WATTSTOPPER, INC.

MIRO KEY FOB

Model : MKFOB

16 July 2007
Report No.: SL07062902-WAT-005
(This report supersedes NONE)

EMC Test Report
To: FCC Part 15.247

SIEMIC, INC.
Accessing global markets

Modifications made to the product : None

This Test Report is Issued Under the Authority of:	
Snell Leong	Leslie Bai
Snell Leong **Compliance Engineer**	**Leslie Bai** **Director of Certification**

SIEMIC ACREDITATION DETAILS: NVLAP Lab Code: 200729-0

United States Department of Commerce
National Institute of Standards and Technology

NVLAP®

Certificate of Accreditation to ISO/IEC 17025:1999

NVLAP LAB CODE: 200729-0

SIEMIC Laboratories
San Jose, CA

is recognized by the National Voluntary Laboratory Accreditation Program for conformance with criteria set forth in NIST Handbook 150:2001 and all requirements of ISO/IEC 17025:1999.
Accreditation is granted for specific services, listed on the Scope of Accreditation, for:

ELECTROMAGNETIC COMPATIBILITY AND TELECOMMUNICATIONS

2007-01-01 through 2007-12-31
Effective dates

Sally S. Bruce
For the National Institute of Standards and Technology

NVLAP-01C (REV. 2005-05-19)

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,

Phyllis Parrish
Information Technician

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

Industry Canada Industrie Canada

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

VCCI

Voluntary Control Council for Interference
by Information Technology Equipment
7F NOA Bldg. 2-3-5, Azabudai,
Minato-Ku, Tokyo, Japan, 106-0041
Tel:+81-3-5575-3138
Fax:+81-3-5575-3137
http://www.vcci.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.vcci.or.jp

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

Their address, phone and fax number are absolutly 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@vcci.or.jp

Enclosure

情報処理装置等電波障害自主規制協議会（略称VCCI）
〒106-0041 東京都港区麻布台7-3-5 ノア ビルディング（NOAビル）7階 Tel:03-5575-3138 Fax:03-5575-3137

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 laborstory 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 Kegami
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

SIEMIC ACREDITATION DETAILS: Korea MIC Lab Code: KR0032

시 험 기 관 지 정 서
Certificate
of Designated Testing Laboratory

지정번호(No.) : KR0032

시험기관명 : (주)현대교정인증기술원
(Name of Lab.) (Hyundai Calibration & Certification Technologies Co., Ltd.)

주 소 : 경기도 이천시 부발읍 아미리 산136-1
(Address) (136-1, Ami-ri, Bubal-eup, Icheon-si, Kyunggi-Do, Korea)
2206 Ringwood Avenue San Jose, CA, USA.

시험분야 및 범위 : 유선(Telecommunication Part)
(Area & Category) 무선(Radio Communication Part)
전자파장해(EMI) : 미국지사 포함
전자파내성(EMS) : 미국지사 포함
전기안전(Safety)
전자파흡수율(SAR)

위 기관을 정보통신기기시험기관지정및관리등에관한규칙에 의해 정보통신기기시험기관으로 지정합니다.

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

2005년(Year) 7월(Month) 5일(Date)

전 파 연 구 소 장
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 Interferenoe 2. Annex 8(KN-22), RRL Notice No. 2005-131: Conformity Assessment Procedure for Electromagnetic Interferenoe	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

NIST

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

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

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 I** 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

NIST

SIEMIC ACREDITATION DETAILS: Taiwan NCC CAB ID: US0160

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

August 8, 2006

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

Dear Mr. Bai:

I am pleased to inform you that SIEMIC Laboratories has been recognized by the Chinese Taipei's National Communications Commission (NCC) under the Asia Pacific Economic Cooperation for Telecommunications and Information, Mutual Recognition Arrangement (APEC Tel 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.

You may submit test data to NCC to verify that the equipment to be imported into Chinese Taipei satisfies their applicable requirements using the following guidelines:

- Your laboratory's assigned 6-digit U.S. identification number is **US0160**. You should reference this number in your correspondence.
- The scope of designation is limited to **LP0002**. Your designation will remain in force as long as your accreditation remains valid for the scope of designation.

If you have any questions please contact Mr. Jogindar Dhillon via email at dhillon@nist.gov or via fax at 301-975-5414. The names of all recognized laboratories will be posted on the NIST website at http://ts.nist.gov/mra. 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

NIST

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 18 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 ingles y español prellenado de los cuales le pido sea revisado y en su caso corregido, para que si esta de acuerdo poder firmarlo para mandarlo con las autoridades Mexicanas para su visto bueno y así poder ejercer dicho acuerdo.

Aprovecho este escrito para mencionarle que nuestro intermediario gestor será la empresa Isabel de México, S. A. de C. V., empresa que ha colaborado durante mucho tiempo con nosotros en lo relacionado a la evaluación de la conformidad y que cuenta con amplia experiencia en la gestoría de la certificación de cumplimiento con Normas Oficiales Mexicanas de producto en México.

Me despido de usted enviándole un cordial saludo y esperando sus comentarios al Acuerdo que nos ocupa.

Atentamente:

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

Culiacán 71
Hipódromo Condesa
06100 México, D.F.
Tel: 5264-0000 con 12 líneas
Fax 5264 9444
www.canieti.org

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

OFTA
電訊管理局

Your Ref 來函檔號 : D23/16 V
Our Ref 本局檔號 :

Telephone 電話 : (852) 2961 6320
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 :

Scope of recognition (HKTA Specifications) :
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 WattStopper, Inc. Miro Key Fob, against the current Stipulated Standards. The Miro Key Fob have demonstrated compliance with the FCC 15.247 2007.

EUT Information

EUT Description	:	The EUT is a battery powered, Top Dog™ enabled remote device, which allows the user to recall and record scenes in a Miro wireless network . CHARACTERISTICS OF DEVICE Operating Temp. Range : 10 °C to 40 °C [32 to 104 F] Battery : Lithium 3V coin cell CR2430 with a 290mAh capacity Frequency: 904.861 MHz, 910.851 MHz, 918.845 MHz, 922.503 MHz, and 924.873 MHz Weight: : 20 g
Model No	:	MKFOB
Serial No	:	N/A
Input Power	:	3.0 Vdc
Classification Per Stipulated Test Standard	:	Digital transmission System / device

2 TECHNICAL DETAILS

Purpose	Compliance testing of Miro Key Fob with stipulated standard
Applicant / Client	WattStopper, Inc
Manufacturer	WattStopper, Inc 2800 De La Cruz Blvd, Santa Clara, CA 95050
Laboratory performing the tests	SIEMIC Laboratories
Test report reference number	SL07062902-WAT-005
Date EUT received	11 July, 2007
Standard applied	FCC 15.247 2007
Dates of test (from – to)	11 July 2007 - 16 July 2007
No of Units:	N/A
Equipment Category:	DTS
Trade Name:	WattStopper, Inc.
Model :	MKFOB
RF Operating Frequency (ies)	904.861 MHz, 910.851 MHz, 918.845 MHz, 922.503 MHz, and 924.873 MHz
Number of Channels :	5
Modulation :	FH & DSS
FCC ID :	Q4BTDKFOB
IC ID :	N/A

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:

Digital transmission System / device

Test Results Summary

Emissions			
Test Standard CFR 47 FCC 15.247 2007	**Description**	**Product Class**	**Pass / Fail**
15.203	Antenna Requirement		Pass
15.205	Restricted Band of Operation		Pass
15.207(a)	Conducted Emissions Voltage		* N/A
15.247(a)(1)	Channel Separation		Pass
15.247(a)	Occupied Bandwidth		Pass
15.247(a)(1)	Number of Hopping Channels		N/A
15.247(a)(1)	Time of Occupancy		Pass
15.247(b)	Output Power		Pass
15.247(c)	Antenna Gain > 6 dBi		N/A
15.247(d)	Conducted Spurious Emissions		Pass
15.209; 15.247(d)	Radiated Spurious Emissions		Pass
15.247(e)	Power Spectral Density		Pass
15.247(f)	Hybrid System Requirement		Pass
15.247(g)	Hopping Capability		Pass
15.247(h)	Hopping Coordination Requirement		Pass
15.247(i)	Maximum Permissible Exposure		Pass
ANSI C63.4: 2003 / RSS-Gen Issue 2: 2007			

* EUT is battery operated.

