

EMI TEST REPORT

On Model Name: IP Camera

Model Number: GXV3615WPI_HD

Brand Name: Grandstream

Prepared for Grandstream Networks, Inc.

FCC ID Number: YZZGXV3615WPI-HD

According to FCC 47 CFR Part 15, Subpart B

Test Report #: SHE-1404-11142 -FCC

Tested by: Daomen Galanz
Daomen /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 May 7th, 2014
Swall Zhang Date

Test Location

Tests performed in a Certified ANSI Semi-Anechoic Chamber and Shielded Room.

| | |
|---------------------------|---|
| <i>Test Site Location</i> | <i>: Galanz</i> |
| | <i>25 South Ronggui Rd., Shunde, Foshan, Guangdong, China</i> |
| <i>Tel</i> | <i>: (86)-757-23612785</i> |
| <i>Fax</i> | <i>: (86)-757-23612537</i> |

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 CN AL/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.

- IC - Registration No.: 8801A***

The Laboratory is registered to perform emission tests with Industry Canada (IC), and the registration number is 8801A.

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List Attached Files

| Exhibit Type | File Description | File Name |
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| <i>Test Report</i> | <i>Test Report</i> | YZZGXV3615WPI-HD _Test report.pdf |
| <i>Operation Description</i> | <i>Technical Description</i> | YZZGXV3615WPI-HD_operation description.pdf |
| <i>External Photos</i> | <i>External Photos</i> | YZZGXV3615WPI-HD_External Photos |
| <i>Internal Photos</i> | <i>Internal Photos</i> | YZZGXV3615WPI-HD_Internal Photos |
| <i>Block Diagram</i> | <i>Block Diagram</i> | YZZGXV3615WPI-HD_Block Diagram.pdf |
| <i>Schematics</i> | <i>Circuit Diagram</i> | YZZGXV3615WPI-HD _Schematics.pdf |
| <i>ID Label/Location</i> | <i>Label and Location</i> | YZZGXV3615WPI-HD_Label & Location.pdf |
| <i>User Manual</i> | <i>User Manual</i> | YZZGXV3615WPI-HD _User Manual.pdf |
| <i>Test set-up photos</i> | <i>Test set-up photos</i> | YZZGXV3615WPI-HD _Test Set-up Photos |

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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 : GXV3615WPI_HD

Model Tested : GXV3615WPI_HD

Receipt Date : April 15th, 2014

Date Tested : April 17th, 2014

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 GXV3615WPI_HD (referred to as the EUT in this report) is an IP Camera.

Technical specifications of the EUT are as belows:

| Parameter | | Range |
|-------------------------|----------------------------|--|
| <i>Basic parameters</i> | <i>Rated voltage</i> | 12VDC |
| | <i>Rated Current</i> | 0.5A |
| <i>I/O Ports</i> | <i>Power Jack</i> | <i>12V/0.5A Power Jack used to connect the power adapter. The camera should adopt BY type other than UPS. The usage of other adapters may lead to an insensitive touch screen.</i> |
| | <i>Network&PC Port</i> | <i>10/100Mbps Ethernet port connect to PC or LAN .</i> |
| <i>Power Adapter#1</i> | <i>Input</i> | <i>100-240VAC 50/60Hz</i> |
| | <i>Output</i> | <i>12VDC, 0.5A</i> |
| | <i>Model</i> | <i>WCF1200050A1BA</i> |
| | <i>Brand name</i> | <i>Mass Power</i> |
| <i>Power Adapter#2</i> | <i>Input</i> | <i>100-240VAC 50/60Hz 0.2A</i> |
| | <i>Output</i> | <i>12VDC, 0.5A</i> |
| | <i>Model</i> | <i>UE06L8-120050SPAU</i> |
| | <i>Brand name</i> | <i>UE</i> |

NOTE:

- 1. The EUT includes two power adapters which have been tested and recorded in this report.*
- 2. For more detailed informations or features please refer to user's manual of EUT.*

Test Summary

The Electromagnetic Compatibility requirements on model GXB3615WPI_HD 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 -2009 | Conducted Emission | Passed | AC Input Port | Attachment 1 |
| FCC Part 15.109 ANSI C63.4 -2009 | Radiated Emission | Passed | Enclosure | Attachment 2 |

Test Mode Justification

The system was tested in as normal use(IP Camera& PoE mode) status.

EUT Exercise Software

No test software support this test.

