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EMI TEST REPORT

On Model Name: IP Phone

Model Number: GXP2124

Brand Name: Grandstream

Prepared for Grandstream Networks, INC

FCC ID Number: YZZGXP2124

According to FCC 47 CFR Part 15, Subpart B

Test Report #: SHE-1208-10871-FCC (a)

Tested by: Daomen Galanz
Engineer Company Name

Reviewed by: Jamerym ECMG
Senior Engineer Company Name

QC Manager: Swall Zhang ECMG
QC Manager Company Name

Test Report Released by: Swall Zhang September 14th, 2012
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	YZZGXP2124 _Test report.pdf
Operation Description	Technical Description	YZZGXP2124_operation description.pdf
External Photos	External Photos	YZZGXP2124_External Photos
Internal Photos	Internal Photos	YZZGXP2124_Internal Photos
Block Diagram	Block Diagram	YZZGXP2124_Block Diagram.pdf
Schematics	Circuit Diagram	YZZGXP2124 _Schematics.pdf
ID Label/Location	Label and Location	YZZGXP2124 _Label & Location.pdf
User Manual	User Manual	YZZGXP2124 _User Manual.pdf
Test setup photos	Test setup photos	YZZGXP2124 _Test Setup 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 Phone*
Model Numbers	*: GXP2124*
Model Tested	*: GXP2124*
Receipt Date	*: September 3rd, 2012*
Date Tested	*: September 3rd to 10th, 2012*
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 GXP2124 (referred to as the EUT in this report) is an IP Phone.

Main technical specifications of the EUT are as below:

Parameter		***Range***
Basic parameters	*Rated voltage*	*5VDC*
	Rated Current	*0.8A*
I/O Ports	*PC socket*	*10/100/1000Mbps RJ-45 ports for PC (downlink) connection.*
	LAN socket	*10/100/1000Mbps RJ-45 port for LAN (uplink) connection. Supports PoE (802.3af).*
	Power Jack	*5V DC power port; UL Certified*
	Headset Jack	*RJ9, supporting EHS (Electronic Hook-Switch) with Plantronics headsets*
	Handset Jack	*RJ9.*
Power Adapter	*Input*	*100-240VAC 50/60Hz 0.15A*
	Output	*5VDC,0.8A,*
	Model	*SCF0500080A1BA*
	Brand name	*Mass*

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

Note:

This is an updating report based on the original report #: SHE-1202-10782-FCC; between them have only the following changes:

1. *Upgraded mainboard hardware version from GXP2124 V1.3A to GXP2124 V2.X;*
2. *Changed component layout& PCB layout;*
3. *Added an Ethernet chip(U102) which was used for upgrading from 100Mbps to 1000Mbps Ethernet;*
4. *Changed Ethernet transformer IC.*
5. *Added conducted emission and radiated emission test as attachment 1 and attachment 2.*

Anything else are the same as before.

This product has been tested and found in compliance with FCC Part 15,subpart B requirements.

Test Summary

The Electromagnetic Compatibility requirements on model GXP2124 for this test are stated below. All results listed in this report relate exclusively to this above-mentioned model as the Equipment under Test. This report confers no approval or endorsement upon any other component, host or subsystem used in the test set-up.

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

Test Mode Justification

Pre-scan has been conducted to determine the worst-case modes from all possible combinations between available working modes, for example,IP call mode and PoE mode.The following modes were chosen for the final test as described below.

IP Call mode:
Connected the EUT to another an IP Phone by an RJ-45 cable and established a call communication Link between them.Then connected a notebook PC to PC port of the EUT by another an RJ-45 cable and ping "192.168.0.162 –t" to EUT and measured it.

For PoE Mode:
Removed AC Adaptor of EUT, Let EUT powered by PoE mode and measured it.

EUT Exercise Software

No test sofware support this test.

