

EMI Test Report

Model Name: USB HUB
Model Number: DX-B4PORT
Brand Name: DYNEX
Trade Mark: DYNEX

FCC ID: XJIBLKDXB4PORT

Prepared for Belkin Electronics (Changzhou) Co., Ltd.

According to FCC Part 15, Class B

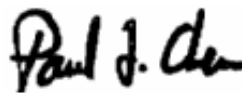
Test Report #: SHA-0906-8255-FCC

Prepared by: Cloud Feng

Reviewed by: Harry Zhao

QC Manager: Paul Chen

Test Report Released by:



Paul Chen

2009, July 13

Date

Test Location

Tests performed in a Certified ANSI Semi-Anechoic Chamber and Shielded Room performed testing.

Test Site Location: *ECMG Worldwide Certification
Solution, Inc. (China)
Building 2, 1298 Lian Xi Road,
Pu Dong New Area, Shanghai,
P.R. China 201204*

Tel: *86-21-51909300*
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FCC Registration Number: *172634*

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Administrative Data

Test Sample : USB HUB

Model Tested : DX-B4PORT

Trade Mark : DYNEX

Serial Number : Engineering Sample

Date Tested : 2009, June 27th

*Applicant : Belkin Electronics (Changzhou) Co., Ltd.
Bldg 6C, No.8 Xi-Hu Road, Wujin Hi-Tech
Industrial Zone, Jiangsu*

Telephone : 86-519-86220991

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*Manufacturer : Belkin Electronics (Changzhou) Co., Ltd.
Bldg 6C, No.8 Xi-Hu Road, Wujin Hi-Tech
Industrial Zone, Jiangsu*

EUT Description

Belkin Electronics (Changzhou) Co., Ltd., models DX-B4PORT (referred to as the EUT in this report) is a USB HUB.

The highest frequency generated by the EUT is 480 MHz, so the frequency range tested is from 30MHz - 2000MHz.

Test Summary

The Electromagnetic Compatibility requirements on model DX-B4PORT for this test are stated below. All results listed in this report relate exclusively to this above-mentioned model as the Equipment under Test. This report confers no approval or endorsement upon any other component, host or subsystem used in the test set-up.

<i>Emission Tests</i>				
<i>Specifications</i>	<i>Description</i>	<i>Test Results</i>	<i>Test Point</i>	<i>Remark</i>
<i>FCC Part 15.107 (150kHz - 30MHz)</i>	<i>Conducted Emission</i>	<i>For DX-B4PORT:</i> <i>Passed by 12.67 dB of QP Passed by 15.62 dB of AVE</i>	<i>AC Input Port</i>	<i>Attachment 1</i>
<i>FCC Part 15.109 (30MHz - 2000MHz)</i>	<i>Radiated Emission</i>	<i>For DX-B4PORT:</i> <i>Passed by 1.80 dB of QP</i>	<i>Enclosure</i>	<i>Attachment 2</i>

Test Mode Justification

This device complies with Part 15 Class B of the FCC rules. The system was tested in the Transmitting data mode.

The EUT connects one U-disk and the other ports connect with USB cables. Pursuant to section 6.1.3(4) of ANSI C63.4, Where there are multiple ports all of the same type, additional connecting cables or wires shall be added to the EUT to determine the effect these cables or wires have on both radiated and conducted emissions from the EUT. The number of additional cables or wires should be limited to the condition where the addition of another cable or wire does not significantly affect the emission level, i.e., varies less than 2 dB, provided, of course, that the EUT remains compliant. These additional cables or wires need not be terminated.

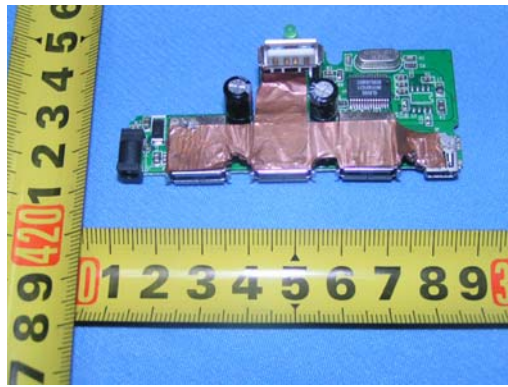
EUT Exercise Software

The software transmit.bat runs on windowsXP, which was used to exercise the EUT during testing. The files are copying and deleting continuously from the U-disk attached on the USB port of EUT to the PC.

