

Technical Compliance Statement



For the following information

Ref. File No.: C1M1305241

Product : Motherboard
Model Number : H81-PLUS
Brand : ASUS
Applicant : ASUSTEK Computer Inc.
Manufacturer #1 : MainTek Computer (Suzhou) Co., Ltd.
Manufacturer #2 : Danriver Technology (GZ) Inc.
Manufacturer #3 : Global Brands Manufacture Ltd
Manufacturer #4 : First International Computer (Suzhou) Inc
Manufacturer #5 : BOATEK ELECTRONIC CO., LTD.
Manufacturer #6 : Cal-Comp Electronics and Communications (suzhou) Co., Ltd
Manufacturer #7 : NBM Production (Dongguan) Co., Ltd
Standards : FCC CFR 47 Part 15 Subpart B/Oct. 2012 and CISPR 22/1997 (Class B Limit) and ICES-003

We hereby certify that the above product has been tested by us and complied with the FCC and IC official limits. These products might be marketed at the US accordance to FCC Rule based on the standard CFR 47 Part 2 and Part 15 Class B Equipment Regulations. The test was performed accordance to the procedures from ANSI C63.4-2009. The test data & results are issued on the test report no. EM-F1020422.

Signature

A handwritten signature in blue ink that reads "Leon Liu".

Leon Liu/Deputy General Manager

Date: Jun. 05, 2013

Test Laboratory:
AUDIX Technology Corporation, EMC Department
NVLAP Lab. Code: 200077-0
FCC OET Designation: TW1004
Web Site: www.audixtech.com



NVLAP Lab Code 200077-0

The statement is based on a single evaluation of one sample of the above-mentioned products. It does not imply an assessment of the whole production and does not permit the use of the test lab logo.

TEST REPORT FOR FCC DoC and INDUSTRY CANADA
ASUSTEK Computer Inc.

Motherboard

Model No.: H81-PLUS

Brand: ASUS

Prepared for : ASUSTEK Computer Inc.
4F, No.150, Li-Te Rd., Peitou, Taipei 112,
Taiwan

Prepared By : AUDIX Technology Corporation
EMC Department
No. 53-11, Dingfu, Linkou Dist.,
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File Number : C1M1305241
(ACW Ref. No. ACWE-G1305032)
Report Number : EM-F1020422
Date of Test : Jun. 03, 2013
Date of Report : Jun. 05, 2013

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TEST REPORT FOR COMPLIANCE DECLARATION

Applicant : ASUSTEK Computer Inc.
 Manufacturer #1 : MainTek Computer (Suzhou) Co., Ltd.
 Manufacturer #2 : Danriver Technology (GZ) Inc.
 Manufacturer #3 : Global Brands Manufacture Ltd
 Manufacturer #4 : First International Computer (Suzhou) Inc
 Manufacturer #5 : BOATEK ELECTRONIC CO., LTD.
 Manufacturer #6 : Cal-Comp Electronics and Communications (suzhou) Co., Ltd
 Manufacturer #7 : NBM Production (Dongguan) Co., Ltd
 EUT Description : Motherboard
 (A) Model No. : H81-PLUS
 (B) Serial No. : N/A
 (C) Brand : ASUS
 (D) Power Supply : Power by PC System
 (E) Test Voltage : AC 120V/60Hz (via PC System)

Measurement Standard Used:

FCC CFR 47 Part 15 Subpart B/Oct. 2012 and CISPR 22/1997
 ANSI C63.4-2009
 ICES-003 Issue 5 Aug. 2012

The device described above was tested by AUDIX Technology Corporation, to determine the maximum emission levels emanating from the device. The maximum emission levels were compared to the FCC Part 15 subpart B with the provisions of sections 15.107 and 15.109 and ICES-003 Class B limits both conducted and radiated emissions.

The measurement results are contained in this test report and AUDIX Technology Corporation is assumed full responsibility for the accuracy and completeness of these measurements. Also, this report shows that the EUT to be technically compliant with the FCC and IC official limits.

This report applies to above tested sample only and which shall not be reproduced in part without written approval of AUDIX Technology Corporation.

The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.

Date of Test : Jun. 03, 2013 Date of Report : Jun. 05, 2013

Producer : 
 (Kitty Ni/Administrator)

Signatory : 
 (Leon Liu/Deputy General Manager)

Name of the Representative of the Responsible Party : _____

Signature : _____

1. GENERAL INFORMATION

1.1. Description of Device (EUT)

Description	:	Motherboard
Model Number	:	H81-PLUS
Brand	:	ASUS
Applicant	:	ASUSTEK Computer Inc. 4F, No.150, Li-Te Rd., Peitou, Taipei 112, Taiwan
Manufacturer #1	:	MainTek Computer (Suzhou) Co., Ltd. No. 233, Jinfeng Road, Suzhou City New District, Jiangsu, P.R. China
Manufacturer #2	:	Danriver Technology (GZ) Inc. No.16, Baoying Dadao, Guangzhou Free Trade Zone, Guangdong, P.R. China
Manufacturer #3	:	Global Brands Manufacture Ltd EMS Business unit Global Brands Manufacture Limited Yuyuan Industrial Estate, Huangjiang Town, Dongguan City, Guangdong, P.R. China
Manufacturer #4	:	First International Computer (Suzhou) Inc Export Processing Zone, No. 200 Central Suhong Road, SuZhou Industrial Park, Jiangsu, P.R. China
Manufacturer #5	:	BOATEK ELECTRONIC CO., LTD. N0.124 bubugao road, wu sha kong bavillage, chang an, dong guan, guang dong
Manufacturer #6	:	Cal-Comp Electronics and Communications (suzhou) Co., Ltd Wujiang Export Processing Zone, No688, Pangjin Road, Wujiang Economic Development Zone, Jiangsu Province, China.
Manufacturer #7	:	NBM Production (Dongguan) Co., Ltd NO. 51 Xinju Rd., Shangjiao community, Changan Town, Dongguan City, Guangdong, P.R. China

Date of Receipt of Sample : May 30, 2013

Date of Test : Jun. 03, 2013

****EUT Description**

CPU : Intel(R) Core(TM) i7-4770T CPU @ 2.50GHz
(Socket 1150)

Chipset : Single Bridge: H81 Rev: QS
Heatsink P/N: 13071-00014800

BIOS Version : 0202

System Memory : Dual channel
DIMM configuration Slots
DIMM_A1
DIMM_B1
Type: DDR3

Memory Size : Max: 32GB; Min: 1024MB

USB : Chipset
(USB 1.1&USB 2.0, built-in USB3.0):Z87
Number of USB 1.1/USB 2.0 only ports:8
ports mid-board: 6 ports back panel: 2 ports

Number of USB 1.1/USB 2.0/3.0 ports: 2 ports
back panel: 2 ports

Network : IC:RTL8111GR PCIE 1Gbps

Graphics : Integrated Gfx in North bridge: H81 GPU
clock range:1100-3000 Default clock: 1100
Max UMA Memory Size: follow1G DVMT
Rev:5.0

D-Sub Max. resolution : 1920*1200@60 Hz

Storage : Chipset built-in: SATA6G SATA3G
Connectors
SATA 3G: 2 TURKISH COFFEE
(Channel model new color)
SATA 6G: 2 CORNSILK
(Channel model new color)

Audio	:	IC: ALC887-VD2 3 jack 8 Channels: Anti-pop Function (Power On/Off; Resume S3/S4); Front Panel Retasking (HD only)
Back I/O Ports	:	PS2 port *2 D-Sub port *1 RS232 port *1 Parallel port*1 USB 1.1& 2.0 port*2 USB 3.0 port*2 RJ-45 port *1 (10Mbps/100Mbps/1000Mbps) Audio ports *3
Highest Working Frequency	:	2.50GHz

Remark:

This EUT (Motherboard, within PC system) with the following test modes was pre-scanned. Finally, this report was selected the worst test mode to issue report.

The details of pre-scanned modes are as follows :

Mode	Test Item	Operating of EUT	VGA Interface, Resolutions and Frequencies
1.	CE	Full System	D-Sub, 1920*1200/60Hz
2.			D-Sub, 1600*1200/60Hz
3.			D-Sub, 1280*1024/60Hz
4.			D-Sub, 640*480/60Hz
5.	RE	Full System	D-Sub, 1920*1200/60Hz
6.			D-Sub, 1600*1200/60Hz
7.			D-Sub, 1280*1024/60Hz
8.			D-Sub, 640*480/60Hz

The worst test mode of finally reported are as follows :

Test Item	Operating of EUT	VGA Interface, Resolutions and Frequencies
Powerline Conducted Emission Measurement	Full System	D-Sub, 1920*1200/60Hz
Radiated Emission Measurement		D-Sub, 1920*1200/60Hz

1.2. Tested Supporting System Details

1.2.1. PC SYSTEM

PC Case : J POWER
Motherboard (EUT) : **ASUS, M/N: H81-PLUS**
 CPU : Intel(R) Core(TM) i7-4770T CPU @ 2.50GHz
 (Socket 1150)
 Hard Disk Drive : WD, M/N WD1600AAJS, 160G
 Power Supply : Seventeam, M/N ST-300WAP, FCC by DoC
 Memory Card : Kingston, 2GB
 Power Cord : Non-Shielded, Detachable, 1.8m

1.2.2. 24" LCD MONITOR (LINK TO EUT)

Model Number : 2408WFP
 Serial Number : GN-OG293H-74261-874-210S-A00
 FCC ID : By DoC
 BSMI ID : R43002
 Brand : DELL
 D-Sub Cable : Shielded, Detachable, 2.0m
 Bonded two ferrite cores
 Power Cord : Non-Shielded, Detachable, 1.8m

1.2.3. USB KEYBOARD (LINK TO EUT)

Model Number : SK-8175
 Serial Number : MY-0W217F-71619-058-1697-A01
 FCC ID : By DoC
 BSMI ID : T3A002
 Brand : DELL
 USB PS2 Data Cable : Shielded, Undetachable, 2.0m

1.2.4. USB MOUSE (LINK TO EUT)

Model Number : MOC5UO
 Serial Number : HOV055BG
 FCC ID : By DoC
 BSMI ID : R41108
 Brand : DELL
 USB PS2 Data Cable : Shielded, Undetachable, 1.8m

