

## EMI TEST REPORT

On Model Name: IP Camera

Model Number: GXV3610\_HD, GXV3610\_FHD

Brand Name: Grandstream

Prepared for Grandstream Networks, INC

FCC ID Number: YZZGXV3610-FHD

According to FCC 47 CFR Part 15, Subpart B

Test Report #: SHE-1306-11008-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 June 24<sup>th</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>YZZGXV3610-FHD _Test report.pdf</i>           |
| <i>Operation Description</i> | <i>Technical Description</i> | <i>YZZGXV3610-FHD _operation description.pdf</i> |
| <i>External Photos</i>       | <i>External Photos</i>       | <i>YZZGXV3610-FHD _External Photos</i>           |
| <i>Internal Photos</i>       | <i>Internal Photos</i>       | <i>YZZGXV3610-FHD _Internal Photos</i>           |
| <i>Block Diagram</i>         | <i>Block Diagram</i>         | <i>YZZGXV3610-FHD _Block Diagram.pdf</i>         |
| <i>Schematics</i>            | <i>Circuit Diagram</i>       | <i>YZZGXV3610-FHD _Schematics.pdf</i>            |
| <i>ID Label/Location</i>     | <i>Label and Location</i>    | <i>YZZGXV3610-FHD _Label &amp; Location.pdf</i>  |
| <i>User Manual</i>           | <i>User Manual</i>           | <i>YZZGXV3610-FHD _User Manual.pdf</i>           |
| <i>Test setup photos</i>     | <i>Test set-up photos</i>    | <i>YZZGXV3610-FHD _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 Camera*

*Model Numbers* : *GXV3610\_HD, GXV3610\_FHD*

*Model Tested* : *GXV3610\_FHD*

*Receipt Date* : *June 14<sup>th</sup>, 2013*

*Date Tested* : *June 17<sup>th</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 GXV3610\_FHD (referred to as the EUT in this report) is an IP Camera.

The EUT is an IP Camera and technical specifications of EUT are as follows:

| <b>Parameter</b>        |                      | <b>Range</b>  |
|-------------------------|----------------------|---|
| <i>Basic parameters</i> | <i>Rated voltage</i> | 12V   |
|                         | <i>Rated Current</i> | 1A  |
| <i>I/O Ports</i>        | --                   | --  |
|                         | <i>Network Port</i>  | 10/100Mbps RJ-45 ports for PC (downlink) connection |
|                         | <i>Power Jack</i>    | 12V DC power port; UL Certified                     |
| <i>Power Adapter</i>    | <i>Input</i>         | 100-240VAC 50/60Hz 0.3A                             |
|                         | <i>Output</i>        | 12VDC, 1.0A   |
|                         | <i>Model</i>         | SEF1200100A1BB                                      |
|                         | <i>Brand name</i>    | Mass  |

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

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

*Model GXV3610\_HD and GXV3610\_FHD are series product, The differences between them are as follows:*

*GXV3610\_HD is High Definition digital which uses the DSP of DM365-300 and the Sensor of AR0130. GXV3610\_FHD is Full High Definition digital which uses the DSP of DM368-400 and the Sensor of AR0331.*

*Pre-scan has been conducted to determine the worst-case between this two models,model GXV3610\_FHD was selected for the final testing.*



## **Test Summary**

*The Electromagnetic Compatibility requirements on model GXV3610\_FHD 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<br/>ANSI C63.4 -2003</i> | <i>Conducted<br/>Emission</i> | <i>Passed</i>       | <i>AC Input Port</i> | <i>Attachment 1</i> |
| <i>FCC Part 15.109<br/>ANSI C63.4 -2003</i> | <i>Radiated<br/>Emission</i>  | <i>Passed</i>       | <i>Enclosure</i>     | <i>Attachment 2</i> |

### **EUT Operation Mode**

*The system was tested in as normal use status. The following modes were selected for the final testing:*

**IP Camera mode:**

*Connected the EUT to an notebook PC by an RJ-45 cord and established a video Links between them and measured it.*

**PoE mode:**

*Let the EUT operates in PoE mode and measured it.*

### **EUT Exercise Software**

*The device is not programmable and does not use software.*

### **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.*

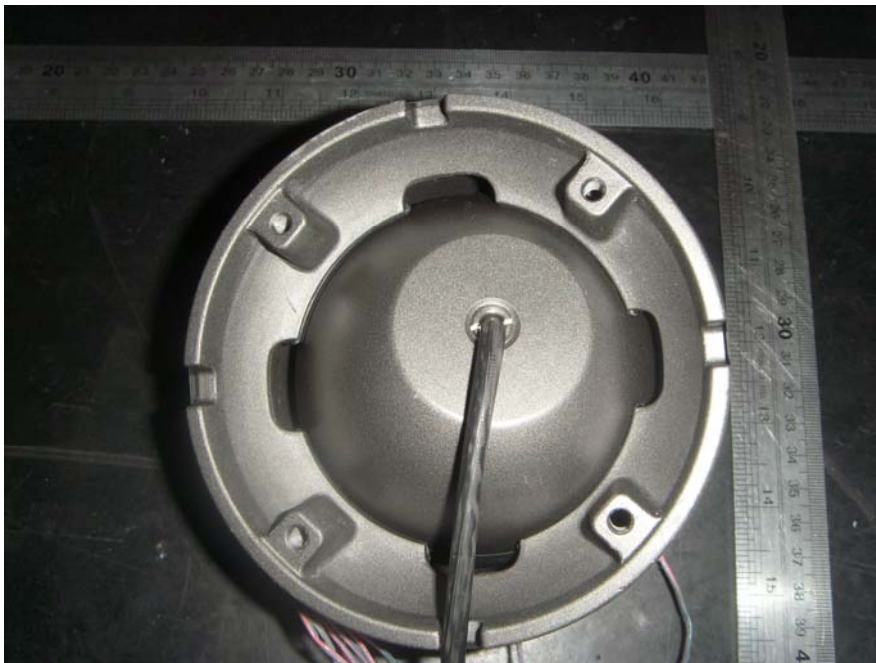
*There were no modifications installed by ECMG Electronic Technical Testing Corp (Shenzhen).*