Equipment Modification

There is a copper cover the USB connector. This modification is made to the EUT to bring the EUT into compliance with the appropriate specifications, that the product will have all of the modification incorporated into the product when manufactured and placed on the market.

The copper's dimension is 62mm 25mm, Manufacturer: lairdcateron, Kunshan.*



There were no modifications installed by ECMG Worldwide Certification Solution, Inc (China) test personnel.

Test System Details

<i>EUT</i>	
<i>Model Numbers:</i>	<i>DX-B4PORT</i>
<i>Trade Mark:</i>	<i>DYNEX</i>
<i>Input Voltage:</i>	<i>5V DC</i>
<i>Serial Number:</i>	<i>Engineering Sample</i>
<i>Description:</i>	<i>USB HUB</i>
<i>Manufacturer:</i>	<i>Belkin Electronics (Changzhou) Co., Ltd.</i>

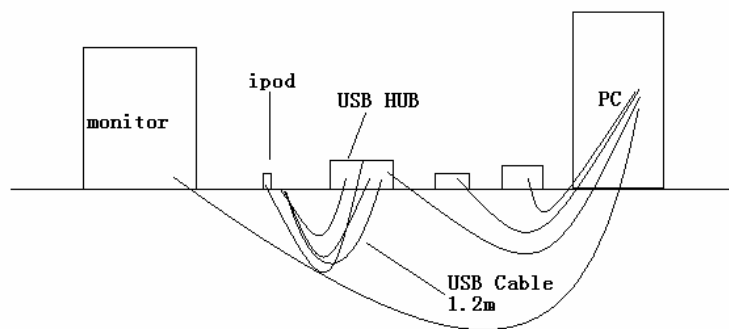
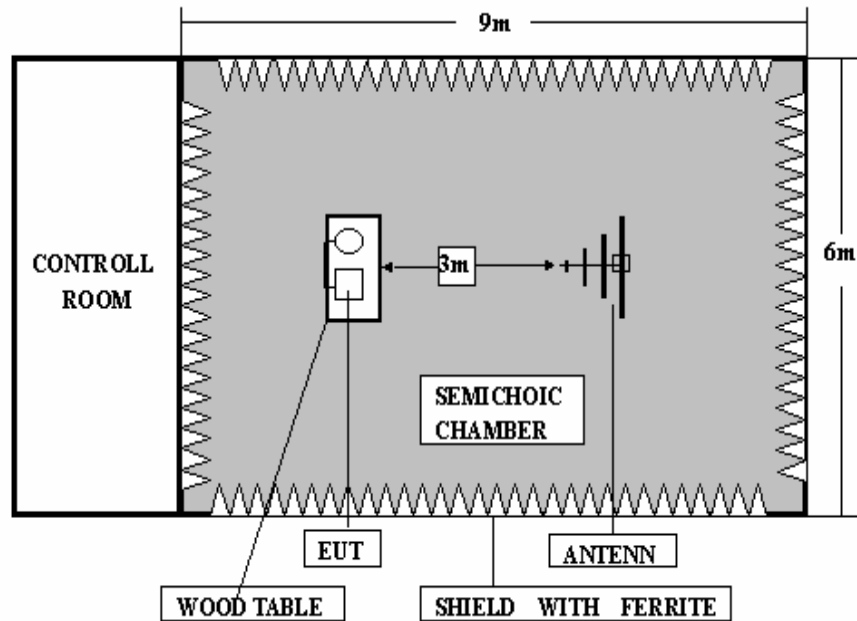
<i>EUT Power Supply</i>	
<i>Model Numbers:</i>	<i>PS0538</i>
<i>Input:</i>	<i>100-240V 50/60Hz 0.6A</i>
<i>Output:</i>	<i>5V 3.5-3.8A</i>