1.2.5. DOT MATRIX PRINTER (LINK TO EUT)

Model Number : KX-P2135
 Serial Number : 8DMCNC02144
 FCC ID : ACJ5Z6KX-P2135
 BSMI ID : 3872A371
 Manufacturer : Matsushita (Brand: Panasonic)
 Data Cable : Shielded, Detachable, 1.5m
 Power Cord : Non-Shielded, Detachable, 1.8m

1.2.6. MODEM (LINK TO EUT)

Model Number : DM-1414
 Serial Number : 980034394
 FCC ID : IFAXDM1414
 Manufacturer : Aceex
 Data Cable : Shielded, Detachable, 1.2m
 Power Adapter : Amigo, Model AM-91000A
 Non-Shielded, Undetachable, 1.8m

1.2.7. USB2.0 STORAGE MEDIA #1 (LINK TO EUT)

Model Number : U273
 Serial Number : N/A
 FCC ID : By DoC
 BSMI ID : D33311
 Manufacturer : pqi
 USB Data Cable : Shielded, Detachable, 1.5m

1.2.8. USB2.0 STORAGE MEDIA #2 (LINK TO EUT)

Model Number : U273
 Serial Number : N/A
 FCC ID : By DoC
 BSMI ID : D33311
 Manufacturer : pqi
 USB Data Cable : Shielded, Detachable, 1.5m

1.2.9. USB2.0 STORAGE MEDIA #3

Model Number : U273
 Serial Number : N/A
 FCC ID : By DoC
 BSMI ID : D33311
 Manufacturer : pqi
 USB Data Cable : Shielded, Detachable, 1.5m

1.2.10. USB2.0 STORAGE MEDIA #4

Model Number : U273
 Serial Number : N/A
 FCC ID : By DoC
 BSMI ID : D33311
 Manufacturer : pqi
 USB Data Cable : Shielded, Detachable, 1.5m

1.2.11. EARPHONE WITH MIC. & IN-LINE VOLUME CONTROL #1

(LINK TO EUT)

Model Number : HS10101
 Serial Number : N/A
 Manufacturer : UIO
 Data Cable : Non-Shielded, Detachable, 1.5m (2Pin)

1.2.12. EARPHONE WITH MIC. & IN-LINE VOLUME CONTROL #2

Model Number : HS10101
 Serial Number : N/A
 Manufacturer : UIO
 Data Cable : Non-Shielded, Detachable, 1.5m

1.2.13. WALKMAN (LINK TO EUT)

Model Number : RQ-P35LT-K
 Serial Number : HA08623
 Manufacturer : Panasonic
 Data Cable : Non-Shielded, Detachable, 1.8m

1.2.14. MY BOOK ESSENTIAL EXTERNAL HARD DRIVE #1 (LINK TO EUT)

Model Number : WDBACW0010HBK-SESN
 Serial Number : WMC0T1058888
 FCC ID : By DoC
 BSMI ID : D33015
 Brand : Western Digital Corporation
 USB Cable : Shielded, Detachable, 1.2m
 AC Adapter : Ktec, M/N KSAS0241200150D5,
 S/N K0021119010085379
 Cord: Non-Shielded, Undetachable, 1.8m
 Bonded a ferrite core

1.2.15. MY BOOK ESSENTIAL EXTERNAL HARD DRIVE #2 (LINK TO EUT)

Model Number : WDBACW0010HBK-SESN
 Serial Number : WMC0S0937433
 FCC ID : By DoC
 BSMI ID : D33015
 Brand : Western Digital Corporation
 USB Cable : Shielded, Detachable, 1.2m
 AC Adapter : Ktec, M/N KSAS0241200150D5,
 S/N K0021119010085379
 Cord: Non-Shielded, Undetachable, 1.8m
 Bonded a ferrite core

【Partner System】

1.2.16. PC SYSTEM (LINK TO EUT)

Model Number	:	DC8M
Serial Number	:	9VDSP1S
FCC ID	:	By DoC
BSMI ID	:	R33002
Manufacturer	:	DELL
LAN Cable	:	Non-Shielded, Detachable, 6m
Power Cord	:	Non-Shielded, Detachable, 1.8m

1.2.17. 24" LCD MONITOR

Model Number	:	2408WFP
Serial Number	:	GN-OG293H-74261-874-214S-A00
FCC ID	:	By DoC
BSMI ID	:	R43002
Manufacturer	:	DELL
Data Cable (D-Sub)	:	Shielded, Detachable, 1.8m Bonded two ferrite cores
Power Cord	:	Non-Shielded, Detachable, 1.8m

1.2.18. USB KEYBOARD

Model Number	:	SK-8815
Serial Number	:	CN-ONM433-71616-7C5-0A40
FCC ID	:	By DoC
BSMI ID	:	T3A002
Manufacturer	:	DELL
USB Cable	:	Shielded, Undetachable, 2m Bonded a ferrite core

1.2.19. USB MOUSE

Model Number	:	MOC5UO
Serial Number	:	HOV0559W
FCC ID	:	By DoC
BSMI ID	:	R41108
Manufacturer	:	DELL
USB Cable	:	Shielded, Undetachable, 1.8m

1.3. Description of Test Facility

Name of Firm	:	AUDIX Technology Corporation EMC Department No. 53-11, Dingfu, Linkou Dist., New Taipei City 244, Taiwan
Test Site (C3/R5/Semi-AC2)	:	No. 3 Shielded Room No. 67-4, Dingfu, Linkou Dist., New Taipei City 244, Taiwan No. 5 Open Area Test Site No. 67-4, Dingfu, Linkou Dist., New Taipei City 244, Taiwan Federal Communication Commission Registration Number: 90992 Filing on August 03, 2010 No. 2 Semi-Anechoic Chamber No. 67-4, Dingfu, Linkou Dist., New Taipei City 244, Taiwan Federal Communication Commission Registration Number: 370172 Filing on July 20, 2010
NVLAP Lab. Code	:	200077-0
TAF Accreditation No	:	1724

1.4. Measurement Uncertainty

Test Item	Frequency Range	Uncertainty (dB)
Conduction Test	150kHz~30MHz	±1.73dB
Radiation Test (Distance: 10m)	30MHz~300MHz	±2.99dB
	300MHz~1000MHz	±2.73dB
Radiation Test (Distance: 3m)	1GHz~18GHz	± 3.73dB

Remark : Uncertainty = $ku_c(y)$

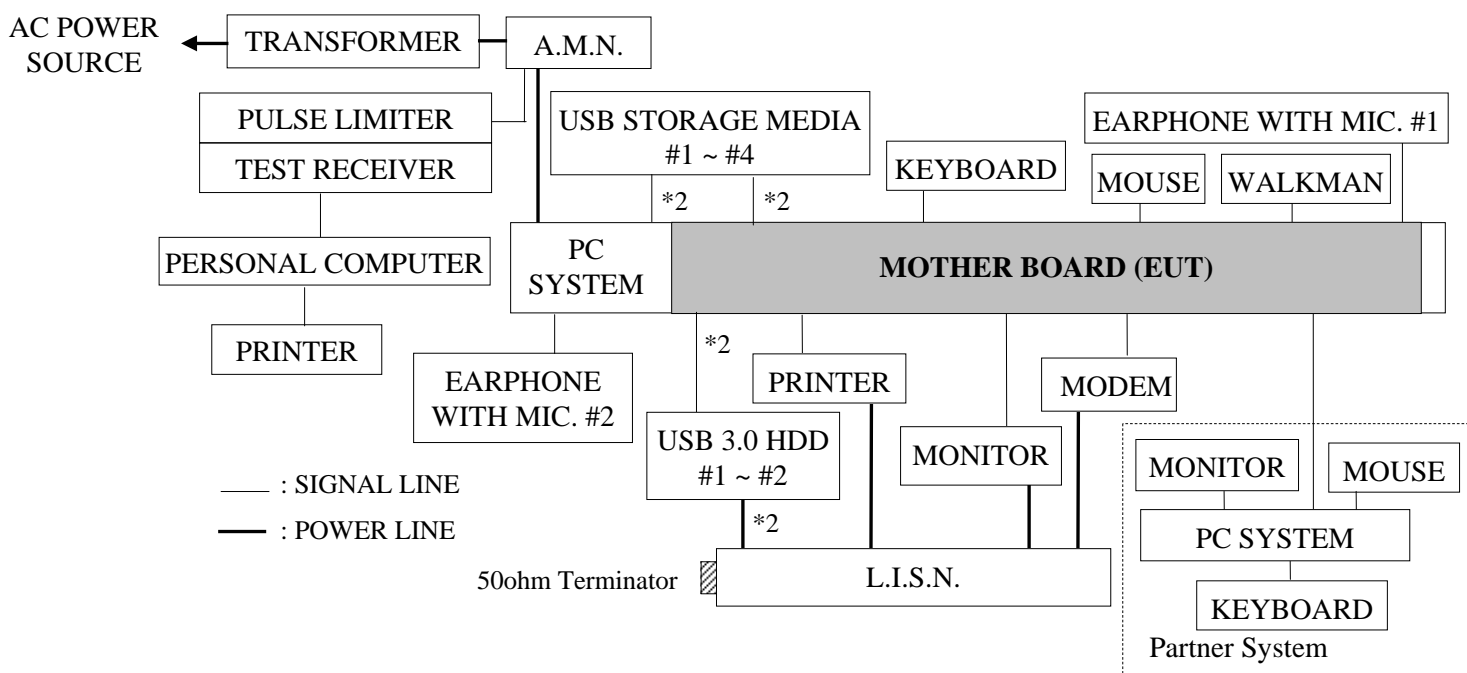
2. POWERLINE CONDUCTED EMISSION MEASUREMENT

2.1. Test Equipment

The following test equipment was used during the powerline conducted emission measurement : (No. 3 Shielded Room)

Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Test Receiver	R & S	ESCS 30	100337	Mar. 22, 13'	Mar. 21, 14'
2.	A.M.N.	Kyoritsu	KNW-244C	8-1373-5	Mar. 22, 13'	Mar. 21, 14'
3.	L.I.S.N.	Kyoritsu	KNW-407	8-1370-9	Mar. 04, 13'	Mar. 03, 14'
4.	Pulse Limiter	R & S	ESH3-Z2	100041	Feb. 02, 13'	Feb. 01, 14'

2.2. Block Diagram of Test Setup



2.3. Powerline Conducted Emission Limit (FCC§15.107/ICES-003, Class B)

Frequency	Maximum RF Line Voltage	
	Quasi-Peak Level	Average Level
150kHz ~ 500kHz	66 ~ 56 dB μ V	56 ~ 46 dB μ V
500kHz ~ 5MHz	56 dB μ V	46 dB μ V
5MHz ~ 30MHz	60 dB μ V	50 dB μ V

- Remark :
1. If the average limit is met when using a Quasi-Peak detector, the EUT shall be deemed to meet both limits and measurement with the average detector is unnecessary.
 2. The lower limit applies at the band edges.

