

EMI TEST REPORT

On Model Name: IP PBX

Model Number: GXE5102, GXE5104

Brand Name: Grandstream

Prepared for Grandstream Networks, INC

FCC ID Number: YZZGXE5102

According to FCC 47 CFR Part 15(2012), Subpart B

Test Report #: SHE-1301-10939-FCC

Tested by: Daomen Galanz
Sewen Guo /Engineer Company Name

Reviewed by: Jawen Yin ECMG
Jawen Yin/ Senior Engineer Company Name

QC Manager: Swall Zhang ECMG
Swall Zhang/QC Manager Company Name

Test Report Released by: Swall Zhang January 30th, 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.

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List Attached Files

<i>Exhibit Type</i>	<i>File Description</i>	<i>File Name</i>
<i>Test Report</i>	<i>Test Report</i>	<i>YZZGXE5102 _Test report.pdf</i>
<i>Operation Description</i>	<i>Technical Description</i>	<i>YZZGXE5102 _operation description.pdf</i>
<i>External Photos</i>	<i>External Photos</i>	<i>YZZGXE5102 _External Photos</i>
<i>Internal Photos</i>	<i>Internal Photos</i>	<i>YZZGXE5102 _Internal Photos</i>
<i>Block Diagram</i>	<i>Block Diagram</i>	<i>YZZGXE5102 _Block Diagram.pdf</i>
<i>Schematics</i>	<i>Circuit Diagram</i>	<i>YZZGXE5102 _Schematics.pdf</i>
<i>ID Label/Location</i>	<i>Label and Location</i>	<i>YZZGXE5102 _Label & Location.pdf</i>
<i>User Manual</i>	<i>User Manual</i>	<i>YZZGXE5102 _User Manual.pdf</i>
<i>Test set-up photos</i>	<i>Test set-up photos</i>	<i>YZZGXE5102 _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 IP PBX

Test Sample : IP PBX

Model Numbers : GXE5102, GXE5104

Model Tested : GXE5104

Receipt Date : January 21st, 2013

Date Tested : January 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 GXE5104 (referred to as the EUT in this report) is an IP PBX.

Technical specifications of the EUT are as follows:

Parameter		Range
<i>Basic parameters</i>	<i>Rated voltage</i>	12VDC
	<i>Rated Current</i>	1.5A
<i>I/O Ports</i>	<i>Power Cable</i>	<i>Power adapter connection</i>
	<i>FXS Ports</i>	<i>FXS port to be connected to analog phones / fax machines.</i>
	<i>Network Interfaces</i>	<i>Single or Dual (GXE5102 only) 10M/100M/1000M RJ45 Ethernet port (s) with integrated PoE Plug (IEEE 802.3at-2009)</i>
	<i>FXO Ports</i>	<i>2 ports (GXE5102); 4 ports (GXE5104); 8 ports (GXE5108); 16 ports (GXE5116)</i>
	<i>RESET</i>	<i>Factory Reset button. Press for 7 seconds to reset factory default settings.</i>
	<i>Peripheral Ports</i>	<i>USB, SD</i>
<i>Adapter (Mass power)</i>	<i>Input</i>	<i>100-240VAC ,50/60Hz, 0.4A</i>
	<i>Output</i>	<i>12VDC,1.5A</i>
	<i>Model</i>	<i>SFF1200150A1BB</i>
	<i>Brand name</i>	<i>Mass power</i>

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

EUT Model Derived

Models GXE5104 and GXE5102 are the same product, they have the same circuit principle & PCB layout, differences between these two models are as follows:

P/N	LAN	WAN	FXO
GXE5102	1	1	2
GXE5104	1	0	4

Note: Pre-scan has been conducted to determine the worst-case between these two models. The worst-case model GXE5104 was selected for the final testing.

Test Summary

The Electromagnetic Compatibility requirements on model GXE5104 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 from all possible combinations between available operation modes. The following mode was chosen for the final test as described below.

Connected to PC mode:

Connected one notebook PC to INTERNET port of the EUT by an RJ-45 signal line and ping "192.168.0.160 -t" to EUT. Then connected one phone to PHONE port of the EUT and established a call link between them and measured it.

PoE mode:

Let EUT runs on PoE mode 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 GXE5104