5 MEASUREMENTS, EXAMINATION AND DERIVED RESULTS

Test Result

N/A

5.1 Occupied Bandwidth

1. Conducted Measurement
   EUT was set for low , mid, high channel with modulated mode and highest RF output power.
   The spectrum analyzer was connected to the antenna terminal.
2. Environmental Conditions

Temperature	23°C
Relative Humidity	50%
Atmospheric Pressure	1019mbar

Test Date : July 16 2007
Tested By : Benjamin Jing

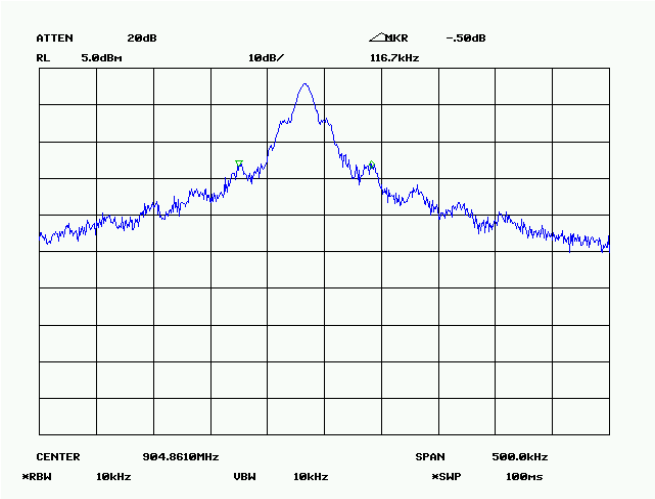
Standard Requirement :

Per FCC rule §15.247(a)(1), the 20 dB bandwidth were measured by conducted method using a spectrum analyzer for the low, mid, and high channels. 20 dB bandwidth limit : < 500 KHz.

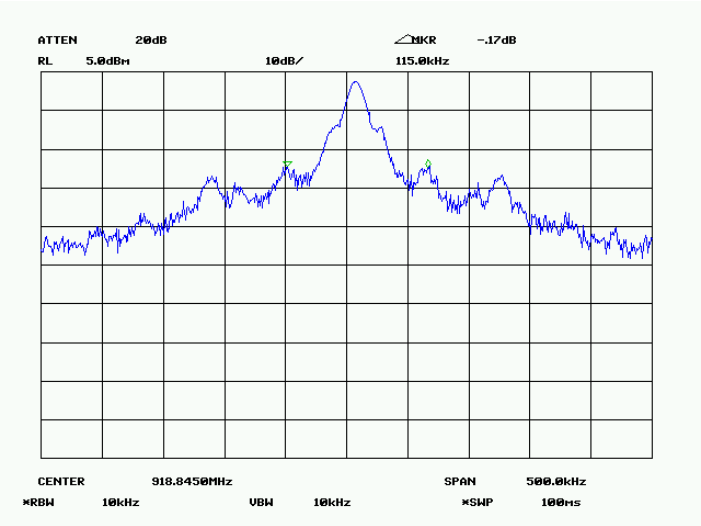
Test Result:

Channel	Channel frequency (MHz)	Channel Bandwidth (kHz)
Low	904.78	116
Mid	918.88	115
Hi	924.88	119

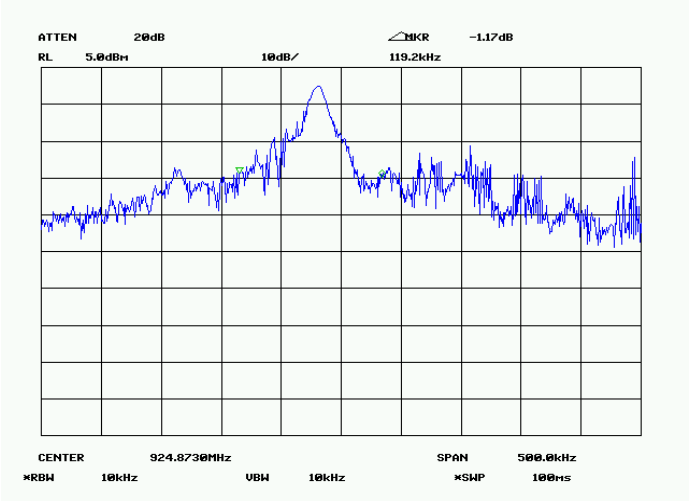
Refer to the attached plots.



Low Channel.



Mid Channel



High Channel

5.2 Carrier Frequency Separation

1. Conducted Measurement
   EUT was set for hopping mode with highest RF output power.
   The spectrum analyzer was connected to the antenna terminal.
2. Environmental Conditions

Temperature	23°C
Relative Humidity	50%
Atmospheric Pressure	1019mbar

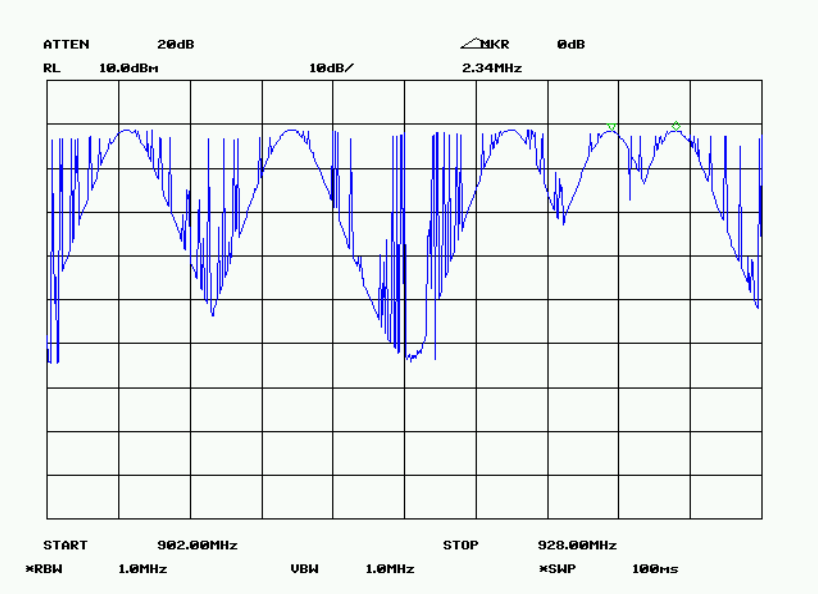
Test Date : July 16 2007
Tested By : Benjamin Jing

Standard Requirement :

Per 15.247(a), carrier frequencies will be separated by a minimum of 25 KHz or the 20 dB bandwidth of the hopping channel, whichever is greater..