2.4. Operating Condition of EUT

PC system (EUT inside) Exercise Program and Condition	
Operating System	Windows 7
Test Program	Burnin Test
Graphic Controller	Display scrolling “H” pattern with respective resolution
Interface Controller	Read/Write operation to hard disk
LAN Controller	Data transfer to client
Serial Ports	Read/Write operation to USB Storage Media or USB HDD
Parallel Port	Sent “H” to printer
PS2 Ports	Write operation to keyboard & mouse
Audio Controller	Run the program “Windows Media Player” and send 1kHz sound to earphone.
The other peripheral devices were driven and operated in turn during all testing.	

2.5. Test Procedure

The EUT (within PC system) was placed on table which was above the ground by 80cm and PC System’s power cord was connected to the power mains through an Artificial Mains Network (A.M.N.). The other peripheral devices power cords were connected to the power mains through a line impedance stabilization network (L.I.S.N.). This provided a 50 ohm coupling impedance for the measuring equipment. (Please refer to the block diagram of the test setup and photographs.)

Both sides of A.C. line were checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables were changed according to ANSI C63.4-2009 during conducted measurement.

The bandwidth of the R&S Test Receiver ESCS30 was set at 9kHz.

The frequency range from 0.15MHz to 30MHz was pre-scanned with a peak detector.

All the final readings from Test Receiver were measured with the Quasi-Peak detector and Average detector. (Remark: If the Average limit is met when using a Quasi-Peak detector, the Average detector is unnecessary)

2.6. Powerline Conducted Emission Measurement Results

PASSED. (All emissions not reported below are too low against the prescribed limits.)

The EUT (within PC system) with the following **worst test mode (D-Sub, 1920*1200/60Hz)** was performed during this section testing and to read Q.P. and Average value, the test data are listed in next pages.

EUT : Motherboard M/N : H81-PLUS

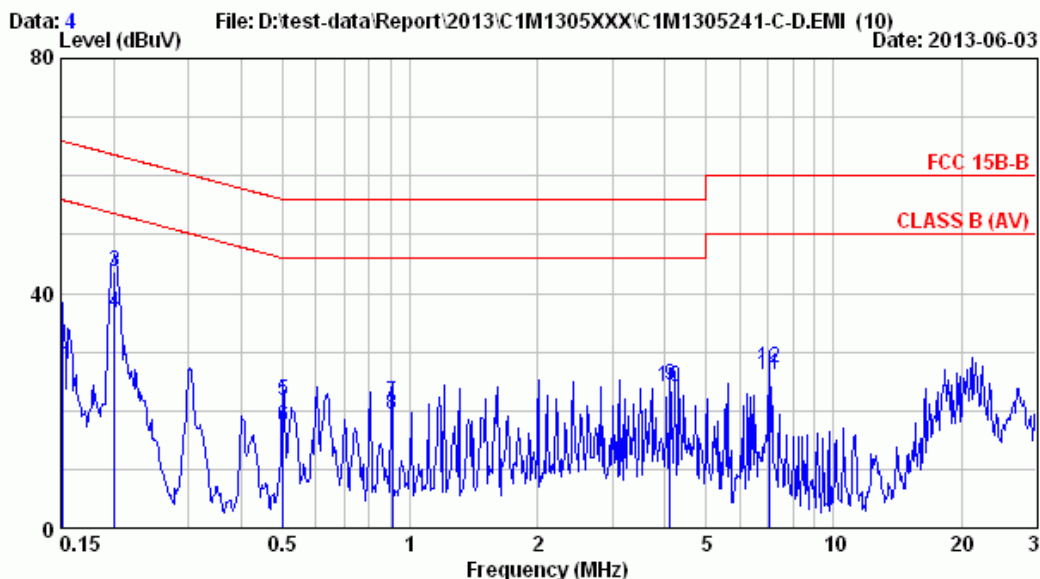
Test Date : Jun. 03, 2013 Temperature : 22 Humidity : 52%

The details are as follows :

Mode	Operating of EUT	VGA Interface, \ Resolutions and Frequencies	Reference Test Data No.	
			Neutral	Line
1.	Full System	D-Sub, 1920*1200/60Hz	# 4	# 3



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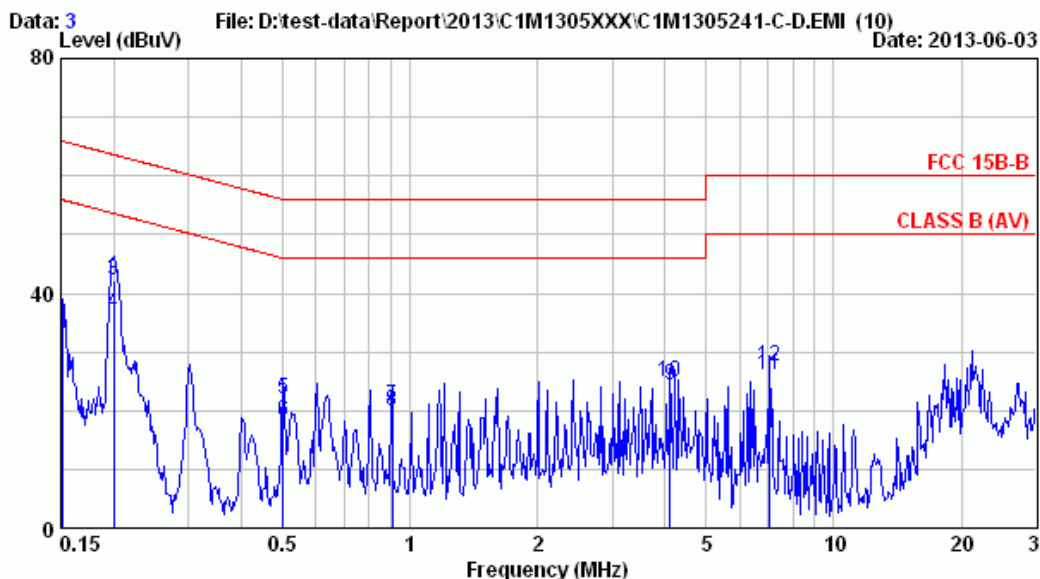
Site : No.3 Shielded Room Data : 4
 Condition : KNW-244C Phase : NEUTRAL
 Limit : FCC 15B-B
 Env. / Ins. : 22°C / 52% ESCS 30 (337) Engineer: Edward
 EUT : H81-PLUS
 Power Rating : 120Vac / 60Hz
 Test Mode : Full System 1920*1200/60Hz

	Freq. (MHz)	AMN Factor (dB)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV)	Limits (dBuV)	Margin (dB)	Remark
1	0.151	0.14	0.20	36.10	36.44	65.96	29.51	QP
2	0.151	0.14	0.20	29.14	29.48	55.96	26.47	AVERAGE
3	0.201	0.10	0.20	43.34	43.64	63.58	19.94	QP
4	0.201	0.10	0.20	36.35	36.65	53.58	16.93	AVERAGE
5	0.502	0.10	0.20	21.50	21.80	56.00	34.20	QP
6	0.502	0.10	0.20	16.86	17.16	46.00	28.84	AVERAGE
7	0.909	0.10	0.20	21.13	21.43	56.00	34.57	QP
8	0.909	0.10	0.20	19.13	19.43	46.00	26.57	AVERAGE
9	4.114	0.20	0.60	23.45	24.26	56.00	31.74	QP
10	4.114	0.20	0.60	23.10	23.90	46.00	22.10	AVERAGE
11	7.025	0.26	0.60	25.27	26.13	50.00	23.87	AVERAGE
12	7.025	0.26	0.60	26.41	27.27	60.00	32.73	QP

Remarks: 1. Emission Level= AMN Factor + Cable Loss + Reading.
 2. If the average limit is met when using a quasi-peak detector, the EUT shall be deemed to meet both limits and measurement with average detector is unnecessary.



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 Email:emc@audixtech.com.tw



Site : No.3 Shielded Room Data : 3
 Condition : KNW-244C Phase : LINE
 Limit : FCC 15B-B
 Env. / Ins. : 22°C / 52% ESCS 30 (337) Engineer: Edward
 EUT : H81-PLUS
 Power Rating : 120Vac / 60Hz
 Test Mode : Full System 1920*1200Hz/60Hz

	Freq. (MHz)	AMN Factor (dB)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV)	Limits (dBuV)	Margin (dB)	Remark
1	0.151	0.14	0.20	35.57	35.91	65.96	30.04	QP
2	0.151	0.14	0.20	32.69	33.03	55.96	22.92	AVERAGE
3	0.200	0.10	0.20	41.89	42.19	63.62	21.43	QP
4	0.200	0.10	0.20	36.38	36.68	53.62	16.94	AVERAGE
5	0.502	0.10	0.20	21.77	22.07	56.00	33.93	QP
6	0.502	0.10	0.20	17.77	18.07	46.00	27.93	AVERAGE
7	0.909	0.10	0.20	20.54	20.84	56.00	35.16	QP
8	0.909	0.10	0.20	19.50	19.80	46.00	26.20	AVERAGE
9	4.114	0.21	0.60	23.57	24.38	56.00	31.62	QP
10	4.114	0.21	0.60	24.22	25.03	46.00	20.97	AVERAGE
11	7.025	0.32	0.60	25.05	25.97	50.00	24.03	AVERAGE
12	7.025	0.32	0.60	26.48	27.40	60.00	32.60	QP

Remarks: 1.Emission Level= AMN Factor + Cable Loss + Reading.
 2.If the average limit is met when using a quasi-peak detector ,the EUT shall be deemed to meet both limits and measurement with average detector is unnecessary.

