

EMI TEST REPORT

On Model Name: VoIP Gateway

Model Number: GXW4248


Brand Name: Grandstream


Prepared for Grandstream Networks, INC

FCC ID Number: YZZGXW4248

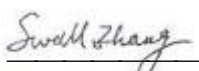
According to FCC 47 CFR Part 15, Subpart B

Test Report #: SHE-1302-10951-FCC

Tested by:  ECMG
Sewen Guo /Engineer Company Name

Reviewed by:  ECMG
Jawen Yin/ Senior Engineer Company Name

QC Manager:  ECMG
Swall Zhang/QC Manager Company Name

Test Report Released by:  March 26th, 2013
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.

Table of Contents

<i>GOVERNMENT DISCLAIMER NOTICE</i>	<i>2</i>
<i>REPRODUCTION CLAUSE</i>	<i>2</i>
<i>OPINIONS AND INTERPRETATIONS</i>	<i>2</i>
<i>STATEMENT OF MEASUREMENT UNCERTAINTY</i>	<i>2</i>
<i>ADMINISTRATIVE VOIP GATEWAY</i>	<i>3</i>
<i>EUT DESCRIPTION</i>	<i>4</i>
<i>TEST SUMMARY</i>	<i>5</i>
<i>TEST MODE JUSTIFICATION</i>	<i>6</i>
<i>EUT EXERCISE SOFTWARE</i>	<i>6</i>
<i>EQUIPMENT MODIFICATION</i>	<i>6</i>
<i>EUT SAMPLE PHOTOS FOR MODEL GXW4248</i>	<i>7</i>
<i>TEST SYSTEM DETAILS</i>	<i>12</i>
<i>ATTACHMENT 1 - CONDUCTED EMISSION TEST RESULTS</i>	<i>15</i>
<i>ATTACHMENT 2 - RADIATED EMISSION MEASUREMENT</i>	<i>20</i>

List Attached Files

<i>Exhibit Type</i>	<i>File Description</i>	<i>File Name</i>
<i>Test Report</i>	<i>Test Report</i>	<i>YZZGXW4248 _Test report.pdf</i>
<i>Operation Description</i>	<i>Technical Description</i>	<i>YZZGXW4248 _operation description.pdf</i>
<i>External Photos</i>	<i>External Photos</i>	<i>YZZGXW4248 _External Photos</i>
<i>Internal Photos</i>	<i>Internal Photos</i>	<i>YZZGXW4248 _Internal Photos</i>
<i>Block Diagram</i>	<i>Block Diagram</i>	<i>YZZGXW4248 _Block Diagram.pdf</i>
<i>Schematics</i>	<i>Circuit Diagram</i>	<i>YZZGXW4248 _Schematics.pdf</i>
<i>ID Label/Location</i>	<i>Label and Location</i>	<i>YZZGXW4248 _Label & Location.pdf</i>
<i>User Manual</i>	<i>User Manual</i>	<i>YZZGXW4248 _User Manual.pdf</i>
<i>Test set-up photos</i>	<i>Test set-up photos</i>	<i>YZZGXW4248 _Test Set-up Photos</i>

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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 VoIP Gateway

Test Sample : VoIP Gateway

Model Numbers : GXW4248

Model Tested : GXW4248

Receipt Date : March 21st, 2013

Date Tested : March 22nd, 2013

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 GXW4248 (referred to as the EUT in this report) is a VoIP Gateway.

Technical specifications of the EUT are as follows:

Parameter		Range
<i>Basic parameters</i>	<i>Rated voltage</i>	<i>24VDC</i>
	<i>Rated Current</i>	<i>6.25A</i>
<i>I/O Ports</i>	<i>Power Cable</i>	<i>Power adapter connection</i>
	<i>FXS Ports</i>	<i>Double 50-pin telecom connector for 48 FXS port, PnP support</i>
	<i>Network Interfaces</i>	<i>One switched 10/100/1000Mbps RJ-45 port for WAN connection</i>
	<i>RESET</i>	<i>Factory Reset button. Press for 7 seconds to reset factory default settings.</i>
	<i>---</i>	<i>---</i>
<i>Power Adapter</i>	<i>Input</i>	<i>100-240VAC 50/60Hz 2A(max)</i>
	<i>Output</i>	<i>24VDC,6.25A</i>
	<i>Model</i>	<i>W150RA07-240063A</i>
	<i>Brand name</i>	<i>rbd</i>

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

Test Summary

The Electromagnetic Compatibility requirements on model GXW4248 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
<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

Pre-scan has been conducted to determine the worst-case from all possible combinations between connected to PC and IP Call. Connected to PC mode was chosen for the final test as described below:

Connected to PC:

Connected an notebook PC to INTERNET port of the EUT by an RJ-45 line and ping "192.168.0.160 -t" to EUT, then connected one analog phones to PHONE port of the EUT and measured it.

EUT Exercise Software

No test software support this test.

