

## EMI TEST REPORT

On Model Name: IP PBX

Model Number: UCM6102, UCM6104

Brand Name: Grandstream

Prepared for Grandstream Networks, INC

FCC ID Number: YZZGXE5102

According to FCC 47 CFR Part 15, Subpart B

Test Report #: SHE-1304-10964-FCC

Tested by: Daomen ECMG  
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 April 3<sup>rd</sup>, 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 &amp; 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 Data**

*Test Sample* : IP PBX

*Model Numbers* : UCM6102, UCM6104

*Model Tested* : UCM6104

*Receipt Date* : March 21<sup>st</sup>, 2013

*Date Tested* : March 22<sup>nd</sup>, 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 UCM6104 (referred to as the EUT in this report) is an IP PBX.*

*Technical specifications of the EUT are as follows:*

<b>Parameter</b>		<b>Range</b>
<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>10M/100M/1000M RJ45 Ethernet port (s) with integrated PoE Plug (IEEE 802.3at-2009)</i>
	<i>FXO Ports</i>	<i>2 ports (UCM6102); 4 ports (UCM6104)</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>Power 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 Modifications:***

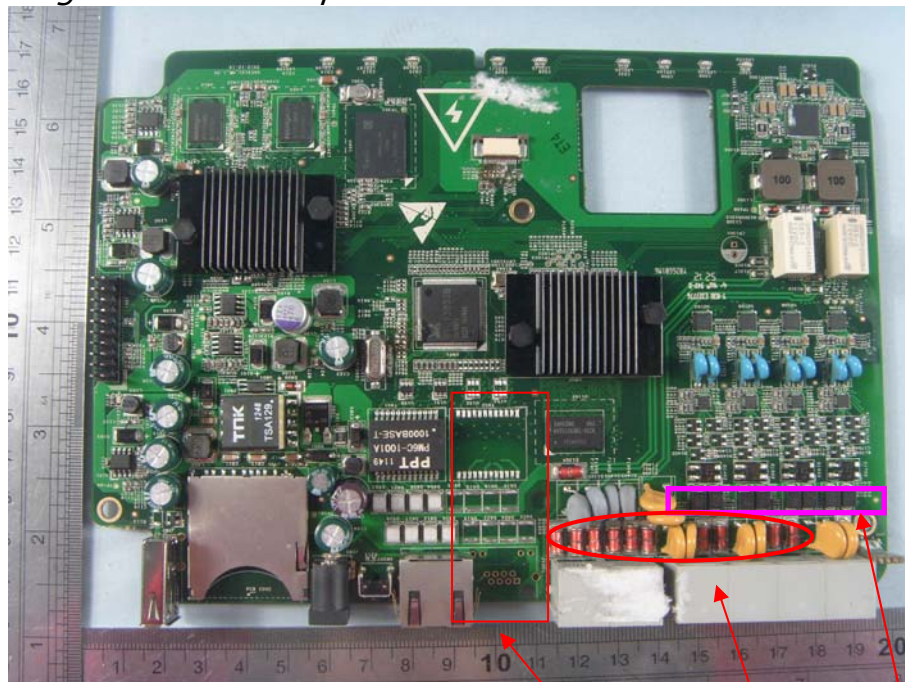
*This is an updating test report based on the original report #: SHE-1301-10939-FCC. Differences between them were listed as described below:*

- 1. Updated model number; changed GXE5104 to UCM6104, GXE5102 to UCM6102;*
- 2. Added an LAN port on original main board reserved location and four surge protectors tube (See Arrow 1);*
- 3. Used four high voltage protectors to replace original eight surge protectors (See Arrow 2).*
- 4. Used ten white surge protectors tube to replace original eleven surge protectors tube (See Arrow 3).*