3. RADIATED EMISSION MEASUREMENT

3.1. Test Equipment

The following test equipment was used during the radiated emission measurement :

3.1.1. For 30MHz-1000MHz Frequency (At No. 5 Open Area Test Site)

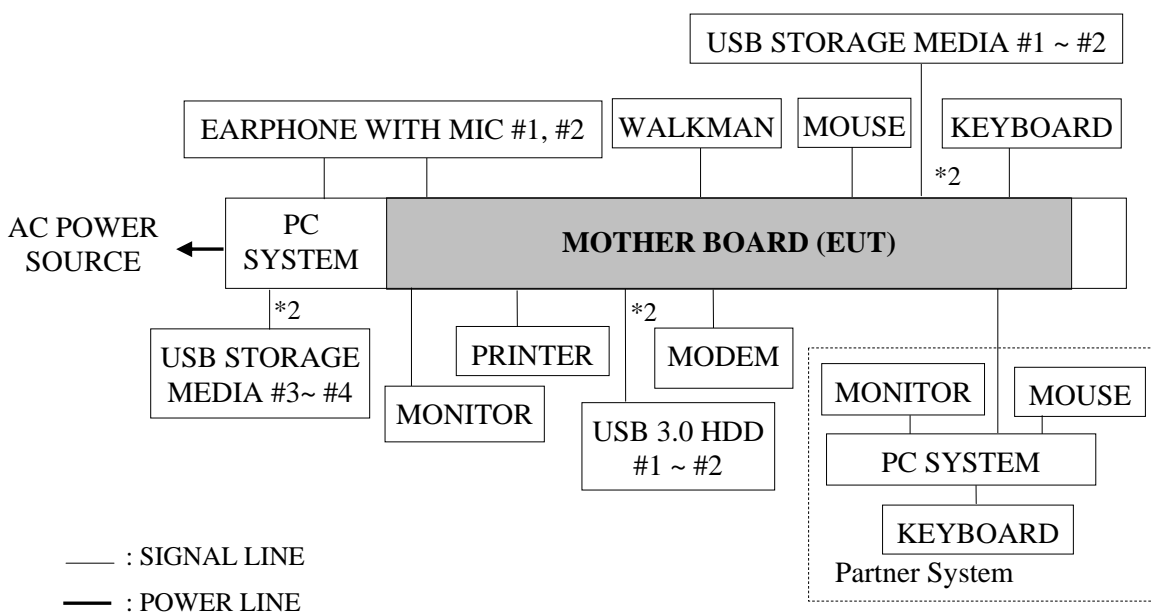
Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Spectrum Analyzer	Agilent	E7405A	MY42000134	Aug. 23, 12'	Aug. 22, 13'
2.	Test Receiver	R&S	ESCI	100555	May 09, 13'	May 08, 14'
3.	Amplifier	HP	8447D	2727A06154	NCR	NCR
4.	Log Periodic Antenna	CHASE	UPA6109	1064	Mar. 02, 13'	Mar. 01, 14'
5.	Biconical Antenna	CHASE	VBA6106A	1258	Mar. 02, 13'	Mar. 01, 14'

3.1.2. For Above 1GHz Frequency (At No. 2 Semi-Anechoic Chamber)

Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Spectrum Analyzer	Agilent	N9010A-507	MY51250907	Mar. 01, 13'	Feb. 28, 14'
2.	Amplifier	HP	8449B	3008A02596	Jan. 09, 13'	Jan. 08, 14'
3.	Horn Antenna	EMCO	3115	9609-4927	Jul. 05, 12'	Jul. 04, 13'

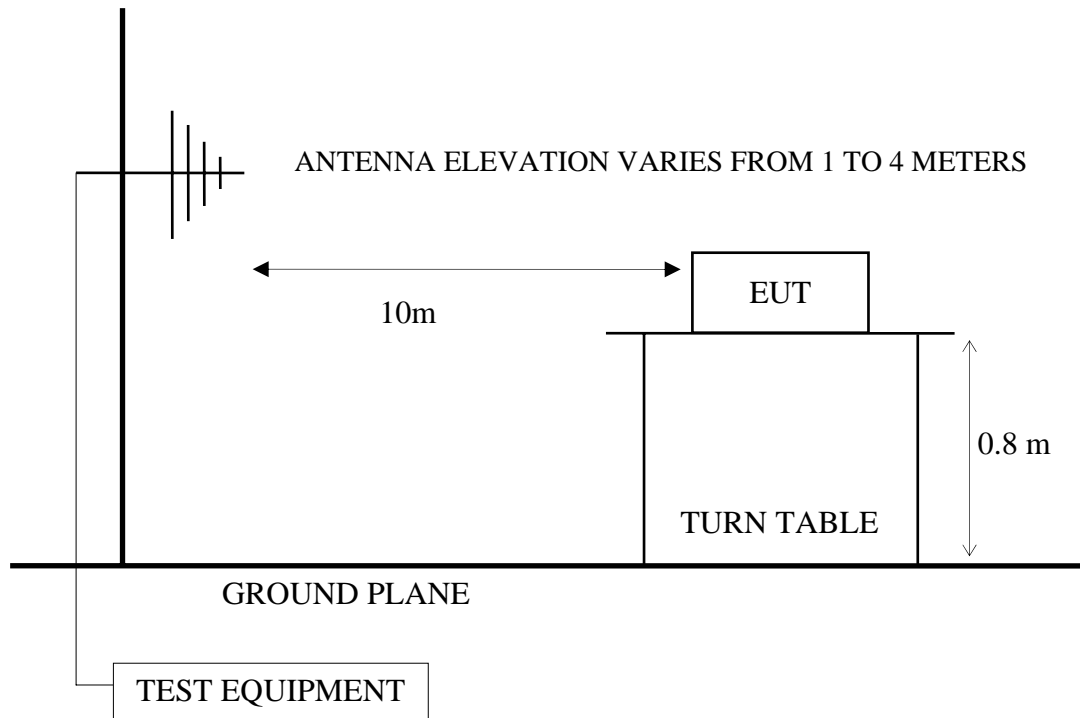
3.2. Block Diagram of Test Setup

3.2.1. Block Diagram of connection between EUT and simulators



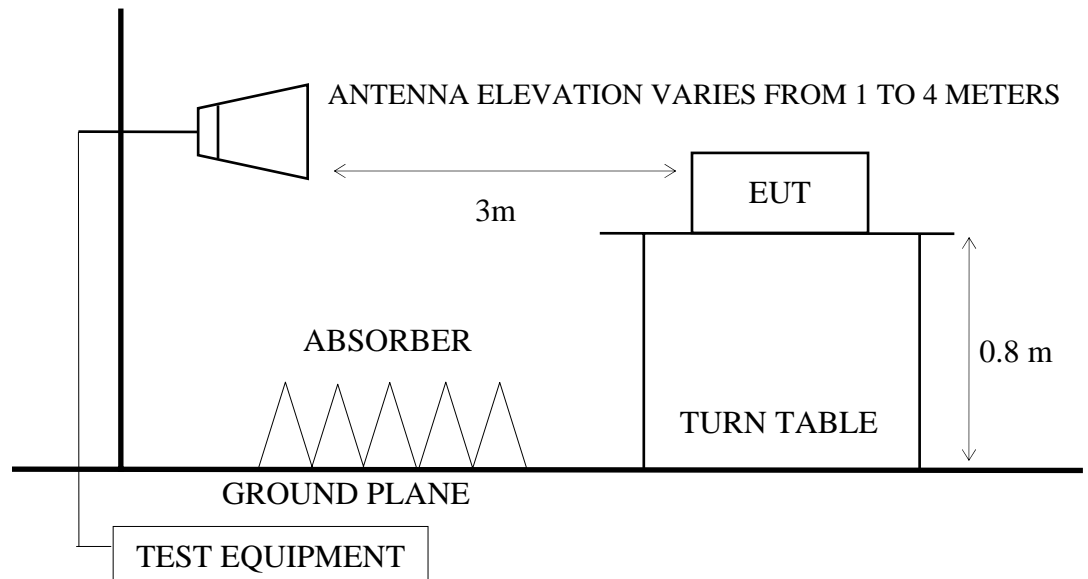
3.2.2. Open Area Test Site Setup Diagram (10m) for 30-1000MHz

ANTENNA TOWER



3.2.3. No. 2 Semi-Anechoic Chamber Setup Diagram (3m) for Above 1GHz

ANTENNA TOWER



3.3. Radiation Emission Limit (FCC § 15.109/CISPR 22/ICES-003, Class B)

All emanations from a class B computing devices or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified below:

FREQUENCY (MHz)	DISTANCE (Meters)	FIELD STRENGTHS LIMITS (dB μ V/m)
30 ~ 230	10	30
230 ~ 1000	10	37
Above 1000	3	74.0 (Peak)
Above 1000	3	54.0 (Average)

- Note :
- (1) The tighter limit applies at the edge between two frequency bands.
 - (2) Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the E.U.T.
 - (3) There is no over 1GHz limits in CISPR 22/1997 standard. Therefore, a FCC limit is used based on CFR 47 Part 15.35 (b) and Part 15.109 (a)(g). The 3m limit apply relation: $L2 = L1(d1/d2)$
 - (4) The system under test shall not exceed the radiated emission limits specified in Section 15.109 of this part by more than 6 dB.

3.4. Operating Condition of EUT

Same as conducted measurement which is listed in 2.4., except the test set up replaced by section 3.2.

3.5. Test Procedure

- 3.5.1. For Frequency Range was 30MHz-1000MHz which measurement distance was 10m at Open Area Test Site:

The EUT and its simulators were placed on a turn table which was 0.8 meter above ground. The turn table rotated 360 degrees to determine the position of the maximum emission level. EUT was set to 10 meters away from the receiving antenna which was mounted on an antenna tower. The antenna could be moved up and down between 1 meter and 4 meters to find out the maximum emission level. Bilog Antennas were used as receiving antenna. Both horizontal and vertical polarizations of the antenna were set on measurement. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.4-2009 on radiated measurement.

The bandwidth of the R&S Test Receiver ESCI was set at 120kHz.

The frequency range from 30MHz to 1000MHz was pre-scanned with Peak detector and all the final readings of measurement were with Quasi-Peak detector.

