

## EMI TEST REPORT

On Model Name: VoIP Gateway

Model Number: GXW4104, GXW4108

Brand Name: Grandstream

Prepared for Grandstream Networks, INC

FCC ID Number: YZZGXW410X

According to FCC 47 CFR Part 15, Subpart B

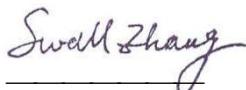
Test Report #: SHE-1110-10701-FCC

Prepared by: Sewen Guo

Reviewed by: Jawen Yin

QC Manager: Swall Zhang

Test Report Released by:

  
Swall Zhang

December 12, 2011

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

<b>Exhibit Type</b>	<b>File Description</b>	<b>File Name</b>
<i>Test Report</i>	<i>Test Report</i>	YZZGXW410X _Test report.pdf
<i>Operation Description</i>	<i>Technical Description</i>	YZZGXW410X _Operation description.pdf
<i>External Photos</i>	<i>External Photos</i>	YZZGXW410X _External Photos
<i>Internal Photos</i>	<i>Internal Photos</i>	YZZGXW410X _Internal Photos
<i>Block Diagram</i>	<i>Block Diagram</i>	YZZGXW410X _Block Diagram.pdf
<i>Schematics</i>	<i>Circuit Diagram</i>	YZZGXW410X _Schematics.pdf
<i>ID Label/Location</i>	<i>Label and Location</i>	YZZGXW410X _Label & Location.pdf
<i>User Manual</i>	<i>User Manual</i>	YZZGXW410X _User Manual.pdf
<i>Test setup photos</i>	<i>Test set-up photos</i>	YZZGXW410X _Test Set-up Photos

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*Any reproduction of this document must be done in full. No single part of this document may be reproduced without permission from ECMG Electronic Technical Testing Corp(Shenzhen).*

### ***Opinions and Interpretations***

*This test report relates to the abovementioned equipment under test (EUT).Without the permission of ECMG Electronic Technical Testing Corp(Shenzhen).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* : *VoIP Gateway*  
*Model Numbers* : *GXW4104, GXW4108*  
*Model Tested* : *GXW4108*  
*Receipt Date* : *October 11, 2011*  
*Date Tested* : *October 14, 2011 to October 26, 2011*  
*Applicant* : *Grandstream Networks, INC*  
*Address* : *5F, Bldg #1, No.2 Kefa Rd., Science & Technology Park, Shenzhen, China*  
*Telephone* : *(86)-755-26014600*  
*Fax* : *(86)-755-26014601*  
*Manufacturer* : *Grandstream Networks, INC*  
*Address* : *5F, Bldg #1, No.2 Kefa Rd., Science & Technology Park, Shenzhen, China*  
*Telephone* : *(86)-755-26014600*  
*Fax* : *(86)-755-26014601*  
*Factory* : *Grandstream Networks, INC*  
*Address* : *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 tested GXW4108 (referred to as the EUT in this report) is a VoIP Gateway. Technical specifications of the EUT are as below:*

Parameter		Range
Basic parameters	Rated voltage	12VDC
	Rated Current	1.0A
I/O Ports	LAN Port	Connect your PC to this port. It will then be assigned an IP address from your Router/DHCP Server.
	WAN Port	Connect to the internal LAN network or Public Internet.
	RESET	Factory Reset button. Press for 7 seconds to reset factory default settings
	DC 12V	Power adapter connection
	OFF/ON	Off/On switch
	FXO1 - FXO8	FXO ports to be connected to physical PSTN lines from a traditional PSTN PBX or PSTN Central Office.
Adapter #1	Input	100-240VAC 50/60Hz 0.3A
	Output	12VDC, 1.0A
	Model	SEF1200100A1BB
	Brand name	Mass
Adapter #2	Input	100-240VAC 50/60Hz 0.4A
	Output	12VDC, 1.0A,
	Model	CPS012A120100U
	Brand name	CLICK

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

## EUT Model Derived

Models of GXW4104 and GXW4108 are the same products, they have the same circuit function. The difference between them is only FXO port's number and anythings else are the same. The worst-case model of GXW4108 was chosen for the final testing.

### **GXW4104 I/O ports view:**



GXW4104  
has four FXO ports.

### **GXW4108 I/O ports view:**



GXW4108 has eight  
FXO ports.

## Test Summary

The Electromagnetic Compatibility requirements on model GXW4108 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.

<b>Emission Tests</b>				
<b>Specifications</b>	<b>Description</b>	<b>Test Results</b>	<b>Test Point</b>	<b>Remark</b>
<i>FCC Part 15.107 ANSI C63.4 -2003</i>	<i>Conducted Emission</i>	<i>Passed</i>	<i>AC Input Port</i>	<i>Attachment 1</i>
<i>FCC Part 15.109 ANSI C63.4 -2003</i>	<i>Radiated Emission</i>	<i>Passed</i>	<i>Enclosure</i>	<i>Attachment 2</i>

### ***Test Mode Justification***

*The EUT was tested in the representative operating mode as normal use. The following mode was chosen for final test as described below:*

*Connected a notebook PC to LAN port of EUT by an RJ-45 cable and ping “192.168.0.160 -t” to EUT. Then connected an IP phone to WAN port by another an RJ-45 cable and connected an analog phone to FXO port by an RJ-11 cable and established a call communication between them and measured it.*

### ***EUT Exercise Software***

*No test software 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 ECMG Electronic Technical Testing Corp(Shenzhen). test personnel.*

