

APPLICATION OF CERTIFICATION  
For

Avnera Corporation

AM1.5G USB SENDER

Model Number: AVR7201-05

FCC ID: V3CAVRB7201A

Prepared for : Avnera Corporation  
16505 NW Bethany Court, Suite 100 Beaverton, Oregon  
97006, United States

Prepared By: Audix Technology (Shenzhen) Co., Ltd.  
No. 6, Ke Feng Rd., 52 Block,  
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Report Number : ACS-F09158  
Date of Test : Jul.22~24, 2009  
Date of Report : Aug.03, 2009

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## TEST REPORT CERTIFICATION

Applicant : Avnera Corporation  
 Manufacturer : Beautiful Enterprise Co., Ltd.  
 EUT Description : AM1.5G USB SENDER  
 Model Number : AVRBT201-05  
 FCC ID : V3CAVRB7201A  
 Power Supply : DC 5V  
 Test Voltage : DC 5V From PC Input AC 120V/60Hz

## Measurement Standard Used:

FCC Rules and Regulations Part 15 Subpart B Class B 2008, ANSI C63.4-2003

The device described above is tested by Audix Technology (Shenzhen) Co., Ltd. to determine the maximum emission levels emanating from the device. The maximum emission levels are compared to the FCC Part 15 Subpart B Class B limits for radiated and conducted emissions. The test results are contained in this test report and Audix Technology (Shenzhen) Co., Ltd. is assumed full responsibility for the accuracy and completeness of tests. Also, this report shows that EUT is technically compliant with FCC requirements.

This report applies to above tested sample only. This report shall not be reproduced in parts without written approval of AUDIX TECHNOLOGY (SHENZHEN) CO., LTD.

Date of Test: Jul.22~24, 2009

Prepared by: Edie Huang  
Edie Huang / Assistant

Reviewer: Jamy Yu  
Jamy Yu / Senior Engineer



Approved & Authorized Signer: Ken Lu  
Ken Lu / Manager

## 1. SUMMARY OF STANDARDS AND RESULTS

### 1.1. Description of Standards and Results

The EUT have been tested according to the applicable standards as referenced below.

EMISSION			
Description of Test Item	Standard	Limits	Results
Power Line Conducted Emission Test	FCC Part 15: 2008 ANSI C63.4: 2003	Class B	PASS
Radiated Emission Test	FCC Part 15: 2008 ANSI C63.4: 2003	Class B	PASS

## 2. GENERAL INFORMATION

### 2.1. Description of Device (EUT)

EUT Description : AM1.5G USB SENDER

Model Number : AVR B7201-05

FCC ID : V3CAVRB7201A

Operation Frequency : 2405MHz – 2477MHz

Power Supply : DC 5V From PC Input AC 120V/60Hz  
(The supply voltage was varied between 85% and 115% of the nominal rated (120V/60Hz) supply voltage. And all the emissions include fundamental emissions had no change. So only the nominal power supply test data were recorded.)

Applicant : Avnera Corporation  
16505 NW Bethany Court, Suite 100 Beaverton, Oregon  
97006, United States

Manufacturer : Beautiful Enterprise Co., Ltd.  
26th Floor, Beautiful Group Tower, 77 Connaught Road  
Central, Hong Kong

Date of Test : Jul.22~24, 2009

Date of Receipt : Jun.21, 2009

Sample Type : Prototype production

## 2.2. Tested Supporting System Details

### 2.2.1. NOTEBOOK

M/N	:	PP09S
S/N	:	N/A
Manufacturer	:	DELL
Power Adaptor	:	Manufacturer: DELL, M/N: LA65NS1-00 Cable: Unshielded, Detachable, 4.0m (Bond one ferrite core)

### 2.2.2. HDD

EMC CODE	:	ACS-EMC-HDD02
M/N	:	F12-UF
S/N	:	A0100215-5390018
Manufacturer	:	Terasys
Data Cable	:	Shielded, Detachable, 1.8m
FCC ID	:	By DoC
BSMI ID	:	4912A022

### 2.2.3. iPod

EMC CODE	:	ACS-EMC-IP03
M/N	:	A1199
S/N	:	YM711H3LVQ5
Manufacturer	:	APPLE
Data Cable	:	Shielded, Detachable, 1.0m
FCC ID	:	By DoC
BSMI ID	:	R33057

### 2.3. Test Facility

#### Site Description

Name of Firm

: Audix Technology (Shenzhen) Co., Ltd.  
No. 6, Ke Feng Rd., 52 Block, Shenzhen  
Science & Industrial Park, Nantou,  
Shenzhen, Guangdong, China

3m Anechoic Chamber

: Mar. 31, 2009 File on Federal  
Communication Commission  
Registration Number: 90454

3m & 10m Anechoic Chamber

: Jan. 31, 2007 File on Federal  
Communication Commission  
Registration Number: 794232

EMC Lab.

