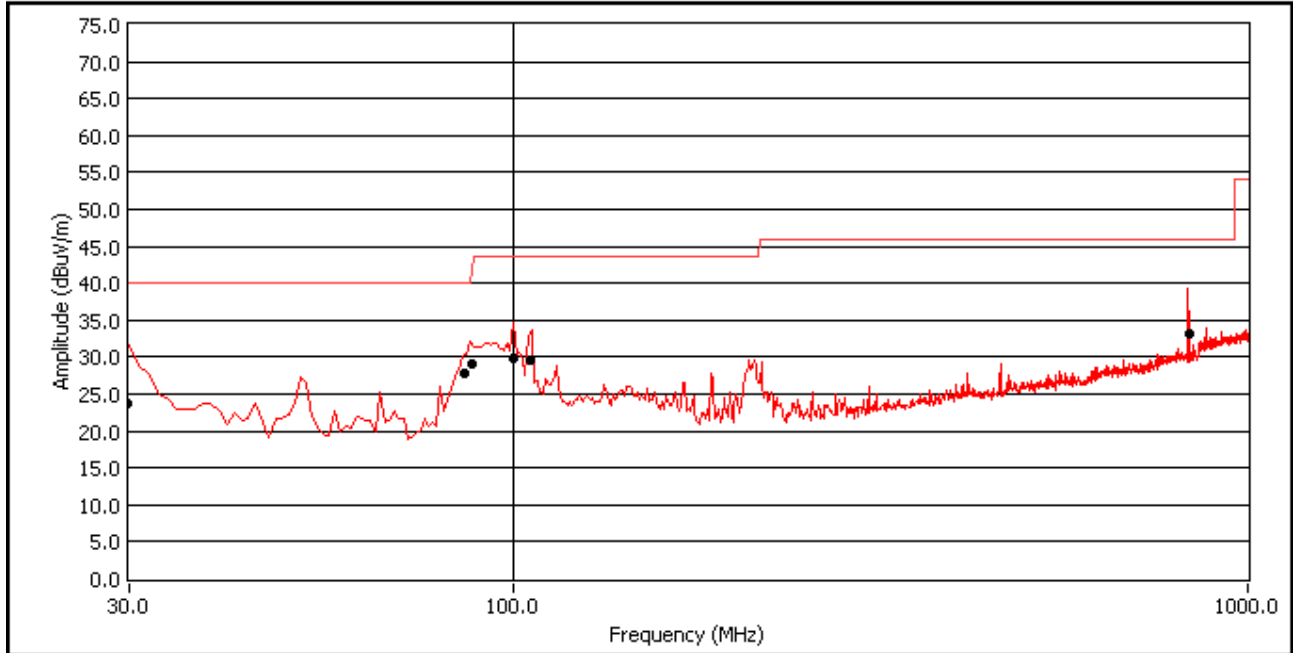
Frequency (MHz)	Quasi-Peak (dBμV/m)	Antenna height (cm)	Polarity	Turntable position (deg)	Limit (dBμV/m)	Margin (dB)
129.14	33.84	276.00	H	248.00	43.50	-9.66
137.89	31.03	297.00	H	248.00	43.50	-12.47
132.06	33.57	266.00	H	248.00	43.50	-9.93
136.92	31.31	297.00	H	248.00	43.50	-12.19
133.03	33.11	266.00	H	248.00	43.50	-10.39
139.84	32.53	266.00	H	248.00	43.50	-10.97

Radiated Emission Plot (Receive Mode)

Host EUT: ZM600

Test Data

Final Plot for 3m Distance Result



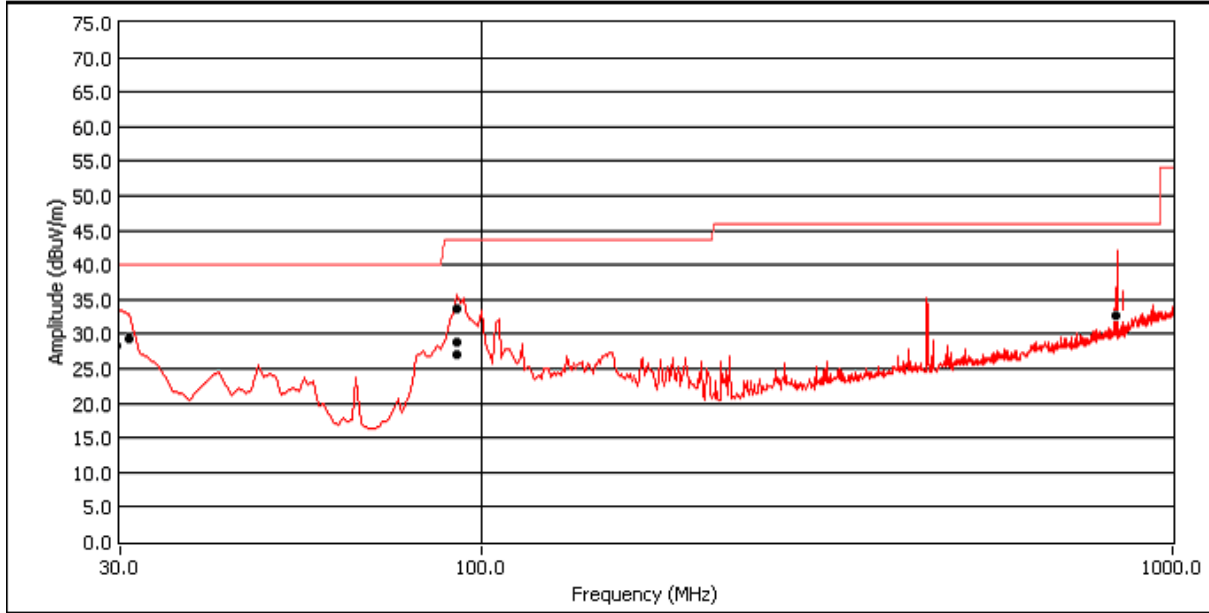
Frequency (MHz)	Quasi-Peak (dBμV/m)	Antenna height (cm)	Polarity	Turntable position (deg)	Limit (dBμV/m)	Margin (dB)
827.01	33.66	189.00	V	99.00	46.00	-12.34
87.35	29.11	356.00	V	100.00	40.00	-10.89
30.00	23.70	213.00	V	100.00	40.00	-16.30
99.98	29.92	3.00	V	100.00	43.50	-13.58
86.38	27.72	335.00	V	100.00	40.00	-12.28
105.82	29.66	266.00	H	100.00	43.50	-13.84

Radiated Emission Plot (Transmit Mode)

Host EUT: ZM400

Test Data

Final Plot for 3m Distance Result



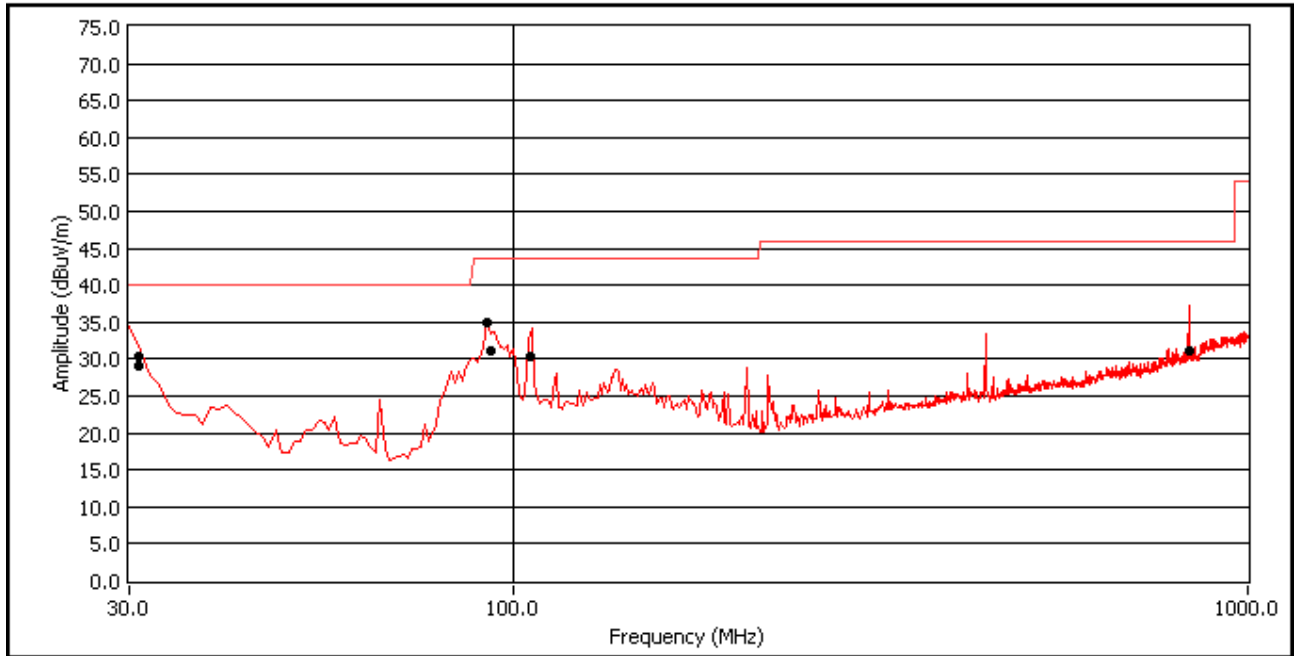
Frequency (MHz)	Quasi-Peak (dBμV/m)	Antenna height (cm)	Polarity	Turntable position (deg)	Limit (dBμV/m)	Margin (dB)
830.90	33.49	260.00	H	102.00	46.00	-12.51
30.00	28.33	123.00	V	98.00	40.00	-11.67
30.97	29.29	123.00	V	98.00	40.00	-10.71
92.21	27.00	43.00	V	98.00	43.50	-16.50
94.15	33.75	356.00	V	98.00	43.50	-9.75
93.18	28.94	265.00	V	98.00	43.50	-14.56

Radiated Emission Plot (Receive Mode)

Host EUT: ZM400

Test Data

Final Plot for 3m Distance Result



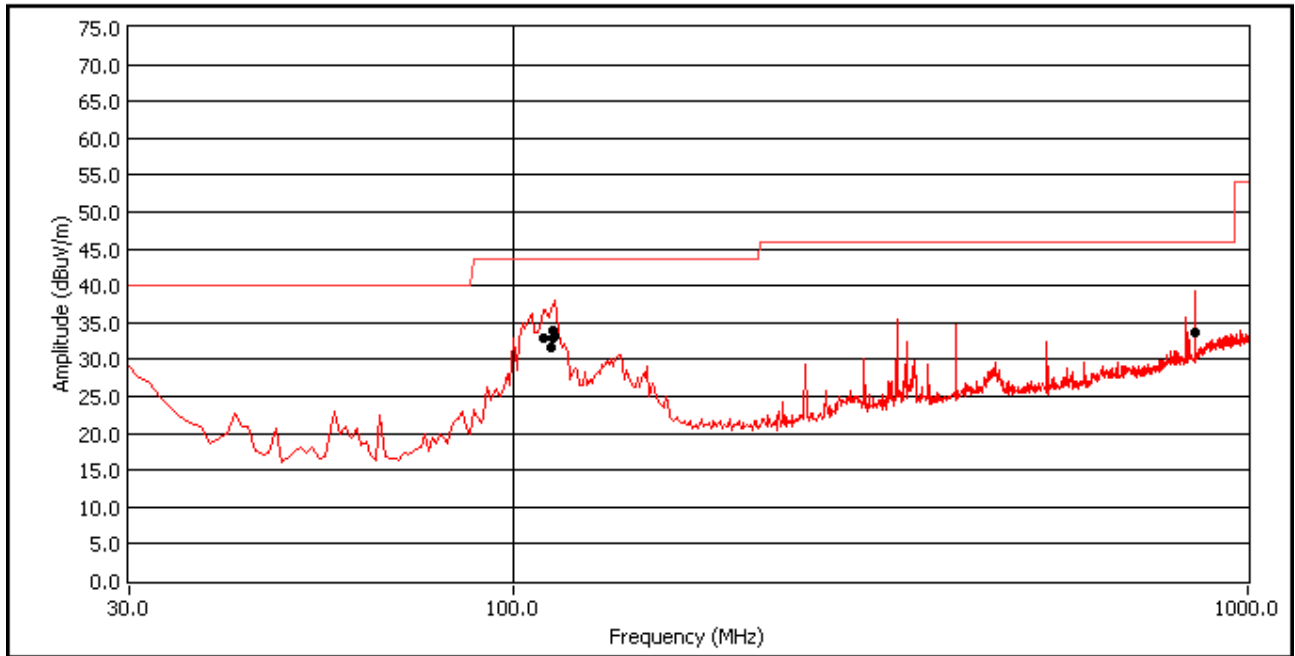
Frequency (MHz)	Quasi-Peak (dBμV/m)	Antenna height (cm)	Polarity	Turntable position (deg)	Limit (dBμV/m)	Margin (dB)
30.00	29.19	173.00	V	98.00	40.00	-10.81
92.21	35.07	214.00	V	98.00	43.50	-8.43
30.97	30.39	173.00	V	98.00	40.00	-9.61
830.90	31.17	58.00	H	250.00	46.00	-14.83
105.82	30.30	215.00	V	98.00	43.50	-13.20
94.15	31.17	315.00	V	98.00	43.50	-12.33

Radiated Emission Plot (Transmit Mode)

Host EUT: 110XIII Plus

Test Data

Final Plot for 3m Distance Result



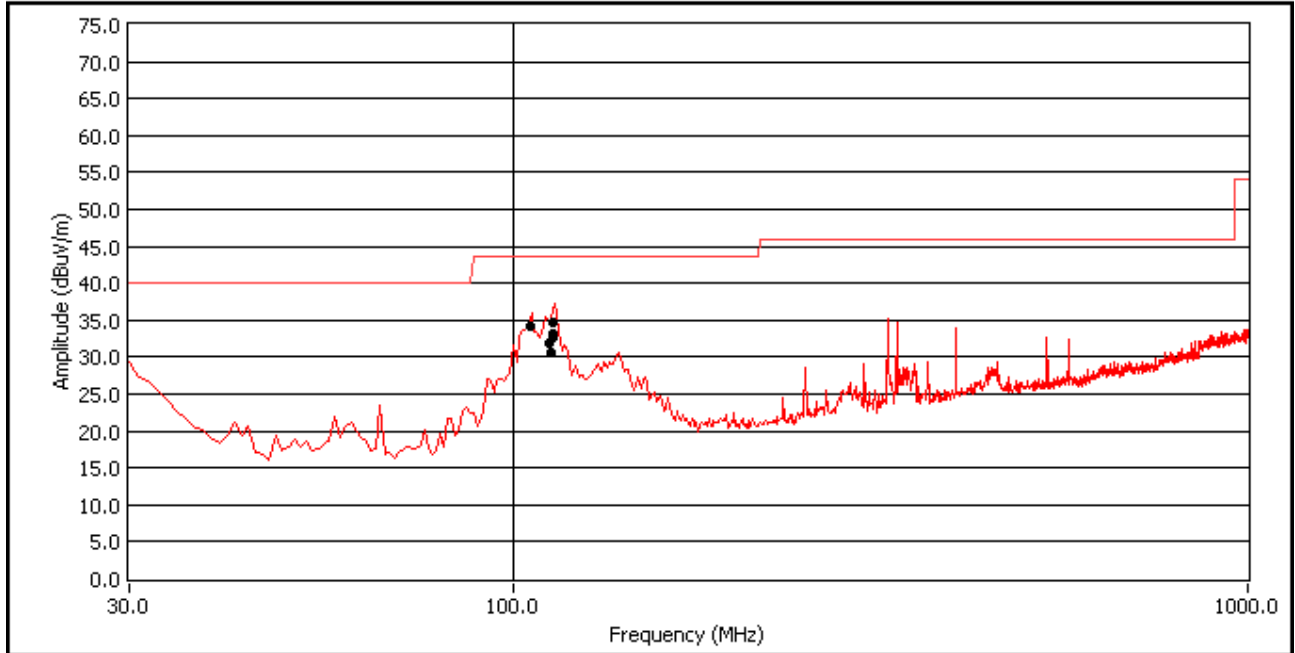
Frequency (MHz)	Quasi-Peak (dBμV/m)	Antenna height (cm)	Polarity	Turntable position (deg)	Limit (dBμV/m)	Margin (dB)
113.59	33.82	84.00	H	248.00	43.50	-9.68
846.45	33.86	119.00	V	100.00	46.00	-12.14
110.68	31.62	94.00	H	248.00	43.50	-11.88
109.70	32.88	74.00	H	248.00	43.50	-10.62
112.62	33.02	306.00	H	248.00	43.50	-10.48
114.56	33.04	104.00	H	248.00	43.50	-10.46

Radiated Emission Plot (Transmit Mode)

Host EUT: 110XIII Plus

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)
113.59	30.51	84.00	H	248.00	43.50	12.99
105.82	34.26	316.00	H	100.00	43.50	9.24
114.56	32.63	84.00	H	248.00	43.50	10.87
110.68	31.87	114.00	H	248.00	43.50	11.63
112.62	33.21	64.00	H	248.00	43.50	10.29
111.65	34.59	315.00	H	248.00	43.50	8.91

5.10 Radiated Spurious Emissions > 1GHz & Band Edge

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 1GHz – 40GH 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 : January 21-25 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 10th 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:

Note: Radiated Spurious Emission test data were presented only on worse case situation which was antenna was connected directly to the Equipment under test without external antenna coaxial cable.

Host EUT :S4M

802.11b @ 2412MHz @ 3 Meter

Frequency (MHz)	Azimuth (Degrees)	Antenna Polarity (H/V)	Height (m)	Raw Amp. @ 3m (dBuV)	Ant.Corr. Factor (dB)	Cable Loss (dB)	EUT Final Field Strength (dBuV/m)	Limit @ 3m (dBuV/m)	Delta (dBuV/m)	Detector (pk/avg)
4825.00	180.00	V	155.00	26.70	33.42	3.46	63.58	74.00	-10.42	pk
4825.00	180.00	V	155.00	11.41	33.42	3.46	48.29	54.00	-5.71	avg
4825.00	180.00	H	155.00	26.10	33.42	3.46	62.98	74.00	-11.02	pk
4825.00	180.00	H	155.00	10.98	33.42	3.46	47.86	54.00	-6.14	avg

Emission was scanned up to 25GHz.

802.11b @ 2437MHz @ 3 Meter

Frequency (MHz)	Azimuth (Degrees)	Antenna Polarity (H/V)	Height (m)	Raw Amp. @ 3m (dBuV)	Ant.Corr. Factor (dB)	Cable Loss (dB)	EUT Final Field Strength (dBuV/m)	Limit @ 3m (dBuV/m)	Delta (dBuV/m)	Detector (pk/avg)
4874.00	180.00	V	155.00	24.81	33.50	3.49	61.80	74.00	-12.20	pk
4874.00	180.00	V	155.00	10.12	33.50	3.49	47.11	54.00	-6.89	avg
4874.00	180.00	H	155.00	24.76	33.50	3.49	61.75	74.00	-12.25	pk
4874.00	180.00	H	155.00	10.22	33.50	3.49	47.21	54.00	-6.79	avg

Emission was scanned up to 25GHz.

802.11b @ 2462MHz @ 3 Meter

Frequency (MHz)	Azimuth (Degrees)	Antenna Polarity (H/V)	Height (m)	Raw Amp. @ 3m (dBuV)	Ant.Corr. Factor (dB)	Cable Loss (dB)	EUT Final Field Strength (dBuV/m)	Limit @ 3m (dBuV/m)	Delta (dBuV/m)	Detector (pk/avg)
4930.00	180.00	V	155.00	25.15	33.60	3.52	62.26	74.00	-11.74	pk
4930.00	180.00	V	155.00	10.70	33.60	3.52	47.81	54.00	-6.19	avg
4930.00	180.00	H	155.00	25.10	33.60	3.52	62.21	74.00	-11.79	pk
4930.00	180.00	H	155.00	10.45	33.60	3.52	47.56	54.00	-6.44	avg

Emission was scanned up to 25GHz.

802.11g @ 2412MHz @ 3 Meter

Frequency	Azimuth	Antenna	Height	Raw Amp.	Ant.Corr.	Cable	EUT Final Field	Limit	Delta	Detector
		Polarity		@ 3m	Factor	Loss	Strength	@ 3m		
(MHz)	(Degrees)	(H/V)	(m)	(dBuV)	(dB)	(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(pk/avg)
4825.00	180.00	V	155.00	26.29	33.42	3.46	63.17	74.00	-10.83	pk
4825.00	180.00	V	155.00	11.58	33.42	3.46	48.46	54.00	-5.54	avg
4825.00	180.00	H	155.00	25.80	33.42	3.46	62.68	74.00	-11.32	pk
4825.00	180.00	H	155.00	10.96	33.42	3.46	47.84	54.00	-6.16	avg

Emission was scanned up to 25GHz.

802.11g @ 2437MHz @ 3 Meter

Frequency	Azimuth	Antenna	Height	Raw Amp.	Ant.Corr.	Cable	EUT Final Field	Limit	Delta	Detector
		Polarity		@ 3m	Factor	Loss	Strength	@ 3m		
(MHz)	(Degrees)	(H/V)	(m)	(dBuV)	(dB)	(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(pk/avg)
4874.00	180.00	V	155.00	25.61	33.50	3.49	62.60	74.00	-11.40	pk
4874.00	180.00	V	155.00	11.90	33.50	3.49	48.89	54.00	-5.11	avg
4874.00	180.00	H	155.00	25.60	33.50	3.49	62.59	74.00	-11.41	pk
4874.00	180.00	H	155.00	11.72	33.50	3.49	48.71	54.00	-5.29	avg

Emission was scanned up to 25GHz.

802.11g @ 2462MHz @ 3 Meter

Frequency	Azimuth	Antenna	Height	Raw Amp.	Ant.Corr.	Cable	EUT Final Field	Limit	Delta	Detector
		Polarity		@ 3m	Factor	Loss	Strength	@ 3m		
(MHz)	(Degrees)	(H/V)	(m)	(dBuV)	(dB)	(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(pk/avg)
4930.00	180.00	V	155.00	25.79	33.60	3.52	62.90	74.00	-11.10	pk
4930.00	180.00	V	155.00	11.70	33.60	3.52	48.81	54.00	-5.19	avg
4930.00	180.00	H	155.00	24.60	33.60	3.52	61.71	74.00	-12.29	pk
4930.00	180.00	H	155.00	11.15	33.60	3.52	48.26	54.00	-5.74	avg

Emission was scanned up to 25GHz.

Host EUT :ZM600

802.11b @ 2412MHz @ 3 Meter

Frequency (MHz)	Azimuth (Degrees)	Antenna Polarity (H/V)	Height (m)	Raw Amp. @ 3m (dBuV)	Ant.Corr. Factor (dB)	Cable Loss (dB)	EUT Final Field Strength (dBuV/m)	Limit @ 3m (dBuV/m)	Delta (dBuV/m)	Detector (pk/avg)
4825.00	180.00	V	155.00	26.14	33.42	3.46	63.02	74.00	-10.98	pk
4825.00	180.00	V	155.00	11.12	33.42	3.46	48.00	54.00	-6.00	avg
4825.00	180.00	H	155.00	25.65	33.42	3.46	62.53	74.00	-11.47	pk
4825.00	180.00	H	155.00	10.58	33.42	3.46	47.46	54.00	-6.54	avg

Emission was scanned up to 25GHz.

802.11b @ 2437MHz @ 3 Meter

Frequency (MHz)	Azimuth (Degrees)	Antenna Polarity (H/V)	Height (m)	Raw Amp. @ 3m (dBuV)	Ant.Corr. Factor (dB)	Cable Loss (dB)	EUT Final Field Strength (dBuV/m)	Limit @ 3m (dBuV/m)	Delta (dBuV/m)	Detector (pk/avg)
4874.00	180.00	V	155.00	25.21	33.50	3.49	62.20	74.00	-11.80	pk
4874.00	180.00	V	155.00	10.82	33.50	3.49	47.81	54.00	-6.19	avg
4874.00	180.00	H	155.00	25.16	33.50	3.49	62.15	74.00	-11.85	pk
4874.00	180.00	H	155.00	10.62	33.50	3.49	47.61	54.00	-6.39	avg

Emission was scanned up to 25GHz.

802.11b @ 2462MHz @ 3 Meter

Frequency (MHz)	Azimuth (Degrees)	Antenna Polarity (H/V)	Height (m)	Raw Amp. @ 3m (dBuV)	Ant.Corr. Factor (dB)	Cable Loss (dB)	EUT Final Field Strength (dBuV/m)	Limit @ 3m (dBuV/m)	Delta (dBuV/m)	Detector (pk/avg)
4930.00	180.00	V	155.00	26.10	33.60	3.52	63.21	74.00	-10.79	pk
4930.00	180.00	V	155.00	10.93	33.60	3.52	48.04	54.00	-5.96	avg
4930.00	180.00	H	155.00	25.67	33.60	3.52	62.78	74.00	-11.22	pk
4930.00	180.00	H	155.00	10.85	33.60	3.52	47.96	54.00	-6.04	avg

Emission was scanned up to 25GHz.

802.11g @ 2412MHz @ 3 Meter

Frequency (MHz)	Azimuth (Degrees)	Antenna Polarity (H/V)	Height (m)	Raw Amp. @ 3m (dBuV)	Ant.Corr. Factor (dB)	Cable Loss (dB)	EUT Final Field Strength (dBuV/m)	Limit @ 3m (dBuV/m)	Delta (dBuV/m)	Detector (pk/avg)
4825.00	180.00	V	155.00	25.79	33.42	3.46	62.67	74.00	-11.33	pk
4825.00	180.00	V	155.00	11.11	33.42	3.46	47.99	54.00	-6.01	avg
4825.00	180.00	H	155.00	25.45	33.42	3.46	62.33	74.00	-11.67	pk
4825.00	180.00	H	155.00	10.36	33.42	3.46	47.24	54.00	-6.76	avg

Emission was scanned up to 25GHz.

802.11g @ 2437MHz @ 3 Meter

Frequency (MHz)	Azimuth (Degrees)	Antenna Polarity (H/V)	Height (m)	Raw Amp. @ 3m (dBuV)	Ant.Corr. Factor (dB)	Cable Loss (dB)	EUT Final Field Strength (dBuV/m)	Limit @ 3m (dBuV/m)	Delta (dBuV/m)	Detector (pk/avg)
4874.00	180.00	V	155.00	24.92	33.50	3.49	61.91	74.00	-12.09	pk
4874.00	180.00	V	155.00	10.64	33.50	3.49	47.63	54.00	-6.37	avg
4874.00	180.00	H	155.00	24.23	33.50	3.49	61.22	74.00	-12.78	pk
4874.00	180.00	H	155.00	10.39	33.50	3.49	47.38	54.00	-6.62	avg

Emission was scanned up to 25GHz.

802.11g @ 2462MHz @ 3 Meter

Frequency (MHz)	Azimuth (Degrees)	Antenna Polarity (H/V)	Height (m)	Raw Amp. @ 3m (dBuV)	Ant.Corr. Factor (dB)	Cable Loss (dB)	EUT Final Field Strength (dBuV/m)	Limit @ 3m (dBuV/m)	Delta (dBuV/m)	Detector (pk/avg)
4930.00	180.00	V	155.00	25.02	33.60	3.52	62.13	74.00	-11.87	pk
4930.00	180.00	V	155.00	10.94	33.60	3.52	48.05	54.00	-5.95	avg
4930.00	180.00	H	155.00	24.84	33.60	3.52	61.95	74.00	-12.05	pk
4930.00	180.00	H	155.00	10.85	33.60	3.52	47.96	54.00	-6.04	avg

Emission was scanned up to 25GHz.

Host EUT :ZM400

802.11b @ 2412MHz @ 3 Meter

Frequency (MHz)	Azimuth (Degrees)	Antenna Polarity (H/V)	Height (m)	Raw Amp. @ 3m (dBuV)	Ant.Corr. Factor (dB)	Cable Loss (dB)	EUT Final Field Strength (dBuV/m)	Limit @ 3m (dBuV/m)	Delta (dBuV/m)	Detector (pk/avg)
4825.00	180.00	V	155.00	25.59	33.42	3.46	62.47	74.00	-11.53	pk
4825.00	180.00	V	155.00	11.72	33.42	3.46	48.60	54.00	-5.40	avg
4825.00	180.00	H	155.00	24.85	33.42	3.46	61.73	74.00	-12.27	pk
4825.00	180.00	H	155.00	10.45	33.42	3.46	47.33	54.00	-6.67	avg

Emission was scanned up to 25GHz.

802.11b @ 2437MHz @ 3 Meter

Frequency (MHz)	Azimuth (Degrees)	Antenna Polarity (H/V)	Height (m)	Raw Amp. @ 3m (dBuV)	Ant.Corr. Factor (dB)	Cable Loss (dB)	EUT Final Field Strength (dBuV/m)	Limit @ 3m (dBuV/m)	Delta (dBuV/m)	Detector (pk/avg)
4874.00	180.00	V	155.00	24.91	33.50	3.49	61.90	74.00	-12.10	pk
4874.00	180.00	V	155.00	10.89	33.50	3.49	47.88	54.00	-6.12	avg
4874.00	180.00	H	155.00	24.10	33.50	3.49	61.09	74.00	-12.91	pk
4874.00	180.00	H	155.00	10.12	33.50	3.49	47.11	54.00	-6.89	avg

Emission was scanned up to 25GHz.

802.11b @ 2462MHz @ 3 Meter

Frequency (MHz)	Azimuth (Degrees)	Antenna Polarity (H/V)	Height (m)	Raw Amp. @ 3m (dBuV)	Ant.Corr. Factor (dB)	Cable Loss (dB)	EUT Final Field Strength (dBuV/m)	Limit @ 3m (dBuV/m)	Delta (dBuV/m)	Detector (pk/avg)
4930.00	180.00	V	155.00	25.45	33.60	3.52	62.56	74.00	-11.44	pk
4930.00	180.00	V	155.00	11.13	33.60	3.52	48.24	54.00	-5.76	avg
4930.00	180.00	H	155.00	24.77	33.60	3.52	61.88	74.00	-12.12	pk
4930.00	180.00	H	155.00	11.82	33.60	3.52	48.93	54.00	-5.07	avg

Emission was scanned up to 25GHz.

802.11g @ 2412MHz @ 3 Meter

Frequency (MHz)	Azimuth (Degrees)	Antenna Polarity (H/V)	Height (m)	Raw Amp. @ 3m (dBuV)	Ant.Corr. Factor (dB)	Cable Loss (dB)	EUT Final Field Strength (dBuV/m)	Limit @ 3m (dBuV/m)	Delta (dBuV/m)	Detector (pk/avg)
4825.00	180.00	V	155.00	25.89	33.42	3.46	62.77	74.00	-11.23	pk
4825.00	180.00	V	155.00	10.46	33.42	3.46	47.34	54.00	-6.66	avg
4825.00	180.00	H	155.00	25.13	33.42	3.46	62.01	74.00	-11.99	pk
4825.00	180.00	H	155.00	10.03	33.42	3.46	46.91	54.00	-7.09	avg

Emission was scanned up to 25GHz.

802.11g @ 2437MHz @ 3 Meter

Frequency (MHz)	Azimuth (Degrees)	Antenna Polarity (H/V)	Height (m)	Raw Amp. @ 3m (dBuV)	Ant.Corr. Factor (dB)	Cable Loss (dB)	EUT Final Field Strength (dBuV/m)	Limit @ 3m (dBuV/m)	Delta (dBuV/m)	Detector (pk/avg)
4874.00	180.00	V	155.00	24.96	33.50	3.49	61.95	74.00	-12.05	pk
4874.00	180.00	V	155.00	10.17	33.50	3.49	47.16	54.00	-6.84	avg
4874.00	180.00	H	155.00	24.67	33.50	3.49	61.66	74.00	-12.34	pk
4874.00	180.00	H	155.00	10.37	33.50	3.49	47.36	54.00	-6.64	avg

Emission was scanned up to 25GHz.

802.11g @ 2462MHz @ 3 Meter

Frequency (MHz)	Azimuth (Degrees)	Antenna Polarity (H/V)	Height (m)	Raw Amp. @ 3m (dBuV)	Ant.Corr. Factor (dB)	Cable Loss (dB)	EUT Final Field Strength (dBuV/m)	Limit @ 3m (dBuV/m)	Delta (dBuV/m)	Detector (pk/avg)
4930.00	180.00	V	155.00	26.56	33.60	3.52	63.67	74.00	-10.33	pk
4930.00	180.00	V	155.00	12.94	33.60	3.52	50.05	54.00	-3.95	avg
4930.00	180.00	H	155.00	26.14	33.60	3.52	63.25	74.00	-10.75	pk
4930.00	180.00	H	155.00	11.98	33.60	3.52	49.09	54.00	-4.91	avg

Emission was scanned up to 25GHz.

Host EUT: 110XIII Plus

802.11b @ 2412MHz @ 3 Meter

Frequency (MHz)	Azimuth (Degrees)	Antenna Polarity (H/V)	Height (m)	Raw Amp. @ 3m (dBuV)	Ant.Corr. Factor (dB)	Cable Loss (dB)	EUT Final Field Strength (dBuV/m)	Limit @ 3m (dBuV/m)	Delta (dBuV/m)	Detector (pk/avg)
4825.00	180.00	V	155.00	27.10	33.60	3.52	64.21	74.00	-9.79	pk
4825.00	180.00	V	155.00	12.81	33.60	3.52	49.92	54.00	-4.08	avg
4825.00	180.00	H	155.00	26.82	33.60	3.52	63.93	74.00	-10.07	pk
4825.00	180.00	H	155.00	11.93	33.60	3.52	49.04	54.00	-4.96	avg

Emission was scanned up to 25GHz.

802.11b @ 2437MHz @ 3 Meter

Frequency (MHz)	Azimuth (Degrees)	Antenna Polarity (H/V)	Height (m)	Raw Amp. @ 3m (dBuV)	Ant.Corr. Factor (dB)	Cable Loss (dB)	EUT Final Field Strength (dBuV/m)	Limit @ 3m (dBuV/m)	Delta (dBuV/m)	Detector (pk/avg)
4825.00	180.00	V	155.00	25.60	33.50	3.49	62.59	74.00	-11.41	pk
4825.00	180.00	V	155.00	10.81	33.50	3.49	47.80	54.00	-6.20	avg
4825.00	180.00	H	155.00	25.67	33.50	3.49	62.66	74.00	-11.34	pk
4825.00	180.00	H	155.00	10.78	33.50	3.49	47.77	54.00	-6.23	avg

Emission was scanned up to 25GHz.

802.11b @ 2462MHz @ 3 Meter

Frequency (MHz)	Azimuth (Degrees)	Antenna Polarity (H/V)	Height (m)	Raw Amp. @ 3m (dBuV)	Ant.Corr. Factor (dB)	Cable Loss (dB)	EUT Final Field Strength (dBuV/m)	Limit @ 3m (dBuV/m)	Delta (dBuV/m)	Detector (pk/avg)
4930.00	180.00	V	155.00	26.80	33.60	3.52	63.91	74.00	-10.09	pk
4930.00	180.00	V	155.00	11.41	33.60	3.52	48.52	54.00	-5.48	avg
4930.00	180.00	H	155.00	26.11	33.60	3.52	63.22	74.00	-10.78	pk
4930.00	180.00	H	155.00	10.92	33.60	3.52	48.03	54.00	-5.97	avg

Emission was scanned up to 25GHz.

802.11g @ 2412MHz @ 3 Meter

Frequency (MHz)	Azimuth (Degrees)	Antenna Polarity (H/V)	Height (m)	Raw Amp. @ 3m (dBuV)	Ant.Corr. Factor (dB)	Cable Loss (dB)	EUT Final Field Strength (dBuV/m)	Limit @ 3m (dBuV/m)	Delta (dBuV/m)	Detector (pk/avg)
4825.00	180.00	V	155.00	27.16	33.42	3.46	64.04	74.00	-9.96	pk
4825.00	180.00	V	155.00	13.50	33.42	3.46	50.38	54.00	-3.62	avg
4825.00	180.00	H	155.00	24.70	33.42	3.46	61.58	74.00	-12.42	pk
4825.00	180.00	H	155.00	11.50	33.42	3.46	48.38	54.00	-5.62	avg

Emission was scanned up to 25GHz.

802.11g @ 2437MHz @ 3 Meter

Frequency (MHz)	Azimuth (Degrees)	Antenna Polarity (H/V)	Height (m)	Raw Amp. @ 3m (dBuV)	Ant.Corr. Factor (dB)	Cable Loss (dB)	EUT Final Field Strength (dBuV/m)	Limit @ 3m (dBuV/m)	Delta (dBuV/m)	Detector (pk/avg)
4874.00	180.00	V	155.00	26.69	33.50	3.49	63.68	74.00	-10.32	pk
4874.00	180.00	V	155.00	12.50	33.50	3.49	49.49	54.00	-4.51	avg
4874.00	180.00	H	155.00	25.60	33.50	3.49	62.59	74.00	-11.41	pk
4874.00	180.00	H	155.00	12.10	33.50	3.49	49.09	54.00	-4.91	avg

Emission was scanned up to 25GHz.