## **EUT Sample Photos**

### **EUT Model: GXW4108**



**EUT- Front View**



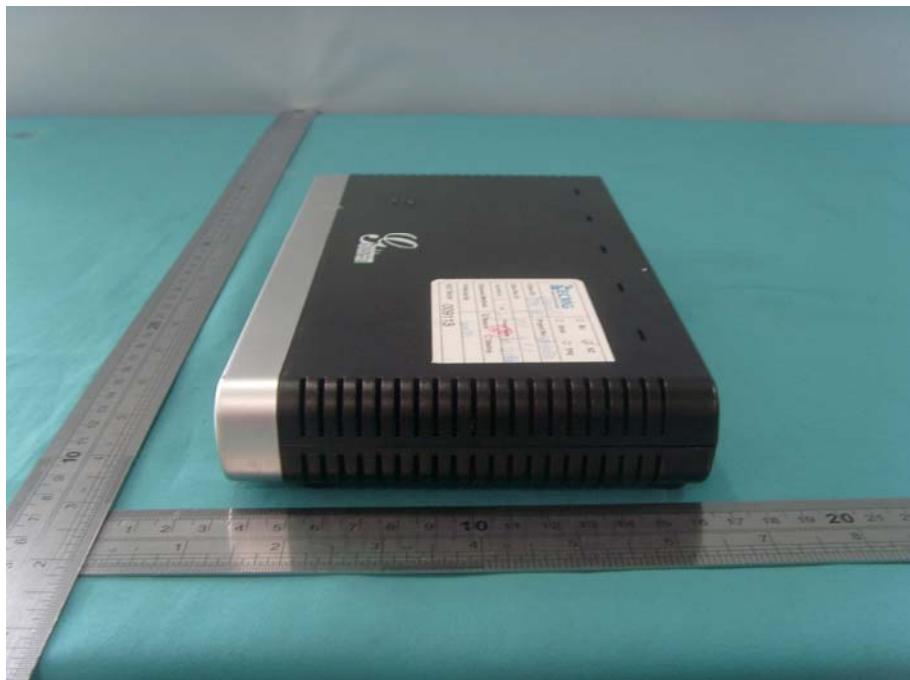
**EUT- Rear View**



**EUT- Top View**



**EUT- Bottom View**



**EUT- Side View**



**RJ-45 Cable View**



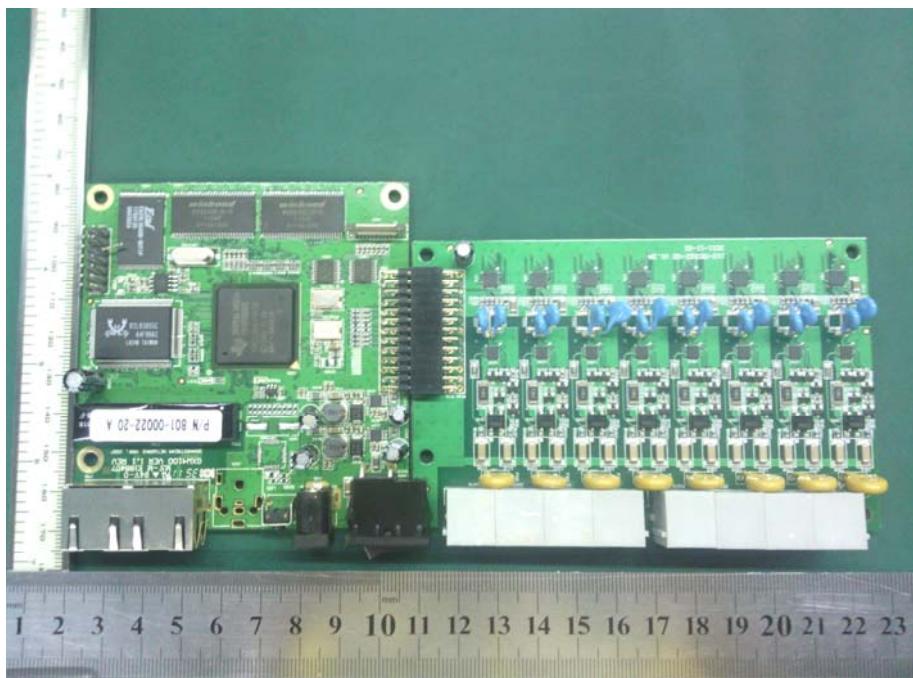
**Adaptor #1 View**(Manufacturer: Mass Power)



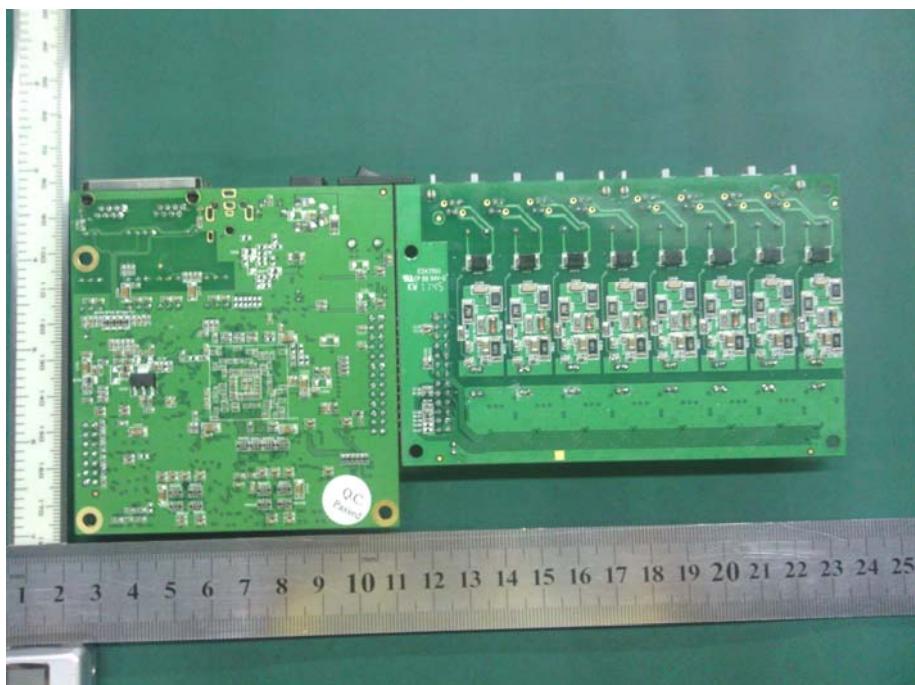
**Adaptor #2 View**(Manufacturer: CLICK)



**Uncovered View**



**Mainboard - Top View**



**Mainboard - Bottom View**

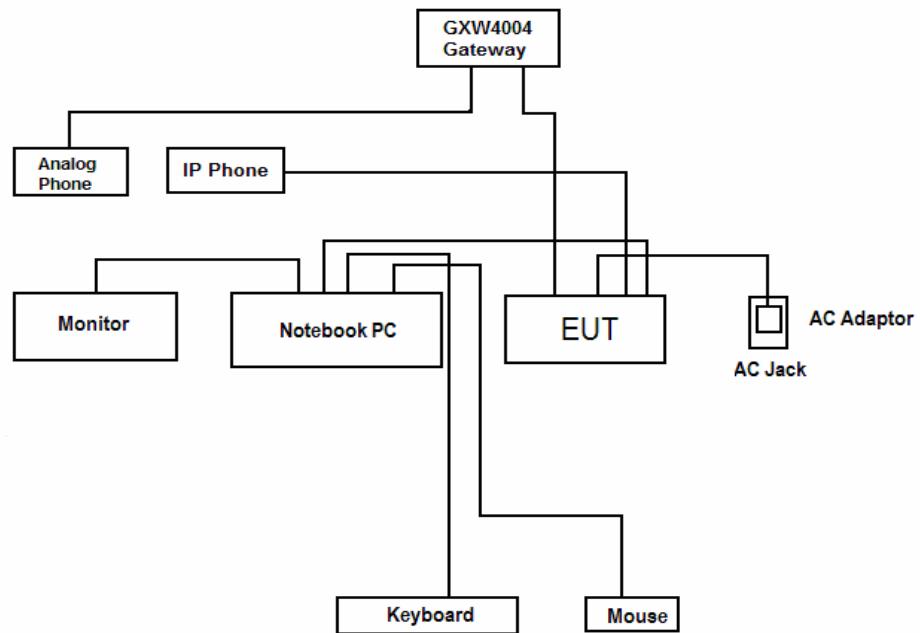
## Test System Details

<b>EUT</b>			
<b>Model Number:</b> <i>GXW4104, GXW4108</i>			
<b>Model Tested:</b> <i>GXW4108</i>			
<b>Description:</b> <i>VoIP Gateway</i>			
<b>Input:</b> <i>AC 120V/60Hz</i>			
<b>Manufacturer:</b> <i>Grandstream Networks, INC</i>			
<b>Support Equipment</b>			
<b>Description</b>	<b>Model Number</b>	<b>Serial Number</b>	<b>Manufacturer</b>
<i>Notebook PC</i>	<i>NC4000</i>	<i>CNU4122BCL</i>	<i>HP</i>
<i>Adapter Of Notebook PC</i>	<i>PPP009H</i>	<i>239427-003</i>	<i>HP</i>
<i>Keyboard</i>	<i>SK-1788</i>	<i>N/A</i>	<i>LENOVO</i>
<i>Mouse</i>	<i>MO32B0</i>	<i>23-033131</i>	<i>HP</i>
<i>Monitor</i>	<i>177V+</i>	<i>N/A</i>	<i>AOC</i>
<i>GATEWAY</i>	<i>GXW4004</i>	<i>N/A</i>	<i>Grandstream Networks, INC</i>
<i>IP Phone</i>	<i>GXP2100</i>	<i>N/A</i>	<i>Grandstream Networks, INC</i>
<i>Analog Phone</i>	<i>2957E</i>	<i>N/A</i>	<i>Shenzhen Daerxun Technology Co., Ltd</i>