Equipment Modification

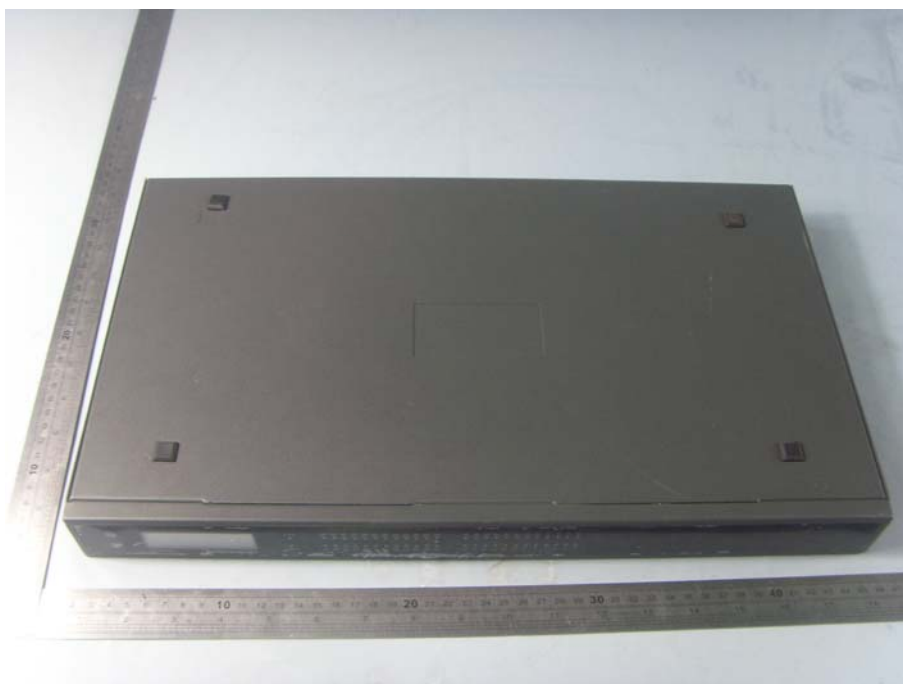
Any modifications installed previous to testing by Grandstream Networks, INC., will be incorporated in each production model sold or leased in United States.

There were no modifications installed by ECMG Electronic Technical Testing Corp (Shenzhen). Test personnel.