Equipment Modification

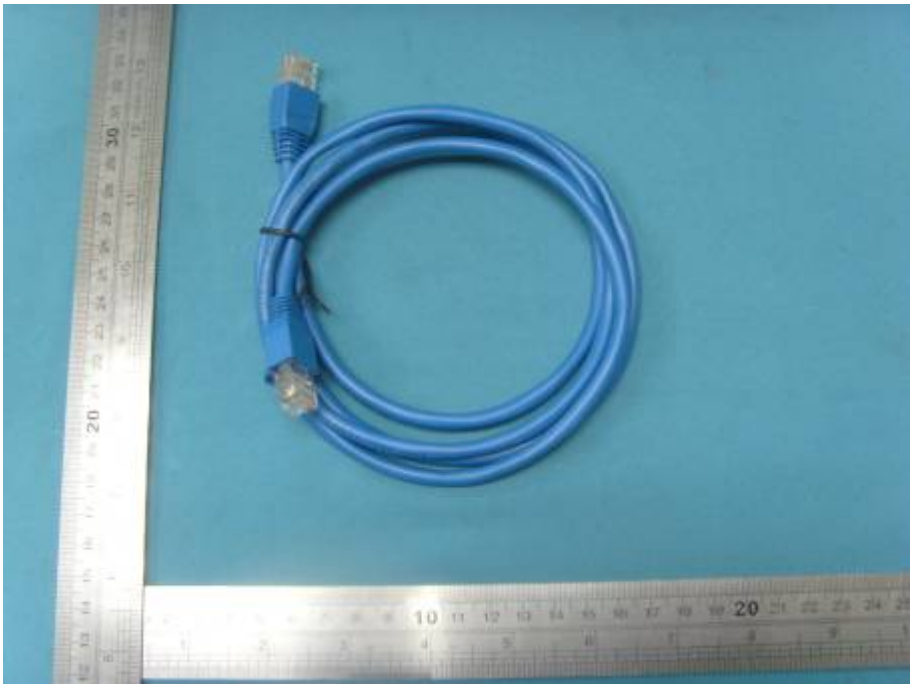
Any modifications installed previous to testing by Grandstream Networks, INC. will be incorporated in each production model sold or leased in United States.

