ECMG
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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-1403-11132-FCC

Tested by: Daomen _____ ECMG
Daomen /Engineer Company Name

Reviewed by: _____ 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 16th, 2014
Swall Zhang Date

Test Location

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

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

Test Facility

The test facility was recognized, certified, or accredited by the following organizations:

- *CNAL – LAB Code: L2244*

Galanz EMC Laboratory has been assessed and in compliance with CNAL/AC01:2002 accreditation criteria for testing laboratories (identical to ISO/IEC 17025:2005 General Requirements)for the Competence of Testing Laboratories.

- *FCC – Registration No.: 580210*

Galanz EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC was maintained in our files.

Table of Contents

List Attached Files

Exhibit Type	File Description	File Name
Test Report	Test Report	YZZGXV3610-FHD _Test report.pdf
Operation Description	Technical Description	YZZGXV3610-FHD _operation description.pdf
External Photos	External Photos	YZZGXV3610-FHD _External Photos
Internal Photos	Internal Photos	YZZGXV3610-FHD _Internal Photos
Block Diagram	Block Diagram	YZZGXV3610-FHD _Block Diagram.pdf
Schematics	Circuit Diagram	YZZGXV3610-FHD _Schematics.pdf
ID Label/Location	Label and Location	YZZGXV3610-FHD _Label & Location.pdf
User Manual	User Manual	YZZGXV3610-FHD _User Manual.pdf
Test setup photos	Test set-up photos	YZZGXV3610-FHD _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	*: GXV3610_HD, GXV3610_FHD*
Model Tested	*: GXV3610_FHD*
Receipt Date	*: April 4th, 2014*
Date Tested	*: April 11st, 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 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 belows:

Parameter		***Range***
Basic parameters	*Rated voltage*	*12V*
	Rated Current	*1A*
I/O Ports	*Network Port*	*RJ-45 ports for PC &router connection*
	Power Jack	*12V DC power port; UL Certified*
	Output Audio	*Connected to Audio device*
Power over Ethernet (PoE)	*IEEE 802.3af, Class 0*	
Power Adapter #1	*Input*	*100-240VAC 50/60Hz 0.3A*
	Output	*12VDC,1.0A*
	Model	*SEF1200100A1BB*
	Brand name	*Mass*
Power Adapter #2	*Input*	*100-240VAC 50/60Hz 0.3A*
	Output	*12VDC,1.0A*
	Model	*WEF1200100A1BA*
	Brand name	*Mass*

Note:

1. *This an Class II Permissive Change report based on original FCC ID #:YZZGXV3610-FHD,for detail information,please refer to request letter of Class II Permissive Change.*
2. *The EUT contains two power adapter which have the same specification except for model number,and both of which have been tested,only the worst results(power adapter #1) are reported in this report.*
3. *For other informations &features please refer to user's manual of EUT.*

EUT Model Derived

Model GXV3610_FHD is identical to GXV3610_HD except for differences as belows:

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.

The worst-case 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.

Emission Tests				
Specifications	***Description***	***Test Results***	***Test Point***	***Remark***
FCC Part 15.107 ANSI C63.4 -2003	*Conducted Emission*	*Passed*	*AC Input Port*	*Attachment 1*
FCC Part 15.109 ANSI C63.4 -2003	*Radiated Emission*	*Passed*	*Enclosure*	*Attachment 2*

EUT Operation Mode

The system was tested in IP Camera mode and PoE mode.

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.

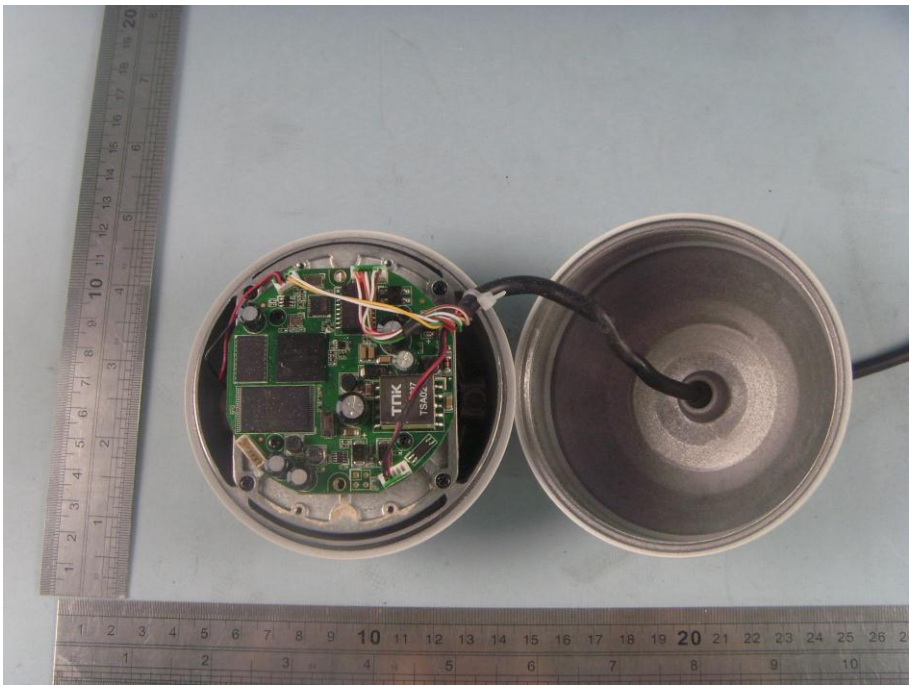
There were no modifications installed by ECMG Electronic Technical Testing Corp (Shenzhen).