802.11g @ 2462MHz @ 3 Meter

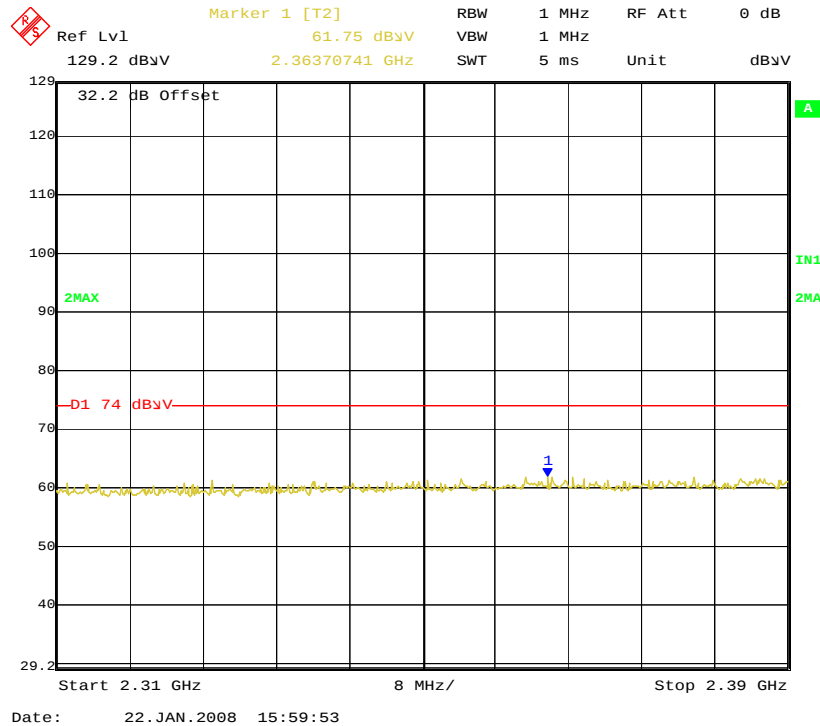
Frequency (MHz)	Azimuth (Degrees)	Antenna Polarity (H/V)	Height (m)	Raw Amp. @ 3m (dBuV)	Ant.Corr. Factor (dB)	Cable Loss (dB)	EUT Final Field Strength (dBuV/m)	Limit @ 3m (dBuV/m)	Delta (dBuV/m)	Detector (pk/avg)
4930.00	180.00	V	155.00	27.69	33.60	3.52	64.80	74.00	-9.20	pk
4930.00	180.00	V	155.00	13.76	33.60	3.52	50.87	54.00	-3.13	avg
4930.00	180.00	H	155.00	26.12	33.60	3.52	63.23	74.00	-10.77	pk
4930.00	180.00	H	155.00	12.80	33.60	3.52	49.91	54.00	-4.09	avg

Emission was scanned up to 25GHz.

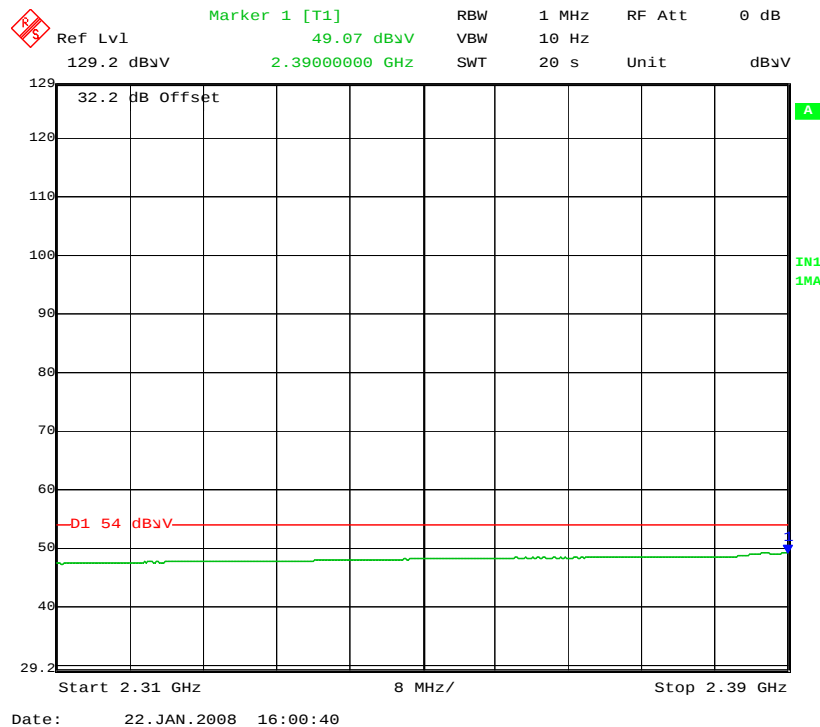
Band Edge Plots

Host EUT: **S4M**

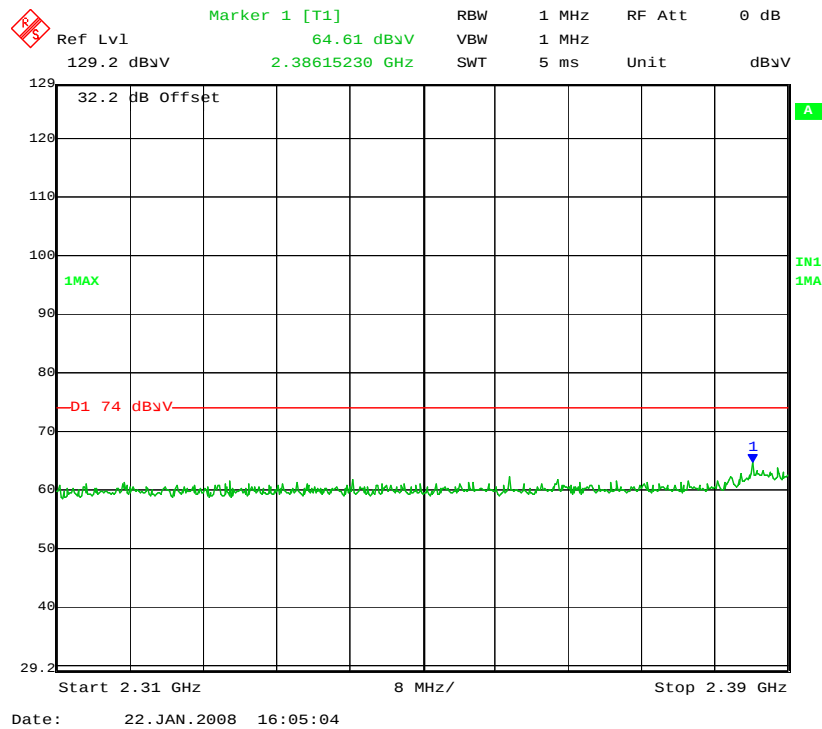
Antenna install type: Antenna permanently attached to the host EUT antenna port.



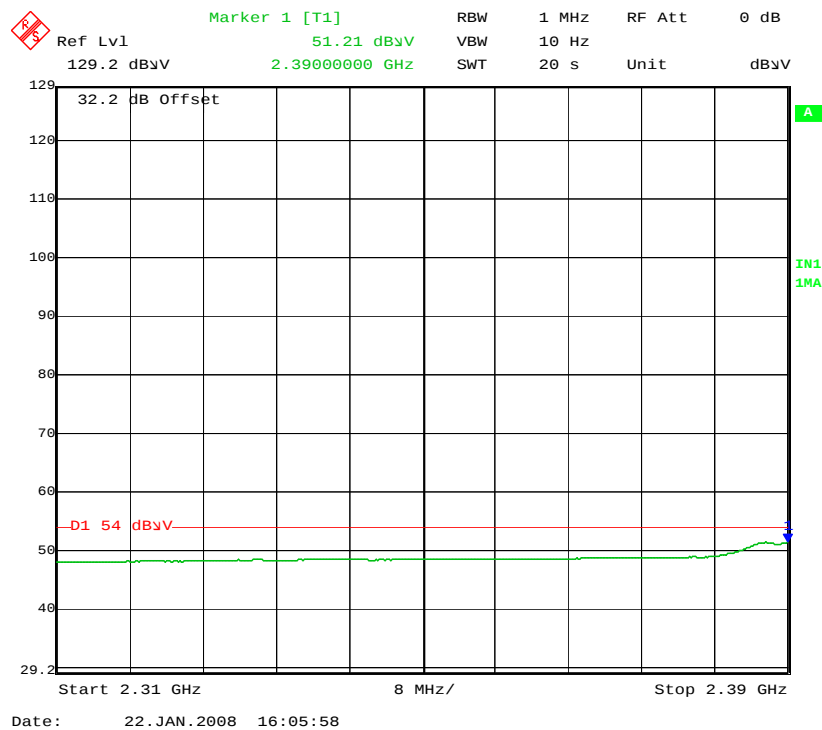
802.11b Low Channel-Vertical Polarity -Peak



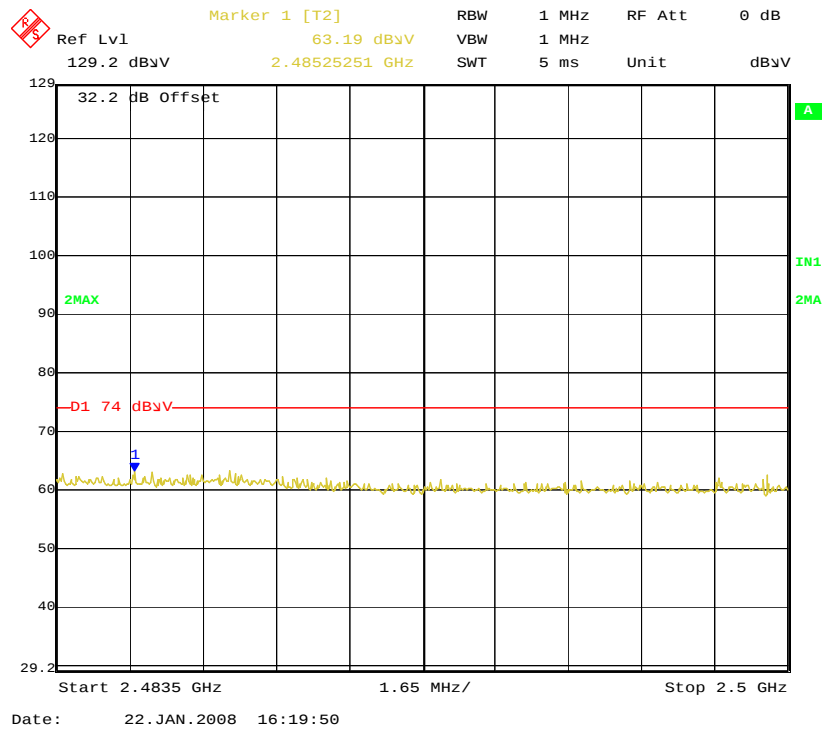
802.11b Low Channel-Vertical Polarity -Average



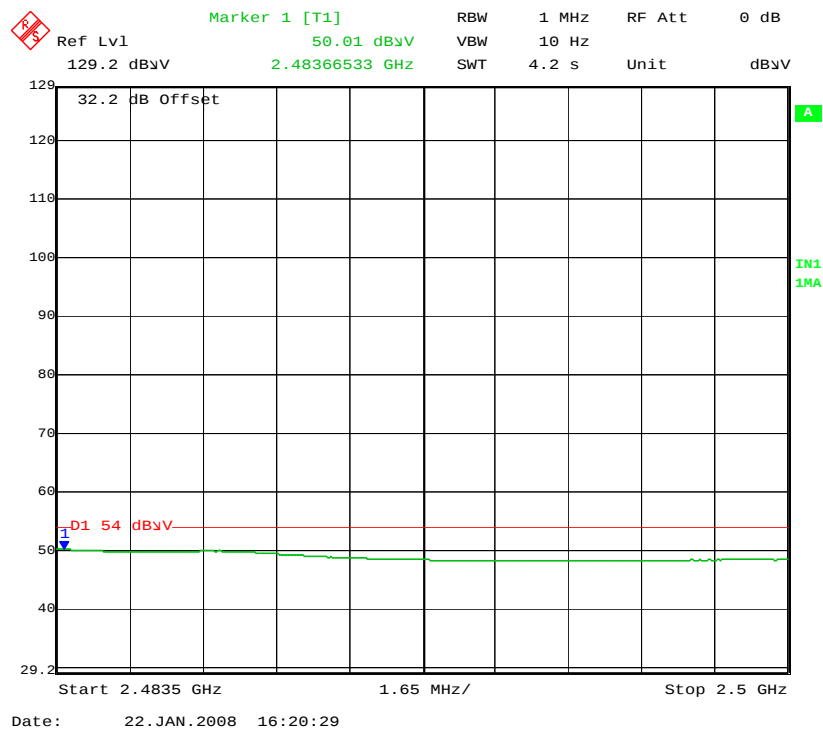
802.11b Low Channel-Horizontal Polarity –Peak



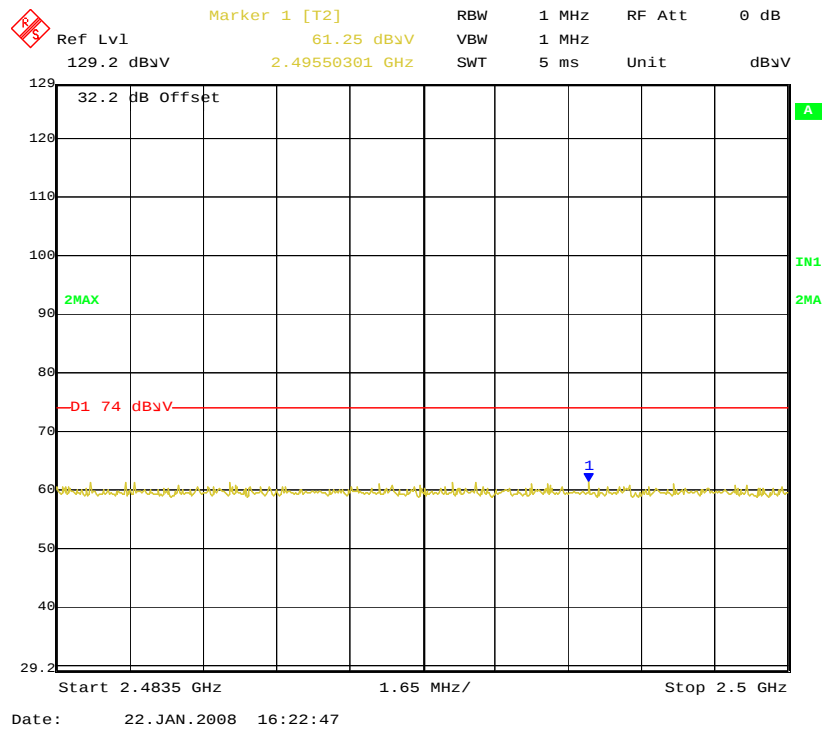
802.11b Low Channel-Horizontal Polarity -Average



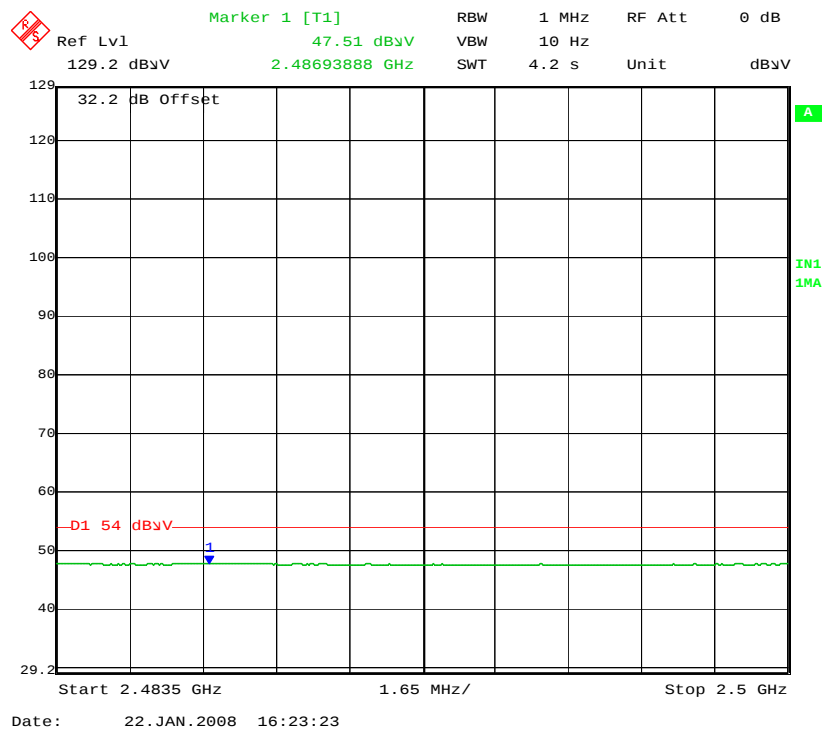
802.11b High Channel-Horizontal Polarity –Peak



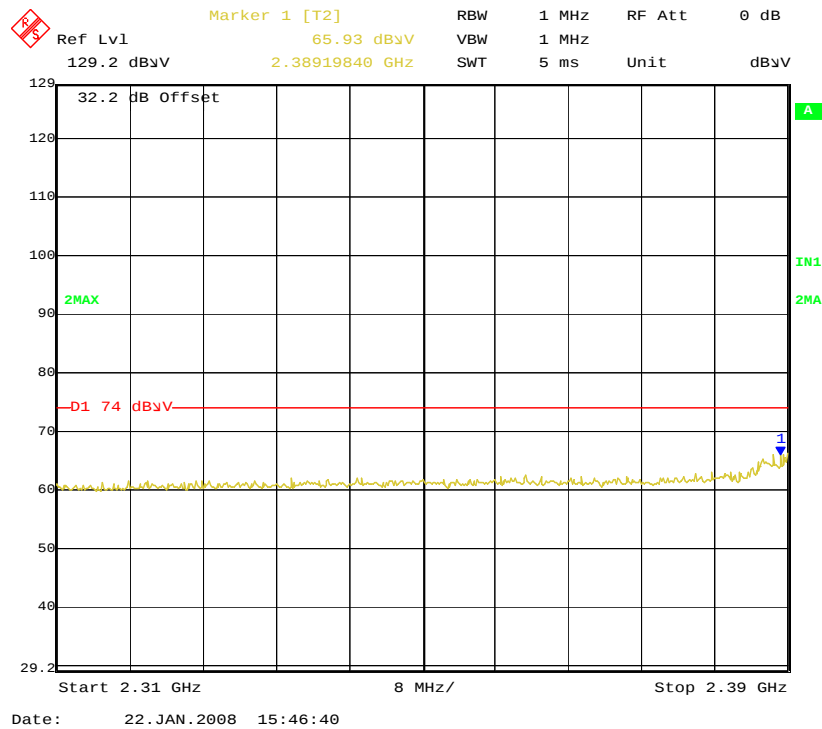
802.11b High Channel-Horizontal Polarity –Average



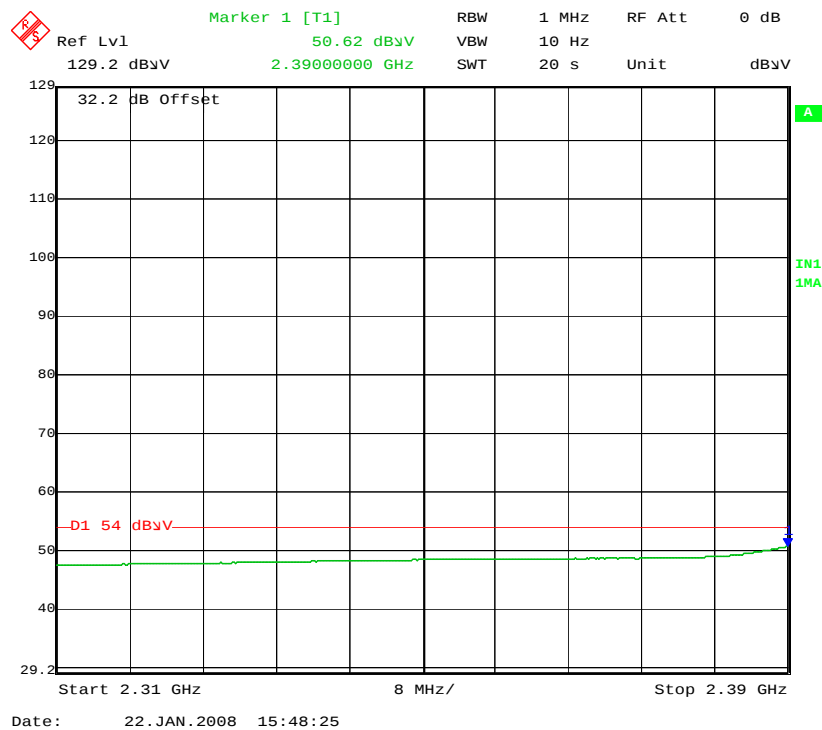
802.11b High Channel-Vertical Polarity –Peak



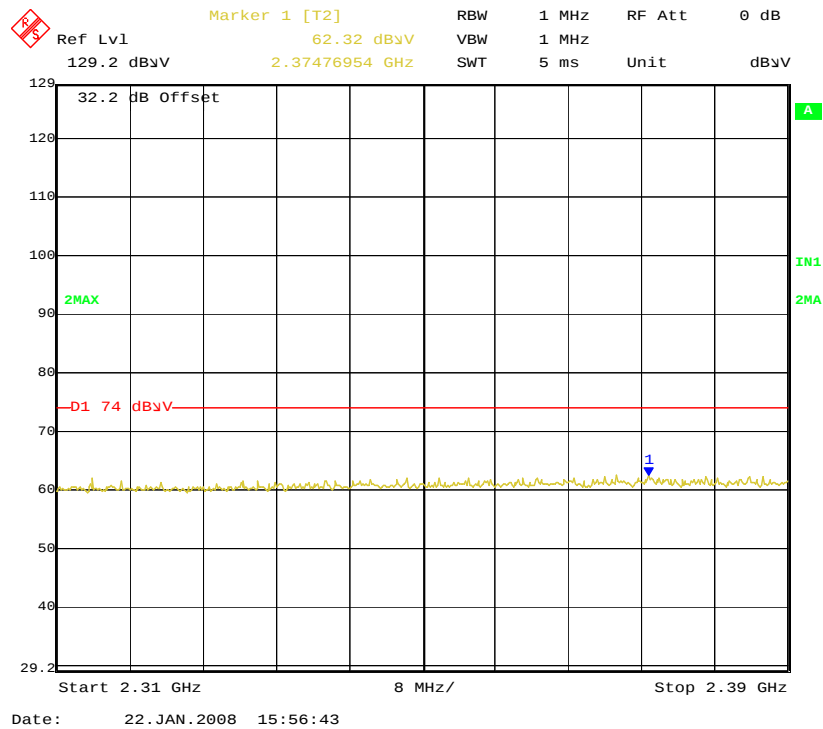
802.11b High Channel-Vertical Polarity –Average



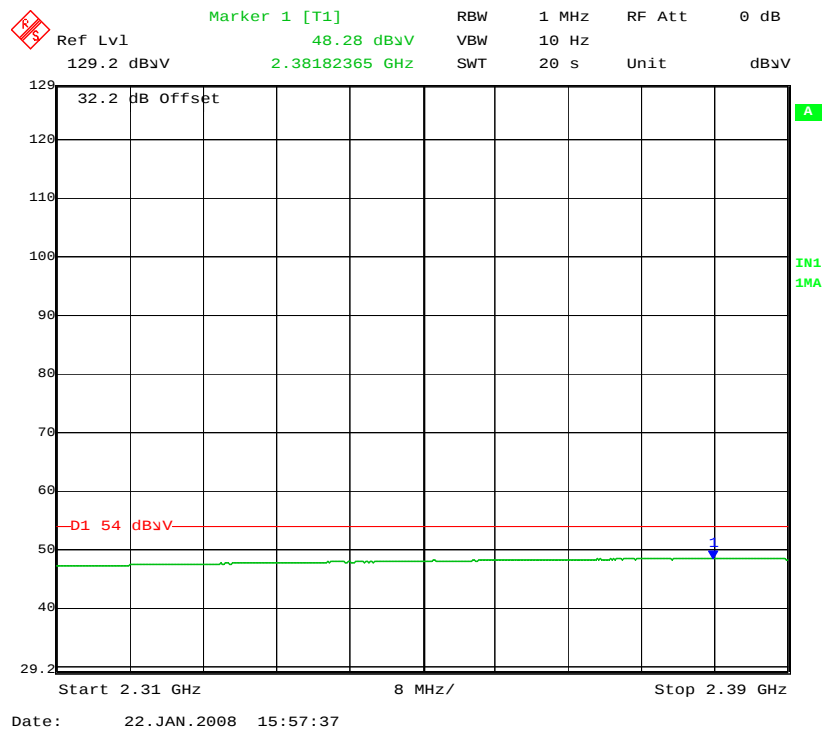
802.11g Low Channel-Horizontal Polarity –Peak



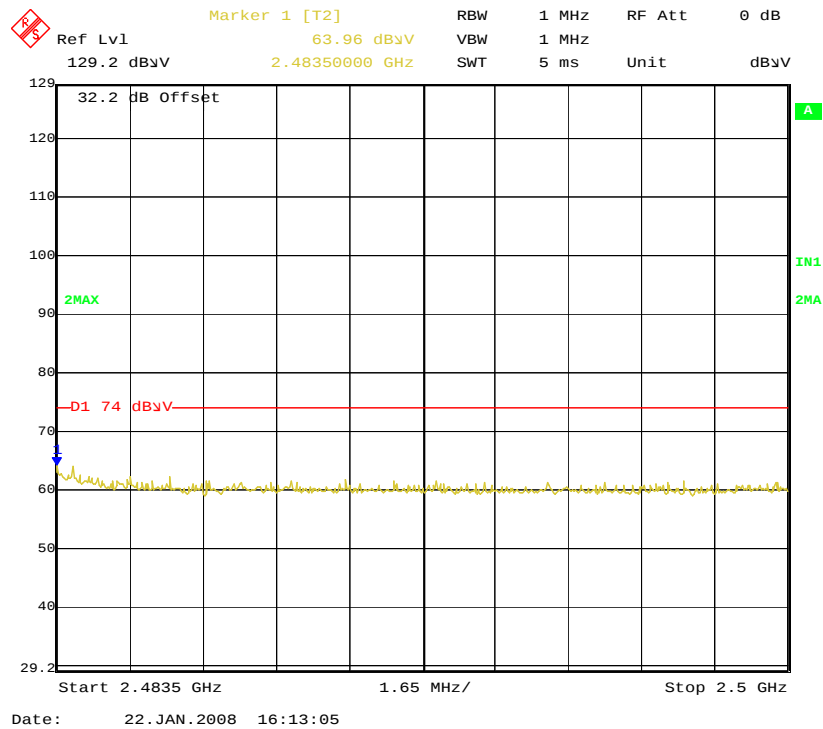
802.11g Low Channel-Horizontal Polarity –Average



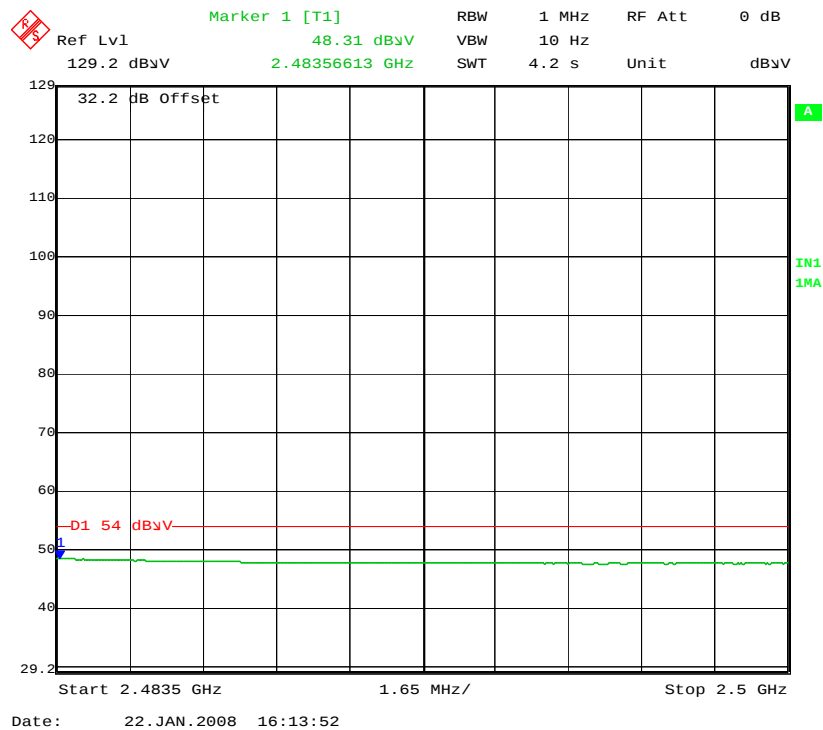
802.11g Low Channel-Vertical Polarity –Peak



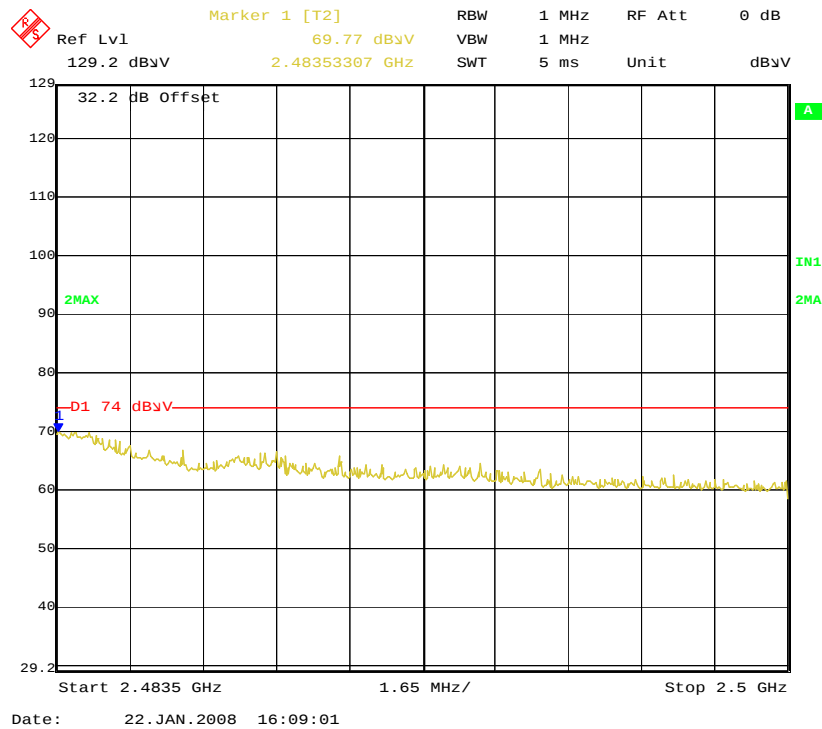
802.11g Low Channel-Vertical Polarity –Average



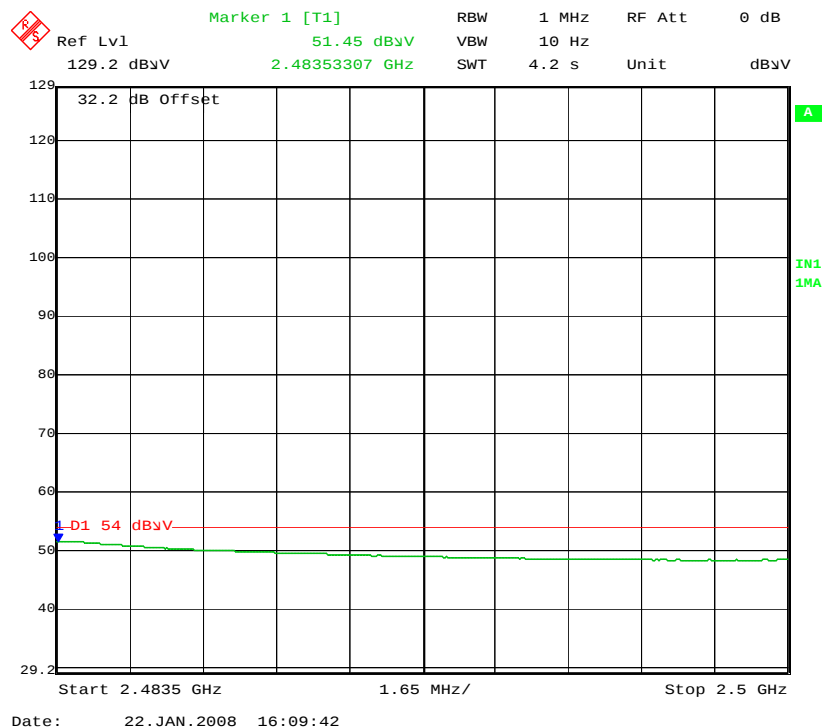
802.11g High Channel-Vertical Polarity –Peak



802.11g High Channel-Vertical Polarity –average

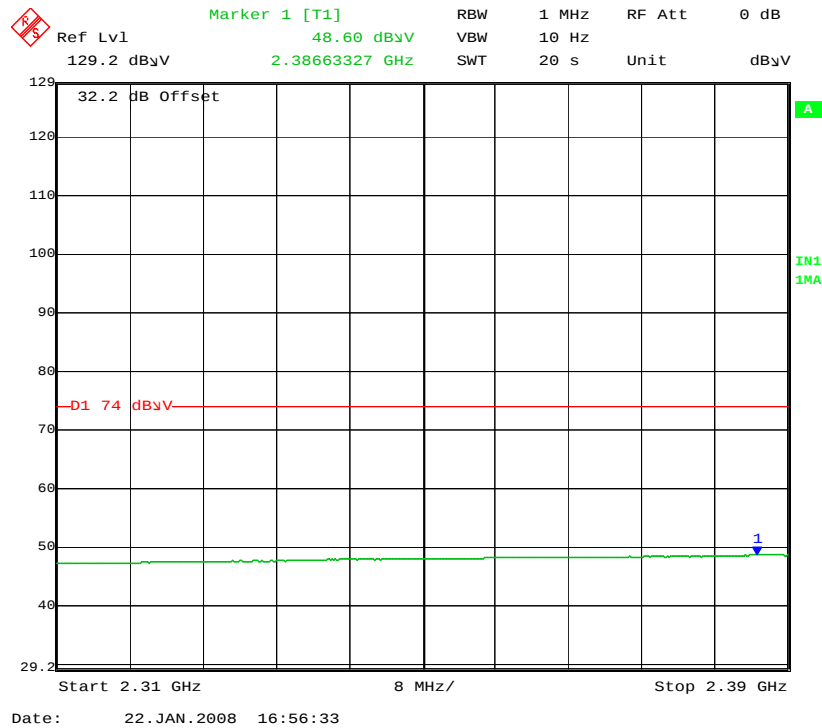


802.11g High Channel-Horizontal Polarity –Peak

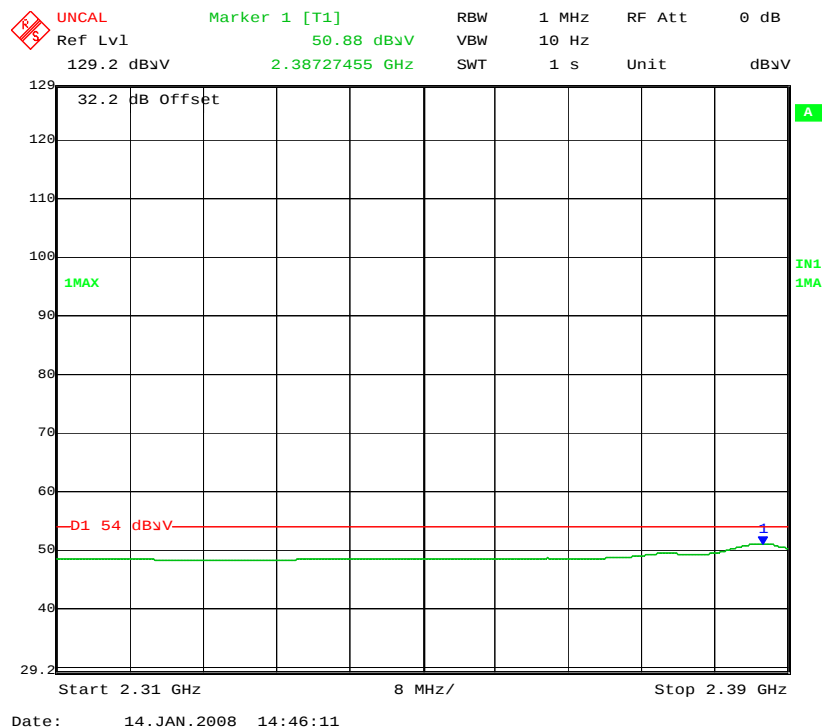


802.11g High Channel-Horizontal Polarity –Average

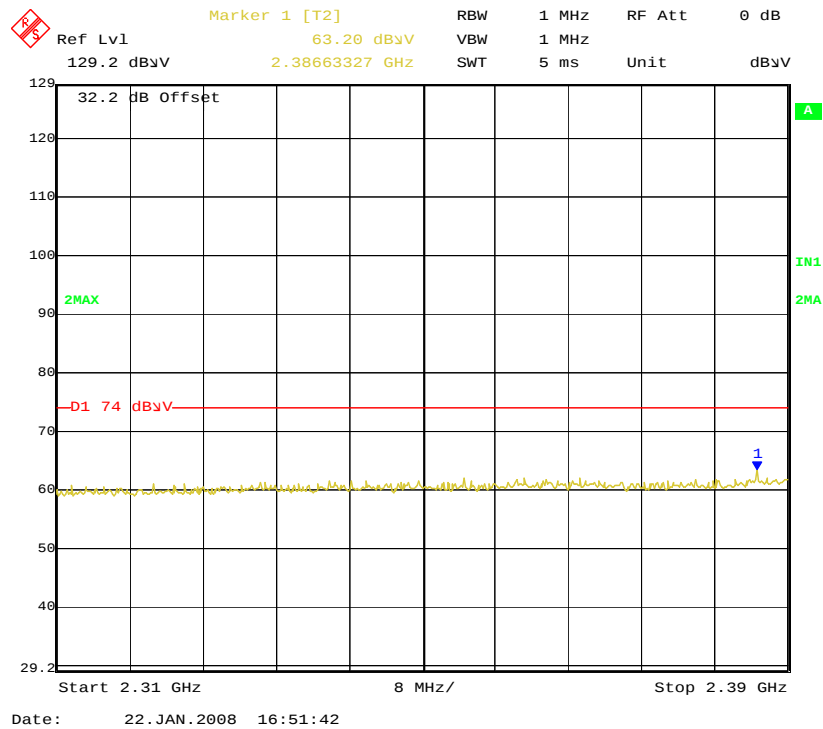
Antenna install type: Antenna permanently attached to the host EUT antenna port with external coaxial cable



