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EMI Test Report

On Model Name: IP Camera

Model Number: GXV3615W

Prepared for Grandstream Networks,Inc

FCC ID Number: YZZGXV3615W

According to FCC Part 15 (2009), Subpart B

Test Report #:	SHE-1011-10539-FCC ID-15B
Prepared by:	May Wang
Reviewed by:	Jawen Yin
QC Manager:	Swall Zhang

Test Report Released by: Swall Zhang — December 18, 2010

Swall Zhang — Date

Test Location

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

Test Site Location : Galanz

25 South Ronggui Rd., Shunde, Foshan, Guangdong, China

Tel : 86-757-23612785

Fax : 86-757-23612537

Test Facility

The test facility was recognized, certified, or accredited by the following organizations:

- *CNAL – LAB Code: L2244*

Galanz EMC Laboratory has been assessed and in compliance with CNAL/AC01:2002 accreditation criteria for testing laboratories (identical to ISO/IEC 17025:2005 General Requirements)for the Competence of Testing Laboratories.

- *FCC – Registration No.: 580210*

Galanz EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC was maintained in our files.

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List Attached Files

Exhibit Type	File Description	File Name
Test Report	Test Report	YZZGXV3615W _Test report.pdf
Operation Description	Technical Description	YZZGXV3615W_operation description.pdf
External Photos	External Photos	YZZGXV3615W_External Photos
Internal Photos	Internal Photos	YZZGXV3615W_Internal Photos
Block Diagram	Block Diagram	YZZGXV3615W_Block Diagram.pdf
Schematics	Circuit Diagram	YZZGXV3615W _Schematics.pdf
ID Label/Location	Label and Location	YZZGXV3615W _Label & Location.pdf
User Manual	User Manual	YZZGXV3615W _User Manual.pdf
Test setup photos	Test setup photos	YZZGXV3615W _Test Setup Photos

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Opinions and Interpretations

This test report relates to the abovementioned equipment under test (EUT).Without the permission of EMC Compliance Management Group Test Lab this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any test mark on this or similar products.The manufacturer has sole responsibility of continued compliance of the device.

Statement of Measurement Uncertainty

The data and results referenced in the document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities that can account for a nominal measurement error. Furthermore, component and process variability of devices similar to that tested may result in additional deviation.

Administrative Data

Test Sample	*: IP Camera*
Model Numbers	*: GXV3615W*
Model Tested	*: GXV3615W*
Receipt Date of Test Item	*: December 3,2010*
Date Tested	*: December 6, 2010 to December 16,2010*
Applicant	*: Grandstream Networks,Inc*
	: 5F, Bldg #1, No.2 Kefa Rd., Science & Technology Park, Shenzhen, China
Telephone	*: +86-755-26014600*
Fax	*: +86-755-26014601*
Manufacturer	*: Grandstream Networks,Inc*
	: 5F, Bldg #1, No.2 Kefa Rd., Science & Technology Park, Shenzhen, China
Telephone	*: +86-755-26014600*
Fax	*: +86-755-26014601*

EUT Description

Grandstream Networks,Inc Model number GXV3615W (referred to as the EUT in this report) is a IP Camera.

The EUT is an IP Camera built-in IEEE 802.11b/g/n adapter which operates in 2.4GHz ISM band and technical specifications of EUT as below:

<table>
<tr><th colspan="2">Parameter</th><th>Range</th></tr>
<tr><td rowspan="2">Basic parameters</td><td>Rated voltage</td><td>DC12V</td></tr>
<tr><td>Rated Current</td><td>0.5A</td></tr>
<tr><td rowspan="6">802.11b/g/n Adapter Parameters</td><td>Operating band</td><td>2400-2483.5MHz</td></tr>
<tr><td>WIFI Module Voltage</td><td>+3V3 supply for WIFI module</td></tr>
<tr><td>Working Frequency of Each Channel</td><td>
<table>
<tr><th>Channel No.</th><th>Frequency (MHz)</th><th>Channel No.</th><th>Frequency (MHz)</th></tr>
<tr><td>001</td><td>2412</td><td>007</td><td>2442</td></tr>
<tr><td>002</td><td>2417</td><td>008</td><td>2447</td></tr>
<tr><td>003</td><td>2422</td><td>009</td><td>2452</td></tr>
<tr><td>004</td><td>2427</td><td>010</td><td>2457</td></tr>
<tr><td>005</td><td>2432</td><td>011</td><td>2462</td></tr>
<tr><td>006</td><td>2437</td><td>--</td><td>--</td></tr>
</table>
</td></tr>
<tr><td>Frequency of Number</td><td>IEEE 802.11b/g: 11 channels;
802.11n HT 20MHz: 11channels;
802.11n HT 40MHz: 7 channels.</td></tr>
<tr><td>Modulation Type</td><td>IEEE 802.11b: DSSS (CCK, DQPSK, DBPSK)
IEEE 802.11g: OFDM (64QAM, 16QAM, QPSK, BPSK)
IEEE 802.11n HT20: OFDM
IEEE 802.11n H420: OFDM</td></tr>
<tr><td>Data Rate</td><td>IEEE 802.11b: 1/2/5.5/11Mbps;
IEEE 802.11g: 6/9/12/18/24/36/48/54Mbps;
IEEE 802.11n HT20: 65/58.5/52/39/26/19.5/13/6.5Mbps;
IEEE 802.11n HT40: 135/121.5/108/81/54/40.5/21/13.5Mbps</td></tr>
</table>