Equipment Modification

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

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

EUT Sample Photos

EUT Model:GXV3615WPI_HD



EUT-Front View



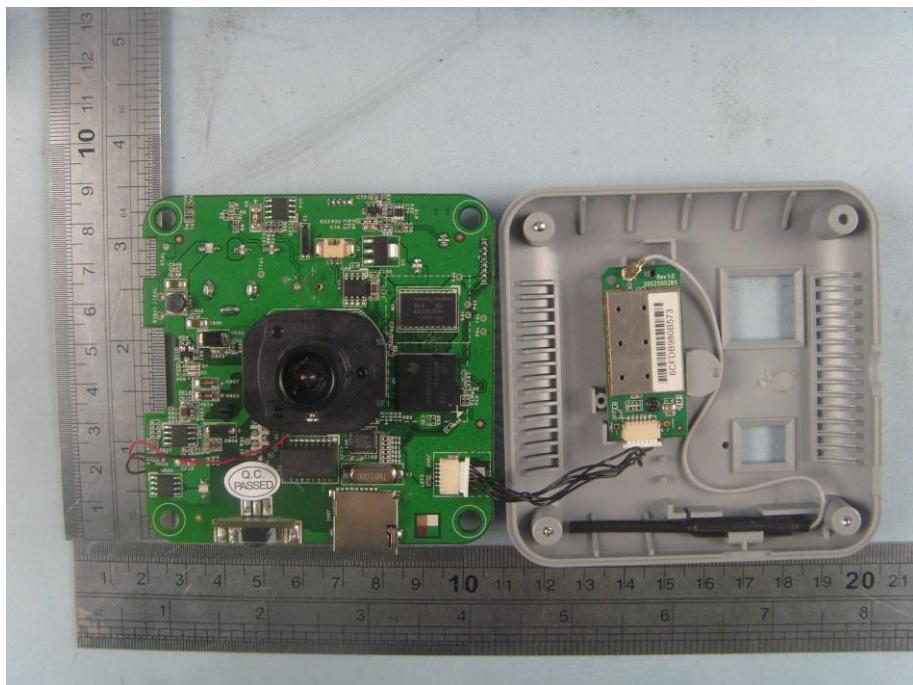
EUT-Rear View



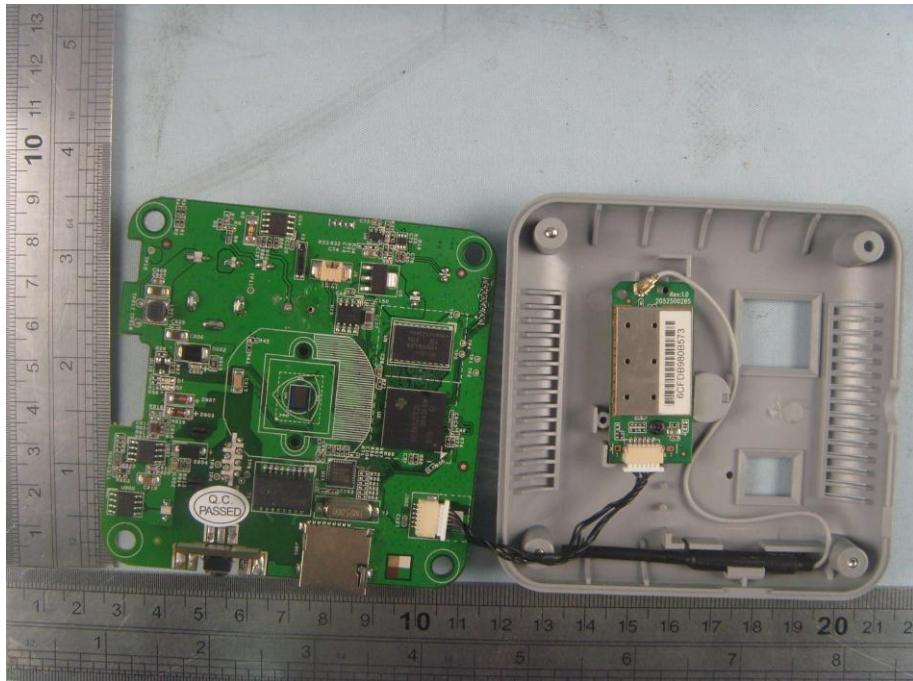
Power Adapter(Mass power)-Top View



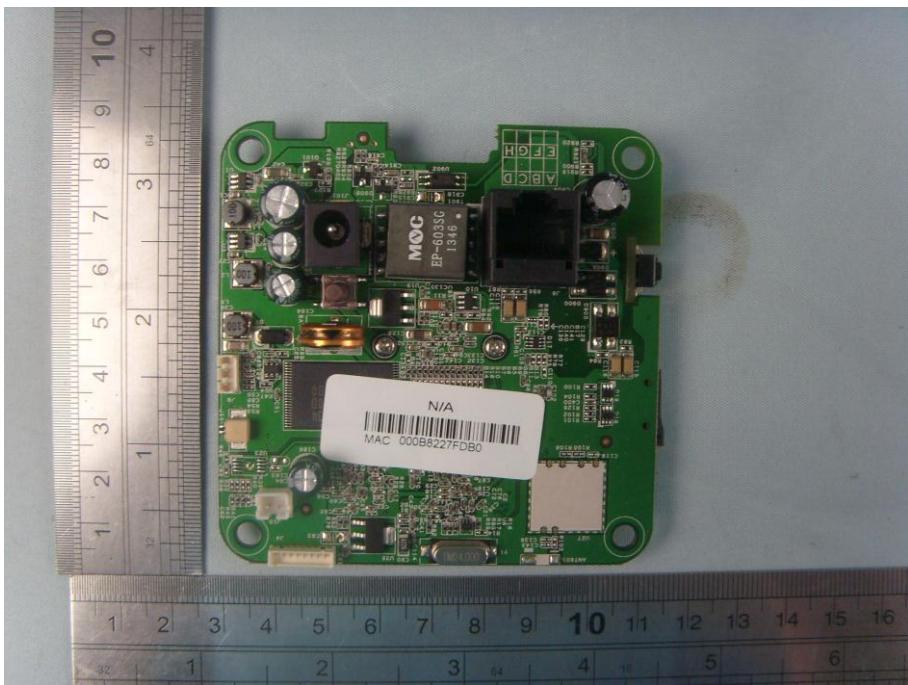
Power Adapter(UE)-Top View



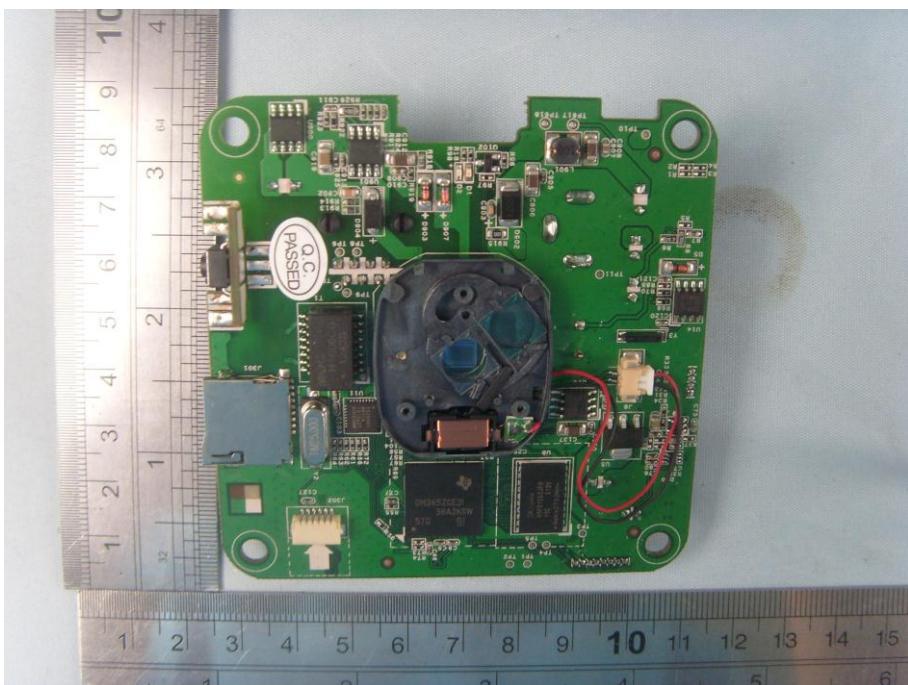
EUT-Uncovered View #1



EUT-Uncovered View #2



Main board- Top View



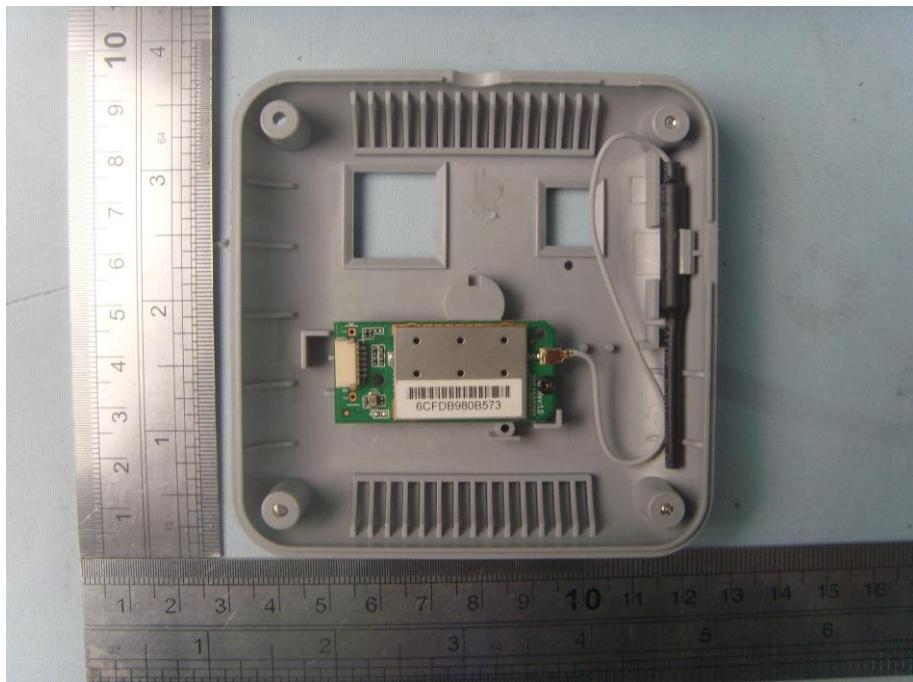
Main board- Bottom View



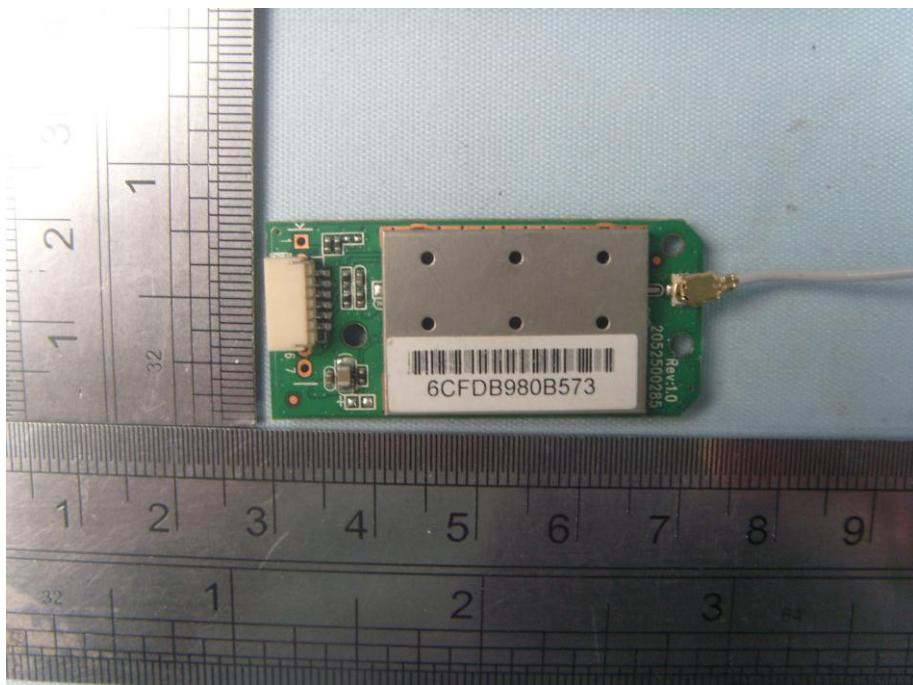
Lens -Top View



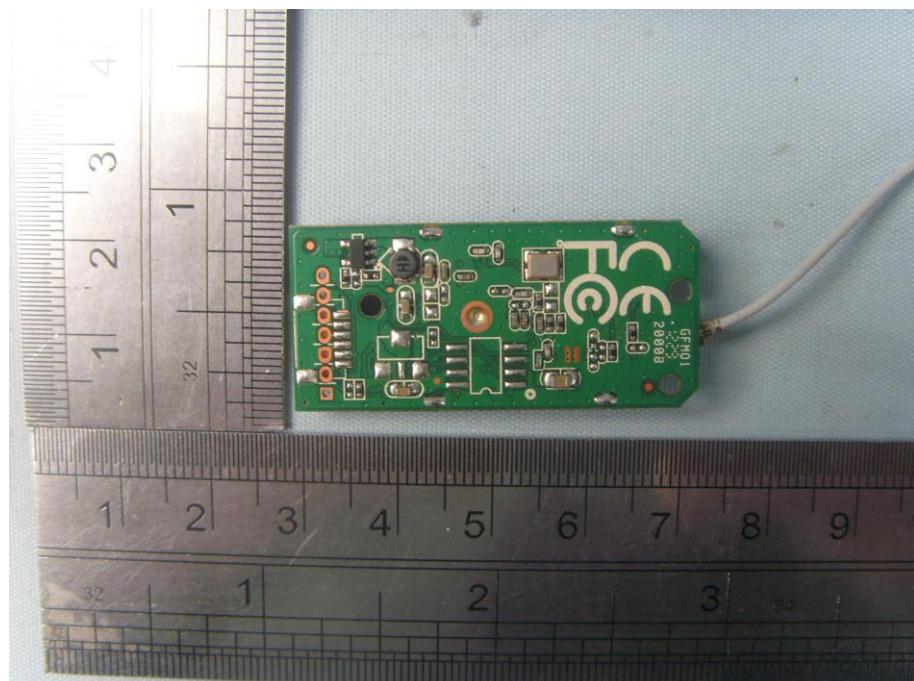
Lens-Bottom View



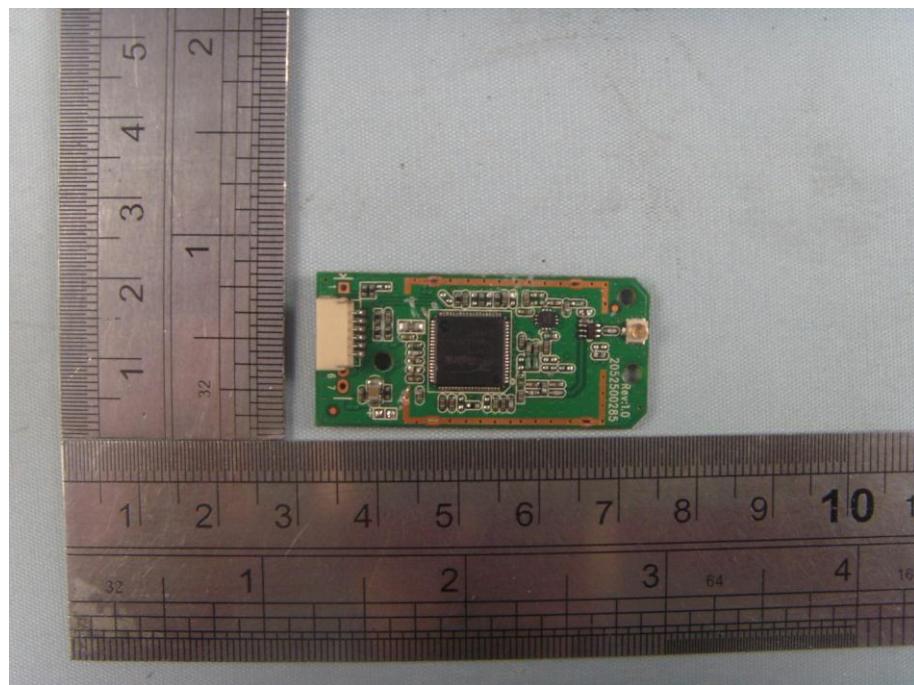
Wi-Fi Module&Antenna Location View



Wi-Fi module-Top View