**EUT Sample Photos**

**EUT Model: GXV3610\_FHD**



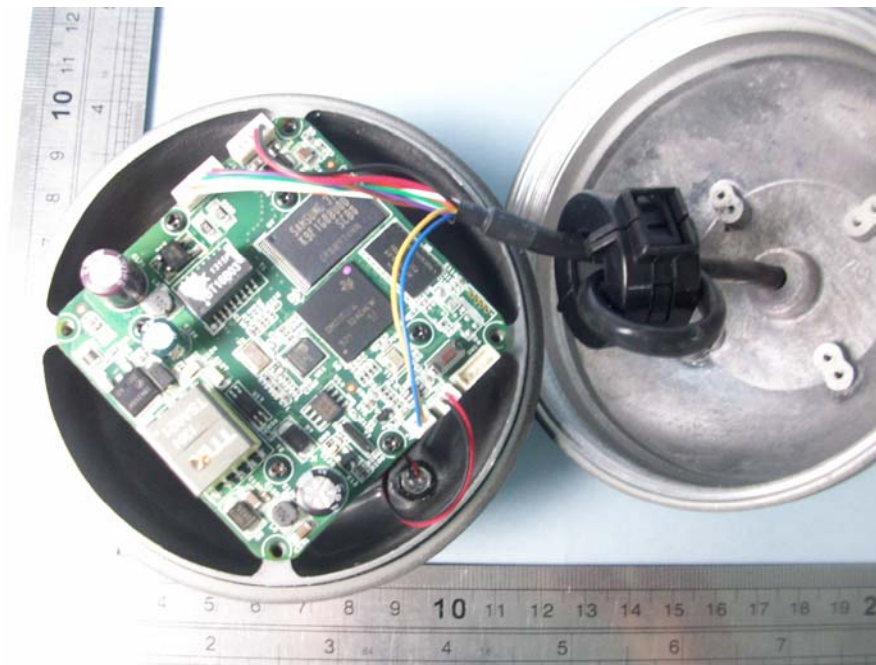
**EUT- Front View**



**EUT- Rear View**



***EUT- Side View***



***EUT-Uncovered View***

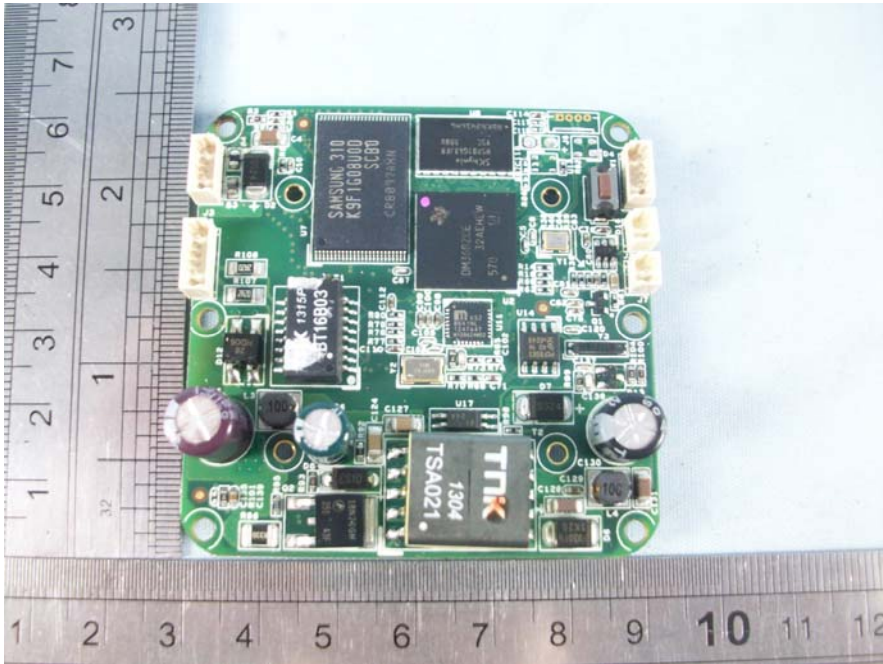


***Lens Front View***

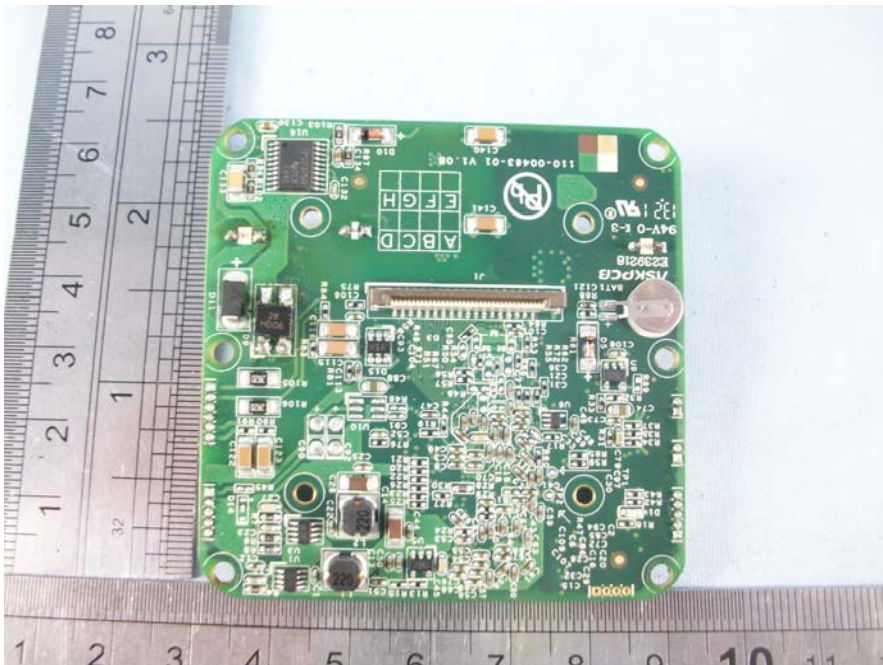


***Lens Rear View***

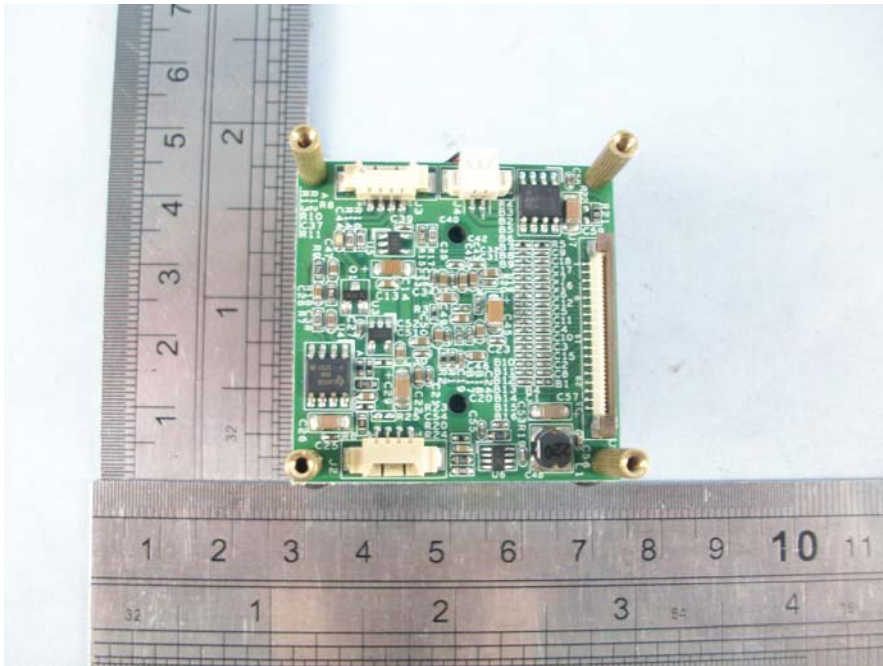




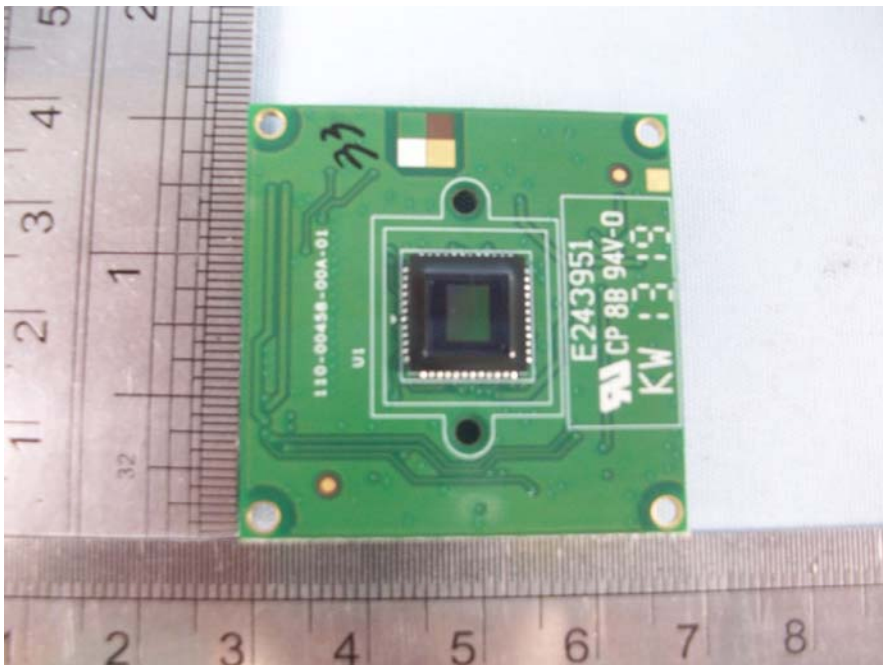
**Main board- Top View**



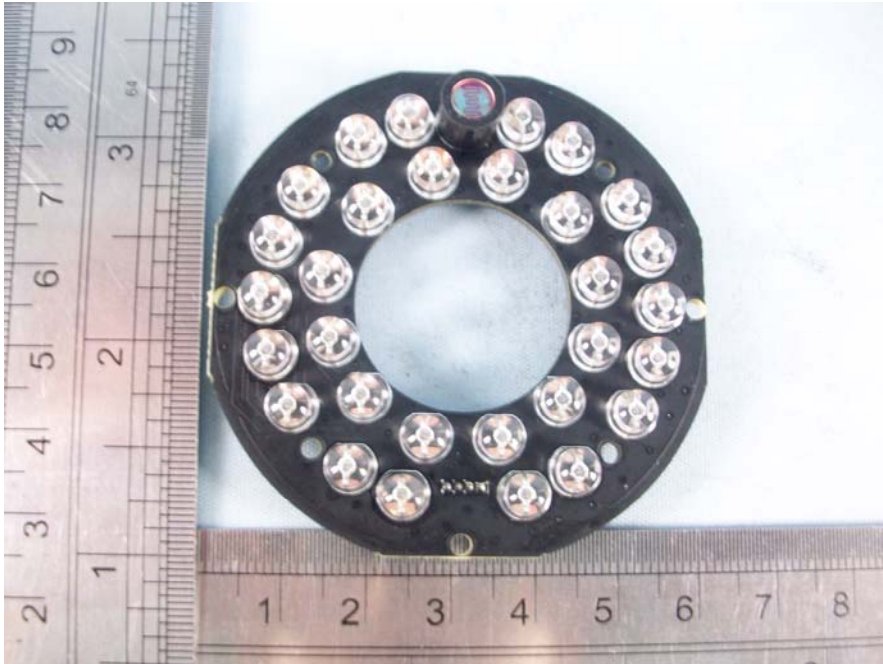
**Main board- Bottom View**



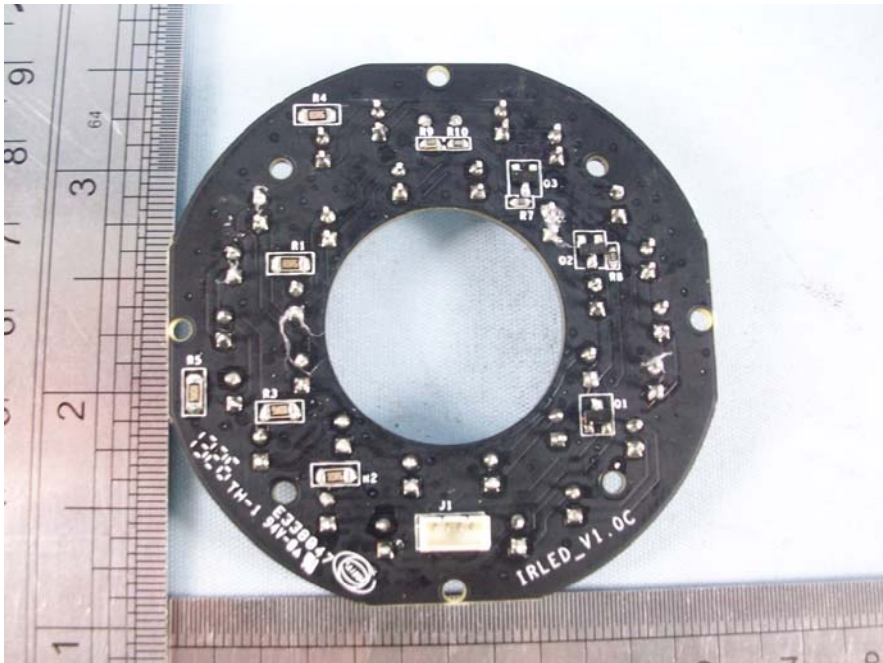
**Sensor board - Top View**



**Sensor board - bottom View**



**LED board - Top View**



**LED board- Bottom View**





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

## Test System Details

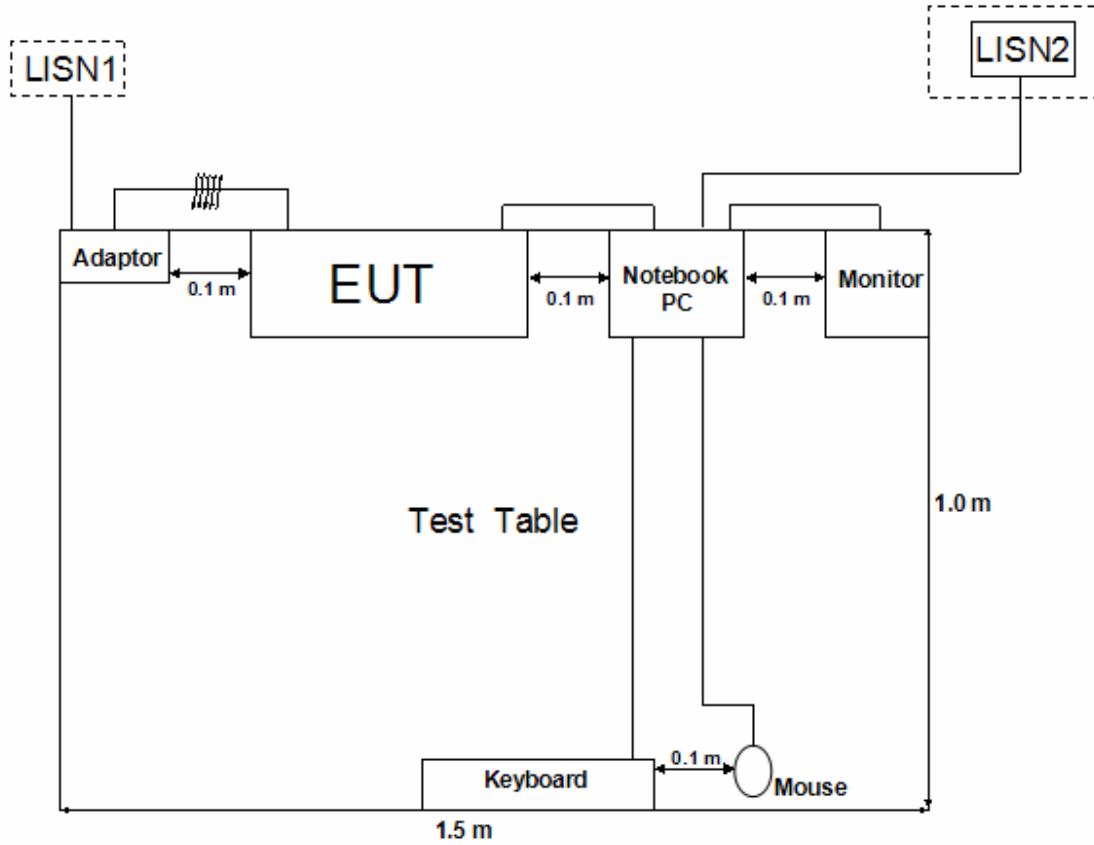
| <i>EUT</i>               |                           |                      |                     |
|--------------------------|---------------------------|----------------------|---------------------|
| <b>Model Number:</b>     | GXV3610_HD,GXV3610_FHD    |                      |                     |
| <b>Model Tested:</b>     | GXV3610_FHD               |                      |                     |