<table>
<tr><td></td><td>Tranmit Power</td><td><table>
<tr><th>Operating mode</th><th>Frequency Range (MHz)</th><th>Output Power (dBm)</th><th>Output Power (mW)</th></tr>
<tr><td>IEEE 802.11b</td><td>2412-2462</td><td>16±15%</td><td>22.91-69.18</td></tr>
<tr><td>IEEE 802.11g</td><td>2412-2462</td><td>12±15%</td><td>10.47-23.99</td></tr>
<tr><td>802.11n HT 20MHz</td><td>2412-2462</td><td>12±15%</td><td>10.47-23.99</td></tr>
<tr><td>802.11n HT 40MHz</td><td>2422-2452</td><td>12±15%</td><td>10.47-23.99</td></tr>
</table></td></tr>
<tr><td></td><td>Antenna Spec.</td><td>1. Gain: 2dBi
2. Impedance: 50ohm</td></tr>
<tr><td rowspan="3">I/O Ports</td><td>Ethernet Port</td><td>1 RJ45 Port LAN 10M/100M b/s,Connected to PC or internet</td></tr>
<tr><td>Audio Input</td><td>1 built-in MIC input</td></tr>
<tr><td>Audio output</td><td>1 buit-in speaker output</td></tr>
<tr><td rowspan="3">AC/DC Adapter</td><td>Input</td><td>100-240VAC 50/60Hz max 0.3A</td></tr>
<tr><td>Output</td><td>12VDC,0.5A</td></tr>
<tr><td>Model</td><td>EGTSA-120050WUY</td></tr>
</table>

NOTE: For more detailed informations or features please refer to user's manual of EUT.

Test Summary

The Electromagnetic Compatibility requirements on model GXV3615W 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.

Emission Tests				
Specifications	***Description***	***Test Results***	***Test Point***	***Remark***
FCC Part 15.107 ANSI C63.4 2003	*Conducted Emission*	*Passed*	*AC Input Port*	*Attachment 1*
FCC Part 15.109 ANSI C63.4 2003	*Radiated Emission*	*Passed*	*Enclosure*	*Attachment 2*

Test Mode Justification

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available mode,and X.Y.Z. axis.

Following mode and X axis (IP Camera mode) was chosen for final test as described below.

IP Camera mode:
Closed WiFi function of EUT,connected EUT to notebook PC by RJ45 line and kept a video communication link with notebook PC.All EMI test shall be performed at this mode.

EUT exercise Software

No test sofware support this test.

Equipment Modification

Any modifications installed previous to testing by Grandstream Networks,Inc will be incorporated in each production model sold or leased in United States.

There were no modifications installed by EMC Compliance Management Group test personnel.

Test System Details

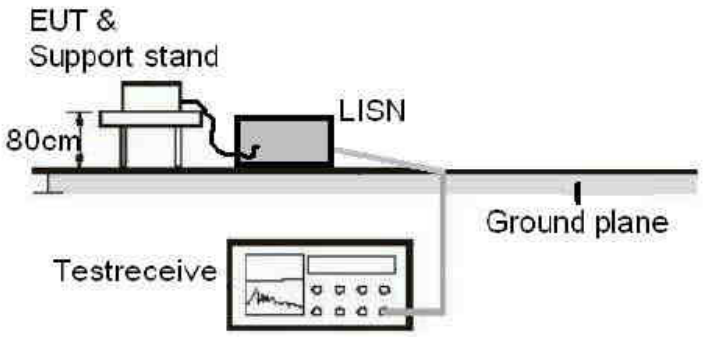
EUT			
Model Number:	GXV3615W		
Model Tested:	GXV3615W		
Description:	IP Camera		
Input:	AC 120V/60Hz		
Manufacturer:	Grandstream Networks,Inc		
Support Equipment			
Description	Model Number	**Serial Number**	**Manufacturer**
Notebook	NC4000	CNU4122BCL	HP
AC/DC Adapter Of Notebook	PPP009H	239427-003	HP
AC/DC Adapter of EUT	EGTSA-12005WUY	N/A	TPI

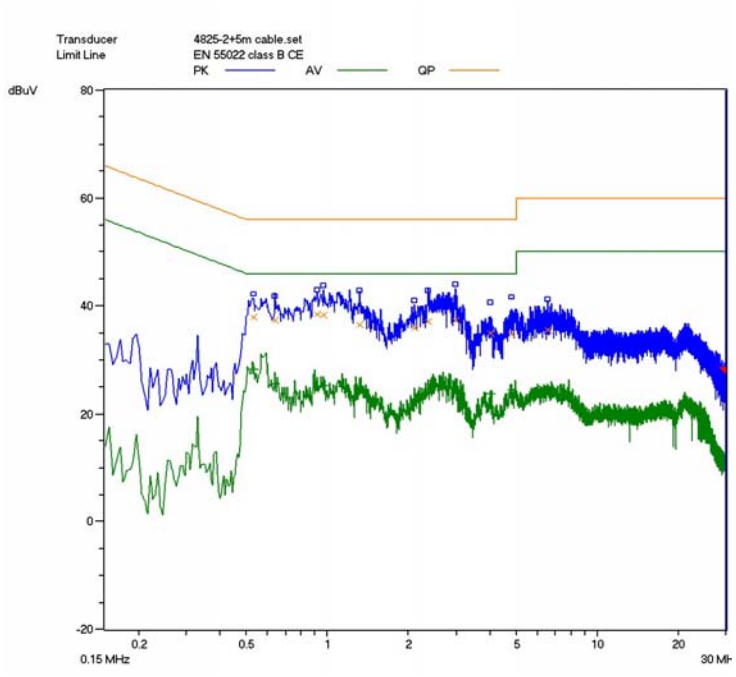
Cable Description					
Description	**From**	**to**	**Length (Meters)**	**Shielded (Y/N)**	**Ferrite (Y/N)**
AC/DC Adapter Cord Of Notebook	Adapter	Notebook	1.6	N	Y
	Notebook	AC Plug	1.2	N	N
AC/DC Adapter of EUT	EUT	Plug	1.8	N	N
Note:The "EUT" means "IP Camera".					