: Accredited by DATech, German  
Registration Number: DAT-P-091/99-01  
Feb. 02, 2009

Accredited by NVLAP, USA  
NVLAP Code: 200372-0  
Apr. 01, 2009

### 2.4. Measurement Uncertainty (95% confidence levels, k=2)

Test Item	Uncertainty
Uncertainty for Conduction emission test in No. 1 Conduction	2.40dB
Uncertainty for Radiation Emission test in 3m chamber	3.78 dB (Polarize: V)
	4.20 dB (Polarize: H)
Uncertainty for DC power test	0.042 %
Uncertainty for test site temperature and humidity	0.6°C
	3%

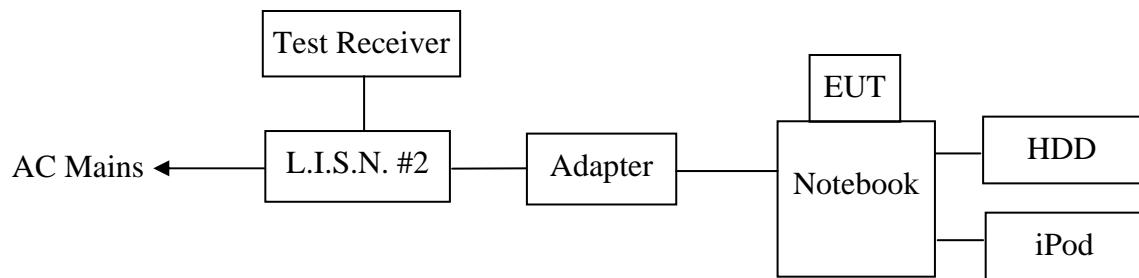
### 3. POWER LINE CONDUCTED EMISSION TEST

#### 3.1. Test Equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Test Receiver	Rohde & Schwarz	ESHS10	838693/001	Jan.10, 09	1 Year
2.	L.I.S.N.#2	Kyoritsu	KNW-407	8-1636-1	May.08, 09	1 Year
3.	Terminator	Hubersuhner	50Ω	No. 1	May.08, 09	1 Year
4.	RF Cable	Fujikura	3D-2W	LISN Cable 1#	May.08, 09	1 Year
5.	Coaxial Switch	Anritsu	MP59B	M55367	May.08, 09	1 Year
6.	Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100341	May.08, 09	1 Year

#### 3.2. Block Diagram of Test Setup

##### 3.2.1. Block diagram of connection between the EUT and simulators



(EUT: AM1.5G USB SENDER)

#### 3.3. Power Line Conducted Emission Test Limits

Frequency	Maximum RF Line Voltage	
	Quasi-Peak Level dB(µV)	Average Level dB(µV)
150kHz ~ 500kHz	66 ~ 56*	56 ~ 46*
500kHz ~ 5MHz	56	46
5MHz ~ 30MHz	60	50

Notes: 1. \* Decreasing linearly with logarithm of frequency.

2. The lower limit shall apply at the transition frequencies.

### 3.4.Configuration of EUT on Test

The following equipment are installed on Power Line Conducted Emission Test to meet the commission requirement and operating regulations in a manner which tends to maximize its emission characteristics in a normal application.

#### 3.4.1. AM1.5G USB SENDER (EUT)

Model Number : AVR7201-05  
 Serial Number : N/A

3.4.2. Support Equipment : As Tested Supporting System Detail, in Section 2.2.

### 3.5.Operating Condition of EUT

3.5.1. Setup the EUT and simulator as shown as Section 3.2.

3.5.2. Turn on the power of all equipment.

3.5.3. Notebook Playing 1KHz signal and send by EUT

### 3.6.Test Procedure

The EUT was placed on the ground plane. The EUT Power connected to the power mains through a line impedance stabilization network (L.I.S.N. 2#). This provided a 50-ohm coupling impedance for the EUT (Please refer to the block diagram of the test setup and photographs). The other peripheral devices power cord connected to the power mains through a line impedance stabilization network (L.I.S.N.#3). Both sides of power line were checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipments and all of the interface cables were changed according to ANSI C63.4-2003 on conducted Emission test.

The bandwidth of test receiver (R&S TEST RECEIVER ESHS10) is set at 10kHz.

The frequency range from 150kHz to 30MHz is checked. The test result are reported on Section 3.7.

### 3.7.Conducted Disturbance at Mains Terminals Test Results

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

The EUT with the following test mode was tested and selected (mode 1) to read Q.P values and Average values, all the test results are listed in next pages.

EUT: AM1.5G USB SENDER

Model No. : AVR7201-05

Test Date: Jul.24, 2009

Temperature: 23°C

Humidity: 54%

The details of test mode are as follows :