| <b>Description:</b>      | IP Camera                 |                      |                     |
| <b>Input:</b>            | AC 120V/60Hz              |                      |                     |
| <b>Manufacturer:</b>     | Grandstream Networks, INC |                      |                     |
| <i>Support Equipment</i> |                           |                      |                     |
| <i>Description</i>       | <i>Model Number</i>       | <i>Serial Number</i> | <i>Manufacturer</i> |
| Notebook PC              | ThinkPad X121e            | ---                  | Lenovo              |
| Mouse                    | MO32B0                    | 23-033131            | IBM                 |
| Keyboard                 | SK-1788                   | ---                  | LENOVO              |
| Monitor                  | TFT1780PS                 | ---                  | AOC                 |

| <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>Adaptor Cord Of Notebook PC</i>        | <i>AC Adaptor</i>  | <i>Notebook PC</i> | <i>1.6</i>             | <i>N</i>              | <i>Y</i>             |
|   | <i>AC Plug</i>     | <i>AC Adaptor</i>  | <i>1.2</i>             | <i>N</i>              | <i>Y</i>             |
| <i>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>Notebook PC</i> | <i>1.2</i>             | <i>N</i>              | <i>Y</i>             |
| <i>Keyboard cord</i>                      | <i>keyboard</i>    | <i>Notebook PC</i> | <i>1.2</i>             | <i>N</i>              | <i>Y</i>             |
| <i>VGA cord</i>                           | <i>Notebook PC</i> | <i>Monitor</i>     | <i>1.2</i>             | <i>Y</i>              | <i>Y</i>             |
| <i>RJ-45 Cord</i>                         | <i>EUT</i>         | <i>Notebook PC</i> | <i>2.0</i>             | <i>N</i>              | <i>Y</i>             |
| <i>AC Adaptor cord</i>                    | <i>EUT</i>         | <i>Plug</i>        | <i>1.8</i>             | <i>N</i>              | <i>Y</i>             |
| <i>Note: The "EUT" means "IP Camera".</i> |                    |                    |                        |                       |                      |

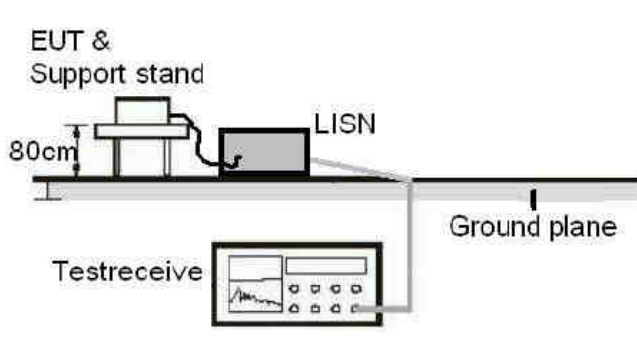
**NOTE:**

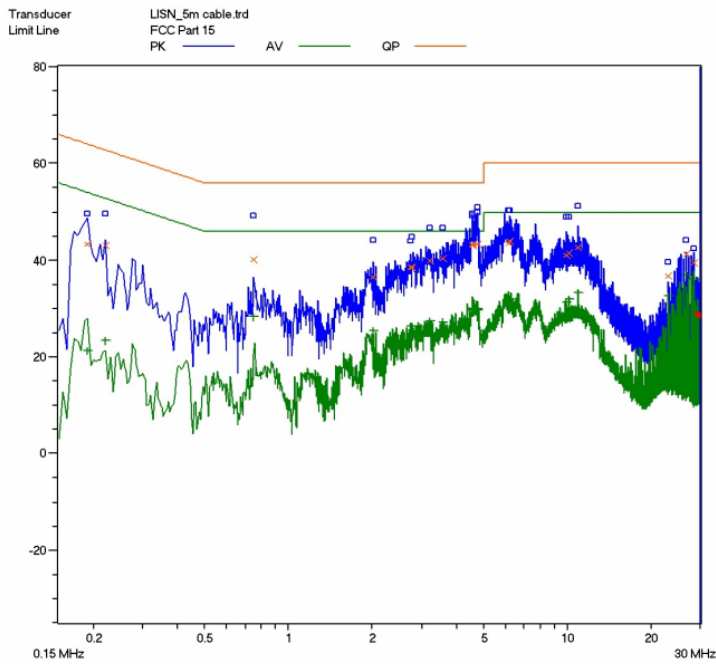
*The EUT has been tested as an independent unit together with other necessary accessories or support units. The above support units or accessories were used to form a representative test configuration during the test tests.*