3.5.2. For Frequency Range was Above 1GHz which measurement distance was 3m at No.2 Semi-Anechoic Chamber:

The EUT and its simulators were placed on a turn table which was 0.8 meter above ground. The portion of the test volume that was obstructed by absorber placed on the floor (30cm maximum). The turn table rotated 360 degrees to determine the position of the maximum emission level. EUT was set to 3 meters away from the receiving antenna which was mounted on an antenna tower. The antenna could be moved up and down between 1 meter and 4 meters to find out the maximum emission level. A calibrated Horn Antenna was used as a receiving antenna. Both horizontal and vertical polarization of the antenna were set on measurement, and both average and peak emission level were recorded form spectrum analyzer. In order to find the maximum emission level, all the interface cables were manipulated according to ANSI C63.4-2009 on radiated measurement.

The resolution bandwidth of Agilent Spectrum Analyzer N9010A-507 was set at 1MHz

The frequency range from Above 1GHz was checked with peak and average detector.

3.6. Radiated Emission Measurement Results

PASSED. (All the emissions not reported below are too low against the prescribed limits.)

For 30MHz-1000MHz frequency range:

The EUT (within PC system) with the **worst test mode (D-Sub, 1920*1200/60Hz)** was performed during this section testing and the test data are listed in 3.6.1.

EUT : Motherboard M/N : H81-PLUS

Test Date : Jun. 03, 2013 Temperature : 23 Humidity : 56%

The details are as follows :

Mode	Operating of EUT	VGA Interface, Resolutions and Frequencies	Reference Test Data No.	
			Horizontal	Vertical
*1.	Full System (Open Case)	D-Sub, 1920*1200/60Hz	# 4	# 3
2.	Full System (Close Case)	D-Sub, 1920*1200/60Hz	# 2	# 1

(*mode for maximum detected emission)

The system under test shall not exceed the radiated emission limits specified in Section 15.109 of this part by more than 6 dB.

For frequency range above 1GHz:

The EUT (within PC system) with the following **worst test mode (D-Sub, 1920*1200/60Hz)** was performed during this section testing and the test data are listed in 3.6.2.

EUT : Motherboard M/N : H81-PLUS

Test Date : Jun. 03, 2013 Temperature : 28 Humidity : 52%

The details are as follows :

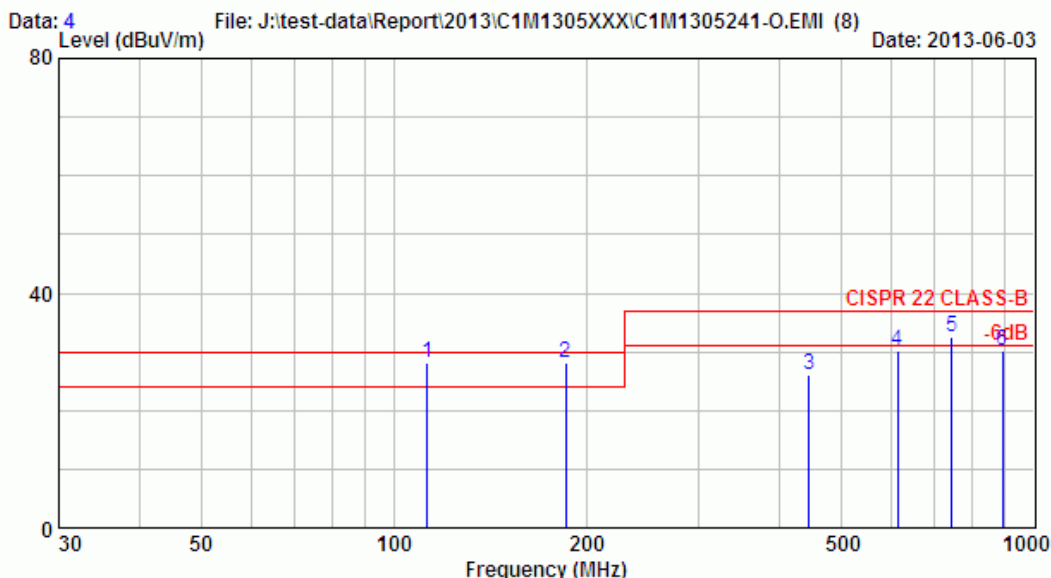
Mode	Operating of EUT	VGA Interface, Resolutions and Frequencies	Reference Test Data No.	
			Horizontal	Vertical
1.	Full System (Open Case)	D-Sub, 1920*1200/60Hz	# 7	# 8
2.	Full System (Close Case)	D-Sub, 1920*1200/60Hz	# 5	# 6

The system under test shall not exceed the radiated emission limits specified in Section 15.109 of this part by more than 6 dB.

3.6.1. Radiated Emission Measurement Results at open area test site
(Frequency Range 30-1000MHz)



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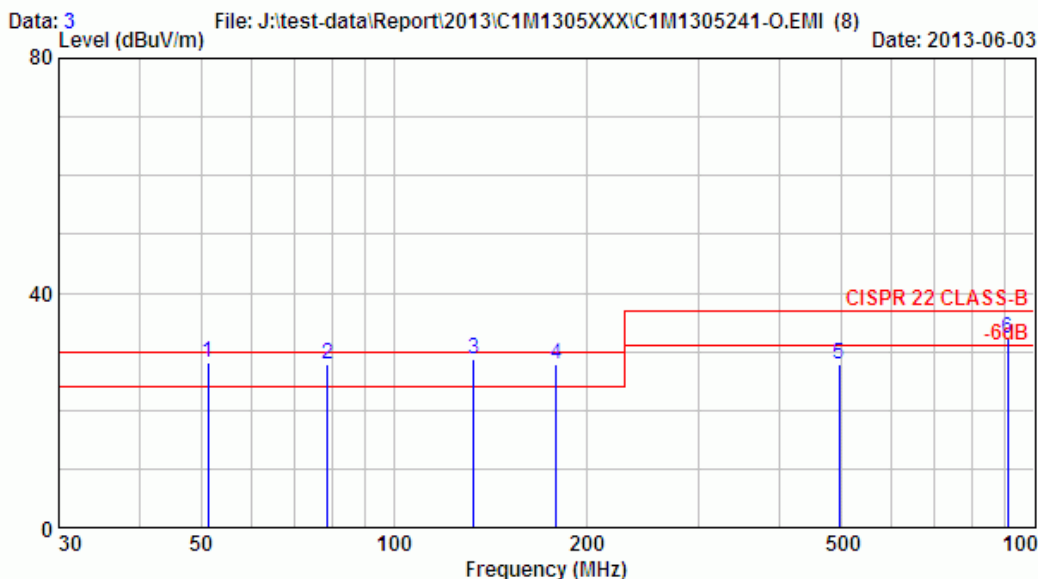
Site no. : No.5 open site Data no. : 4
 Dis. / Ant. : 10m VBA6106A/UPA6109 Ant. pol. : HORIZONTAL
 Limit : CISPR 22 CLASS-B
 Env. / Ins. : 23°C / 56% ESCI (555) Engineer : WANG
 EUT M/N : H81-PLUS
 Power Rating : 120Vac / 60Hz
 Test Mode : FULL SYSTEM 1920*1200/60Hz D-SUB
 OPEN CASE

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBµV)	Emission Level (dBµV/m)	Limits (dBµV/m)	Margin (dB)	Remark
1	112.745	18.40	1.49	8.14	28.03	30.00	1.97	
2	185.445	21.52	1.95	4.62	28.09	30.00	1.91 *	
3	445.415	16.27	3.25	6.42	25.94	37.00	11.06	
4	613.454	19.94	3.95	6.38	30.27	37.00	6.73	
5	743.521	21.43	4.44	6.64	32.51	37.00	4.49	
6	892.742	23.04	4.96	2.25	30.25	37.00	6.75	

- Remarks:
1. Emission Level= Antenna Factor + Cable Loss + Reading.
 2. The emission levels that are 20dB below the official limit are not reported.
 3. The worst emission was detected at 185.445MHz with corrected signal level of 28.09dBµV/m (limit is 30.0dBµV/m) when the antenna was at horizontal polarization and was at 4m high and the turn table was at 280°.
 4. 0°was the table front facing the antenna. Degree is calculated from 0°clockwise facing the antenna.
 5. The EUT with open case was measured, the limit not exceed the radiated emission limits specified in Section 15.109 of this part by more than 6 dB.



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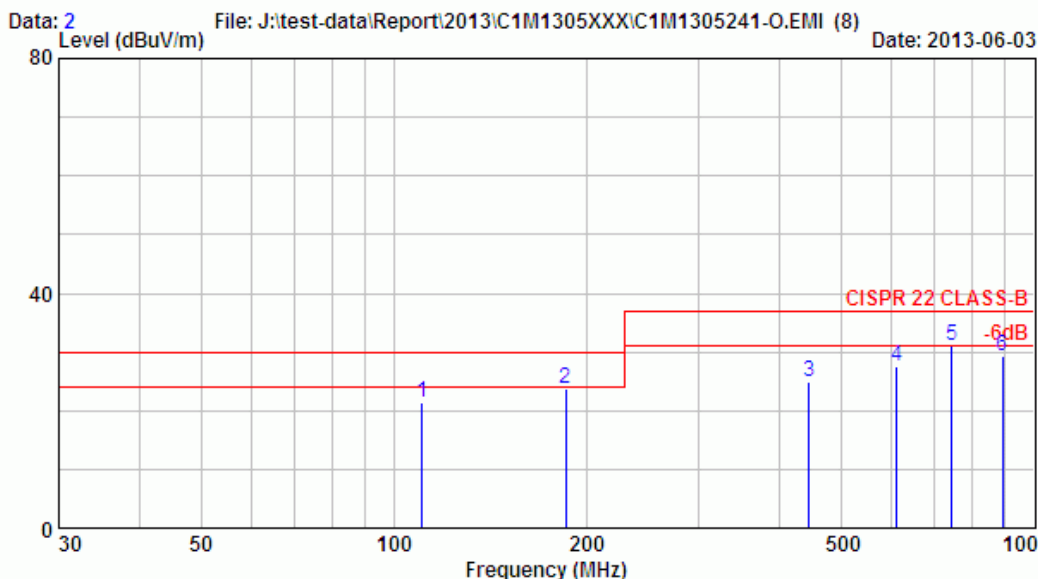
Site no. : No.5 open site Data no. : 3
 Dis. / Ant. : 10m VBA6106A/UPA6109 Ant. pol. : VERTICAL
 Limit : CISPR 22 CLASS-B
 Env. / Ins. : 23°C / 56% ESCI (555) Engineer : WANG
 EUT M/N : H81-PLUS
 Power Rating : 120Vac / 60Hz
 Test Mode : FULL SYSTEM 1920*1200/60Hz D-SUB
 OPEN CASE

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	51.354	15.17	0.92	12.07	28.16	30.00	1.84	
2	78.882	13.72	1.24	12.79	27.75	30.00	2.25	
3	133.454	19.54	1.64	7.56	28.74	30.00	1.26 *	
4	179.544	21.21	1.92	4.81	27.94	30.00	2.06	
5	496.115	17.22	3.48	7.26	27.97	37.00	9.03	
6	911.215	23.31	5.01	3.80	32.12	37.00	4.88	

- Remarks:
1. Emission Level= Antenna Factor + Cable Loss + Reading.
 2. The emission levels that are 20dB below the official limit are not reported.
 3. The worst emission was detected at 133.454MHz with corrected signal level of 28.74dBuV/m (limit is 30.0dBuV/m) when the antenna was at vertical polarization and was at 1m high and the turn table was at 100°.
 4. 0°was the table front facing the antenna. Degree is calculated from 0°clockwise facing the antenna.
 5. The EUT with open case was measured, the limit not exceed the radiated emission limits specified in Section 15.109 of this part by more than 6 dB.