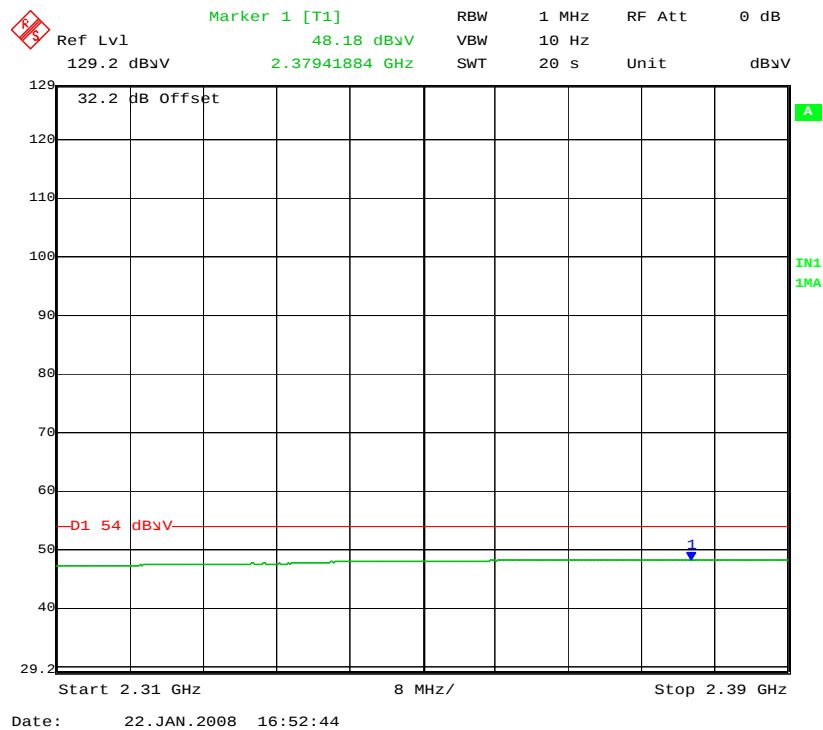
802.11b Low Channel-Vertical Polarity -Peak



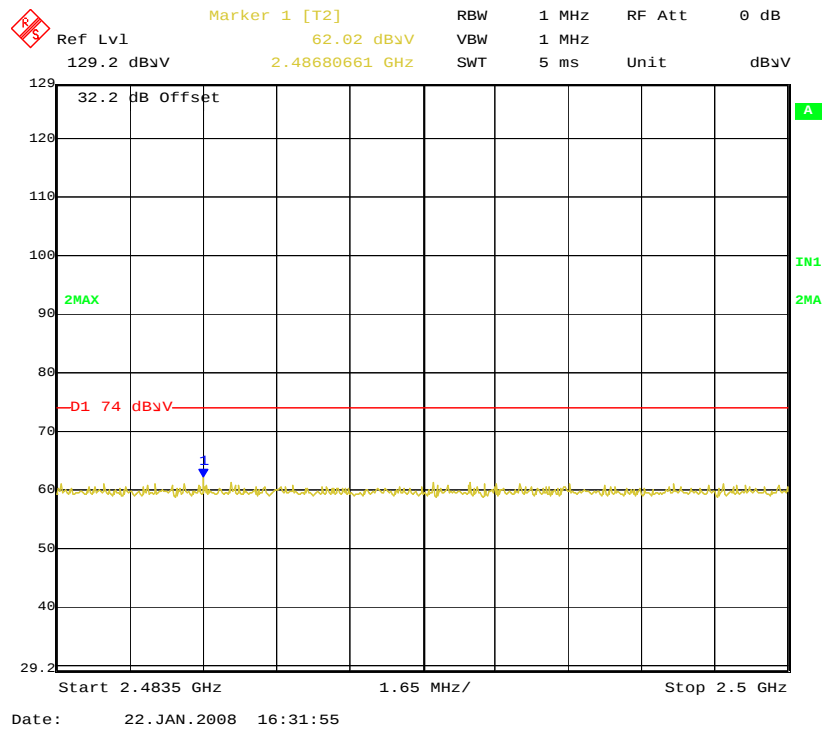
802.11b Low Channel-Vertical Polarity -Average



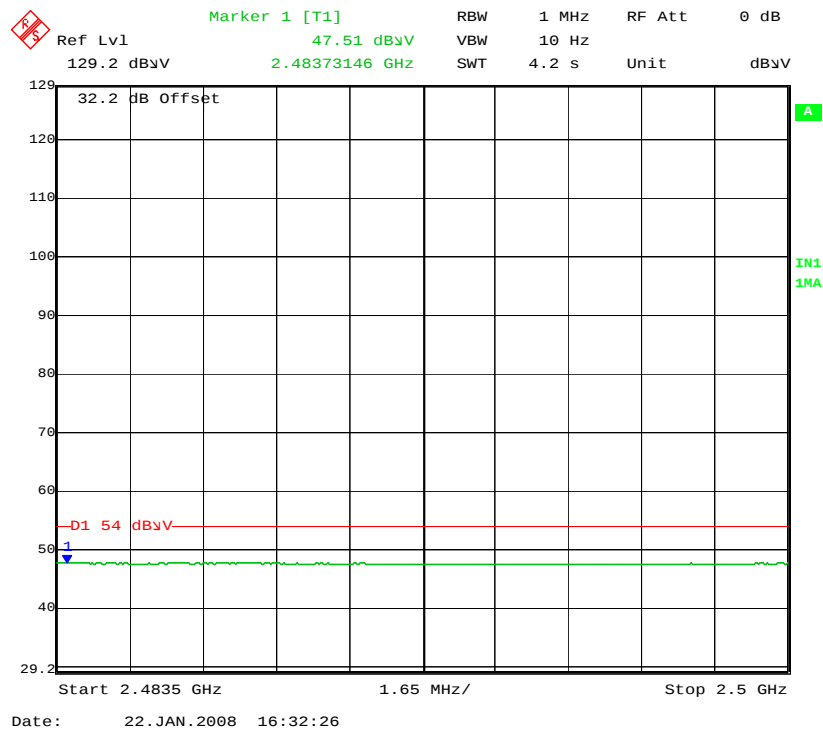
802.11b Low Channel-Horizontal Polarity –Peak



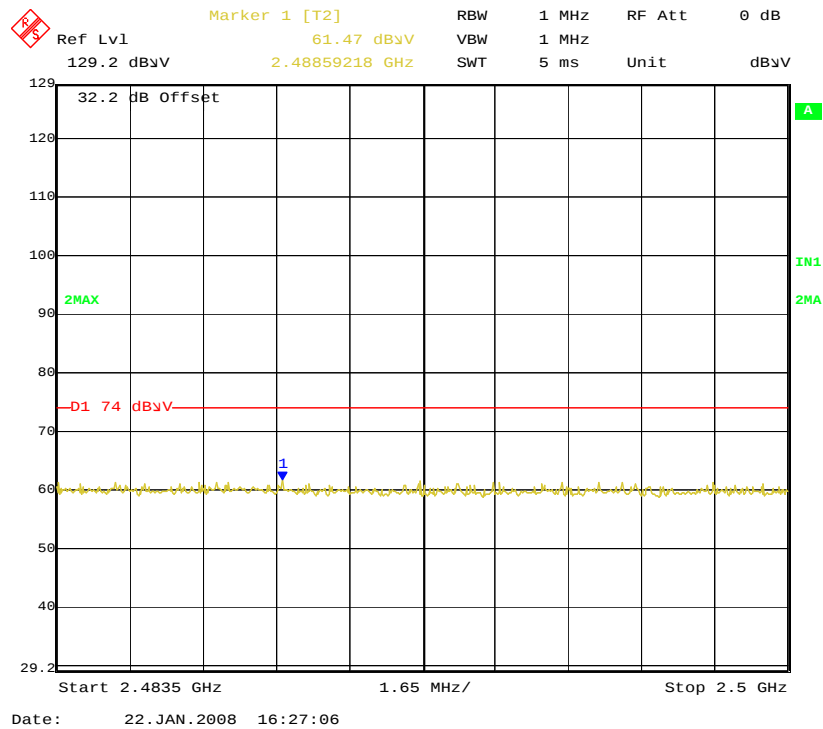
802.11b Low Channel-Horizontal Polarity -Average



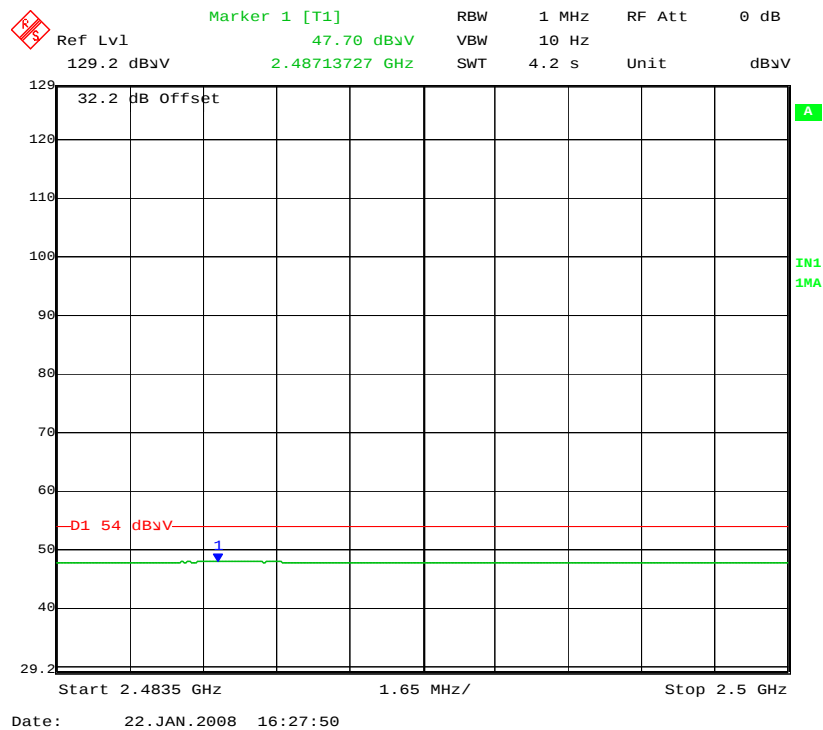
802.11b High Channel-Horizontal Polarity –Peak



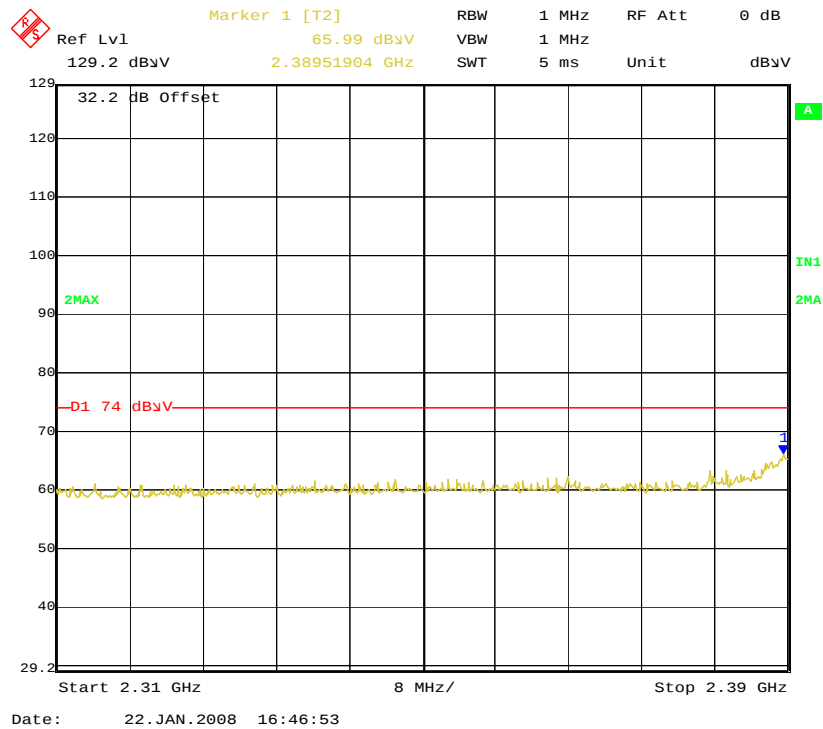
802.11b High Channel-Horizontal Polarity –Average



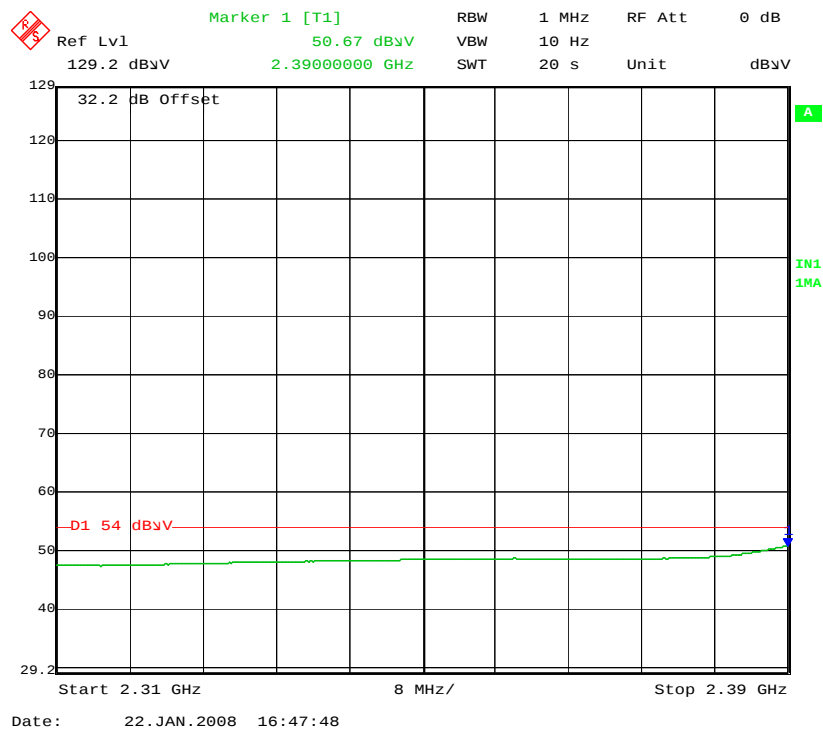
802.11b High Channel-Vertical Polarity –Peak



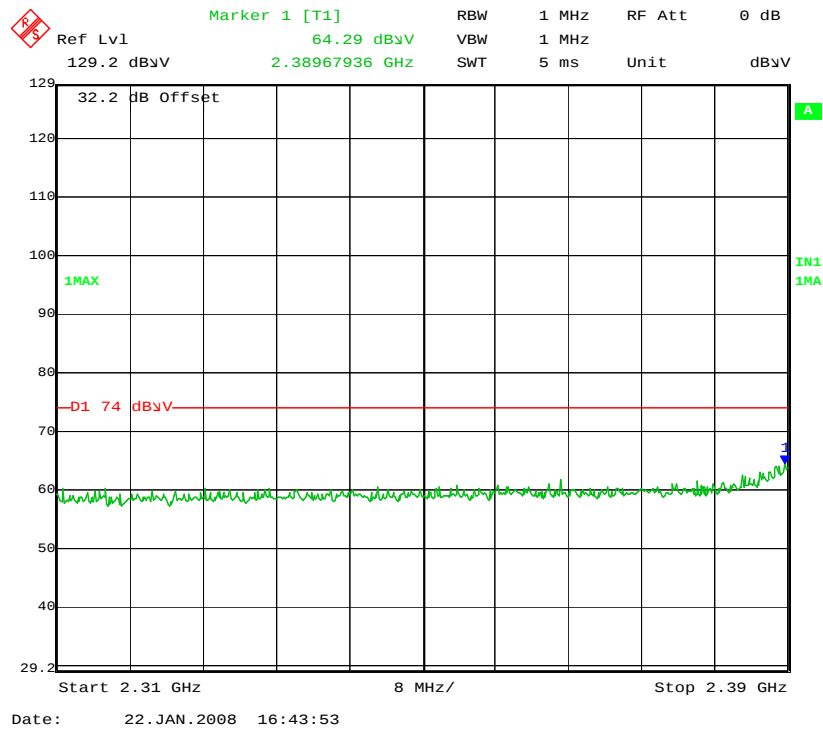
802.11b High Channel-Vertical Polarity –Average



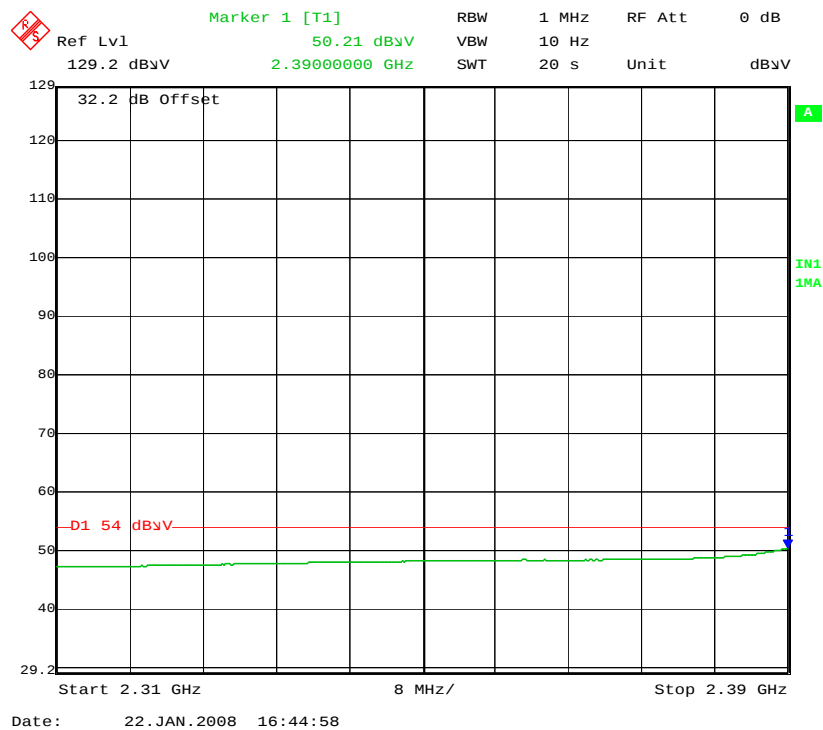
802.11g Low Channel-Horizontal Polarity –Peak



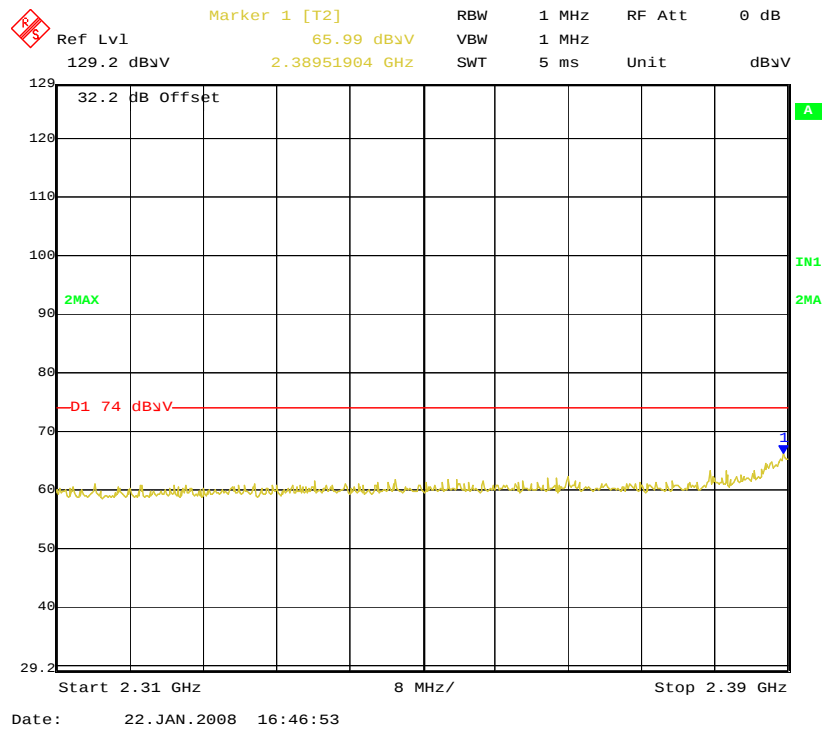
802.11g Low Channel-Horizontal Polarity –Average



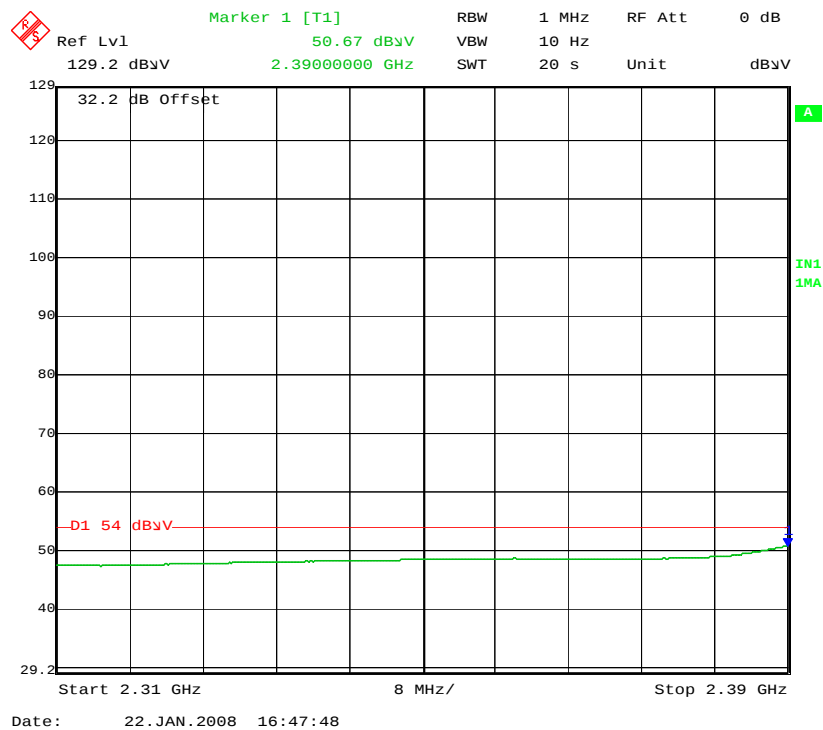
802.11g Low Channel-Vertical Polarity –Peak



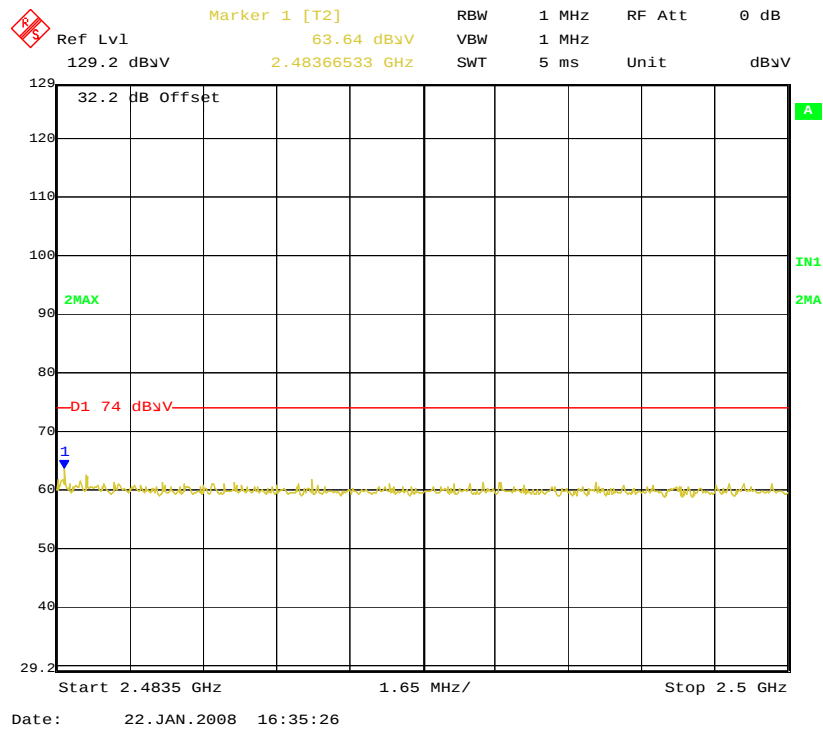
802.11g Low Channel-Vertical Polarity –Average



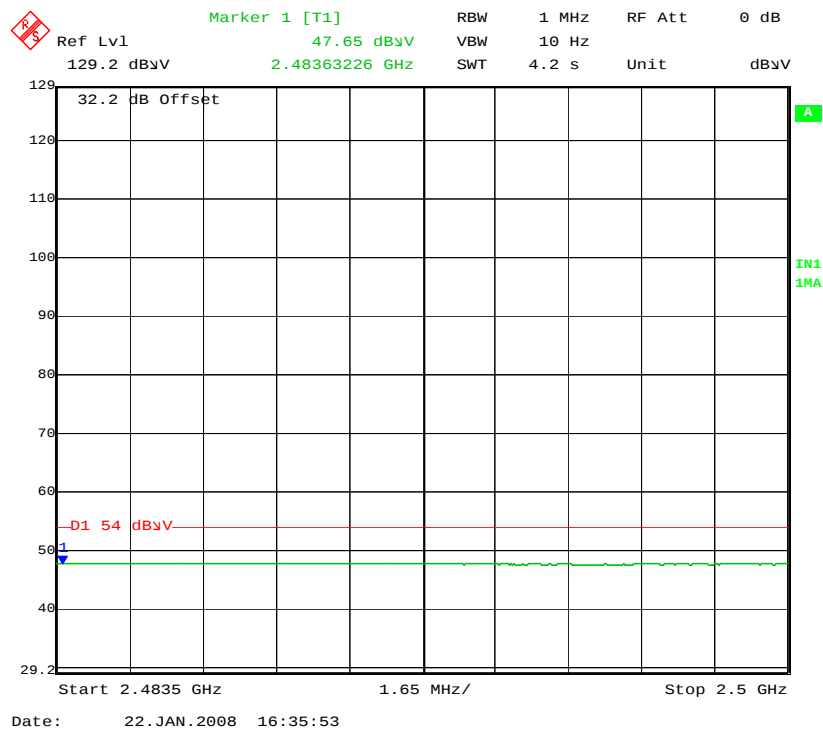
802.11g High Channel-Vertical Polarity –Peak



802.11g High Channel-Vertical Polarity –average



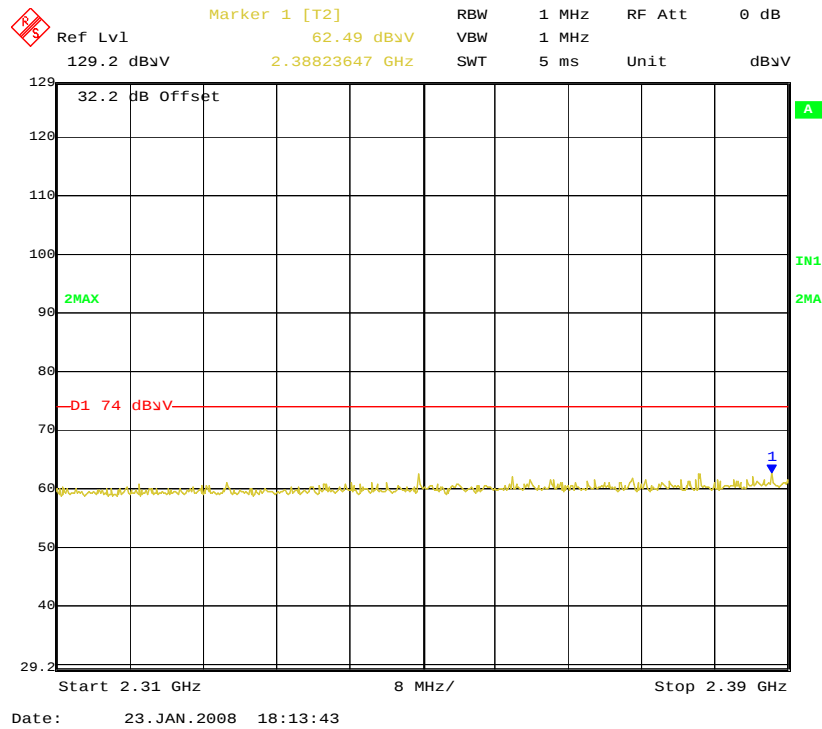
802.11g High Channel-Horizontal Polarity –Peak



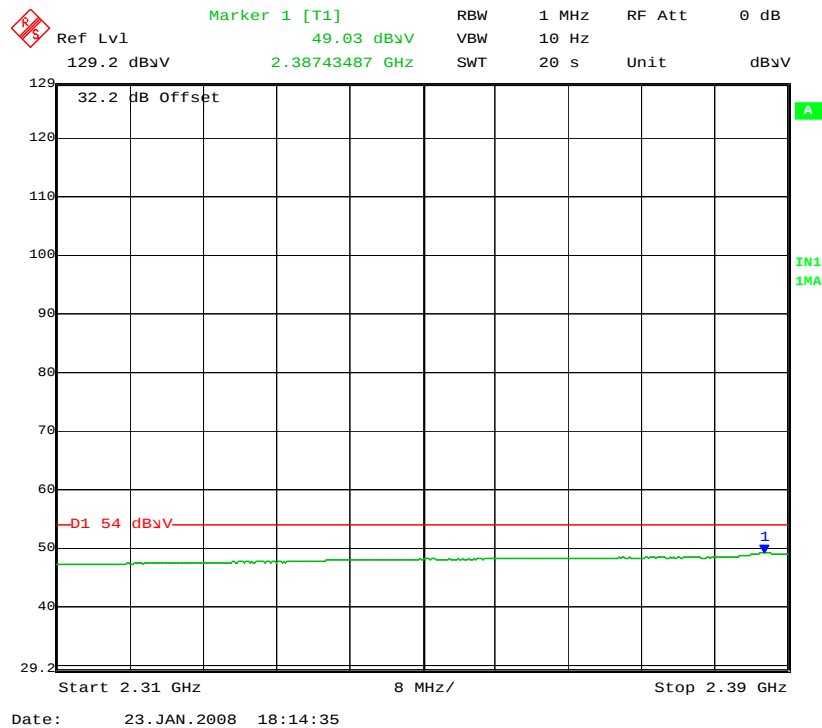
802.11g High Channel-Horizontal Polarity –Average

Host EUT: **ZM600**

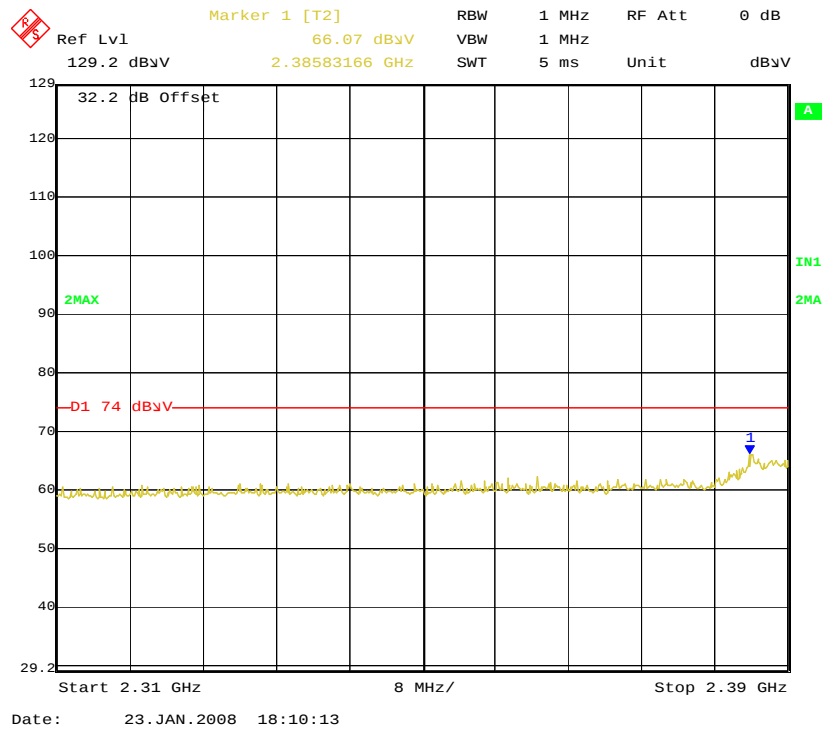
Antenna install type: Antenna permanently attached to the host EUT antenna port.