## Configuration of Tested System

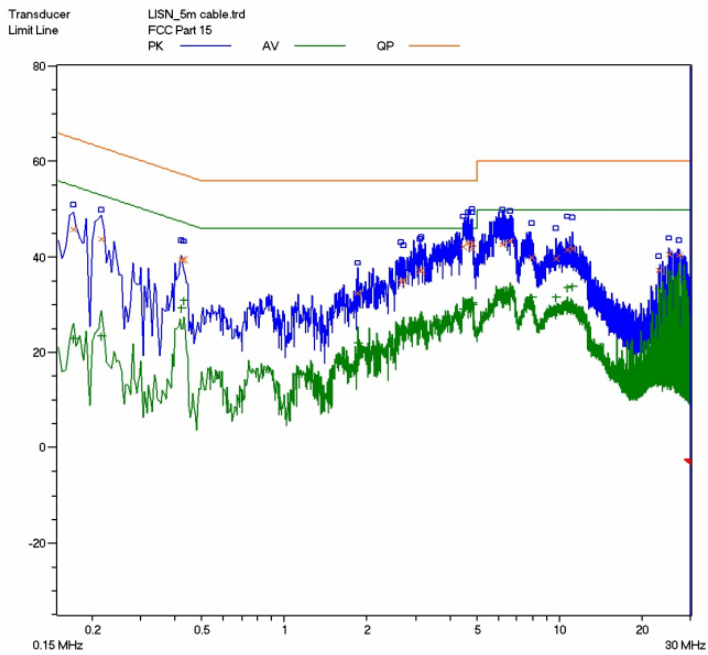


## ATTACHMENT 1 - CONDUCTED EMISSION TEST RESULTS

|                                  |  |                         |  |
|----------------------------------|--|-------------------------|--|
| <b>CLIENT:</b>                   | Grandstream Networks, INC  | <b>TEST STANDERD:</b>   | FCC Part 15, Subpart B, Section 15.107 |
| <b>MODEL NUMBERS:</b>            | GXV3610_HD,GXV3610_FHD   | <b>PRODUCT:</b>         | IP Camera                              |
| <b>MODEL TESTED:</b>             | GXV3610_FHD  | <b>EUT DESIGNATION:</b> | Home or Office                         |
| <b>TEMPERATURE:</b>              | 22°C   | <b>HUMIDITY:</b>        | 48%                                    |
| <b>ATM PRESSURE:</b>             | 103kPa   | <b>GROUNDING:</b>       | None                                   |
| <b>TESTED BY:</b>                | Daomen   | <b>DATE OF TEST:</b>    | June 17 <sup>th</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>  | IP Camera mode   |                         |  |
| <b>TEST SET UP:</b>              |  <p>The diagram illustrates the test setup. It shows an 'EUT &amp; Support stand' with a height of '80cm'. The EUT is connected to a 'LISN' (Line Impedance Stabilization Network). The LISN is connected to a 'Testreceive' unit, which is 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 -  
IP Camera mode**



**Line N Conducted Emission Graph -  
IP Camera mode**

**Test Data:****IP Camera mode:**

| 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           | 4.755           | 43.4                      | 56               | -12.6          | 4.755           | 30.0                      | 46               | -16.0          |
| L           | 6.150           | 43.5                      | 60               | -16.5          | 6.150           | 31.8                      | 50               | -18.2          |
| L           | 6.240           | 44.0                      | 60               | -16.0          | 6.240           | 31.9                      | 50               | -18.1          |
| N           | 0.170           | 45.9                      | 65               | -19.1          | 0.170           | 22.9                      | 55               | -32.1          |
| N           | 0.215           | 43.9                      | 63               | -19.1          | 0.215           | 23.4                      | 53               | -29.6          |
| N           | 0.420           | 39.5                      | 57.4             | -17.9          | 0.420           | 29.3                      | 47.4             | -18.1          |

**Note :**

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

**Test Equipment List:**

| Test Equipment                       | Model No. | Manufacturer | Serial No.             | Last Cal.  | Cal. Interval |
|--------------------------------------|-----------|--------------|------------------------|------------|---------------|
| Receiver                             | SMR4503   | SCHAFFNER    | 11725                  | 2012.07.08 | 2013.07.08    |
| Line impedance stabilization network | ESH2-Z5   | R&S          | 0338.5219.53-100396-vj | 2013.03.14 | 2014.03.13    |

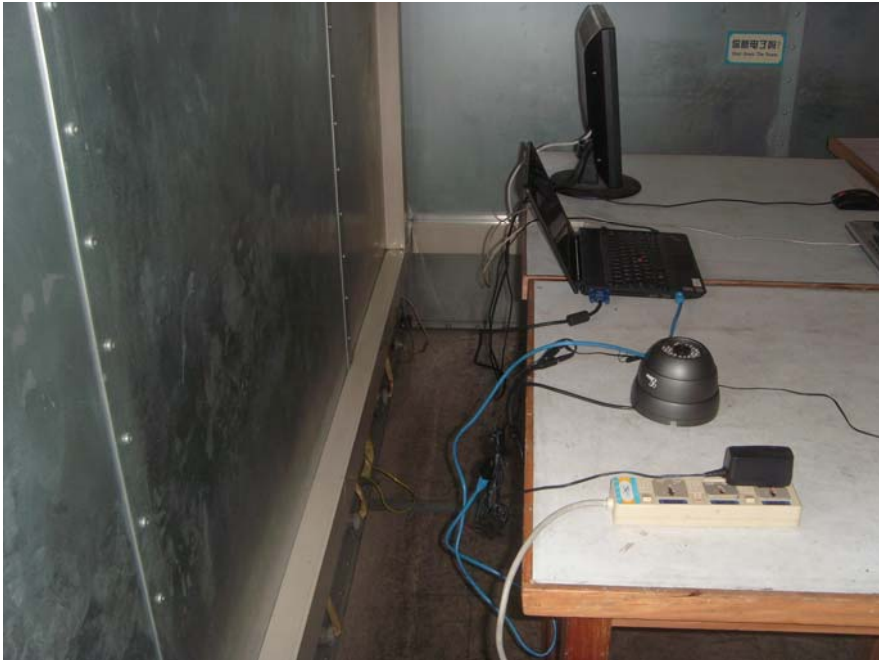
Note: All testing were performed using internationally recognized standards. All test instruments were calibrated.