<i>Support Equipment</i>				
<i>Description</i>	<i>Model Number</i>	<i>Serial Number</i>	<i>Manufacturer</i>	<i>Power Cable Description</i>
<i>PC</i>	<i>OPTIPLEX 330</i>	<i>HBSF92X</i>	<i>DELL</i>	<i>1.8m unshielded</i>
<i>Monitor</i>	<i>E178FPC</i>	<i>CN0WR979641 807CA7L4C</i>	<i>DELL</i>	<i>1.8m unshielded</i>
<i>Keyboard</i>	<i>L100</i>	<i>CN0RH656658 907C401F9</i>	<i>DELL</i>	<i>N/A</i>
<i>Mouse</i>	<i>MOC5UO</i>	<i>G1D02BPQ</i>	<i>DELL</i>	<i>N/A</i>
<i>Printer converter</i>	<i>45CV</i>	<i>961217</i>	<i>INTEL LIGENT</i>	<i>N/A</i>
<i>Remote control box</i>	<i>IT-251B</i>	<i>N/A</i>	<i>N/A</i>	<i>N/A</i>

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<i>U disk</i>	<i>iPod shuffle MB683</i>	<i>03285</i>	<i>Apple</i>	<i>1.2m unshielded</i>	
<i>Cable Description</i>					
<i>Description</i>	<i>From</i>	<i>To</i>	<i>Length (Meters)</i>	<i>Shielded (Y/N)</i>	<i>Ferrite (Y/N)</i>
<i>Power Cable</i>	<i>Adaptor</i>	<i>EUT</i>	<i>1.5m</i>	<i>N</i>	<i>N</i>
<i>USB Cable</i>	<i>EUT</i>	<i>PC</i>	<i>1.2m</i>	<i>Y</i>	<i>N</i>
<i>Parallel Cable</i>	<i>Converter</i>	<i>PC</i>	<i>0.5m</i>	<i>N</i>	<i>N</i>
<i>Serial Cable</i>	<i>Remote box</i>	<i>PC</i>	<i>1.5m</i>	<i>N</i>	<i>N</i>
<i>USB Cable</i>	<i>EUT</i>	<i>U Disk</i>	<i>1.2m</i>	<i>Y</i>	<i>N</i>
<i>USB CableX3</i>	<i>EUT</i>		<i>1.2m</i>	<i>N</i>	<i>N</i>