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

EUT Sample Photos for model GXP2124

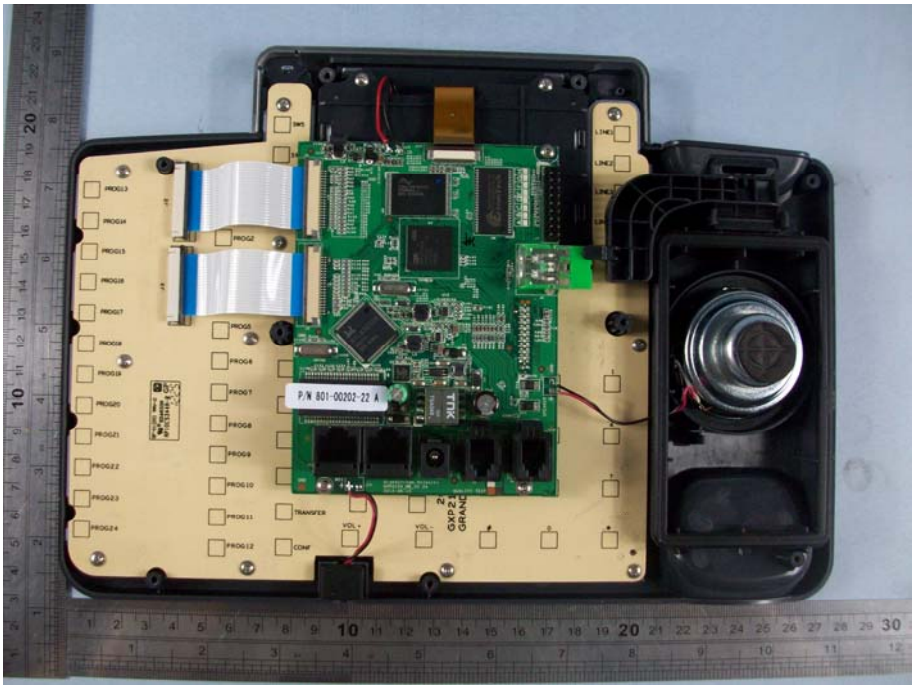
EUT- Front View

EUT- Rear View

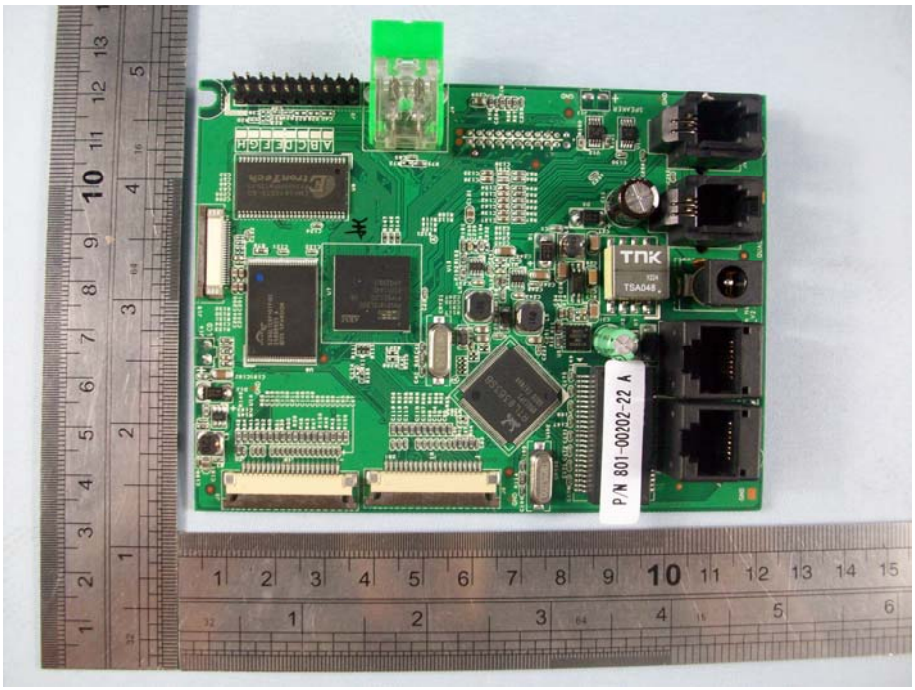


RJ-45 Cable View

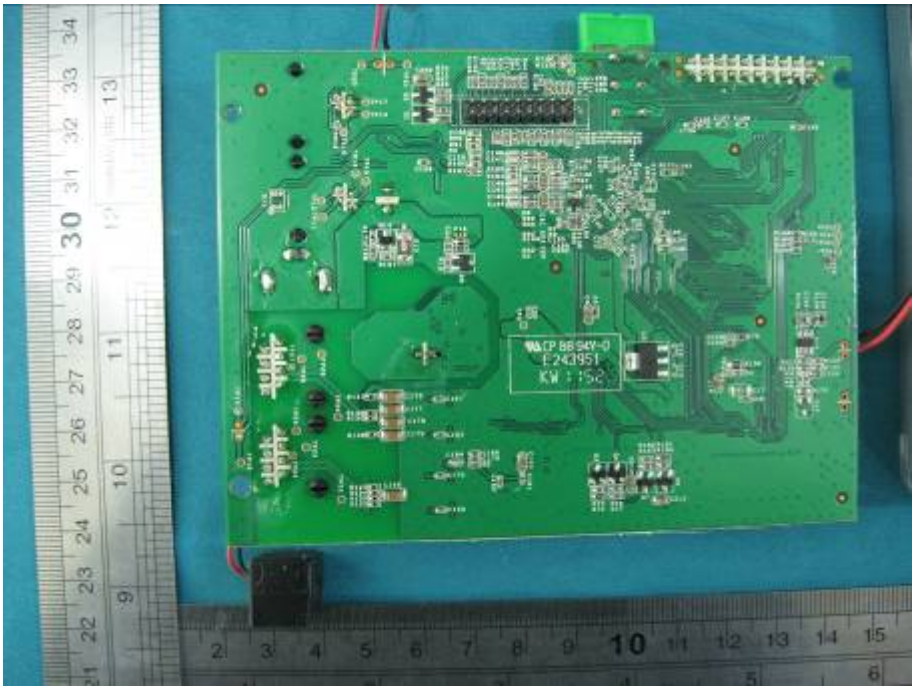
Power Adaptor View(Manufacturer: Mass Power)