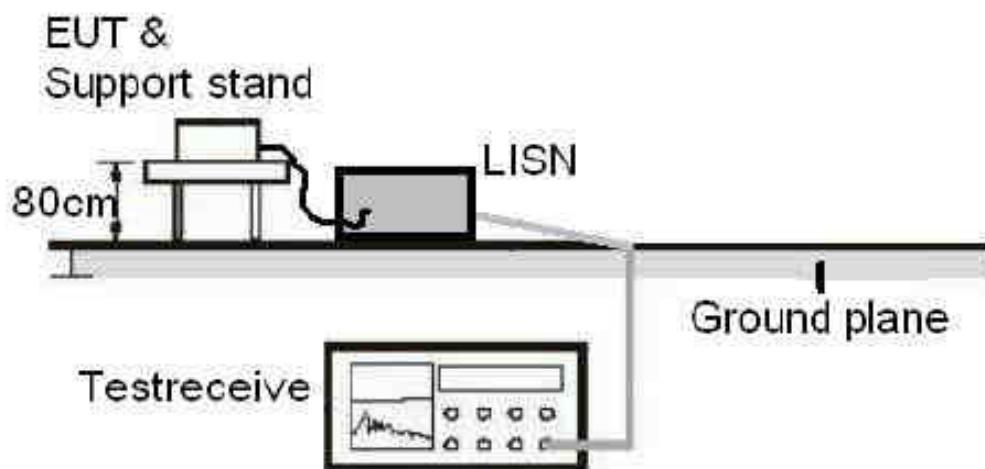
<b>Cable Description</b>					
<b>Description</b>	<b>From</b>	<b>to</b>	<b>Length (Meters)</b>	<b>Shielded (Y/N)</b>	<b>Ferrite (Y/N)</b>
<i>Adapter Cord Of Notebook</i>	<i>AC Adapter</i>	<i>Notebook PC</i>	<i>1.6</i>	<i>N</i>	<i>Y</i>
	<i>AC Adaptor</i>	<i>Plug</i>	<i>1.2</i>	<i>N</i>	<i>Y</i>
<i>Mouse Cord</i>	<i>Mouse</i>	<i>PC</i>	<i>1.2</i>	<i>N</i>	<i>Y</i>
<i>Keyboard Cord</i>	<i>Keyboard</i>	<i>PC</i>	<i>1.2</i>	<i>N</i>	<i>Y</i>
<i>VGA Cord</i>	<i>Monitor</i>	<i>PC</i>	<i>1.2</i>	<i>Y</i>	<i>Y</i>
<i>RJ-45 Cord #1</i>	<i>EUT</i>	<i>PC</i>	<i>1.5</i>	<i>N</i>	<i>N</i>
<i>RJ-45 Cord #2</i>	<i>EUT</i>	<i>GXP2100</i>	<i>&gt;3.0</i>	<i>N</i>	<i>Y</i>
<i>RJ-11 Cord</i>	<i>EUT</i>	<i>GXW4004</i>	<i>&gt;3.0</i>	<i>N</i>	<i>N</i>
<i>AC Adapter cable Of EUT</i>	<i>EUT</i>	<i>Plug</i>	<i>2.4</i>	<i>N</i>	<i>N</i>
<i>Note: The "EUT" means "VOIP Gateway".</i>					