EUT- Front&Top View



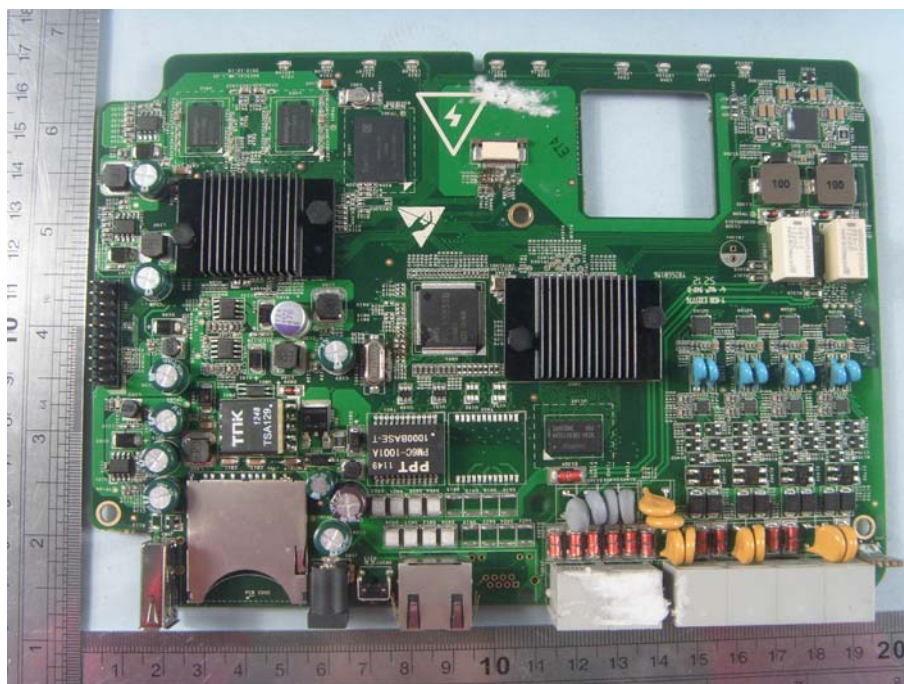
EUT- Rear View



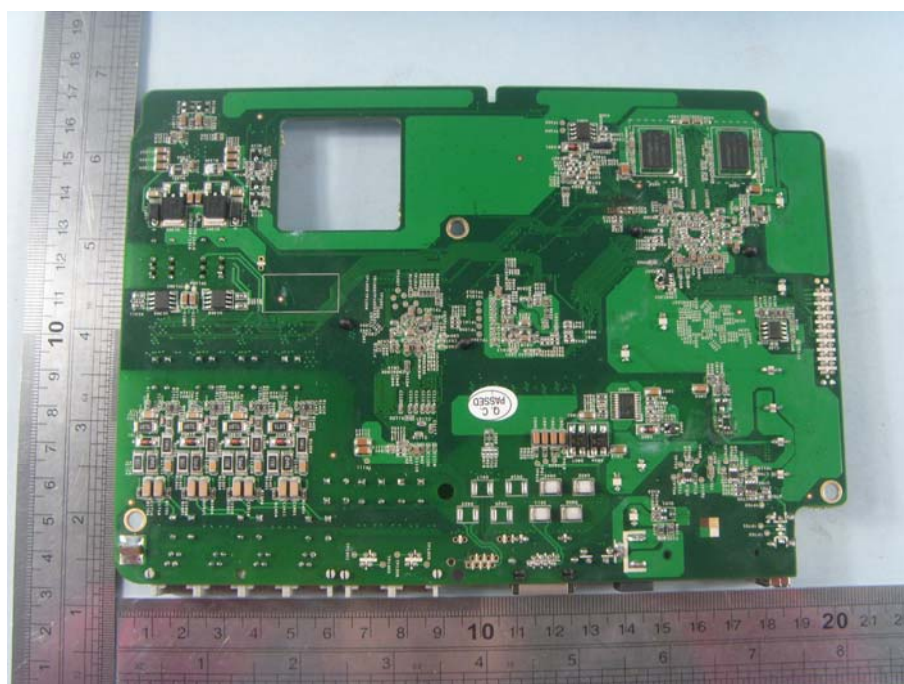
I/O Ports view



EUT-Uncovered View



Mainboard- Top View



Mainboard- Bottom View



Power Adaptor View (Manufacturer: Mass Power)

Test System Details

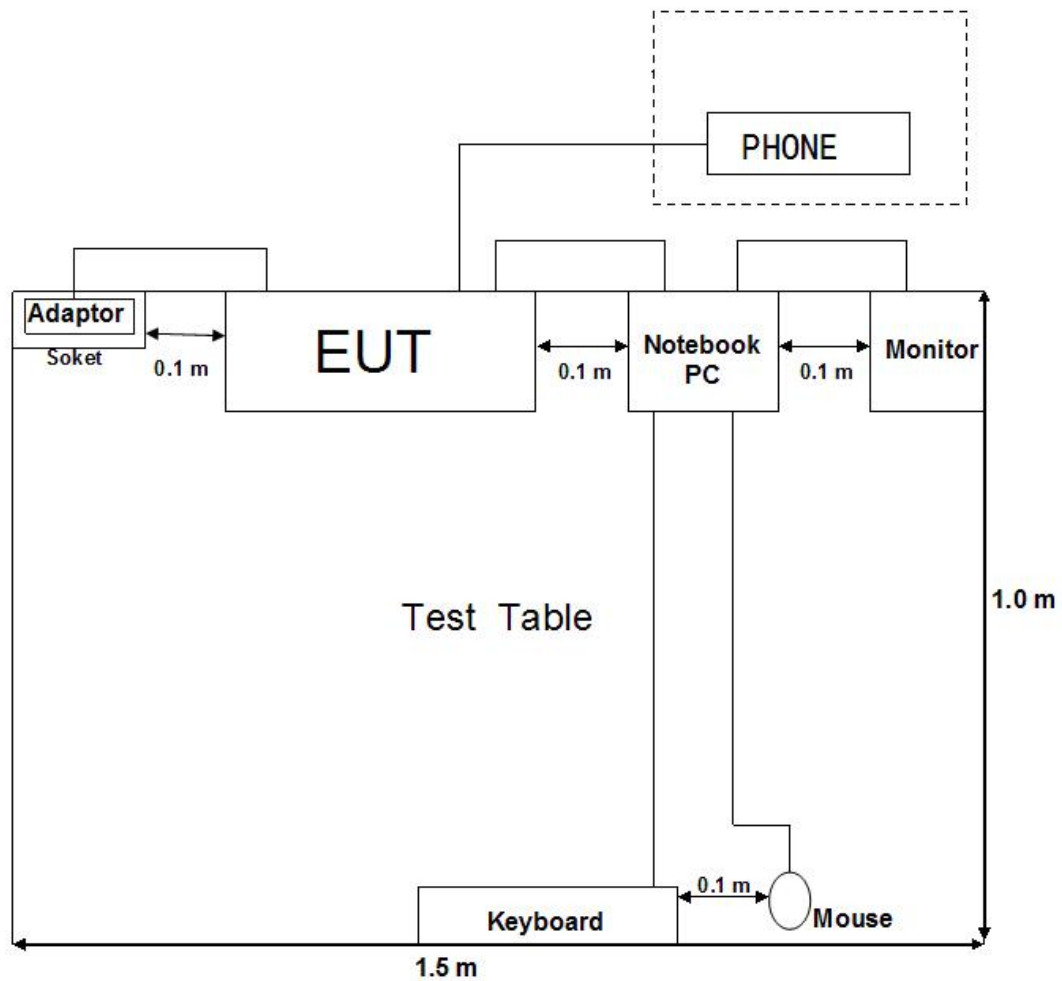
EUT			
Model Number:	GXE5102,GXE5104		
Model Tested:	GXE5104		
Description:	IP PBX		
Input:	DC12V/1.5A		
Manufacturer:	Grandstream Networks, INC		
Support Equipment			
Description	Model Number	Serial Number	Manufacturer
Notebook PC	ThinkPad x121e	---	Lenovo
Adapter Of Notebook PC	ThinkPad 57Y4614	---	Lenovo
Mouse	MO32B0	23-033131	IBM
Keyboard	SK-1788	---	Lenovo
Monitor	TFT1780PS	B8879HA021638	AOC
Analog Phones	2957E	---	Daerxun Technology Co., Ltd