Uncovered View



Mainboard Top View



Mainboard Bottom View

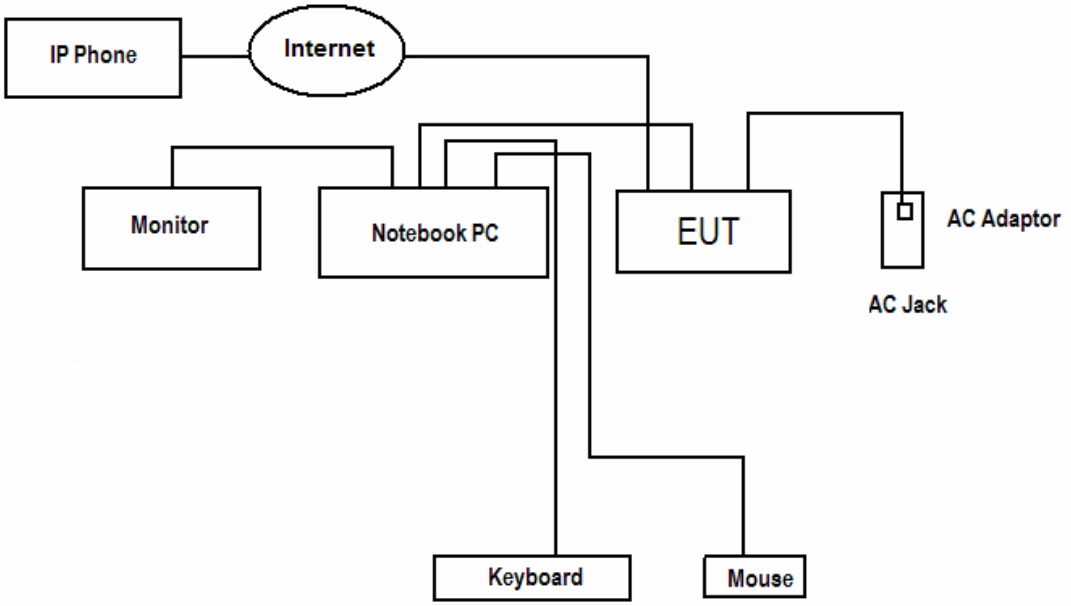
Test System Details

EUT			
Model Number:	GXP2124		
Model Tested:	GXP2124		
Description:	IP Phone		
Input:	AC 120V/60Hz		
Manufacturer:	Grandstream Networks, INC		
Support Equipment			
Description	**Model Number**	**Serial Number**	**Manufacturer**
Notebook PC	NC4000	CNU4122BCL	HP
Adapter Of Notebook PC	PPP009H	239427-003	HP
Mouse	MO32B0	23-033131	HP
Keyboard	SK-1788	N/A	LENOVO

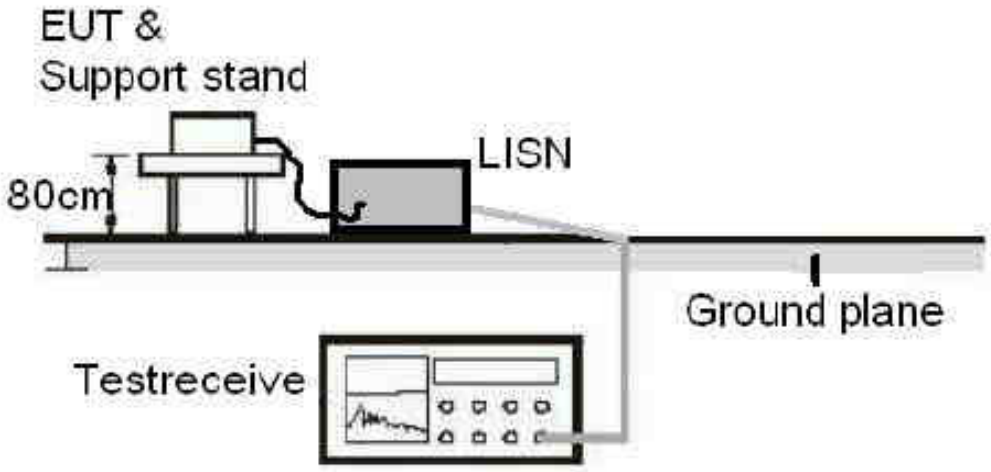
Cable Description					
Description	**From**	**To**	**Length (Meters)**	**Shielded (Y/N)**	**Ferrite (Y/N)**
Adapter Cord Of Notebook	AC Adapter	Notebook PC	1.6	N	Y
	AC Adapter	Plug	1.2	N	Y
Mouse cord	Mouse	Plug	1.2	N	Y
Keyboard cord	keyboard	Plug	1.2	N	Y
RJ-45 Cord #1	EUT	Notebook PC	1.5	N	N
RJ-45 Cord #2	EUT	Other IP Phone	>3.0	N	N
Power Adapter cord of EUT	EUT	Plug	1.8	N	N
Note:The "EUT" means "IP Phone".					