NO.	Test Mode	Reference Test Data No.	
		VA	VB
1.	Tx Mode	#1	#2

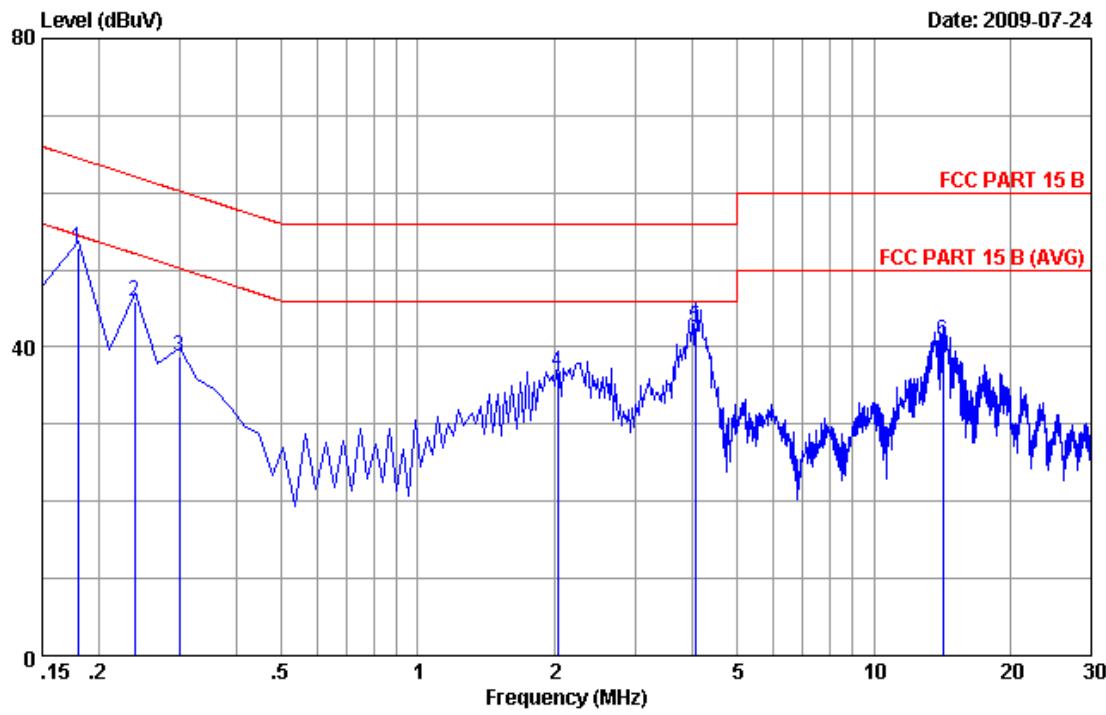


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Data: 1

File: D:\DATA\2009 Report\B\Beautiful\ACS9Q1161.EM6 (2)

Date: 2009-07-24



Site no :Audix No.1 Conduction Data no :1  
 Dis./Ant. :\*\* 2009 KNW407 VA  
 Limit :FCC PART 15 B  
 Env./Ins. :Temp:23'C Humi:54% Engineer :Paul Tian  
 EUT :AM1.5G USB SENDER M/N:AVRB7201-05  
 Power Rating :DC 5V From PC Input AC 120V/60Hz  
 Test Mode :Tx Mode  
 Memo :

No	Freq (MHz)	LISN	Cable	Emission			
		Factor (dB)	Loss (dB)	Reading (dBuV)	Level (dBuV)	Limits (dBuV)	Margin (dB)
1	0.17985	0.43	9.88	42.40	52.71	64.49	11.78 QP
2	0.23955	0.41	9.88	35.69	45.98	62.11	16.13 QP
3	0.29925	0.39	9.88	28.57	38.84	60.26	21.42 QP
4	2.031	0.36	9.90	26.61	36.87	56.00	19.13 QP
5	4.060	0.38	9.91	32.31	42.60	56.00	13.40 QP
6	14.180	0.48	9.97	30.37	40.82	60.00	19.18 QP

Remarks: 1.Emission Level=LISN Factor+Cable Loss(Include 10dB pulse limit)+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.

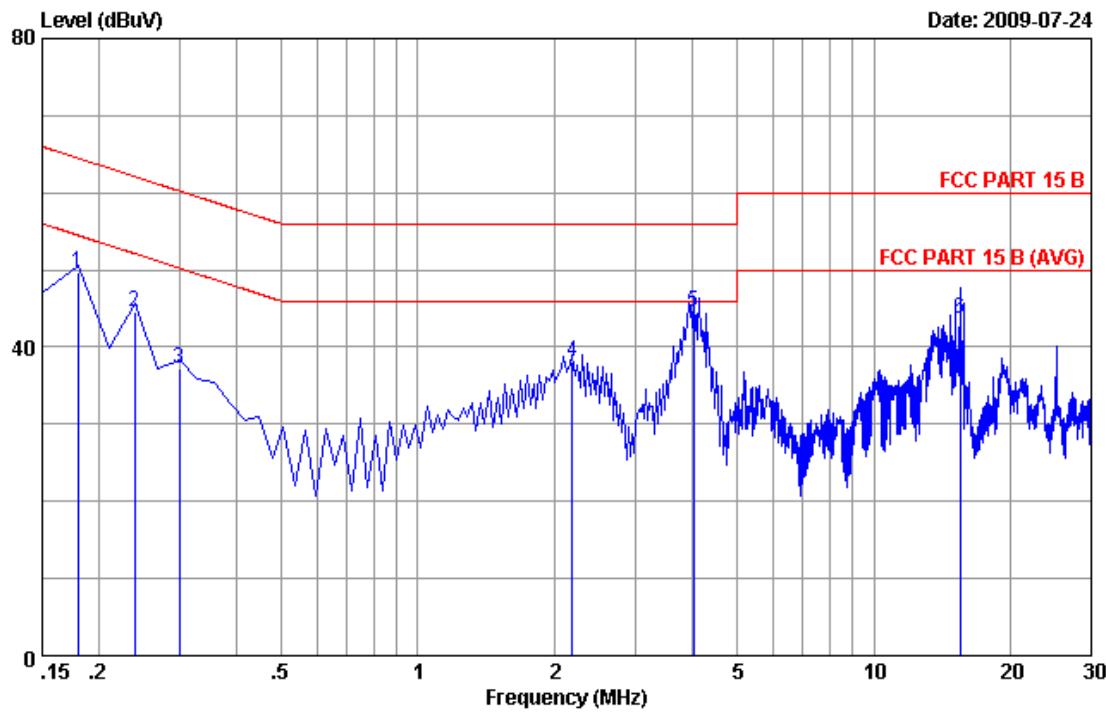


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Data: 2

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Date: 2009-07-24



Site no :Audix No.1 Conduction Data no :2  
 Dis./Ant. :\*\* 2009 KNW407 VB  
 Limit :FCC PART 15 B  
 Env./Ins. :Temp:23'C Humi:54% Engineer :Paul Tian  
 EUT :AM1.5G USB SENDER M/N:AVRB7201-05  
 Power Rating :DC 5V From PC Input AC 120V/60Hz  
 Test Mode :Tx Mode  
 Memo :

No	Freq (MHz)	LISN	Cable	Emission			
		Factor (dB)	Loss (dB)	Reading (dBuV)	Level (dBuV)	Limits (dBuV)	Margin (dB)
1	0.17985	0.45	9.88	39.26	49.59	64.49	14.90 QP
2	0.23955	0.43	9.88	34.27	44.58	62.11	17.53 QP
3	0.29925	0.41	9.88	27.02	37.31	60.26	22.95 QP
4	2.180	0.36	9.90	27.75	38.01	56.00	17.99 QP
5	4.031	0.37	9.91	34.19	44.47	56.00	11.53 QP
6	15.463	0.49	9.97	33.25	43.71	60.00	16.29 QP

Remarks: 1.Emission Level=LISN Factor+Cable Loss(Include 10dB pulse limit)+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.