Wi-Fi module-Bottom View



Wi-Fi module-Removed Shield Cover View

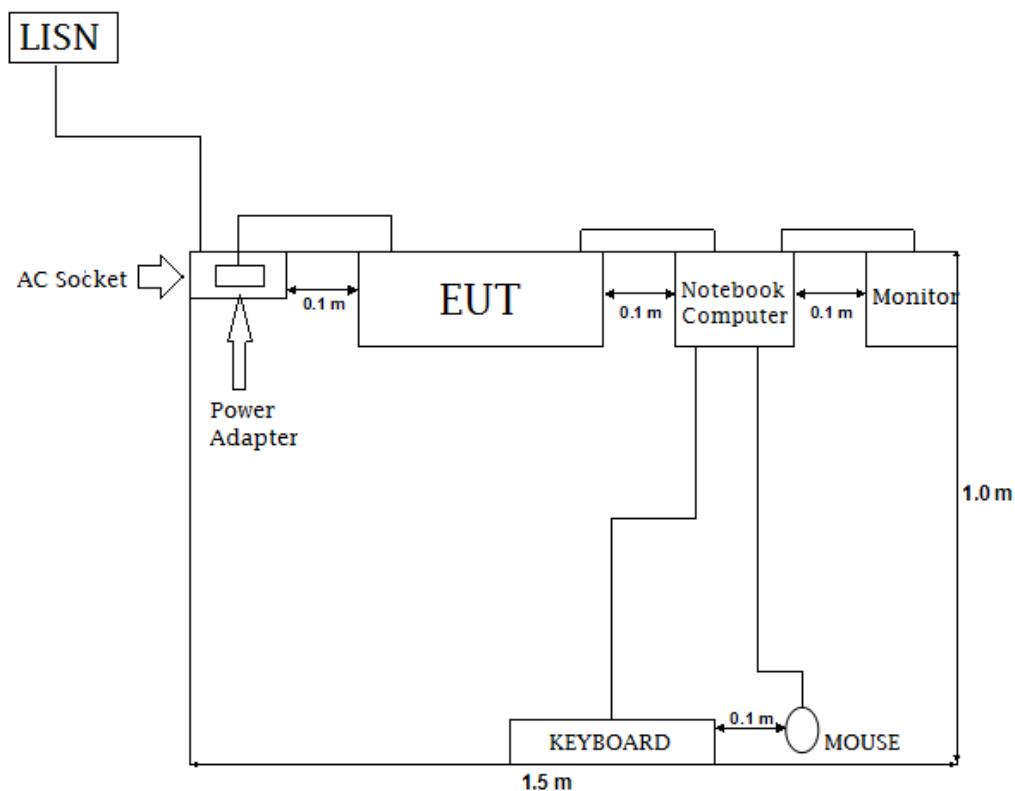
Test System Details

| EUT | | | |
|---------------------------|----------------------------|---------------|--------------|
| Model Number: | GXV3615WPI_HD | | |
| Model Tested: | GXV3615WPI_HD | | |
| Description: | IP Camera | | |
| Input: | AC 120V/60Hz | | |
| Manufacturer: | Grandstream Networks, Inc. | | |
| Support Equipment | | | |
| Description | Model Number | Serial Number | Manufacturer |
| Notebook computer | ThinkPad Edge E40 | TYPE0578-MDC | Lenovo |
| Adapter Of Notebook PC | ThinkPad 57Y4614 | 42T4424 | Lenovo |
| Mouse | MO32B0 | 23-033131 | IBM |
| Keyboard | SK-1788 | --- | Lenovo |
| Monitor | TFT1780PS | B8879HA021638 | AOC |
| PoE Adapter terminal unit | DWL-P200 | F370175001634 | D-Link |