Test Result :

Carrier Frequency Separation : 2.34 MHz



5.3 Number of Hopping Channels

1. Conducted Measurement
   EUT was set for hopping mode with highest RF output power.
   The spectrum analyzer was connected to the antenna terminal.
2. Environmental Conditions

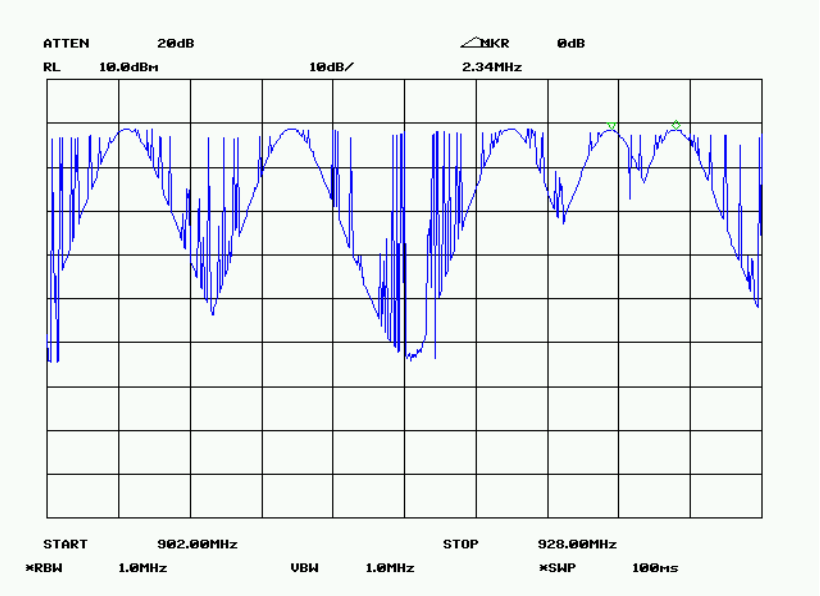
Temperature	23°C
Relative Humidity	50%
Atmospheric Pressure	1019mbar

Test Date : July 16 2007
Tested By : Benjamin Jing

Standard Requirement : Per 15.247(a)(1)

Test Result :

Number of Hopping Channels : 5



5.4 Time of Occupancy

1. Conducted Measurement

EUT was set for hopping mode with highest RF output power.
The spectrum analyzer was connected to the antenna terminal.
The span set to o Hz.

2. Environmental Conditions

Temperature	23°C
Relative Humidity	50%
Atmospheric Pressure	1019mbar

Test Date : July 16 2007
Tested By : Benjamin Jing

Standard Requirement :

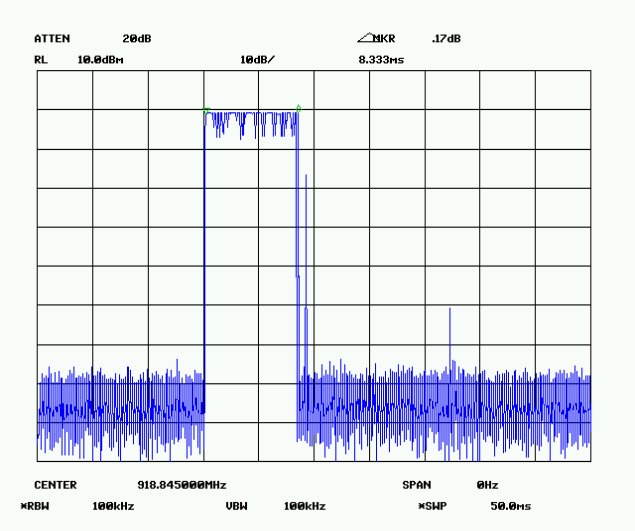
Per FCC rule §15.247(f), time of occupancy shall not be greater than 0.4 second within a period of 0.4 second multiplied by the number of hopping channels.
For this EUT the period is : 0.4 second X number 5 = 2 seconds

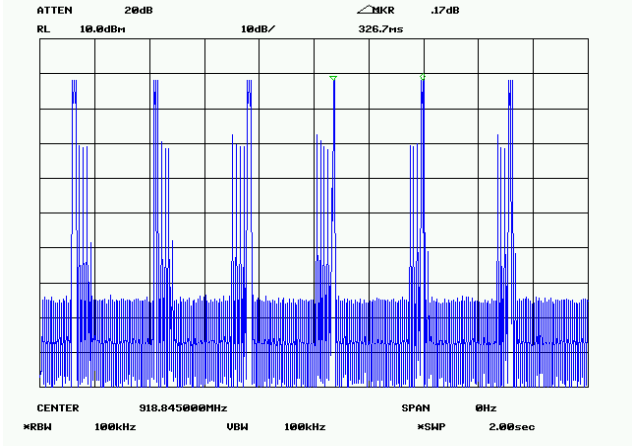
Test Result:

Time of occupancy per cycle = 8.33 ms

Number of cycles within 2 seconds = 6

Time of occupancy = 8.33 mS X 6 = 49.98 ms < 0.4 seconds





5.5 Peak RF Output Pwoer

1. Conducted Measurement
   EUT was set for hopping mode with highest RF output power.
   The spectrum analyzer was connected to the antenna terminal.
2. Environmental Conditions

Temperature	23°C
Relative Humidity	50%
Atmospheric Pressure	1019mbar

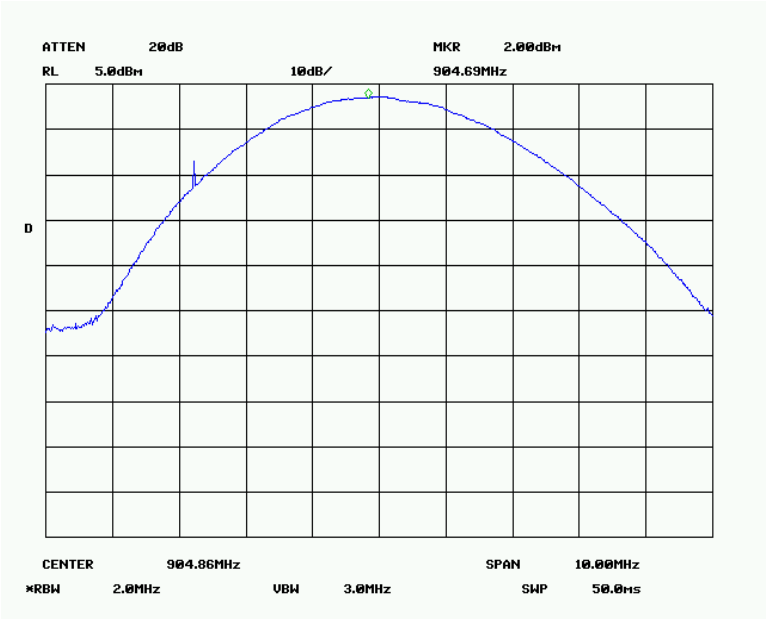
Test Date : July 16 2007
Tested By : Benjamin Jing

Standard Requirement :

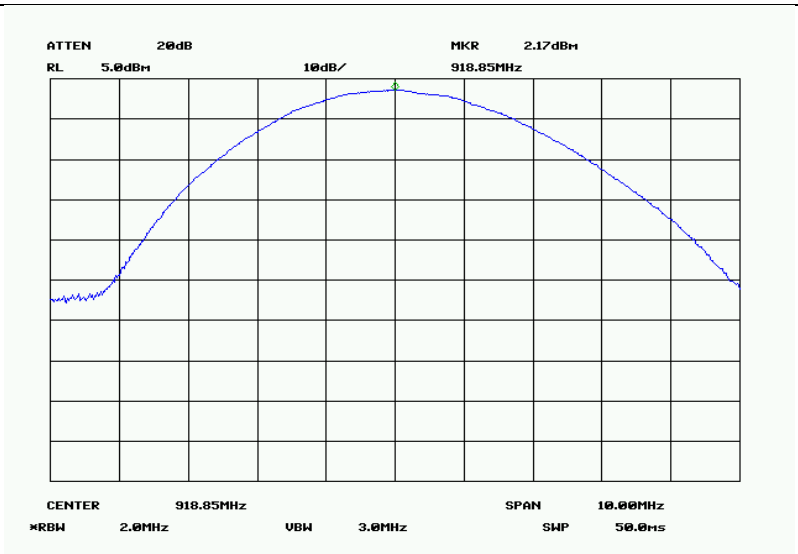
Per FCC rule §15.247(b).