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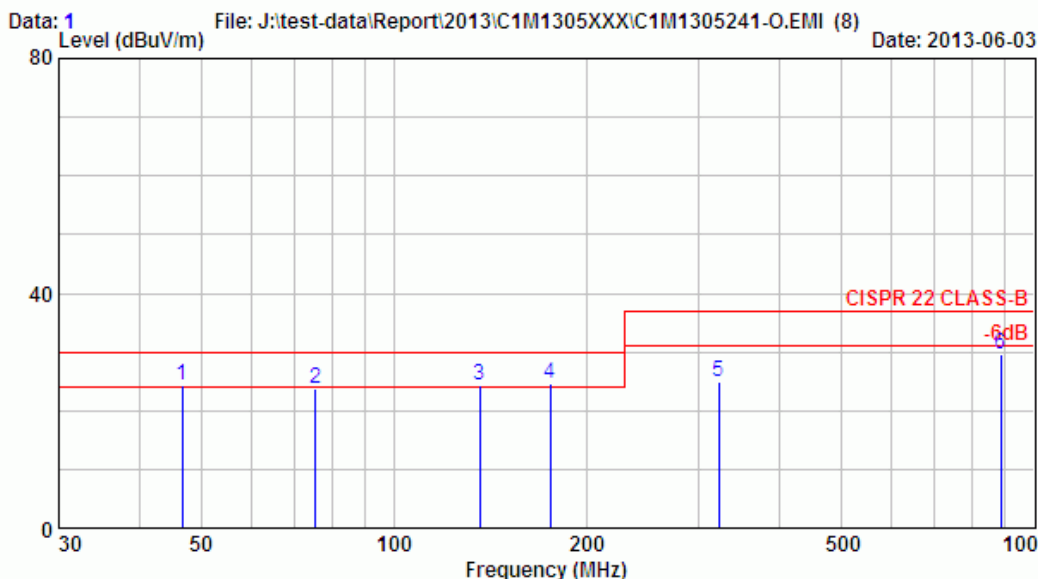
Site no. : No.5 open site Data no. : 2
 Dis. / Ant. : 10m VBA6106A/UPA6109 Ant. pol. : HORIZONTAL
 Limit : CISPR 22 CLASS-B
 Env. / Ins. : 23°C / 56% ESCI (555) Engineer : WANG
 EUT M/N : H81-PLUS
 Power Rating : 120Vac / 60Hz
 Test Mode : FULL SYSTEM 1920*1200/60Hz D-SUB

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBµV)	Emission Level (dBµV/m)	Limits (dBµV/m)	Margin (dB)	Remark
1	110.790	18.40	1.48	1.66	21.54	30.00	8.46	
2	185.653	21.52	1.95	0.33	23.80	30.00	6.20	
3	445.102	16.27	3.25	5.46	24.99	37.00	12.01	
4	610.651	19.90	3.95	3.82	27.67	37.00	9.33	
5	743.827	21.43	4.44	5.18	31.04	37.00	5.96	
6	892.608	23.04	4.96	1.27	29.28	37.00	7.72	

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
 2. The emission levels that are 20dB below the official limit are not reported.



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Site no. : No.5 open site Data no. : 1
 Dis. / Ant. : 10m VBA6106A/UPA6109 Ant. pol. : VERTICAL
 Limit : CISPR 22 CLASS-B
 Env. / Ins. : 23°C / 56% ESCI (555) Engineer : WANG
 EUT M/N : H81-PLUS
 Power Rating : 120Vac / 60Hz
 Test Mode : FULL SYSTEM 1920*1200/60Hz D-SUB

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBµV)	Emission Level (dBµV/m)	Limits (dBµV/m)	Margin (dB)	Remark
1	46.785	17.17	0.87	6.30	24.34	30.00	5.66	
2	75.393	13.28	1.22	9.37	23.87	30.00	6.13	
3	136.454	19.64	1.66	3.12	24.42	30.00	5.58	
4	175.611	20.92	1.90	1.73	24.56	30.00	5.44	
5	321.769	14.18	2.67	8.08	24.94	37.00	12.06	
6	888.182	23.02	4.94	1.54	29.50	37.00	7.50	

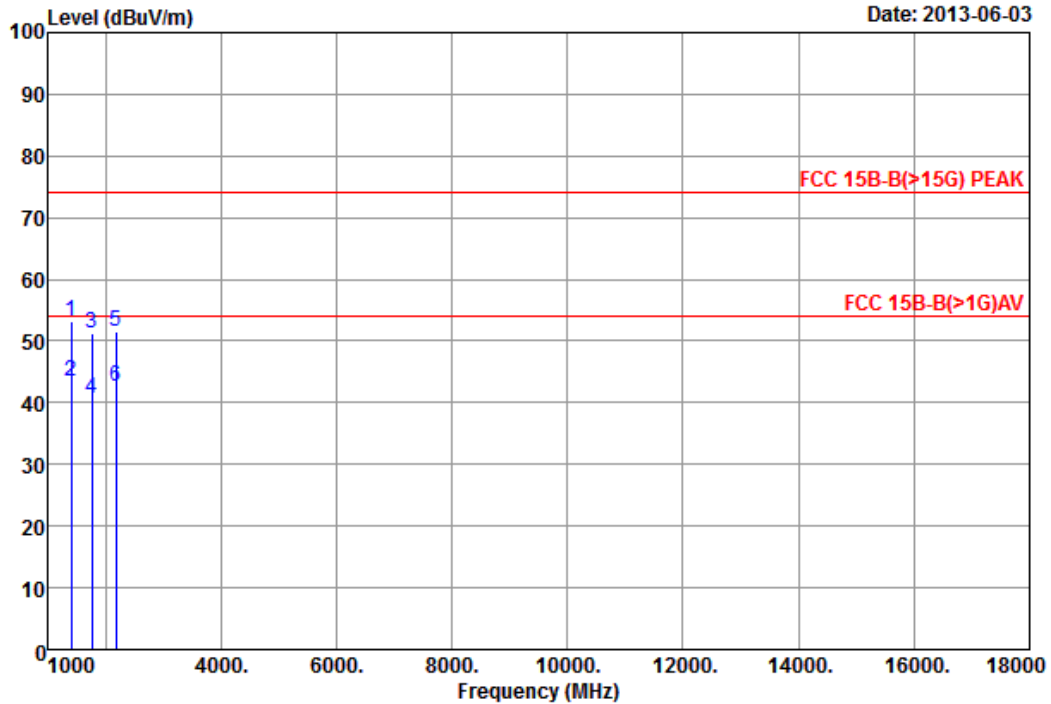
Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
 2. The emission levels that are 20dB below the official limit are not reported.

3.6.2. Radiated Emission Measurement Results at Semi-Anechoic Chamber
(Frequency Range Above 1GHz)



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Data: 7 File: \\Em2_chamber\data\Test data\REPORT\2013\C1M1305XXX\C1M1305241-CHAME Date: 2013-06-03



Site no. : Audix No.2 3m Chamber Data no. : 7
Dis. / Ant. : 3m 3115 4927 Ant. pol. : HORIZONTAL
Limit : FCC 15B-B(>15G) PEAK
Env. / Ins. : 28°C / 52% N9010A (907) Engineer : An
EUT : H81-PLUS
Power Rating : 120Vac/60Hz
Test Mode : Full System 1920*1200/60Hz D-SUB
Open Case

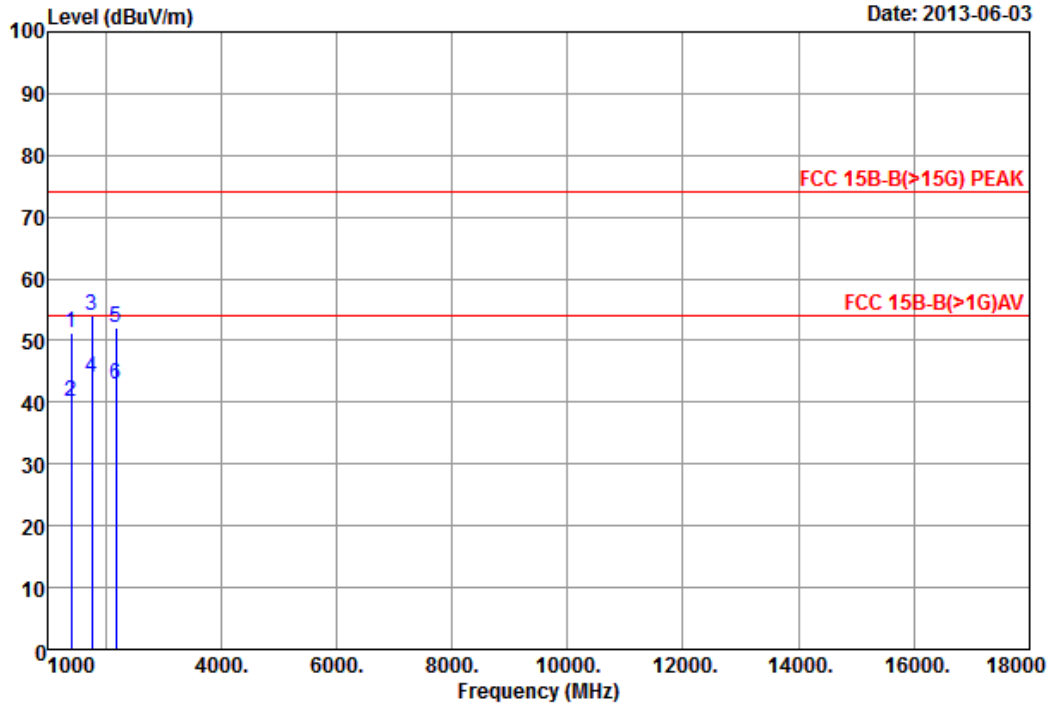
	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	PREAMP Gain (dB)	Reading (dBµV)	Emission Level (dBµV/m)	Limits (dBµV/m)	Margin (dB)	Remark
1	1408.11	25.58	3.05	35.70	60.29	53.22	74.00	20.78	Peak
2	1408.79	25.59	3.05	35.70	50.58	43.52	54.00	10.48	Average
3	1763.18	26.86	3.54	35.29	56.14	51.25	74.00	22.75	Peak
4	1763.40	26.86	3.54	35.29	45.54	40.65	54.00	13.35	Average
5	2181.10	28.09	3.89	35.03	54.67	51.62	74.00	22.38	Peak
6	2181.22	28.09	3.89	35.03	45.68	42.63	54.00	11.37	Average

Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Preamp Gain + Reading.
2. The emission levels that are 20dB below the official limit are not reported.