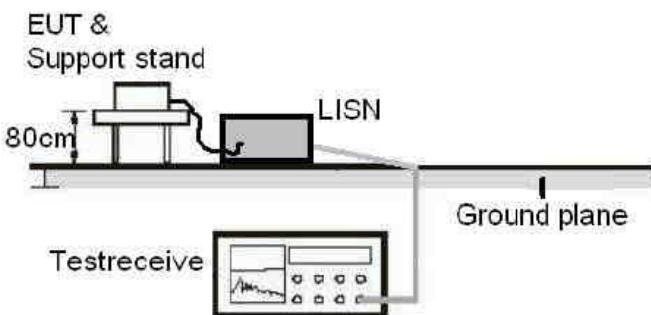
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| <i>Cable Description</i> | | | | | |
|---|--------------------|--------------------------|-------------------------------|------------------------------|-----------------------------|
| <i>Description</i> | <i>From</i> | <i>To</i> | <i>Length (Meters)</i> | <i>Shielded (Y/N)</i> | <i>Ferrite (Y/N)</i> |
| <i>Power Cord Of Notebook PC</i> | <i>Adapter</i> | <i>Notebook Computer</i> | 1.6 | N | Y |
| | <i>Adapter</i> | <i>AC Plug</i> | 1.2 | N | Y |
| <i>AC power cord of monitor</i> | <i>Monitor</i> | <i>Plug</i> | 1.2 | N | Y |
| <i>Mouse cord</i> | <i>Mouse</i> | <i>Plug</i> | 1.2 | N | Y |
| <i>Keyboard cord</i> | <i>Keyboard</i> | <i>Plug</i> | 1.2 | N | Y |
| <i>RJ-45 Cord</i> | <i>EUT</i> | <i>Notebook Computer</i> | 1.5 | N | N |
| <i>Power cord of Adapter</i> | <i>EUT</i> | <i>Plug</i> | 1.8 | N | N |
| <i>Note: The "EUT" means "IP CAMERA".</i> | | | | | |

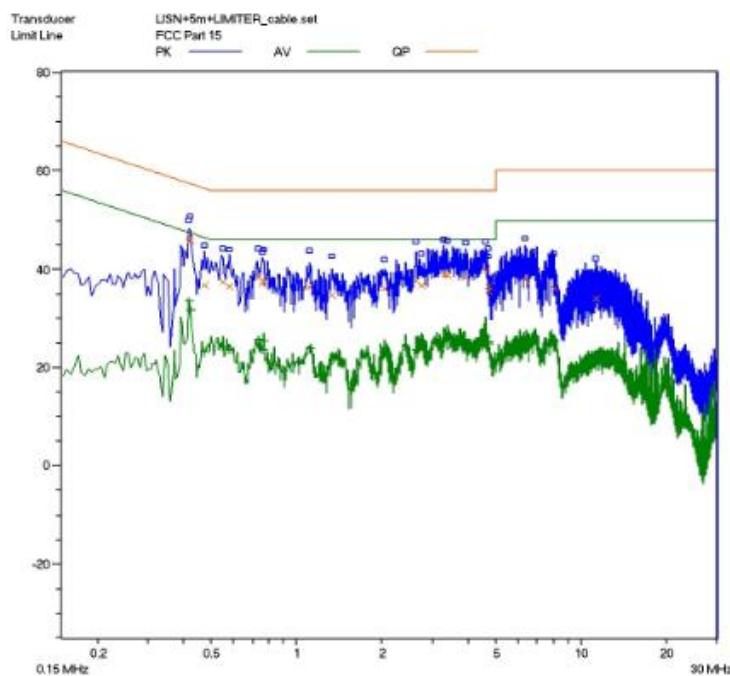
Configuration of Tested System



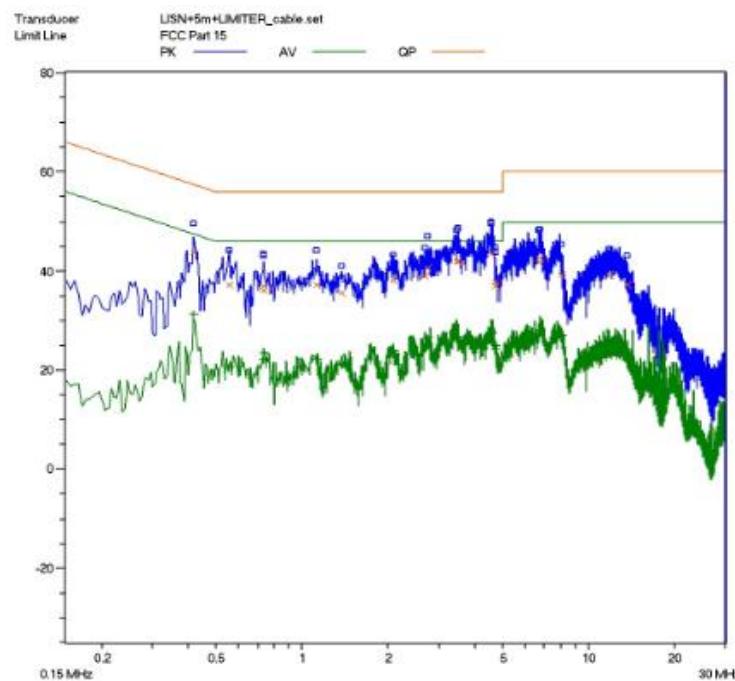
ATTACHMENT 1 - CONDUCTED EMISSION TEST RESULTS

| | | | |
|----------------------------------|---|-------------------------|--|
| CLIENT: | Grandstream Networks, Inc. | TEST STANDERD: | FCC Part 15, Subpart B, Section 15.107 |
| MODEL NUMBERS: | GXV3615WPI_HD | PRODUCT: | IP Camera |
| MODEL TESTED: | GXV3615WPI_HD | EUT DESIGNATION: | Home or Office |
| TEMPERATURE: | 23°C | HUMIDITY: | 51% |
| ATM PRESSURE: | 103kPa | GROUNDING: | None |
| TESTED BY: | Daomen | DATE OF TEST: | April 17 th , 2014 |
| TEST REFERENCE: | ANSI C63.4 -2009 | | |
| TEST PROCEDURE: | The EUT was set up according to the guidelines of ANSI C63.4 -2009 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 | IP Camera | | |
| TEST SET UP |  | | |
| 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. $\pm 2 \times 10^{-7} \times$ Center Freq., Amp ± 2.6 dB | | |

Mass power:

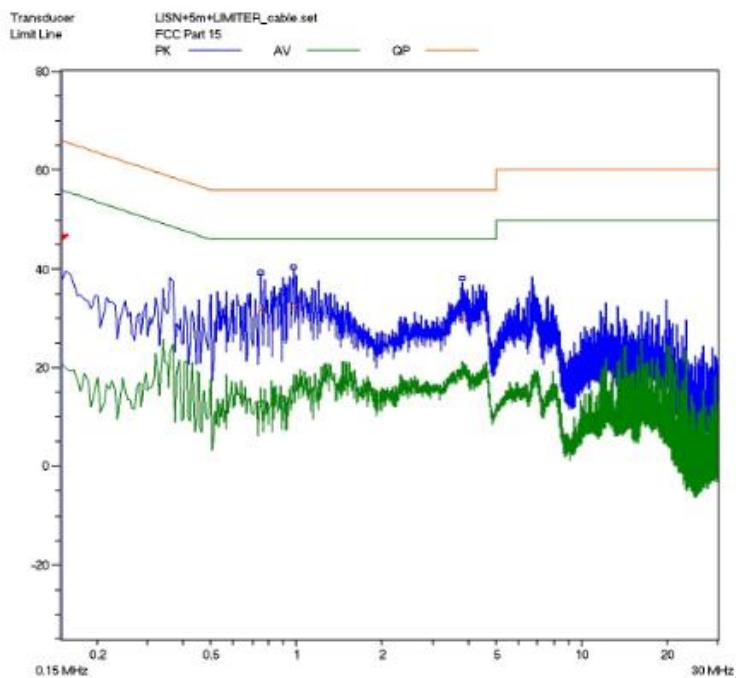


Line L Conducted Emission Graph

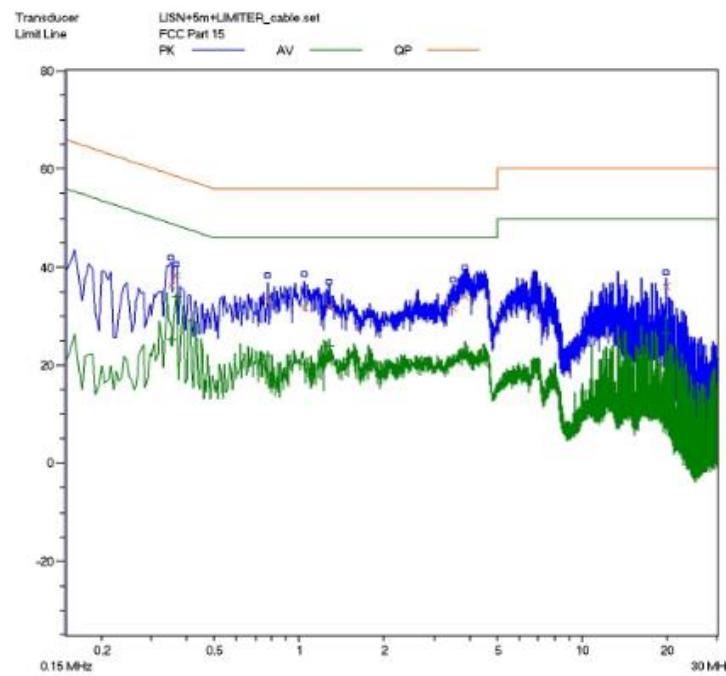


Line N Conducted Emission Graph

UE power:



Line L Conducted Emission Graph



Line N Conducted Emission Graph

Test Data:
Mass power

| Lines | Frequency (MHz) | Corrected QP Level (dBuV) | Limits QP (dBuV) | Margin QP (dB) | Frequency (MHz) | Corrected AVE Level (dBuV) | Limits AVE (dBuV) | Margin AVE (dB) |
|-------|-----------------|---------------------------|------------------|----------------|-----------------|----------------------------|-------------------|-----------------|
| L | 0.415 | 46.2 | 57.5 | -11.3 | 0.415 | 33.7 | 47.5 | -11.8 |
| L | 0.420 | 45.9 | 57.4 | -11.5 | 0.420 | 31.9 | 47.4 | -15.5 |
| L | 4.610 | 39.7 | 56 | -26.3 | 4.610 | 26.3 | 46 | -19.7 |
| N | 0.415 | 43.7 | 57.5 | -13.8 | 0.415 | 31.3 | 47.5 | -16.2 |
| N | 4.555 | 43.6 | 56 | -12.4 | 4.555 | 27.5 | 46 | -18.5 |
| N | 4.575 | 43.5 | 56 | -13.5 | 4.575 | 27.6 | 46 | -18.4 |

Note:

- 1) All readings are using a bandwidth of 9 kHz, with a 500ms sweep time. A video filter was not used.
- 2) Other emission levels are too low against official limit that are not reported.

UE power:

| Lines | Frequency (MHz) | Corrected QP Level (dBuV) | Limits QP (dBuV) | Margin QP (dB) | Frequency (MHz) | Corrected AVE Level (dBuV) | Limits AVE (dBuV) | Margin AVE (dB) |
|-------|-----------------|---------------------------|------------------|----------------|-----------------|----------------------------|-------------------|-----------------|
| L | 0.745 | 31.7 | 56 | -23.3 | 0.745 | 13.0 | 46 | -33.0 |
| L | 0.975 | 32.3 | 56 | -23.7 | 0.975 | 16.1 | 46 | -29.1 |
| L | 3.810 | 30.0 | 56 | -26.0 | 3.810 | 18.9 | 46 | -27.1 |
| N | 0.350 | 36.3 | 59 | -22.7 | 0.350 | 25.1 | 49 | -23.9 |
| N | 0.365 | 38.4 | 58.6 | -20.2 | 0.365 | 34.0 | 48.6 | -14.6 |
| N | 3.840 | 34.1 | 56 | -21.9 | 3.840 | 22.3 | 46 | -23.7 |

Note:

- 3) All readings are using a bandwidth of 9 kHz, with a 500ms sweep time. A video filter was not used.
- 4) Other emission levels are too low against official limit 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. Interval</i> |
|---|------------------|---------------------|-------------------|------------------|----------------------|
| EMI Receiver | SMR4503 | SCHAFFNER | 11725 | 2013.07.08 | 2014.07.08 |
| Line impedance stabilization network | ESZH-Z2 | R&S | --- | 2013.07.08 | 2014.07.08 |
| <i>Note: All testing were performed using internationally recognized standards. All test instruments were calibrated.</i> | | | | | |