Test Result:

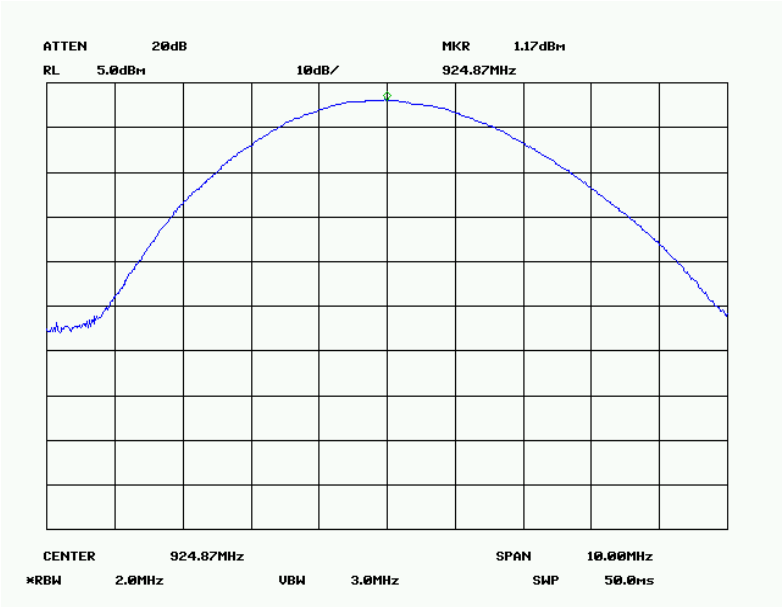
Channel	Channel Frequency (MHz)	Peak Power (dBm)	Peak Power (milliWatt)
Low	904.86	2.00	1.58
Mid	918.85	2.17	1.65
High	924.87	1.17	1.31



Low Channel



Mid Channel



High Channel

5.6 Peak Power Spectral

1. Conducted Measurement
   EUT was set for low , mid, high channel with modulated mode and highest RF output power.
   The spectrum anlyzer was connected to the antenna terminal. RBW = VBW = 3 KHz
2. Environmental Conditions

Temperature	23°C
Relative Humidity	50%
Atmospheric Pressure	1019mbar

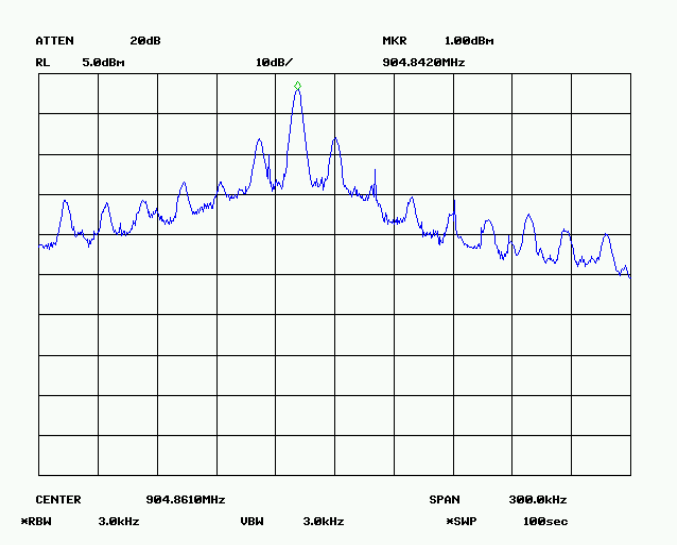
Test Date : July 16 2007
Tested By : Benjamin Jing

Standard Requirement :

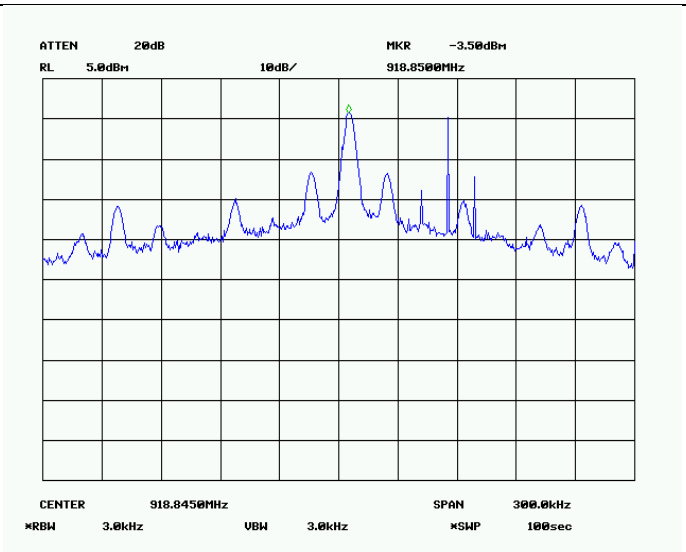
Per FCC rule §15.247(e), the power spectral density shall not be greater than 8 dBm in any 3 KHz band.

Test Result:

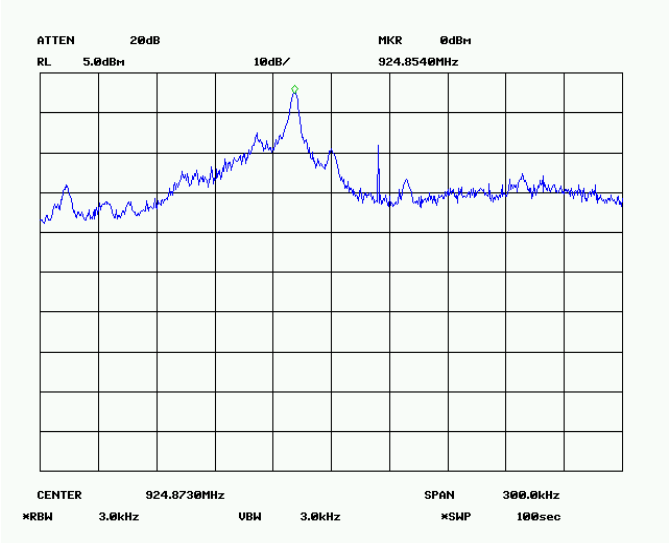
Channel	Channel Frequency (MHz)	PPSD (dBm/3 kHz)	Limit (dBm/3 kHz)
Low	904.78	1.0	8
Mid	918.88	-3.5	8
Hi	924.88	0.0	8



Low Channel



Mid Channel



High Channel

5.7 Spurious Emissions at Antenna Terminals

1. Conducted Measurement
   EUT was set for hopping mode with highest RF output power.
   The spectrum analyzer was connected to the antenna terminal.
2. Environmental Conditions