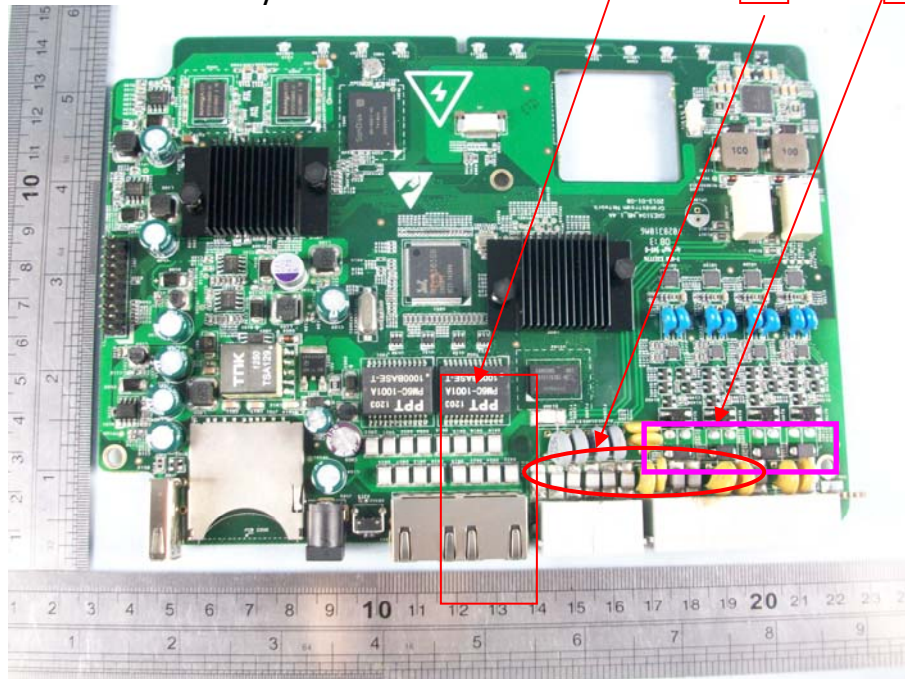
*Anything else are the same as before.*



*Original mainboard photo view*



*New mainboard photo view*



### ***EUT Model Derived***

*Model UCM6104 and UCM6102 are the same product. they utilize the identical circuit design, PCB layout, shielding. differences between them are only as follows:*

<i>P/N</i>	<i>LAN</i>	<i>WAN</i>	<i>FXO</i>
<i>UCM6102</i>	<i>1</i>	<i>1</i>	<i>2</i>
<i>UCM6104</i>	<i>2</i>	<i>0</i>	<i>4</i>

*Note: Pre-scan has been conducted to determine the worst-case between this two model, model UCM6104 was selected for the final testing.*

## **Test Summary**

*The Electromagnetic Compatibility requirements on model UCM6104 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***

*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:***

*Connected an notebook PC to LAN port of the EUT by an RJ-45 signal line and ping "192.168.0.160 -t" to EUT. then connected separately one IP phone and one analog phone to another LAN port and PHONE port and established a call link between them and measured it.*