EUT Sample Photos

EUT Model: GXV3610_FHD

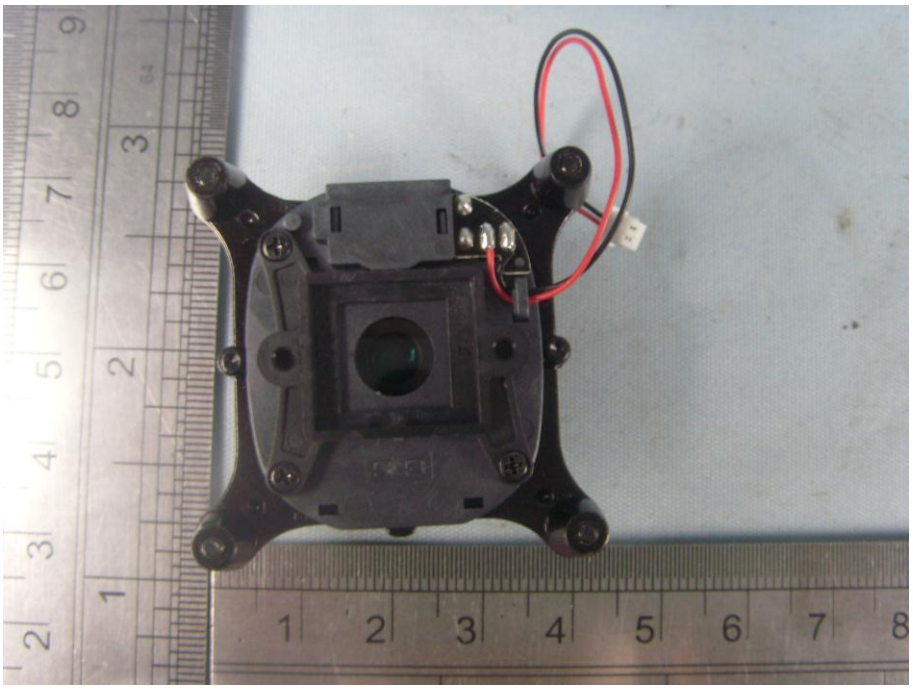
EUT- Front View

EUT- Rear View

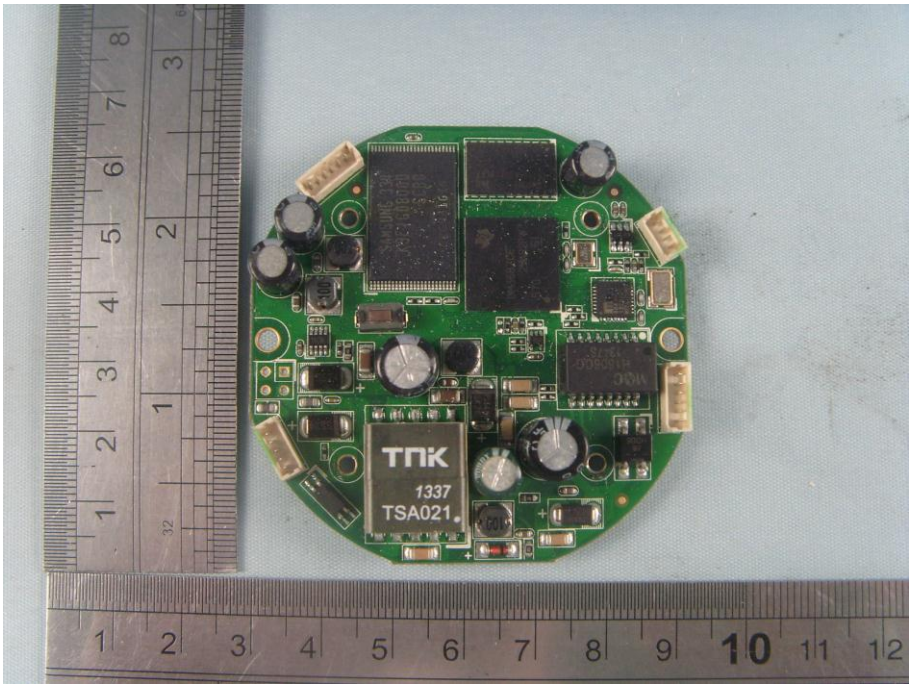


EUT-Uncovered View

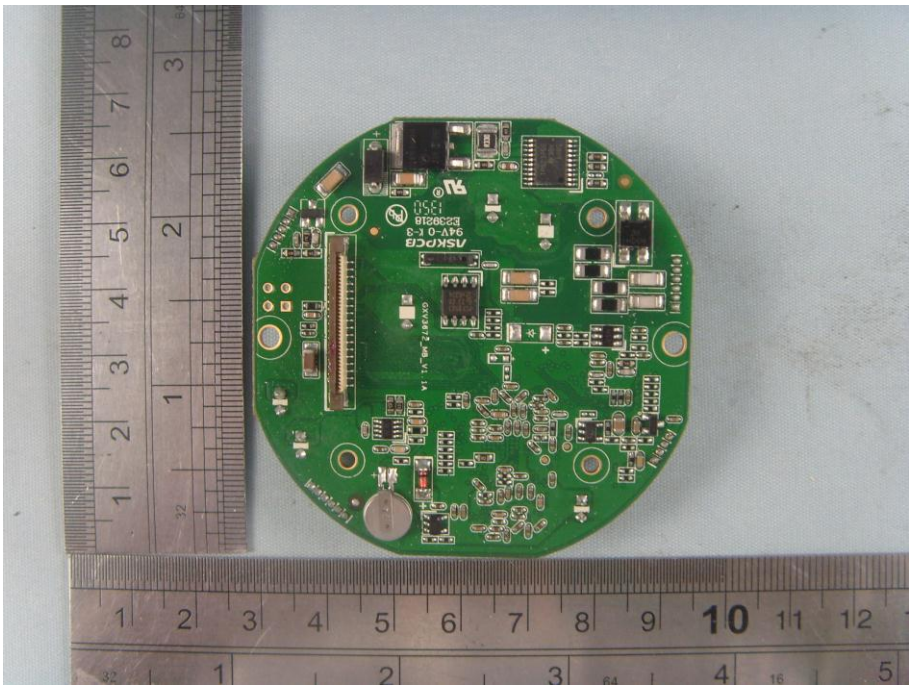
Lens Front View



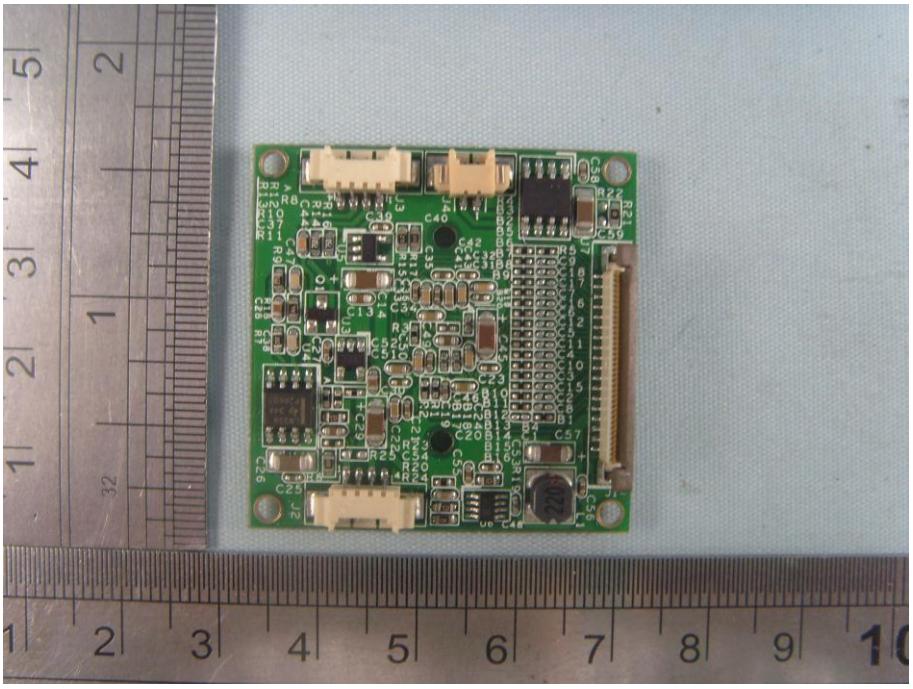
Lens Rear View