*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.*

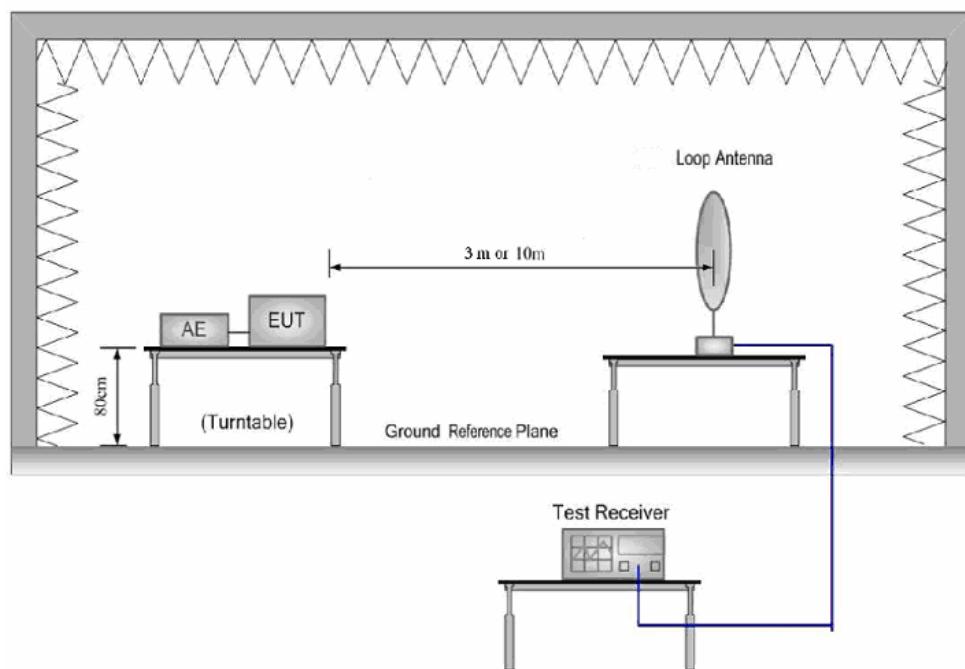
## *Configuration of Tested System*



*Block Diagram of EUT Configuration*



*Conducted Emission Test Set-up Photograph*



*Radiated Emission Test Set-up Photograph(9KHz to 30MHz)*

Figure 1 : Frequencies measured below 1 GHz configuration

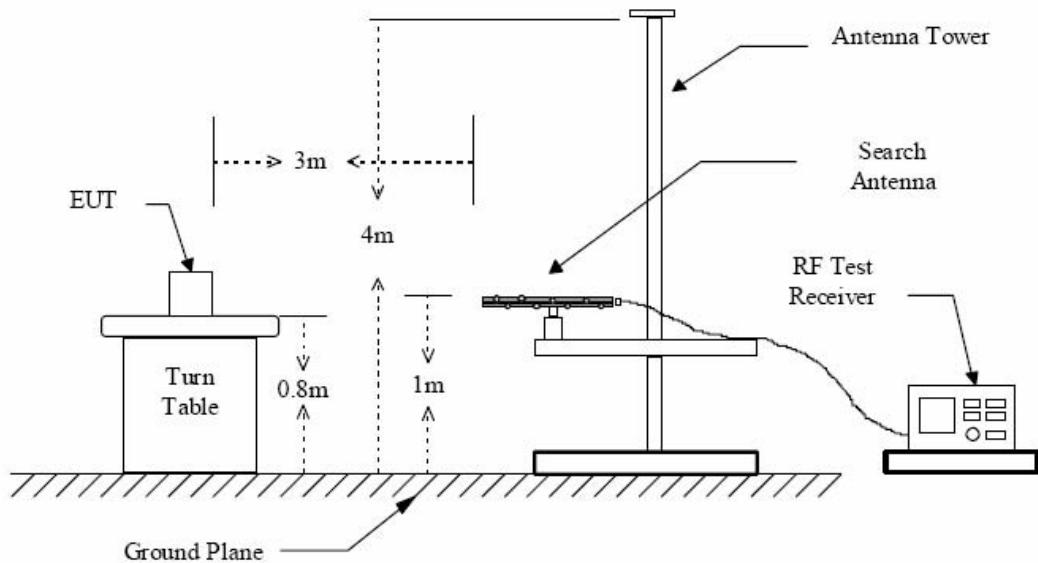
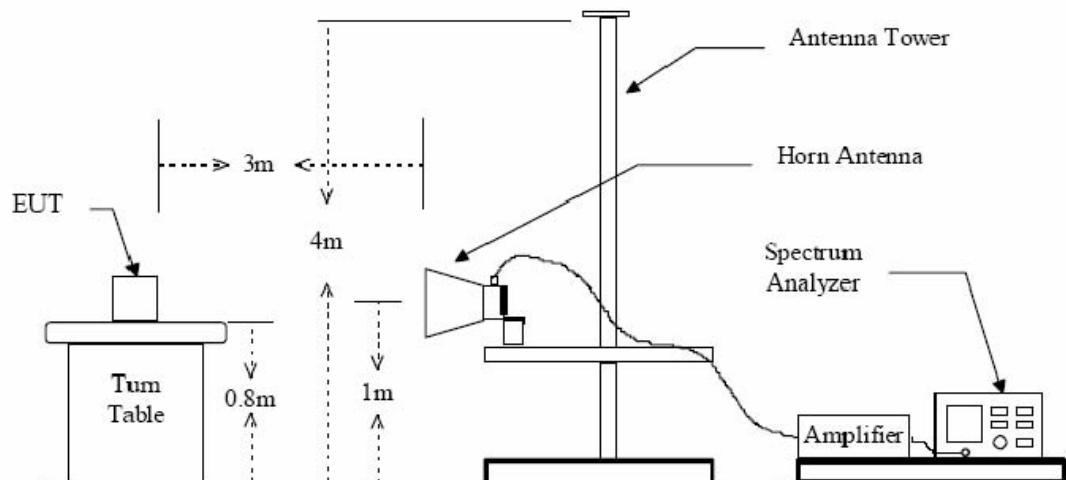


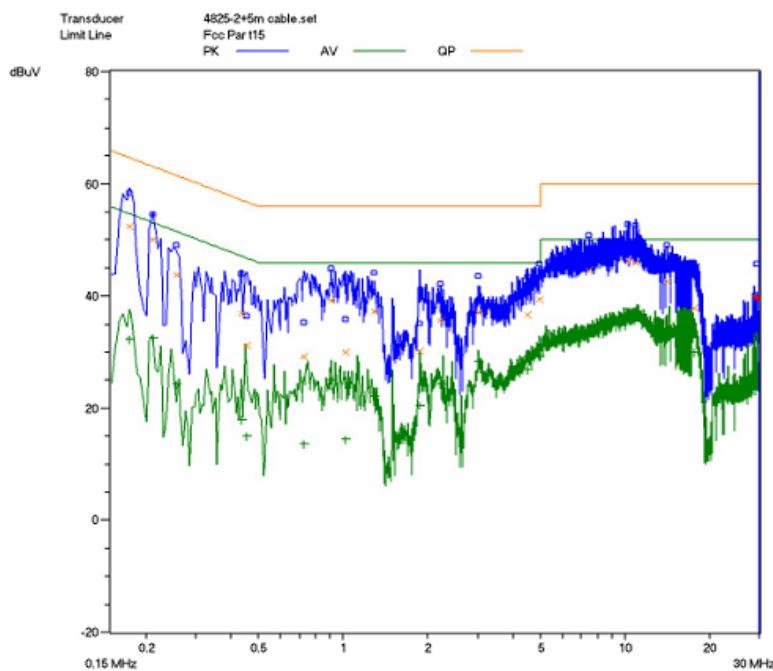
Figure 2 : Frequencies measured above 1 GHz configuration



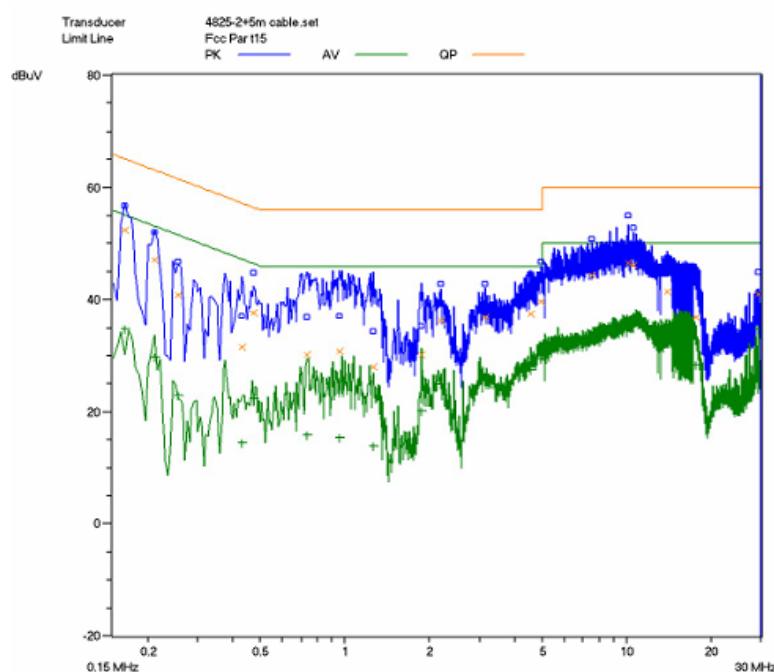
## ATTACHMENT 1 - CONDUCTED EMISSION TEST RESULTS

<b>CLIENT:</b>	Grandstream Networks, INC	<b>TEST STANDERD:</b>	FCC Part 15, Subpart B, Section 15.107
<b>MODEL NUMBERS:</b>	GXW4104,GXW4108	<b>PRODUCT:</b>	VoIP Gateway
<b>MODEL TESTED:</b>	GXW4108	<b>EUT DESIGNATION:</b>	Home or Office
<b>TEMPERATURE:</b>	21°C	<b>HUMIDITY:</b>	49%
<b>ATM PRESSURE:</b>	102kPa	<b>GROUNDING:</b>	None
<b>TESTED BY:</b>	Sewen Guo	<b>DATE OF TEST:</b>	October 24, 2011
<b>TEST REFERENCE:</b>	ANSI C63.4- 2003		
<b>TEST PROCEDURE:</b>	<p>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.</p> <p>The frequency range investigated was from 150KHz to 30MHz.</p>		
<b>DESCRIPTION OF TEST MODE</b>	As normal use mode		
<b>TESTED RANGE:</b>	150kHz to 30MHz		
<b>TEST VOLTAGE:</b>	AC 120V/60Hz		
<b>RESULTS:</b>	The EUT meets the requirements of test reference for Conducted Emissions. The test results relate only to the equipment under test provided by client.		
<b>Changes or Modifications:</b>	There were no modifications installed by ECMG Electronic Technical Testing Corp(Shenzhen). test personnel.		
<b>M. UNCERTAINTY:</b>	Freq. $\pm 2 \times 10^{-7} \times$ Center Freq., Amp $\pm 2.6$ dB		