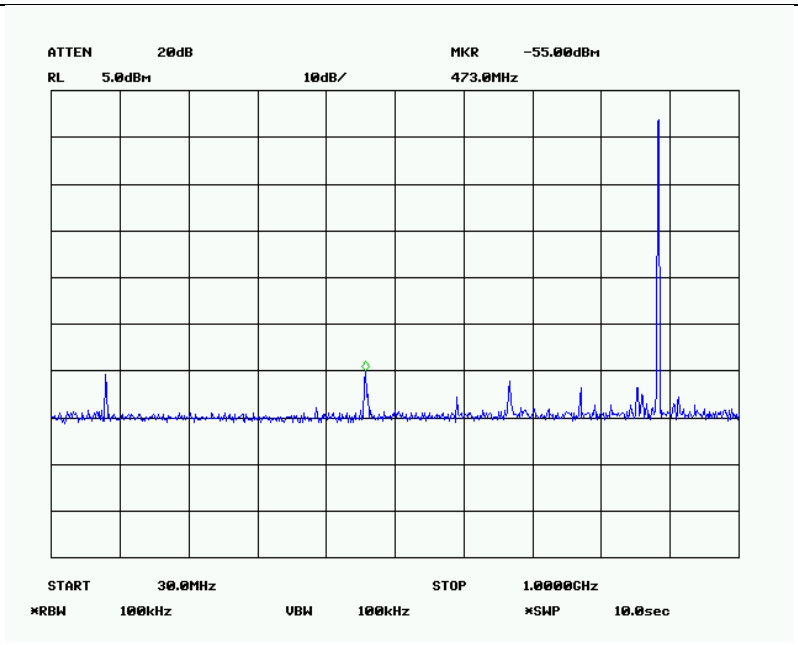
Temperature	23°C
Relative Humidity	50%
Atmospheric Pressure	1019mbar

Test Date : July 16 2007
Tested By : Benjamin Jing

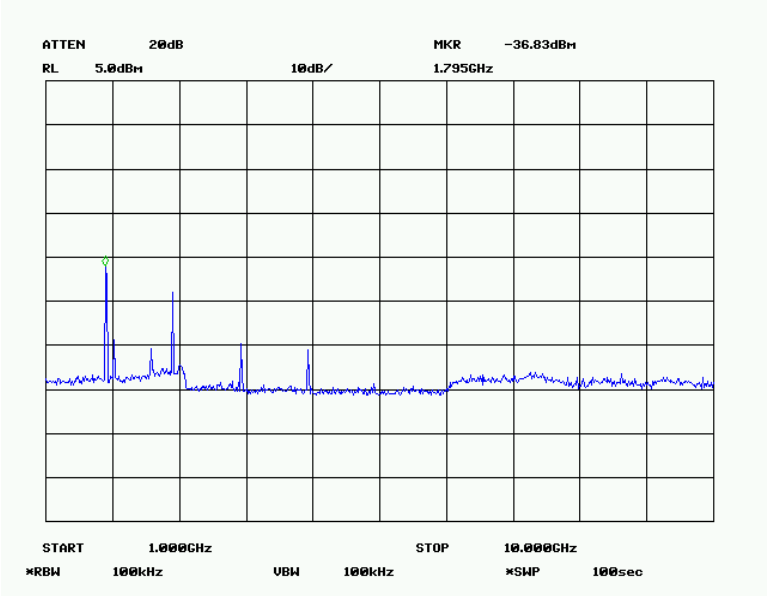
Standard Requirement : FCC rule §15.247(d) .

Test Result:

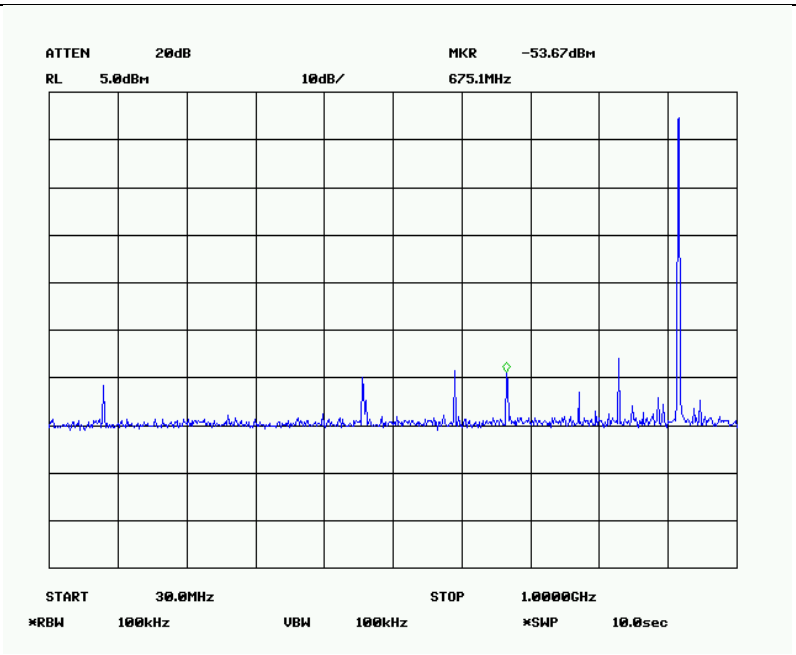
Channel	Channel Frequency (MHz)	Pass/Fail
Low	904.86	Pass
Mid	918.85	Pass
Hi	924.87	Pass



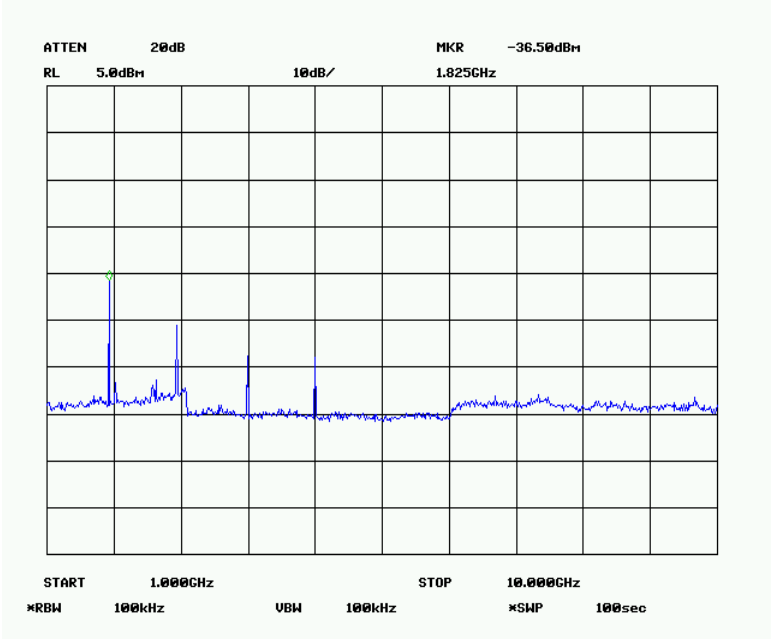
Low Channel (0.3 - 1 GHz)