Configuration of Tested System

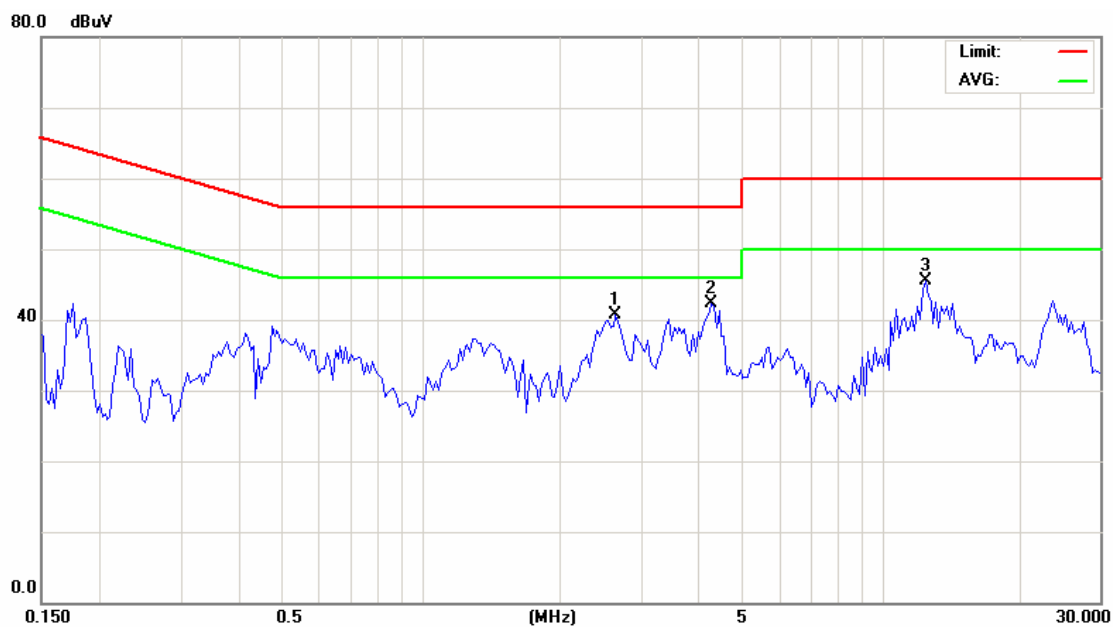


EUT arrangements Layout View

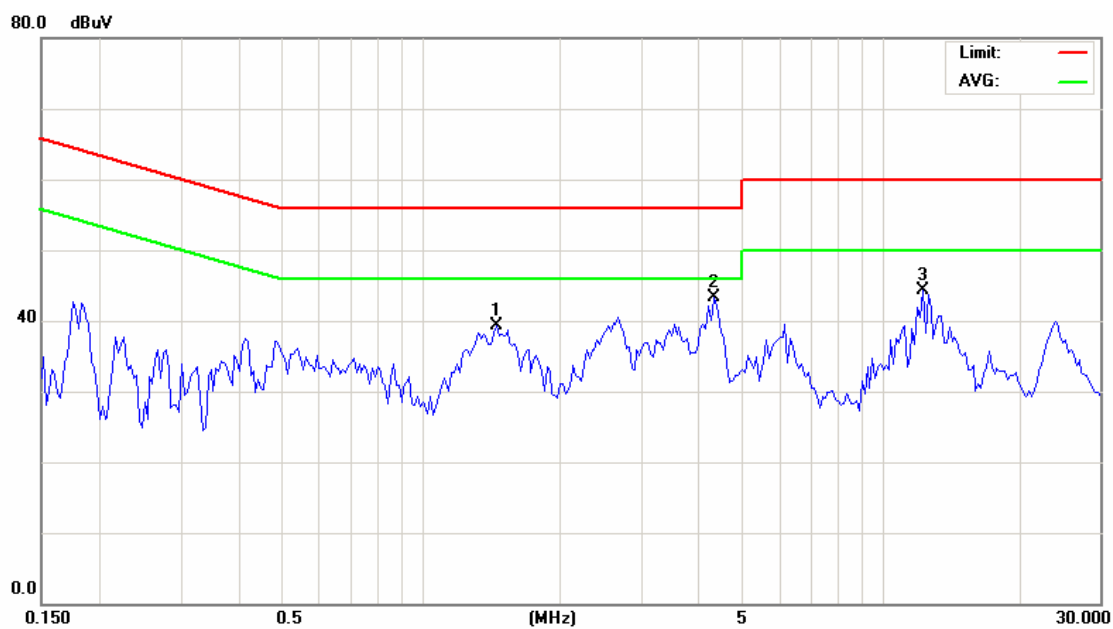
ATTACHMENT 1 – CONDUCTED EMISSION TEST RESULTS

CLIENT:	Belkin Electronics (Changzhou) Co., Ltd.	TEST REFERENCE:	FCC Part 15 subpart B Class B
MODEL NUMBER:	DX-B4PORT	PRODUCT:	USB HUB
SERIAL NO.:	Engineering Sample	EUT DESIGNATION:	ITE equipment
TEMPERATURE:	22°C	HUMIDITY:	54%
ATM PRESSURE:	102.1Pa	GROUNDING:	Grounding through USB
TESTED BY:	Cloud Feng	DATE OF TEST:	2009, June 27
SETUP METHOD:	ANSI C63.4-2003		
TEST PROCEDURE:	<p>a. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.</p> <p>b. Connect EUT to the power mains through a line impedance stabilization network(LISN)</p> <p>c. The LISN provides 50ohm coupling impedance for the measuring instrument</p> <p>d. Both sides of AC line were checked for maximum conducted interference.</p> <p>e. The frequency range from 150KHz to 30MHz was searched..</p> <p>f. Set the test-receiver system to Peak Detect Function and Specified bandwidth.</p> <p>g. If the emission level of the EUT in peak mode was 20 dB lower than the specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be tested using the quasi-peak method in about six maximal points and the results will be reported.</p>		
TESTED RANGE:	150kHz to 30MHz		
TEST VOLTAGE:	120VAC/60Hz		
RESULTS:	<p>For DX-B4PORT:</p> <p>The EUT meets the requirements of test reference for Conducted Emissions on line N by 12.67 dB of Quasi-Peak detector and by 15.62 dB of Average detector.</p> <p>The test results relate only to the equipment under test provided by client.</p>		
CHANGES OR MODIFICATIONS:	There were no modifications installed by ECMG Worldwide Certification Solution, Inc (China) test personnel.		
M. UNCERTAINTY:	Freq. $\pm 2 \times 10^{-7}$ x Center Freq., Amp ± 2.6 dB		