TESTED BY: *Daomen* **GALANZ**
ENGINEER **COMPANY NAME**

REVIEWED BY: *Jamere Liu* **ECMG**
SENIOR ENGINEER **COMPANY NAME**



Conducted Emission Test Set-up-Front View

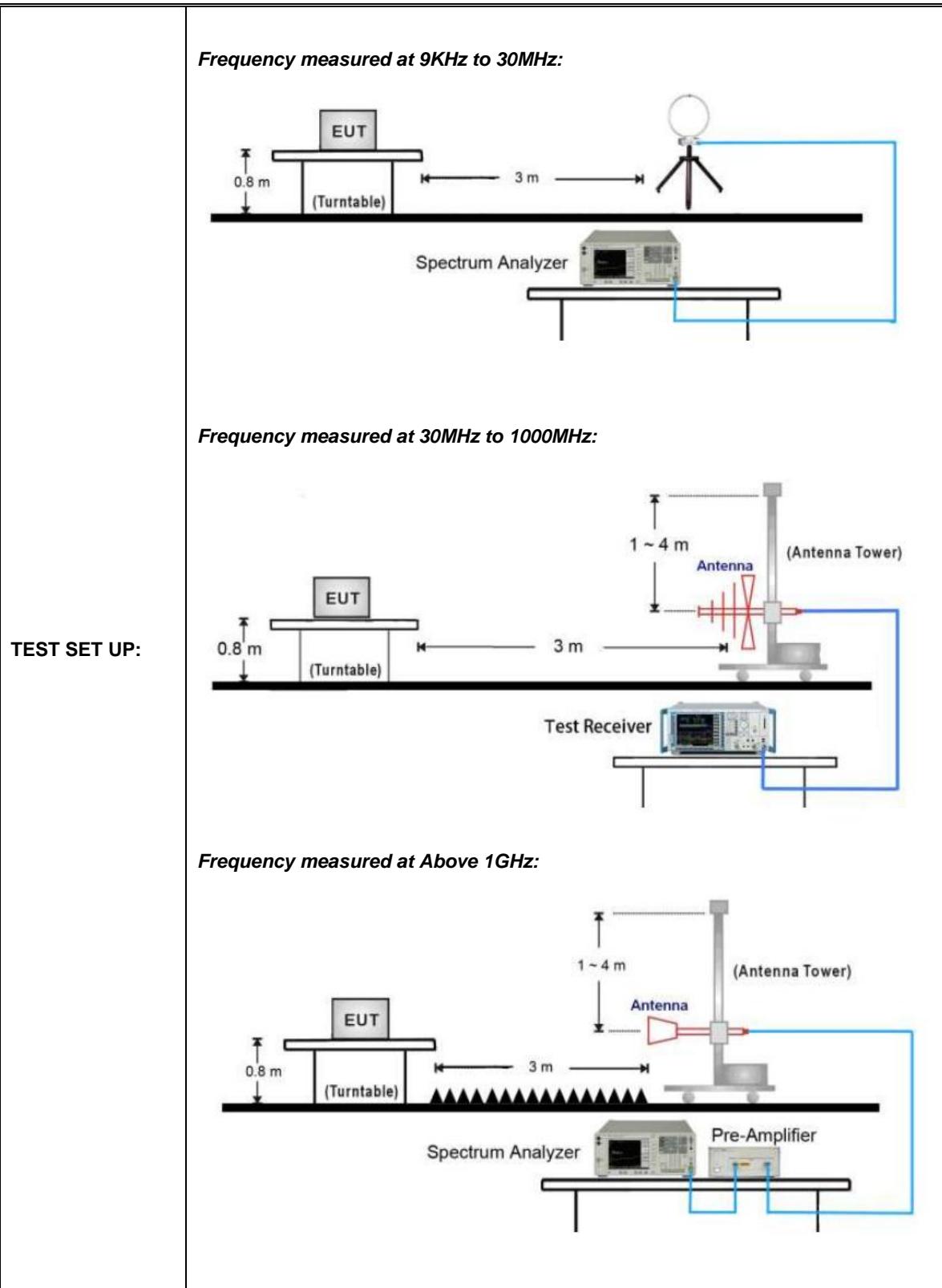


Conducted Emission Test Set-up-Rear View

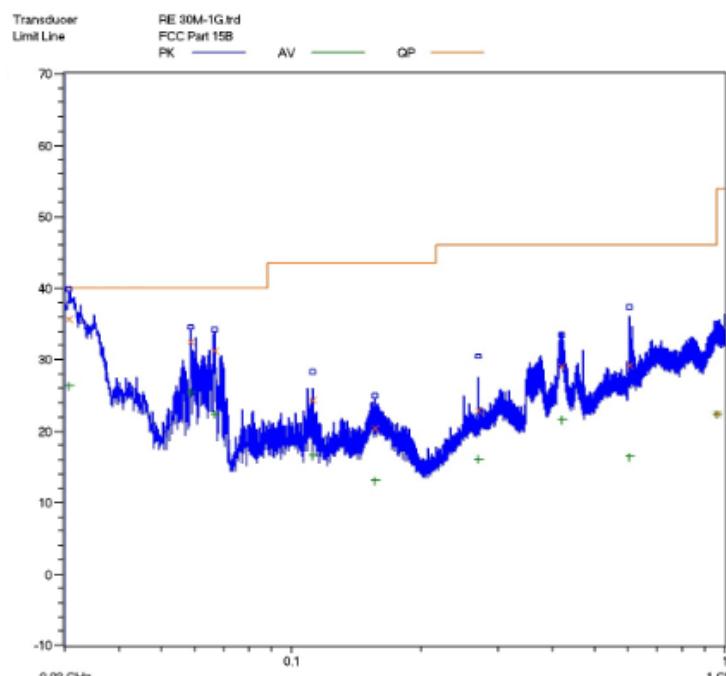
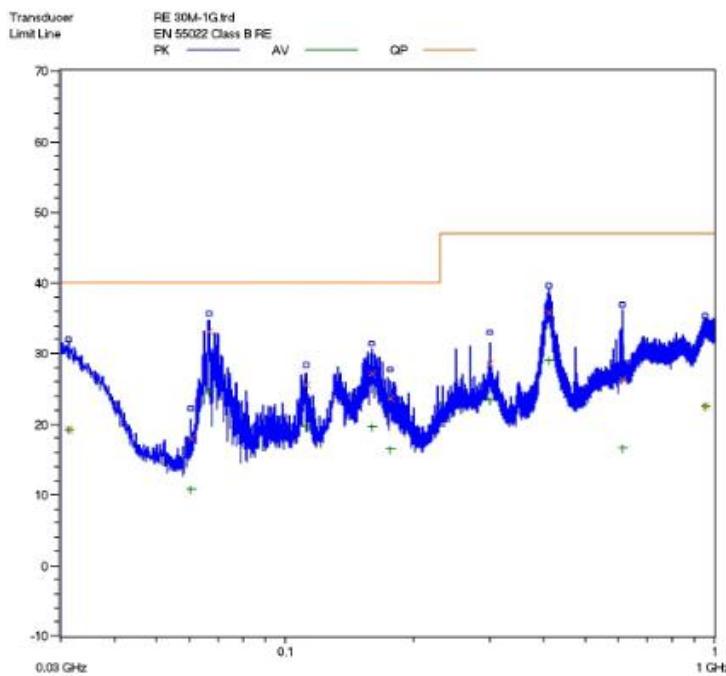
ATTACHMENT 2 – RADIATED EMISSION MEASUREMENT

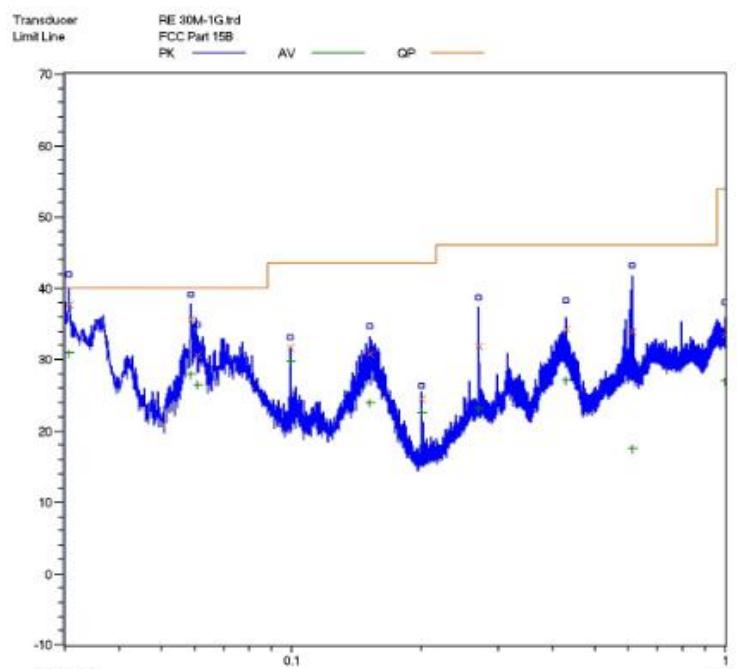
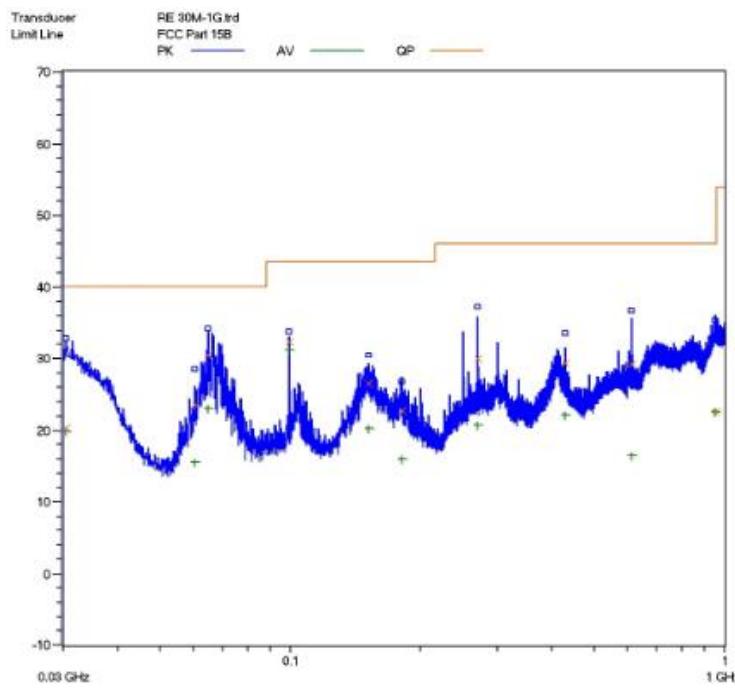
| | | | |
|----------------------------------|---|-------------------------|---------------------------------------|
| CLIENT: | Grandstream Networks, Inc. | TEST STANDERD: | FCC Part 15,Subpart B, Section 15.109 |
| MODEL NUMBERS: | GXV3615WPI_HD | PRODUCT: | IP Camera |
| EUT MODEL: | GXV3615WPI_HD | EUT DESIGNATION: | Home or Office |
| TEMPERATURE: | 23°C | HUMIDITY: | 49%RH |
| ATM PRESSURE: | 103.0kPa | GROUNDING: | None |
| TESTED BY: | Daomen | DATE OF TEST: | April 17 th , 2014 |
| TEST REFERENCE: | ANSI C63.4 -2009 | | |
| TEST PROCEDURE: | <p>The EUT was set up according to the guidelines of ANSI C63.4 -2009 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 2GHz at an anechoic chamber.</p> <p>The following data lists the significant emission frequencies, measured levels, correction factors (including cable and antenna correction factors), and the corrected readings against the limits. Explanation of the Correction Factor are given as follows:</p> <p>FS= RA + AF + CF - AG</p> <p>Where: FS = Field Strength</p> <p>RA = Receiver Amplitude</p> <p>AF = Antenna Factor</p> <p>CF = Cable Attenuation Factor</p> <p>AG = Amplifier Gain</p> | | |
| TEST MODE: | IP Camera mode,PoE mode | | |
| TESTED RANGE: | 9K-30MHz and 30MHz to 5GHz Note: As highest frequency operated of the EUT is 667MHz, so upper frequency of radiated emission test is up to 2GHz by FCC PART 15,subpart B,section 15.33(b). | | |
| 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. $\pm 2 \times 10^{-7} \times$ Center Freq., Amp ± 3.6 dB | | |