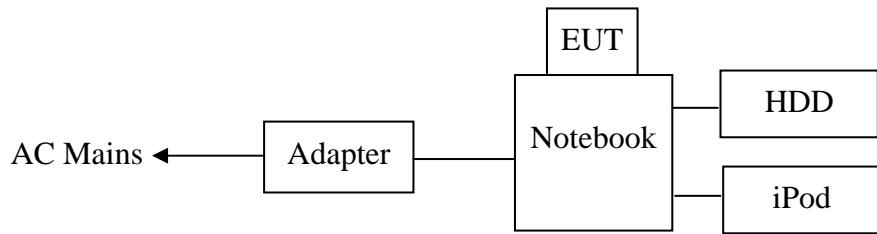
## 4. RADIATED EMISSION TEST

### 4.1. Test Equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1	3#Chamber	AUDIX	N/A	N/A	Dec.05,08	1 Year
2	EMI Spectrum	Agilent	E4407B	MY41440292	May.08, 09	1 Year
3	Test Receiver	Rohde & Schwarz	ESVS10	834468/011	May.08, 09	1 Year
4	Amplifier	HP	8447D	2648A04738	May.08, 09	1 Year
5	Bilog Antenna	Schaffner	CBL6111C	2598	Nov.10, 08	1 Year
6	RF Cable	MIYAZAKI	8D-FB	3# Chamber No.1	May.08, 09	1 Year
7	Coaxial Switch	Anritsu	MP59B	M73989	May.08, 09	1 Year

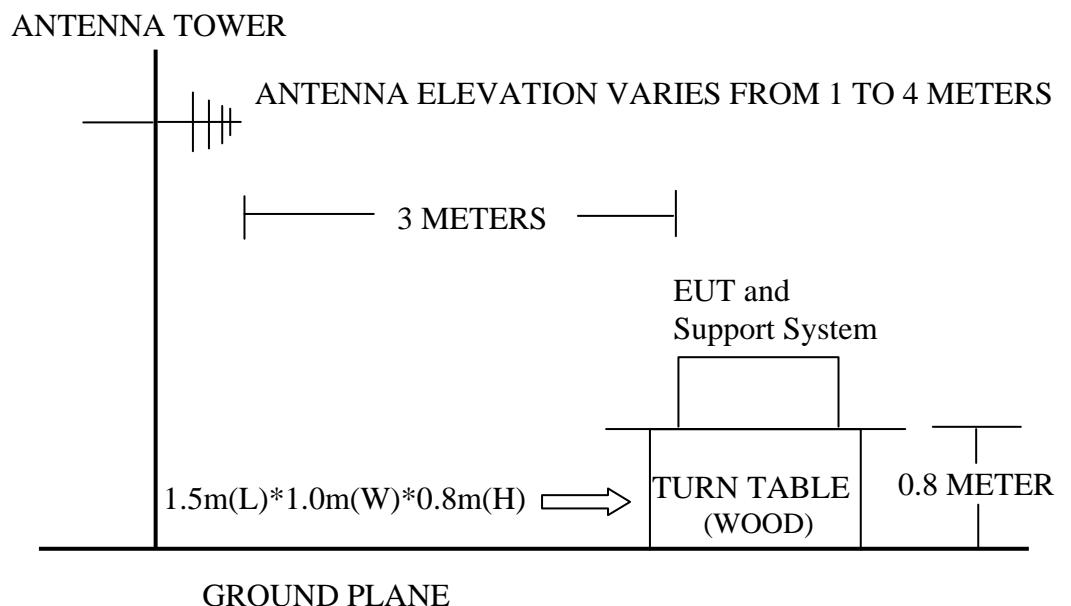
### 4.2. Block Diagram of Test Setup

#### 4.2.1. Block diagram of connection between the EUT and simulators



(EUT: AM1.5G USB SENDER)

#### 4.2.2. In Anechoic Chamber



### 4.3.Radiated Emission Limit

FREQUENCY MHz	DISTANCE Meters	FIELD STRENGTHS LIMIT
		dB( $\mu$ V)/m
30 ~ 88	3	40.0
88 ~ 216	3	43.5
216 ~ 960	3	46.0
960 ~ 1000	3	54.0

Remark: (1) Emission level = Antenna Factor + Cable Loss + Reading

(2) The smaller limit shall apply at the cross point between two frequency bands.

(3) Distance is the distance in meters between the measuring instrument, antenna and the closest point of any part of the device or system.

### 4.4.EUT Configuration on Test

The following equipment are installed on Radiated Emission Test to meet the commission requirements and operating regulations in a manner that tends to maximize its emission characteristics in normal application.

#### 4.4.1. AM1.5G USB SENDER (EUT)

Model Number : AVR7201-05  
Serial Number : N/A

4.4.2. Support Equipment : As Tested Supporting System Detail, in Section 2.2.

### 4.5.Operating Condition of EUT

4.5.1. Setup the EUT as shown in Section 4.2.

4.5.2. Turn on the power of all equipment.

4.5.3. Notebook Playing 1KHz signal and send by EUT

### 4.6.Test Procedure

The EUT was placed on the ground plane inside a semi-anechoic chamber. An antenna was located 3m from the EUT on an adjustable mast. A pre-scan was first performed in order to find prominent radiated emissions. For final emissions measurements at each frequency of interest, the EUT were rotated and the antenna height was varied between 1m and 4m in order to maximize the emission. Measurements in both horizontal and vertical polarities were made and the data was recorded. In order to find the maximum emission, the relative positions of equipments and all of the interface cables were changed according to ANSI C63.4-2003 on Radiated Emission test.