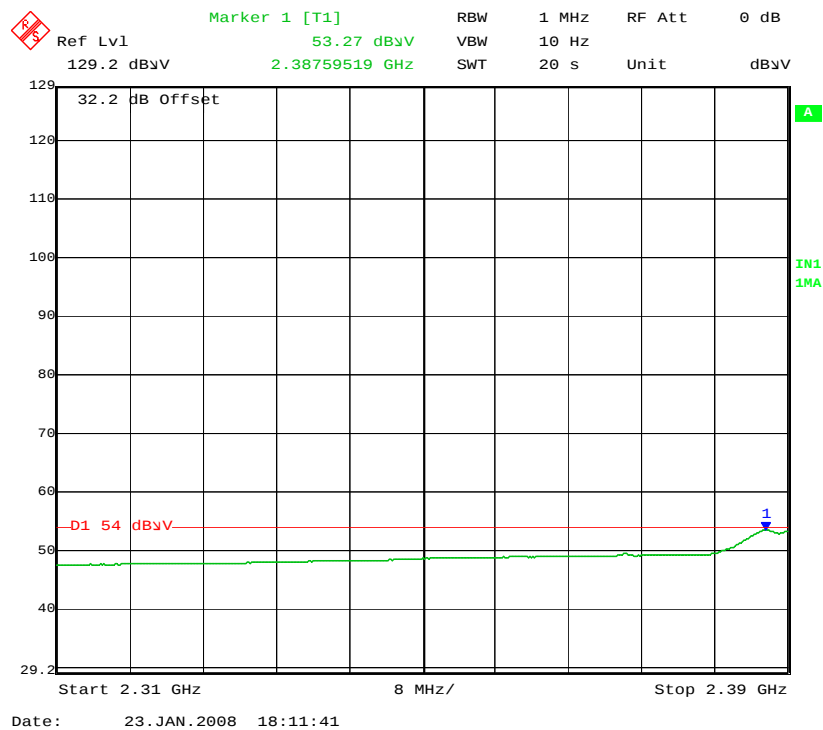
802.11b Low Channel-Vertical Polarity -Peak



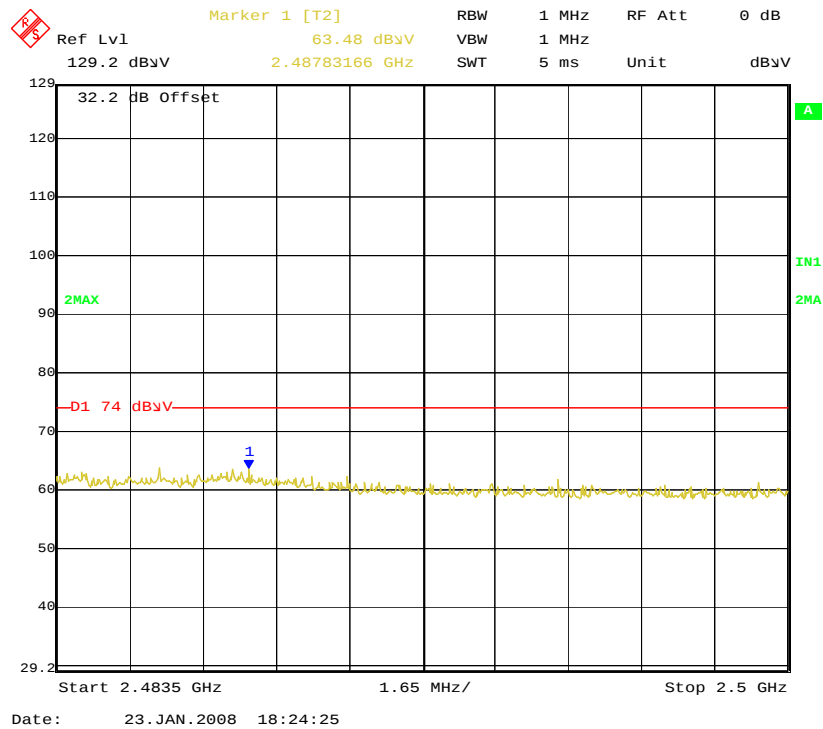
802.11b Low Channel-Vertical Polarity -Average



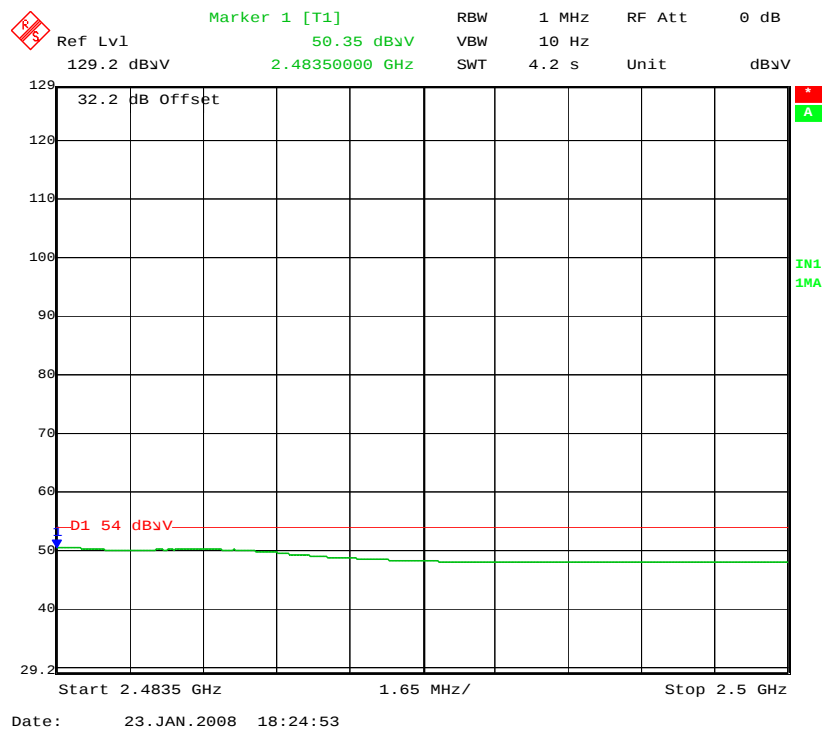
802.11b Low Channel-Horizontal Polarity –Peak



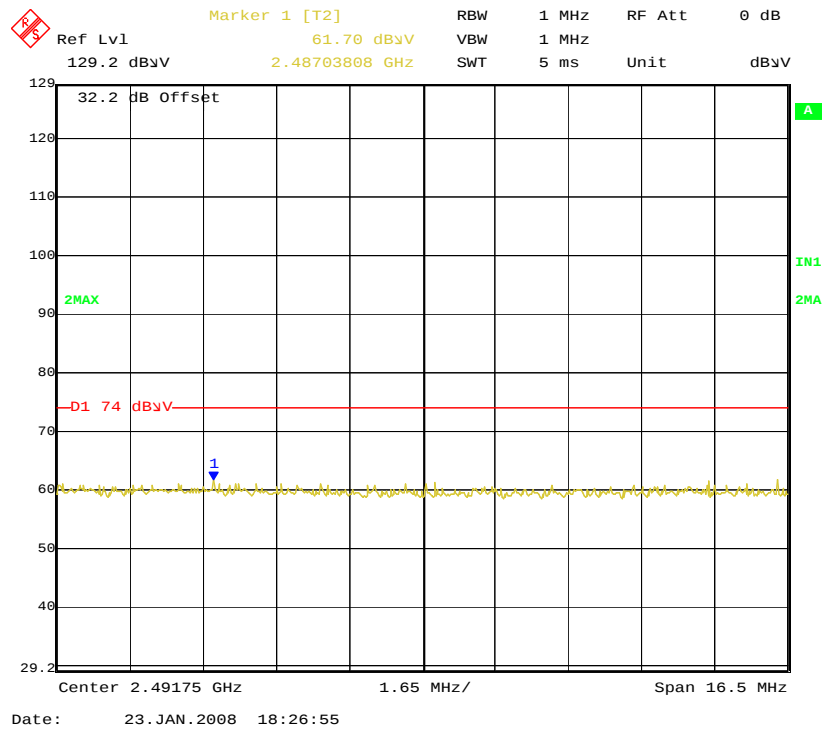
802.11b Low Channel-Horizontal Polarity -Average



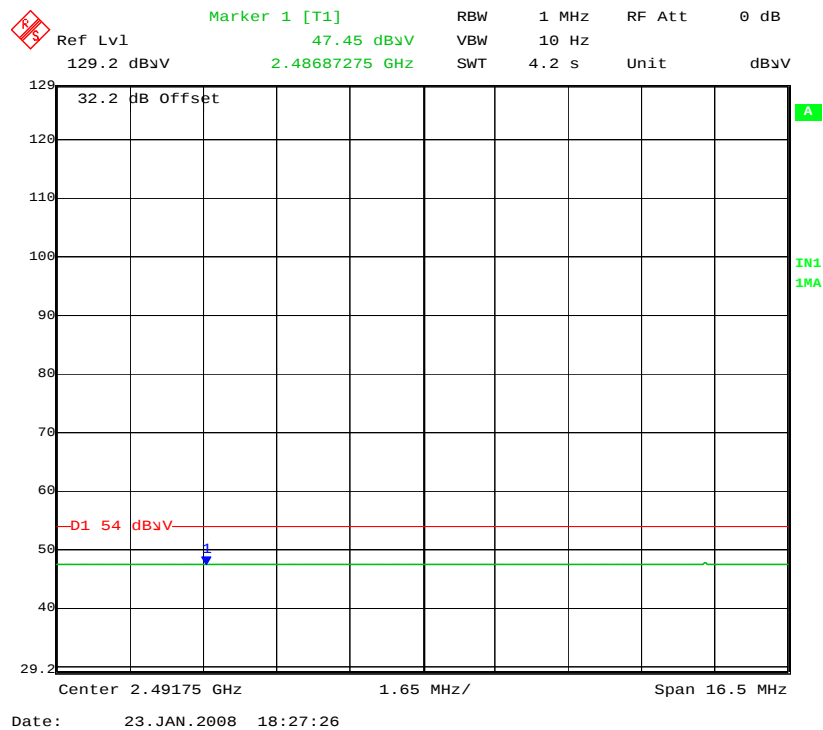
802.11b High Channel-Horizontal Polarity –Peak



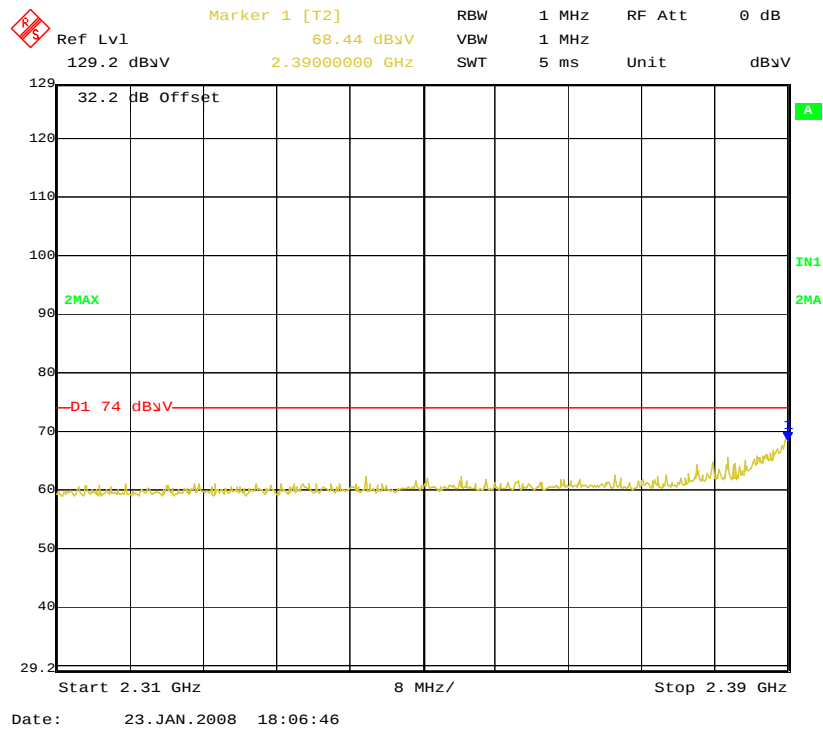
802.11b High Channel-Horizontal Polarity –Average



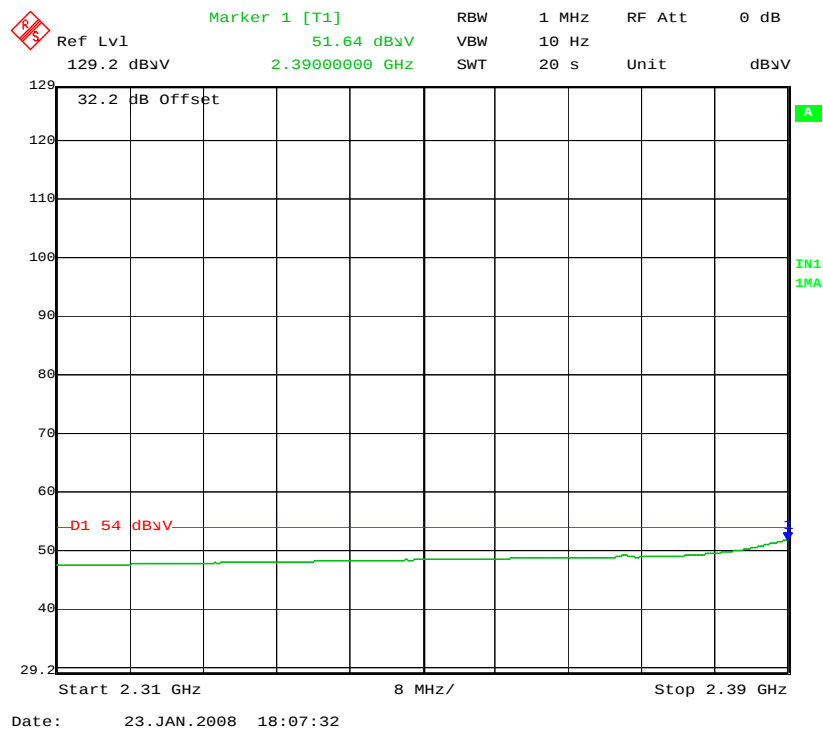
802.11b High Channel-Vertical Polarity –Peak



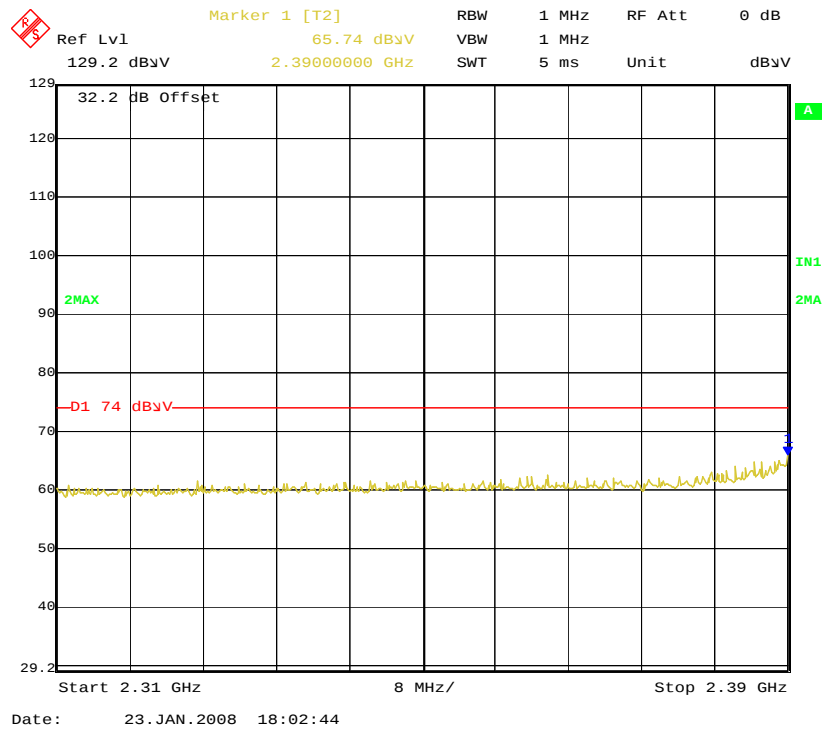
802.11b High Channel-Vertical Polarity –Average



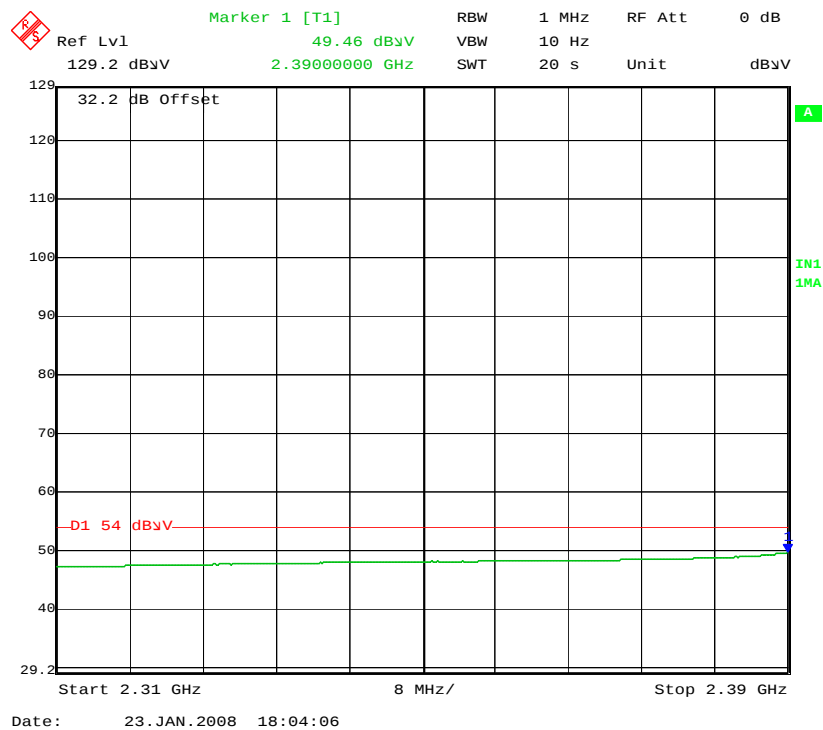
802.11g Low Channel-Horizontal Polarity –Peak



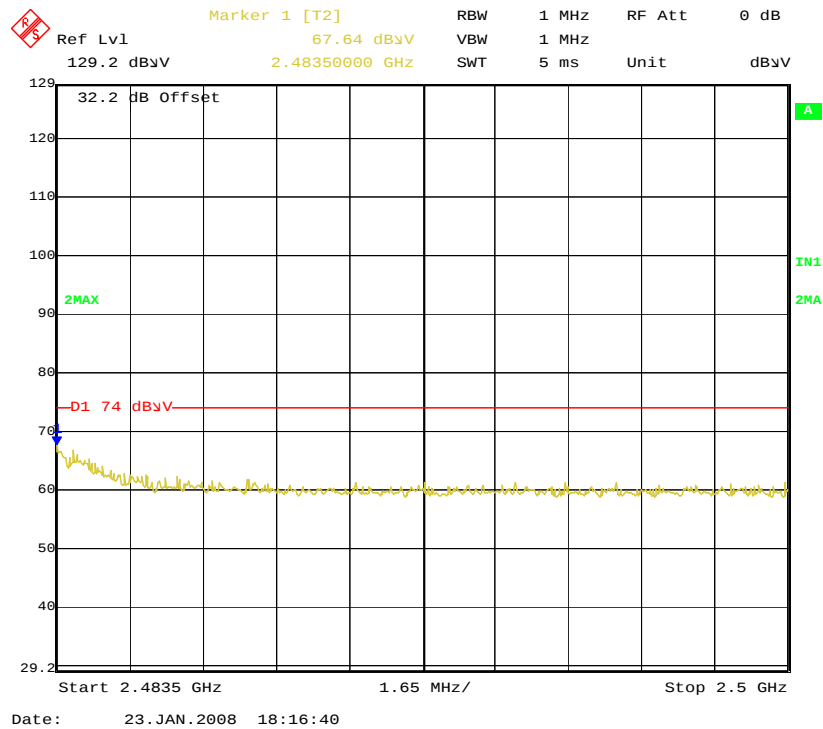
802.11g Low Channel-Horizontal Polarity –Average



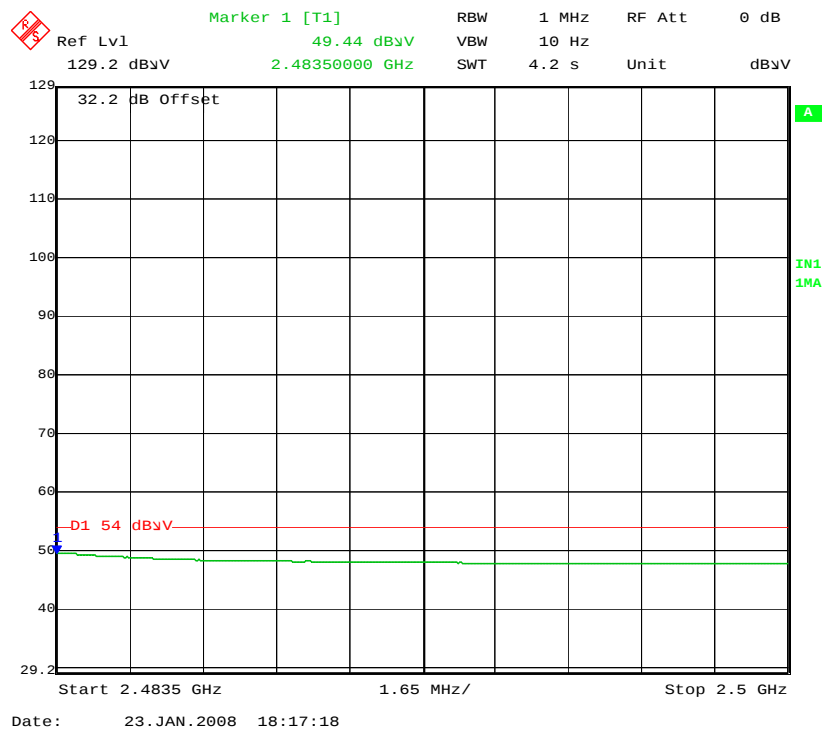
802.11g Low Channel-Vertical Polarity –Peak



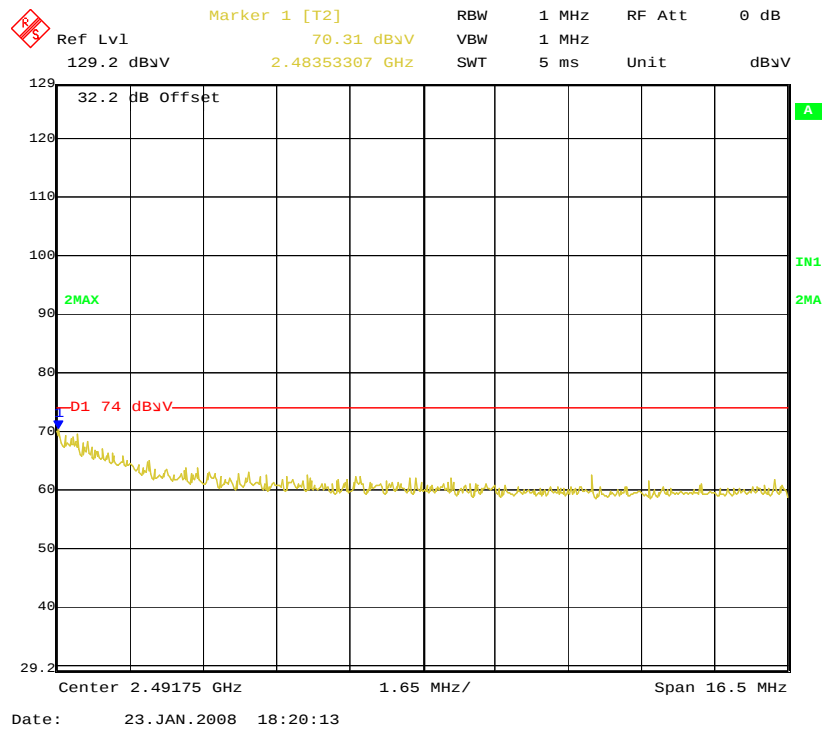
802.11g Low Channel-Vertical Polarity –Average



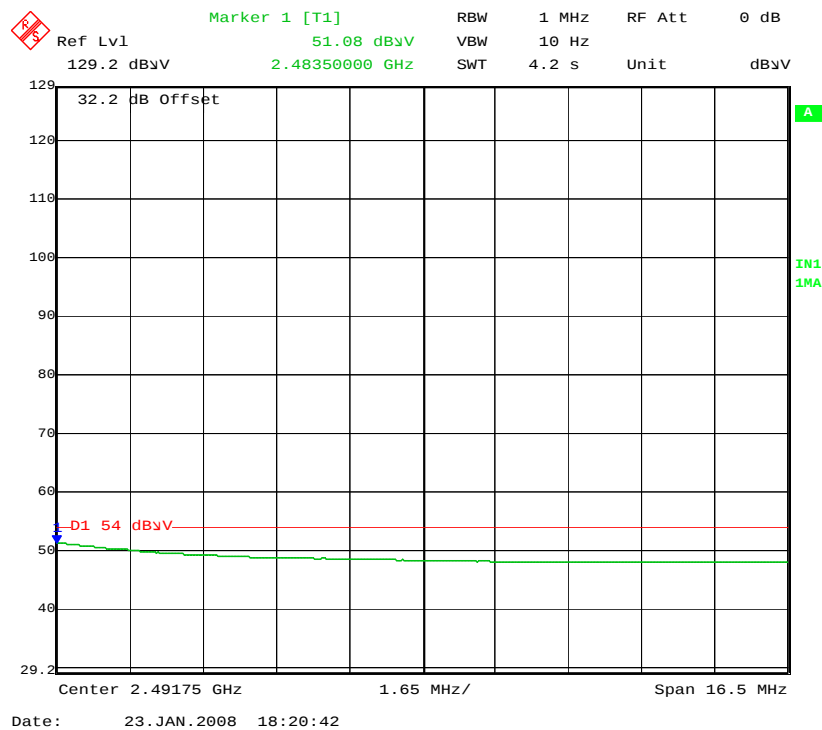
802.11g High Channel-Vertical Polarity –Peak



802.11g High Channel-Vertical Polarity –average

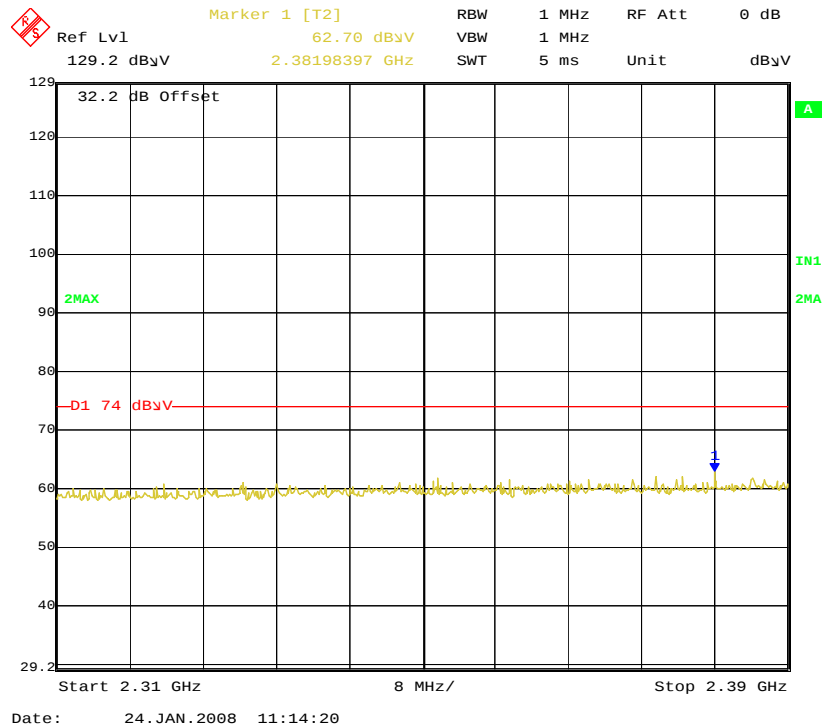


802.11g High Channel-Horizontal Polarity –Peak

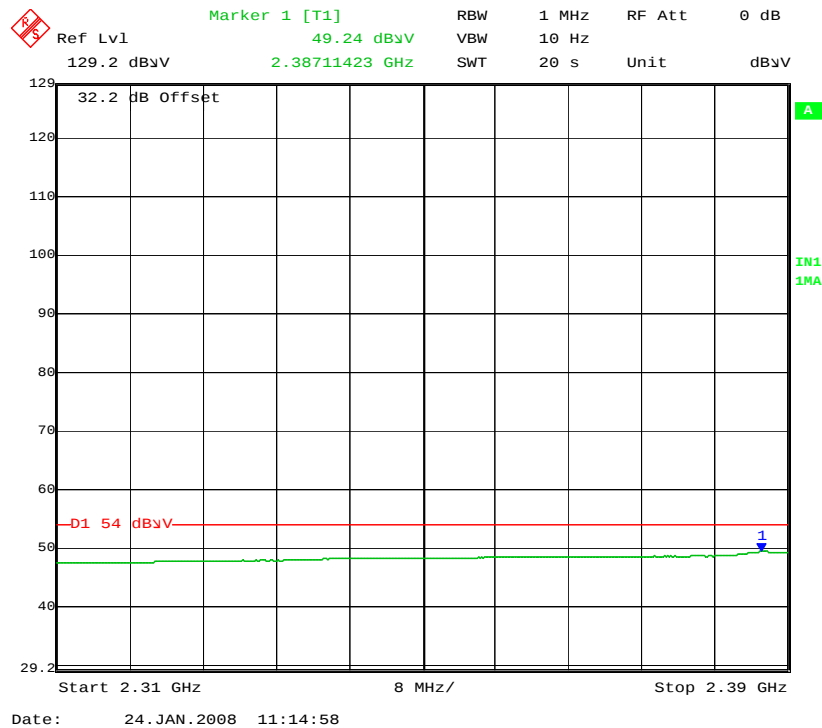


802.11g High Channel-Horizontal Polarity –Average

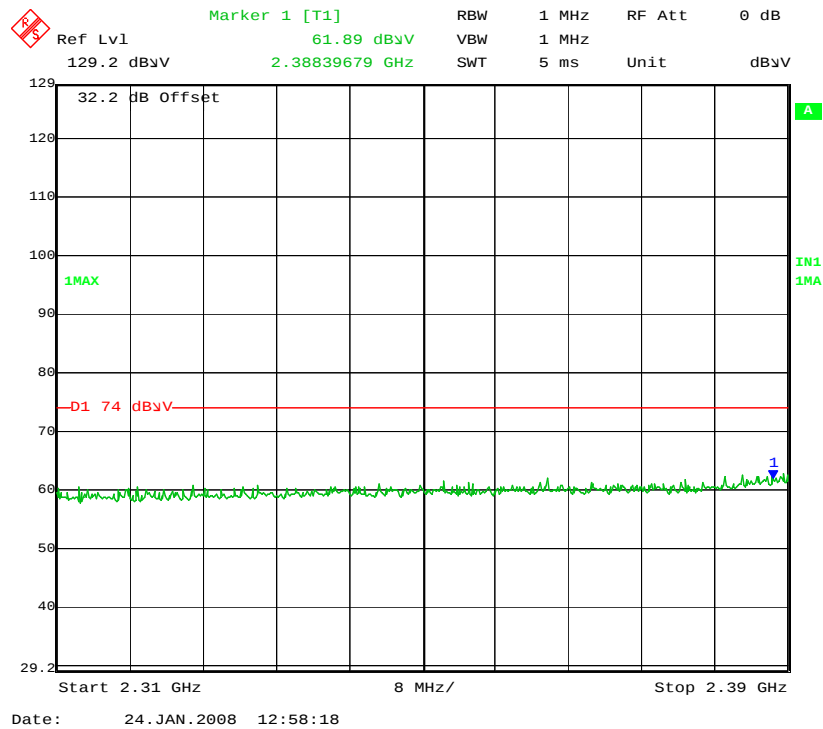
Antenna install type: Antenna permanently attached to the host EUT antenna port with external coaxial cable



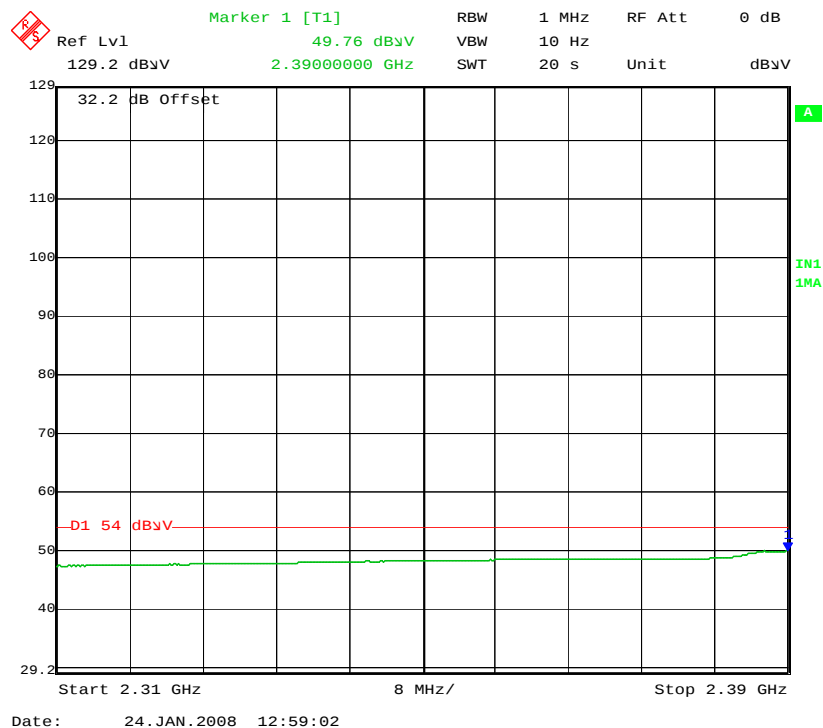
802.11b Low Channel-Vertical Polarity -Peak



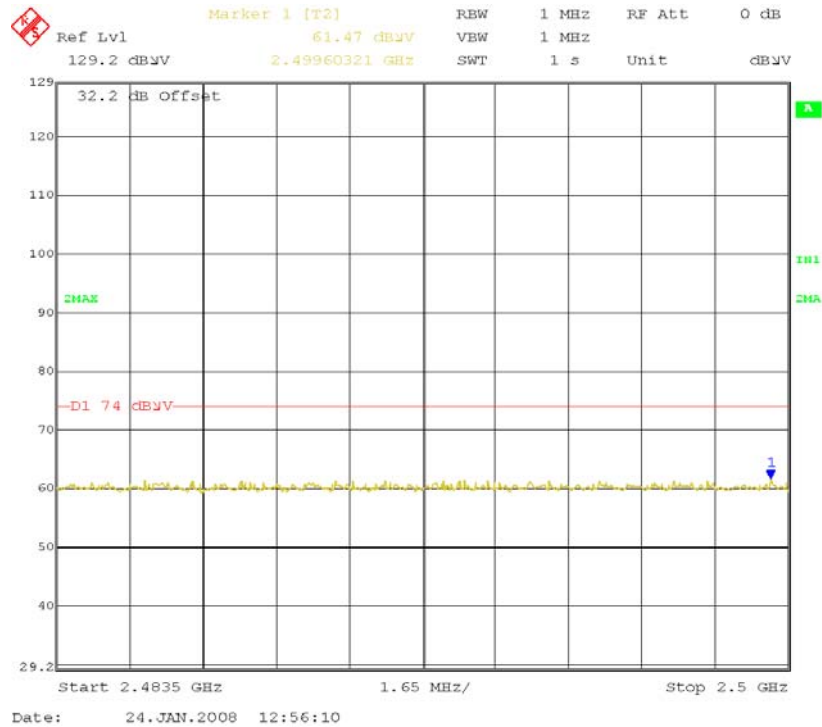
802.11b Low Channel-Vertical Polarity -Average



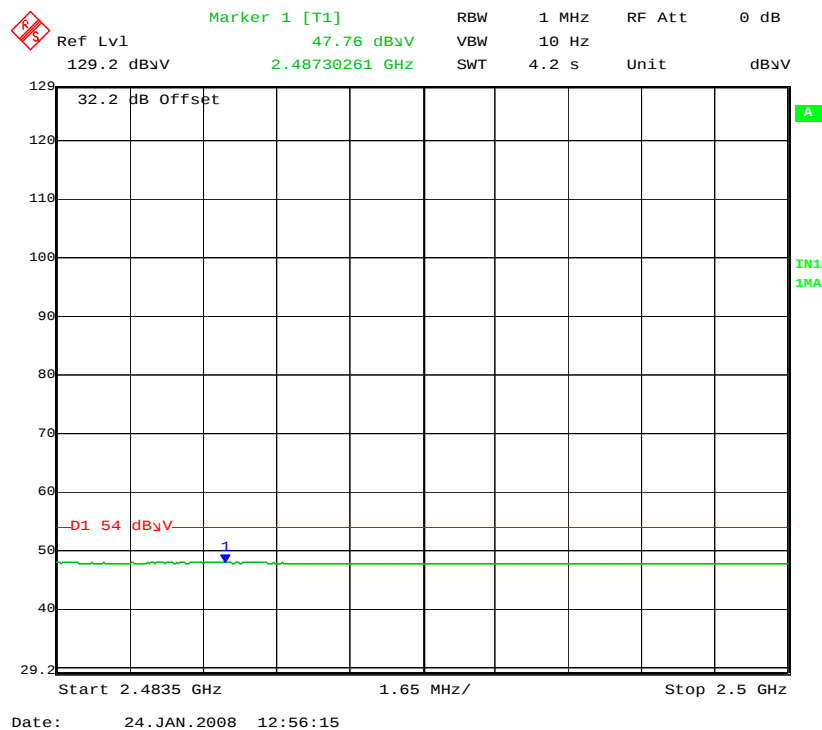
802.11b Low Channel-Horizontal Polarity –Peak



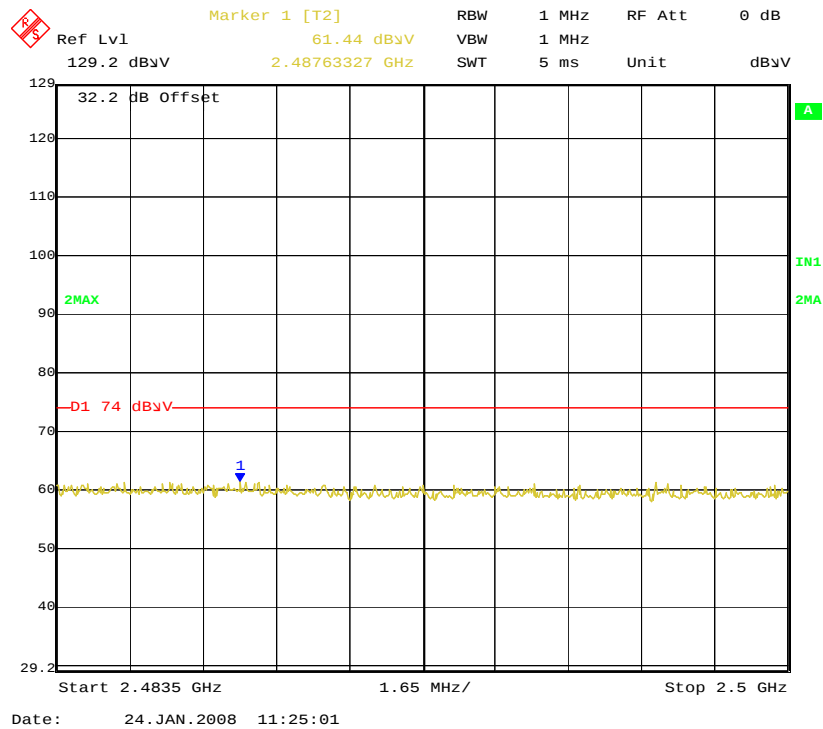
802.11b Low Channel-Horizontal Polarity -Average