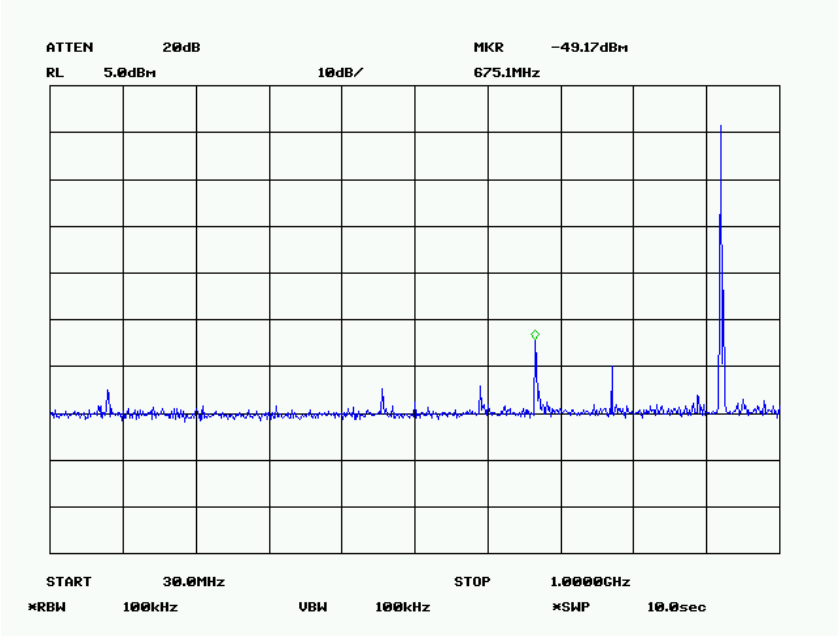
Low Channel (1 – 10 GHz)



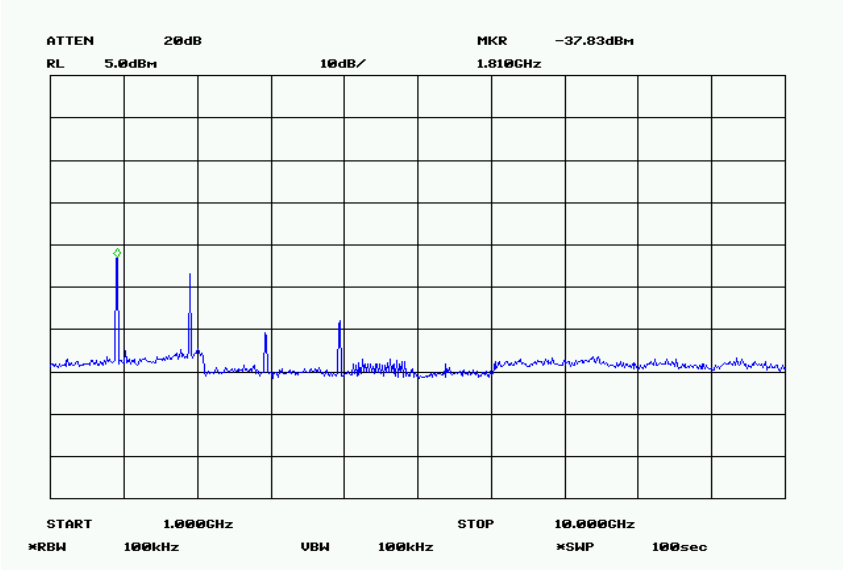
Mid Channel (0.3 – 1 GHz)



Mid Channel (1 – 10 GHz)



High Channel (0.3 – 1 GHz)



High Channel (1 – 10 GHz)

5.8 Radiated Spurious Emission

1. Radiated emissions below 1 GHz were measured according to ANSI C63.4. For radiated emissions above 1 GHz, equipment was setup in a semi-anechoic chamber, average measurement was taken with a 10Hz video bandwidth. Peak measurement was taken with 1 MHz BW. The EUT was tested at low, mid and high channel with the highest output power and worse case protocol . Note that while single channel mode is set, the side skirts of the fundamental is the same emissions
2. All possible modes of operation were investigated. The worst case emissions measured, using the correct CISPR detectors, are reported. All other emissions were relatively insignificant. The EUT was tested at three orthogonal plans.
3. A "-ve" margin indicates a PASS as it refers to the margin present below the limit line at the particular frequency.
4. 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). In range of 1-40Ghz is ±3.6dB
5. Environmental Conditions

Temperature	23°C
Relative Humidity	50%
Atmospheric Pressure	1019mbar

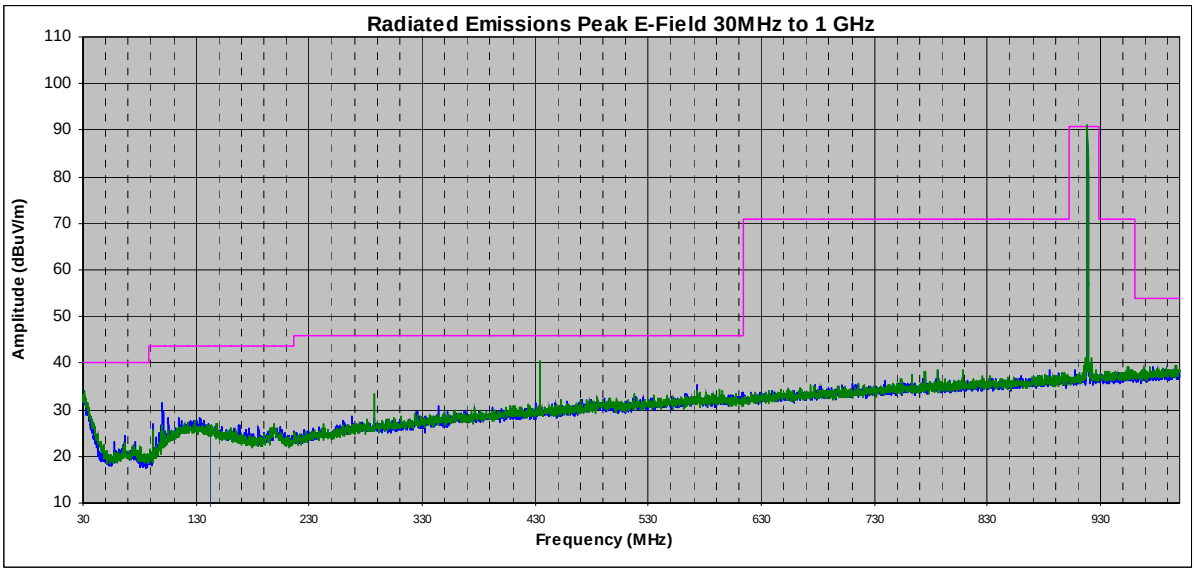
Test date : July 16 2007
Tested By : Benjamin Jing

Standard requirement : FCC rule §15.247(d),

Test Result for Radiated Spurious Emissions < 1 GHz

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

Plot : Vertical Polarization | Horizontal Polarization | Limit



Frequency	Azimuth	Measure	Antenna Polarity	Antenna Height	Raw Amplitude @ 3m	ACF	CBL loss	Corrected Amplitude @ 3m	Limit @3m	Delta
(MHz)	(degrees)	(Avg/QP/Pk)	(H/V)	(m)	(dBuV/m)	(dB)	(dB)	(dBuV/m)	(dBuV/m)	(dB)
100.52	210	Pk	v	1.2	21.1	9.7	0.9	31.7	43.5	-11.8

Note: Emission collected is the worse case using Restricted Band Limit.