### For Adaptor #1:(Mass)

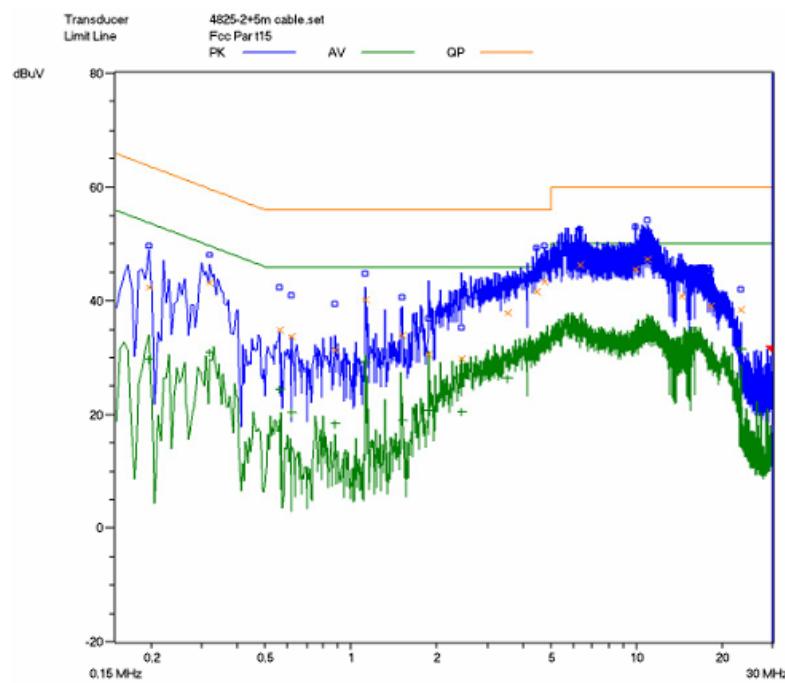


**Line L Conducted Emission Graph**

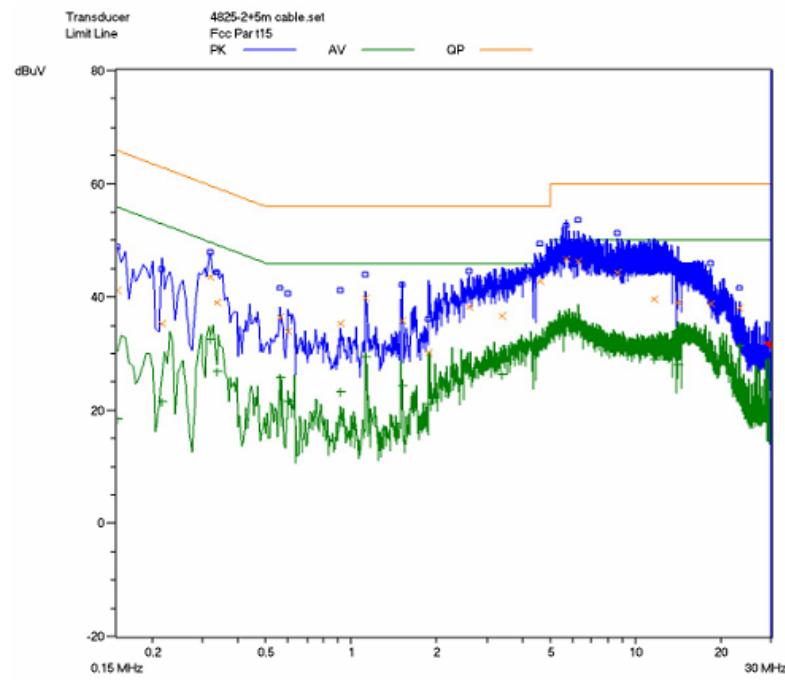


**Line N Conducted Emission Graph**

### For Adaptor #2: (CLICK)



**Line L Conducted Emission Graph**



**Line N Conducted Emission Graph**

**Test Data:****For Adaptor #1(Mass):**

Lines (L/N)	Frequency (MHz)	Corrected QP Level (dBuV)	Limits QP (dBuV)	Margin QP (dB)	Frequency (MHz)	Corrected AV Level (dBuV)	Limits AV (dBuV)	Margin QP (dB)
L	0.1750	52.5	64.6	-12.1	0.1750	32.4	54.6	-22.2
L	0.2100	50.0	63.1	-13.1	0.2100	32.5	53.1	-20.6
L	10.290	46.3	60.0	-14.0	10.290	36.3	50.0	-13.7
N	0.1750	52.2	64.6	-12.4	0.1750	32.3	54.6	-22.3
N	0.2100	50.0	63.0	-13.0	0.2100	32.7	53.1	-20.4
N	10.290	46.3	59.3	-13.0	10.290	36.8	50.0	-13.2

**Note :**

- 1) All readings are using a bandwidth of 9 kHz, with a 500 ms sweep time. A video filter was not used.
- 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.

**For Adaptor #2( CLICK):**

Lines (L/N)	Frequency (MHz)	Corrected QP Level (dBuV)	Limits QP (dBuV)	Margin QP (dB)	Frequency (MHz)	Corrected AV Level (dBuV)	Limits AV (dBuV)	Margin QP (dB)
L	0.3200	43.1	59.7	-16.6	0.3200	30.9	49.7	-18.8
L	6.3750	46.3	60.0	-13.7	6.3750	35.6	50.0	-14.4
L	9.9250	45.5	60.0	-14.5	9.9250	33.6	50.0	-16.4
N	0.3200	43.7	59.7	-16.0	0.3200	31.2	49.7	-18.5
N	6.3750	46.4	60.0	-13.6	6.3750	35.7	50.0	-14.3
N	9.9250	46.1	60.0	-13.9	9.9250	34.0	50.0	-16.0

**Note :**

- 1) All readings are using a bandwidth of 9 kHz, with a 500 ms sweep time. A video filter was not used.
- 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:

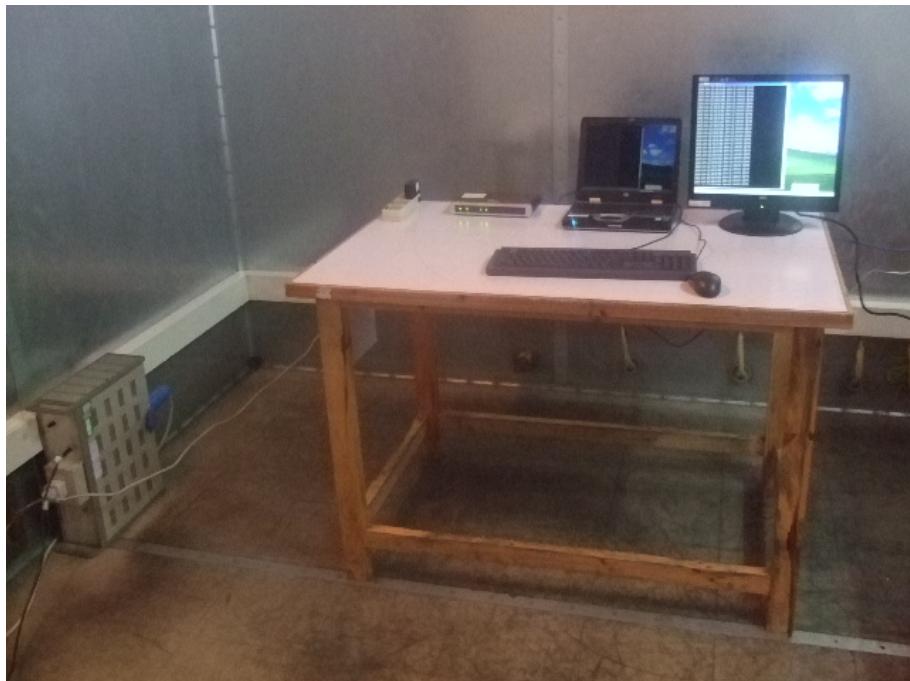
Test Equipment	Model No.	Manufacturer	Serial No.	Last Cal.	Cal. Interval
Receiver	SMR4503	SCHAFFNER	11725	2011.07.08	2012.07.08
Line impedance stabilization network	4825/2	ETS	1161	2011.07.08	2012.07.08
Note: All testing were performed using internationally recognized standards. All test instruments were calibrated.					