The bandwidth setting on the test receiver (R&S TEST RECEIVER ESVS10) is 120 kHz.

The frequency range from 30MHz to 1000MHz is checked. The test results are reported on Section 4.7.

#### 4.7.Radiated Disturbance Test Results

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

The EUT with the following test mode was tested and selected (mode 1) to read Q.P values, all the test results are listed in next pages.

EUT: AM1.5G USB SENDER

Model No. : AVRB7201-05

Test Date: Jul.22, 2009

Temperature: 24°C

Humidity: 56%

The details of test mode are as follows :

NO.	Test Mode	Reference Test Data No.	
		Horizontal	Vertical
1.	Tx Mode	#2	#1

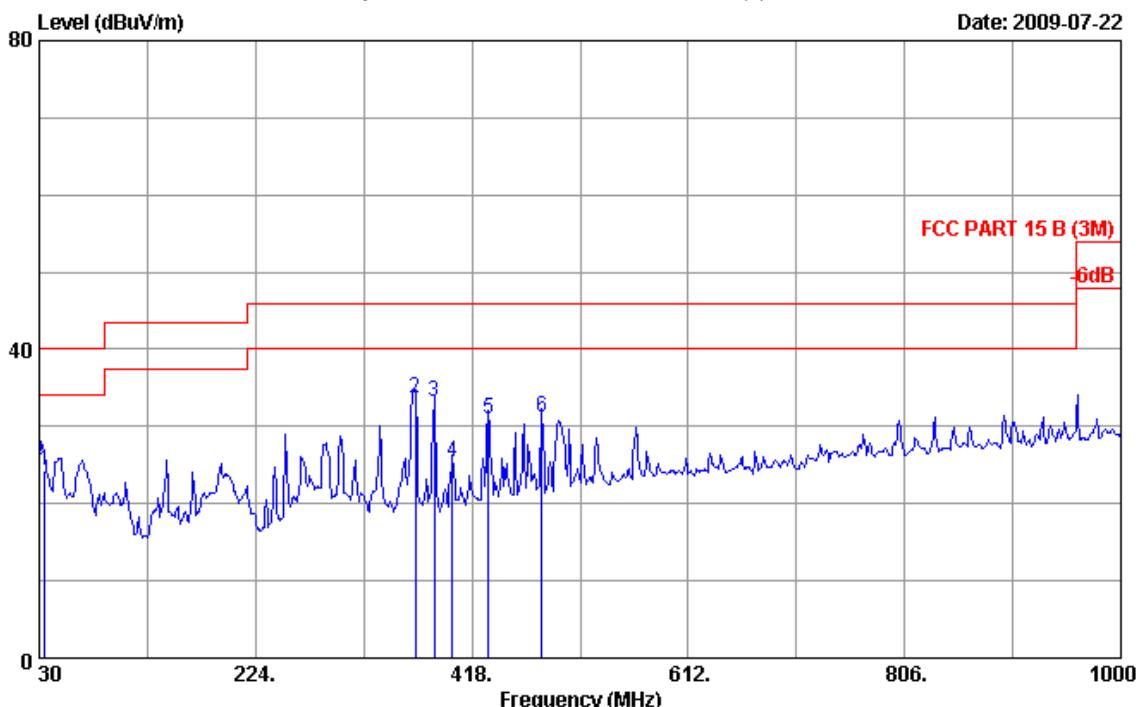
For above 1GHz frequency

Due to the EUT's highest frequency generated and the highest frequency below 108MHz , therefore the above 1GHz frequency is no need to measurement.



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Data: 2 File: D:\2009 Report Data\B\Beautiful\ACS9Q1161.EM6 (2)



Site no. : 3m Chamber Data no. : 2  
Dis. / Ant. : 3m CBL6111C Ant. pol. : HORIZONTAL  
Limit : FCC PART 15 B (3M)  
Env. / Ins. : 24°C/56% Engineer : Cary Luo  
EUT : AM1.5G USB SENDER M/N:AVRB7201-05  
Power Rating : DC 5V From PC Input AC 120V/60Hz  
Test Mode : Tx