TESTED BY: Severino ECMG  
COMPANY NAME  
ENGINEER

REVIEWED BY: Janeyan ECMG  
COMPANY NAME  
SENIOR ENGINEER



***Conducted Emission Test Set-up -Front view***



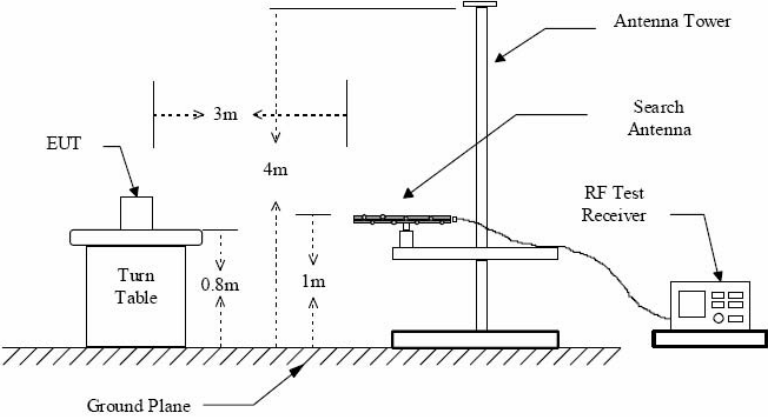
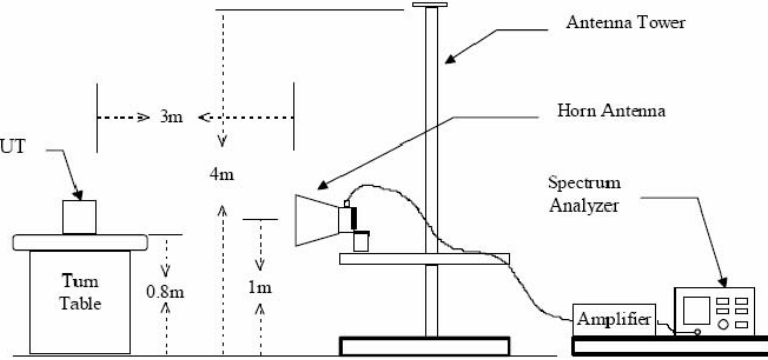
***Conducted Emission Test Set-up -Rear view***

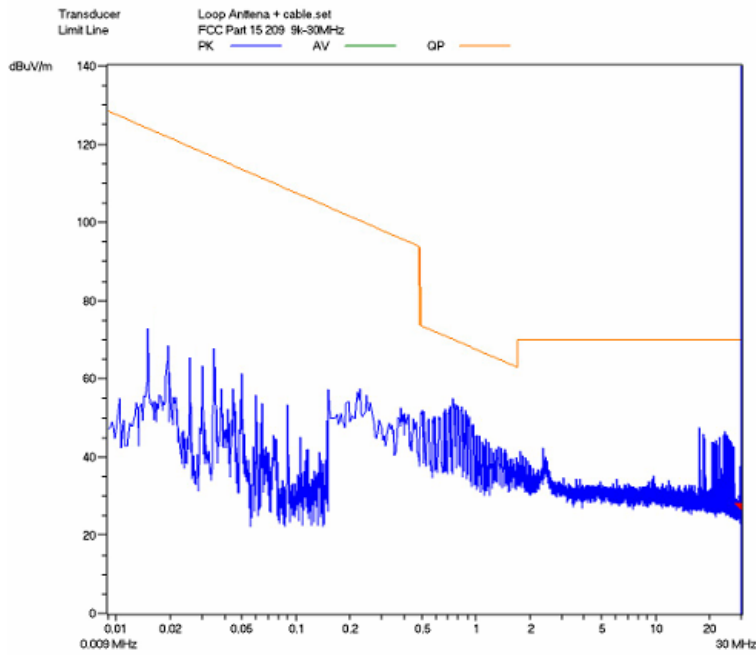


## ATTACHMENT 2 – RADIATED EMISSION MEASUREMENT

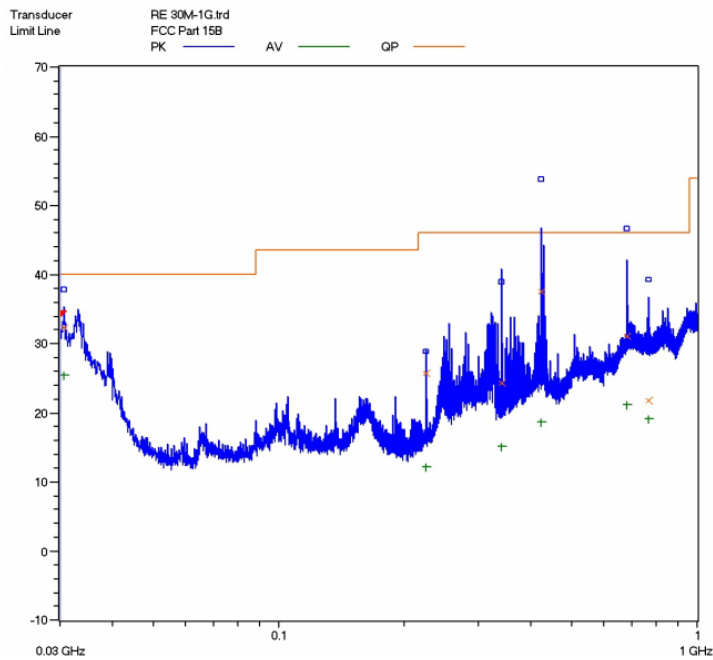
|                        |   |                         |                                       |
|------------------------|---|-------------------------|---------------------------------------|
| <b>CLIENT:</b>         | Grandstream Networks, INC   | <b>TEST STANDERD:</b>   | FCC Part 15,Subpart B, Section 15.109 |
| <b>MODEL NUMBERS:</b>  | GXV3610_HD,GXV3610_FHD  | <b>PRODUCT:</b>         | IP Camera                             |
| <b>EUT MODEL:</b>      | GXV3610_FHD   | <b>EUT DESIGNATION:</b> | Home or Office                        |
| <b>TEMPERATURE:</b>    | 22°C  | <b>HUMIDITY:</b>        | 47%RH                                 |
| <b>ATM PRESSURE:</b>   | 103.0kPa  | <b>GROUNDING:</b>       | None                                  |
| <b>TESTED BY:</b>      | Daomen  | <b>DATE OF TEST:</b>    | June 17 <sup>th</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.</p> <p>An EMI receiver peak scan was made at the frequency measurement range (pre-scan) in an Anechoic chamber.signal discrimination was then performed and the significant peaks marked.these peaks were then quasi-peaked in the frequency range of 30 MHz to 1GHz and average and peak in the frequency range of 1GHz to 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>       | IP Camera mode and PoE Mode   |                         |                                       |
| <b>TESTED RANGE:</b>   | 30MHz to 5GHz   |                         |                                       |
| <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.   |                         |                                       |

Continue on to next page...

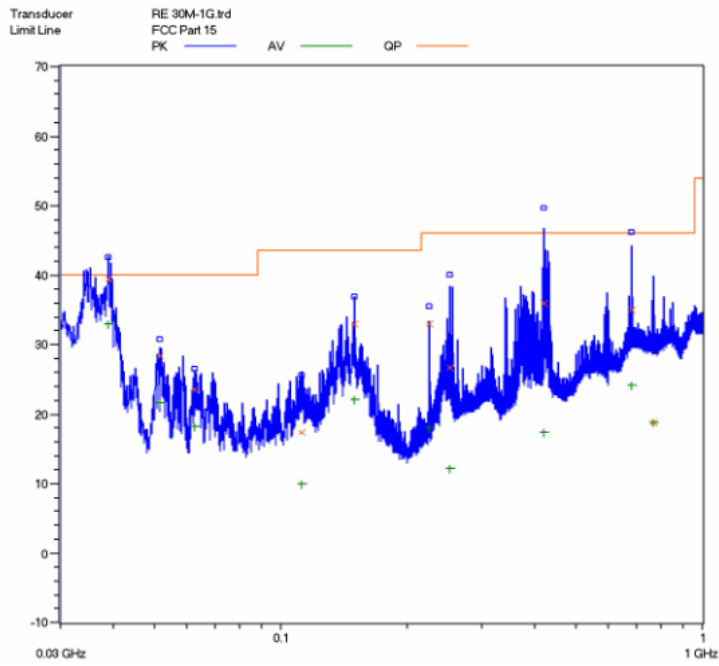
|   |   |
|---|---|
| <p><b>TEST SET-UP</b></p>               | <p style="text-align: center;">Figure 1 : Frequencies measured below 1 GHz configuration</p>  <p style="text-align: center;">Figure 2 : Frequencies measured above 1 GHz configuration</p>  |
| <p><b>CHANGES OR MODIFICATIONS:</b></p> | <p>There were no modifications installed by ECMG Electronic Technical Testing Corp (Shenzhen). Test personnel.</p>  |
| <p><b>M. UNCERTAINTY:</b></p>           | <p>Freq. <math>\pm 2 \times 10^{-7}</math> x Center Freq., Amp <math>\pm 2.6</math> dB</p>  |