EUT Sample Photos for model GXW4248



EUT- Front&Top View



EUT- Bottom View



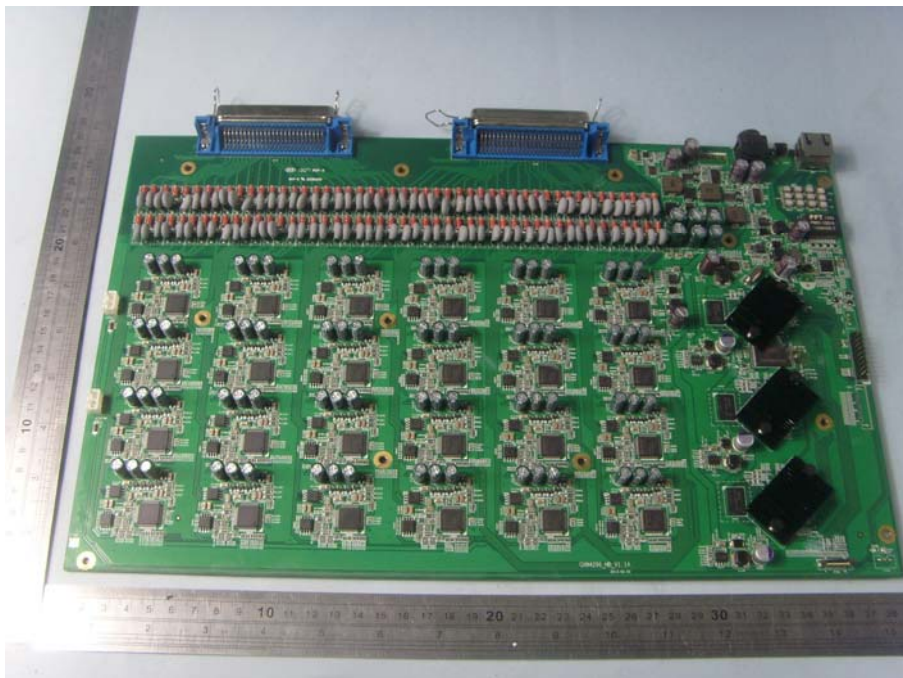
Front View



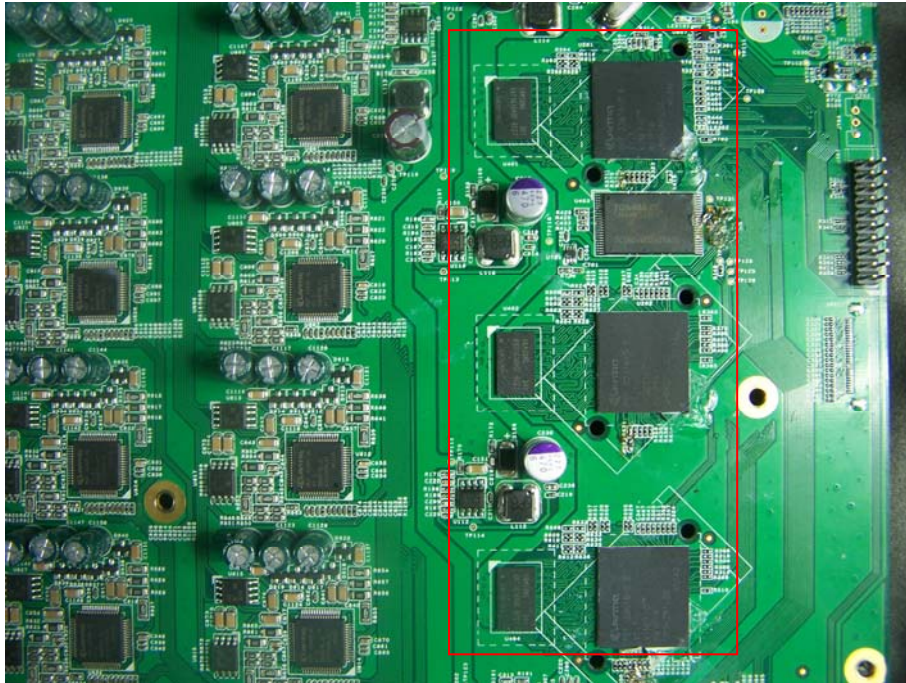
Back View



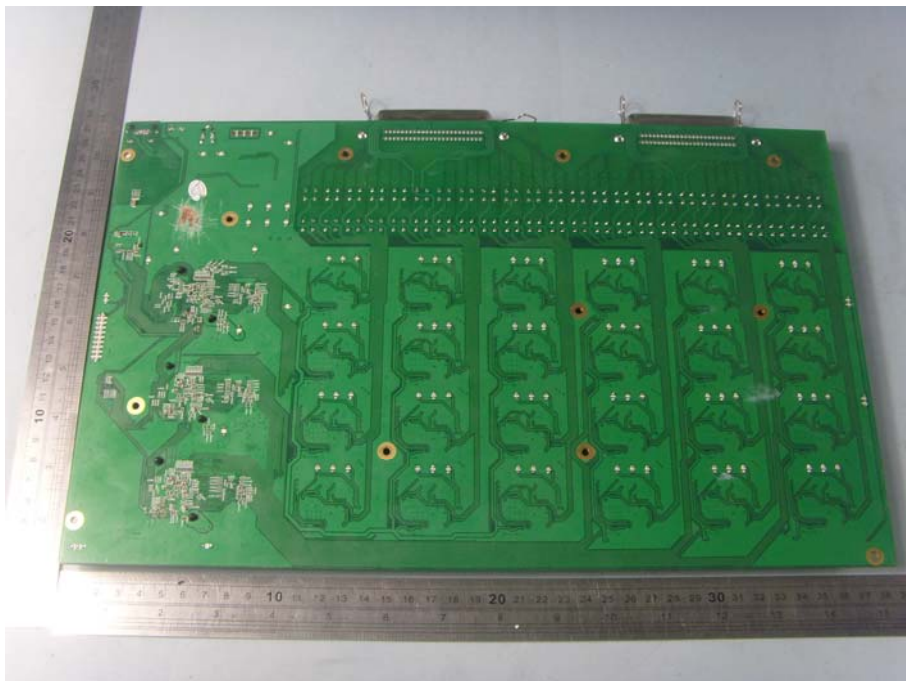
EUT-Uncovered View



Mainboard- Top View(full view)



Mainboard- Top View(main chip view)



Mainboard- Bottom View



Power Adaptor View

Test System Details

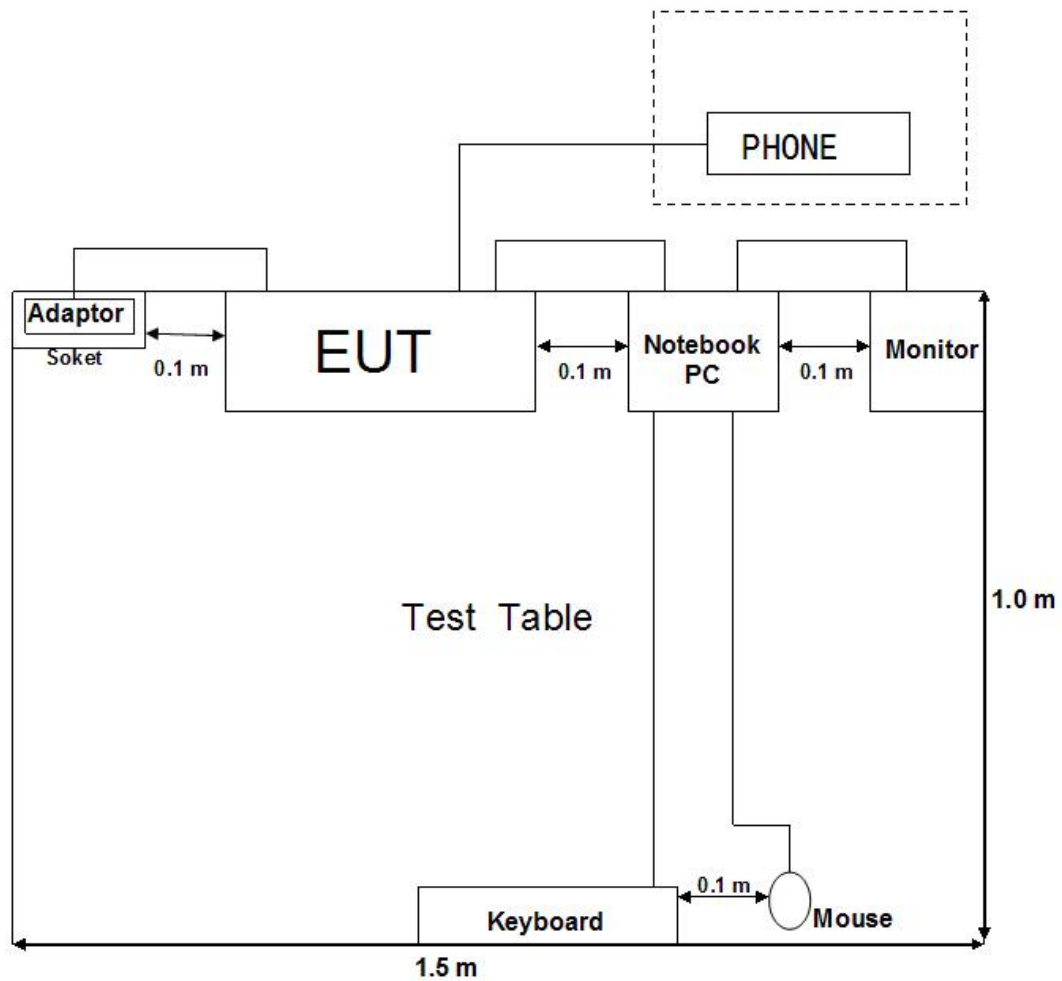
EUT			
Model Number:	GXW4248		
Model Tested:	GXW4248		
Description:	VoIP Gateway		
Input:	DC24V		
Manufacturer:	Grandstream Networks, INC		
Support Equipment			
<i>Description</i>	<i>Model Number</i>	<i>Serial Number</i>	<i>Manufacturer</i>
<i>Notebook PC</i>	<i>ThinkPad x121e</i>	---	<i>Lenovo</i>
<i>Adapter Of Notebook PC</i>	<i>ThinkPad 57Y4614</i>	---	<i>Lenovo</i>
<i>Mouse</i>	<i>MO32B0</i>	<i>23-033131</i>	<i>IBM</i>
<i>Keyboard</i>	<i>SK-1788</i>	---	<i>Lenovo</i>
<i>Monitor</i>	<i>TFT1780PS</i>	<i>B8879HA021638</i>	<i>AOC</i>
<i>Analog Phones</i>	<i>2957E</i>	---	<i>Daerxun Technology Co., Ltd</i>