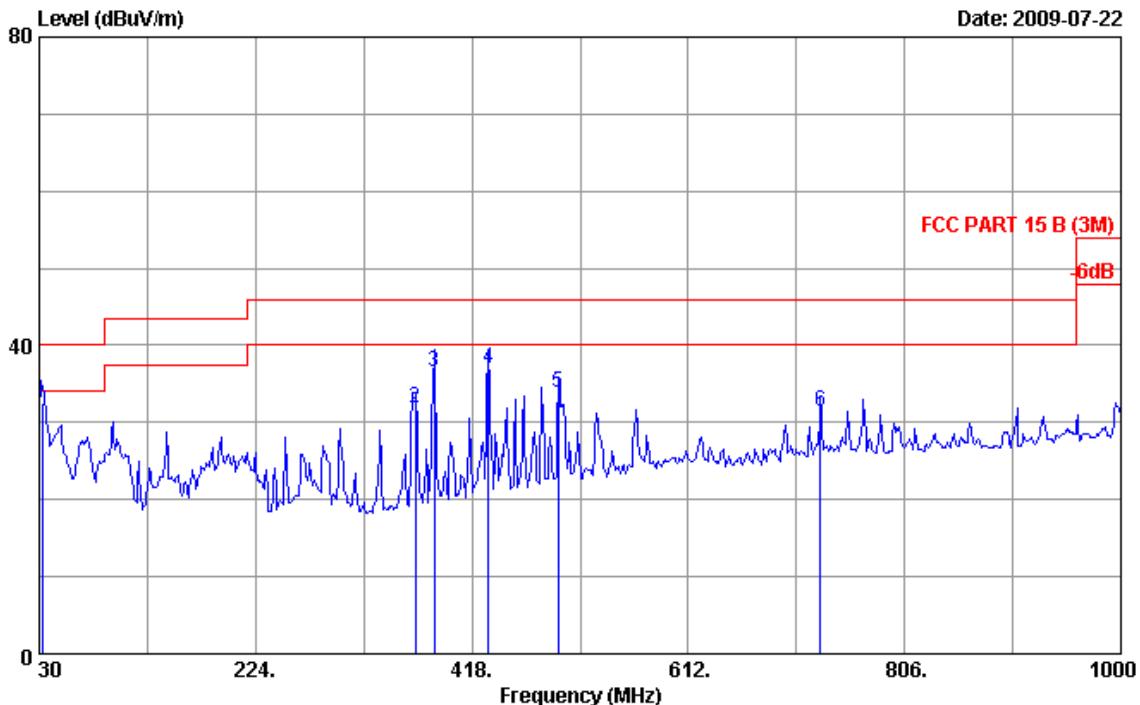
No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Emission				
				Reading (dB $\mu$ V)	Level (dB $\mu$ V/m)	Limits (dB $\mu$ V/m)	Margin (dB)	Remark
1	34.850	17.04	0.55	6.80	24.39	40.00	15.61	QP
2	367.560	15.41	1.87	16.47	33.75	46.00	12.25	QP
3	384.050	15.72	1.90	15.56	33.18	46.00	12.82	QP
4	400.540	16.23	1.93	7.18	25.34	46.00	20.66	QP
5	432.550	16.90	2.03	12.10	31.03	46.00	14.97	QP
6	481.050	17.68	2.19	11.38	31.25	46.00	14.75	QP

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 367.560MHz with corrected signal level of 33.75dB $\mu$ V/m (Limit is 46.00dB $\mu$ V/m) when the antenna was at horizontal polarization and at 2.0m high and the turn table was at 145°.  
4. 0° was the table front facing the antenna. Degree is calculated from 0° clockwise facing the antenna.



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Data: 1 File: D:\2009 Report Data\B\Beautiful\ACS9Q1161.EM6 (2)



Site no. : 3m Chamber Data no. : 1  
Dis. / Ant. : 3m CBL6111C Ant. pol. : VERTICAL  
Limit : FCC PART 15 B (3M)  
Env. / Ins. : 24°C/56% Engineer : Cary Luo  
EUT : AM1.5G USB SENDER M/N:AVRB7201-05  
Power Rating : DC 5V From PC Input AC 120V/60Hz  
Test Mode : Tx

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission			
					Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	32.910	18.17	0.54	13.93	32.64	40.00	7.36	QP
2	367.560	15.41	1.87	14.69	31.97	46.00	14.03	QP
3	384.050	15.72	1.90	18.88	36.50	46.00	9.50	QP
4	432.550	16.90	2.03	18.11	37.04	46.00	8.96	QP
5	495.600	17.96	2.24	13.69	33.89	46.00	12.11	QP
6	730.340	21.21	2.88	7.29	31.38	46.00	14.62	QP

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 32.910MHz with corrected signal level of 32.64dB $\mu$ V/m (Limit is 40.00dB $\mu$ V/m) when the antenna was at vertical polarization and at 1.0m high and the turn table was at 310°.  
4. 0° was the table front facing the antenna. Degree is calculated from 0° clockwise facing the antenna.