Continue on to next page...

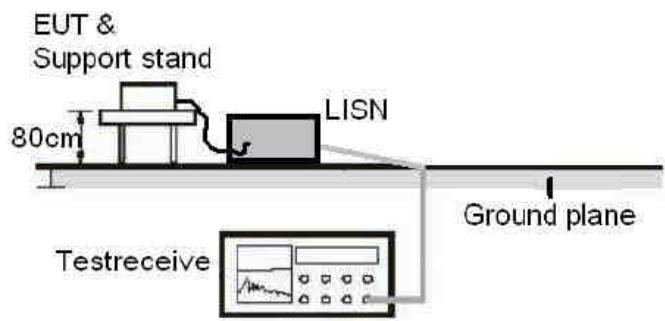
Cable Description					
<i>Description</i>	<i>From</i>	<i>To</i>	<i>Length (Meters)</i>	<i>Shielded (Y/N)</i>	<i>Ferrite (Y/N)</i>
<i>Power Cord Of Notebook PC</i>	<i>Adapter</i>	<i>Notebook PC</i>	<i>1.6</i>	<i>N</i>	<i>Y</i>
	<i>Adapter</i>	<i>Plug</i>	<i>1.2</i>	<i>N</i>	<i>Y</i>
<i>AC power cord of 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>Notebook 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 (Mass power)</i>	<i>EUT</i>	<i>Plug</i>	<i>2.4</i>	<i>N</i>	<i>N</i>
<i>Note: The "EUT" means "IP PBX".</i>					

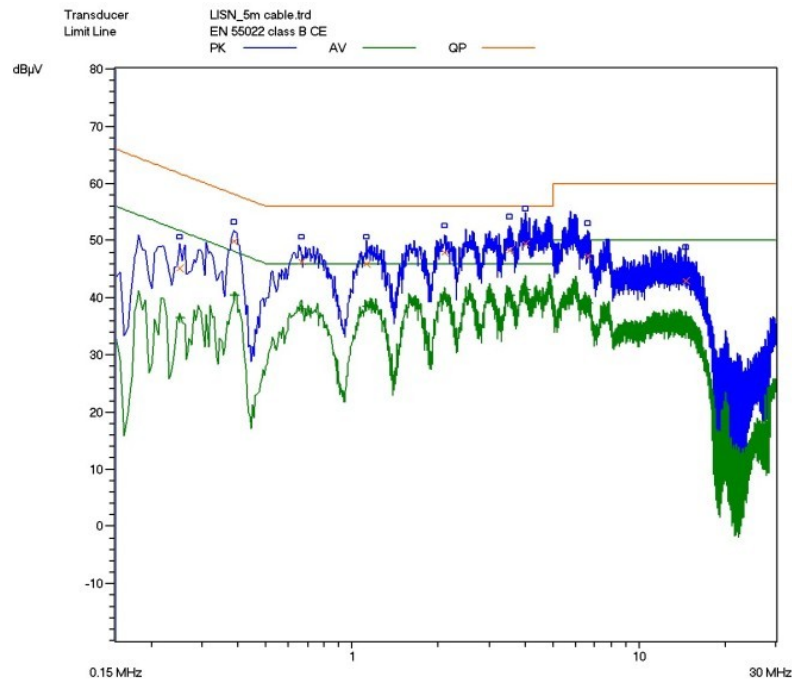
NOTE: The EUT has been tested as an independent unit together with other necessary accessories or support units. The above support units or accessories were used to form a representative test configuration during the test tests.