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

*No exercise 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 UCM6104***



***EUT- Front&Top View***



***EUT- Bottom View***



***EUT- Rear View***

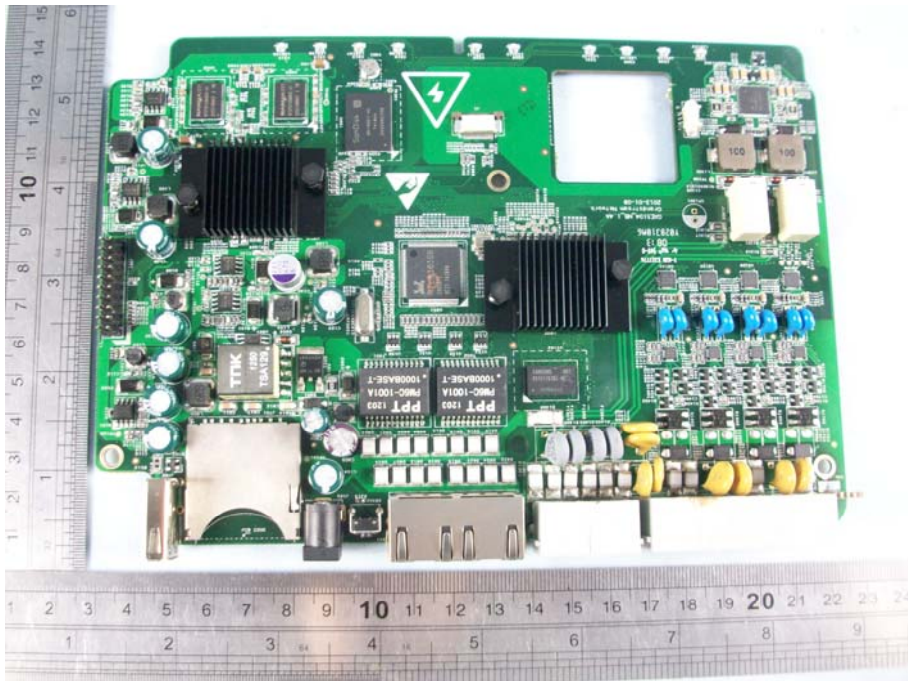


***Power Adaptor View (Manufacturer: Mass Power)***

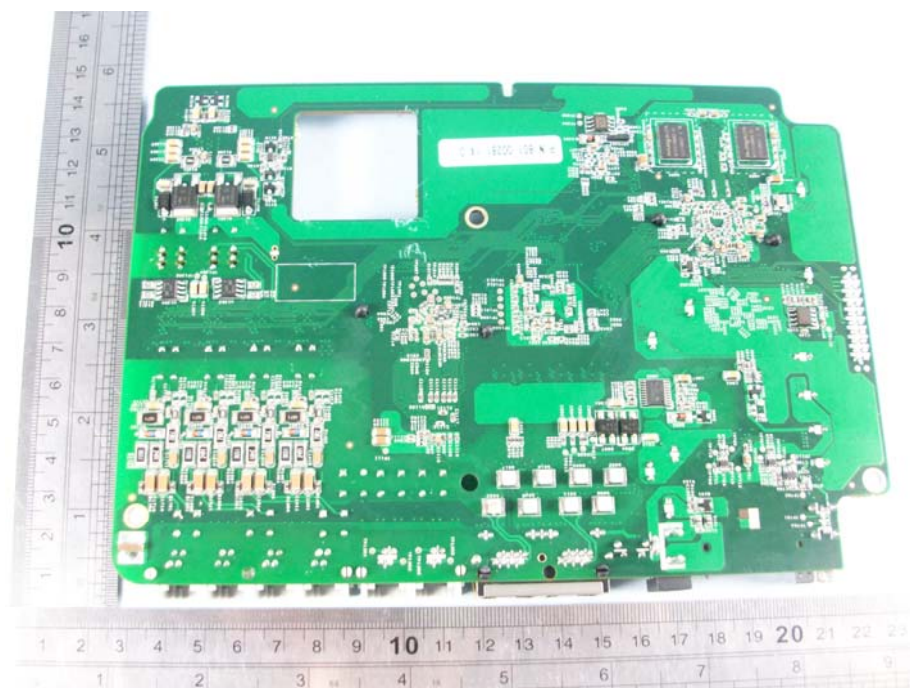




***EUT-Uncovered View***



***Mainboard- Top View***



**Mainboard- Bottom View**



## Test System Details

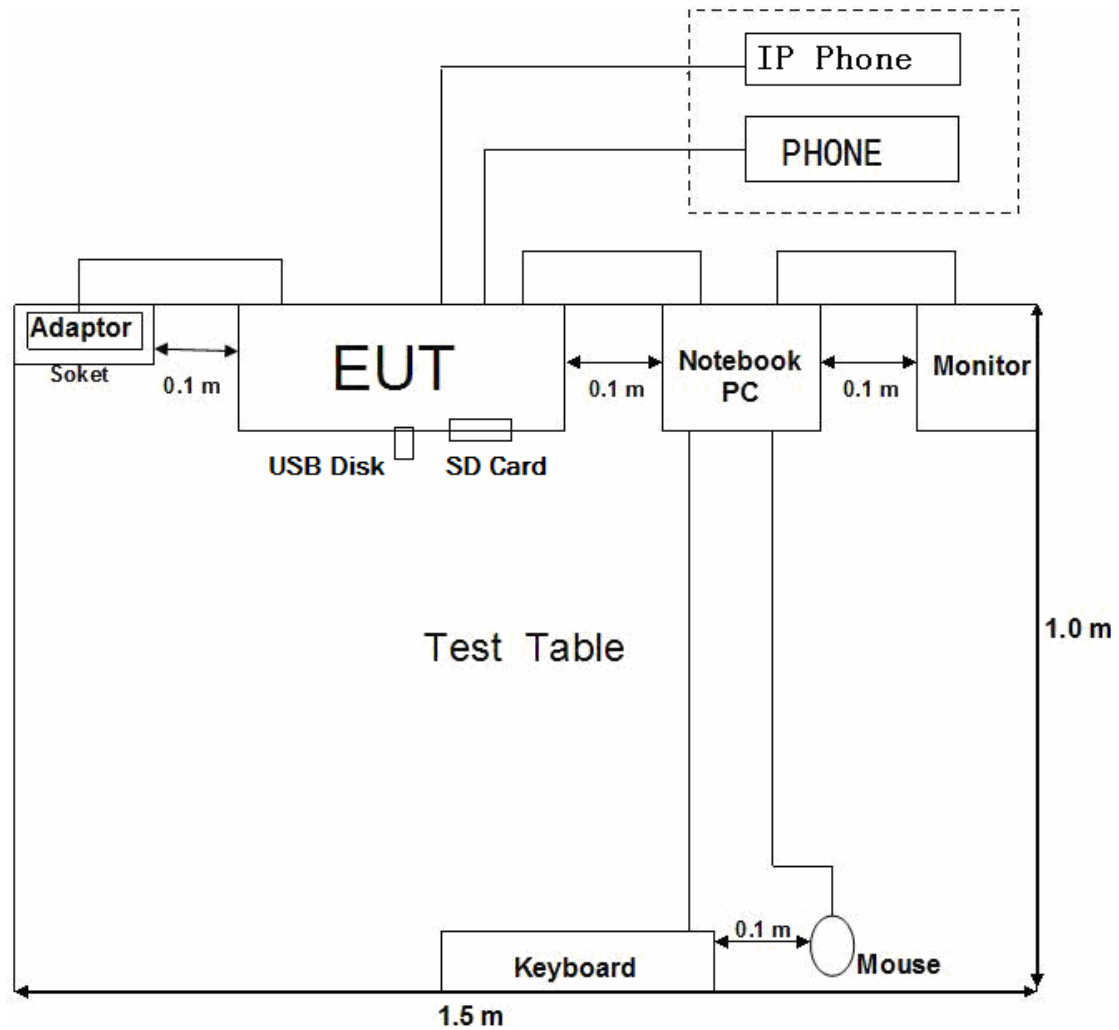
EUT			
Model Number:	UCM6102,UCM6104		
Model Tested:	UCM6104		
Description:	IP PBX		
Input:	DC12V/1.5A		
Manufacturer:	Grandstream Networks, INC		
Support Equipment			
Description	Model Number	Serial Number	Manufacturer
Notebook PC	ThinkPad x121e	---	Lenovo
Adapter Of Notebook PC	ThinkPad 57Y4614	---	Lenovo
Mouse	MO32B0	23-033131	IBM
Keyboard	SK-1788	---	Lenovo
Monitor	TFT1780PS	B8879HA021638	AOC
Analog Phones	2957E	---	Daerxun Technology Co., Ltd
IP Phone	GXV3175	---	Grandstream