802.11b High Channel-Horizontal Polarity –Peak



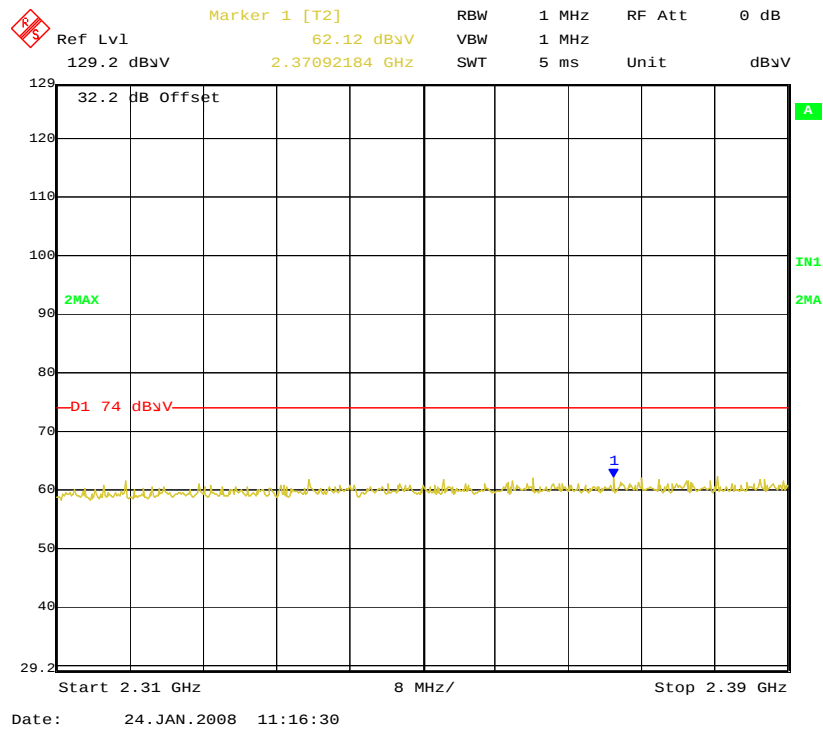
802.11b High Channel-Horizontal Polarity –Average



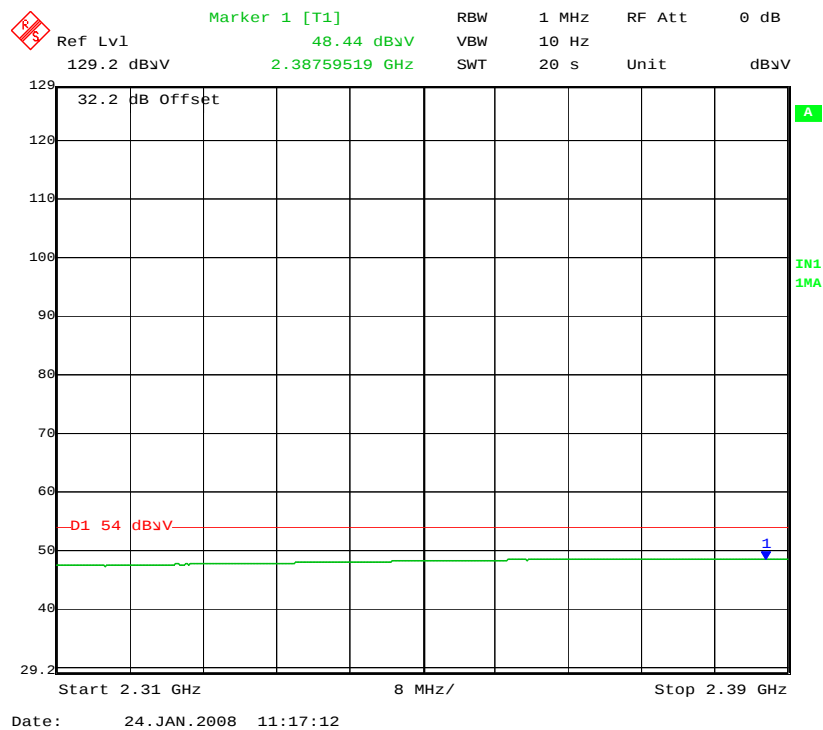
802.11b High Channel-Vertical Polarity –Peak



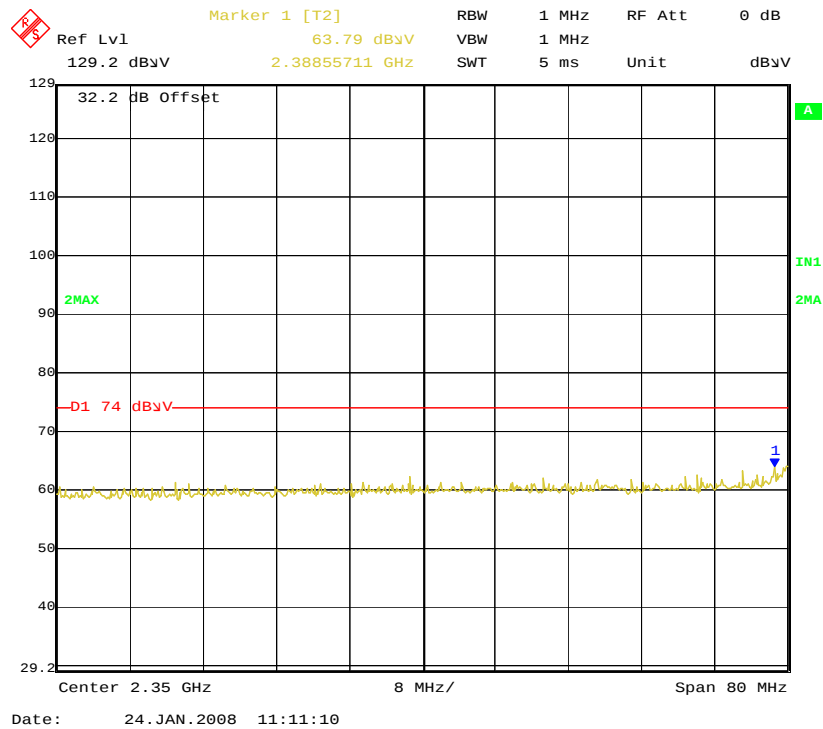
802.11b High Channel-Vertical Polarity –Average



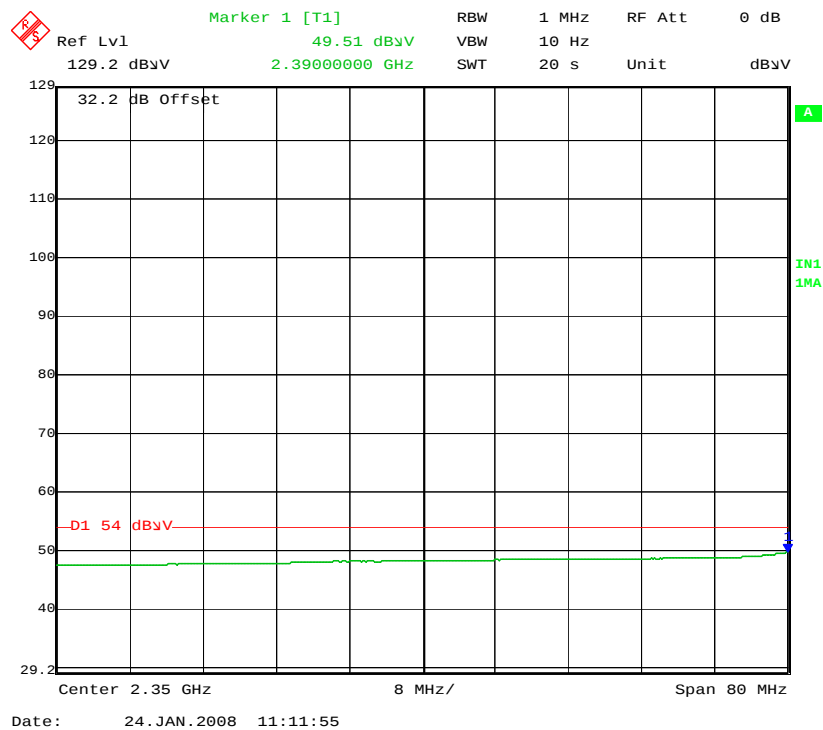
802.11g Low Channel-Horizontal Polarity –Peak



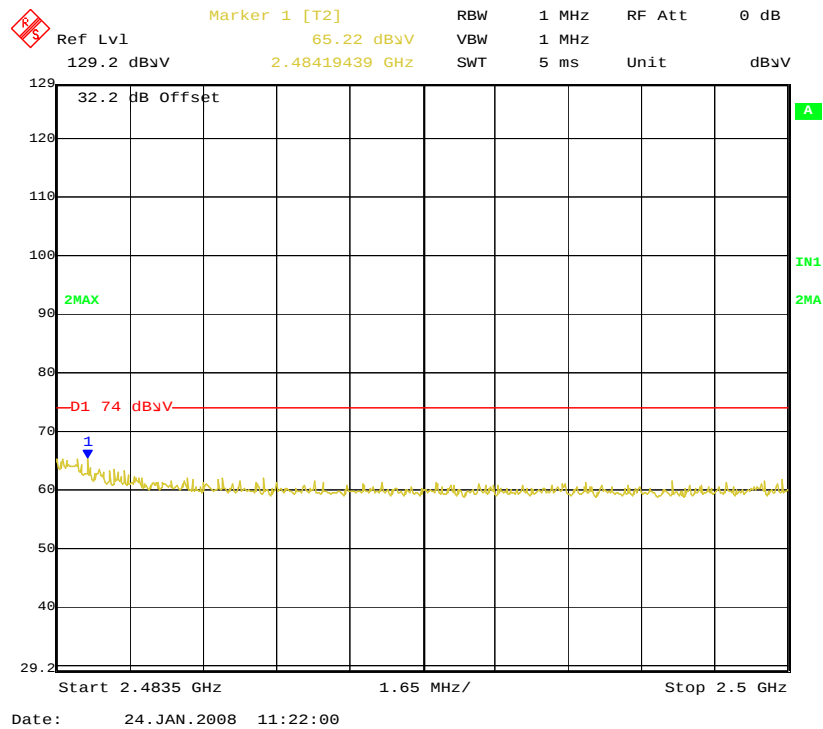
802.11g Low Channel-Horizontal Polarity –Average



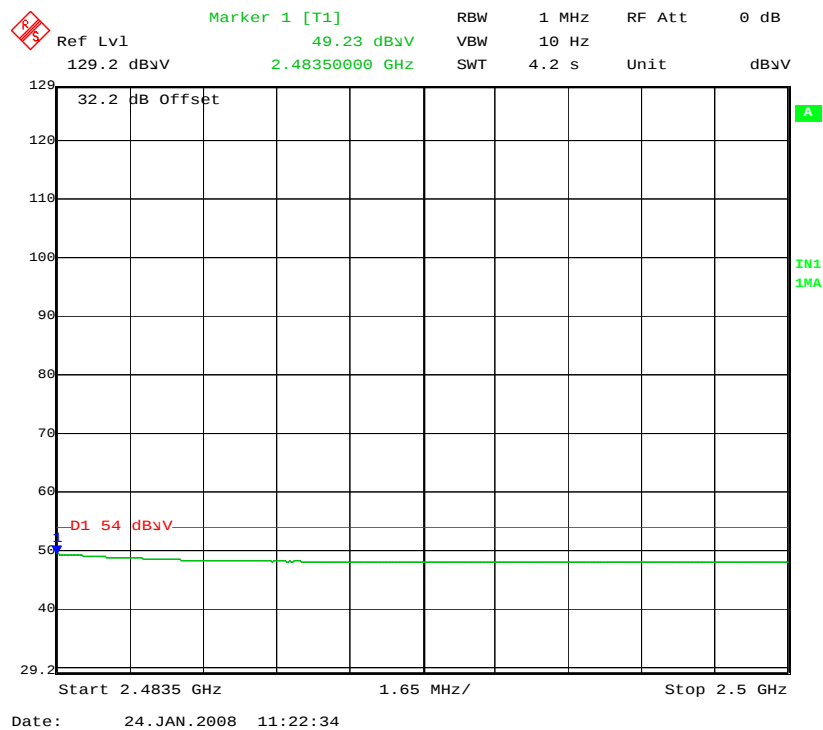
802.11g Low Channel-Vertical Polarity –Peak



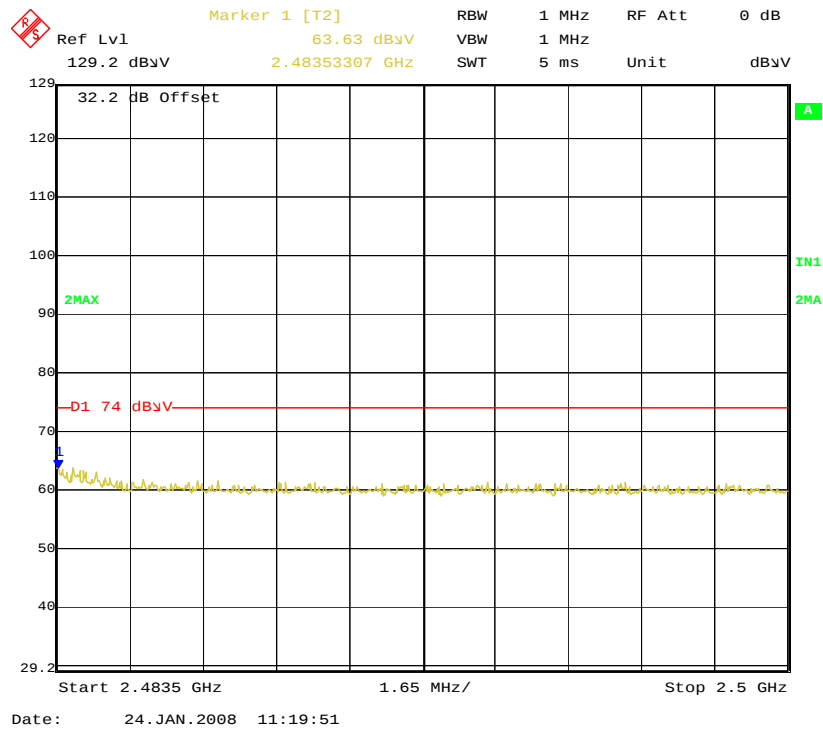
802.11g Low Channel-Vertical Polarity –Average



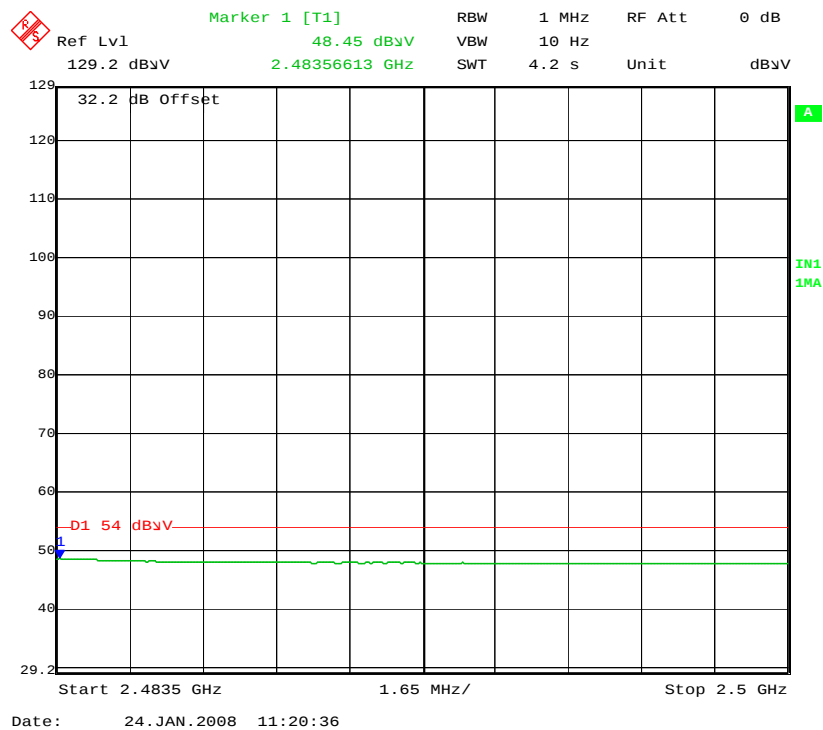
802.11g High Channel-Vertical Polarity –Peak



802.11g High Channel-Vertical Polarity –average



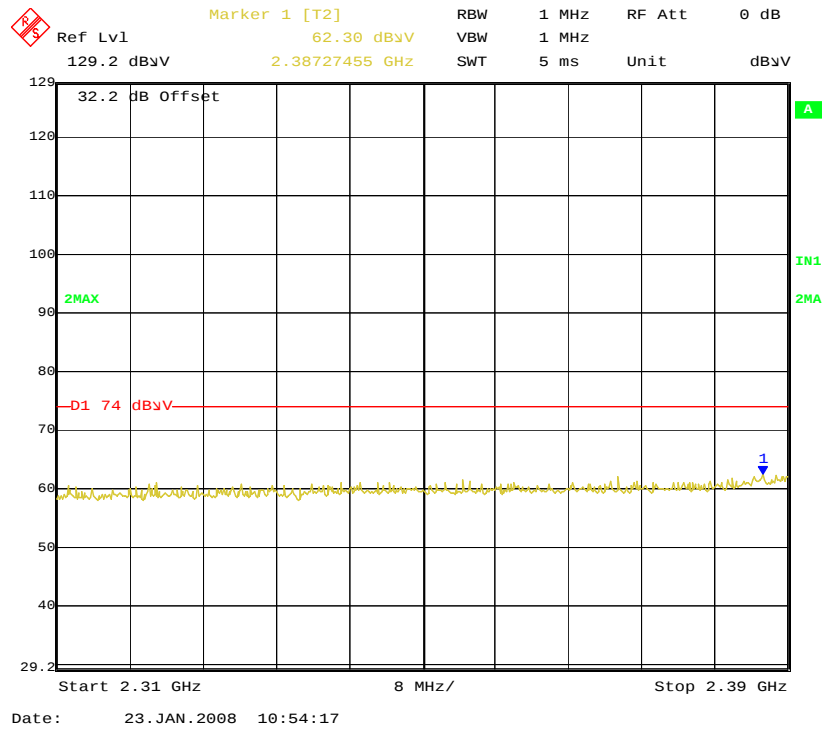
802.11g High Channel-Horizontal Polarity –Peak



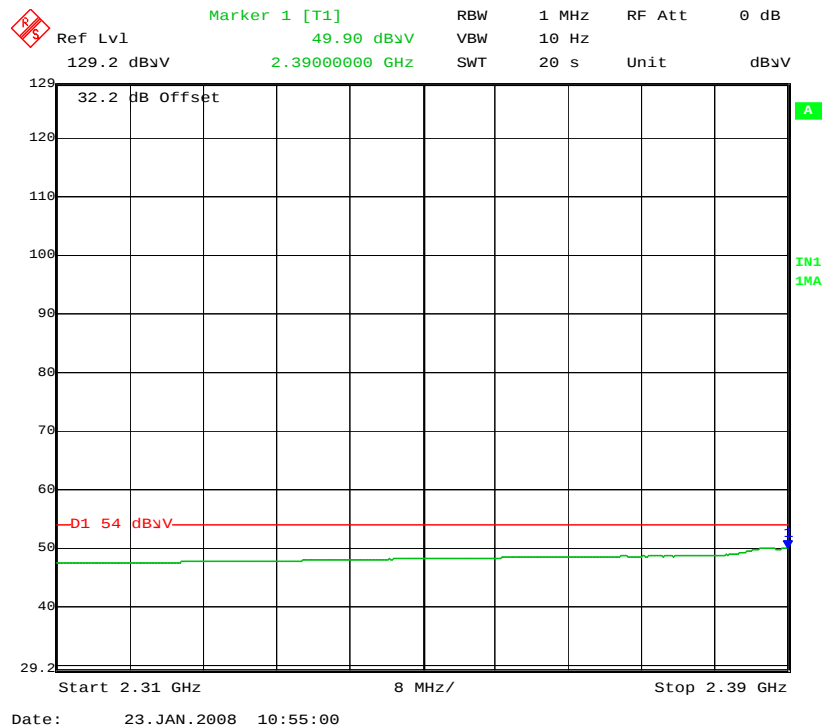
802.11g High Channel-Horizontal Polarity –Average

Host EUT: **ZM400**

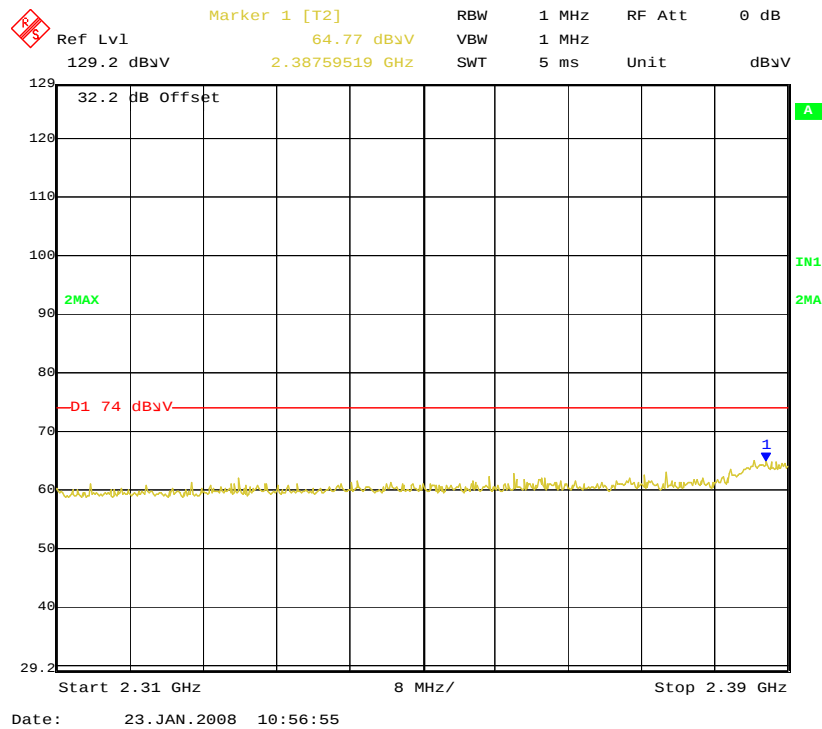
Antenna install type: Antenna permanently attached to the host EUT antenna port.



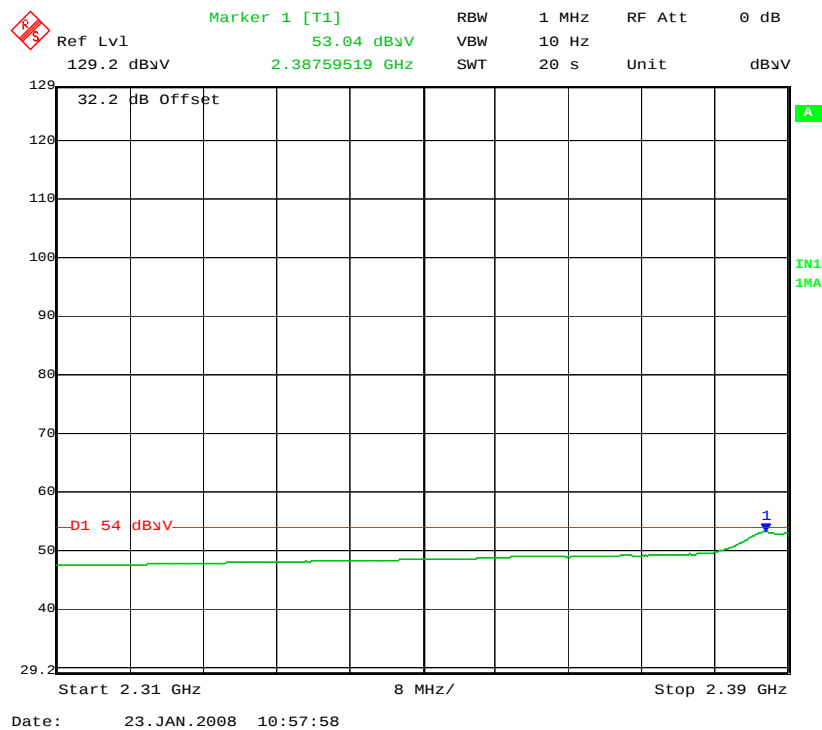
802.11b Low Channel-Vertical Polarity -Peak



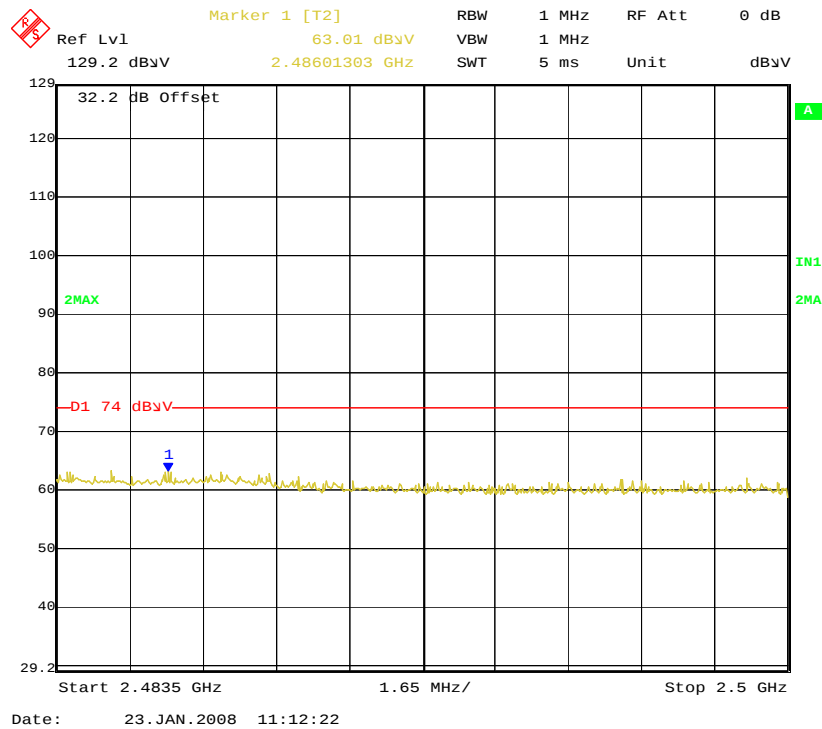
802.11b Low Channel-Vertical Polarity -Average



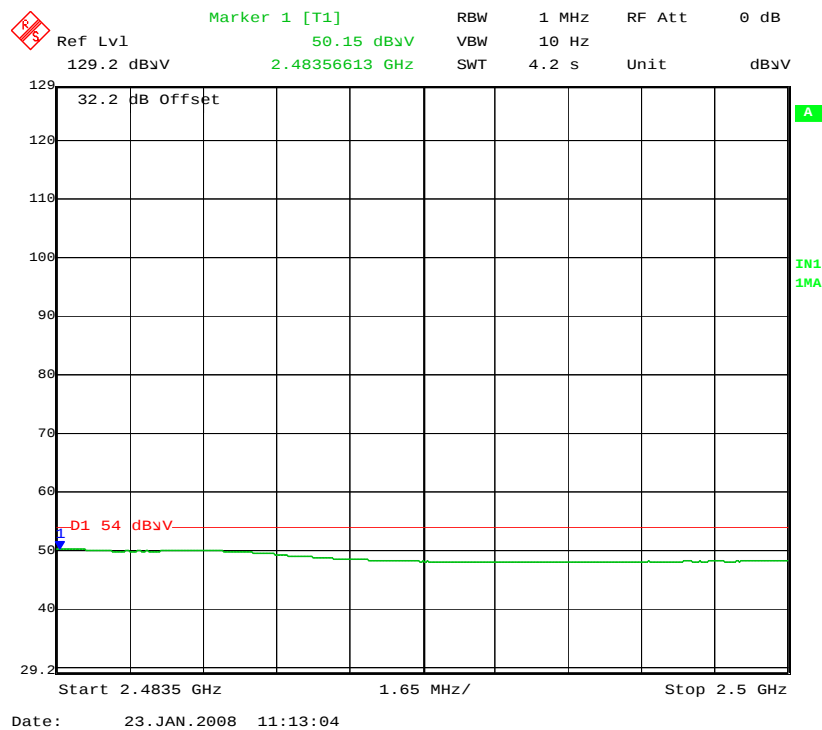
802.11b Low Channel-Horizontal Polarity –Peak



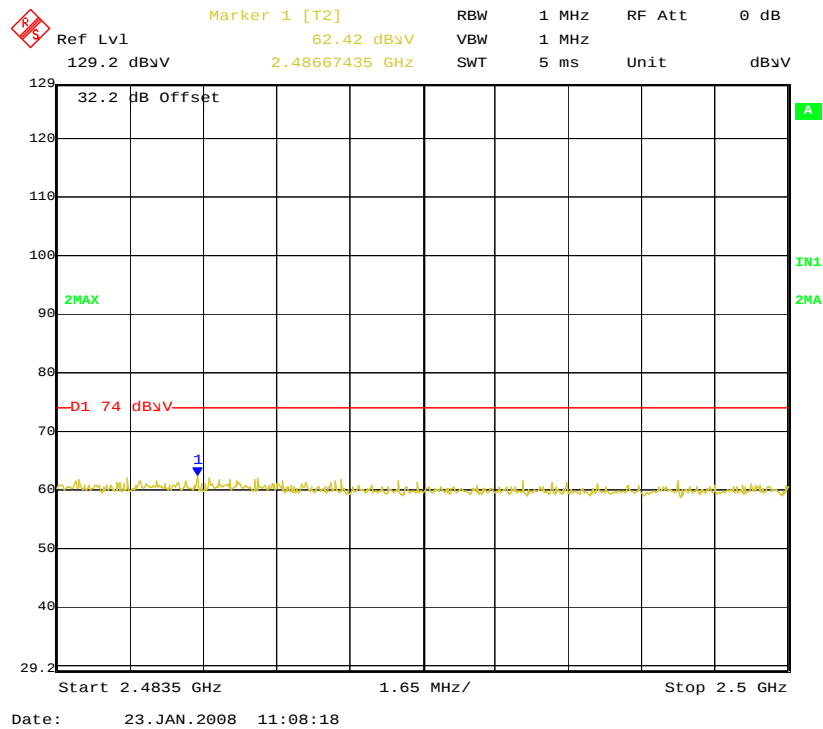
802.11b Low Channel-Horizontal Polarity -Average



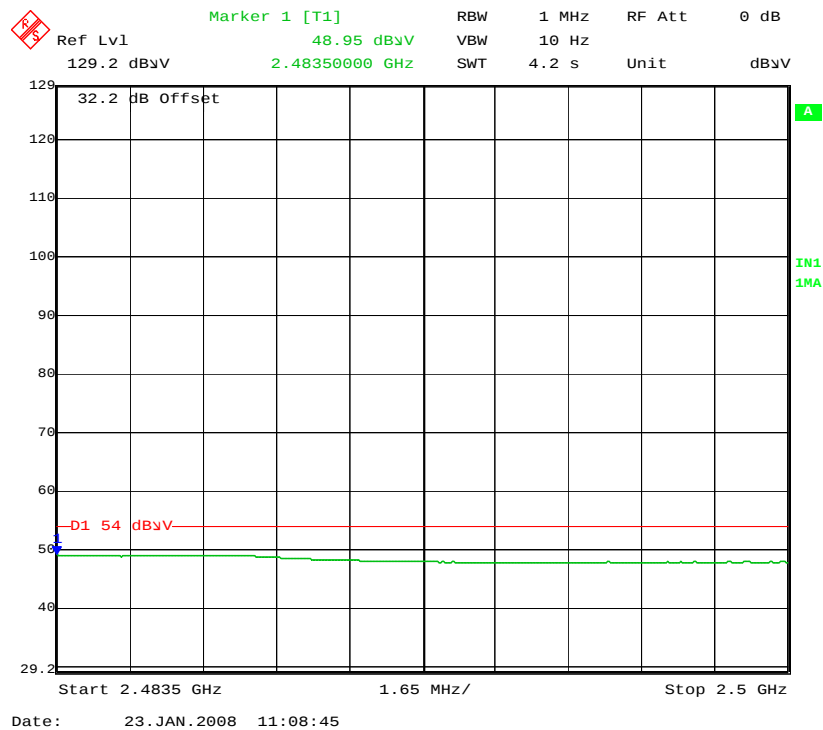
802.11b High Channel-Horizontal Polarity –Peak



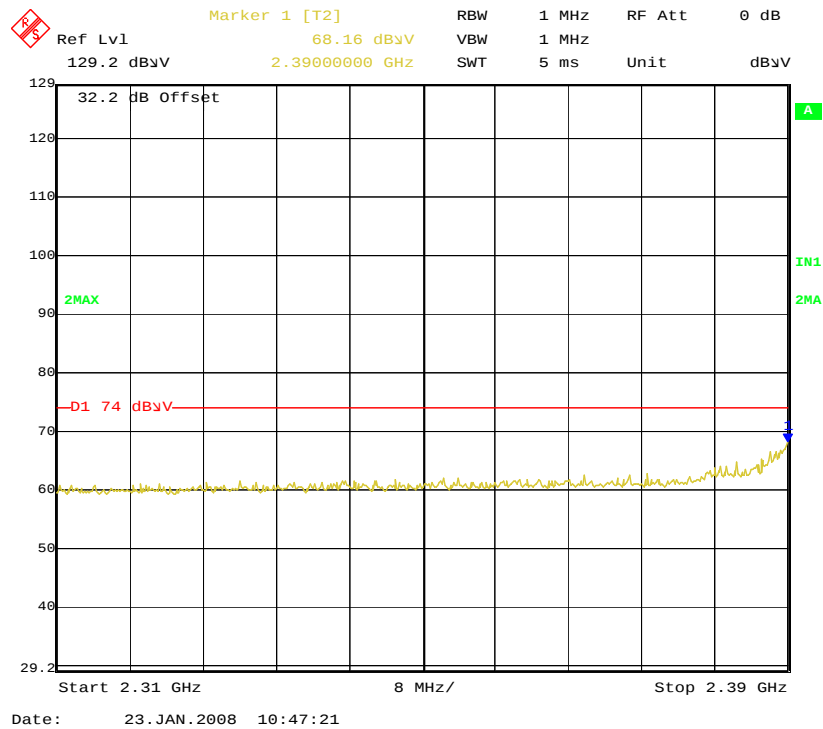
802.11b High Channel-Horizontal Polarity –Average



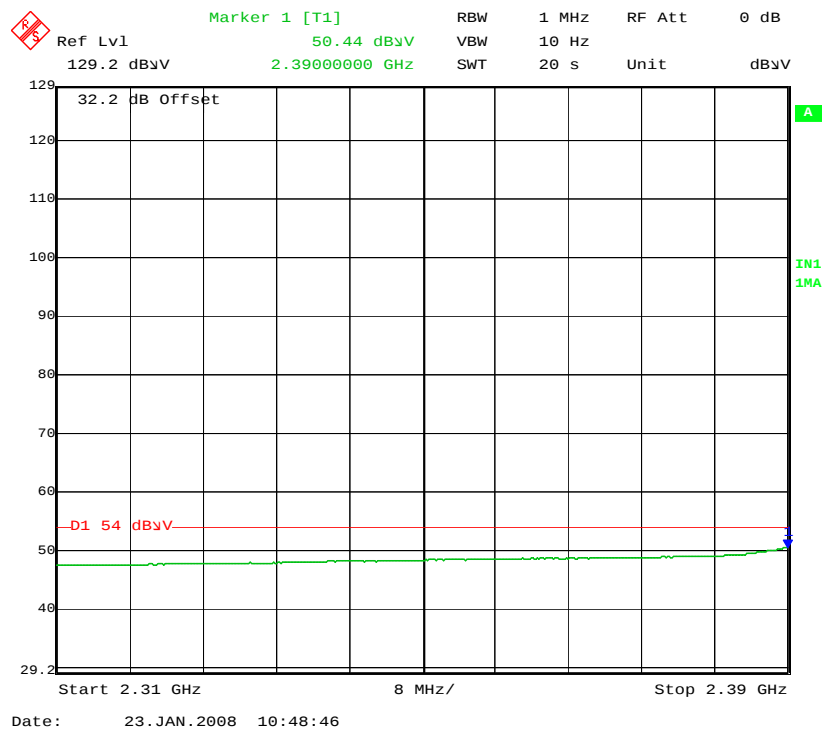
802.11b High Channel-Vertical Polarity –Peak



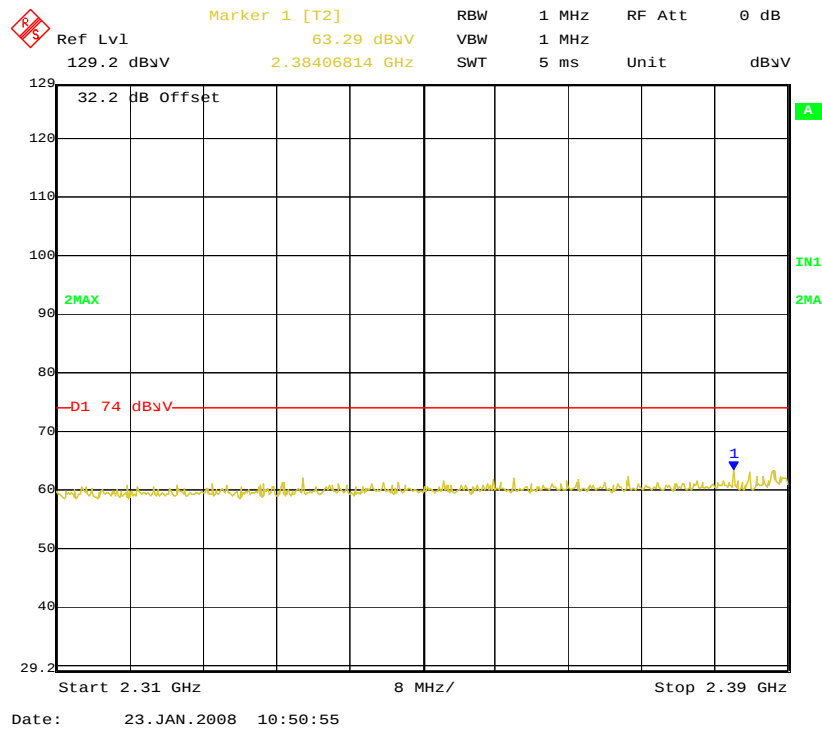
802.11b High Channel-Vertical Polarity –Average