## 5. DEVIATION TO TEST SPECIFICATIONS

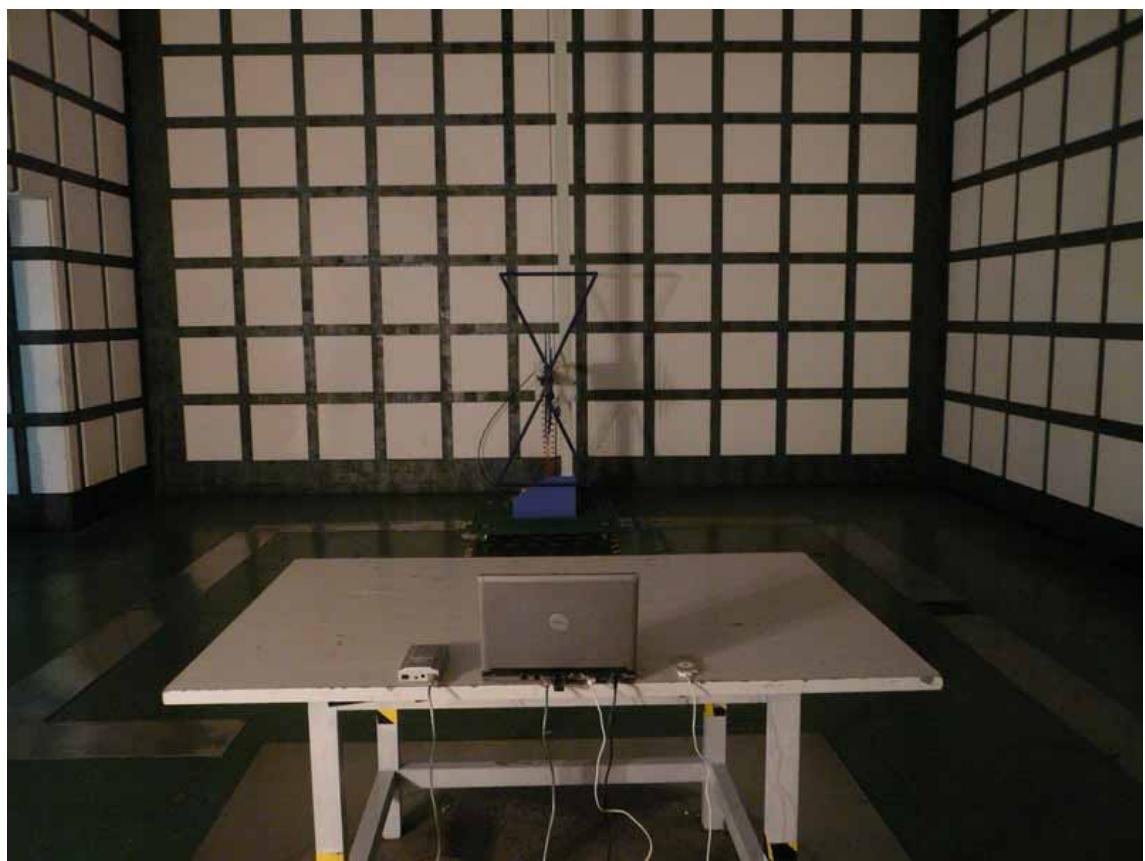
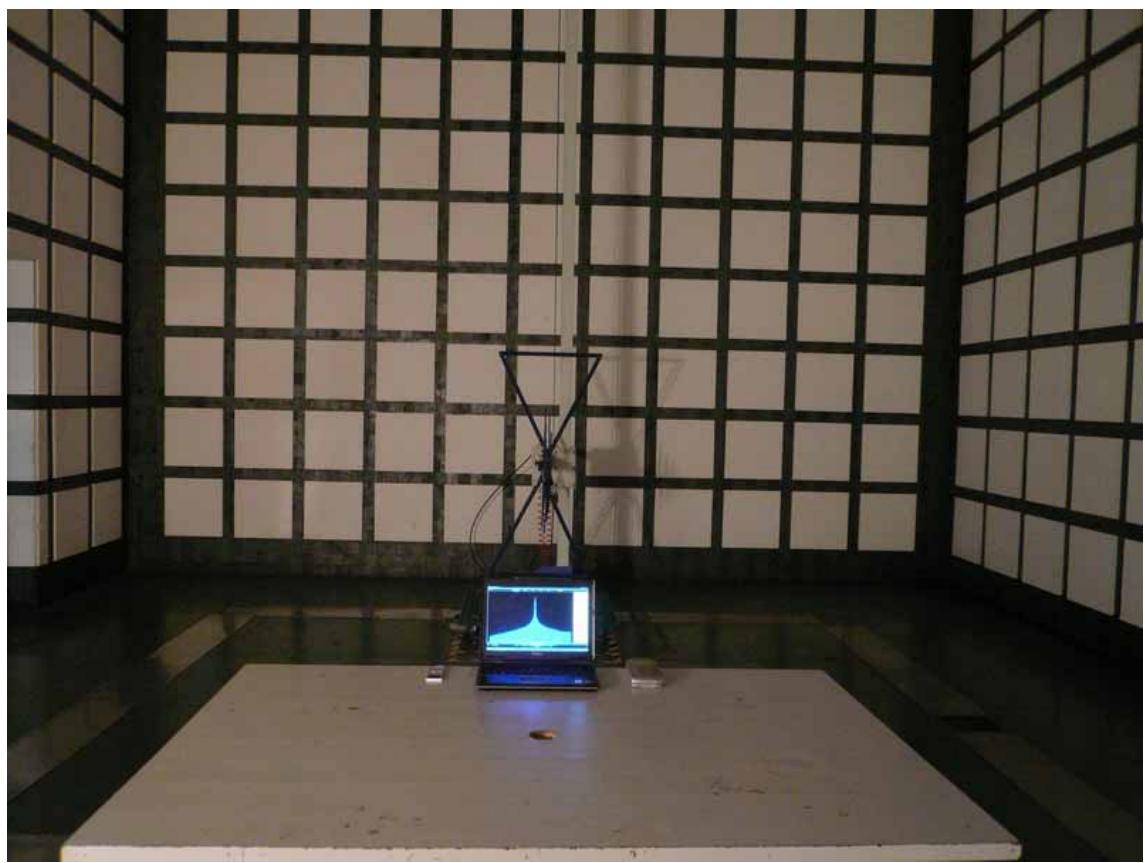
[ NONE]