For DX-B4PORT:



Line L Conducted Emission Graph



Line N Conducted Emission Graph

Line L (Hot Lead)								
Signal	Frequency (MHz)	Corrected QP Level (dBuV)	Limits QP (dBuV)	Margin QP (dB)	Frequency (MHz)	Corrected AVE Level (dBuV)	Limits AVE (dBuV)	Margin AVE (dB)
1	2.657	40.65	56.00	-15.35	2.657	29.54	46.00	-16.46
2	4.280	42.26	56.00	-13.74	4.280	29.14	46.00	-16.86
3	12.516	45.50	60.00	-14.50	12.516	31.07	50.00	-18.93
Line N (Neutral Lead)								
Signal	Frequency (MHz)	Corrected QP Level (dBuV)	Limits QP (dBuV)	Margin QP (dB)	Frequency (MHz)	Corrected AVE Level (dBuV)	Limits AVE (dBuV)	Margin AVE (dB)
1	1.464	39.40	56.00	-16.60	1.464	29.62	46.00	-16.38
2	4.338	43.33	56.00	-12.67	4.338	30.38	46.00	-15.62
3	12.351	44.28	60.00	-15.72	12.351	31.29	50.00	-18.71
Note: All readings are using a bandwidth of 9 kHz, with a 30 ms sweep time. A video filter was not used.								

Test Equipment	Manufacturer	Model	Serial No.	Last Cal.	Cal. Due Date
EMI Receiver	HP	85462A	3650A00363	11/29/08	11/28/09
LISN 1	R&S	ESH3-Z5	844249/018	12/04/08	12/03/09
LISN 2	EMCO	3816/2	00084033	12/04/08	12/03/09
Note: All testing were performed using internationally recognized standards. All test instruments were calibrated.					