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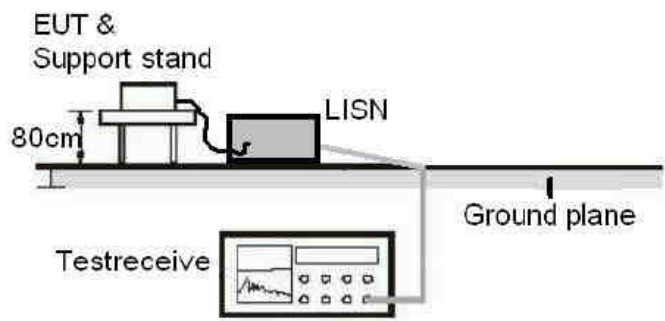
Cable Description					
<i>Description</i>	<i>From</i>	<i>To</i>	<i>Length (Meters)</i>	<i>Shielded (Y/N)</i>	<i>Ferrite (Y/N)</i>
<i>Power Cord Of Notebook PC</i>	<i>Adapter</i>	<i>Notebook PC</i>	<i>1.6</i>	<i>N</i>	<i>Y</i>
	<i>Adapter</i>	<i>Plug</i>	<i>1.2</i>	<i>N</i>	<i>Y</i>
<i>AC power cord of monitor</i>	<i>Monitor</i>	<i>Plug</i>	<i>1.2</i>	<i>N</i>	<i>Y</i>
<i>Mouse cord</i>	<i>Mouse</i>	<i>Plug</i>	<i>1.2</i>	<i>N</i>	<i>Y</i>
<i>Keyboard cord</i>	<i>Keyboard</i>	<i>Plug</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</i>	<i>EUT</i>	<i>Notebook PC</i>	<i>1.5</i>	<i>N</i>	<i>N</i>
<i>Power cord of Adapter</i>	<i>EUT</i>	<i>Plug</i>	<i>2.4</i>	<i>N</i>	<i>Y</i>
<i>Note: The "EUT" means "VOIP GATEWAY".</i>					

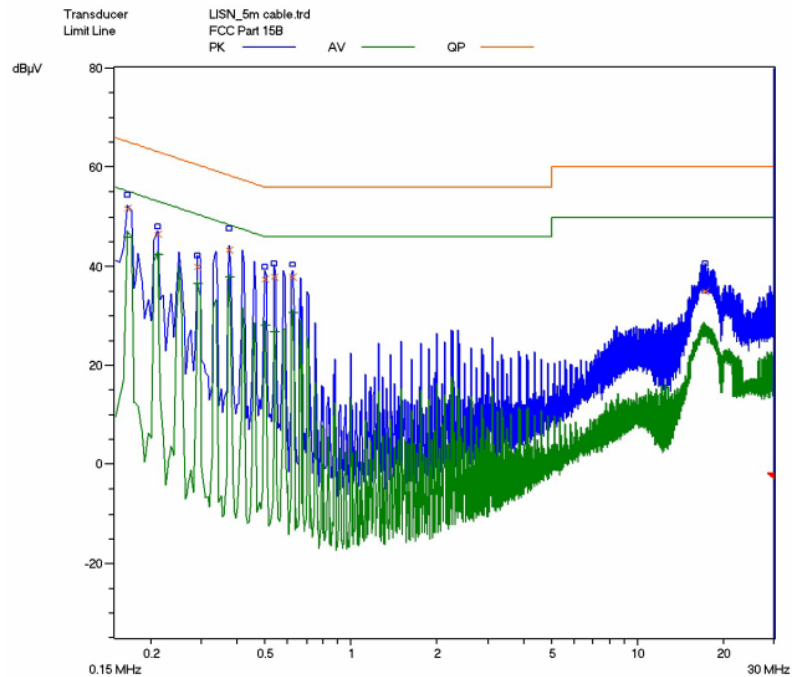
NOTE: The EUT has been tested as an independent unit together with other necessary accessories or support units. The above support units or accessories were used to form a representative test configuration during the test tests.