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.

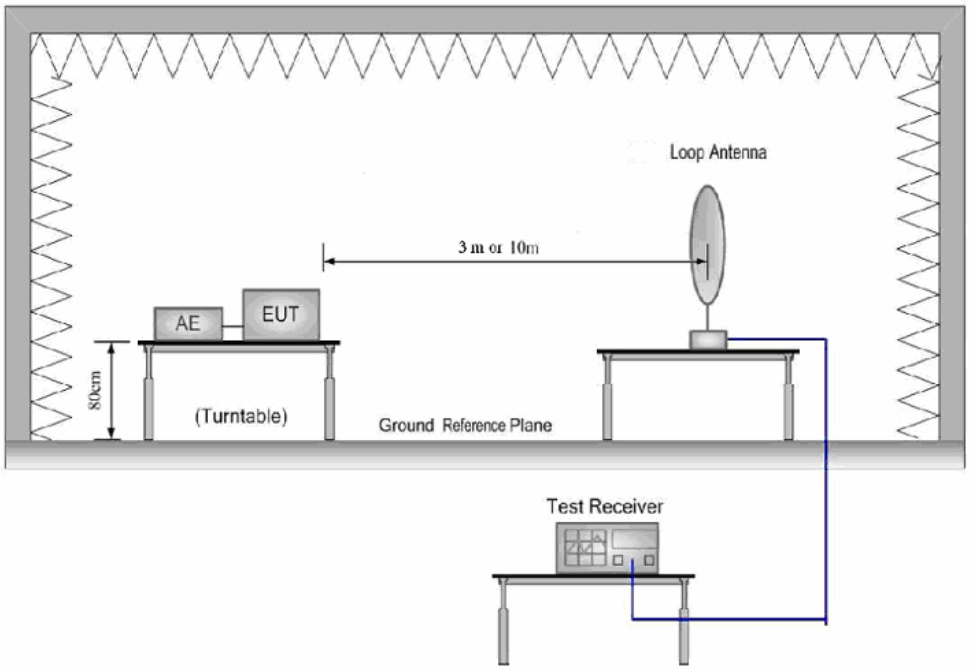
Configuration of Tested System



Note : The same system configuration shall still applly to PoE mode when removed AC Adaptor of EUT.