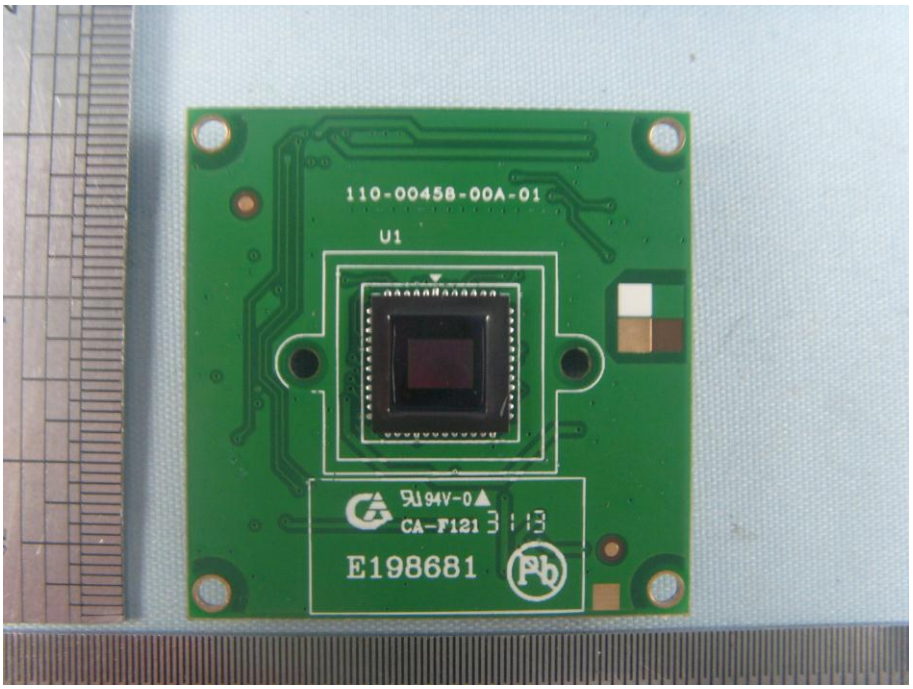
Mainboard- Top View



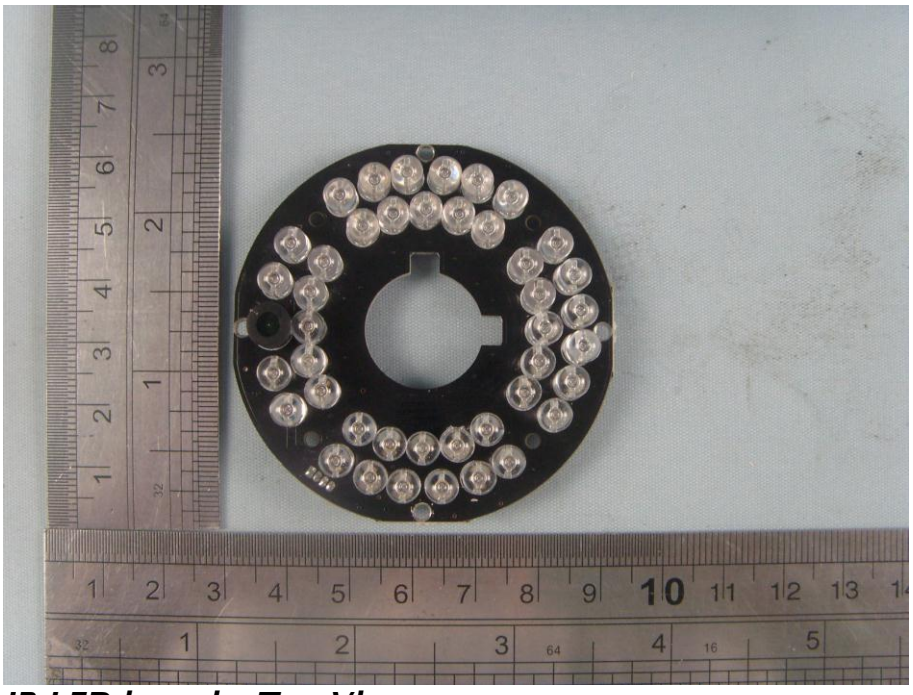
Mainboard- Bottom View



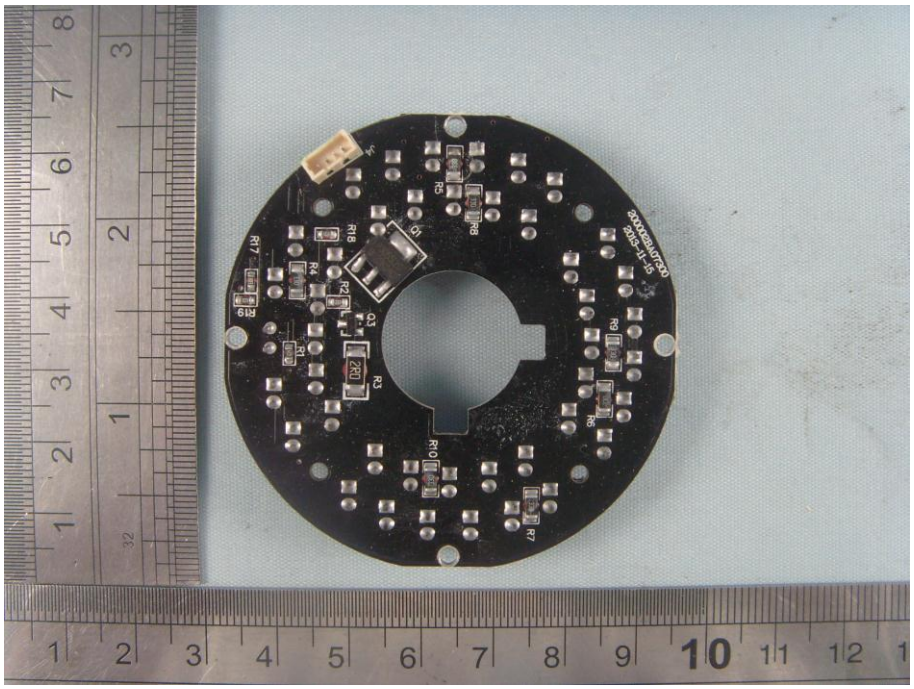
Sensor board – Top View



Sensor board – bottom View



IR LED board – Top View



IR LED board- Bottom View

Power Adaptor View (Manufacturer: Mass Power)