SIGNED BY: Seunghwan

ENGINEER

REVIEWED BY: Jamemy

SENIOR ENGINEER



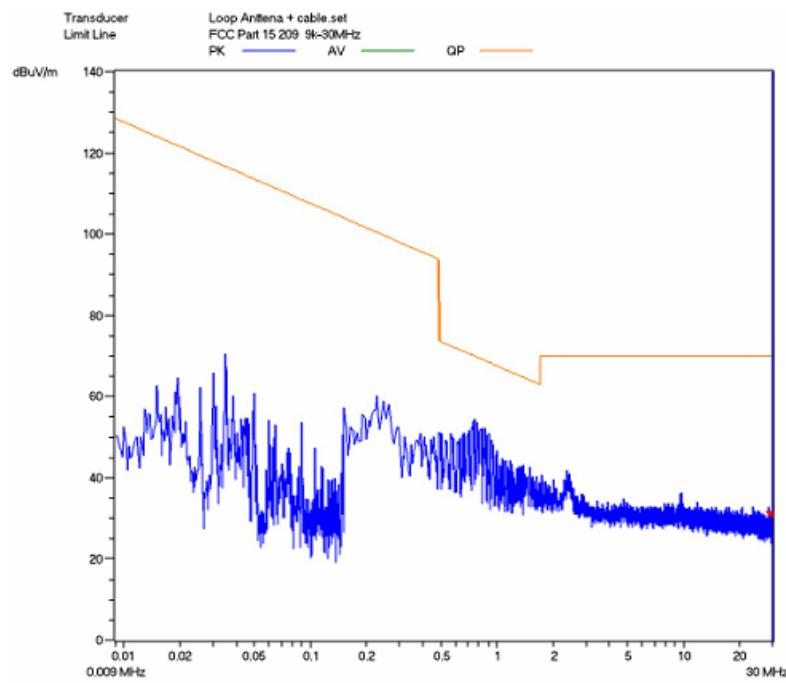
**Conducted Emission Test Set-up**

## **ATTACHMENT 2 – RADIATED EMISSION MEASUREMENT**

<b>CLIENT:</b>	Grandstream Networks, INC	<b>TEST STANDERD:</b>	FCC Part 15,Subpart B, Section 15.109
<b>MODEL NUMBERS:</b>	GXW4104,GXW4108	<b>PRODUCT:</b>	VoIP Gateway
<b>EUT MODEL:</b>	GXW4108	<b>EUT DESIGNATION:</b>	Home or Office
<b>TEMPERATURE:</b>	23°C	<b>HUMIDITY:</b>	49%RH
<b>ATM PRESSURE:</b>	103.0kPa	<b>GROUNDING:</b>	None
<b>TESTED BY:</b>	Sewen Guo	<b>DATE OF TEST:</b>	August 10, 2011
<b>TEST REFERENCE:</b>	ANSI C63.4- 2003		
<b>TEST PROCEDURE:</b>	<p>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 9KHz to 1GHz and average and peak in the frequency range of 1GHz to 2GHz at an anechoic chamber.</p> <p>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:</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>		
<b>TEST MODE</b>	As normal use mode		
<b>TESTED RANGE:</b>	<p><b>For 9KHz to 30MHz:</b>            Pre-scan has been conducted to determine the worst-case modes from all possible combinations between available adapter. Adapter #1(Mass) was chosen for final test.</p> <p><b>For 30MHz to 2,000MHz:</b>            Adater #1(Mass) and Adapter #2(CLICK) were selected for the final testing.</p>		
<b>TEST VOLTAGE:</b>	AC 120V/60Hz		
<b>RESULTS:</b>	The EUT meet the requirements of test reference for radiated emissions.The test results relate only to the equipment under test provided by client.		
<b>CHANGES OR MODIFICATIONS:</b>	There were no modifications installed by ECMG Electronic Technical Testing Corp(Shenzhen). Test personnel.		
<b>M. UNCERTAINTY:</b>	Freq. $\pm 2 \times 10^{-7} \times$ Center Freq., Amp $\pm 2.6$ dB		