NOTE:

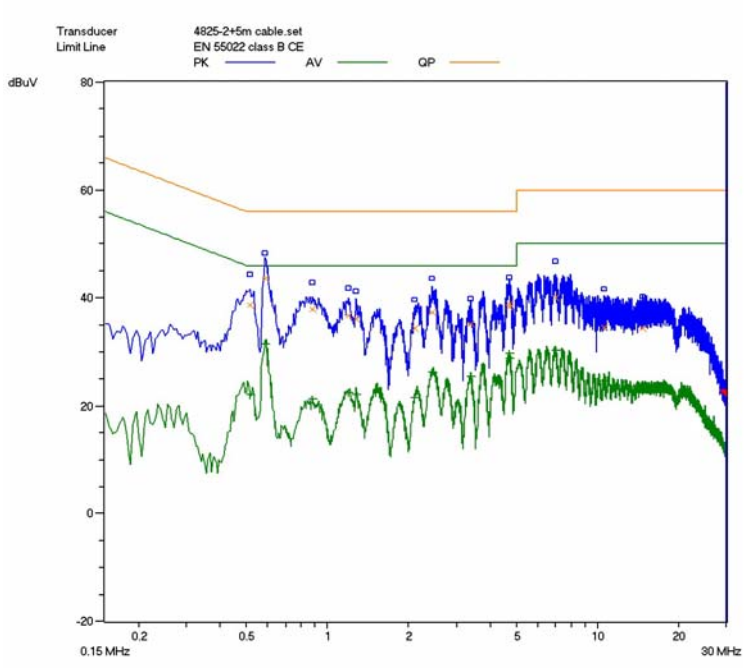
The EUT has been tested as an independent unit together with other necessary accessories or support units.the above support units or accessories were used to form a representative test configuration during the test tests.

ATTACHMENT 1 - CONDUCTED EMISSION TEST RESULTS

CLIENT:	Grandstream Networks,Inc	**TEST STANDERD:**	FCC Part 15, Subpart B, Section 15.207
MODEL NUMBERS:	GXV3615W	**PRODUCT:**	IP Camera
MODEL TESTED:	GXV3615W	**EUT DESIGNATION:**	Commercial and Residential use
TEMPERATURE:	21°C	**HUMIDITY:**	56%
ATM PRESSURE:	101kPa	**GROUNDING:**	None
TESTED BY:	May Wang	**DATE OF TEST:**	December 6, 2010
TEST REFERENCE:	Section 15.207,ANSI C63.4: 2003		
TEST PROCEDURE:	The EUT was set up according to the guidelines of ANSI C63.4: 2003 for conducted emissions. The measurement was using a AMN on each line and an EMI receiver peak scan was made at the frequency measurement range. The six highest significant peaks were then marked, and these signals were then quasi-peaked and averaged.The frequency range investigated was from 150KHz to 30MHz.		
DESCRIPTION OF TEST MODE	Refer to test mode justification.		
TEST SET UP			
TESTED RANGE:	150kHz to 30MHz		
TEST VOLTAGE:	AC 120V/60Hz		
RESULTS:	The EUT meets the requirements of test reference for Conducted Emissions. The test results relate only to the equipment under test provided by client.		
Changes or Modifications:	There were no modifications installed by EMC Compliance Management Group test personnel.		
M. UNCERTAINTY:	Freq. ± 2x10-7 x Center Freq., Amp ± 2.6 dB		



Line L Conducted Emission Graph



Line N Conducted Emission Graph

Conducted Emission Test Data:

Line	*Frequency (MHz)*	*Corrected QP Level (dBuV)*	*Limits QP (dBuV)*	*Margin QP (dB)*	*Frequenc y (MHz)*	*Corrected AV Level (dBuV)*	*Limits AV (dBuV)*	*Margin QP (dB)*
L	*0.530*	*38.0*	*56*	*-18.0*	*0.530*	*28.1*	*46*	*-17.9*
L	*0.920*	*38.5*	*56*	*-17.5*	*0.920*	*25.0*	*46*	*-21.0*
L	*0.9650*	*38.3*	*56*	*-17.7*	*0.9650*	*24.3*	*46*	*-21.7*
L	*1.3150*	*36.5*	*56*	*-19.5*	*1.3150*	*24.3*	*46*	*-21.7*
L	*2.3550*	*37.0*	*56*	*-19.0*	*2.3550*	*24.7*	*46*	*-21.3*
L	*2.9800*	*37.4*	*56*	*-18.6*	*2.9800*	*24.5*	*46*	*-21.5*
N	*0.5150*	*38.6*	*56*	*-17.4*	*0.5150*	*22.2*	*46*	*-23.8*
N	*0.5850*	*43.6*	*56*	*-12.4*	*0.5850*	*31.5*	*46*	*-14.5*
N	*0.8800*	*37.9*	*56*	*-18.1*	*0.8800*	*21.4*	*46*	*-24.6*
N	*4.6900*	*38.3*	*56*	*-17.7*	*4.6900*	*28.7*	*46*	*-17.3*
N	*6.9950*	*40.0*	*56*	*-16.0*	*6.9950*	*30.3*	*46*	*-15.7*
N	*10.5200*	*34.6*	*56*	*-21.4*	*10.5200*	*34.7*	*46*	*-11.3*