Continue on to next page...

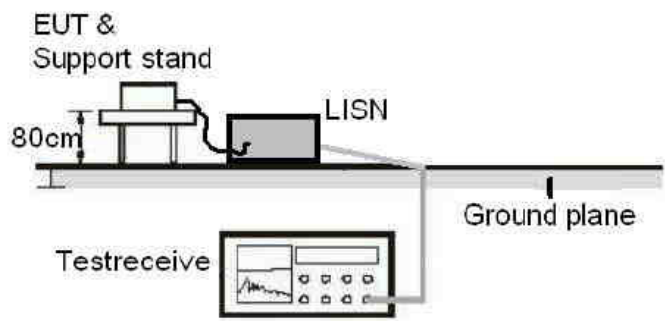
<b>Cable Description</b>					
<i>Description</i>	<i>From</i>	<i>To</i>	<i>Length (Meters)</i>	<i>Shielded (Y/N)</i>	<i>Ferrite (Y/N)</i>
<i>Power Cord Of Notebook PC</i>	<i>Adapter</i>	<i>Notebook PC</i>	<i>1.6</i>	<i>N</i>	<i>Y</i>
	<i>Adapter</i>	<i>Plug</i>	<i>1.2</i>	<i>N</i>	<i>Y</i>
<i>AC power 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 #1</i>	<i>EUT</i>	<i>Notebook PC</i>	<i>1.5</i>	<i>N</i>	<i>N</i>
<i>RJ-45 Cord #2</i>	<i>EUT</i>	<i>IP PHONE</i>	<i>&gt;3.0</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>					

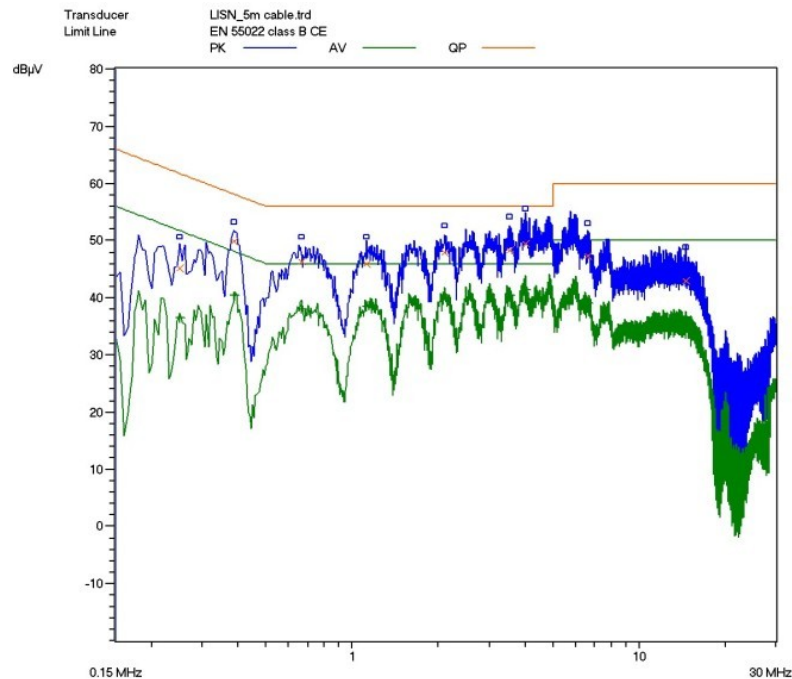
*NOTE: The EUT has been tested as an independent unit together with other necessary accessories or support units. The above support units or accessories were used to form a representative test configuration during the test tests.*