Configuration of Tested System

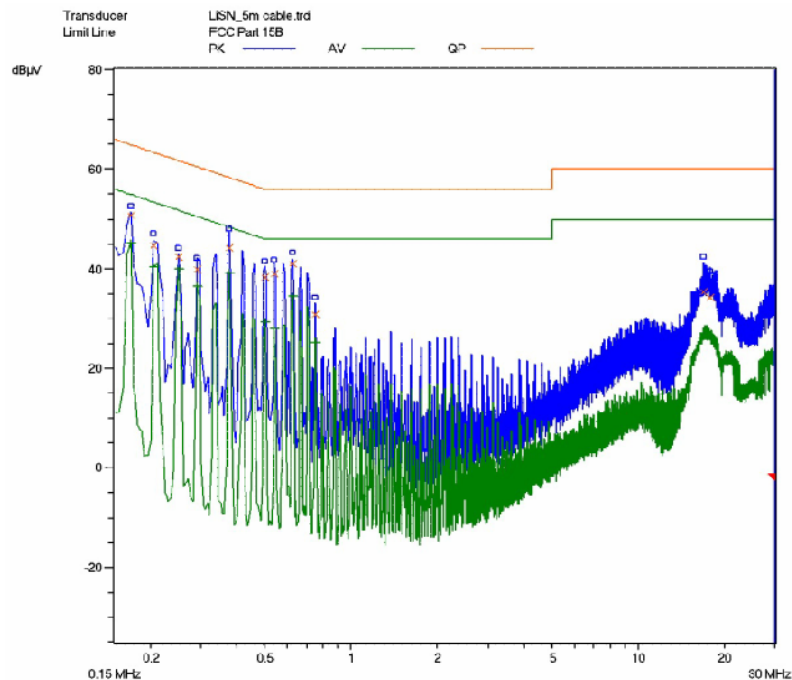


ATTACHMENT 1 - CONDUCTED EMISSION TEST RESULTS

CLIENT:	Grandstream Networks, INC	TEST STANDERD:	FCC Part 15, Subpart B, Section 15.107
MODEL NUMBERS:	GXW4248	PRODUCT:	VOIP GATEWAY
MODEL TESTED:	GXW4248	EUT DESIGNATION:	Home or Office
TEMPERATURE:	23°C	HUMIDITY:	51%
ATM PRESSURE:	103kPa	GROUNDING:	None
TESTED BY:	Daomen	DATE OF TEST:	March 22 nd , 2013
TEST REFERENCE:	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	Connected to PC		
TEST SET UP	 <p>The diagram illustrates the test setup. An EUT (Equipment Under Test) is placed on a support stand at a height of 80cm. It is connected to a LISN (Line Impedance Stabilization Network). The LISN is connected to a Test receiver, which is also connected to a Ground plane. The Test receiver is shown with a display screen and control buttons.</p>		
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 ECMG Electronic Technical Testing Corp (Shenzhen). test personnel.		
M. UNCERTAINTY:	Freq. $\pm 2 \times 10^{-7}$ x Center Freq., Amp ± 2.6 dB		



Line L Conducted Emission Graph




Line N Conducted Emission Graph

Test Data:

<i>Lines</i>	<i>Frequenc y (MHz)</i>	<i>Corrected QP Level (dBuV)</i>	<i>Limits QP (dBuV)</i>	<i>Margin QP (dB)</i>	<i>Frequenc y (MHz)</i>	<i>Corrected AVE Level (dBuV)</i>	<i>Limits AVE (dBuV)</i>	<i>Margin AVE (dB)</i>
<i>L</i>	<i>0.165</i>	<i>51.6</i>	<i>65.2</i>	<i>-13.6</i>	<i>0.165</i>	<i>45.9</i>	<i>55.2</i>	<i>-9.3</i>
<i>L</i>	<i>0.375</i>	<i>43.3</i>	<i>58.4</i>	<i>-15.1</i>	<i>0.375</i>	<i>37.8</i>	<i>48.4</i>	<i>-10.6</i>
<i>L</i>	<i>0.625</i>	<i>38.0</i>	<i>56.0</i>	<i>-18.0</i>	<i>0.625</i>	<i>30.7</i>	<i>46.0</i>	<i>-15.3</i>
<i>N</i>	<i>0.170</i>	<i>50.8</i>	<i>65.0</i>	<i>-14.2</i>	<i>0.170</i>	<i>45.1</i>	<i>55.0</i>	<i>-9.9</i>
<i>N</i>	<i>0.205</i>	<i>44.6</i>	<i>63.4</i>	<i>-18.8</i>	<i>0.205</i>	<i>40.4</i>	<i>53.4</i>	<i>-13.0</i>
<i>N</i>	<i>0.625</i>	<i>41.0</i>	<i>56.0</i>	<i>-15.0</i>	<i>0.625</i>	<i>34.4</i>	<i>46.0</i>	<i>-11.6</i>
<i>Note:</i> 1) <i>All readings are using a bandwidth of 9 kHz, with a 500 ms sweep time. A video filter was not used.</i> 2) <i>Other emission levels are too low against official limit a are not report.</i>								

Test Equipment List:

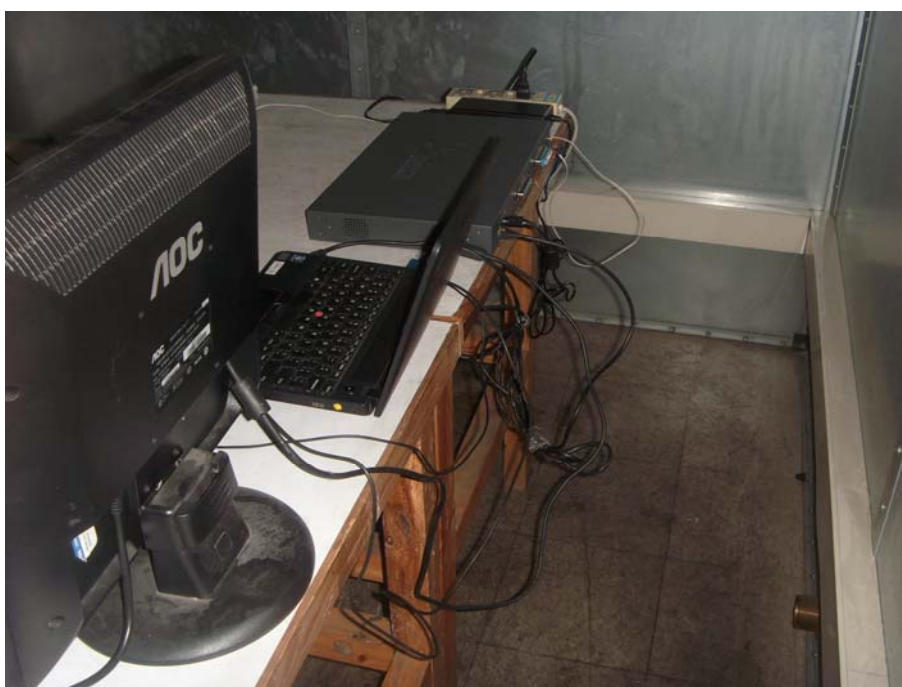
Test Equipment	Model No.	Manufacturer	Serial No.	Last Cal.	Cal. Interval
Receiver	SMR4503	SCHAFFNER	11725	2012.07.08	2013.07.08
Line impedance stabilization network	4825/2	ETS	1161	2012.07.08	2013.07.08
Note: All testing were performed using internationally recognized standards. All test instruments were calibrated.					

TESTED BY:  ECMG
ENGINEER COMPANY NAME

REVIEWED BY:  ECMG
SENIOR ENGINEER COMPANY NAME



Conducted Emission Test Set-up –front view



Conducted Emission Test Set-up –rear view

ATTACHMENT 2 - RADIATED EMISSION MEASUREMENT

CLIENT:	Grandstream Networks, INC	TEST STANDERD:	FCC Part 15,Subpart B, Section 15.109
MODEL NUMBERS:	GXW4248	PRODUCT:	VOIP GATEWAY
EUT MODEL:	GXW4248	EUT DESIGNATION:	Home or Office
TEMPERATURE:	23°C	HUMIDITY:	49%RH
ATM PRESSURE:	103.0kPa	GROUNDING:	None
TESTED BY:	Daomen	DATE OF TEST:	March 22 nd , 2013
TEST REFERENCE:	ANSI C63.4 -2003		
TEST PROCEDURE:	<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 30 MHz to 1GHz and average and peak in the frequency range of 1 GHz to 5GHz 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>		
TEST MODE	Conneced to PC		
TESTED RANGE:	9K-30MHz and 30MHz to 5,000MHz		
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.		
CHANGES OR MODIFICATIONS:	There were no modifications installed by ECMG Electronic Technical Testing Corp (Shenzhen). Test personnel.		
M. UNCERTAINTY:	Freq. $\pm 2 \times 10^{-7}$ x Center Freq., Amp ± 2.6 dB		

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TEST SET-UP:

Frequency measured at 9KHz to 30MHz:

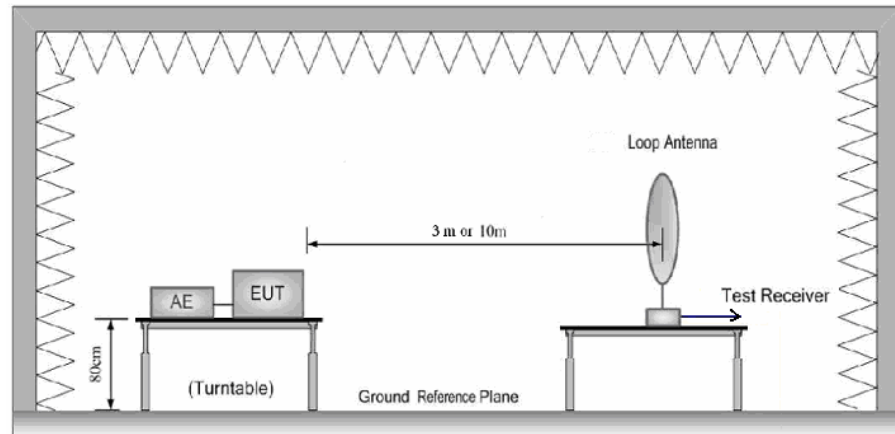


Figure 1 : Frequencies measured below 1 GHz configuration

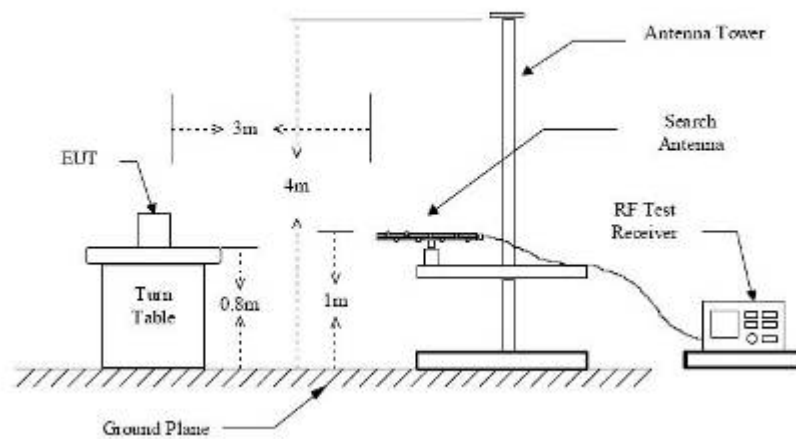
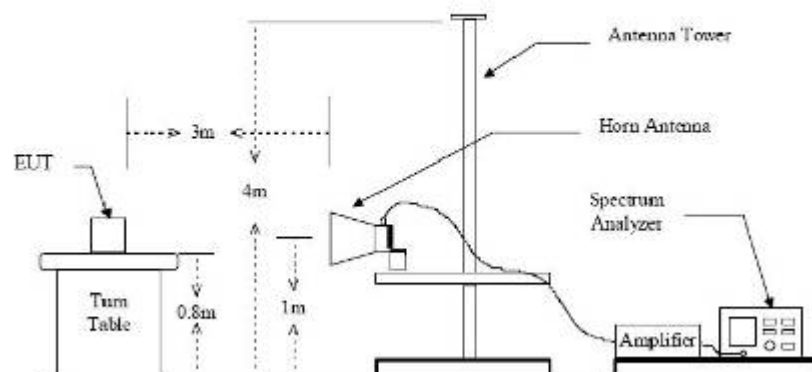
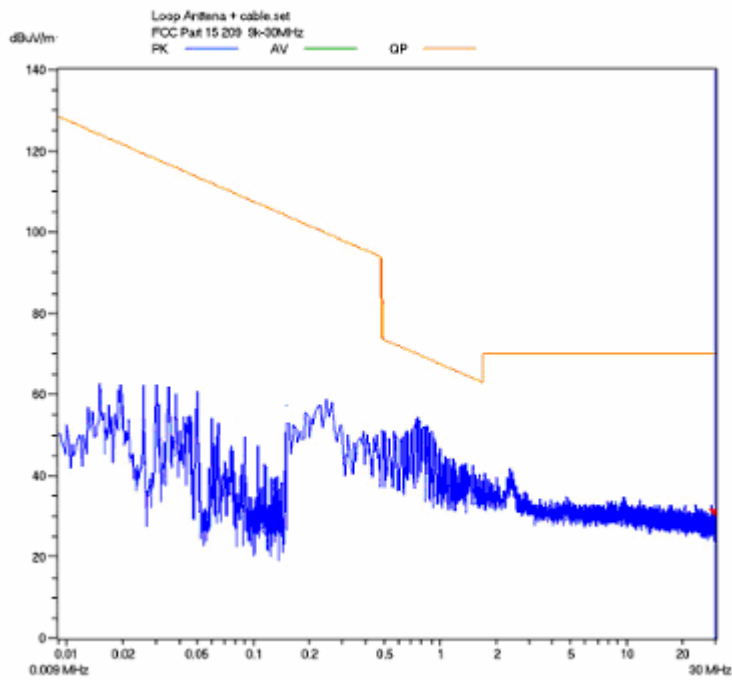