Test System Details

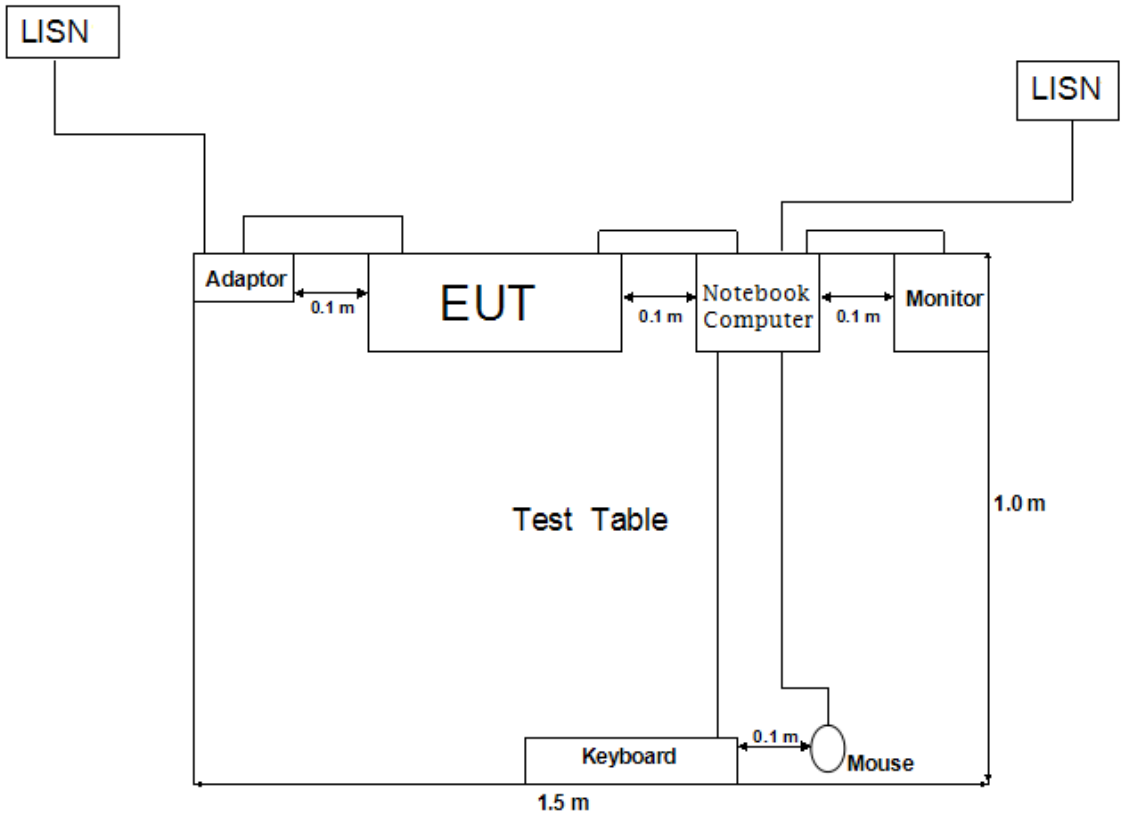
EUT			
Model Number:	GXV3610_HD,GXV3610_FHD		
Model Tested:	GXV3610_FHD		
Description:	IP Camera		
Input:	AC 120V/60Hz		
Manufacturer:	Grandstream Networks, Inc.		
Support Equipment			
Description	**Model Number**	**Serial Number**	**Manufacturer**
Notebook COMPUTER	ThinkPad X121e	---	Lenovo
Mouse	MO32B0	23-033131	IBM
Keyboard	SK-1788	---	LENOVO
Monitor	TFT1780PS	---	AOC

Cable Description					
Description	**From**	**To**	**Length (Meters)**	**Shielded (Y/N)**	**Ferrite (Y/N)**
Adaptor Cord Of Notebook COMPUTER	AC Adaptor	Notebook COMPUTER	1.6	N	Y
	AC Plug	AC Adaptor	1.2	N	Y
Power cord of monitor	Monitor	Plug	1.2	N	Y
Mouse cord	Mouse	Notebook COMPUTER	1.2	N	Y
Keyboard cord	keyboard	Notebook COMPUTER	1.2	N	Y
VGA cord	Notebook COMPUTER	Monitor	1.2	Y	Y
RJ-45 Cord	EUT	Notebook COMPUTER	2.0	N	N
Power Adaptor cord of EUT	EUT	Plug	1.8	N	Y
Note:The "EUT" means "IP Camera".					

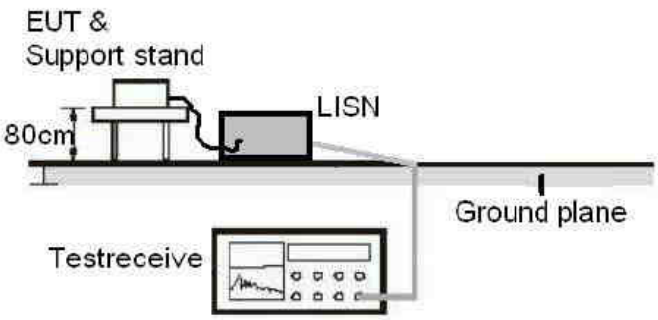
NOTE:

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

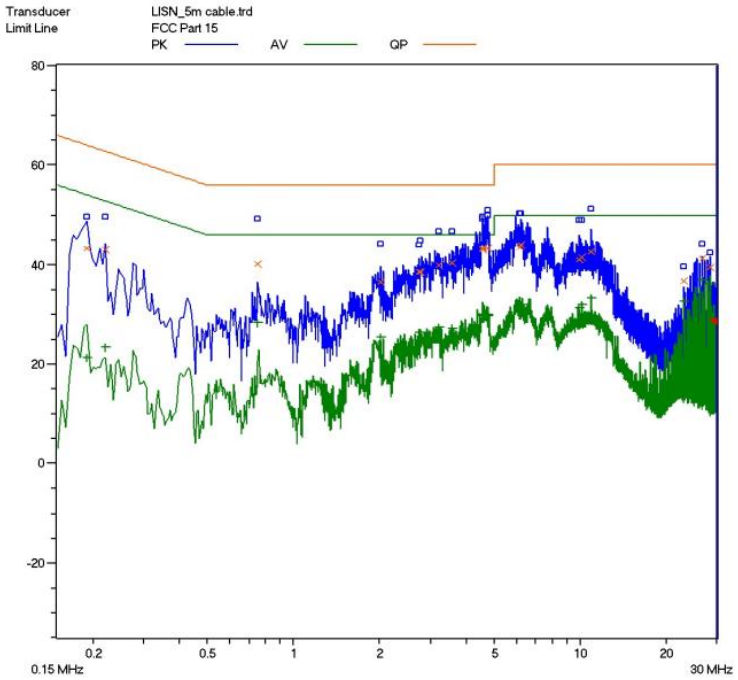
Configuration of Tested System



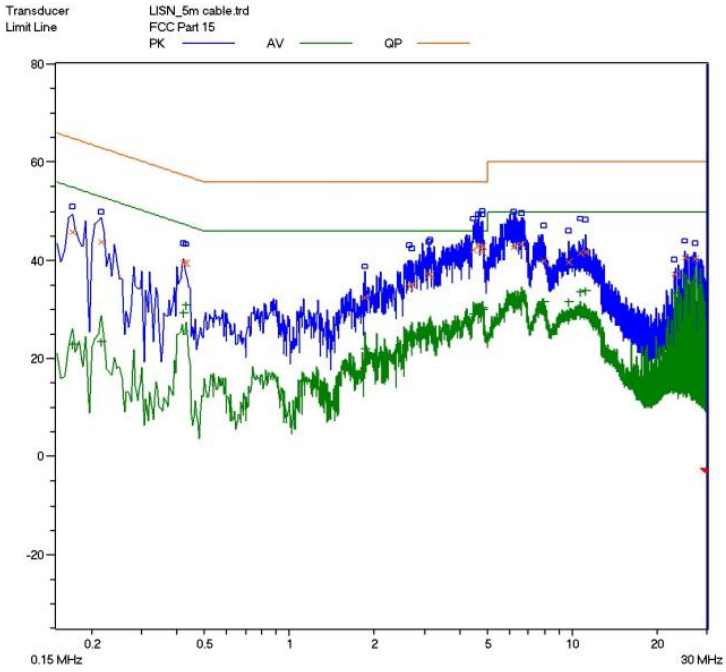
ATTACHMENT 1 - CONDUCTED EMISSION TEST RESULTS

CLIENT:	Grandstream Networks, Inc.	**TEST STANDERD:**	FCC Part 15, Subpart B, Section 15.107
MODEL NUMBERS:	GXV3610_HD,GXV3610_FHD	**PRODUCT:**	IP Camera
MODEL TESTED:	GXV3610_FHD	**EUT DESIGNATION:**	Home or Office
TEMPERATURE:	22°C	**HUMIDITY:**	48%
ATM PRESSURE:	103kPa	**GROUNDING:**	None
TESTED BY:	Daomen	**DATE OF TEST:**	April 11st, 2014
TEST REFERENCE:	ANSI C63.4- 2003		
TEST PROCEDURE:	The EUT was set up according to the guidelines of ANSI C63.4: 2003 for conducted emissions. The measurement was using a AMN on each line and an EMI receiver peak scan was made at the frequency measurement range. The six highest significant peaks were then marked, and these signals were then quasi-peaked and averaged.The frequency range investigated was from 150KHz to 30MHz.		
DESCRIPTION OF TEST MODE:	IP Camera mode		
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. ± $2x10^{-7}$ x Center Freq., Amp ± 2.6 dB		

IP Camera Mode:



Line L Conducted Emission Graph



Line N Conducted Emission Graph

Test Data:

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	2014.07.08	2015.07.07
Line impedance stabilization network	ESH2-Z5	R&S	0338.5219.53-100396-vj	2014.03.14	2015.03.13

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

TESTED BY: _____ **ECMG**
ENGINEER **COMPANY NAME**

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

Conducted Emission Test Set-up –Front view

Conducted Emission Test Set-up –Rear view

ATTACHMENT 2 – RADIATED EMISSION MEASUREMENT

CLIENT:	Grandstream Networks, Inc.	**TEST STANDERD:**	FCC Part 15,Subpart B, Section 15.109
MODEL NUMBERS:	GXV3610_HD,GXV3610_FHD	**PRODUCT:**	IP Camera
EUT MODEL:	GXV3610_FHD	**EUT DESIGNATION:**	Home or Office
TEMPERATURE:	22°C	**HUMIDITY:**	47%RH
ATM PRESSURE:	103.0kPa	**GROUNDING:**	None
TESTED BY:	Daomen	**DATE OF TEST:**	April11st, 2014
TEST REFERENCE:	ANSI C63.4: 2003		
TEST PROCEDURE:	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 1GHz to 5GHz at an anechoic chamber. 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: FS= RA + AF + CF - AG Where: FS = Field Strength RA = Receiver Amplitude AF = Antenna Factor CF = Cable Attenuation Factor AG = Amplifier Gain		
TEST MODE	IP Camera mode and PoE Mode		
TESTED RANGE:	As the highest operating frequency of the EUT is 680MHz,so test upper frequency range is up to 5GHz.		
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. $\pm$ 2x10^{-7} x Center Freq., Amp $\pm$ 3.6 dB		

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TEST SET-UP:

Frequency measured at 9KHz to 30MHz:

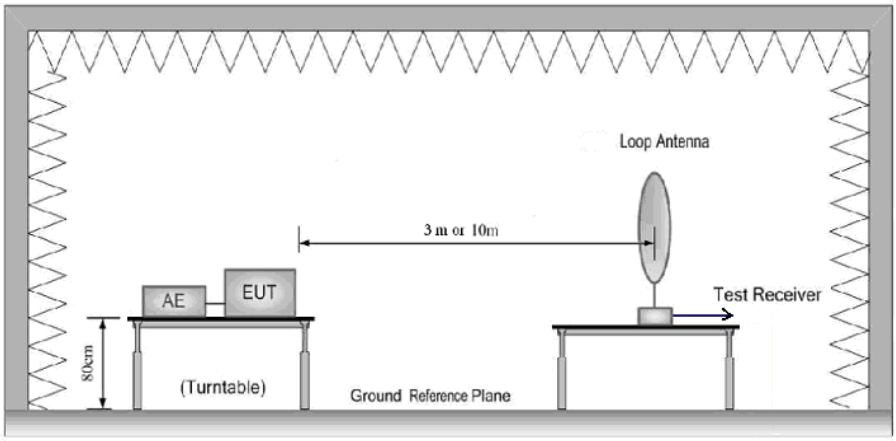


Figure 1 : Frequencies measured below 1 GHz configuration

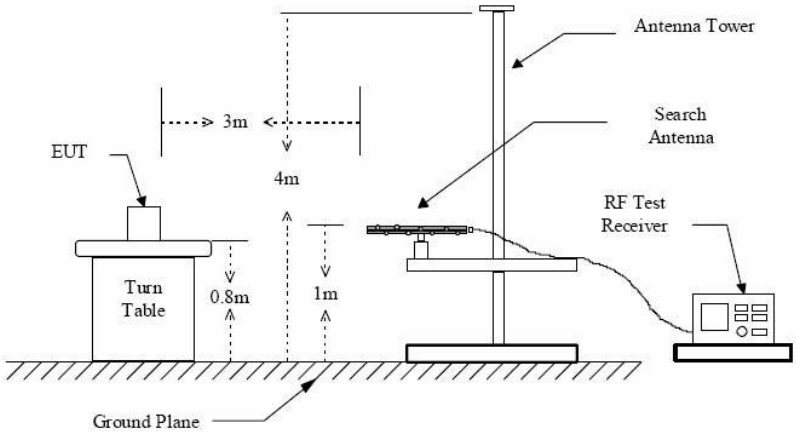
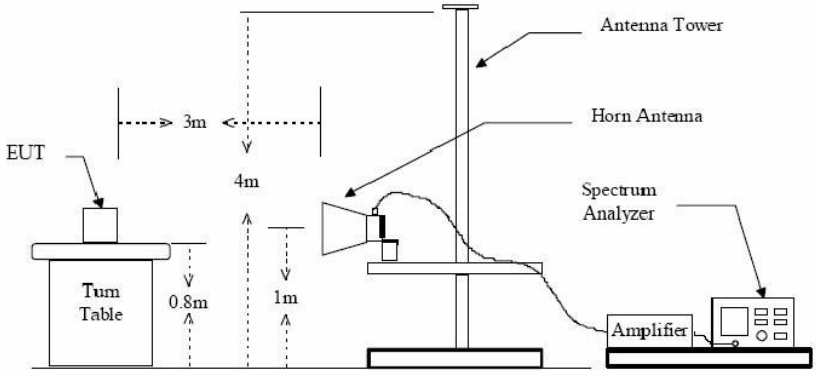
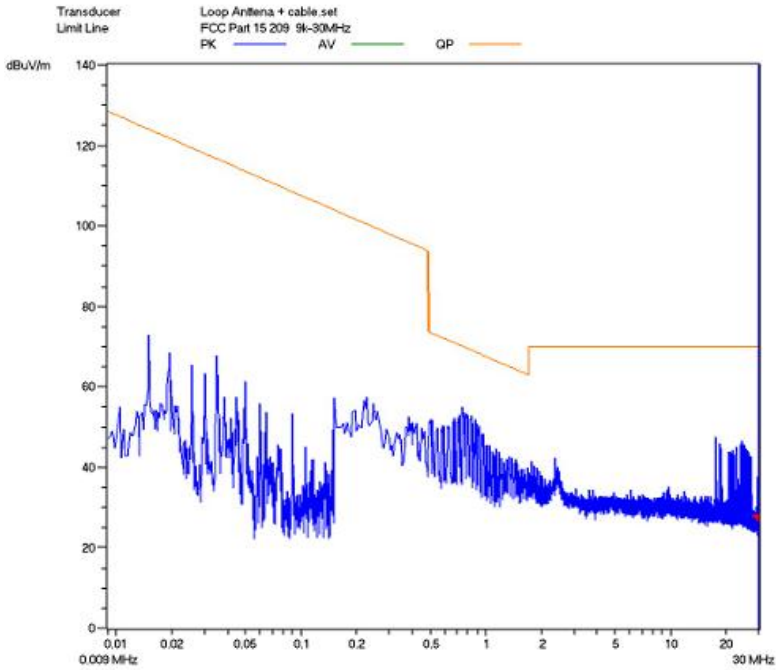


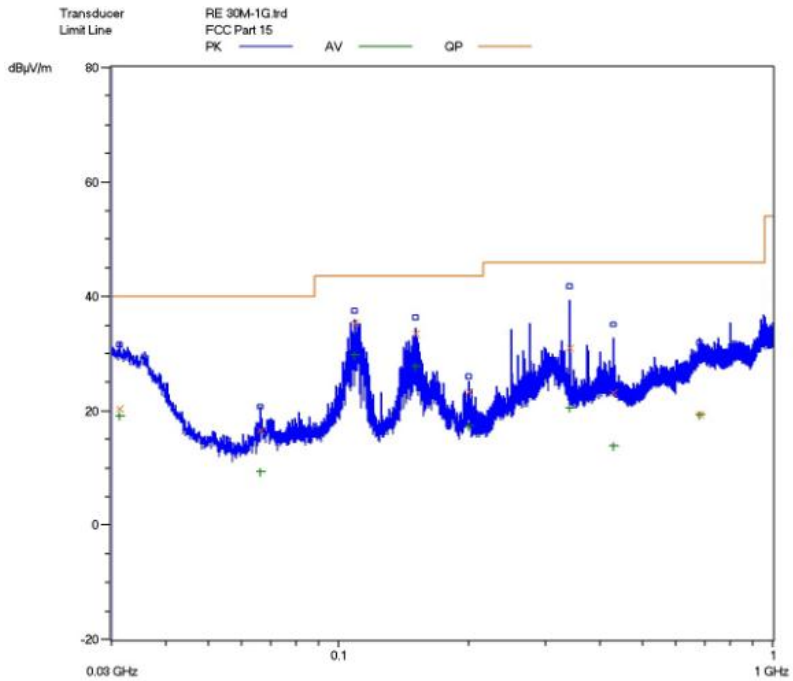
Figure 2 : Frequencies measured above 1 GHz configuration



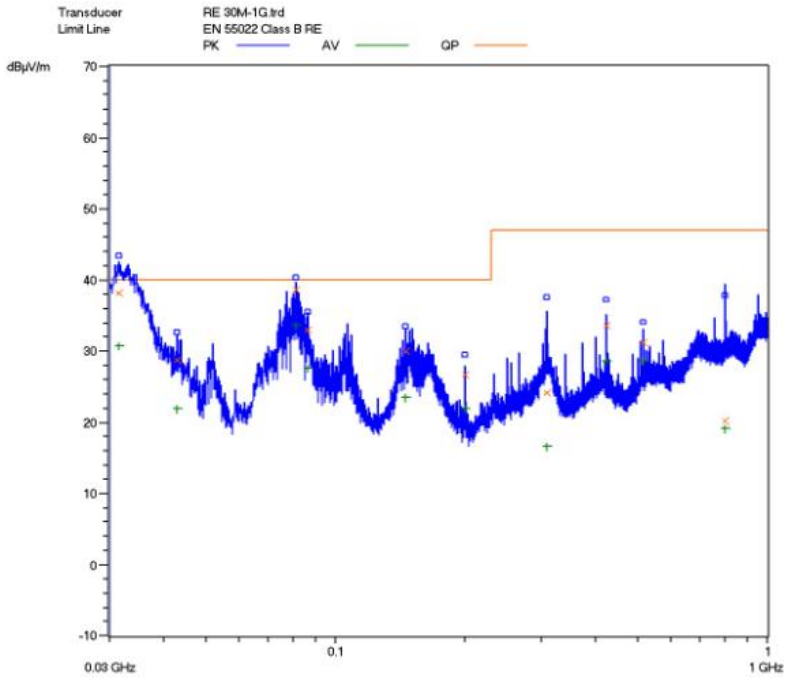
IP Camera Mode:



9KHz-30MHz:Radiated Filed Strength Emission Test Plot(Peak,Max. hold)

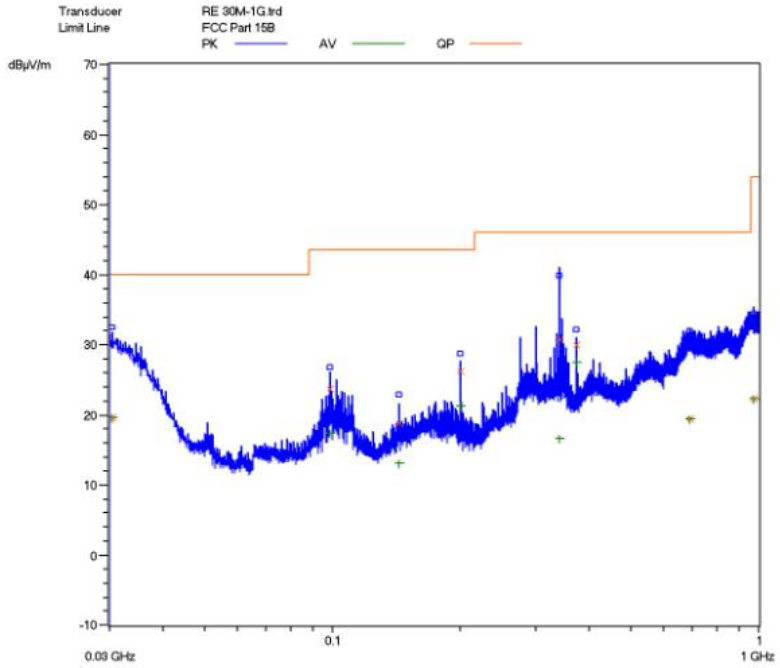


30-1000MHz: Horizontal:Radiated Emission Test Plot(Peak,Max. hold)

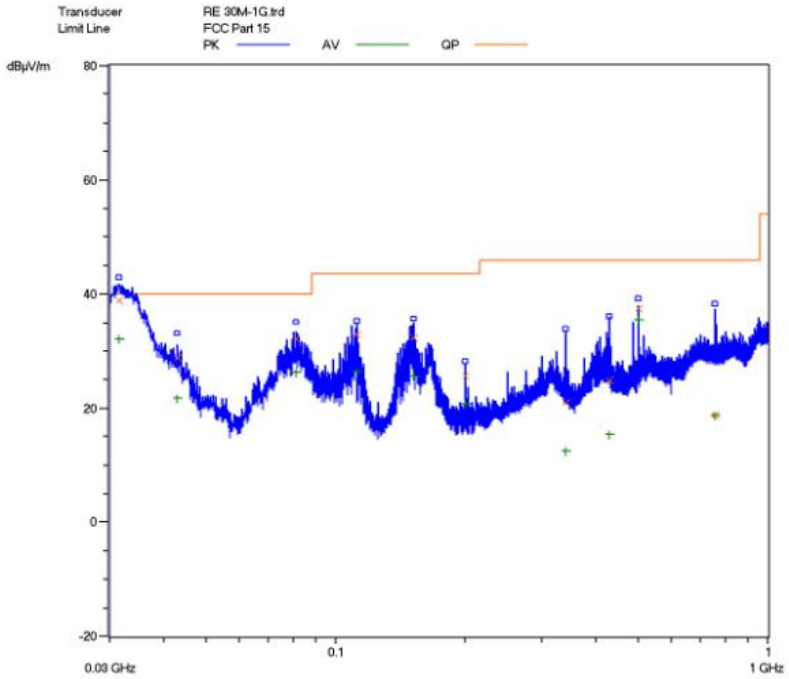


30-1000MHz: Vertical:Radiated Emission Test Plot (Peak,Max. hold)

PoE Mode:



30-1000MHz: Horizontal:Radiated Emission Test Plot(Peak,Max.hold)



30-1000MHz: Vertical:Radiated Emission Test Plot (Peak,Max.hold)

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)
Horizontal							
31.260	0.12	23.2	/	-2.92	20.4	40	-19.6
108.780	0.23	7.3	/	27.77	35.3	43.5	-8.2
150.000	0.28	8.9	/	24.42	33.6	43.5	-9.9
/	/	/	/	/	/	/	/
/	/	/	/	/	/	/	/
/	/	/	/	/	/	/	/
Vertical							
31.440	0.13	22.1	/	16.67	38.9	40	-1.1
81.1800	0.21	5.7	/	26.29	32.2	40	-7.8
111.600	0.23	7.3	/	25.47	33.0	43.5	-10.5
151.560	0.28	8.9	/	23.12	32.3	43.5	-11.2
/	/	/	/	/	/	/	/
/	/	/	/	/	/	/	/

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.*

Above 1GHz&IP Camera mode:

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)
Peak Measurement								
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
Average Measurement								
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)
Horizontal							
30.240	0.12	23.2	/	6.28	29.6	40.0	-10.4
98.480	0.22	7.2	/	16.28	23.7	40.0	-16.3
339.920	0.51	12.4	/	17.89	30.8	46	-15.2
/	/	/	/	/	/	/	/
/	/	/	/	/	/	/	/
/	/	/	/	/	/	/	/
Vertical							
34.640	0.02	16.7	/	15.28	32.0	40	-8.0
98.480	0.22	7.2	/	29.28	36.7	40	-3.3
957.120	0.89	23.4	/	13.51	37.8	46	-8.2
/	/	/	/	/	/	/	/
/	/	/	/	/	/	/	/
/	/	/	/	/	/	/	/

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)
Peak Measurement								
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
Average Measurement								
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:

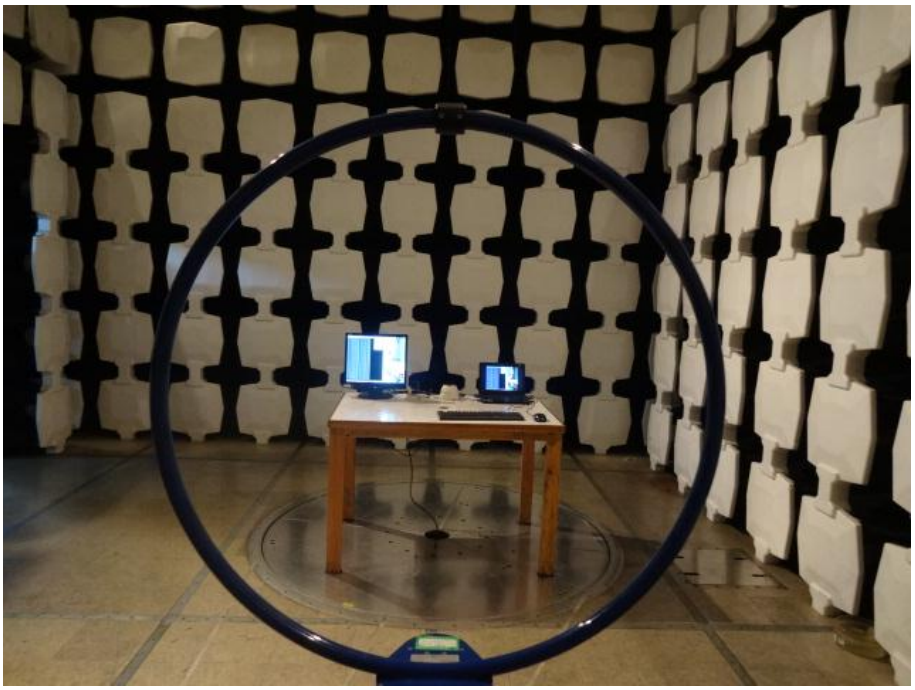
Test Equipment	*Model No.*	*Manufacturer*	*Serial No.*	*Last Cal.*	*Cal. Due*
Receiver	*SMR4503*	*SCHAFFNER*	*11725*	*2013.07.08*	*2014.07.07*
Double-ridged Wave guide horn	*3115*	*ETS*	*6587*	*2013.08.02*	*2014.08.01*
Microwave system amplifier	*83017A*	*Agilent*	*MY39500438*	*2013.07.11*	*2014.07.10*
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*
HF Loop Antenna	*HLA6120*	*TESEQ*	*26348*	*2013-10-11*	*2014-10-12*
Note: All testing were performed using internationally recognized standards. All test instruments were calibrated.					

TESTED BY: _____ ***ECMG***

ENGINEER ***COMPANY NAME***

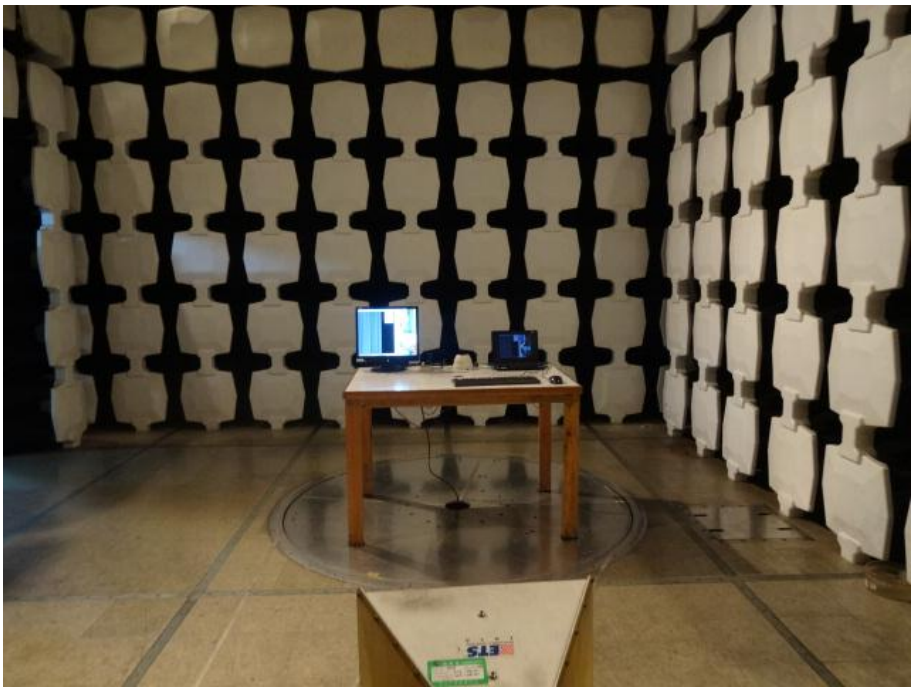
REVIEWED BY: _____ ***ECMG***

SENIOR ENGINEER ***COMPANY NAME***

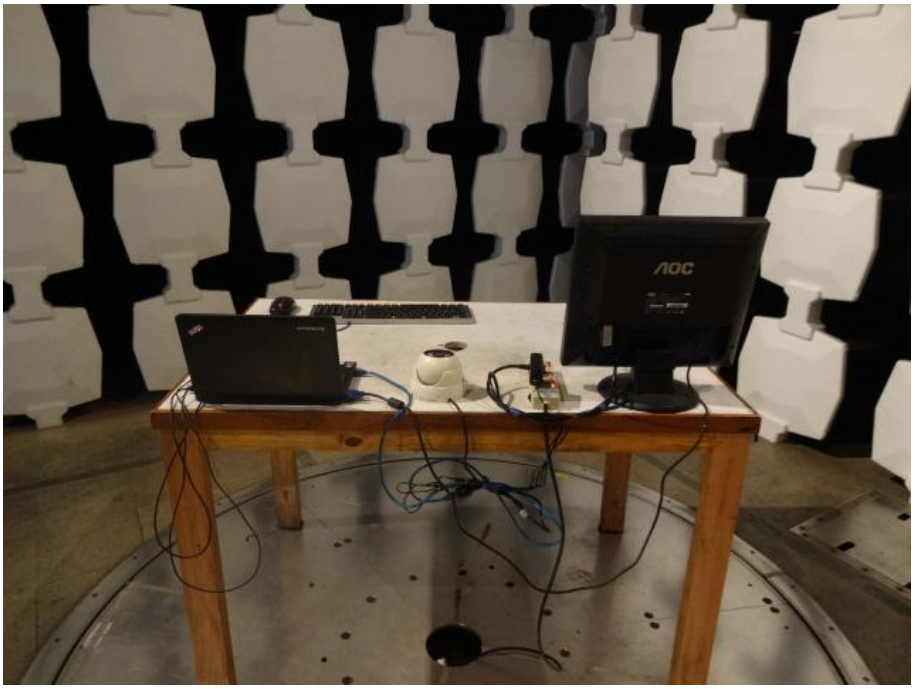


Radiated Emission Test Set-up(9KHz-30MHz)

Radiated Emission Test Set-up(Below 1GHz)



Radiated Emission Test Set-up(Above 1GHz)



Radiated Emission Test Set-up (Rear View)