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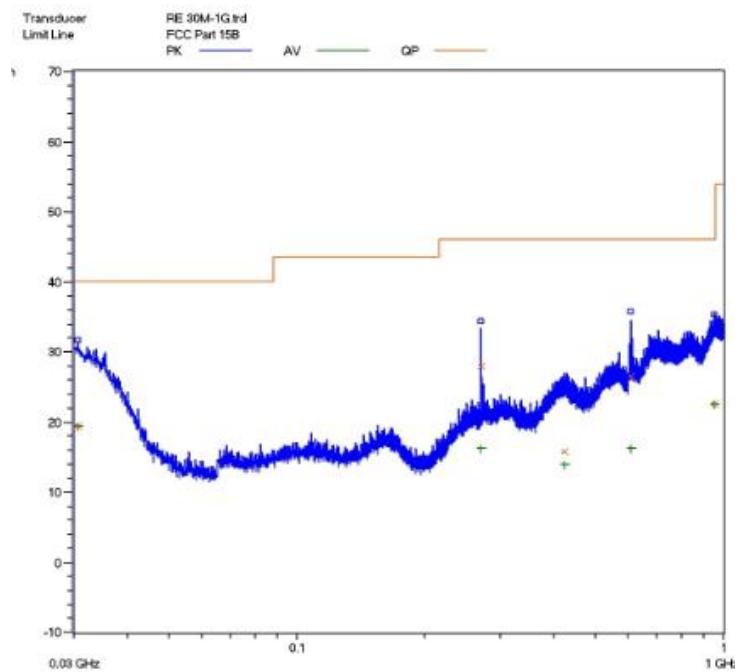


IP Camera mode:

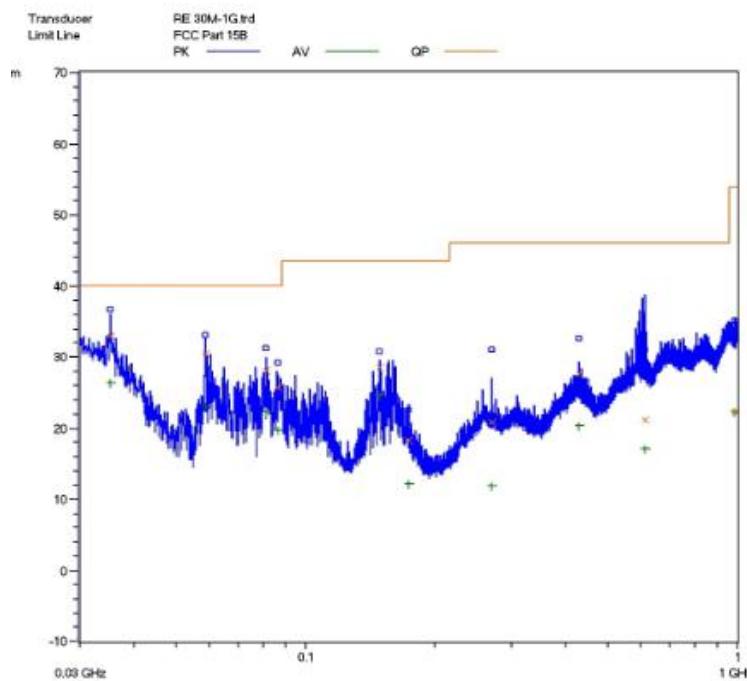




PoE Mode:



30MHz-1000MHz-Horizontal:Radiated Emission Test Plot



30MHz-1000MHz-Vertical:Radiated Emission Test Plot

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

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

Note:

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. IP Camera mode@ power adapter #1 was selected for the final testing in frequency range of 9KHz 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:**IP Camera/30-1000MHz(Mass power):**

| 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 | | | | | | | |
| 66.320 | 0.19 | 5.5 | / | 27.01 | 32.7 | 40 | -7.3 |
| 270.000 | 0.40 | 12.5 | / | 17.00 | 29.9 | 46 | -12.1 |
| 414.080 | 0.59 | 16.3 | / | 18.51 | 35.4 | 46 | -10.6 |
| / | / | / | / | / | / | / | / |
| / | / | / | / | / | / | / | / |
| / | / | / | / | / | / | / | / |
| Vertical | | | | | | | |
| 30.560 | 0.12 | 23.2 | / | 12.38 | 35.7 | 40 | -10.5 |
| 58.720 | 0.18 | 5.8 | / | 26.62 | 32.6 | 40 | -10.7 |
| 66.320 | 0.19 | 5.6 | / | 25.51 | 31.3 | 40 | -5.6 |
| / | / | / | / | / | / | / | / |
| / | / | / | / | / | / | / | / |
| / | / | / | / | / | / | / | / |

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.

Radiated Emission from 1 to 2GHz:

| Frequency (GHz) | 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) |
|----------------------------|-----------------|---------------------|--------------------|------------------------|-------------------------|----------------|-------------|----------------------------|
| Peak Measurement | | | | | | | | |
| 1.169 | 1.12 | 24.5 | -34.45 | -11.84 | 48.23 | 74 | -25.77 | H |
| 1.192 | 1.20 | 24.7 | -34.45 | -11.23 | 49.12 | 74 | -24.88 | H |
| 1.627 | 1.75 | 26.8 | -33.6 | -14.51 | 47.64 | 74 | -26.36 | H |
| 1.169 | 1.12 | 24.5 | -34.45 | -10.84 | 49.23 | 74 | -24.77 | V |
| 1.298 | 1.45 | 25.2 | -33.60 | -12.67 | 47.58 | 74 | -26.42 | V |
| 1.638 | 1.75 | 26.8 | -33.60 | -13.24 | 48.91 | 74 | -25.09 | V |
| Average Measurement | | | | | | | | |
| 1.169 | 1.12 | 24.5 | -34.45 | -21.86 | 38.21 | 54 | -15.79 | H |
| 1.192 | 1.20 | 24.7 | -34.45 | -23.57 | 36.78 | 54 | -17.22 | H |
| 1.627 | 1.75 | 26.8 | -33.6 | -22.94 | 39.21 | 54 | -14.79 | H |
| 1.169 | 1.12 | 24.5 | -34.45 | -21.8 | 38.27 | 54 | -15.73 | V |
| 1.298 | 1.45 | 25.2 | -33.60 | -22.96 | 37.29 | 54 | -16.71 | V |
| 1.638 | 1.75 | 26.8 | -33.60 | -24.96 | 37.19 | 54 | -16.81 | 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.

IP Camera mode/30MHz-1000MHz(UE power):

| 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 | | | | | | | |
| 64.800 | 0.19 | 5.5 | / | 24.81 | 30.5 | 40 | -7.3 |
| 99.360 | 0.22 | 7.4 | / | 24.78 | 32.4 | 46 | -12.1 |
| 270.000 | 0.40 | 12.5 | / | 17.00 | 29.9 | 46 | -10.6 |
| / | / | / | / | / | / | / | / |
| / | / | / | / | / | / | / | / |
| / | / | / | / | / | / | / | / |
| Vertical | | | | | | | |
| 30.640 | 0.12 | 23.2 | / | 14.38 | 37.7 | 40 | -2.3 |
| 58.720 | 0.18 | 5.8 | / | 29.62 | 35.6 | 40 | -4.4 |
| 429.520 | 0.59 | 16.0 | / | 17.71 | 34.3 | 46 | -11.7 |
| / | / | / | / | / | / | / | / |
| / | / | / | / | / | / | / | / |
| / | / | / | / | / | / | / | / |

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.