**For Adaptor #1(Mass):**

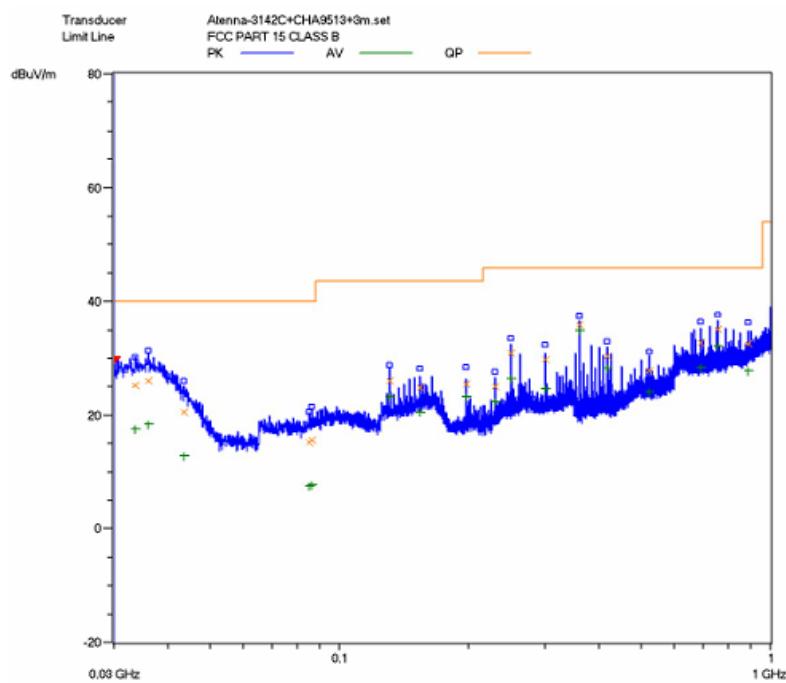
**9KHz-30MHz:**



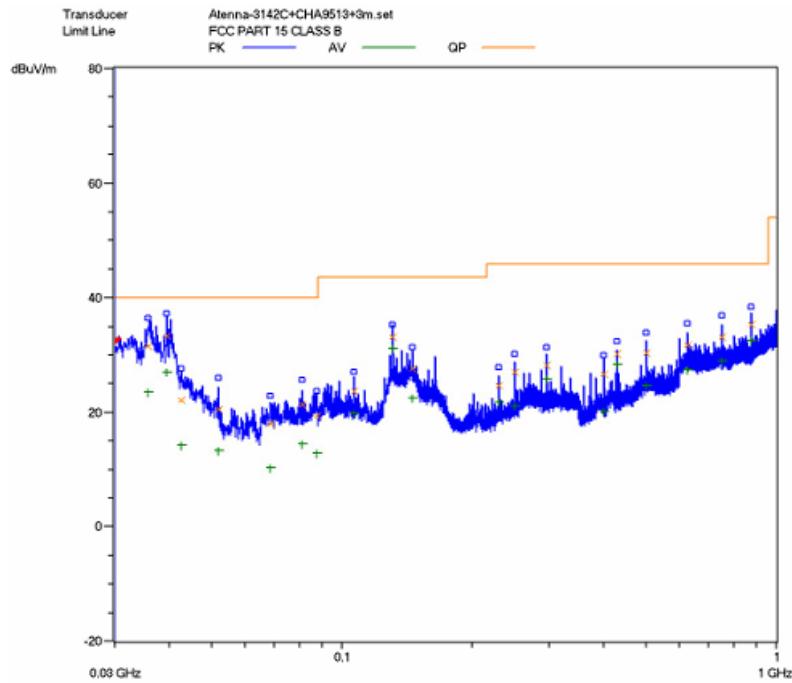
**Radiated Filed Strength Emission Test Plot**

**For Adaptor #1(Mass):**

**30MHz-1000MHz:**



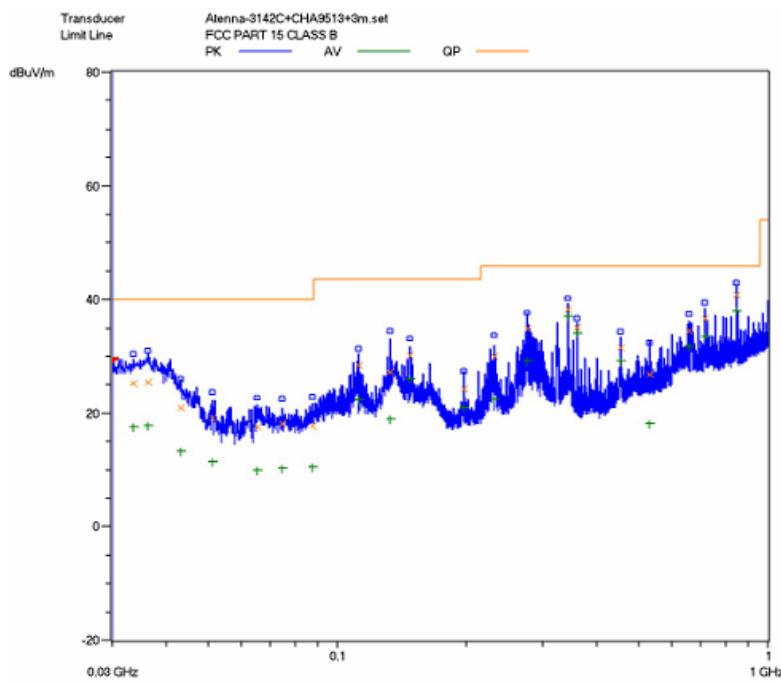
**Horizontal:Radiated Emission Test Plot**



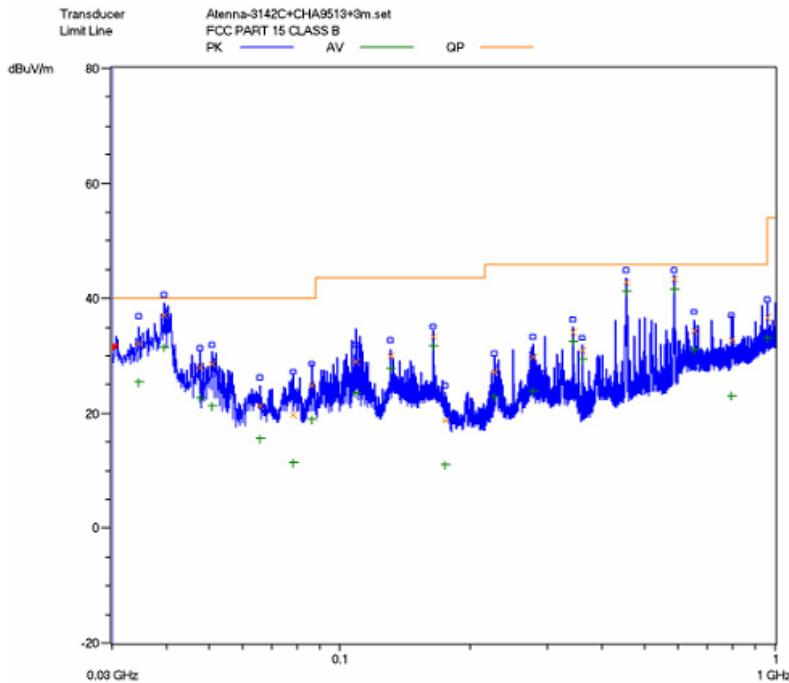
**Vertical:Radiated Emission Test Plot**

**For Adaptor #2:(CLICK)**

**30MHz-1000MHz:**



**Horizontal:Radiated Emission Test Plot**



**Vertical:Radiated Emission Test Plot**

**Test Data:  
9KHz to 30MHz:**

Test No. #:	Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB)	Reading Level QP (dBuV/m)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
1	/	/	/	/	/	/	/
2	/	/	/	/	/	/	/
3	/	/	/	/	/	/	/
4	/	/	/	/	/	/	/
5	/	/	/	/	/	/	/
6	/	/	/	/	/	/	/

**Note:**

- The field strength is calculated by adding the antenna factor, cable factor. The basic equation with a sample calculation is as follows: Emission Level =Reading Level + Antenna Factor + Cable Loss.
- The limits shown are based on quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz. the bandwidth of Test Receiver was set at 200Hz in frequency range of 9KHz to 150KHz, 9kHz in the frequency range of 150KHz to 30MHz.
- All emission levels in the frequency range of 9KHz to 30MHz are 20dB below the official limits that are not reported.