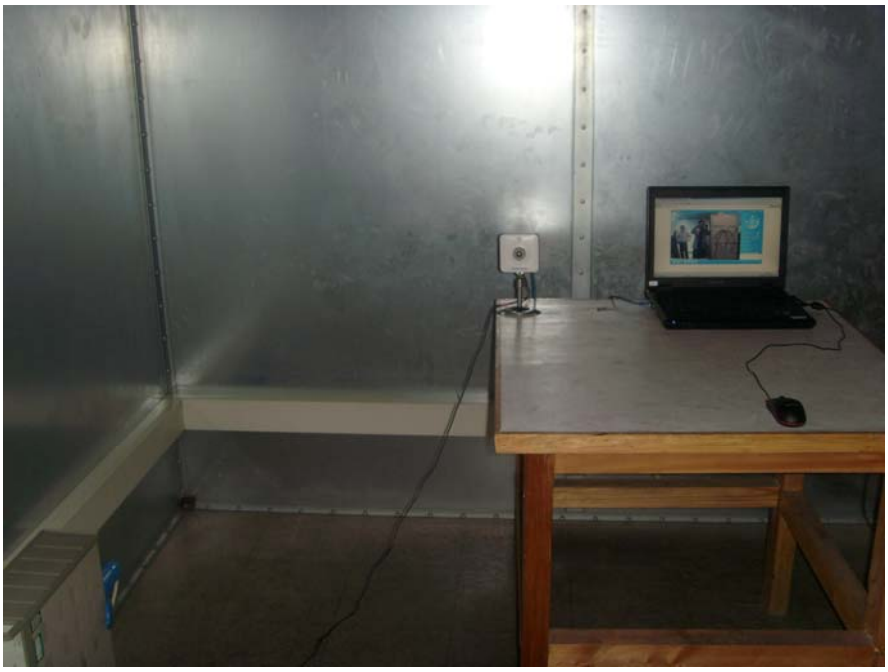
Note :
1) All readings are using a bandwidth of 9 kHz, with a 500 ms sweep time. A video filter was not use.
2) "QP" means "Quasi-Peak" values, "AV" means "Average" values.
3) The other reading are too low against official limits that are not be recorded.

Test Equipment List:

Test Equipment	*Model No.*	*Manufacturer*	*Serial No.*	*Last Cal.*	*Cal. Interval*
Receiver	*SMR4503*	*SCHAFFNER*	*11725*	*2010.07.08*	*2011.07.08*
Line impedance stabilization network	*4825/2*	*ETS*	*1161*	*2010.07.08*	*2011.07.08*
Note: All testing were performed using internationally recognized standards. All test instruments were calibrated.					

SIGNED BY: May wang _____ ***REVIEWED BY:*** _____

ENGINEER ***SENIOR ENGINEER***

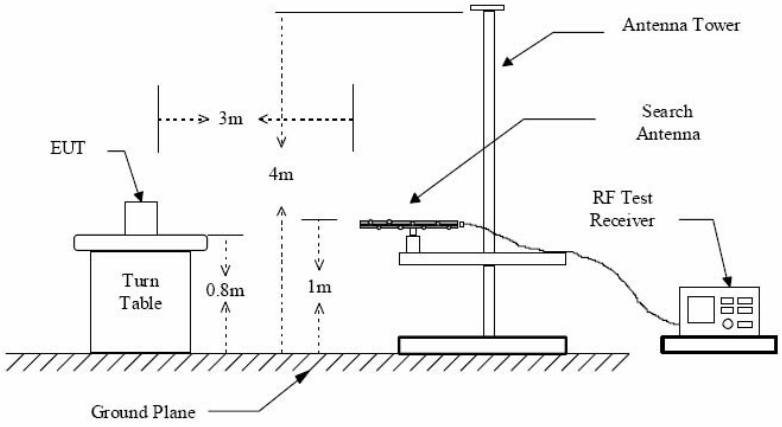
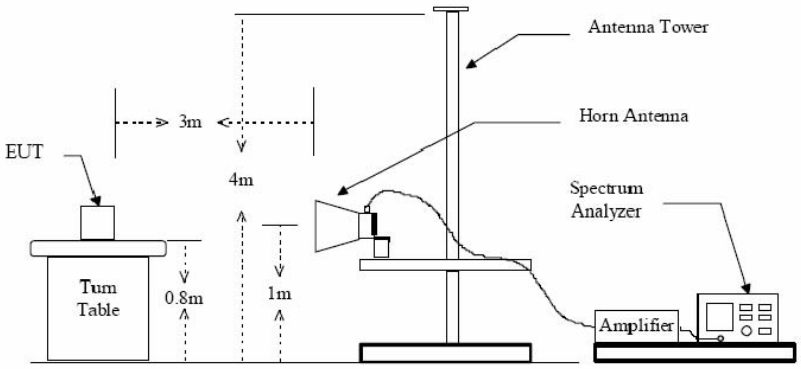