Radiated Emission from 1 to 2GHz:

| Frequency (GHz) | 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) |
|----------------------------|-----------------|---------------------|--------------------|------------------------|-------------------------|----------------|-------------|----------------------------|
| Peak Measurement | | | | | | | | |
| 1.169 | 1.12 | 24.5 | -34.45 | -11.84 | 48.23 | 74 | -25.77 | H |
| 1.192 | 1.20 | 24.7 | -34.45 | -11.23 | 49.12 | 74 | -24.88 | H |
| 1.627 | 1.75 | 26.8 | -33.6 | -14.51 | 47.64 | 74 | -26.36 | H |
| 1.169 | 1.12 | 24.5 | -34.45 | -10.84 | 49.23 | 74 | -24.77 | V |
| 1.298 | 1.45 | 25.2 | -33.60 | -12.67 | 47.58 | 74 | -26.42 | V |
| 1.638 | 1.75 | 26.8 | -33.60 | -13.24 | 48.91 | 74 | -25.09 | V |
| Average Measurement | | | | | | | | |
| 1.169 | 1.12 | 24.5 | -34.45 | -21.86 | 38.21 | 54 | -15.79 | H |
| 1.192 | 1.20 | 24.7 | -34.45 | -23.57 | 36.78 | 54 | -17.22 | H |
| 1.627 | 1.75 | 26.8 | -33.6 | -22.94 | 39.21 | 54 | -14.79 | H |
| 1.169 | 1.12 | 24.5 | -34.45 | -21.8 | 38.27 | 54 | -15.73 | V |
| 1.298 | 1.45 | 25.2 | -33.60 | -22.96 | 37.29 | 54 | -16.71 | V |
| 1.638 | 1.75 | 26.8 | -33.60 | -24.96 | 37.19 | 54 | -16.81 | 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/30 -1000MHz:

| 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 | | | | | | | |
| 30.560 | 0.12 | 23.2 | / | -3.8 | 19.5 | 40 | -20.5 |
| 270.000 | 0.40 | 12.5 | / | 15 | 27.9 | 46 | -18.1 |
| 606.000 | 0.69 | 16.1 | / | 8.81 | 25.6 | 46 | -20.4 |
| / | / | / | / | / | / | / | / |
| / | / | / | / | / | / | / | / |
| / | / | / | / | / | / | / | / |
| Vertical | | | | | | | |
| 35.360 | 0.13 | 15.6 | / | 17.27 | 33.0 | 40 | -7.0 |
| 58.720 | 0.18 | 5.8 | / | 24.42 | 30.4 | 40 | -9.6 |
| 81.200 | 0.21 | 8.6 | / | 19.29 | 28.1 | 40 | -11.9 |
| / | / | / | / | / | / | / | / |
| / | / | / | / | / | / | / | / |
| / | / | / | / | / | / | / | / |

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.

PoE Mode/ Radiated Emission from 1 to 2GHz:

| Frequency (GHz) | 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) |
|----------------------------|-----------------|---------------------|--------------------|------------------------|-------------------------|----------------|-------------|----------------------------|
| Peak Measurement | | | | | | | | |
| 1.169 | 1.12 | 24.5 | -34.45 | -11.80 | 48.27 | 74 | -25.73 | H |
| 1.192 | 1.20 | 24.7 | -34.45 | -13.57 | 46.78 | 74 | -27.22 | H |
| 1.627 | 1.75 | 26.8 | -33.6 | -12.94 | 49.21 | 74 | -24.79 | H |
| 1.169 | 1.12 | 24.5 | -34.45 | -13.53 | 46.54 | 74 | -27.46 | V |
| 1.298 | 1.45 | 25.2 | -33.6 | -12.98 | 47.27 | 74 | -26.73 | V |
| 1.638 | 1.75 | 26.8 | -33.6 | -15.26 | 46.89 | 74 | -27.11 | V |
| Average Measurement | | | | | | | | |
| 1.169 | 1.12 | 24.5 | -34.45 | -23.32 | 36.75 | 54 | -17.25 | H |
| 1.192 | 1.20 | 24.7 | -34.45 | -22.14 | 38.21 | 54 | -15.79 | H |
| 1.627 | 1.75 | 26.8 | -33.6 | -22.94 | 39.21 | 54 | -14.79 | H |
| 1.169 | 1.12 | 24.5 | -34.45 | -23.52 | 36.55 | 54 | -17.45 | V |
| 1.298 | 1.45 | 25.2 | -33.6 | -24.74 | 35.51 | 54 | -18.49 | V |
| 1.638 | 1.75 | 26.8 | -33.6 | -25.83 | 36.32 | 54 | -17.68 | V |

Note:

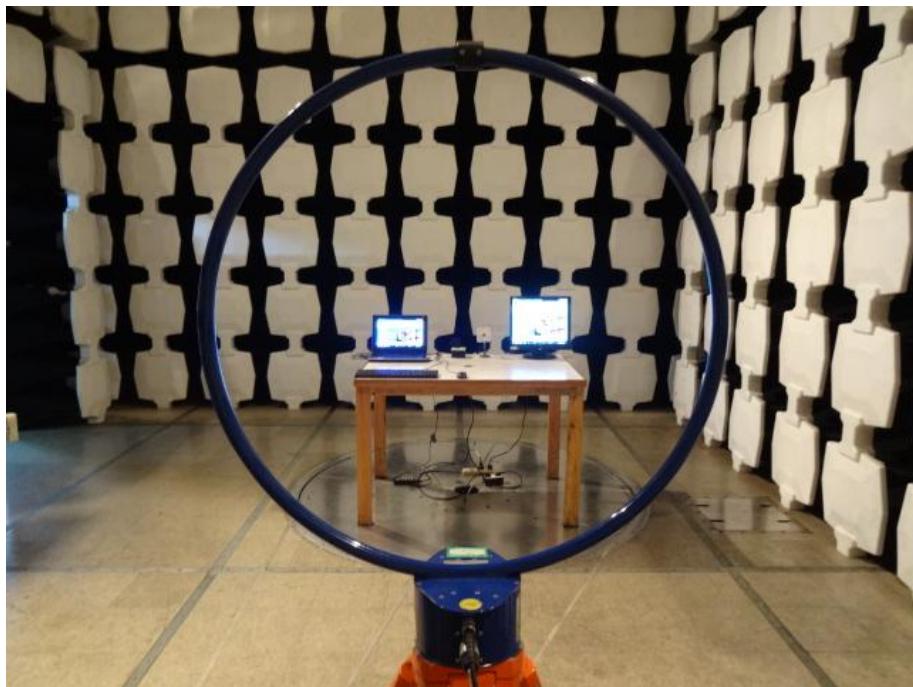
1. The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows: Emission Level =Reading Level + Antenna Factor + Cable Loss -Preamplifier Factor.
2. The limits shown are based on Peak value and Average value detector 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 |
|---|------------------|---------------------|-------------------|------------------|-----------------|
| EMI Receiver | SMR4503 | SCHAFFNER | 11725 | 2013.07.08 | 2014.07.07 |
| HF Loop Antenna | HLA6120 | TESEQ | 26348 | 2013.09.27 | 2014.09.26 |
| Double-ridged Wave guide horn | 3115 | ETS | 6587 | 2013.08.02 | 2014.08.01 |
| Microwave system amplifier | 83017A | Agilent | MY39500438 | 2013.07.11 | 2014.07.10 |
| Biconilog Antenna | 3142C | ETS | 00042672 | 2013.09.28 | 2014.09.27 |
| Band-pass Filter | BRM50702 | Micro-Tronic | S/N-030 | 2013.11.30 | 2014.11.29 |
| Spectrum Analyzer | FSP30 | R&S | 100755 | 2013.11.30 | 2014.11.29 |
| <i>Note: All testing were performed using internationally recognized standards. All test instruments were calibrated.</i> | | | | | |

TESTED BY: Daomen **GALANZ**
ENGINEER **COMPANY NAME**

REVIEWED BY: Jawen **ECMG**
SENIOR ENGINEER **COMPANY NAME**



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



Radiated Emission Test Set-up (Below 1GHz)



Radiated Emission Test Set-up (Rear View)



Radiated Emission Test Set-up (Above 1GHz)

*** ***End Of Report*** ***

FCC Test Report #: SHE-1404-11142 -FCC

Prepared for Grandstream Networks, Inc.

Prepared by ECMG Electronic Technical Testing Corp (Shenzhen)

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