## 6. PHOTOGRAPH

### 6.1.Photos of Power Line Conducted Emission Test



## 6.2.Photos of Radiated Emission Test (In Anechoic Chamber)



## 7. PHOTOS OF THE EUT

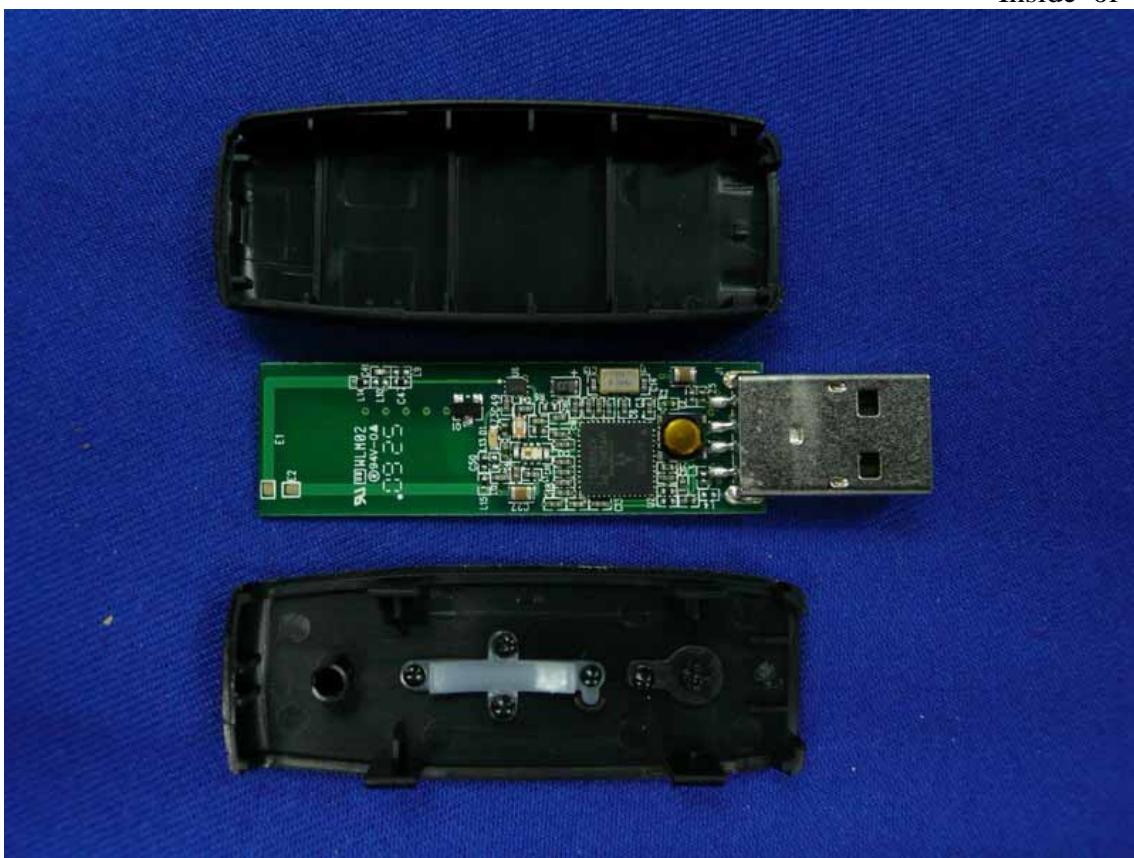
**Figure 1**  
General Appearance of the EUT



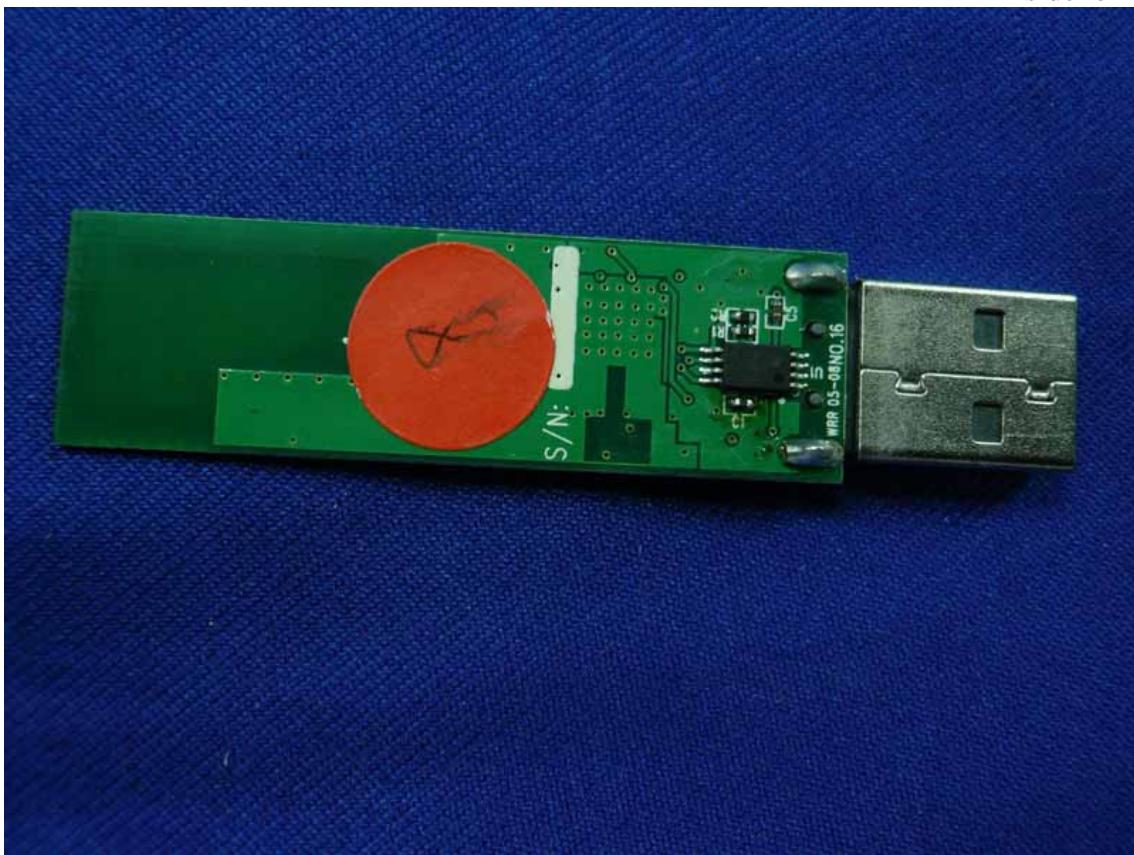
**Figure 2**  
General Appearance of the EUT



**Figure 3**  
Inside of the EUT



**Figure 4**  
Inside of the EUT



**Figure 5**  
Inside of the EUT