Conducted Emission Test Set-up

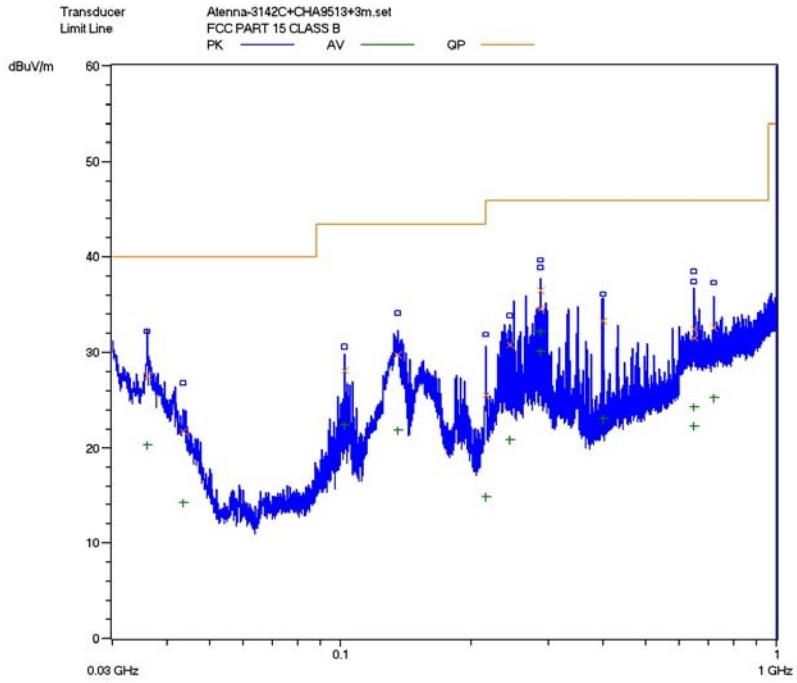
ATTACHMENT 2 – RADIATED EMISSION MEASUREMENT

CLIENT:	Grandstream Networks,Inc	**TEST STANDERD:**	FCC Part 15,Subpart B, Section 15.209
MODEL NUMBERS:	GXV3615W	**PRODUCT:**	IP Camera
EUT MODEL:	GXV3615W	**EUT DESIGNATION:**	Commercial and Residential use
TEMPERATURE:	23°C	**HUMIDITY:**	47%RH
ATM PRESSURE:	101.0kPa	**GROUNDING:**	None
TESTED BY:	May Wang	**DATE OF TEST:**	December 6, 2010
TEST REFERENCE:	ANSI C63.4: 2003		
TEST PROCEDURE:	The EUT was set up according to the guidelines of ANSI C63.4: 2003 for radiated emissions. An EMI receiver peak scan was made at the frequency measurement range (pre-scan) in an Anechoic chamber.signal discrimination was then performed and the significant peaks marked.these peaks were then quasi-peaked in the frequency range of 30 MHz to 1GHz and average and peak in the frequency range of 1GHz to 9GHz at an anechoic chamber. The following data lists the significant emission frequencies, measured levels, correction factors (including cable and antenna correction factors), and the corrected readings against the limits. Explanation of the Correction Factor are given as follows: FS= RA + AF + CF - AG Where: FS = Field Strength RA = Receiver Amplitude AF = Antenna Factor CF = Cable Attenuation Factor AG = Amplifier Gain		
TEST MODE	Refer to test mode justfication.		
TESTED RANGE:	The EUT highest operated frequency is 143MHz, so test frequency range is from 30MHz to 2GHz		
TEST VOLTAGE:	AC 120V/60Hz		
RESULTS:	The EUT meet the requirements of test reference for radiated emissions.The test results relate only to the equipment under test provided by client.		

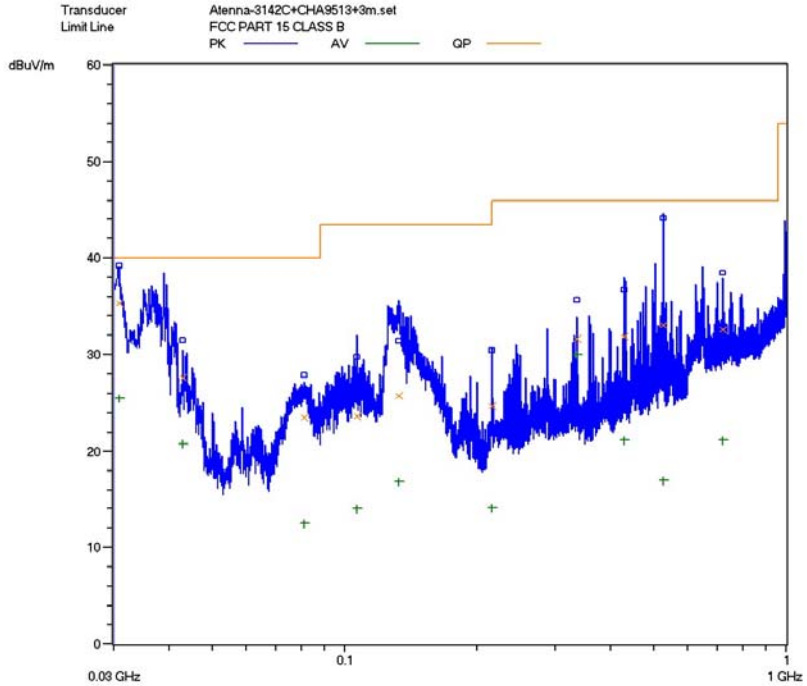
Continue on to next page...