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Data: 8 File: \\Em2_chamber\data (d)\Test data\REPORT\2013\C1M1305XXX\C1M1305241-CHAME Date: 2013-06-03



Site no. : Audix No.2 3m Chamber Data no. : 8
 Dis. / Ant. : 3m 3115 4927 Ant. pol. : VERTICAL
 Limit : FCC 15B-B(>15G) PEAK
 Env. / Ins. : 28°C / 52% N9010A (907) Engineer : An
 EUT : H81-PLUS
 Power Rating : 120Vac/60Hz
 Test Mode : Full System 1920*1200/60Hz D-SUB
 Open Case

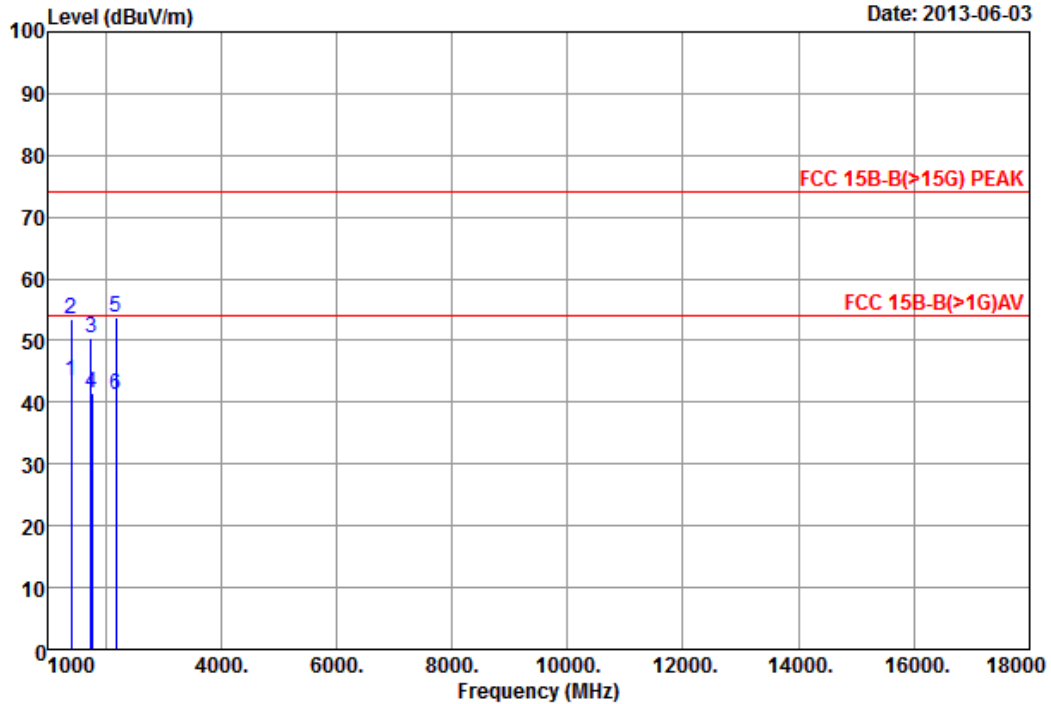
	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	PREAMP Gain (dB)	Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Remark
1	1412.09	25.59	3.06	35.70	58.19	51.14	74.00	22.86	Peak
2	1412.77	25.60	3.06	35.70	47.05	40.01	54.00	13.99	Average
3	1764.18	26.86	3.54	35.29	58.87	53.98	74.00	20.02	Peak
4	1764.40	26.86	3.55	35.29	48.86	43.98	54.00	10.02	Average
5	2184.01	28.09	3.89	35.03	55.10	52.05	74.00	21.95	Peak
6	2184.21	28.09	3.89	35.03	46.07	43.02	54.00	10.98	Average

Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Preamp Gain + Reading.
 2. The emission levels that are 20dB below the official limit are not reported.



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Data: 5 File: \\Em2_chamber\data (d)\Test data\REPORT\2013\C1M1305XXX\C1M1305241-CHAME Date: 2013-06-03



Site no. : Audix No.2 3m Chamber Data no. : 5
 Dis. / Ant. : 3m 3115 4927 Ant. pol. : HORIZONTAL
 Limit : FCC 15B-B(>15G) PEAK
 Env. / Ins. : 28°C / 52% N9010A (907) Engineer : An
 EUT : H81-PLUS
 Power Rating : 120Vac/60Hz
 Test Mode : Full System 1920*1200/60Hz D-SUB

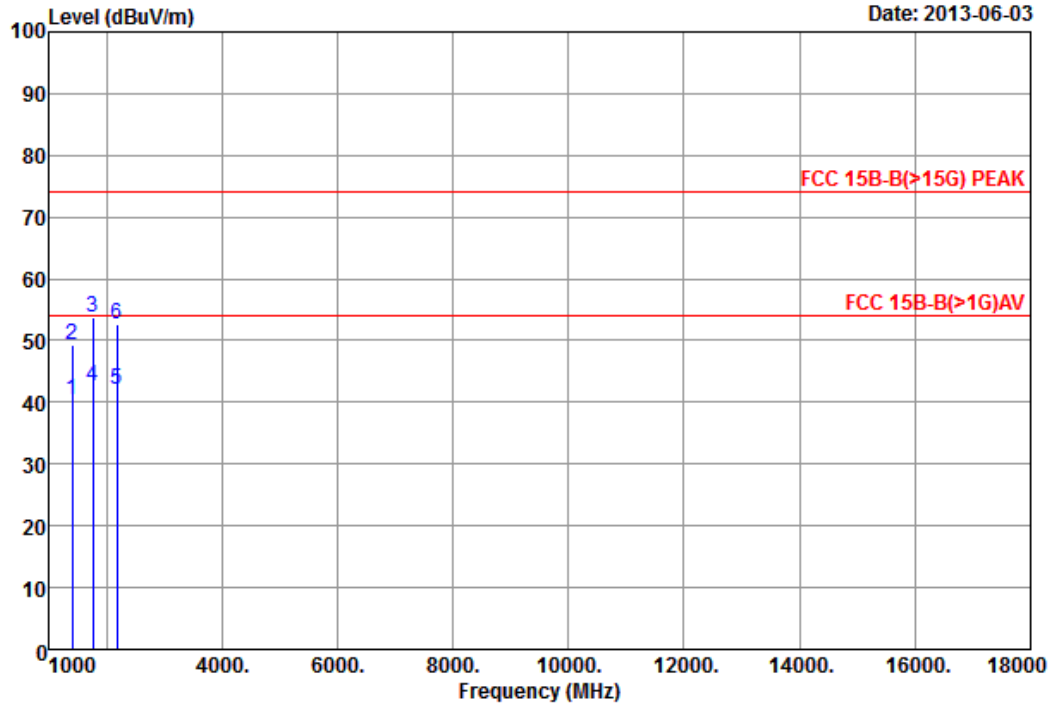
	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	PREAMP Gain (dB)	Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Remark
1	1410.31	25.59	3.06	35.70	50.58	43.53	54.00	10.47	Average
2	1410.76	25.59	3.06	35.70	60.40	53.35	74.00	20.65	Peak
3	1759.07	26.84	3.54	35.30	55.29	50.37	74.00	23.63	Peak
4	1759.35	26.84	3.54	35.30	46.50	41.58	54.00	12.42	Average
5	2180.06	28.09	3.89	35.03	56.72	53.67	74.00	20.33	Peak
6	2180.94	28.09	3.89	35.03	44.29	41.24	54.00	12.76	Average

Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Preamp Gain + Reading.
 2. The emission levels that are 20dB below the official limit are not reported.



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Data: 6 File: \\Em2_chamber\data (d)\Test data\REPORT\2013\C1M1305XXX\C1M1305241-CHAME Date: 2013-06-03



Site no. : Audix No.2 3m Chamber Data no. : 6
 Dis. / Ant. : 3m 3115 4927 Ant. pol. : VERTICAL
 Limit : FCC 15B-B(>15G) PEAK
 Env. / Ins. : 28°C / 52% N9010A (907) Engineer : An
 EUT : H81-PLUS
 Power Rating : 120Vac/60Hz
 Test Mode : Full System 1920*1200/60Hz D-SUB

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	PREAMP Gain (dB)	Reading (dBµV)	Emission Level (dBµV/m)	Limits (dBµV/m)	Margin (dB)	Remark
1	1412.33	25.59	3.06	35.70	47.31	40.26	54.00	13.74	Average
2	1412.92	25.60	3.06	35.70	56.40	49.36	74.00	24.64	Peak
3	1760.03	26.86	3.54	35.29	58.76	53.87	74.00	20.13	Peak
4	1760.91	26.86	3.54	35.29	47.45	42.56	54.00	11.44	Average
5	2179.16	28.08	3.89	35.03	45.00	41.94	54.00	12.06	Average
6	2179.59	28.09	3.89	35.03	55.70	52.65	74.00	21.35	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Preamp Gain + Reading.
 2. The emission levels that are 20dB below the official limit are not reported.