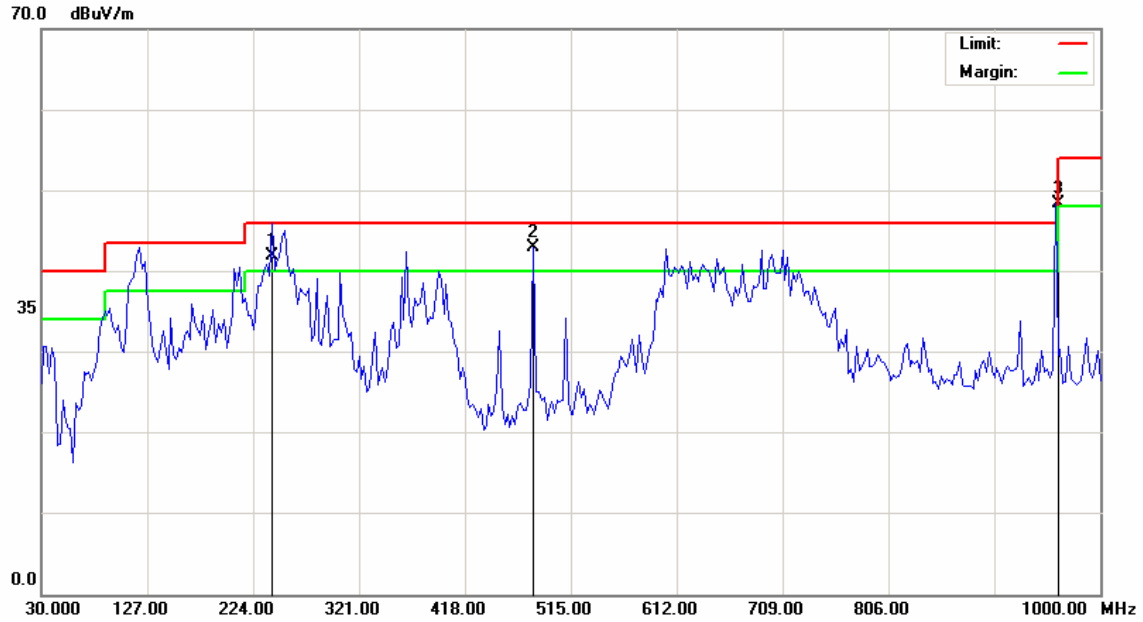
SIGNED BY: Cloud Feng
ENGINEER

REVIEWED BY: Hayzha
SENIOR ENGINEER

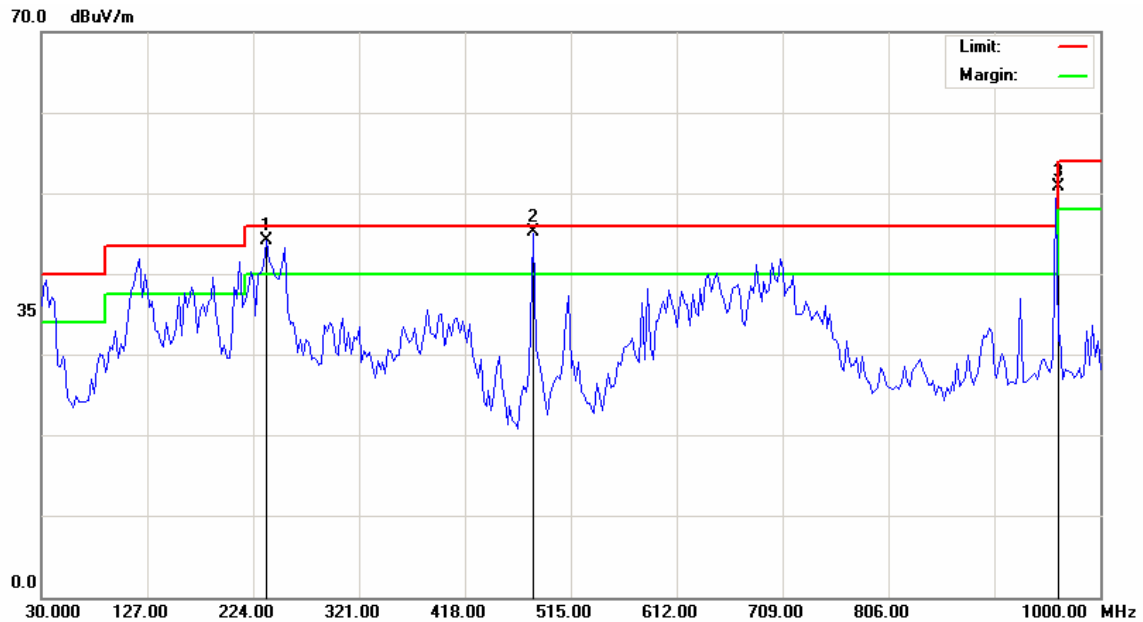
ATTACHMENT 2 – RADIATED EMISSION TEST RESULTS

CLIENT:	Belkin Electronics (Changzhou) Co., Ltd.	TEST REFERENCE:	FCC Part 15, Class B
MODEL TESTED:	DX-B4PORT	PRODUCT:	USB HUB
SERIAL NO.:	Engineering Sample	EUT DESIGNATION:	ITE equipment
TEMPERATURE:	22°C	HUMIDITY:	54%
ATM PRESSURE:	101.7Pa	GROUNDING:	Grounding through USB
TESTED BY:	Cloud Feng	DATE OF TEST:	2009, June 27
SETUP METHOD:	ANSI C63.4-2003		
TEST PROCEDURE:	<p>a. The EUT was placed on a rotatable table with 0.8 meters above ground.</p> <p>b. The EUT was set 3 meters from the interference-receiving antenna, which was mounted on the top of a variable height antenna tower.</p> <p>c. For each suspected emission the EUT was arranged to its worst case and turn table (from 0 degree to 360 degree) to find the maximum reading.</p> <p>d. If the emission level of the EUT in peak mode was 20 dB lower than the specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be tested using the quasi-peak method in about six maximal points and the results will be reported.</p> <p>Explanation of the Correction Factor are given as follows:</p> <p>$FS = RA + AF + CF - AG$</p> <p>Where: FS = Field Strength</p> <p>RA = Receiver Amplitude</p> <p>AF = Antenna Factor</p> <p>CF = Cable Attenuation Factor</p> <p>AG = Amplifier Gain</p>		
TESTED RANGE:	30MHz to 2000MHz		
TEST VOLTAGE:	120VAC / 60Hz		
RESULTS:	<p>For DX-B4PORT:</p> <p>The EUT meets the requirements of test reference for Radiated Emissions on vertical polarization by 1.80 dB at 480.000 MHz.</p> <p>The test results relate only to the equipment under test provided by client.</p>		
CHANGES OR MODIFICATIONS:	There were no modifications installed by ECMG Worldwide Certification Solution, Inc (China) test personnel.		
M. UNCERTAINTY:	Freq. $\pm 2 \times 10^{-7}$ x Center Freq., Amp ± 2.6 dB		