**Test Data:****Adaptor #1(Mass):****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)
<b>Horizontal</b>							
35.920	0.02	18.4	/	7.68	26.1	40.0	-13.9
131.040	0.02	7.4	/	18.58	26.0	43.5	-17.5
196.640	0.10	6.4	/	18.9	25.4	43.5	-18.1
360.480	0.16	13.3	/	22.44	35.9	46.0	-10.1
688.080	0.36	20.5	/	11.84	32.7	46.0	-13.3
753.680	0.39	21.1	/	13.51	35.0	46.0	-11.0
<b>Vertical</b>							
35.760	0.02	18.4	/	13.08	31.5	40.0	-8.5
39.520	0.02	16.8	/	16.48	33.3	40.0	-6.7
131.040	0.02	7.4	/	25.68	33.1	43.5	-10.4
624.960	0.36	20.2	/	11.24	31.8	46.0	-14.2
750.000	0.39	21.1	/	11.61	33.1	46.0	-12.9
874.960	0.42	22.4	/	12.58	35.4	46.0	-10.6

**Note:**

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

**Above 1GHz:**

<b>Frequenc y (MHz)</b>	<b>Cable Loss (dB)</b>	<b>Antenna Factor (dB)</b>	<b>Preamp Factor (dB)</b>	<b>Reading Level (dBuV/m)</b>	<b>Emission Level (dBuV/m)</b>	<b>Limit (dBuV/m)</b>	<b>Margin (dB)</b>	<b>Antenna Polarizati on (H/V)</b>
<b>Peak Measurement</b>								
1.056	1.40	23.9	-33.6	-8.8	50.10	74.0	-23.90	H
1.200	1.45	24.5	-33.6	-8.3	51.25	74.0	-22.75	H
1.328	1.57	25.1	-33.6	-7.57	52.70	74.0	-21.30	H
1.456	1.65	25.7	-33.6	-7.78	53.17	74.0	-20.83	V
1.592	1.76	26.7	-33	-11.25	50.21	74.0	-23.79	V
1.720	1.86	27.6	-33	-14.69	47.77	74.0	-26.23	V
<b>Average Measurement</b>								
1.056	1.40	23.9	-33.6	-10.91	47.99	54.0	-6.01	H
1.192	1.45	24.5	-33.6	-11.95	47.60	54.0	-6.40	H
1.200	1.45	24.5	-33.6	-12.67	46.88	54.0	-7.12	H
1.456	1.65	25.7	-33.6	-16.63	44.32	54.0	-9.68	V
1.592	1.76	26.7	-33	-18.25	43.21	54.0	-10.79	V
1.720	1.86	27.6	-33	-19.73	42.73	54.0	-11.27	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.

**Adaptor #2:(CLICK)****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)
<b>Horizontal</b>							
36.320	0.02	18.4	/	17.08	35.5	40.0	-4.5
111.600	0.02	7.4	/	21.08	28.5	43.5	-15.0
231.680	0.12	10.1	/	19.68	29.9	46.0	-16.1
344.080	0.16	13.8	/	24.44	38.4	46.0	-7.6
360.480	0.16	13.3	/	21.74	35.2	46.0	-10.8
844.560	0.42	22.6	/	17.78	40.8	46.0	-5.2
<b>Vertical</b>							
39.520	0.02	16.8	/	20.28	37.1	40.0	-2.9
163.840	0.02	10.2	/	23.08	33.3	43.5	-10.2
344.080	0.16	13.8	/	20.14	34.1	46.0	-11.9
454.800	0.20	16.8	/	25.80	42.8	46.0	-3.2
584.720	0.30	18.7	/	24.3	43.3	46.0	-2.7
959.280	0.44	23.9	/	12.46	36.8	46.0	-9.2

**Note:**

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

**Above 1GHz:**

<b>Frequenc y (MHz)</b>	<b>Cable Loss (dB)</b>	<b>Antenna Factor (dB)</b>	<b>Preamp Factor (dB)</b>	<b>Reading Level (dBuV/m)</b>	<b>Emission Level (dBuV/m)</b>	<b>Limit (dBuV/m)</b>	<b>Margin (dB)</b>	<b>Antenna Polarizati on (H/V)</b>
<b>Peak Measurement</b>								
1.056	1.40	23.9	-33.6	-7.54	51.36	74.0	-22.64	H
1.200	1.45	24.5	-33.6	-6.31	53.24	74.0	-20.76	H
1.328	1.57	25.1	-33.6	-7.67	52.60	74.0	-21.40	H
1.456	1.65	25.7	-33.6	-11.09	49.86	74.0	-24.14	V
1.592	1.76	26.7	-33	-6.29	55.17	74.0	-18.83	V
1.720	1.86	27.6	-33	-12.2	50.26	74.0	-23.74	V
<b>Average Measurement</b>								
1.056	1.40	23.9	-33.6	-12.78	46.12	54.0	-7.88	H
1.192	1.45	24.5	-33.6	-15.62	43.93	54.0	-10.07	H
1.200	1.45	24.5	-33.6	-14.18	45.37	54.0	-8.63	H
1.456	1.65	25.7	-33.6	-19.33	41.62	54.0	-12.38	V
1.592	1.76	26.7	-33	-19.36	42.10	54.0	-11.90	V
1.720	1.86	27.6	-33	-22.1	40.36	54.0	-13.64	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:**

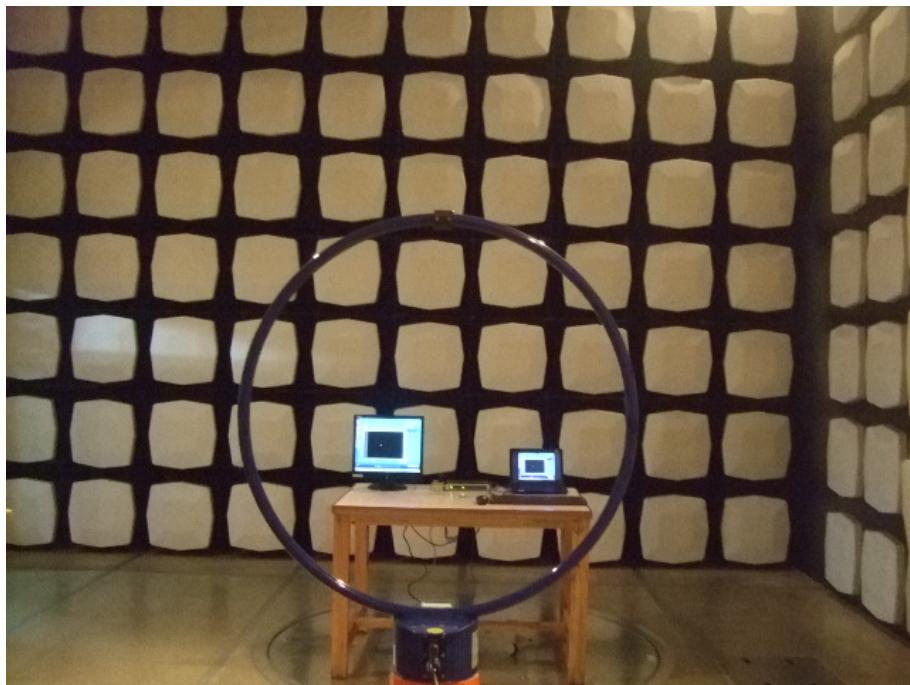
<b>Test Equipment</b>	<b>Model No.</b>	<b>Manufacturer</b>	<b>Serial No.</b>	<b>Last Cal.</b>	<b>Cal. Due</b>
Receiver	SMR4503	SCHAFFNER	11725	2011.07.08	2012.07.07
HF Loop Antenna	HLA6120	TESEQ	26348	2011.09.27	2012.09.26
Double-ridged Wave guide horn	3115	ETS	6587	2011.08.02	2012.08.01
Microwave system amplifier	83017A	Agilent	MY39500438	2011.07.11	2012.07.10
Biconilog Antenna	3142C	ETS	00042672	2011.09.28	2012.09.27
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
<i>Note: All testing were performed using internationally recognized standards. All test instruments were calibrated.</i>					

**SIGNED BY:**

  
\_\_\_\_\_  
**ENGINEER**

**REVIEWED BY:**

  
\_\_\_\_\_  
**SENIOR ENGINEER**



***Radiated Emission Test Set-up(9KHz-30MHz)***



***Radiated Emission Test Set-up(30MHz- 1000MHz)***



***Radiated Emission Test Set-up(Above 1GHz)***