## Configuration of Tested System

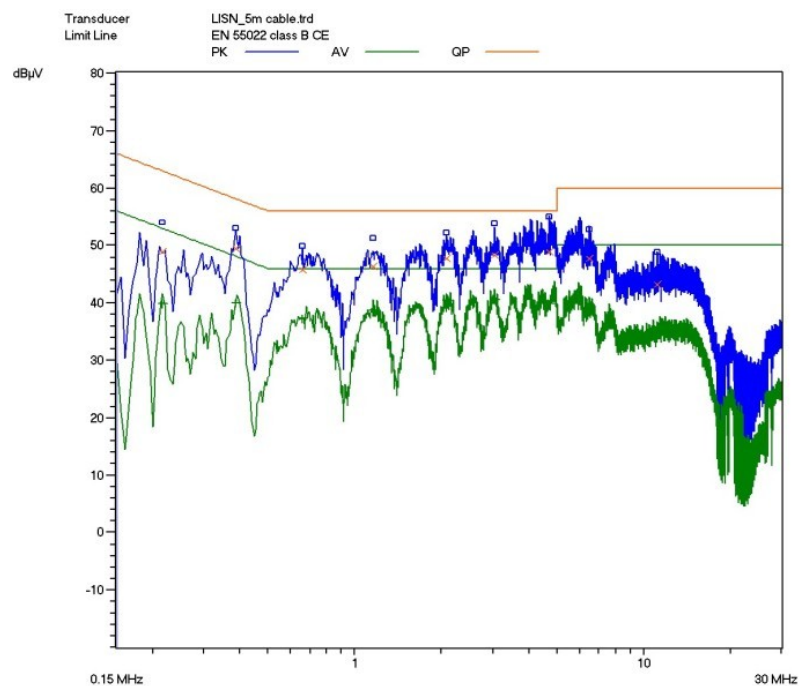


**ATTACHMENT 1 - CONDUCTED EMISSION TEST RESULTS**

<b>CLIENT:</b>	Grandstream Networks, INC	<b>TEST STANDERD:</b>	FCC Part 15, Subpart B, Section 15.107
<b>MODEL NUMBERS:</b>	UCM6102,UCM6104	<b>PRODUCT:</b>	IP PBX
<b>MODEL TESTED:</b>	UCM6104	<b>EUT DESIGNATION:</b>	Home or Office
<b>TEMPERATURE:</b>	23°C	<b>HUMIDITY:</b>	51%
<b>ATM PRESSURE:</b>	103kPa	<b>GROUNDING:</b>	None
<b>TESTED BY:</b>	Daomen	<b>DATE OF TEST:</b>	March 22 <sup>nd</sup> , 2013
<b>TEST REFERENCE:</b>	ANSI C63.4 -2003		
<b>TEST PROCEDURE:</b>	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.		
<b>DESCRIPTION OF TEST MODE</b>	Connected to PC		
<b>TEST SET UP</b>	 <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>		
<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. $\pm 2 \times 10^{-7}$ x Center Freq., Amp $\pm 2.6$ 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>0.190</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>
<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 limta that 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**

<b>CLIENT:</b>	Grandstream Networks, INC	<b>TEST STANDERD:</b>	FCC Part 15,Subpart B, Section 15.109
<b>MODEL NUMBERS:</b>	UCM6102,UCM6104	<b>PRODUCT:</b>	IP PBX
<b>EUT MODEL:</b>	UCM6104	<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>	Daomen	<b>DATE OF TEST:</b>	March 22 <sup>nd</sup> , 2013
<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 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>		
<b>TEST MODE</b>	Connected to PC &PoE mode		
<b>TESTED RANGE:</b>	9K-30MHz and 30MHz to 5,000MHz		
<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. $\pm 2 \times 10^{-7}$ x Center Freq., Amp $\pm 2.6$ dB		

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**TEST SET-UP:**

Frequency measured at 9KHz to 30MHz:

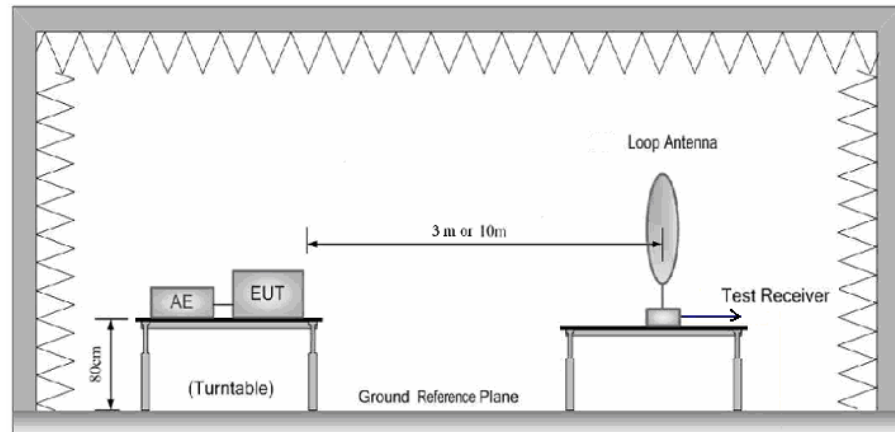


Figure 1 : Frequencies measured below 1 GHz configuration

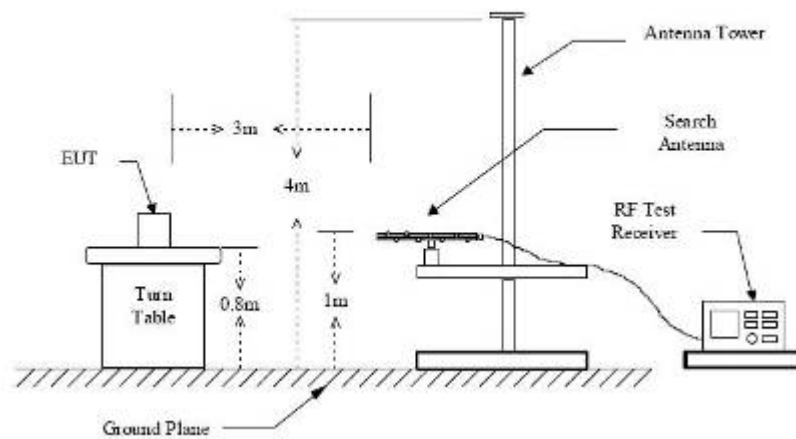
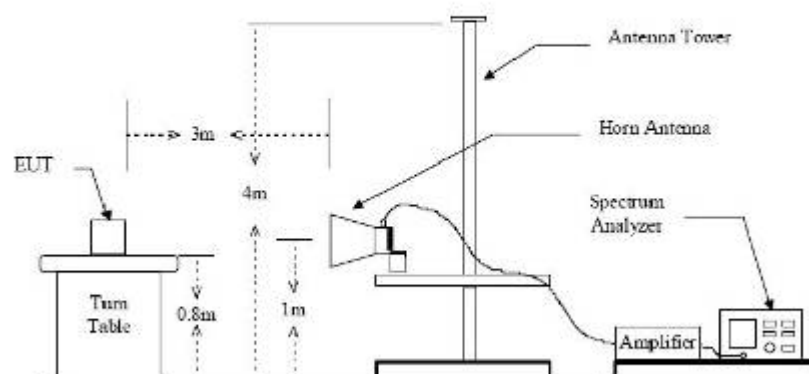
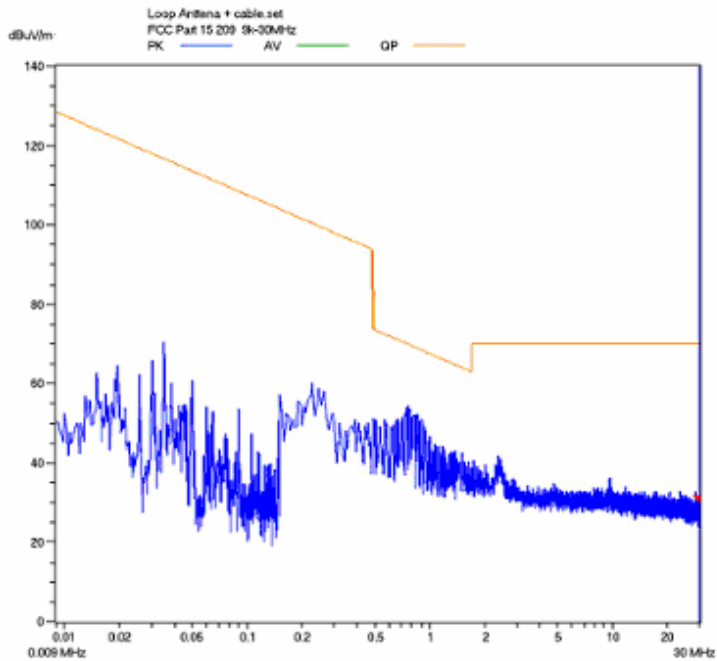