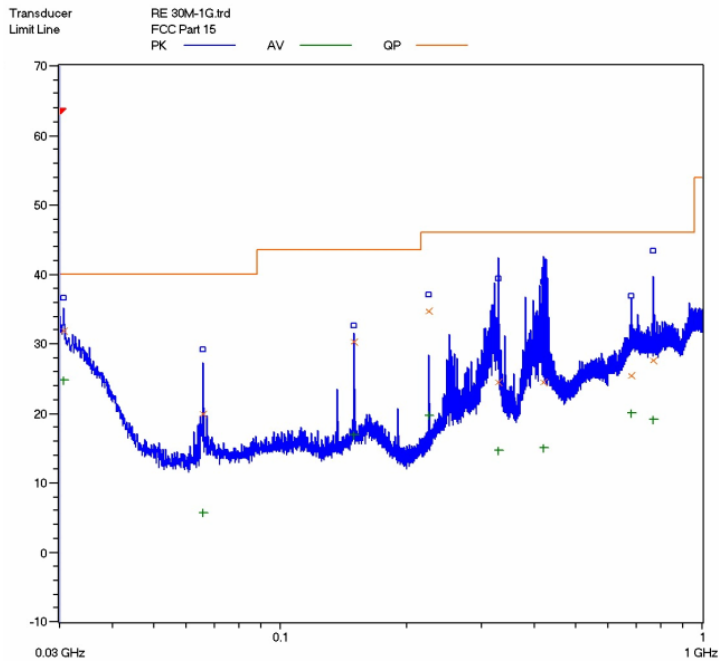
***Radiated Filed Strength Emission Test Plot  
(9KHz-30MHz)- IP Camera mode***



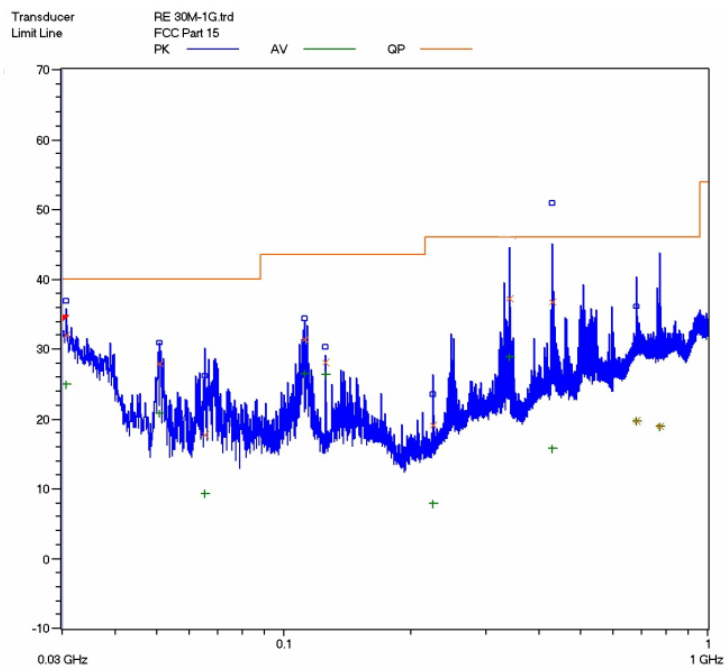
***Horizontal:Radiated Emission Test Plot  
(30-1000MHz) - IP Camera mode***



**Vertical:Radiated Emission Test Plot  
 (30-1000MHz) - IP Camera mode**



**Horizontal:Radiated Emission Test Plot-PoE Mode**



**Vertical:Radiated Emission Test Plot -PoE Mode**

**Test Data:**

**For 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:**  
**Below 1GHz:**  
**IP Camera mode:**

| 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> |                 |                     |                    |                           |                         |                |             |
| 30.640            | 0.02            | 16.7                | /                  | 15.68                     | 32.4                    | 40             | -7.6        |
| 224.400           | 0.12            | 9.0                 | /                  | 16.58                     | 25.7                    | 46             | -20.3       |
| 340.080           | 0.16            | 13.8                | /                  | 10.34                     | 24.3                    | 46             | -21.7       |
| 424.560           | 0.2             | 15.5                | /                  | 21.9                      | 37.6                    | 46             | -8.4        |
| 679.680           | 0.36            | 20.5                | /                  | 10.24                     | 31.1                    | 46             | -14.9       |
| 764.640           | 0.39            | 21.3                | /                  | 0.21                      | 21.9                    | 46             | -24.1       |
| <b>Vertical</b>   |                 |                     |                    |                           |                         |                |             |
| 38.960            | 0.02            | 18.4                | /                  | 21.08                     | 39.5                    | 40             | -0.5        |
| 51.760            | 0.02            | 8.2                 | /                  | 20.18                     | 28.4                    | 40             | -11.6       |
| 149.600           | 0.02            | 8.8                 | /                  | 24.08                     | 32.9                    | 43.5           | -10.6       |
| 224.400           | 0.12            | 9.0                 | /                  | 23.88                     | 33.0                    | 46             | -13.0       |
| 420.880           | 0.2             | 15.5                | /                  | 20.3                      | 36.0                    | 46             | -10.0       |
| 679.600           | 0.36            | 20.5                | /                  | 14.14                     | 35.0                    | 46             | -11.0       |