Configuration of Tested System

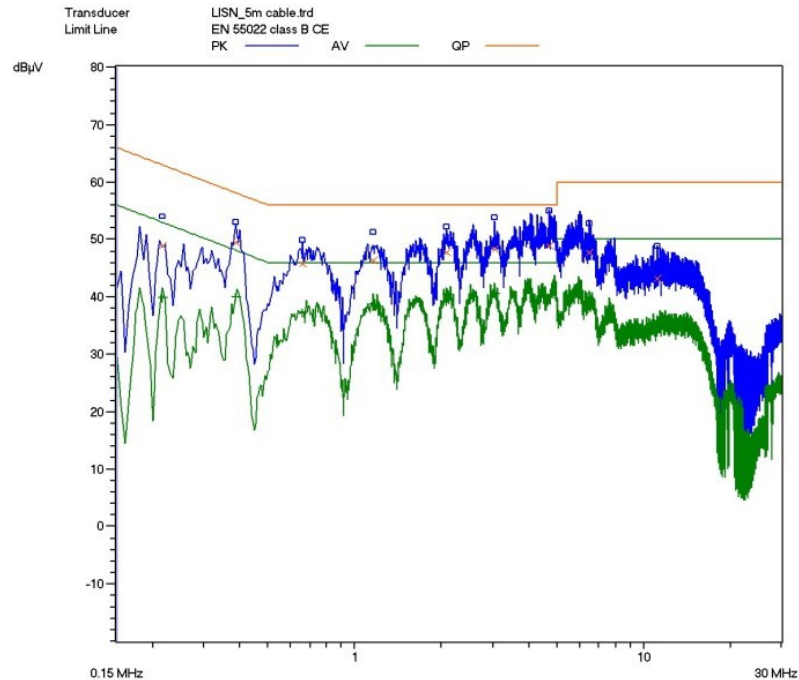


ATTACHMENT 1 - CONDUCTED EMISSION TEST RESULTS

CLIENT:	Grandstream Networks, INC	TEST STANDERD:	FCC Part 15, Subpart B, Section 15.107
MODEL NUMBERS:	GXE5102,GXE5104	PRODUCT:	IP PBX
MODEL TESTED:	GXE5104	EUT DESIGNATION:	Home or Office
TEMPERATURE:	23°C	HUMIDITY:	51%
ATM PRESSURE:	103kPa	GROUNDING:	None
TESTED BY:	Daomen	DATE OF TEST:	January 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. The EUT 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.</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>
Mass power								
<i>L</i>	<i>0.190</i>	<i>52.7</i>	<i>64</i>	<i>-11.3</i>	<i>0.190</i>	<i>42.8</i>	<i>54</i>	<i>-11.2</i>
<i>L</i>	<i>0.375</i>	<i>49.9</i>	<i>58.4</i>	<i>-8.5</i>	<i>0.375</i>	<i>40.7</i>	<i>48.4</i>	<i>-7.7</i>
<i>L</i>	<i>0.615</i>	<i>46.6</i>	<i>56</i>	<i>-9.4</i>	<i>0.615</i>	<i>38.1</i>	<i>46</i>	<i>-7.9</i>
<i>N</i>	<i>0.210</i>	<i>43.7</i>	<i>63.2</i>	<i>-19.5</i>	<i>0.210</i>	<i>30.0</i>	<i>53.2</i>	<i>-23.2</i>
<i>N</i>	<i>0.410</i>	<i>47.5</i>	<i>57.2</i>	<i>-9.7</i>	<i>0.410</i>	<i>38.6</i>	<i>47.6</i>	<i>-9.0</i>
<i>N</i>	<i>0.595</i>	<i>41.1</i>	<i>56</i>	<i>-14.9</i>	<i>0.595</i>	<i>31.7</i>	<i>46</i>	<i>-14.3</i>
Note: 1) All readings are using a bandwidth of 9 kHz, with a 500 ms sweep time. A video filter was not used. 2) Other emission levels are too low against official limits that are not reported.								

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:  GALANZ
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:	GXE5102,GXE5104	PRODUCT:	IP PBX
EUT MODEL:	GXE5104	EUT DESIGNATION:	Home or Office
TEMPERATURE:	23°C	HUMIDITY:	49%RH
ATM PRESSURE:	103.0kPa	GROUNDING:	None
TESTED BY:	Daomen	DATE OF TEST:	January 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	Connected to PC &PoE mode		
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:

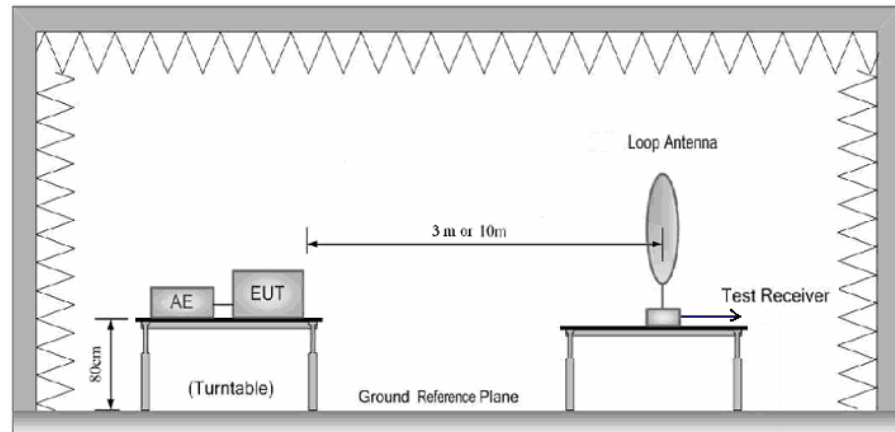


Figure 1 : Frequencies measured below 1 GHz configuration

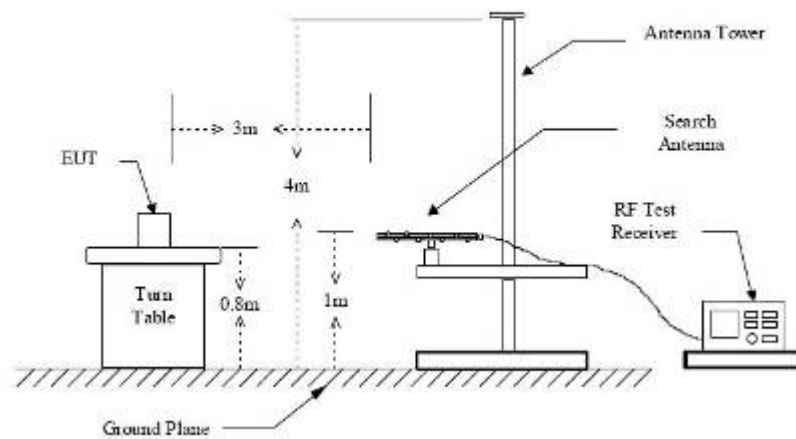
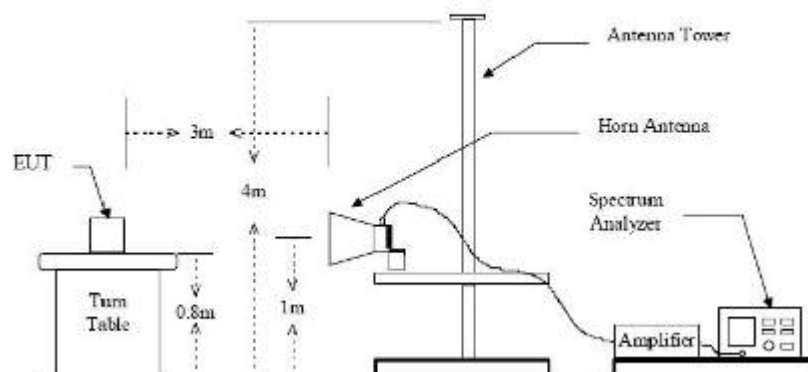
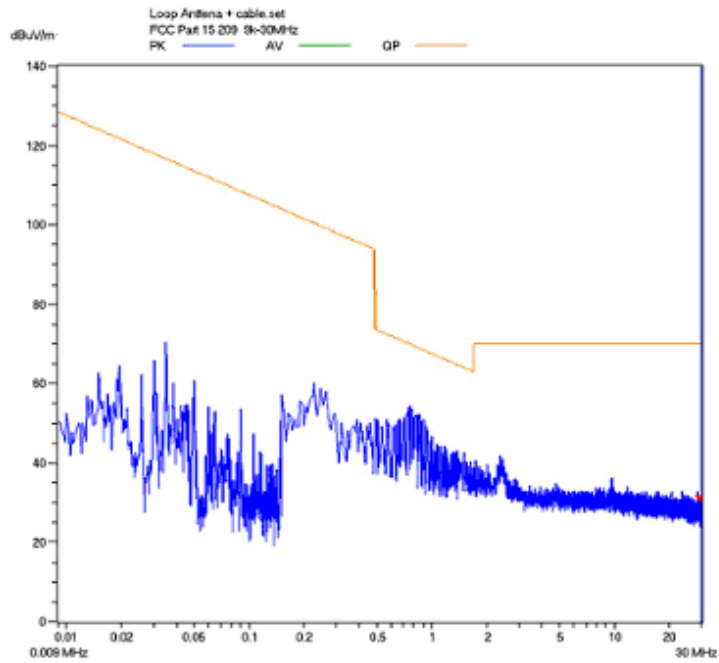