Figure 2 : Frequencies measured above 1 GHz configuration

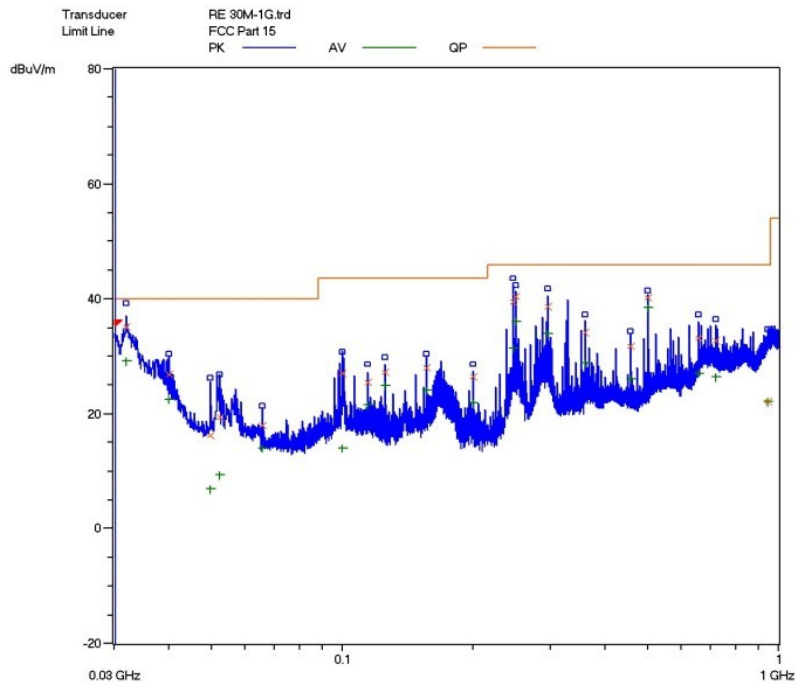


### 9 KHz-30MHz:

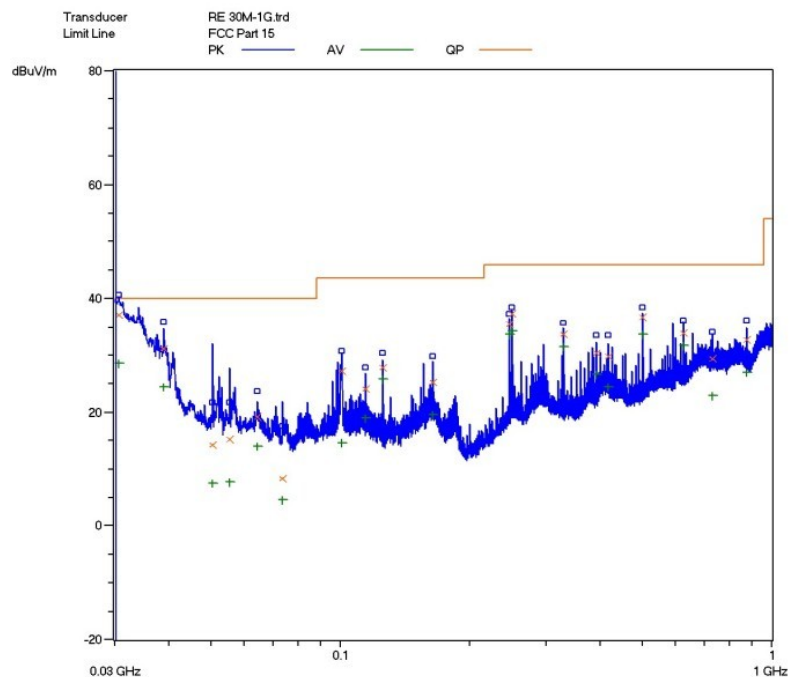


**Radiated Filed Strength Emission Test Plot  
(Peak,maxhold)-IP Call**

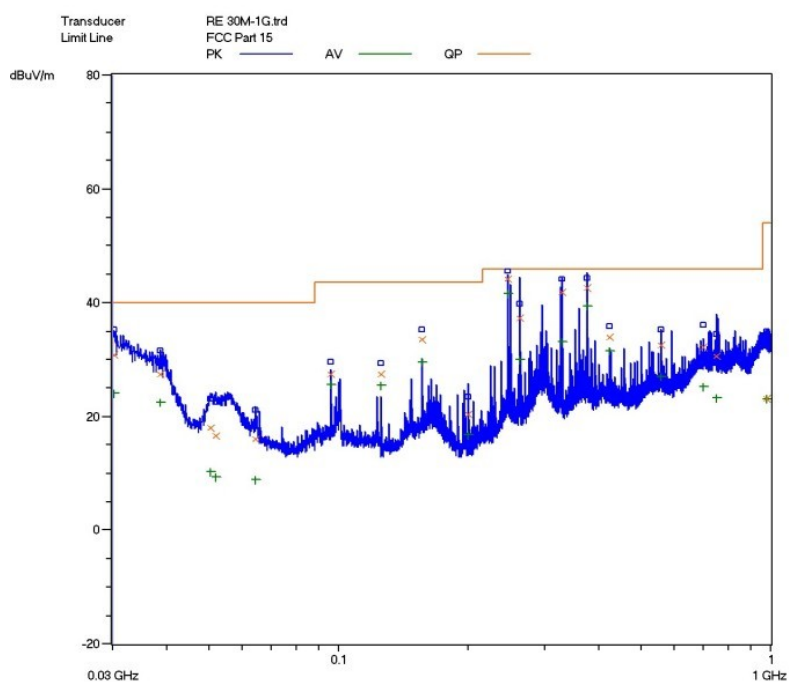
### 30-1000MHz:



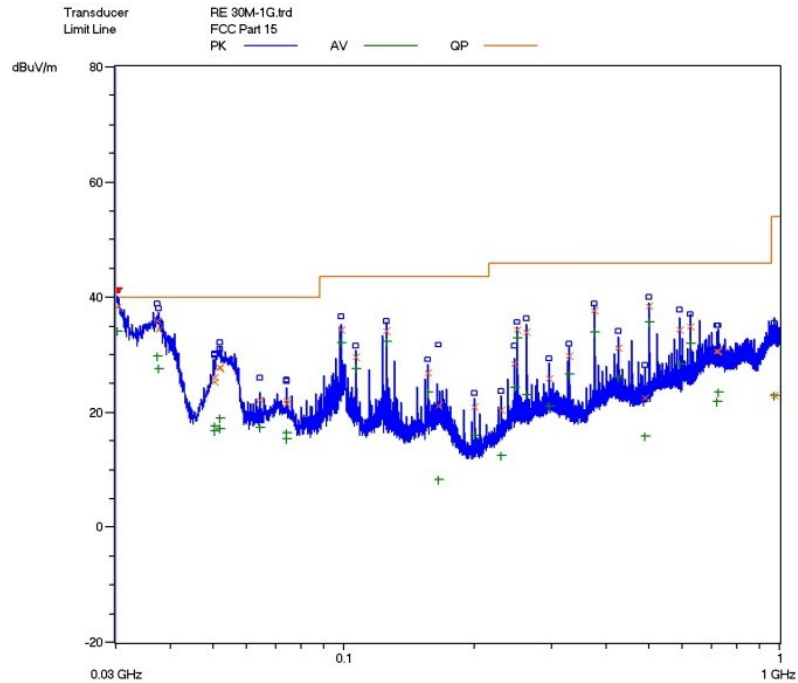
**Horizontal: Radiated Emission Test Plot  
(Peak,maxhold)-Connected to PC**



**Vertical: Radiated Emission Test Plot  
(Peak,maxhold)- Connected to PC**



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



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

**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 mode. PoE 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)
<b>Horizontal</b>							
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	0.2	17.4	/	22.7	40.3	46	-5.7
655.280	0.36	20	/	12.74	33.1	46	-12.9
<b>Vertical</b>							
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	0.2	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:**

<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>
<b>Peak Measurement</b>								
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
<b>Average Measurement</b>								
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	-18.90	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	-13.80	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.



**PoE Mode/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)
<b>Horizontal</b>							
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
<b>Vertical</b>							
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:**


<b>Frequency (MHz)</b>	<b>Cable Loss (dB)</b>	<b>Antenna Factor (dB)</b>	<b>Preamplifier 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 Polarization (H/V)</b>
<b>Peak Measurement</b>								
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	-17.90	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
<b>Average Measurement</b>								
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:**

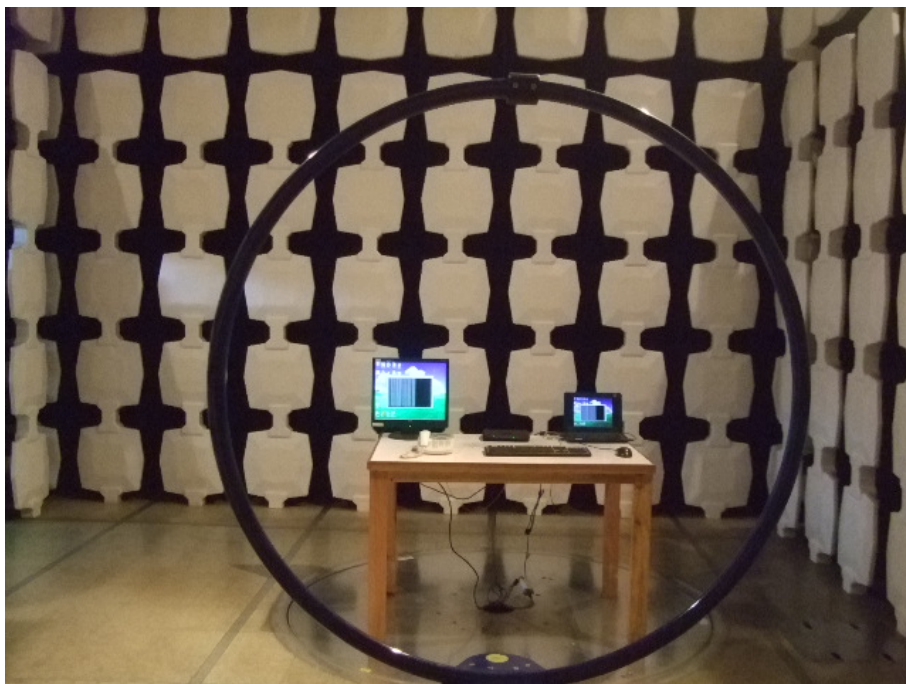
1. The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows: Emission Level = Reading Level + Antenna Factor + Cable Loss - Preamplifier Factor.
2. The limits shown are based on Peak value and Average value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

<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	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)***