**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.

**Above 1GHz:  
IP Camera mode:**

| Frequency (MHz)            | 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) |
|----------------------------|-----------------|---------------------|--------------------------|------------------------|-------------------------|----------------|-------------|----------------------------|
| <b>Peak Measurement</b>    |                 |                     |                          |                        |                         |                |             |                            |
| 1.016                      | 1.40            | 23.9                | -33.6                    | 21.81                  | 47.11                   | 74             | -26.89      | H                          |
| 1.190                      | 1.45            | 24.5                | -33.6                    | 23.76                  | 49.71                   | 74             | -24.29      | H                          |
| 1.330                      | 1.57            | 25.1                | -33.6                    | 23.53                  | 50.20                   | 74             | -23.8       | H                          |
| 1.365                      | 1.58            | 25.1                | -33.6                    | 24.62                  | 51.30                   | 74             | -22.7       | V                          |
| 1.450                      | 1.65            | 25.7                | -33.6                    | 22.47                  | 49.82                   | 74             | -24.18      | V                          |
| 1.590                      | 1.76            | 26.7                | -33                      | 23.3                   | 51.76                   | 74             | -22.24      | V                          |
| <b>Average Measurement</b> |                 |                     |                          |                        |                         |                |             |                            |
| 1.016                      | 1.40            | 23.9                | -33.6                    | 18.42                  | 43.72                   | 54             | -10.28      | H                          |
| 1.190                      | 1.45            | 24.5                | -33.6                    | 19.65                  | 45.60                   | 54             | -8.4        | H                          |
| 1.330                      | 1.57            | 25.1                | -33.6                    | 13.6                   | 40.27                   | 54             | -13.73      | H                          |
| 1.365                      | 1.58            | 25.1                | -33.6                    | 14.95                  | 41.63                   | 54             | -12.37      | V                          |
| 1.450                      | 1.65            | 25.7                | -33.6                    | 18.42                  | 45.77                   | 54             | -8.23       | V                          |
| 1.590                      | 1.76            | 26.7                | -33                      | 11.66                  | 40.12                   | 54             | -13.88      | 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.



**For 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) |
|-------------------|-----------------|---------------------|--------------------|---------------------------|-------------------------|----------------|-------------|
| <b>Horizontal</b> |                 |                     |                    |                           |                         |                |             |
| 30.640            | 0.02            | 16.7                | /                  | 15.28                     | 32                      | 40.0           | -8.0        |
| 149.600           | 0.02            | 8.8                 | /                  | 21.48                     | 30.3                    | 43.5           | -13.2       |
| 224.400           | 0.12            | 9.0                 | /                  | 25.68                     | 34.8                    | 46             | -11.2       |
| 328.000           | 0.16            | 13.4                | /                  | 10.94                     | 24.5                    | 46             | -21.5       |
| 421.920           | 0.2             | 15.5                | /                  | 8.8                       | 24.5                    | 46             | -21.5       |
| 680.080           | 0.36            | 20.2                | /                  | 4.84                      | 25.4                    | 46             | -20.6       |
| <b>Vertical</b>   |                 |                     |                    |                           |                         |                |             |
| 30.640            | 0.02            | 16.7                | /                  | 15.28                     | 32.0                    | 40             | -8.0        |
| 51.040            | 0.02            | 6.2                 | /                  | 21.78                     | 28.0                    | 40             | -12.0       |
| 111.600           | 0.02            | 7.4                 | /                  | 24.08                     | 31.5                    | 43.5           | -12.0       |
| 125.040           | 0.02            | 16.9                | /                  | 11.18                     | 28.1                    | 43.5           | -15.4       |
| 340.000           | 0.16            | 13.8                | /                  | 23.34                     | 37.3                    | 46             | -8.7        |
| 428.240           | 0.2             | 15.8                | /                  | 20.8                      | 36.8                    | 46             | -9.2        |

**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.

**For PoE Mode/Above 1GHz:**

| Frequency (MHz)            | Cable Loss (dB) | Antenna Factor (dB) | Preamp Factor (dB) | Reading Level (dBuV/m) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Polarization (H/V) |
|----------------------------|-----------------|---------------------|--------------------|------------------------|-------------------------|----------------|-------------|----------------------------|
| <b>Peak Measurement</b>    |                 |                     |                    |                        |                         |                |             |                            |
| 1.016                      | 1.40            | 23.9                | -33.6              | 29.37                  | 54.67                   | 74             | -19.33      | H                          |
| 1.190                      | 1.45            | 24.5                | -33.6              | 26.28                  | 52.23                   | 74             | -21.77      | H                          |
| 1.330                      | 1.57            | 25.1                | -33.6              | 23.03                  | 49.70                   | 74             | -24.3       | H                          |
| 1.365                      | 1.58            | 25.1                | -33.6              | 21.68                  | 48.36                   | 74             | -25.64      | V                          |
| 1.450                      | 1.65            | 25.7                | -33.6              | 22                     | 49.35                   | 74             | -24.65      | V                          |
| 1.590                      | 1.76            | 26.7                | -33                | 24.25                  | 52.71                   | 74             | -21.29      | V                          |
| <b>Average Measurement</b> |                 |                     |                    |                        |                         |                |             |                            |
| 1.016                      | 1.40            | 23.9                | -33.6              | 21.2                   | 46.50                   | 54             | -7.5        | H                          |
| 1.190                      | 1.45            | 24.5                | -33.6              | 17.26                  | 43.21                   | 54             | -10.79      | H                          |
| 1.330                      | 1.57            | 25.1                | -33.6              | 19                     | 45.67                   | 54             | -8.33       | H                          |
| 1.365                      | 1.58            | 25.1                | -33.6              | 16.09                  | 42.77                   | 54             | -11.23      | V                          |
| 1.450                      | 1.65            | 25.7                | -33.6              | 14.75                  | 42.10                   | 54             | -11.9       | V                          |
| 1.590                      | 1.76            | 26.7                | -33                | 11.9                   | 40.36                   | 54             | -13.64      | 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:**

| <i>Test Equipment</i>                | <i>Model No.</i> | <i>Manufacturer</i> | <i>Serial No.</i> | <i>Last Cal.</i>  | <i>Cal. Due</i>   |
|--------------------------------------|------------------|---------------------|-------------------|-------------------|-------------------|
| <i>Receiver</i>                      | <i>SMR4503</i>   | <i>SCHAFFNER</i>    | <i>11725</i>      | <i>2012.07.08</i> | <i>2013.07.07</i> |
| <i>Double-ridged Wave guide horn</i> | <i>3115</i>      | <i>ETS</i>          | <i>6587</i>       | <i>2012.08.02</i> | <i>2013.08.01</i> |
| <i>Microwave system amplifier</i>    | <i>83017A</i>    | <i>Agilent</i>      | <i>MY39500438</i> | <i>2012.07.11</i> | <i>2013.07.10</i> |
| <i>Biconilog Antenna</i>             | <i>3142C</i>     | <i>ETS</i>          | <i>00042672</i>   | <i>2012.09.28</i> | <i>2013.09.27</i> |
| <i>Band-pass Filter</i>              | <i>BRM50702</i>  | <i>Micro-Tronic</i> | <i>S/N-030</i>    | <i>2012.11.30</i> | <i>2013.11.29</i> |
| <i>Spectrum Analyzer</i>             | <i>FSP30</i>     | <i>R&amp;S</i>      | <i>100755</i>     | <i>2012.11.30</i> | <i>2013.11.29</i> |
| <i>HF Loop Antenna</i>               | <i>HLA6120</i>   | <i>TESEQ</i>        | <i>26348</i>      | <i>2012-10-11</i> | <i>2013-10-12</i> |

*Note: All testing were performed using internationally recognized standards. All test instruments were calibrated.*

TESTED BY: *Jensen* ECMG  
ENGINEER COMPANY NAME

REVIEWED BY: *Janeyan* 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)***