Test Result for Radiated Spurious Emissions > 1 GHz

Sample Calculation:

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

Fundamental = 0.904861 GHz (Low Channel)

Frequency (GHz)	Azimuth (Degrees)	Antenna Polarity (H/V)	Height (m)	Raw Amp. (dBuV)	Pre Amp. (dB)	Ant.Corr. Factor (dB)	Cable Loss (dB)	Dist.Corr. Factor (dB)	EUT Final Field Strength (dBuV/m)	Limit @ 3m (dBuV/m)	Delta (dBuV/m)	Detector (pk/avg)
1.8097	180	H	1.2	71.2	32.02	28.30	2.01	9.54	59.96	74	-14.04	pk
1.8097	180	H	1.2	49.6	32.02	28.30	2.01	9.54	38.36	54	-15.64	avg
2.7145	60	H	1.1	74.1	32.19	31.13	2.51	9.54	66.01	74	-7.99	pk
2.7145	60	H	1.1	52.5	32.19	31.13	2.51	9.54	44.41	54	-9.59	avg
3.6193	40	H	1.3	55.8	32.37	33.02	2.99	9.54	49.90	74	-24.10	pk
3.6193	40	H	1.3	34.2	32.37	33.02	2.99	9.54	28.30	54	-25.70	avg
4.5248	90	H	1.1	51.9	32.49	33.42	3.32	9.54	46.60	74	-27.40	pk
4.5248	90	H	1.1	30.3	32.49	33.42	3.32	9.54	25.00	54	-29.00	avg
1.8097	280	V	1.3	67.1	32.02	27.94	2.01	9.54	55.49	74	-18.51	pk
1.8097	280	V	1.3	45.5	32.02	27.94	2.01	9.54	33.89	54	-20.11	avg
2.7145	330	V	1.1	66.3	32.19	30.92	2.51	9.54	58.01	74	-15.99	pk
2.7145	330	V	1.1	44.7	32.19	30.92	2.51	9.54	36.41	54	-17.59	avg
3.6193	0	V	1.2	58.4	32.37	32.65	2.99	9.54	52.13	74	-21.87	pk
3.6193	0	V	1.2	36.8	32.37	32.65	2.99	9.54	30.53	54	-23.47	avg
4.5248	210	V	1.1	49.8	32.49	33.42	3.32	9.54	44.51	74	-29.49	pk
4.5248	210	V	1.1	28.2	32.49	33.42	3.32	9.54	22.91	54	-31.09	avg

Fundamental = 0.918845 GHz (Mid Channel)

Freq. (GHz)	Azimuth (Degrees)	Antenna Polarity (H/V)	Height (m)	Raw Amp. @ 1m (dBuV)	Pre Amp. (dB)	Ant.Corr. Factor (dB)	Cable Loss (dB)	Dist.Corr. Factor (dB)	EUT Final Field Strength (dBuV/m)	Limit @ 3m (dBuV/m)	Delta (dBuV/m)	Detector (pk/avg)
1.8377	320	H	1.2	72.3	32.02	28.45	2.03	9.54	61.22	74	-12.78	pk
1.8377	320	H	1.2	50.7	32.02	28.45	2.03	9.54	39.62	54	-14.38	avg
2.7565	0	H	1.1	73.5	32.21	31.31	2.54	9.54	65.60	74	-8.40	pk
2.7565	0	H	1.1	51.9	32.21	31.31	2.54	9.54	44.00	54	-10.00	avg
3.6754	60	H	1.3	54.4	32.37	33.14	3.02	9.54	48.65	74	-25.35	pk
3.6754	60	H	1.3	32.8	32.37	33.14	3.02	9.54	27.05	54	-26.95	avg
4.5946	80	H	1.1	55.9	32.51	33.50	3.35	9.54	50.71	74	-23.29	pk
4.5946	80	H	1.1	34.3	32.51	33.50	3.35	9.54	29.11	54	-24.89	avg
1.8377	210	V	1.3	69.6	32.02	28.06	2.03	9.54	58.13	74	-15.87	pk
1.8377	210	V	1.3	47.7	32.02	28.06	2.03	9.54	36.23	54	-17.77	avg
2.7565	45	V	1.1	65.4	32.21	31.15	2.54	9.54	57.33	74	-16.67	pk
2.7565	45	V	1.1	43.8	32.21	31.15	2.54	9.54	35.73	54	-18.27	avg
3.6754	180	V	1.2	57.5	32.37	32.80	3.02	9.54	51.41	74	-22.59	pk
3.6754	180	V	1.2	35.9	32.37	32.80	3.02	9.54	29.81	54	-24.19	avg
4.5946	90	V	1.1	55.8	32.51	33.51	3.35	9.54	50.61	74	-23.39	pk
4.5946	90	V	1.1	34.2	32.51	33.51	3.35	9.54	29.01	54	-24.99	avg

Fundamental = 0.924873 GHz (High Channel)

Freq. (GHz)	Azimuth (Degrees)	Antenna Polarity (H/V)	Height (m)	Raw Amp. @ 1m (dBuV)	Pre Amp. (dB)	Ant.Corr. Factor (dB)	Cable Loss (dB)	Dist.Corr. Factor (dB)	EUT Final Field Strength (dBuV/m)	Limit @ 3m (dBuV/m)	Delta (dBuV/m)	Detector (pk/avg)
1.8497	320	H	1.2	73.9	32.02	28.51	2.03	9.54	62.88	74	-11.12	pk
1.8497	320	H	1.2	52.3	32.02	28.51	2.03	9.54	41.28	54	-12.72	avg
2.7745	0	H	1.1	71.2	32.23	31.39	2.55	9.54	63.37	74	-10.63	pk
2.7745	0	H	1.1	49.6	32.23	31.39	2.55	9.54	41.77	54	-12.23	avg
3.6996	60	H	1.3	54.4	32.37	33.20	3.03	9.54	48.72	74	-25.28	pk
3.6996	60	H	1.3	32.8	32.37	33.20	3.03	9.54	27.12	54	-26.88	avg
4.6244	110	H	1.1	60.1	32.51	33.55	3.36	9.54	54.96	74	-19.04	pk
4.6244	110	H	1.1	38.5	32.51	33.55	3.36	9.54	33.36	54	-20.64	avg
1.8497	230	V	1.3	69.5	32.02	28.11	2.03	9.54	58.08	74	-15.92	pk
1.8497	230	V	1.3	47.9	32.02	28.11	2.03	9.54	36.48	54	-17.52	avg
2.7745	45	V	1.1	67.6	32.23	31.24	2.55	9.54	59.63	74	-14.37	pk
2.7745	45	V	1.1	46	32.23	31.24	2.55	9.54	38.03	54	-15.97	avg
3.6996	80	V	1.2	58	32.37	32.87	3.03	9.54	51.99	74	-22.01	pk
3.6996	80	V	1.2	36.4	32.37	32.87	3.03	9.54	30.39	54	-23.61	avg
4.6244	160	V	1.1	59.8	32.51	33.56	3.36	9.54	54.67	74	-19.33	pk
4.6244	160	V	1.1	38.2	32.51	33.56	3.36	9.54	33.07	54	-20.93	avg

5.9 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.

This EUT antenna is attached permanently to the device which meets the requirement.