Figure 2 : Frequencies measured above 1 GHz configuration

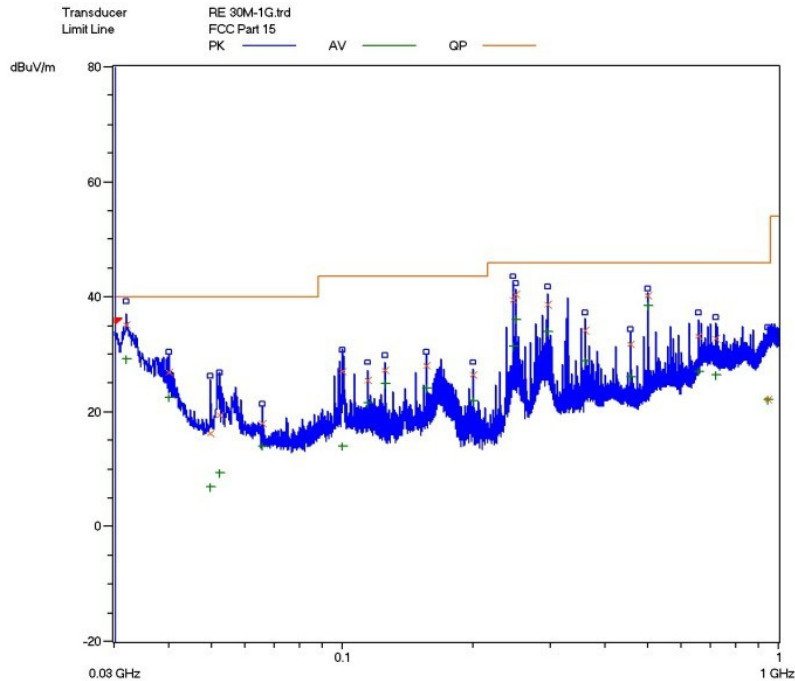


9 KHz-30MHz:

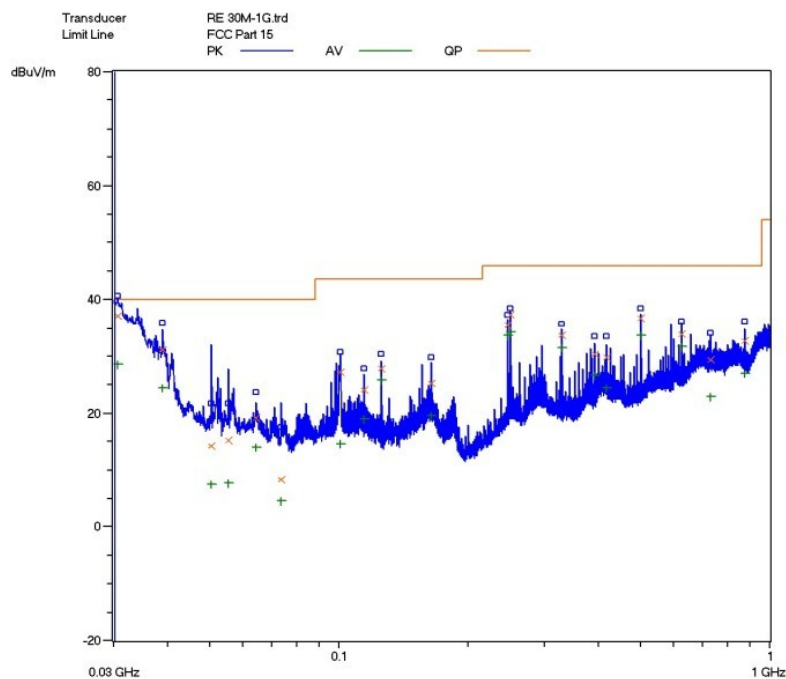


**Radiated Filed Strength Emission Test Plot
(Peak,maxhold)**

Connected to PC Mode:

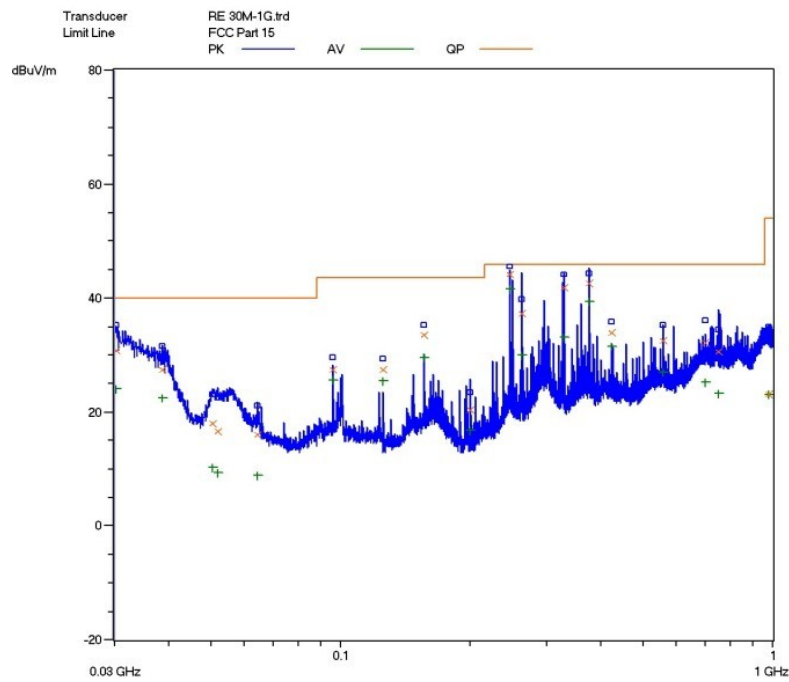


**Horizontal: Radiated Emission Test Plot
(Peak,maxhold)**

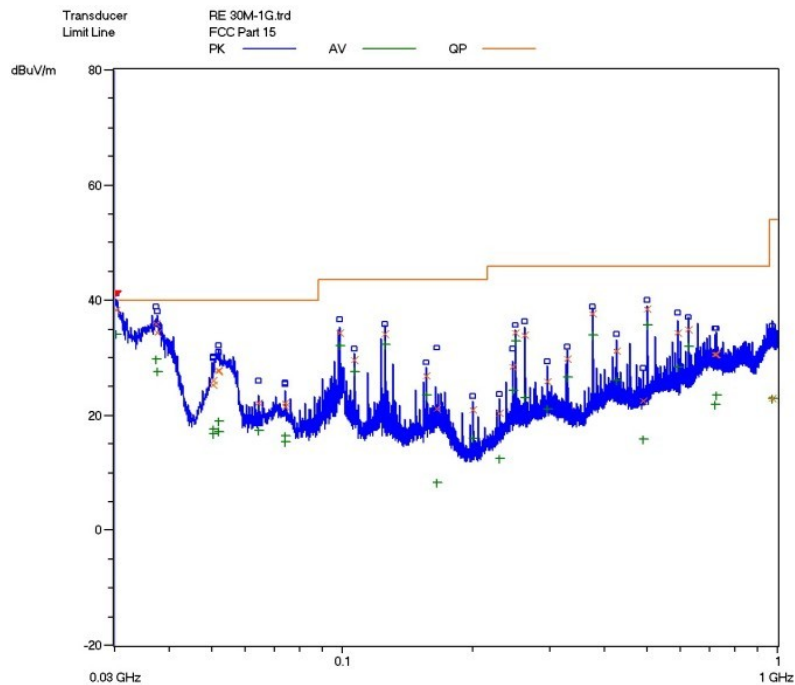


**Vertical: Radiated Emission Test Plot
(Peak,maxhold)**

For PoE Mode



**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. For band in 9KHz to 30MHz, Pre-scan has been conducted to determine the worst-case. Connected to PC mode was selected for the final testing.
3. 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.
4. 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)	Preamplifier Factor (dB)	Reading Level QP (dBuV/m)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
Horizontal							
32.000	0.02	17.3	/	17.68	35.0	40	-5.0
245.680	0.12	11.4	/	27.98	39.5	46	-6.5
250.000	0.12	11.8	/	28.48	40.4	46	-5.6
294.880	0.16	13.2	/	25.24	38.6	46	-7.4
500.000	0.20	17.4	/	22.7	40.3	46	-5.7
655.280	0.36	20	/	12.74	33.1	46	-12.9
Vertical							
30.720	0.02	16.7	/	20.48	37.2	40	-2.8
245.760	0.12	11.4	/	24.08	35.6	46	-10.4
250.000	0.12	11.8	/	25.38	37.3	46	-8.7
327.680	0.16	13.4	/	20.24	33.8	46	-12.2
393.200	0.16	14.0	/	16.24	30.4	46	-15.6
500.000	0.20	17.4	/	19.1	36.7	46	-9.3

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:

Frequency (GHz)	Cable Loss (dB)	Antenna Factor (dB)	Preamplifier Factor (dB)	Reading Level (dBuV/m)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Polarization (H/V)
Peak Measurement								
1.101	1.39	23.9	33.6	2.57	56.32	74	-17.68	H
1.320	1.40	24.2	33.6	3.03	56.17	74	-17.83	H
2.653	2.3	29.3	33	9.5	55.10	74	-18.9	H
1.228	1.40	24.0	33.6	1.79	57.21	74	-16.79	V
1.320	1.40	24.2	33.6	3.94	55.26	74	-18.74	V
1.679	1.73	27.2	33	7.21	54.72	74	-19.28	V
Average Measurement								
1.101	1.39	23.9	33.6	20.68	38.21	54	-15.79	H
1.320	1.40	24.2	33.6	22.43	36.77	54	-17.23	H
2.657	2.3	29.3	33	29.5	35.10	54	-18.9	H
1.228	1.40	24.0	33.6	20.68	38.32	54	-15.68	V
1.320	1.40	24.2	33.6	21.85	37.35	54	-16.65	V
1.685	1.73	27.2	33	21.73	40.20	54	-13.8	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.

PoE Mode/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							
245.760	0.12	11.4	/	31.68	43.2	46	-2.8
262.080	0.12	12.6	/	24.48	37.2	46	-8.8
327.760	0.16	13.4	/	28.34	41.9	46	-4.1
374.960	0.16	13.7	/	28.84	42.7	46	-3.3
424.960	0.2	15.5	/	18.3	34.0	46	-12.0
557.040	0.3	18.5	/	13.7	32.5	46	-13.5
Vertical							
30.160	0.02	16.7	/	20.58	37.3	40	-2.7
37.280	0.02	18.4	/	17.58	36.0	40	-4.0
37.600	0.02	18.4	/	15.98	34.4	40	-5.6
500.000	0.2	17.4	/	20.8	38.4	46	-7.6
589.840	0.3	19	/	15.1	34.4	46	-11.6
624.960	0.36	20.2	/	14.44	35.0	46	-11.0

Note:

1. All readings are quasi-peak unless stated otherwise, using a QPA bandwidth of 120 kHz, 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.