*For DX-B4PORT:
30MHz-1000MHz*



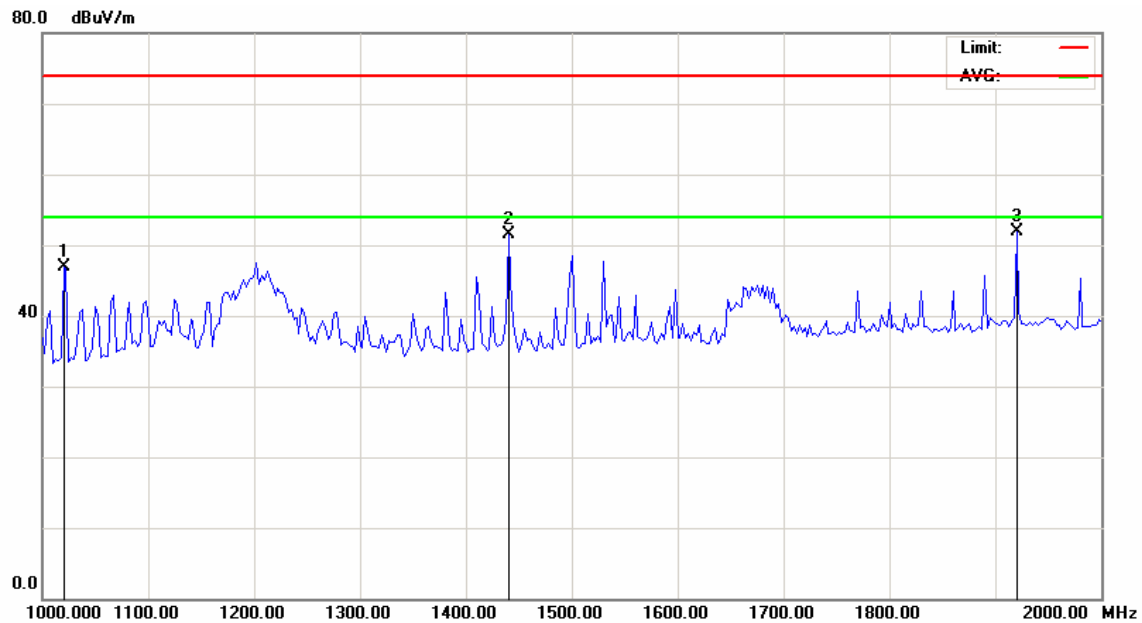
Field strength Emission Plot (Peak, Max Hold Mode Horizontal)



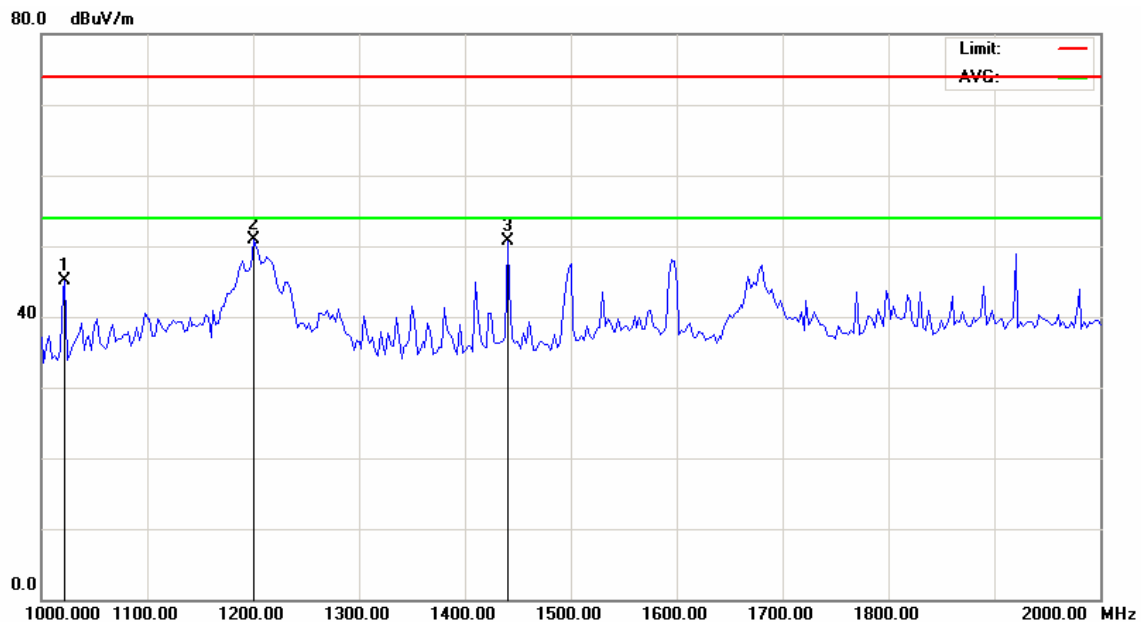
Field strength Emission Plot (Peak, Max Hold Mode Vertical)