Annex A. TEST INSTRUMENT & METHOD

Annex A.i. TEST INSTRUMENTATION & GENERAL PROCEDURES

Instrument	Manufacturer	Model	CAL Due Date
Spectrum Analyzer	HP	8568B	04/26/2008
Quasi-Peak Adapter	HP	85650A	04/26/2008
RF Pre-Selector	HP	85685A	04/26/2008
Spectrum Analyzer	HP	8564E	12/29/2007
Power Meter	HP	437B	04/26/2008
Power Sensor	HP	8485A	04/26/2008
Bilog Antenna	Sunol Sciences, Inc.	JB1	09/11/2007
Horn Antenna	Emco	3115	08/17/2007
Horn Antenna	Emco	3115	See Note
Signal Generator	Wiltron	68169B	04/26/2008
Chamber	Lingren	3m	08/21/2007
Pre-Amplifier	HP	8449	05/01/2008
Variac	KRM	AEEC-2090	See Note
Environment Chamber	TestEquity	1007H	10/27/2007
DMM	Fluke	51II	See Note
900 MHz Notch Filter	AWID	N/A	See Note
4GHz High Pass Filter	LORCH Microwave	4HPD-X4000-3R	See Note

Annex A. ii 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.

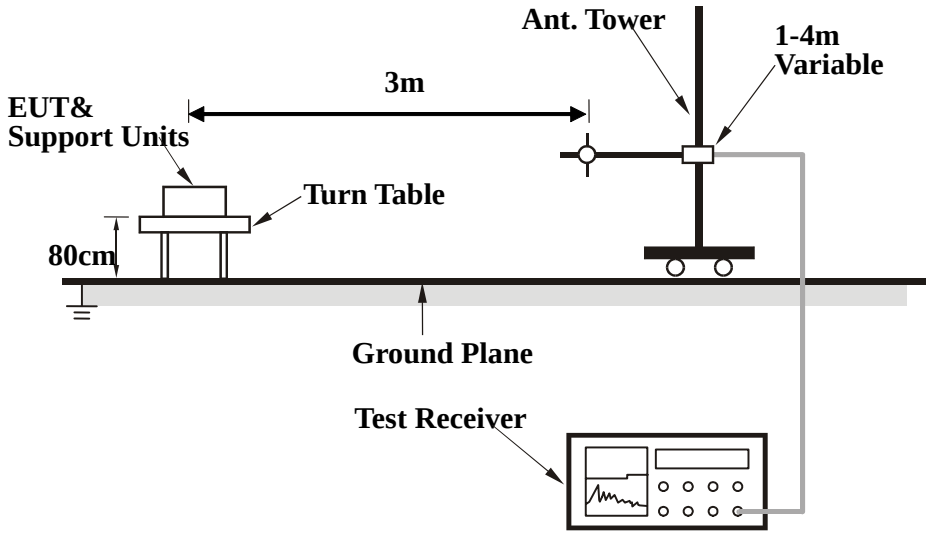
The EUT was placed in the chamber, at a height of about 0.8m on a turntable. Its radiated emissions frequency profile was observed, using a spectrum analyzer /receiver with the appropriate broadband antenna placed 3m away from the EUT. Radiated emissions from the EUT were maximised by rotating the turntable 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:

Peak = Reading + Corrected Factor

where
Corr. Factor = Antenna Factor + Cable Factor - Amplifier Gain (if any)
And the average value is

Average = Peak Value + Duty Factor

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

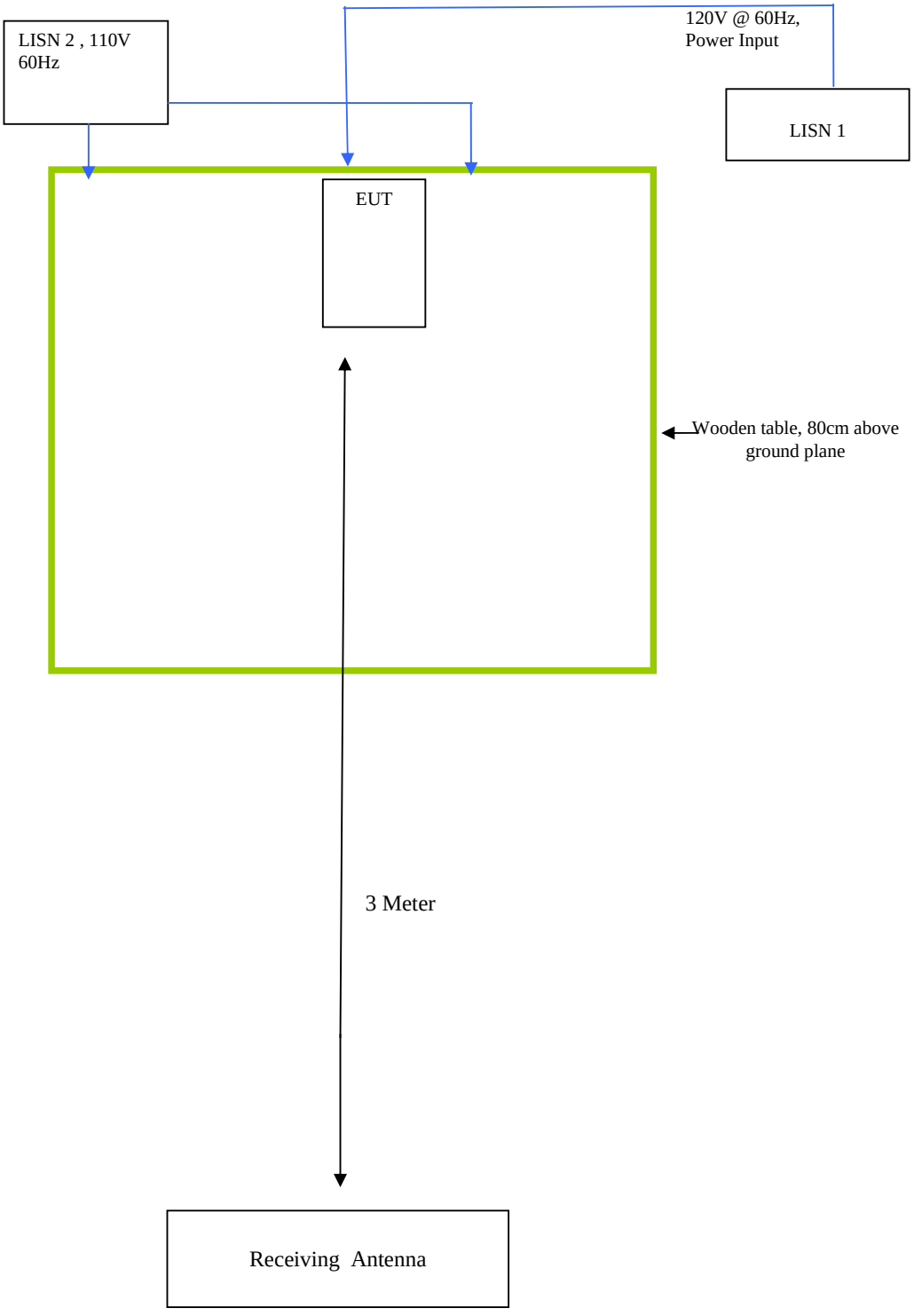
The following is a description of supporting equipment and details of cables used with the EUT.

Equipment Description (Including Brand Name)	Model & Serial Number	Cable Description (List Length, Type & Purpose)
None		None

Block Configuration Diagram for Conducted Emission

N/A

Block Configuration Diagram for Radiated 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	EUT is configured for worst case.

Annex C.iii. Duty Cycle For Average Correction Factor.

CALCULATION OF DUTY FACTOR

The duty factor is calculated with following formula :

Duty factor = 20 X Log (On time / Period of Pulse Train),

PS: if pulse train period is more than 100ms. Then 100ms should be used.

Annex D USER MANUAL, BLOCK & CIRCUIT DIAGRAM

Please see attachment