TEST SET UP	Figure 1 : Frequencies measured below 1 GHz configuration  Figure 2 : Frequencies measured above 1 GHz configuration 
CHANGES OR MODIFICATIONS:	There were no modifications installed by EMC Compliance Management Group (China) test personnel.
M. UNCERTAINTY:	Freq. ± 2x10-7 x Center Freq., Amp ± 2.6 dB

Below 1GHz:

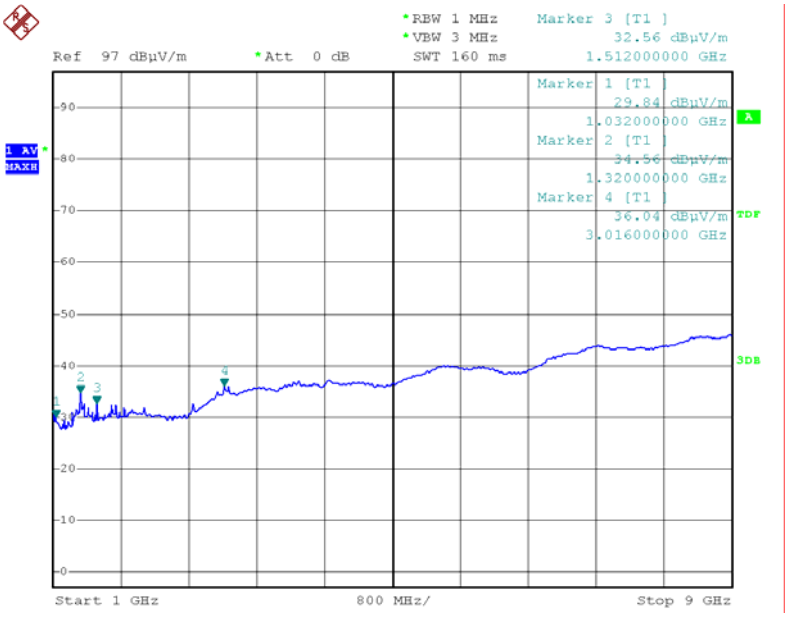


Horizontal -Radiated Emission Test Plot

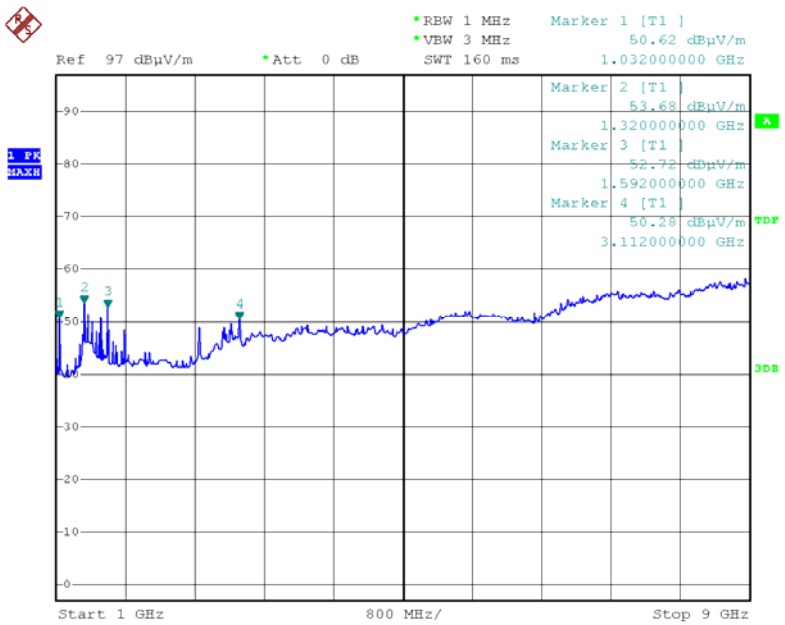


Vertical -Radiated Emission Test Plot

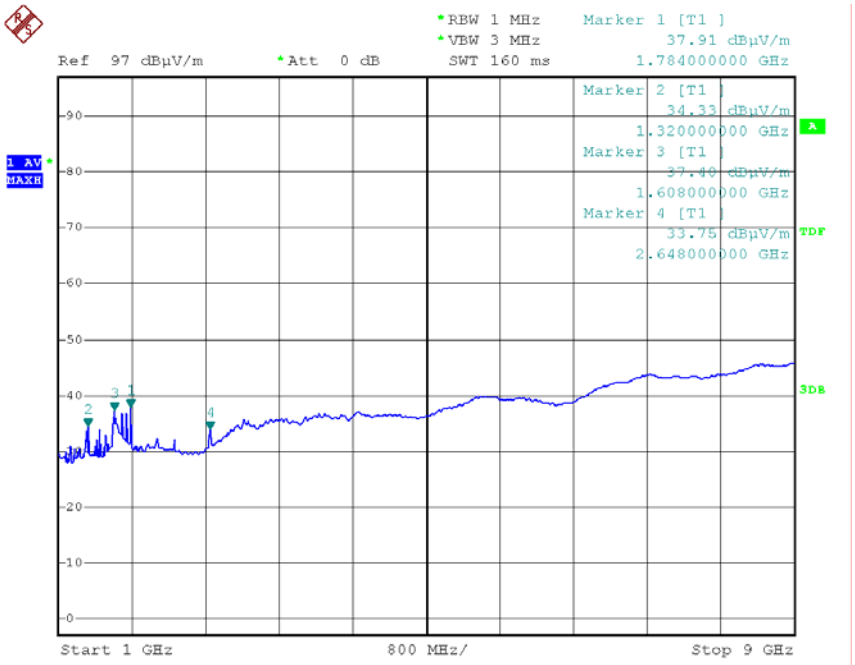
Above 1GHz:



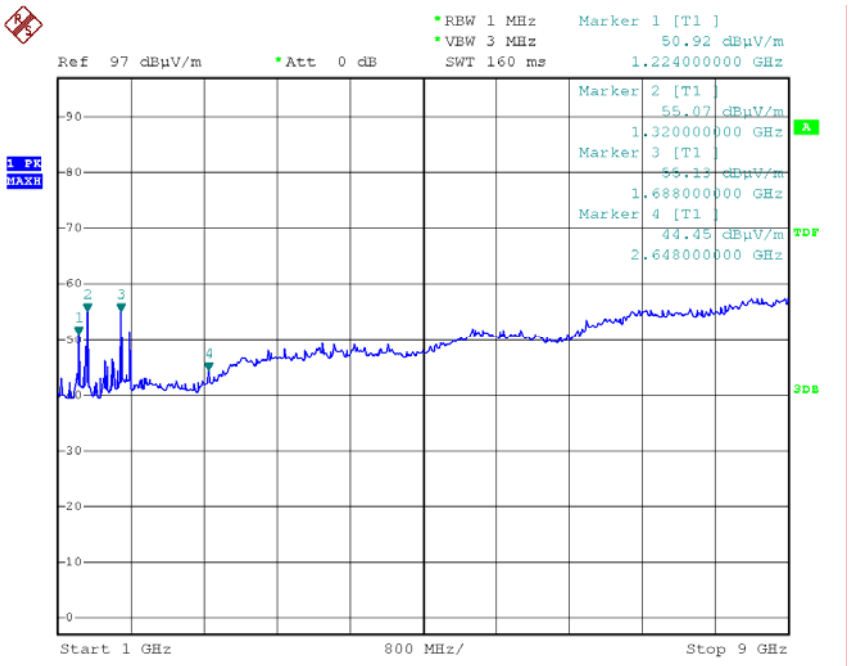
Horizontal -Radiated Emission Test Plot(AV Detector)



Horizontal -Radiated Emission Test Plot(Peak Detector)



Vertical -Radiated Emission(AV Detector)



Vertical -Radiated Emission Test Plot(Peak Detector)

Radiated Emission Test Data:

Below 1GHz:

Frequency (MHz)	*Cable Loss (dB)*	*Antenna Factor (dB)*	*Preamp Factor (dB)*	*Reading Level QP (dBuV/m)*	*Emission Level (dBuV/m)*	*Limit (dBuV/m)*	*Margin (dB)*
Horizontal							
36.150	*0.02*	*18.4*	*/*	*9.08*	*27.5*	*40.0*	*-12.5*
101.900	*0.02*	*7.8*	*/*	*20.28*	*28.1*	*43.5*	*-15.4*
135.000	*0.02*	*7.6*	*/*	*22.18*	*29.8*	*43.5*	*-13.7*
243.850	*0.12*	*11.4*	*/*	*19.28*	*30.8*	*46.0*	*-15.2*
287.950	*0.15*	*13.1*	*/*	*21.35*	*34.6*	*46.0*	*-11.4*
288.000	*0.16*	*13.1*	*/*	*23.24*	*36.5*	*46.0*	***-9.5***
Vertical							
30.850	*0.02*	*16.7*	*/*	*18.58*	*35.3*	*40.0*	***-4.7***
42.950	*0.02*	*15.4*	*/*	*12.18*	*27.6*	*40.0*	*-12.4*
132.800	*0.02*	*7.4*	*/*	*18.38*	*25.8*	*43.5*	*-17.7*
336.000	*0.16*	*13.8*	*/*	*17.74*	*31.7*	*46.0*	*-14.3*
527.850	*0.30*	*18.1*	*/*	*14.70*	*33.1*	*46.0*	*-12.9*
719.750	*0.39*	*20.7*	*/*	*18.91*	*32.0*	*46.0*	*-14.0*

Note:

a) All readings are quasi-peak unless stated otherwise, using a QPA bandwidth of 120kHz, with a 60 s sweep time. A video filter was not used.

b) The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows: Emission Level =Reading Level + Antenna Factor + Cable Loss –Preamplifier Factor.

c) The other emission levels are 20dB below the official limits that are not reported.

Above 1GHz:

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB)	Preamp Factor (dB)	Reading Level (dBuV/m)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Polarization (H/V)
Peak Measurement								
3112.00	2.57	31.5	32.1	52.25	50.28	74	-23.72	H
1592.00	1.71	26.1	33.6	46.93	52.72	74	-21.28	H
1320.00	1.39	23.9	33.6	45.37	53.68	74	-20.32	H
1032.00	1.39	23.9	33.6	42.31	50.62	74	-23.38	H
1200.50	1.39	23.9	33.6	40.19	48.50	74	-25.50	H
1600.00	1.71	26.1	33.6	47.21	53.00	74	-21.00	H
2648.00	2.3	29.3	33.0	43.05	44.45	74	-29.55	V
1688.00	1.71	26.1	33.6	49.34	55.13	74	-18.87	V
1320.00	1.39	23.9	33.6	46.76	55.07	74	-18.93	V
1224.00	1.39	23.9	33.6	42.61	50.92	74	-23.08	V
1500.50	1.71	26.1	33.6	45.71	51.50	74	-22.50	V
1300.50	1.39	23.9	33.6	41.69	50.00	74	-24.00	V