<i>30MHz-1000MHz</i>							
Horizontal							
Signal	Frequency (MHz)	Factor (dB)	Corrected QP Level dB(uV/m)	3 Meter Limits dB(uV/m)	Margin (dB)	Angle of Turner (degree)	Height of Tower (cm)
1	240.975	14.42	41.94	46.00	-4.06	107	209
2	480.050	19.62	42.89	46.00	-3.11	310	170
3	960.100	25.88	48.35	54.00	-5.65	271	182
Vertical							
Signal	Frequency (MHz)	Factor (dB)	Corrected QP Level dB(uV/m)	3 Meter Limits dB(uV/m)	Margin (dB)	Angle of Turner (degree)	Height of Tower (cm)
1	236.125	14.32	44.17	46.00	-1.83	170	143
2	480.050	19.62	44.20	46.00	-1.80	121	109
3	960.100	25.88	50.92	54.00	-3.08	222	106
Set-up/Configuration: ANSI C63.4-2003							
Comments: None							
Note: All readings are quasi-peak unless stated otherwise, using a QPA bandwidth of 120kHz, with a 30 ms sweep time. A video filter was not used.							

1000MHz- 2000MHz



Horizontal Radiated Emission Plot (Peak, Max Hold Mode)



Vertical Radiated Emission Plot (Peak, Max Hold Mode)

1000MHz-2000MHz								
Horizontal								
Signal	Frequency (MHz)	Factor (dB)	Corrected PK Level (dBuV/m)	3 Meter PK Limits (dB uV/m)	Margin (dB)	Corrected AV Level (dBuV/m)	3 Meter AV Limits (dBuV/m)	Margin (dB)
1	1020.2	23.13	47.16	74.00	-27.00	26.81	54.00	-27.19
2	1440.3	25.77	51.63	74.00	-22.40	26.97	54.00	-27.03
3	1920.2	28.80	51.92	74.00	-22.10	26.92	54.00	-27.08
Vertical								
Signal	Frequency (MHz)	Factor (dB)	Corrected PK Level (dBuV/m)	3 Meter PK Limits (dB uV/m)	Margin (dB)	Corrected AV Level (dBuV/m)	3 Meter AV Limits (dBuV/m)	Margin (dB)
1	1022.5	23.14	45.19	74.00	-28.81	25.64	54.00	-28.36
2	1200.5	24.26	50.96	74.00	-23.04	26.93	54.00	-27.07
3	1440.3	25.77	50.77	74.00	-23.23	26.80	54.00	-27.20
Note: All readings are peak and average unless stated otherwise, using a bandwidth of 1000kHz, with a 30 ms sweep time. A video filter was not used.								

Test Equipment	Manufacturer	Model	Serial No.	Last Cal.	Cal. Due Date
EMI Receiver	HP	85462A	3650A00363	11/29/08	11/28/09
Broadband Antenna	Sunol	JB5	A110503	11/29/08	11/28/09
Broadband Horn Antenna	Schwarzbek	BBHA9120D	430	11/29/08	11/28/09
Note: All testing were performed using internationally recognized standards. All test instruments were calibrated.					

SIGNED BY: Cloud Feng
ENGINEER

REVIEWED BY: Hangzhou
SENIOR ENGINEER