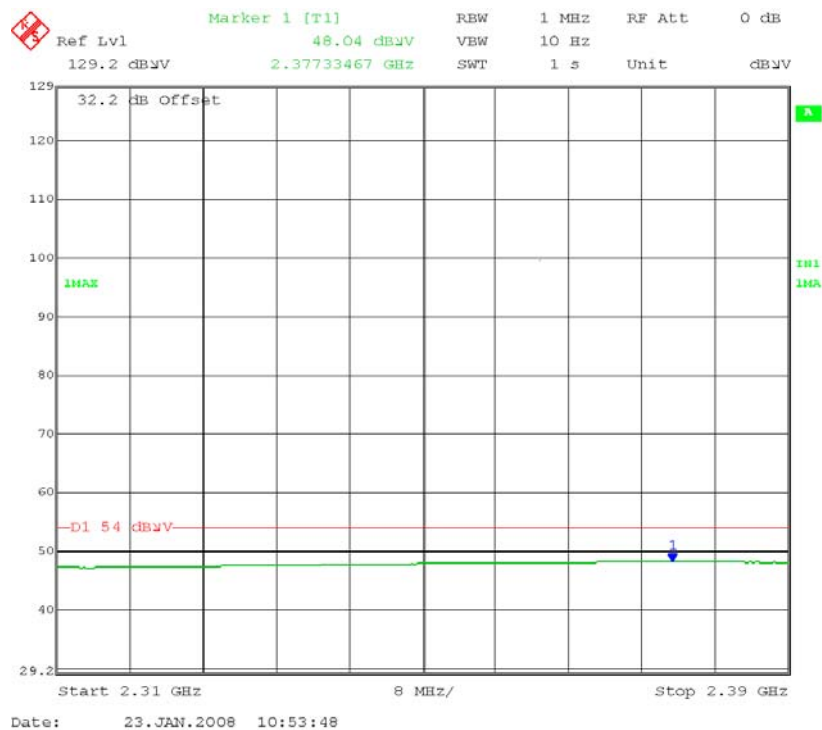
802.11g Low Channel-Horizontal Polarity –Peak



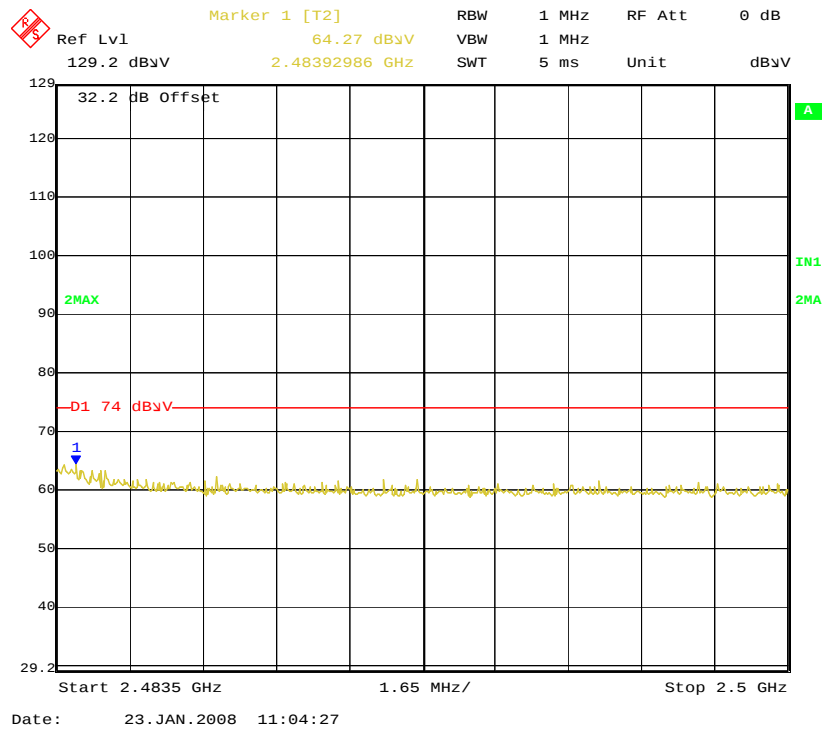
802.11g Low Channel-Horizontal Polarity –Average



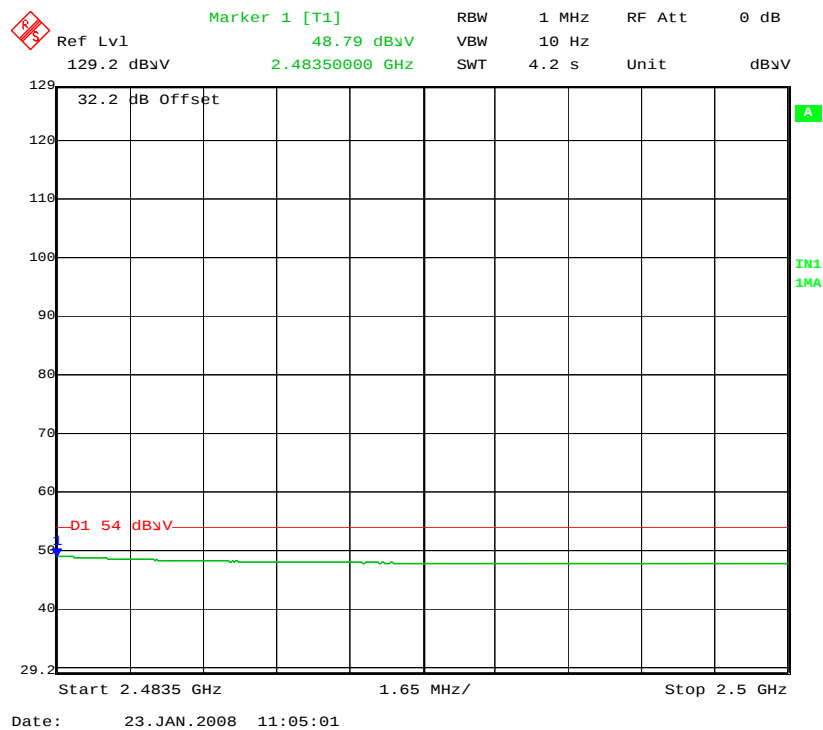
802.11g Low Channel-Vertical Polarity –Peak



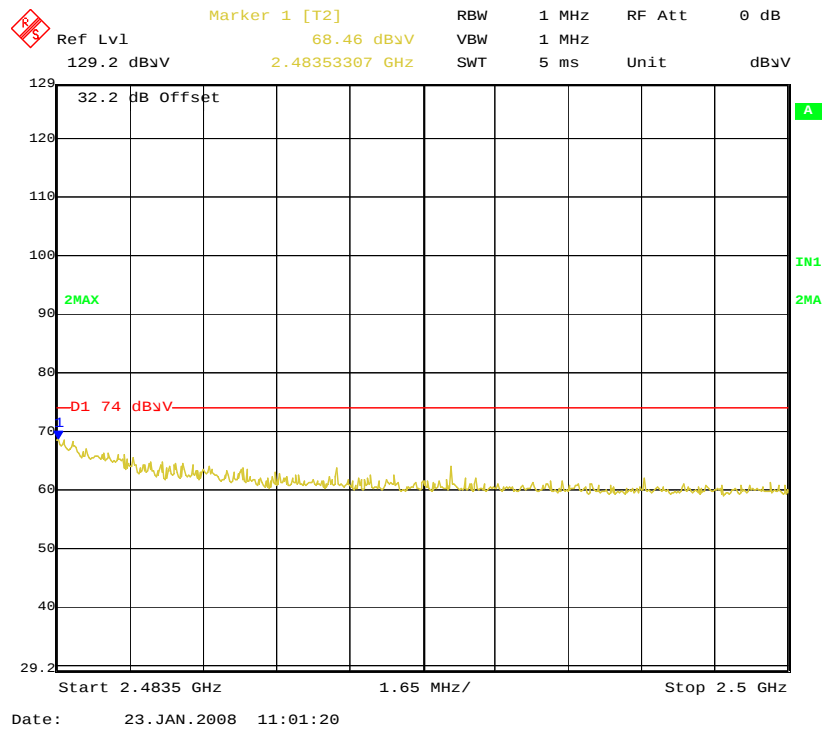
802.11g Low Channel-Vertical Polarity –Average



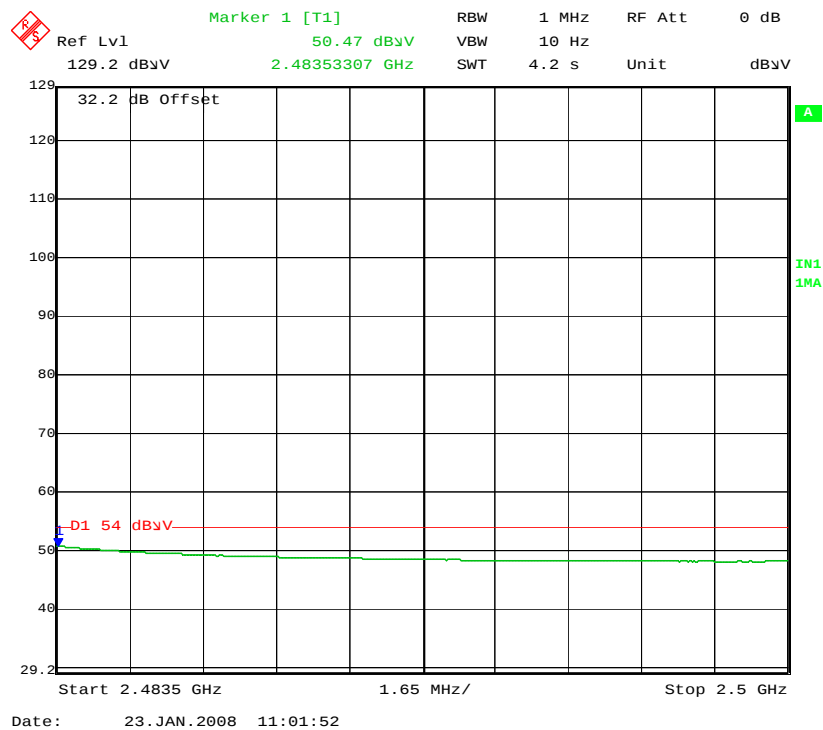
802.11g High Channel-Vertical Polarity –Peak



802.11g High Channel-Vertical Polarity –average

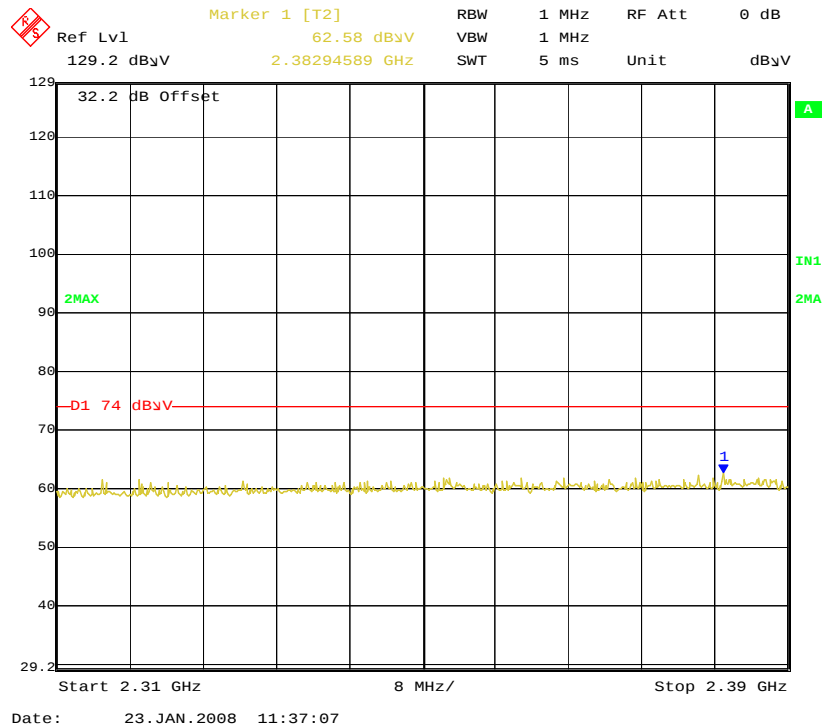


802.11g High Channel-Horizontal Polarity –Peak

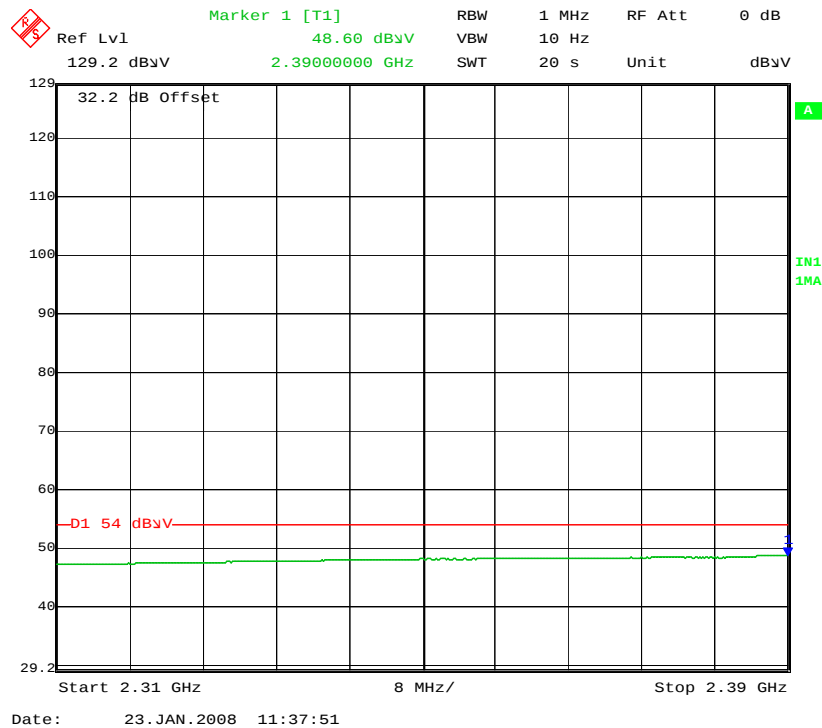


802.11g High Channel-Horizontal Polarity –Average

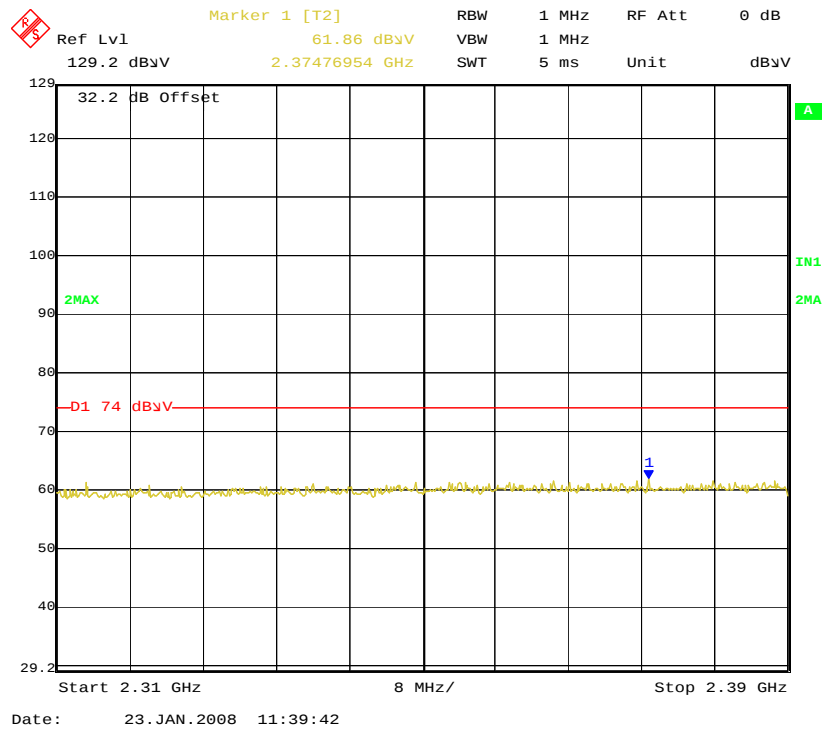
Antenna install type: Antenna permanently attached to the host EUT antenna port with external coaxial cable



802.11b Low Channel-Vertical Polarity -Peak



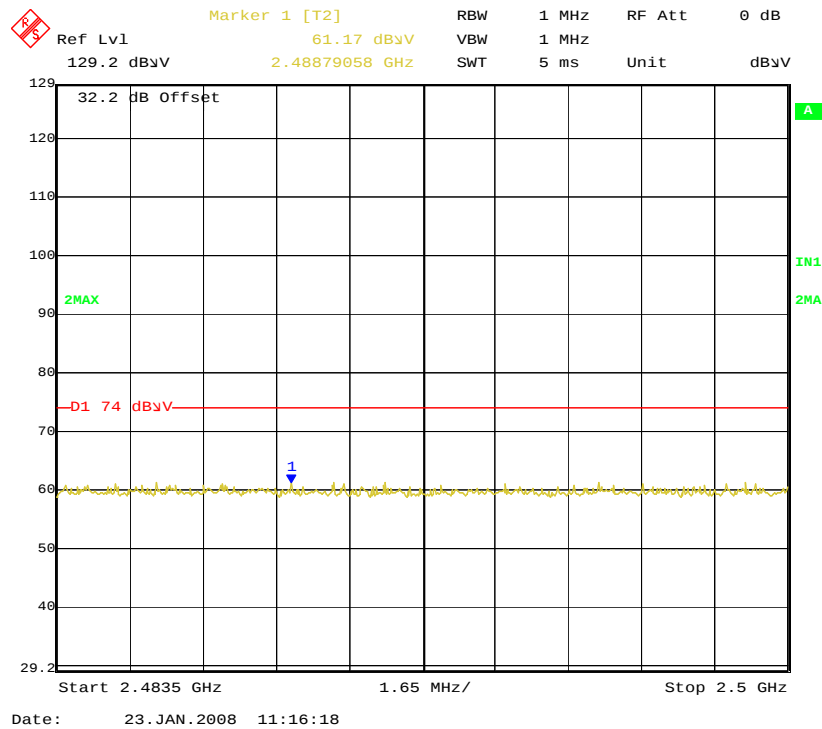
802.11b Low Channel-Vertical Polarity -Average



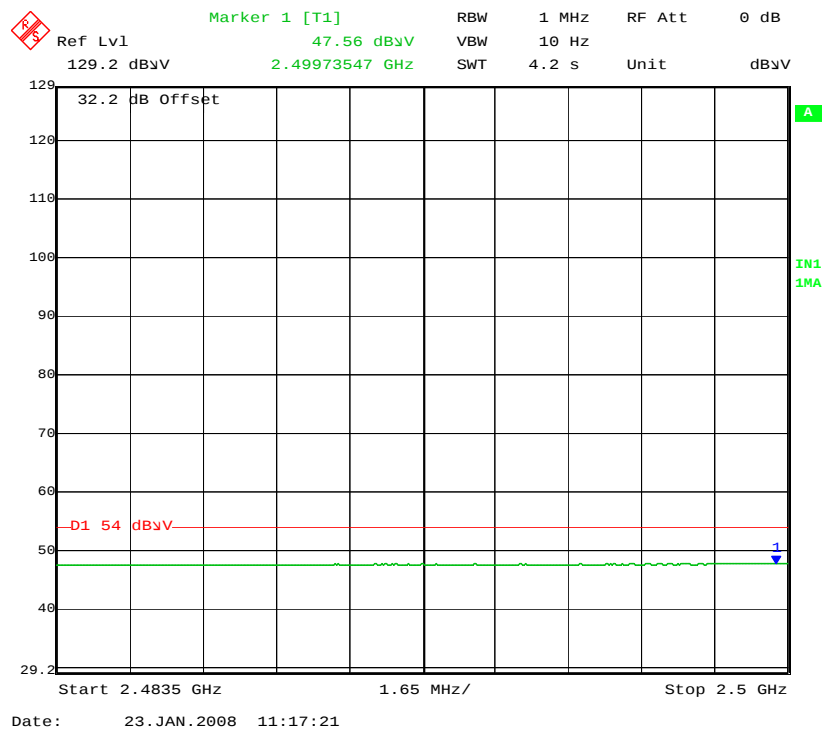
802.11b Low Channel-Horizontal Polarity –Peak



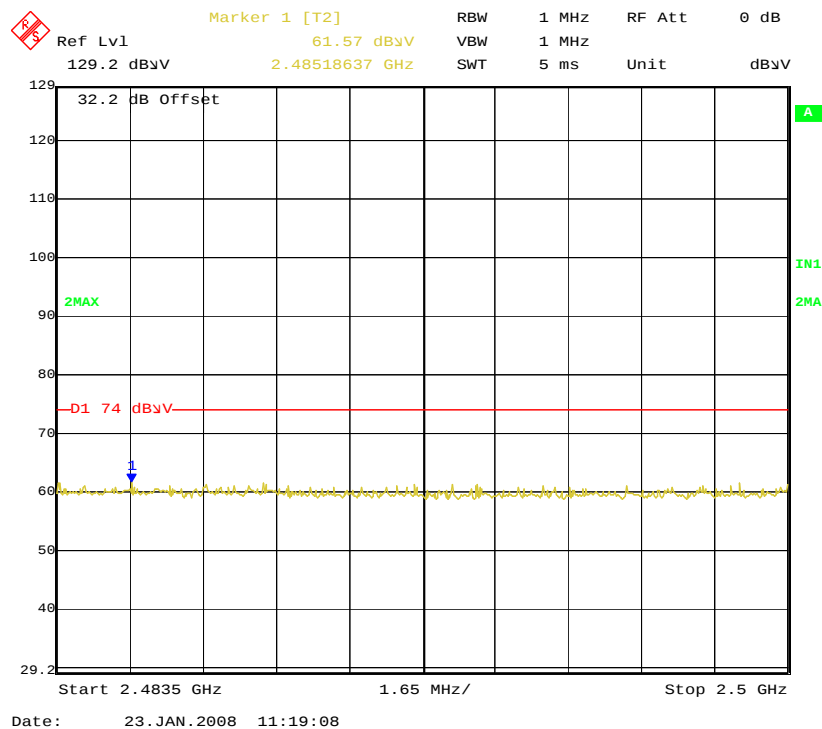
802.11b Low Channel-Horizontal Polarity -Average



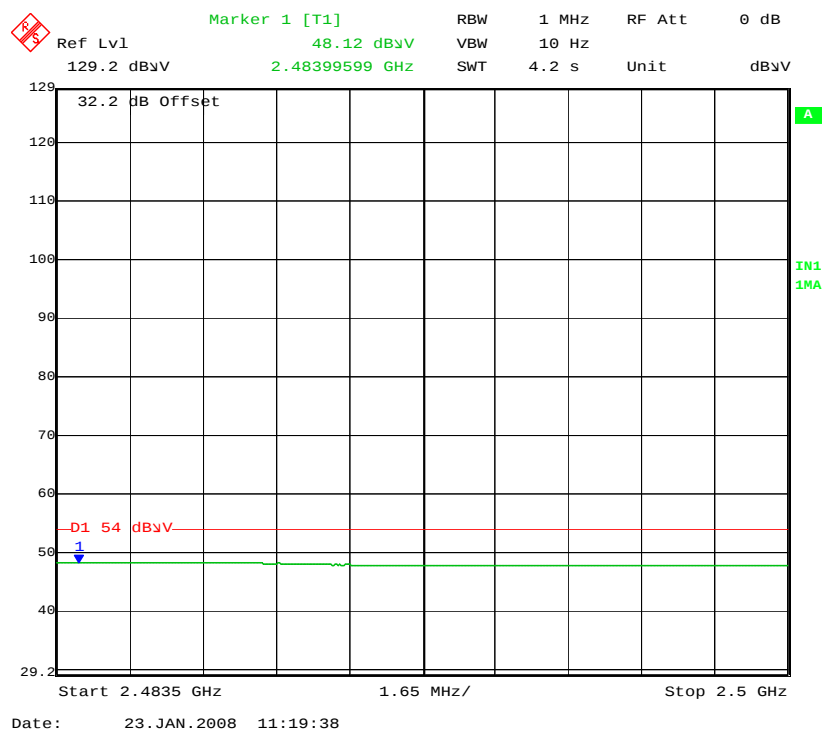
802.11b High Channel-Horizontal Polarity –Peak



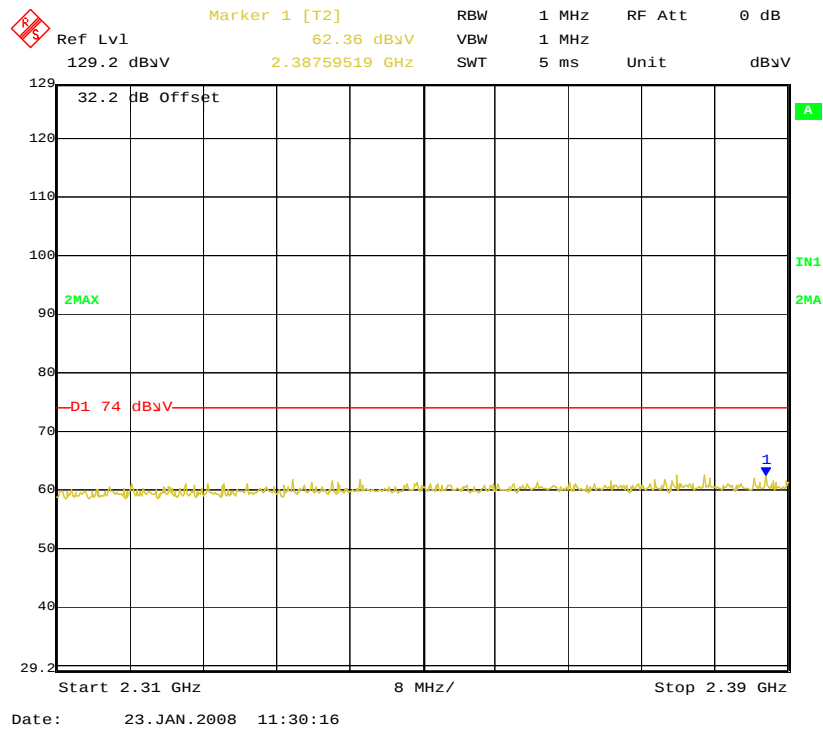
802.11b High Channel-Horizontal Polarity –Average



802.11b High Channel-Vertical Polarity –Peak



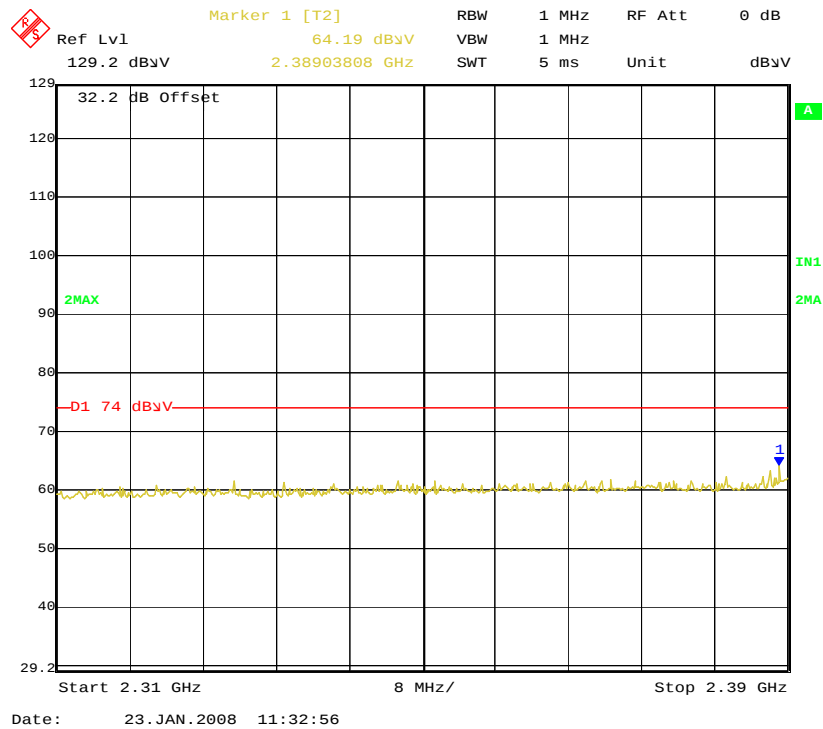
802.11b High Channel-Vertical Polarity –Average



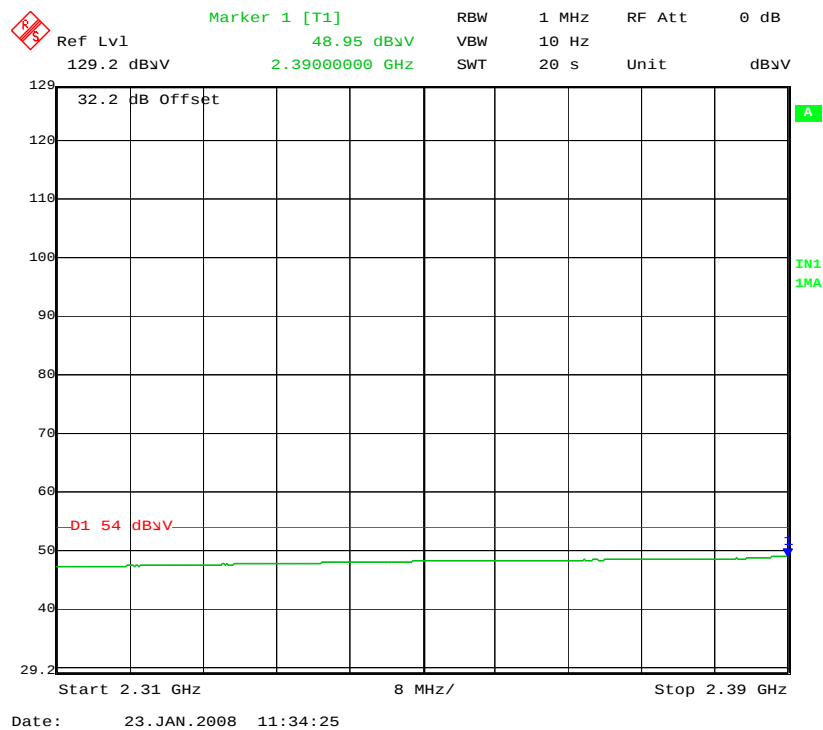
802.11g Low Channel-Horizontal Polarity –Peak



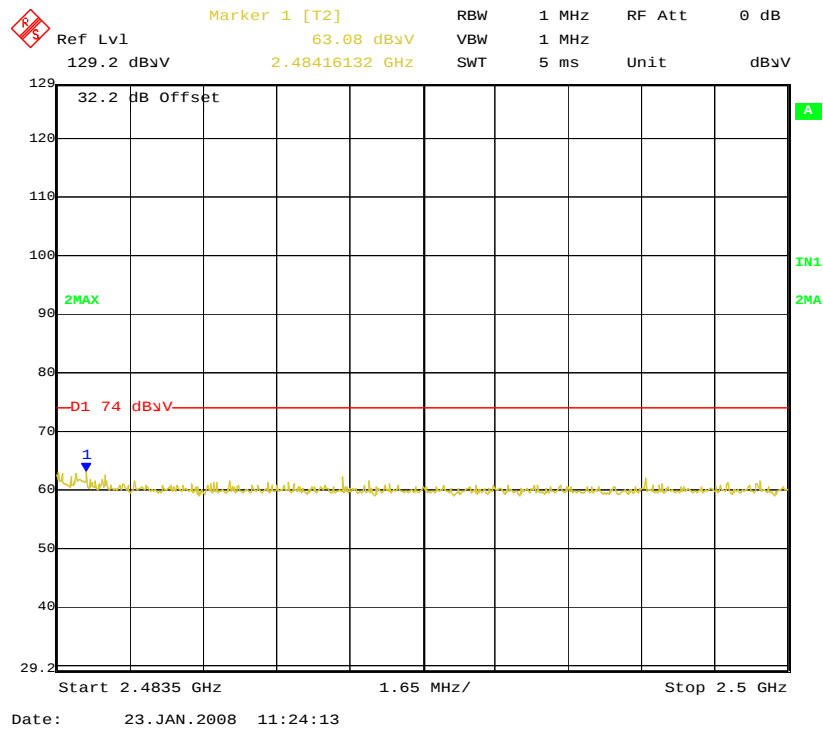
802.11g Low Channel-Horizontal Polarity –Average



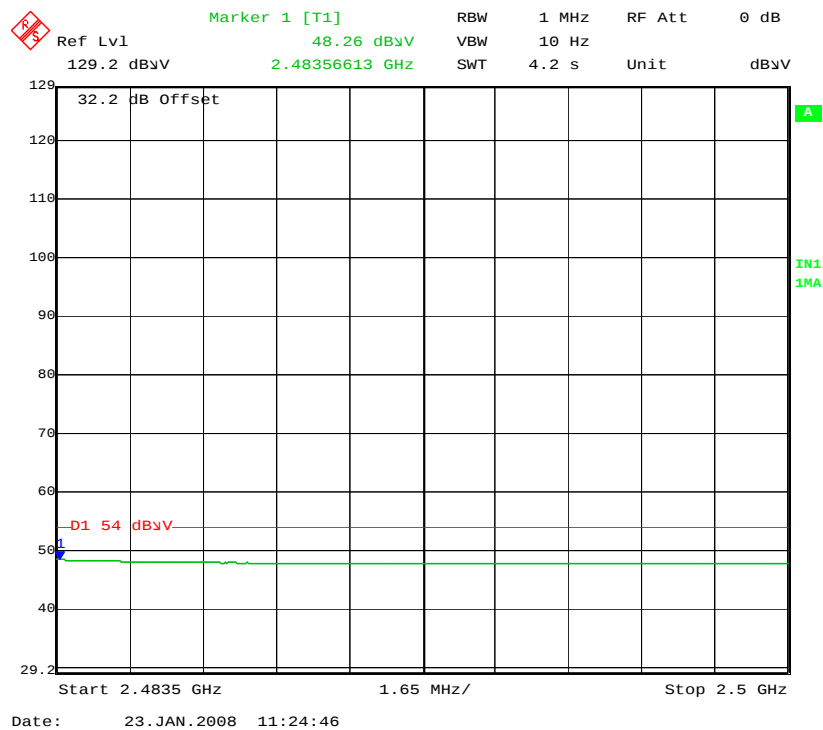
802.11g Low Channel-Vertical Polarity –Peak



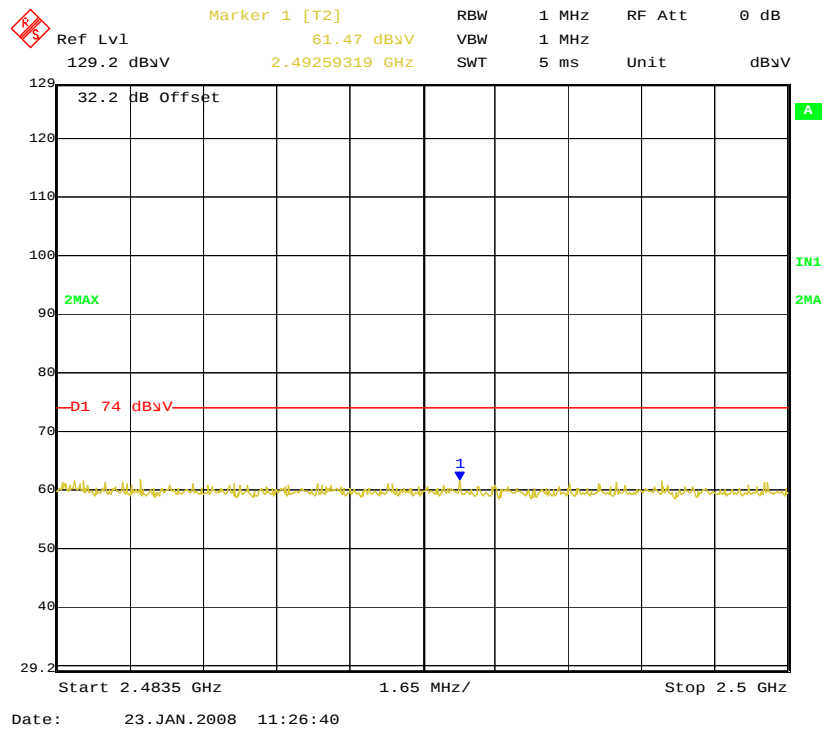
802.11g Low Channel-Vertical Polarity –Average