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB)	Preamp Factor (dB)	Reading Level (dBuV/m)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Polarization (H/V)
Average Measurement								
3016.00	2.57	31.5	32.1	38.01	36.04	54	-17.96	H
1320.00	1.39	23.9	33.6	26.25	34.56	54	-19.44	H
1032.00	1.39	23.9	33.6	21.53	29.84	54	-24.16	H
1512.00	1.71	26.1	33.6	26.77	32.56	54	-21.44	H
1600.00	1.71	26.1	33.6	29.21	35.00	54	-19.00	H
1200.00	1.39	23.9	33.6	24.19	32.50	54	-21.50	H
2648.00	2.3	29.3	33.0	32.35	33.75	54	-20.25	V
1608.00	1.71	26.1	33.6	31.61	37.40	54	-16.60	V
1320.00	1.39	23.9	33.6	26.02	34.33	54	-19.67	V
1784.00	1.71	26.1	33.6	32.12	37.91	54	-16.09	V
1550.00	1.71	26.1	33.6	29.71	35.50	54	-18.50	V
1300.00	1.39	23.9	33.6	24.19	32.50	54	-21.50	V

Note:

a) *The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows: Emission Level =Reading Level + Antenna Factor + Cable Loss –Preamplifier Factor.*

b) *The limits shown are based on Peak value and Average value detector above 1GHz,the bandwidth of Test Receiver was set at 1MHz above 1GHz.*

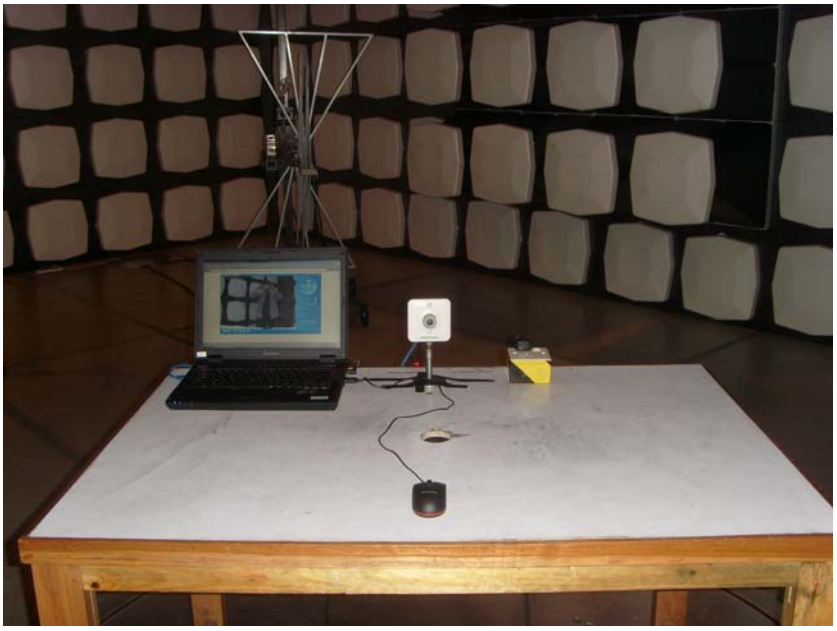
c) *The other emission levels are 20dB below the official limits that are not reported.*

Test Equipment List:

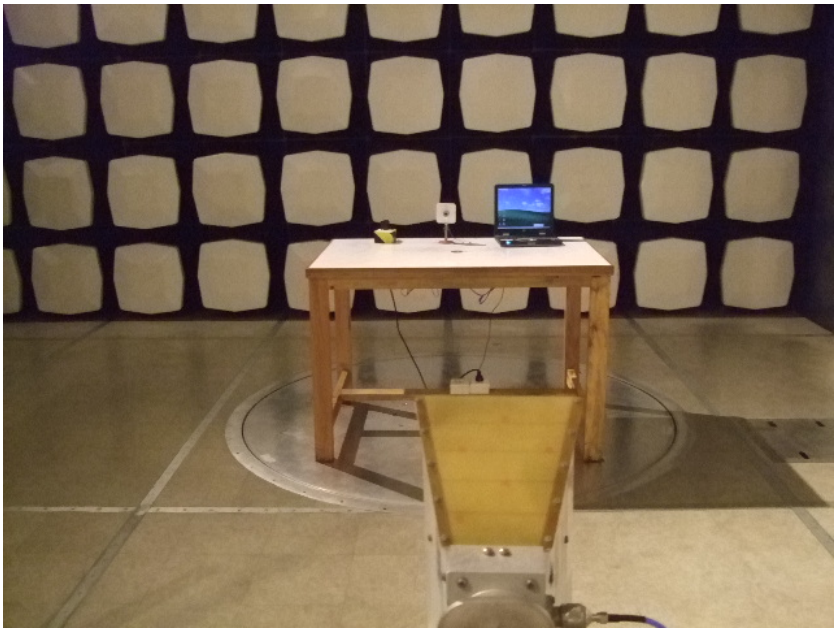
Test Equipment	*Model No.*	*Manufacturer*	*Serial No.*	*Last Cal.*	*Cal. Due*
Receiver	*SMR4503*	*SCHAFFNER*	*11725*	*2010.07.08*	*20110.07.07*
Double-ridged Wave guide horn	*3115*	*ETS*	*6587*	*2010.08.02*	*2011.08.01*
Microwave system amplifier	*83017A*	*Agilent*	*MY39500438*	*2010.07.11*	*2011.07.10*
Biconilog Antenna	*3142C*	*ETS*	*00042672*	*2010.09.28*	*2011.09.27*
Band-pass Filter	*BRM50702*	*Micro-Tronic*	*S/N-030*	*2010.11.30*	*2011.11.29*
Spectrum Analyzer	*FSP30*	*R&S*	*100755*	*2010.11.30*	*2011.11.29*
Note: All testing were performed using internationally recognized standards. All test instruments were calibrated.					

SIGNED BY: _____ ***REVIEWED BY:*** _____

ENGINEER ***SENIOR ENGINEER***



Radiated Emission Test Set-up(Below 1GHz)



Radiated Emission Test Set-up(Above 1GHz)