Figure 2 : Frequencies measured above 1 GHz configuration

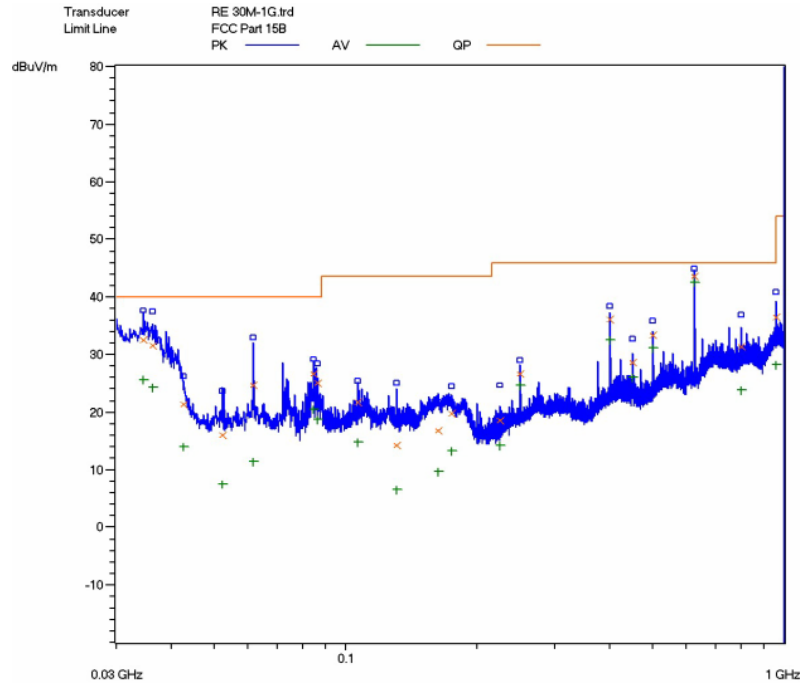


9 KHz-30MHz:

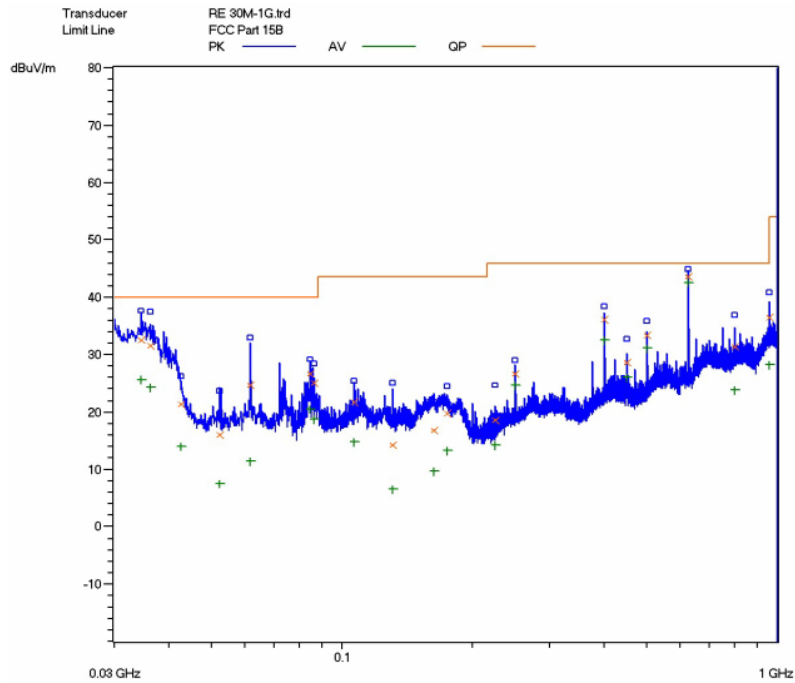


**Radiated Filed Strength Emission Test Plot
(Peak,maxhold)**

30-1000MHz:



**Horizontal: Radiated Emission Test Plot
(Peak,maxhold)**



Vertical: Radiated Emission Test Plot (Peak,maxhold)

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:

1. 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.
2. 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.
3. All emission levels in the frequency range of 9KHz to 30MHz are 20dB below the official limits that are not reported.

Test Data:
Connected to PC /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							
34.640	0.02	17.9	/	14.68	32.6	40	-7.4
36.160	0.02	18.4	/	13.18	31.6	40	-8.4
84.640	0.02	6.1	/	20.48	26.6	40	-13.4
400.000	0.16	14.7	/	21.24	36.1	46	-9.9
624.960	0.36	20.2	/	23.34	43.9	46	-2.1
957.120	0.44	23.9	/	12.16	36.5	46	-9.5
Vertical							
34.640	0.02	17.9	/	14.68	32.6	40	-7.4
36.160	0.02	18.4	/	13.18	31.6	40	-8.4
84.640	0.02	6.1	/	20.48	26.6	40	-13.4
400.000	0.16	14.7	/	21.24	36.1	46	-9.9
624.960	0.36	20.2	/	23.04	43.6	46	-2.4
957.120	0.44	23.9	/	12.16	36.5	46	-9.5

Note:

1. 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.
2. 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.
3. The other emission levels are 20dB below the official limits that are not reported.

Connected to PC /Above 1GHz:


<i>Frequency (GHz)</i>	<i>Cable Loss (dB)</i>	<i>Antenna Factor (dB)</i>	<i>Preamp Factor (dB)</i>	<i>Reading Level (dBuV/m)</i>	<i>Emission Level (dBuV/m)</i>	<i>Limit (dBuV/m)</i>	<i>Margi n (dB)</i>	<i>Antenna Polariza tion (H/V)</i>
Peak Measurement								
1.001	1.39	23.9	33.6	12.71	46.18	74	-27.82	H
1.100	1.40	24.2	33.6	5	54.20	74	-19.80	H
2.600	2.3	29.3	33	8.89	55.71	74	-18.29	H
1.128	1.40	24.0	33.6	11.79	47.21	74	-26.79	V
1.100	1.40	24.2	33.6	1.1	58.10	74	-15.90	V
1.660	1.73	27.2	33	2.43	59.50	74	-14.50	V
Average Measurement								
1.001	1.39	23.9	33.6	30.8	28.09	54	-25.91	H
1.100	1.40	24.2	33.6	26.9	32.30	54	-21.70	H
2.600	2.3	29.3	33	28.68	35.92	54	-18.08	H
1.128	1.40	24.0	33.6	29.69	29.31	54	-24.69	V
1.100	1.40	24.2	33.6	25.44	33.76	54	-20.24	V
1.660	1.73	27.2	33	22.73	39.20	54	-14.80	V

Note:

1. 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.
2. 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.
3. 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	2012.07.08	2013.07.07
HF Loop Antenna	HLA6120	TESEQ	26348	2012.09.27	2013.09.26
Double-ridged Wave guide horn	3115	ETS	6587	2012.08.02	2013.08.01
Microwave system amplifier	83017A	Agilent	MY39500438	2012.07.11	2013.07.10
Biconilog Antenna	3142C	ETS	00042672	2012.09.28	2013.09.27
Band-pass Filter	BRM50702	Micro-Tronic	S/N-030	2012.11.30	2013.11.29
Spectrum Analyzer	FSP30	R&S	100755	2012.11.30	2013.11.29
Note: All testing were performed using internationally recognized standards. All test instruments were calibrated.					

TESTED BY:  ECMG
ENGINEER COMPANY NAME

REVIEWED BY:  ECMG
SENIOR ENGINEER COMPANY NAME



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



Radiated Emission Test Set-up (Below 1GHz)



Radiated Emission Test Set-up (Above 1GHz)



Radiated Emission Test Set-up (rear view)