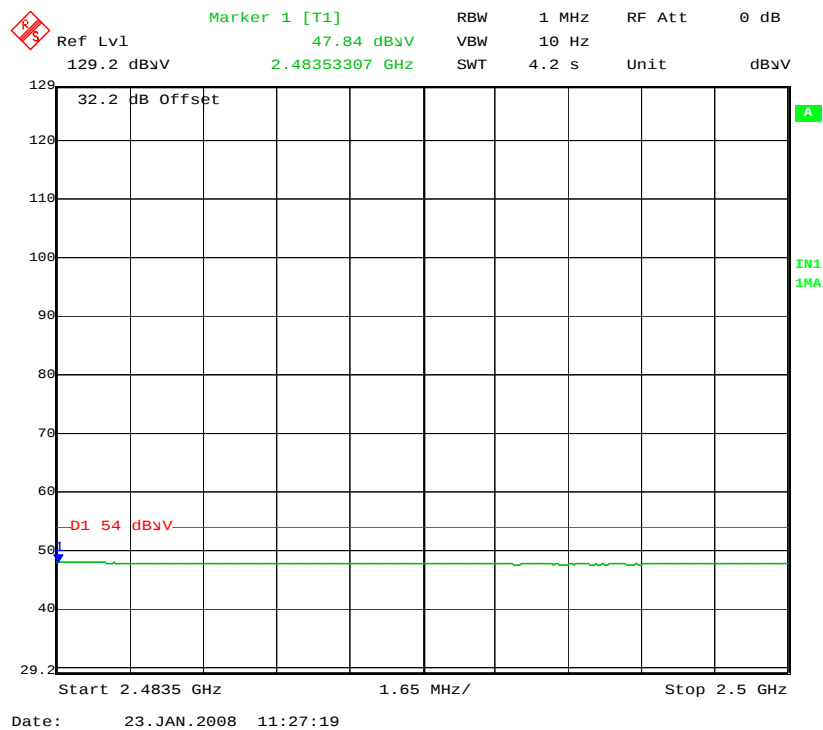
802.11g High Channel-Vertical Polarity –Peak



802.11g High Channel-Vertical Polarity –average



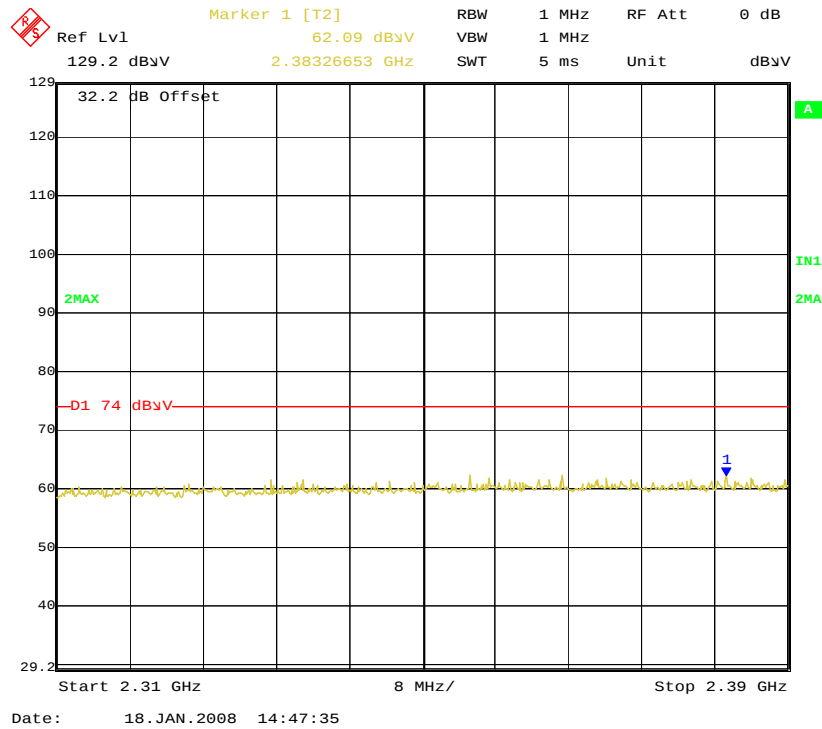
802.11g High Channel-Horizontal Polarity –Peak



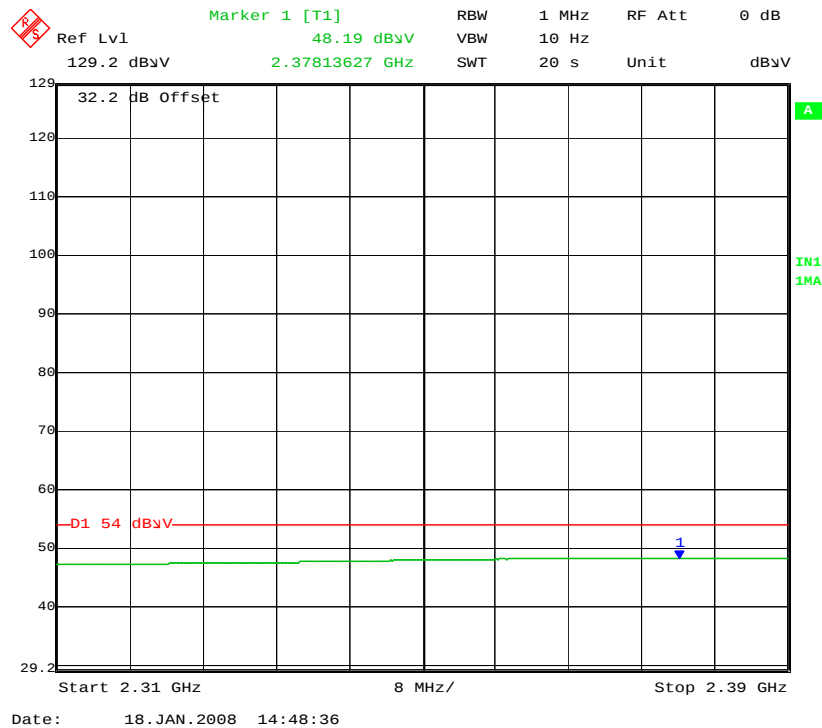
802.11g High Channel-Horizontal Polarity –Average

Host EUT: **110XIII Plus**

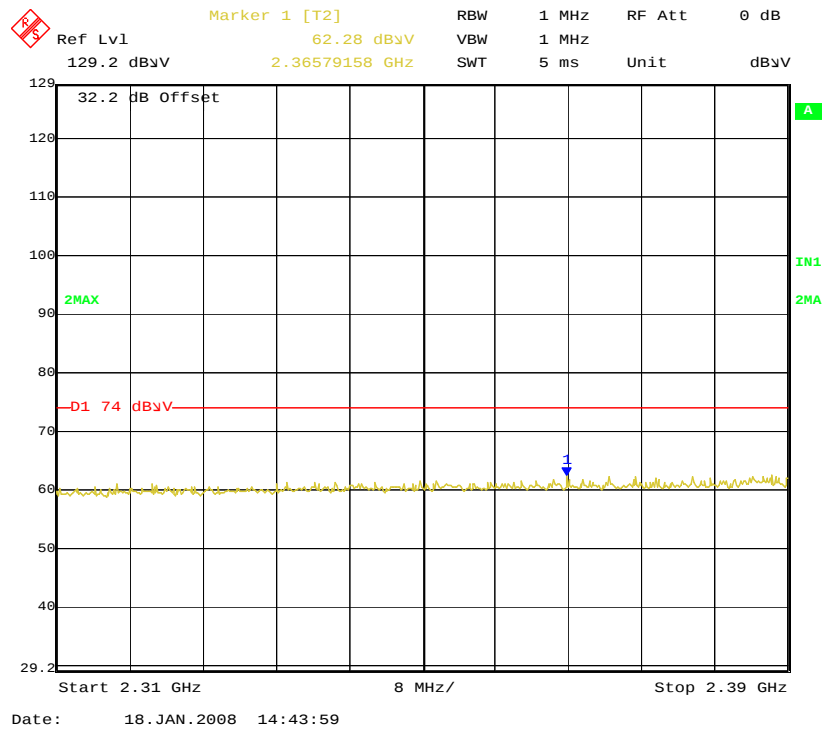
Antenna install type: Antenna permanently attached to the host EUT antenna port.



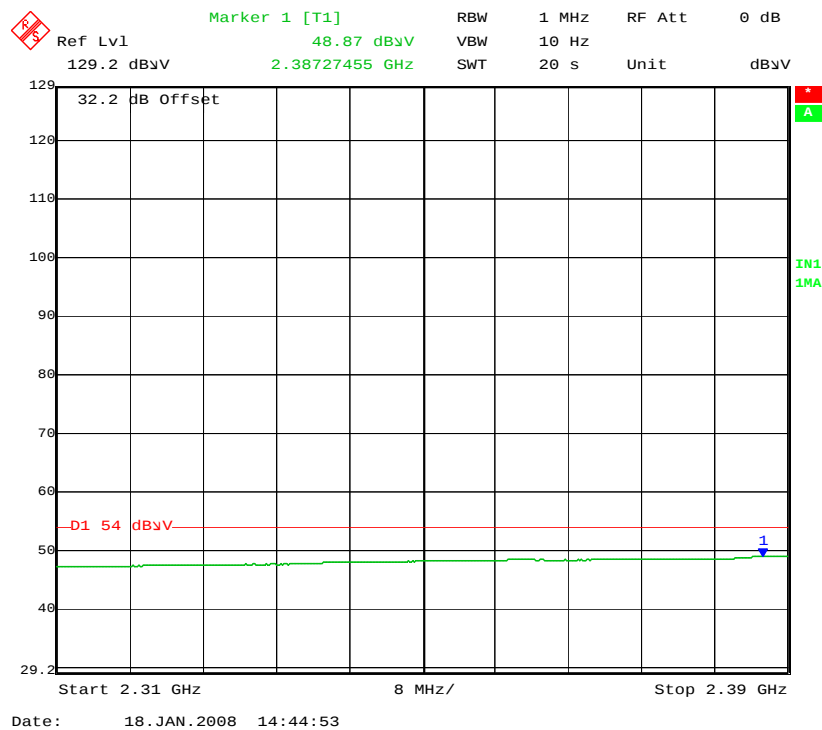
802.11b Low Channel-Vertical Polarity -Peak



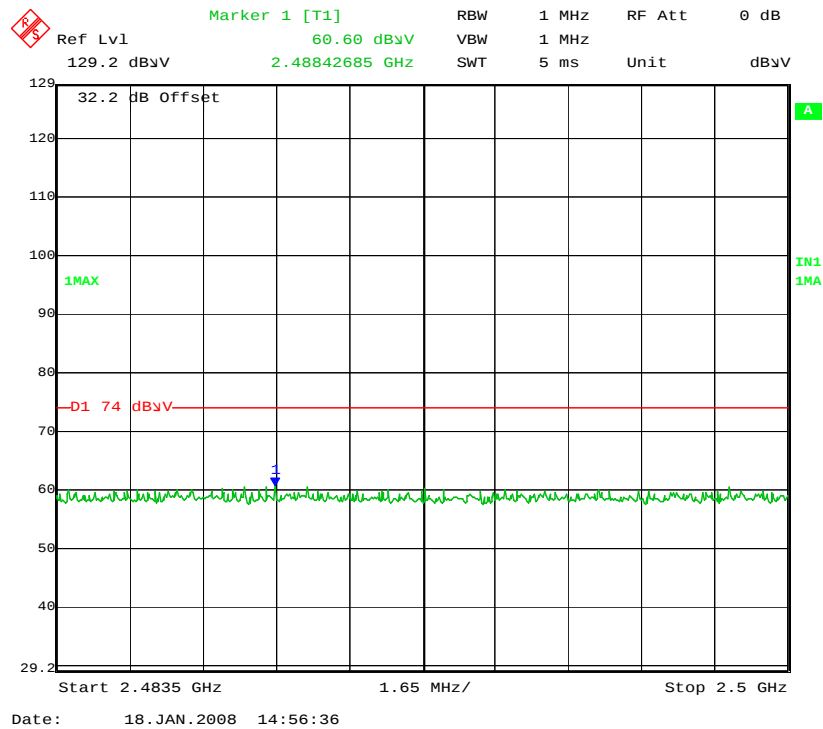
802.11b Low Channel-Vertical Polarity -Average



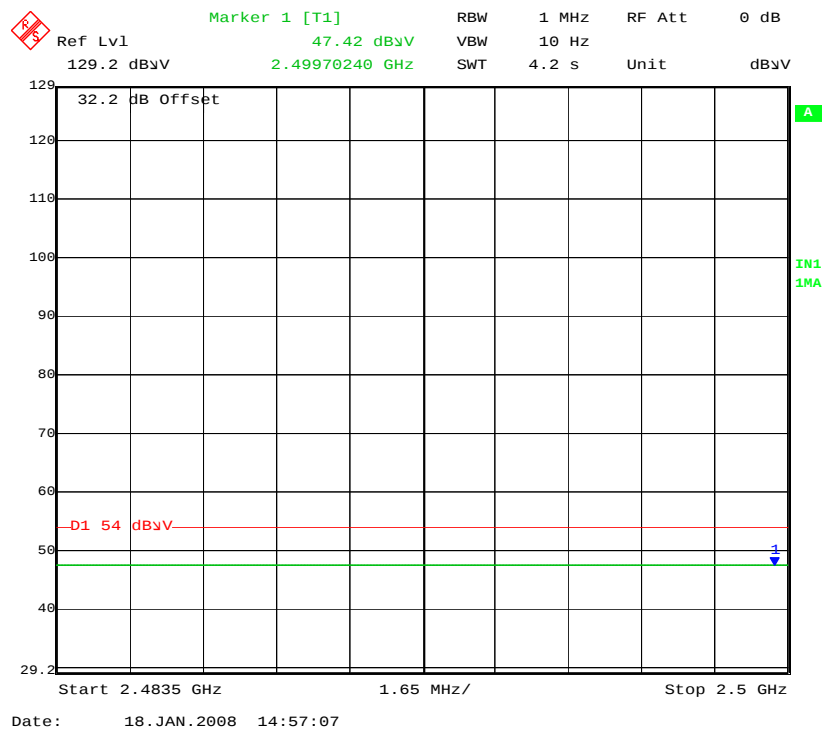
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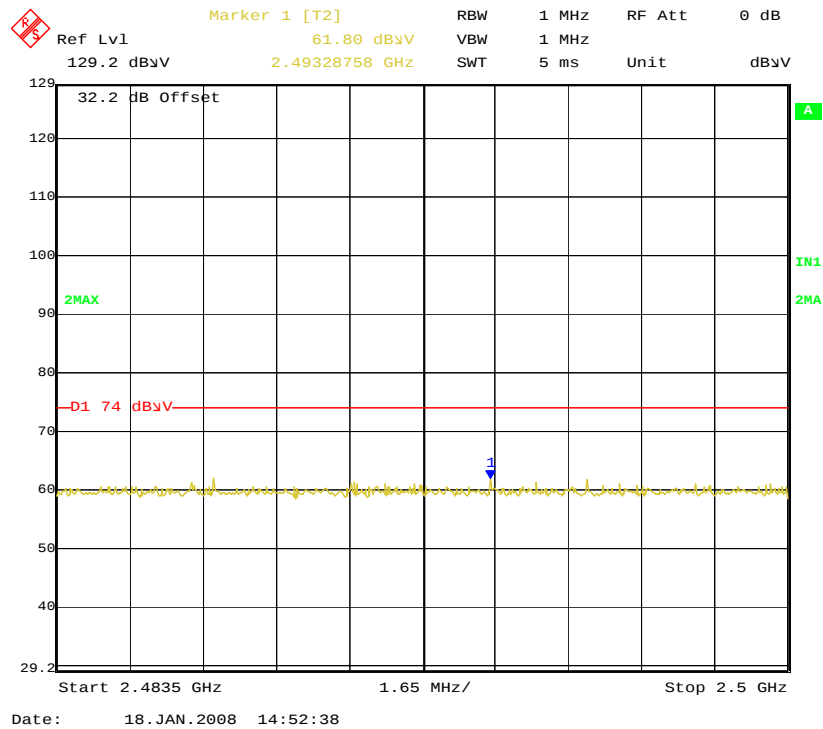
802.11b Low Channel-Horizontal Polarity -Average



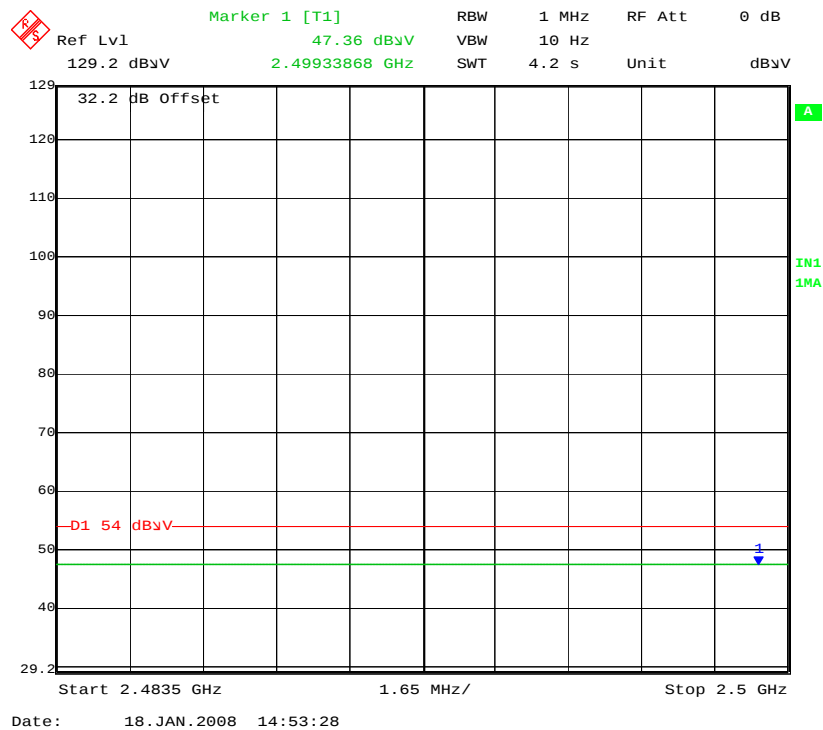
802.11b High Channel-Horizontal Polarity –Peak



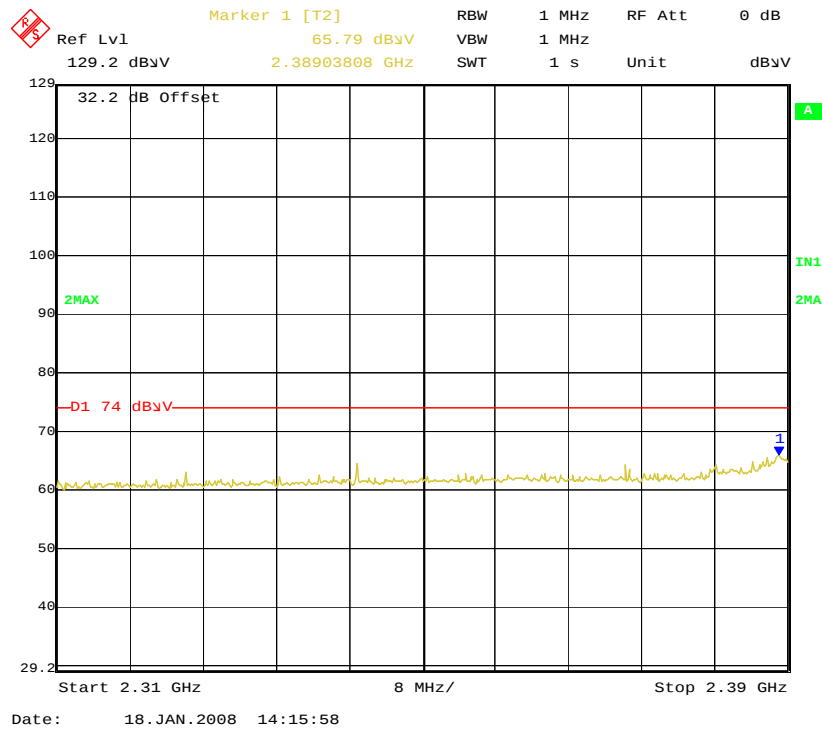
802.11b High Channel-Horizontal Polarity –Average



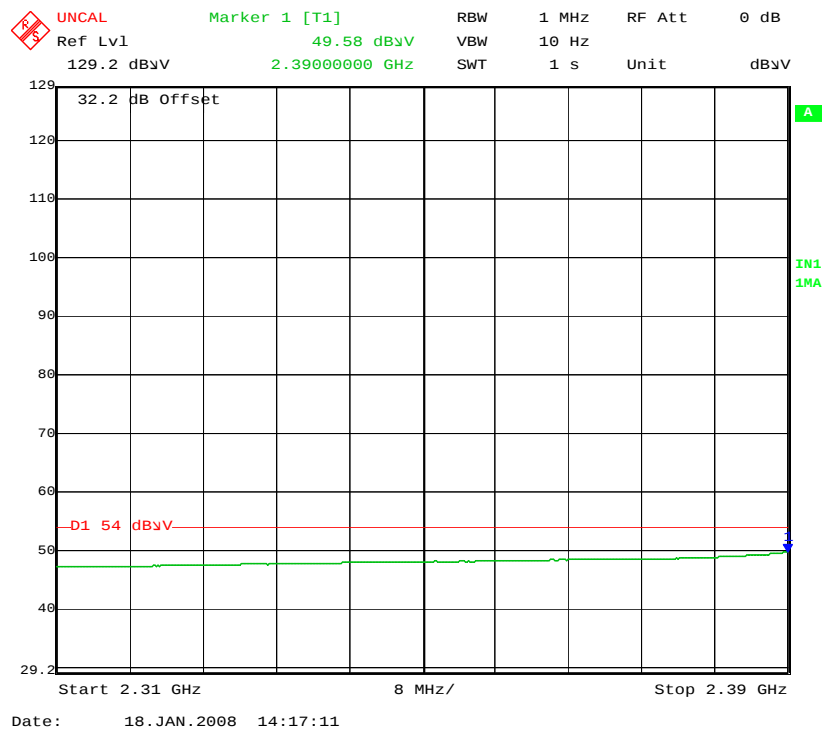
802.11b High Channel-Vertical Polarity –Peak



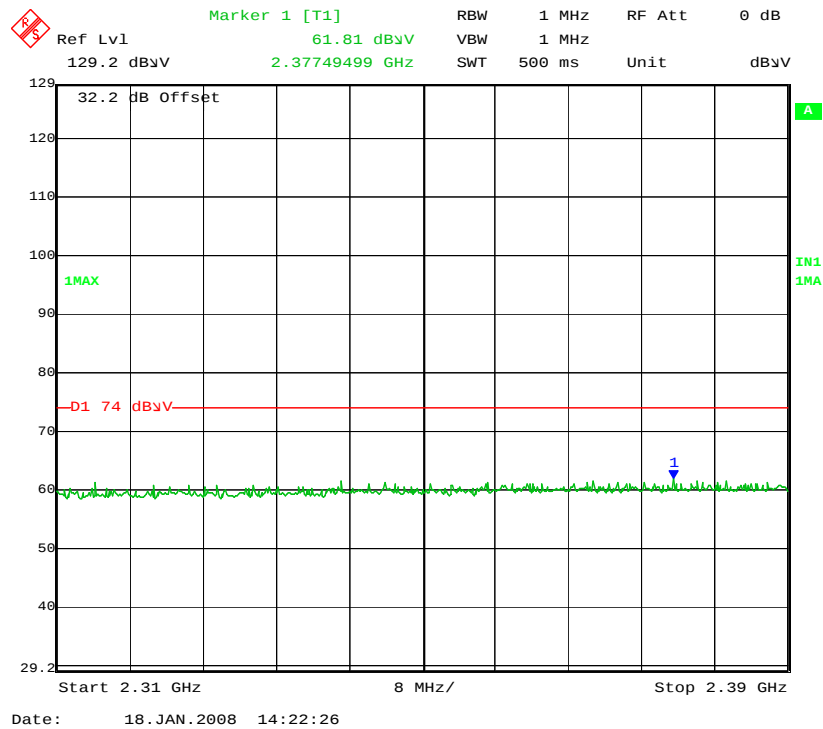
802.11b High Channel-Vertical Polarity –Average



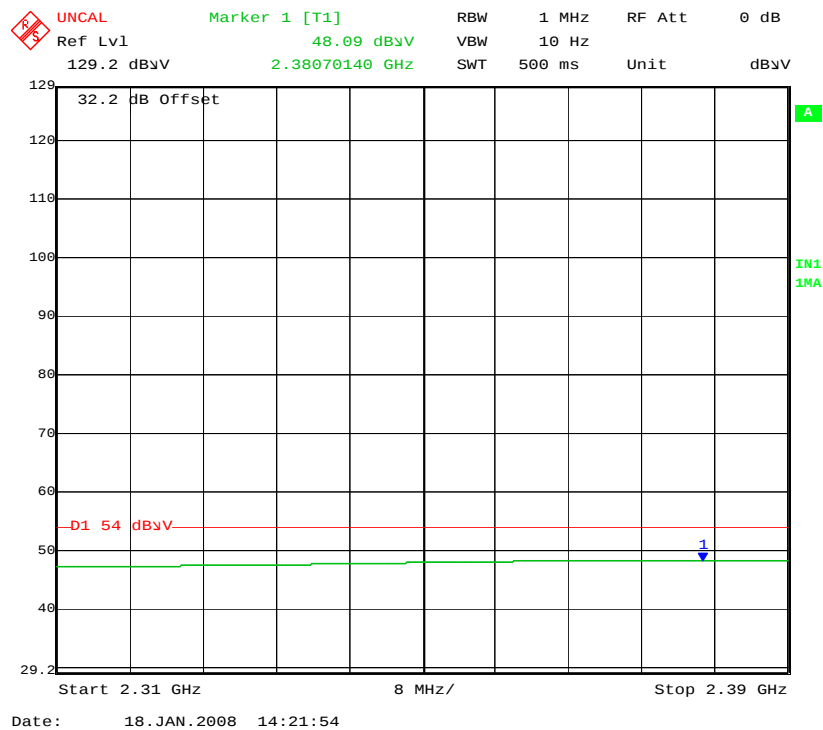
802.11g Low Channel-Horizontal Polarity –Peak



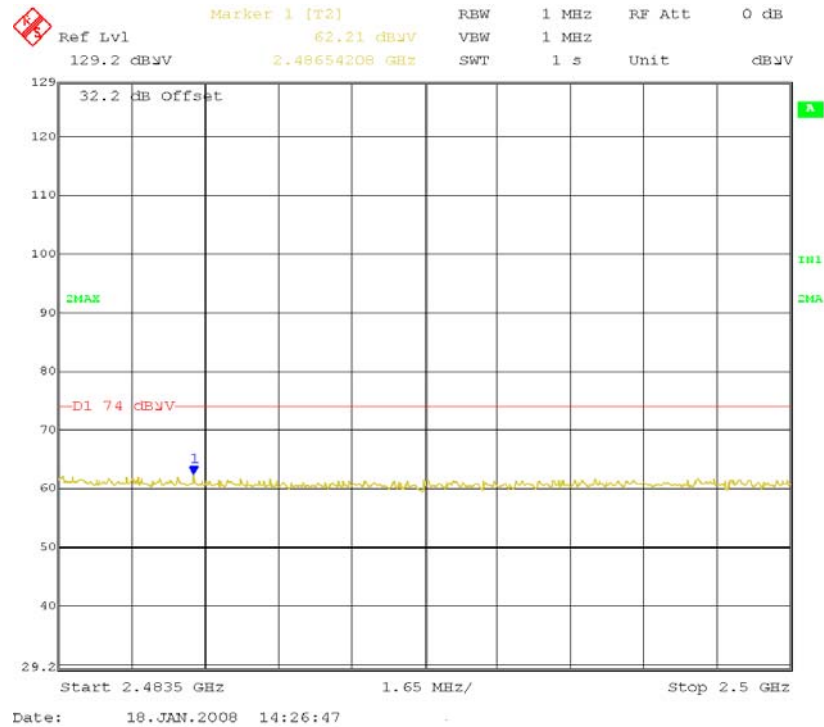
802.11g Low Channel-Horizontal Polarity –Average



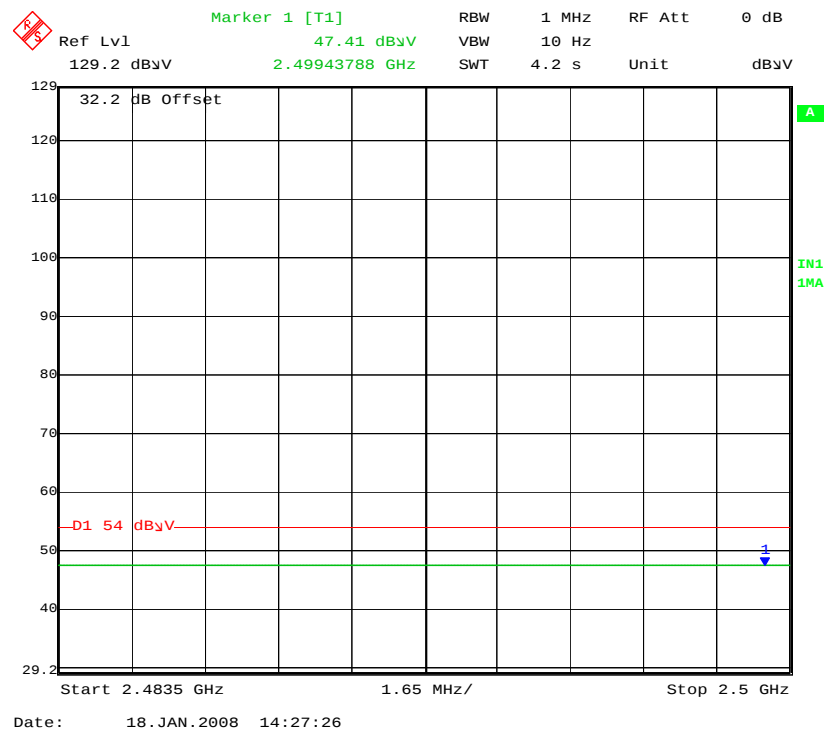
802.11g Low Channel-Vertical Polarity –Peak



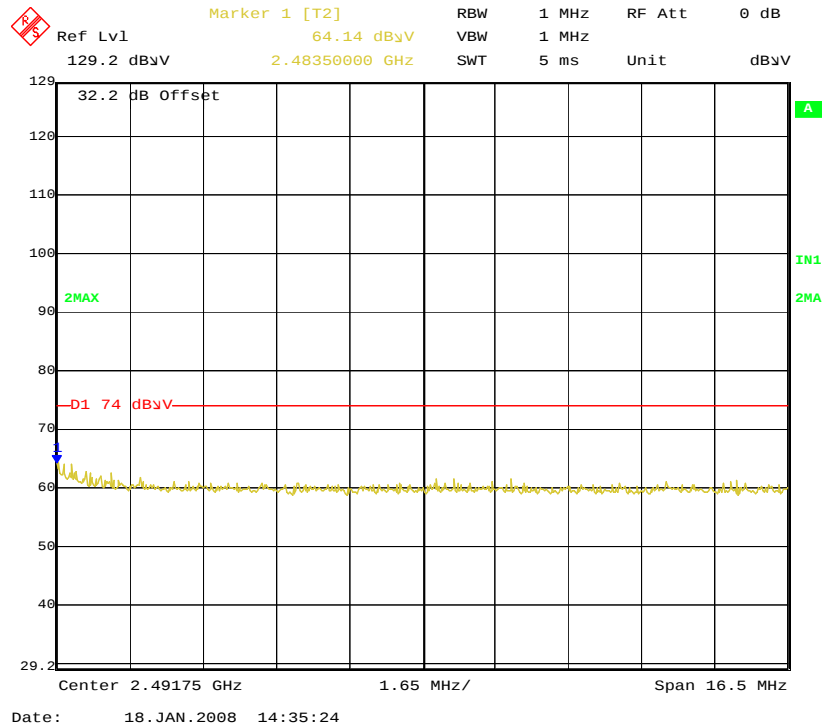
802.11g Low Channel-Vertical Polarity –Average



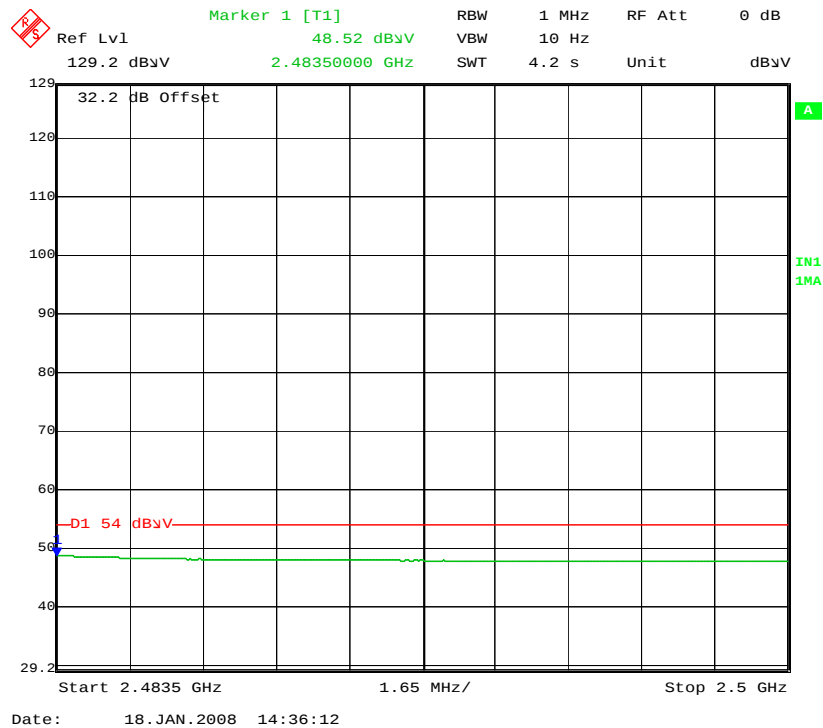
802.11g High Channel-Vertical Polarity –Peak



802.11g High Channel-Vertical Polarity –average

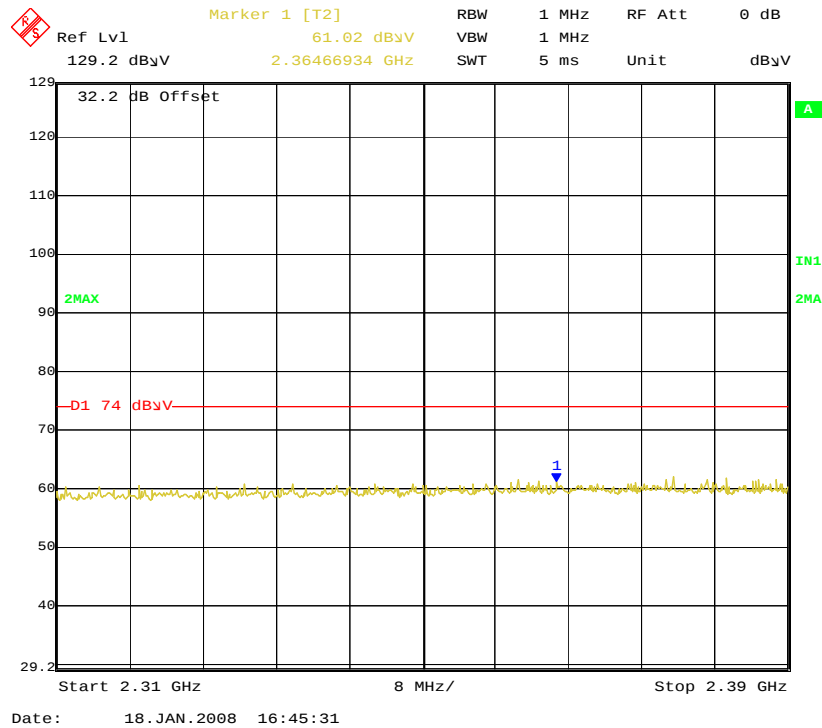


802.11g High Channel-Horizontal Polarity –Peak

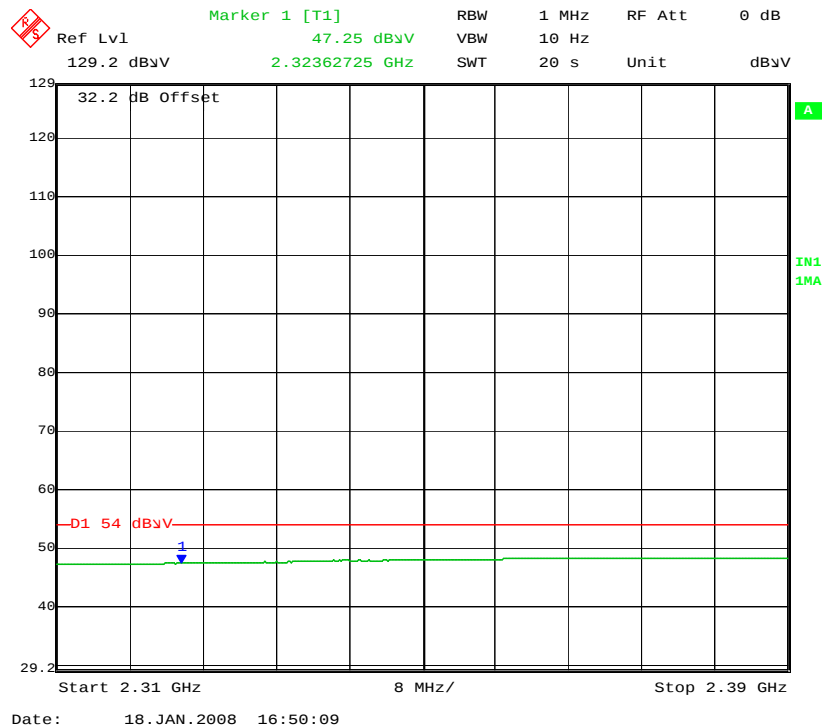


802.11g High Channel-Horizontal Polarity –Average

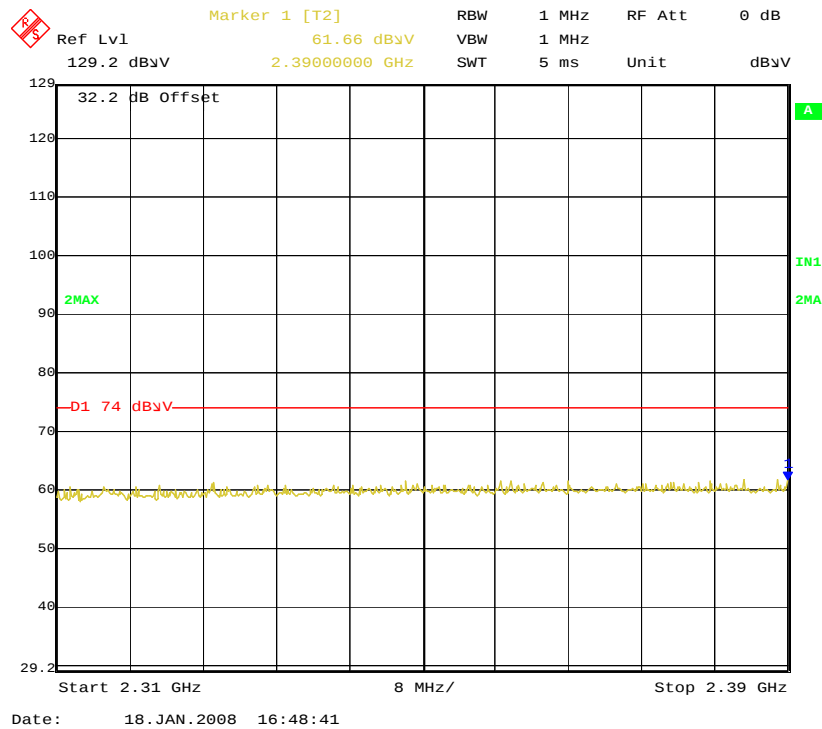
Antenna install type: Antenna permanently attached to the host EUT antenna port with external coaxial cable