4. DEVIATION TO TEST SPECIFICATIONS

【NONE】

5. PHOTOGRAPHS

5.1. Photos of Powerline Conducted Emission Measurement



FRONT VIEW OF CONDUCTED MEASUREMENT



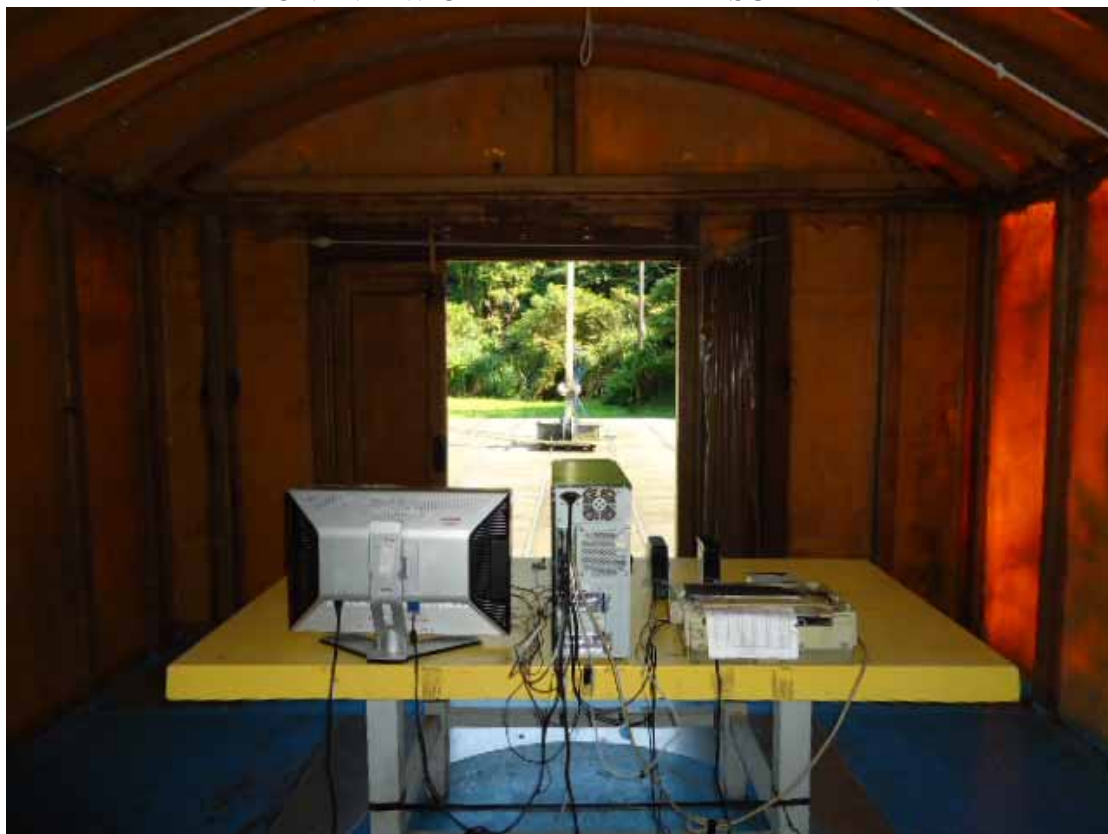
BACK VIEW OF CONDUCTED MEASUREMENT

5.2. Photos of Radiated Emission Measurement at Open Area Test Site (30-1000MHz)

Test Mode: Open Case



FRONT VIEW OF RADIATED MEASUREMENT



BACK VIEW OF RADIATED MEASUREMENT

Test Mode: Close Case



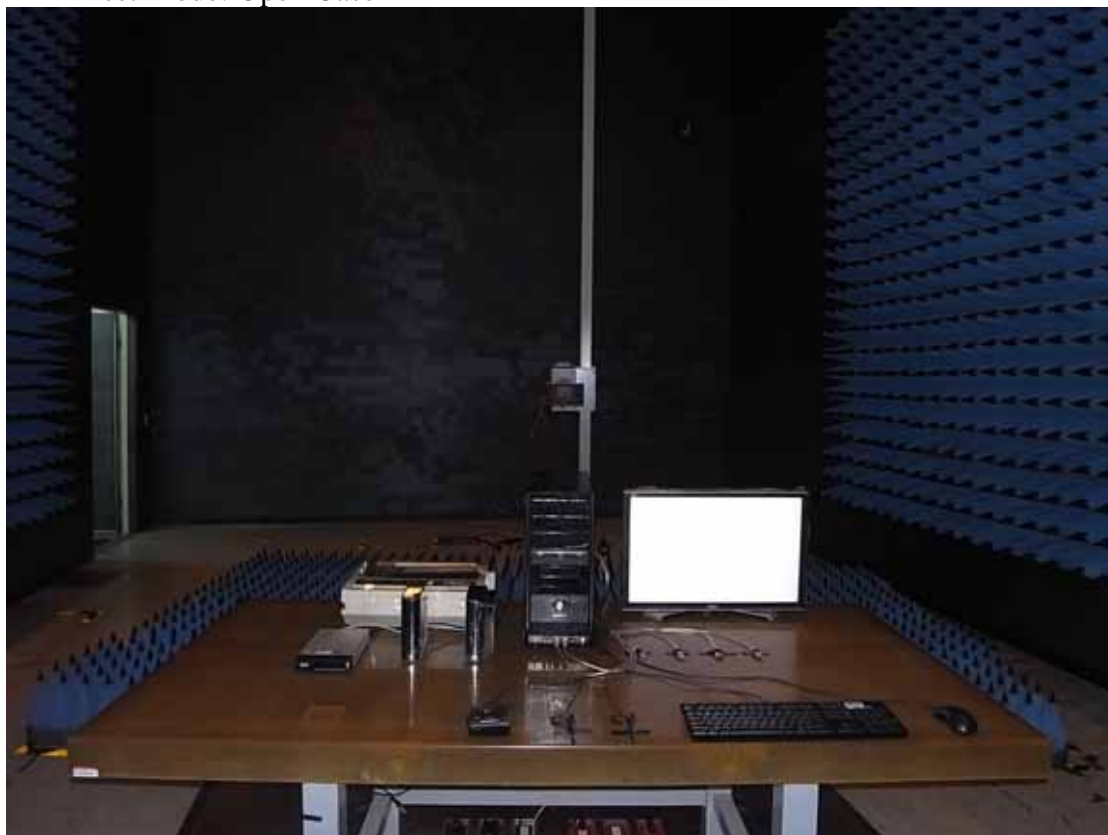
FRONT VIEW OF RADIATED MEASUREMENT



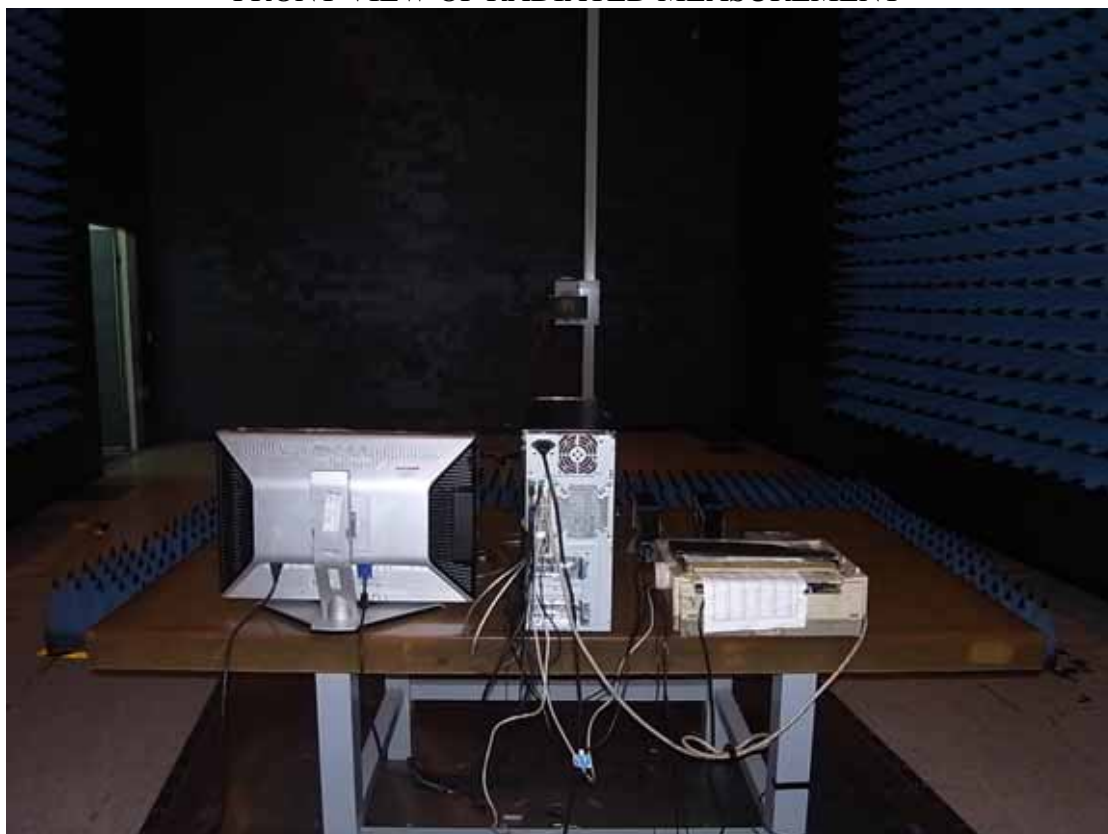
BACK VIEW OF RADIATED MEASUREMENT

5.3. Photos of Radiated Emission Measurement at Semi-Anechoic Chamber (Above 1GHz)

Test Mode: Open Case



FRONT VIEW OF RADIATED MEASUREMENT



BACK VIEW OF RADIATED MEASUREMENT

Test Mode: Close Case



FRONT VIEW OF RADIATED MEASUREMENT



BACK VIEW OF RADIATED MEASUREMENT

Partner PC System



APPENDIX I

(Photos of EUT)

(Total Page: 2 Pages)

Figure 1
Motherboard (Front View)



Figure 2
Motherboard (Back View)



Figure 3
Motherboard (Side View, I/O Ports)