PoE Mode/Above 1GHz:


<i>Frequency (GHz)</i>	<i>Cable Loss (dB)</i>	<i>Antenna Factor (dB)</i>	<i>Preamplifier Factor (dB)</i>	<i>Reading Level (dBuV/m)</i>	<i>Emission Level (dBuV/m)</i>	<i>Limit (dBuV/m)</i>	<i>Margin (dB)</i>	<i>Antenna Polarization (H/V)</i>
Peak Measurement								
1.131	1.39	23.9	33.6	6.58	52.31	74	-21.69	H
1.320	1.40	24.2	33.6	3.93	55.27	74	-18.73	H
2.676	2.3	29.3	33	8.5	56.10	74	-17.9	H
1.228	1.40	24.0	33.6	1.8	57.20	74	-16.80	V
1.108	1.40	24.2	33.6	5.98	53.22	74	-20.78	V
1.678	1.73	27.2	33	8.03	53.90	74	-20.10	V
Average Measurement								
1.108	1.39	23.9	33.6	24.38	34.51	54	-19.49	H
1.320	1.40	24.2	33.6	23.93	35.27	54	-18.73	H
2.656	2.3	29.3	33	31.87	32.73	54	-21.27	H
1.228	1.40	24.0	33.6	22.79	36.21	54	-17.79	V
1.320	1.40	24.2	33.6	20.84	38.36	54	-15.64	V
1.690	1.73	27.2	33	28.72	33.21	54	-20.79	V

Note:

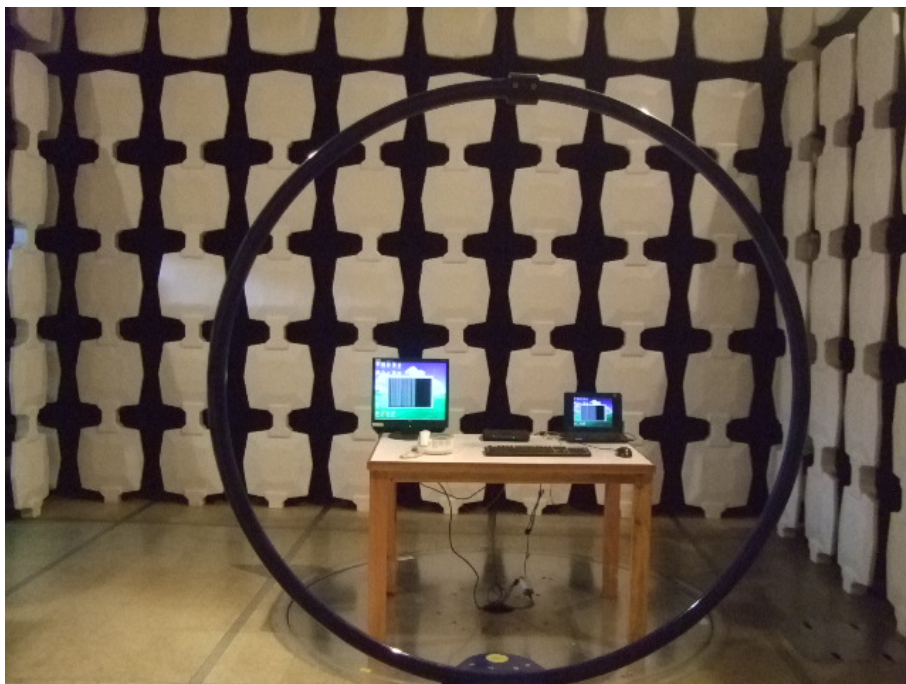
1. The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows: Emission Level = Reading Level + Antenna Factor + Cable Loss - Preamplifier Factor.
2. The limits shown are based on Peak value and Average value 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:  GALANZ
ENGINEER COMPANY NAME

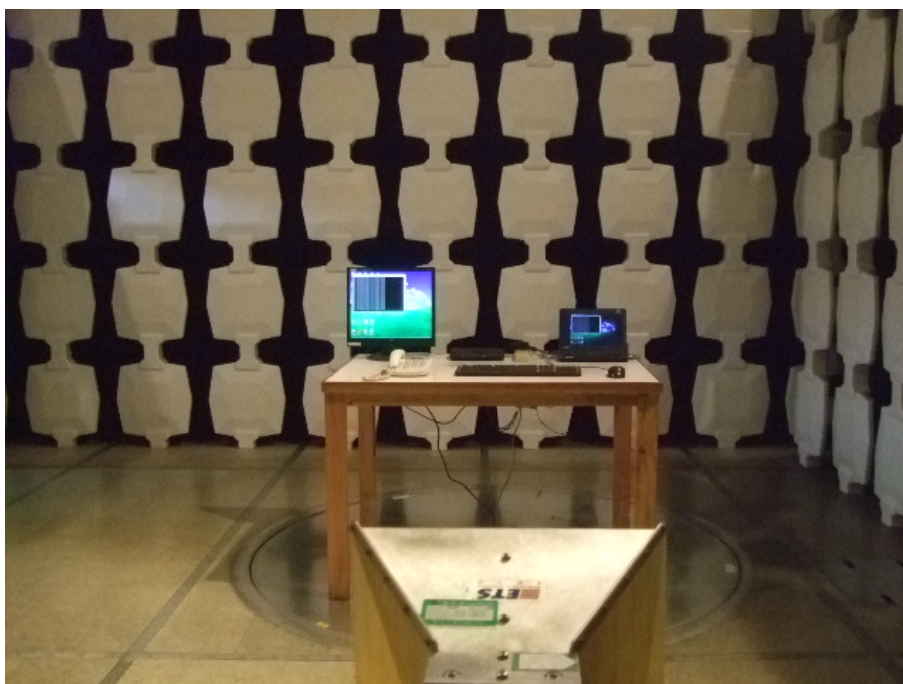
REVIEWED BY:  ECMG
SENIOR ENGINEER COMPANY NAME



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)