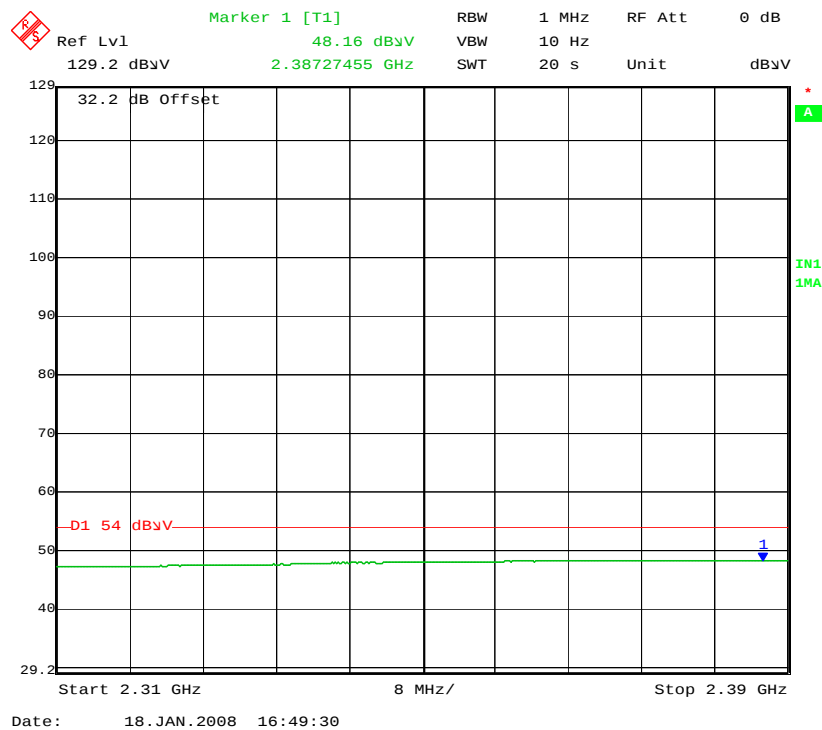
802.11b Low Channel-Vertical Polarity -Peak



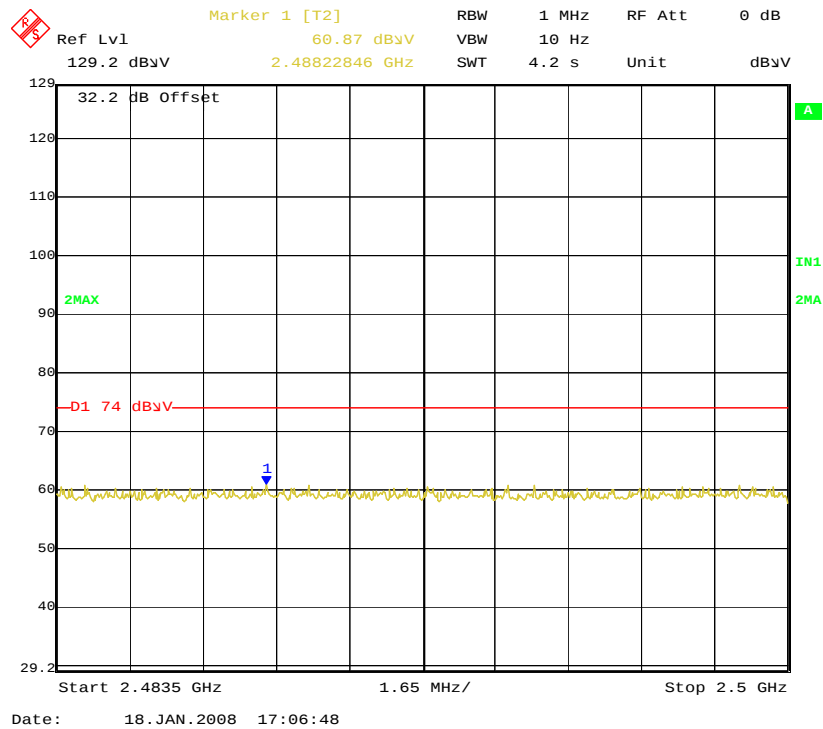
802.11b Low Channel-Vertical Polarity -Average



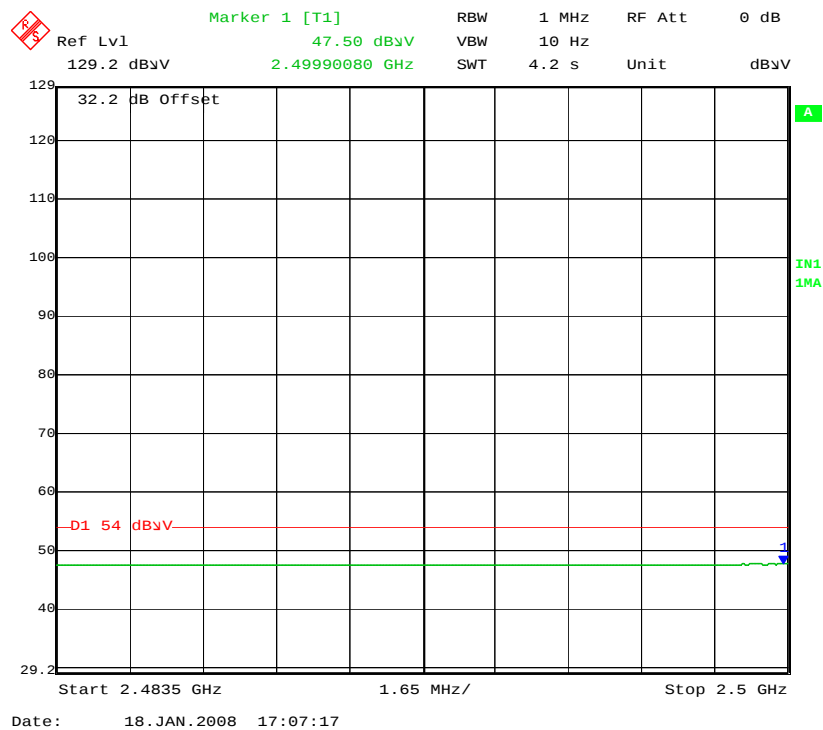
802.11b Low Channel-Horizontal Polarity -Peak



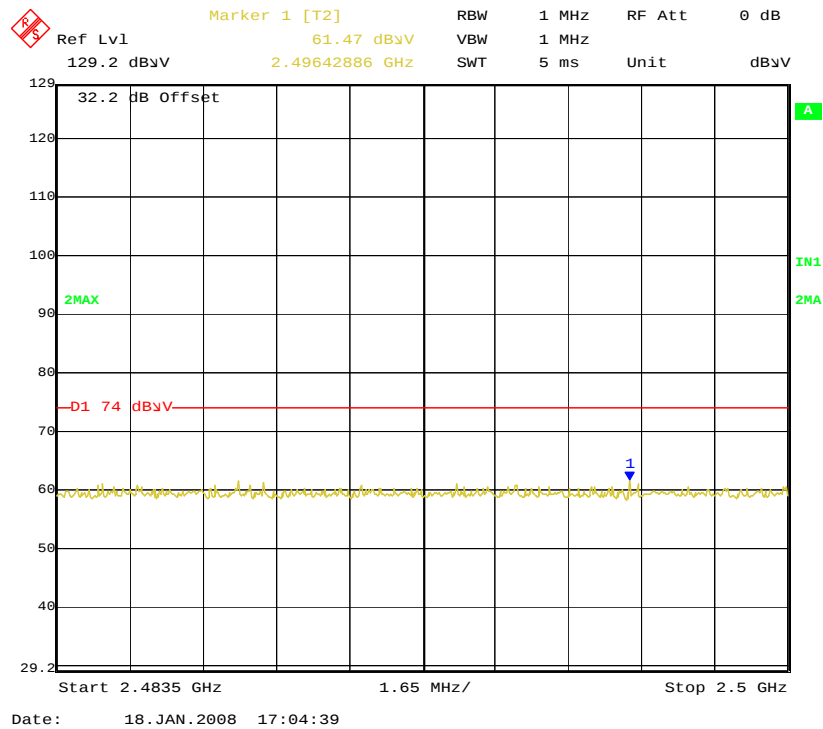
802.11b Low Channel-Horizontal Polarity -Average



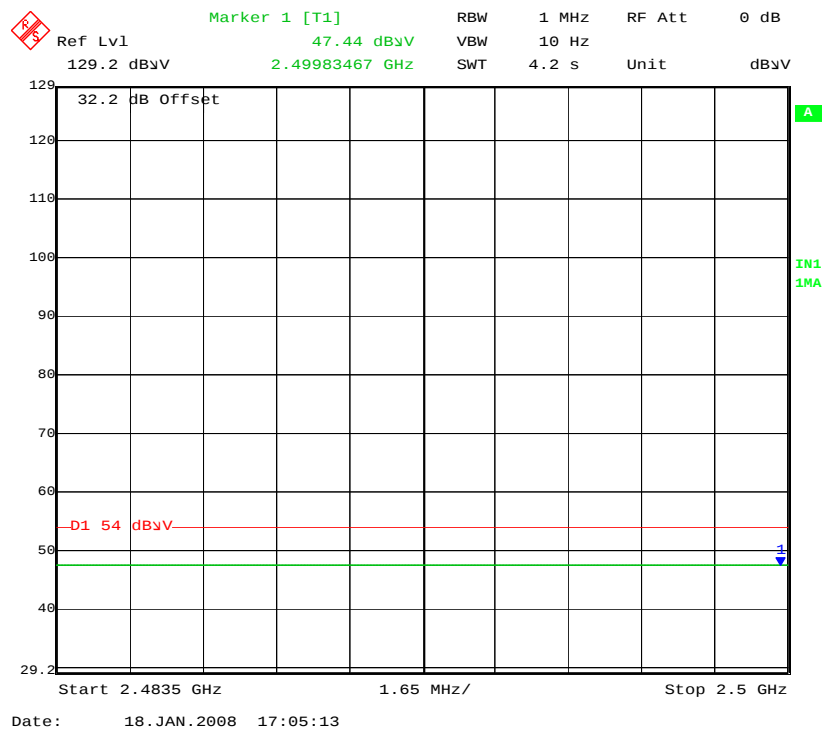
802.11b High Channel-Horizontal Polarity –Peak



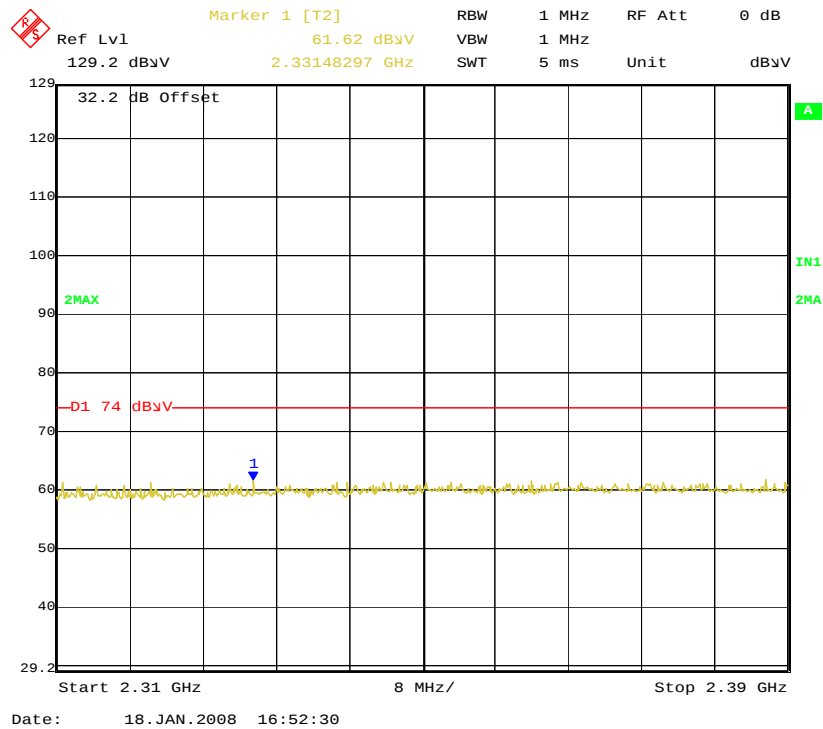
802.11b High Channel-Horizontal Polarity –Average



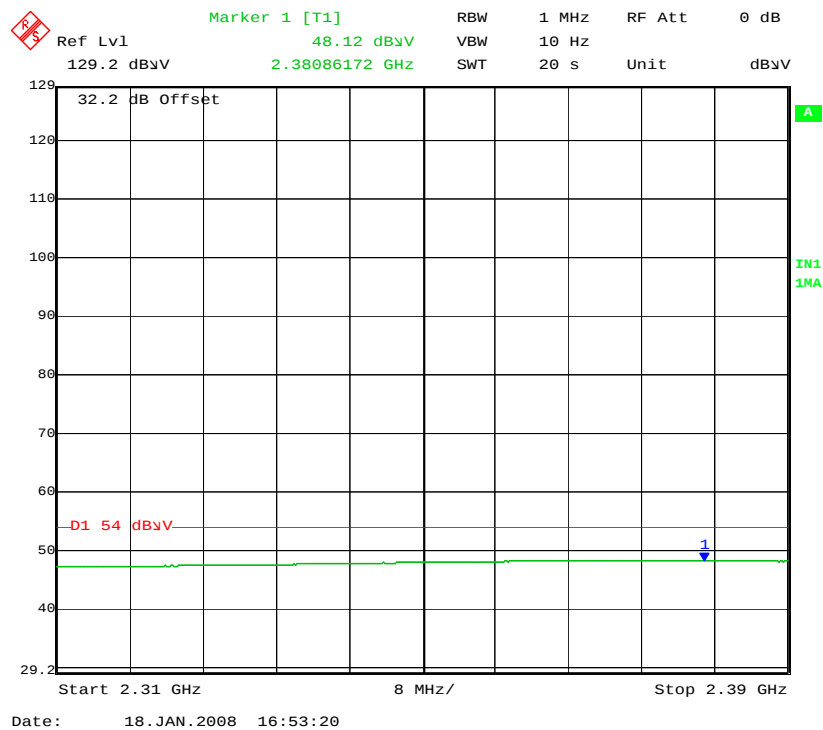
802.11b High Channel-Vertical Polarity –Peak



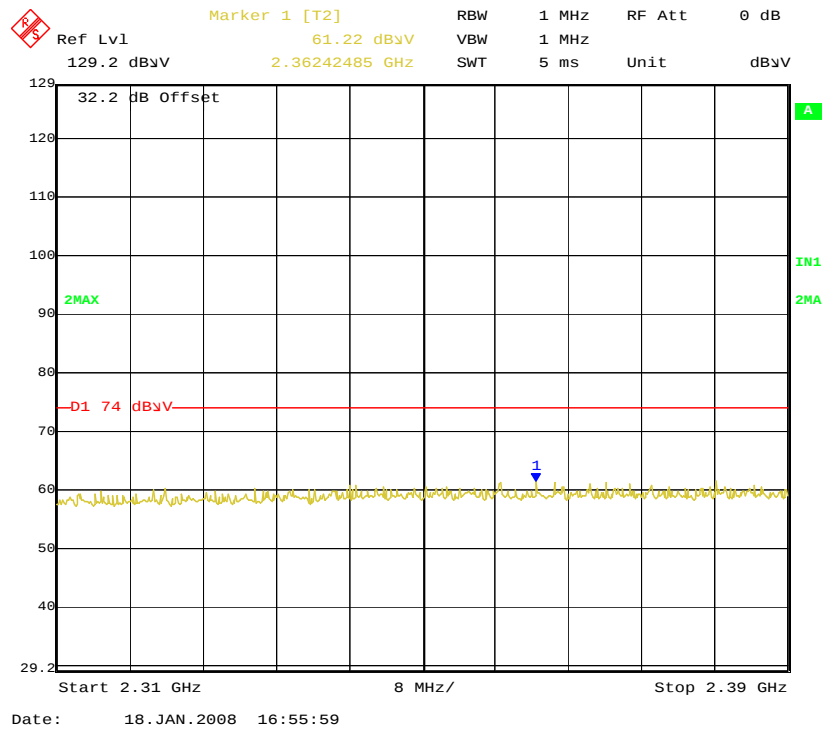
802.11b High Channel-Vertical Polarity –Average



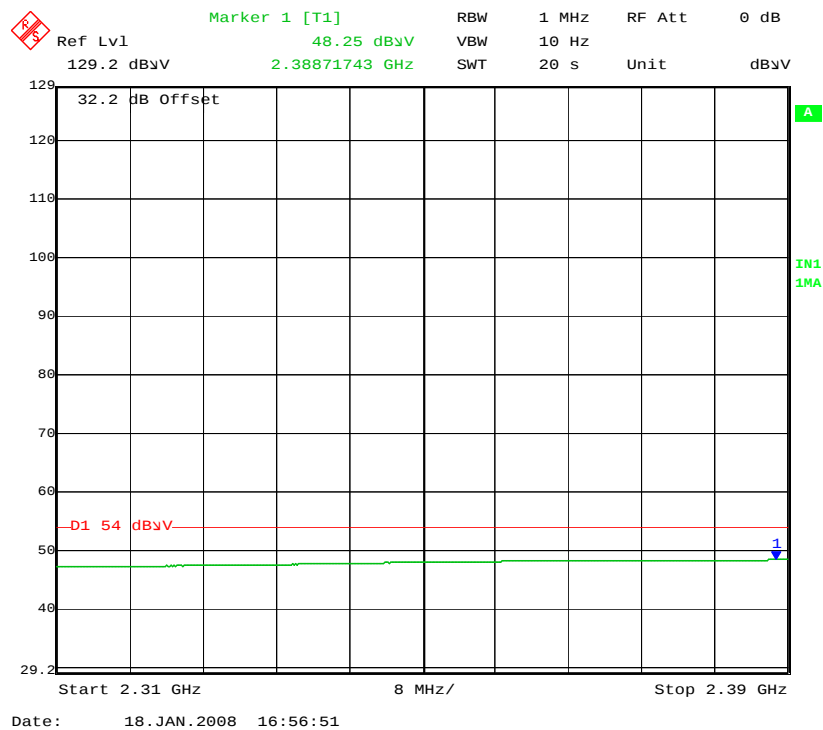
802.11g Low Channel-Horizontal Polarity –Peak



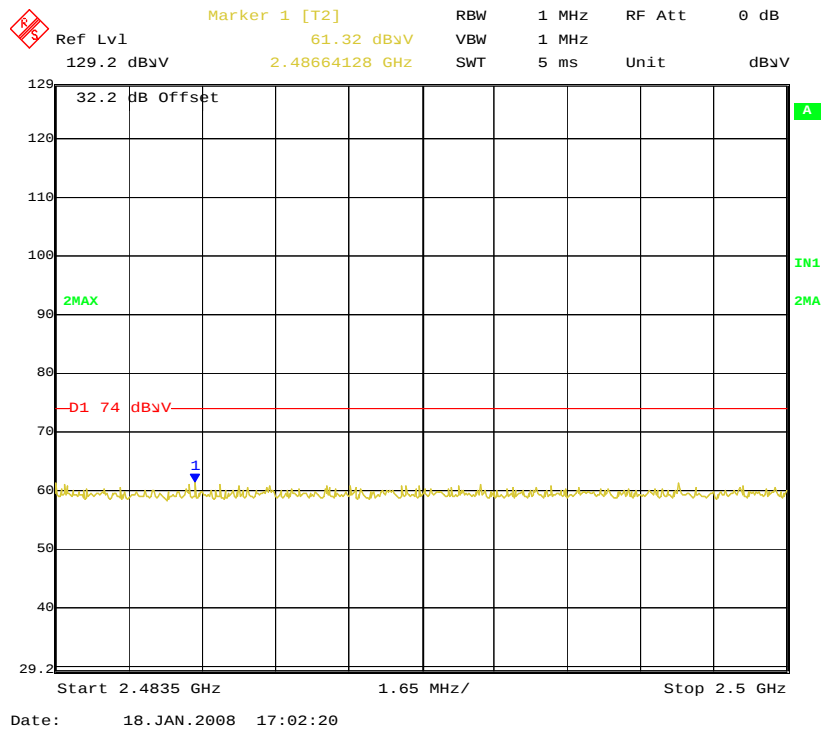
802.11g Low Channel-Horizontal Polarity –Average



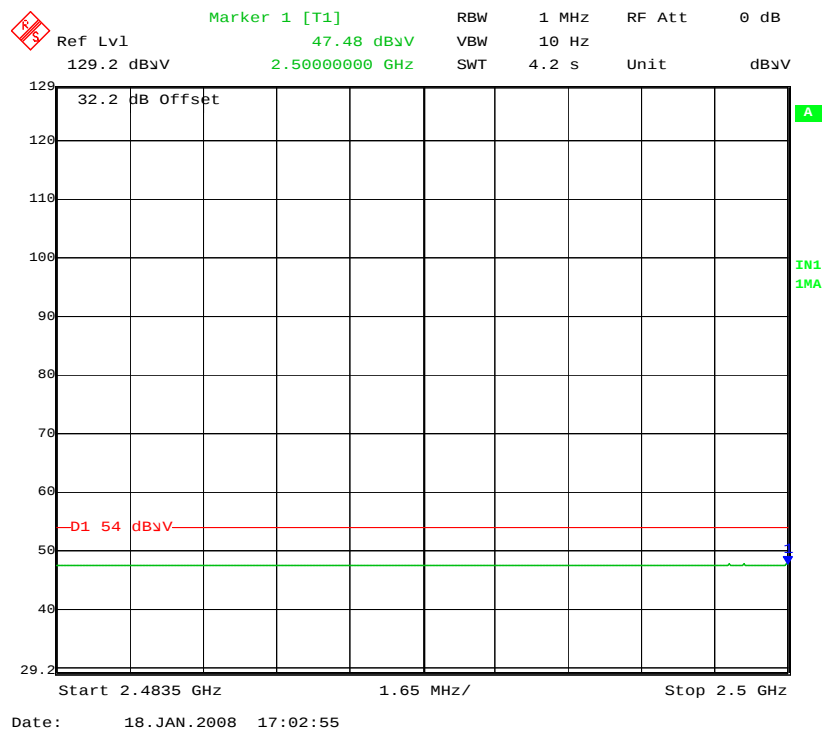
802.11g Low Channel-Vertical Polarity –Peak



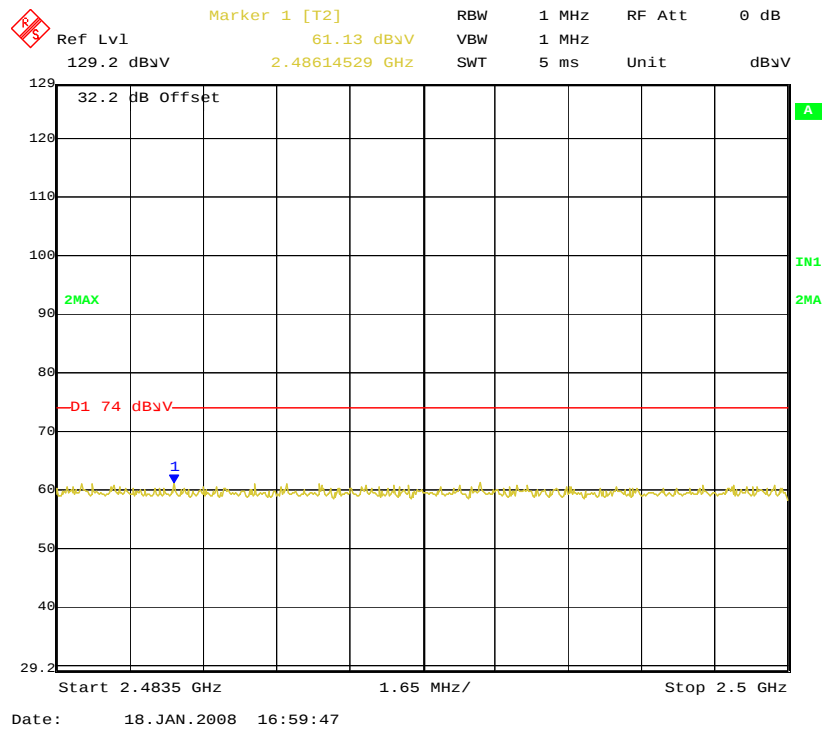
802.11g Low Channel-Vertical Polarity –Average



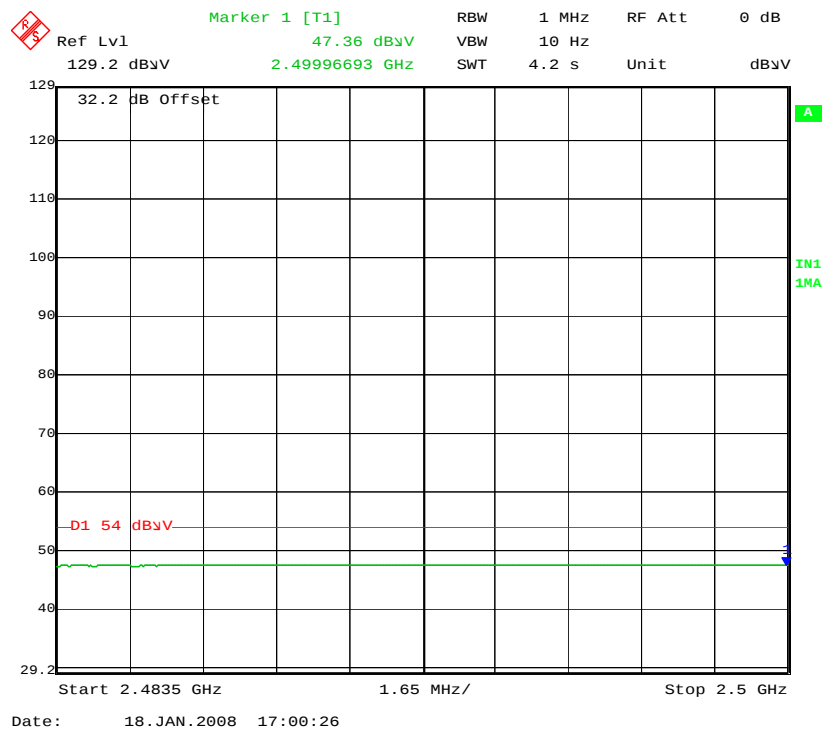
802.11g High Channel-Vertical Polarity –Peak



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	02/07/2008
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 (30MHz~2GHz)	Sunol Sciences	JB1	10/04/2008
Chamber	Lingren	3m	09/28/2008
Pre-Amplifier(1 ~ 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 (18~40GHz)	Com Power	AH-840	5/21/2008
Microwave Pre-Amp (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 Ω /50 μ 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 μ V = 47.96 dB μ 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 μ V (Calibrated for system losses)	
Therefore, Q-P margin = 47.96 – 40.00 = 7.96	i.e. 7.96 dB below limit

Annex A. iii RADIATED EMISSIONS TEST DESCRIPTION

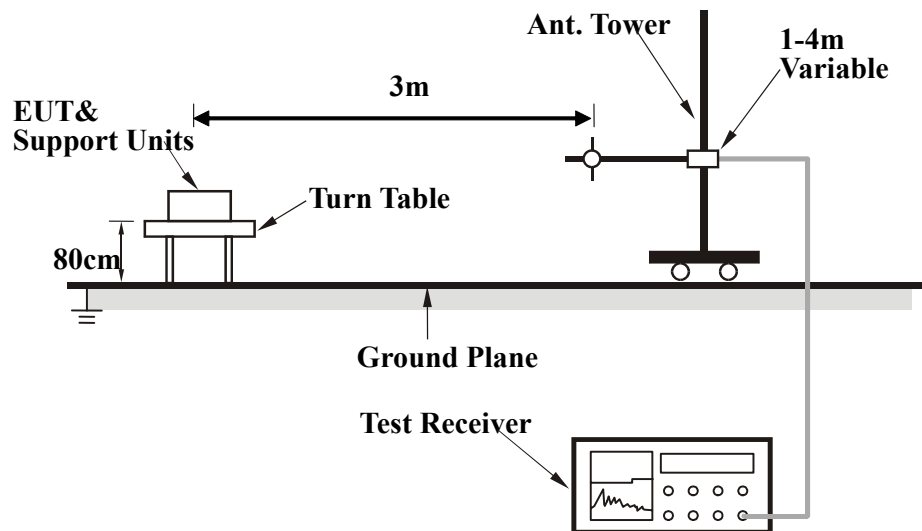
EUT Characterisation

EUT characterisation, over the frequency range from 30MHz to 10th 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

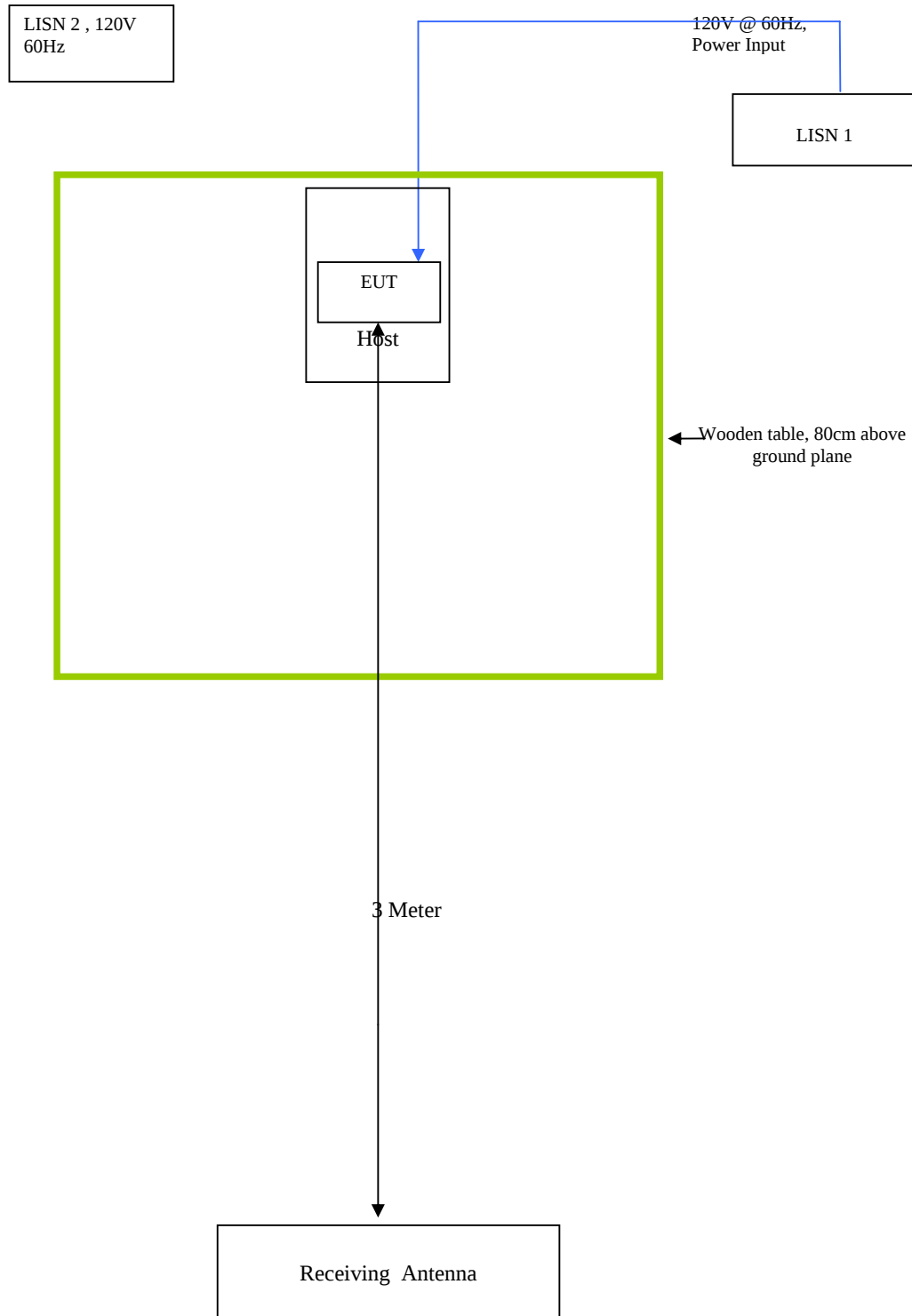
Annex C. i. SUPPORTING EQUIPMENT DESCRIPTION

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

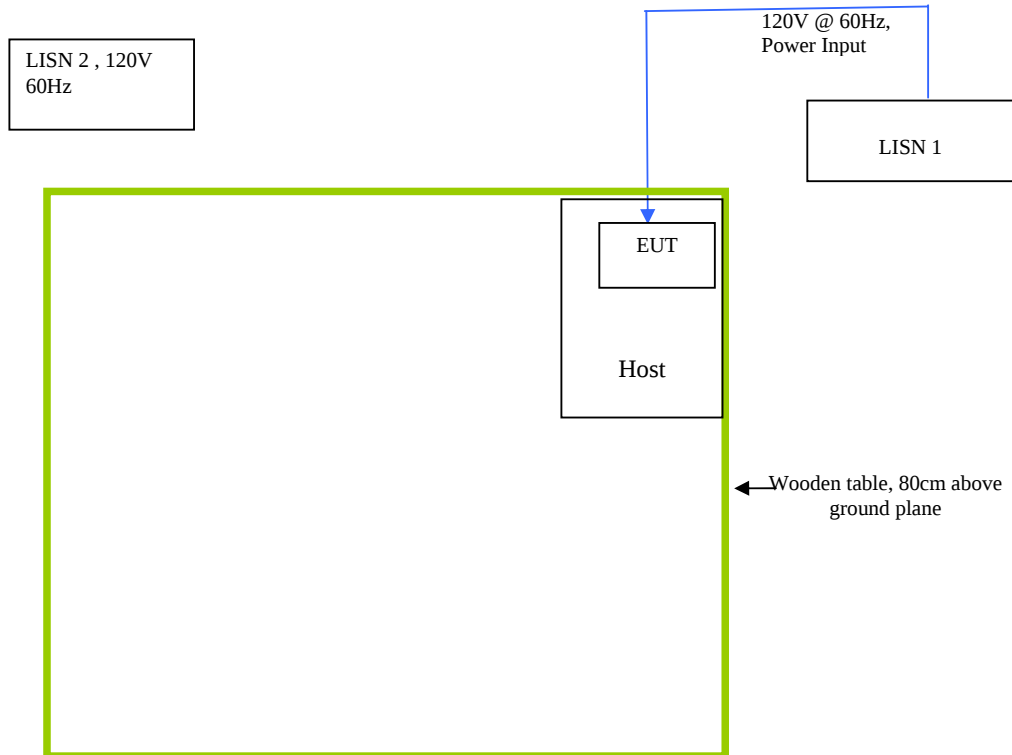
Equipment Description (Including Brand Name)	Model & Serial Number	Cable Description (List Length, Type & Purpose)
N/A	N/A	N/A

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