Conducted Emission Test Set-up Photograph



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

Figure 1 : Frequencies measured below 1 GHz configuration

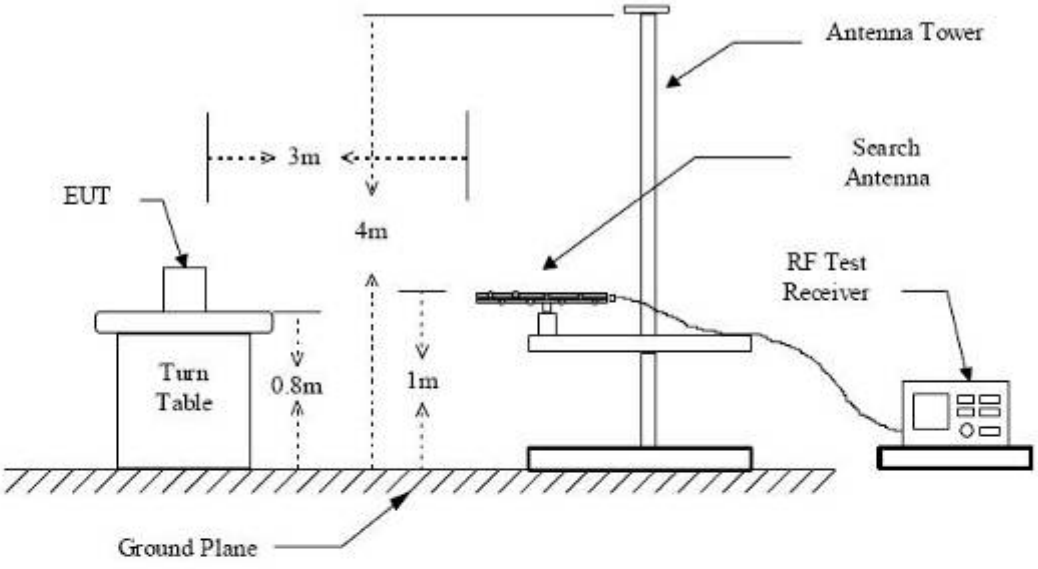
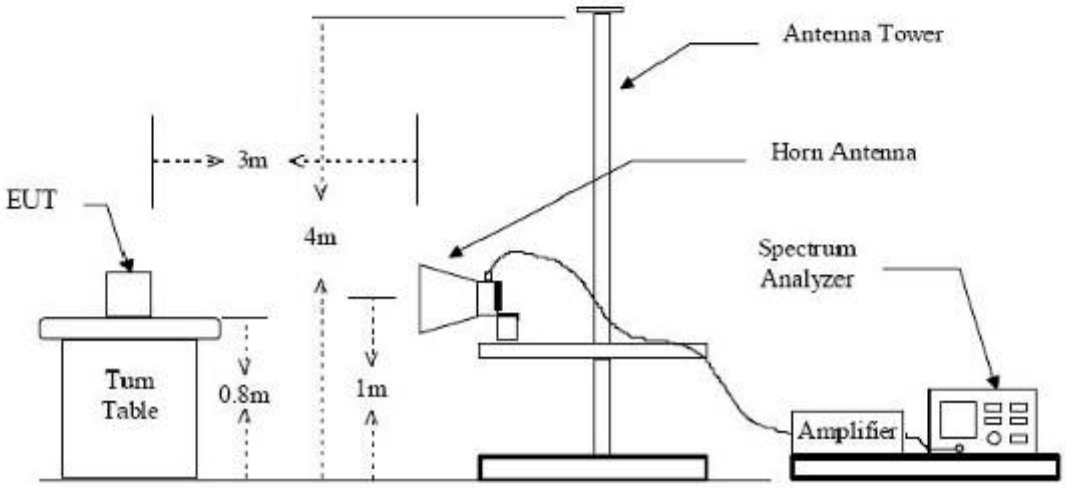


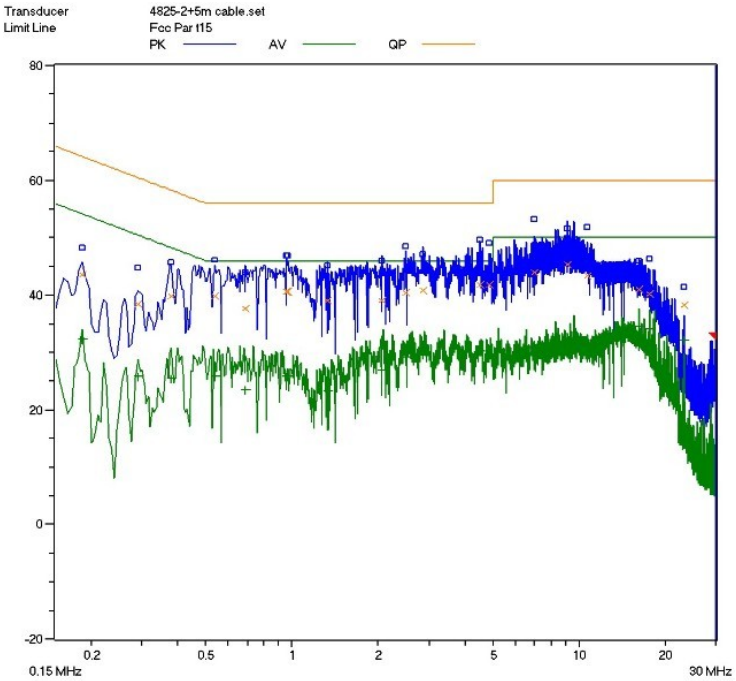
Figure 2 : Frequencies measured above 1 GHz configuration



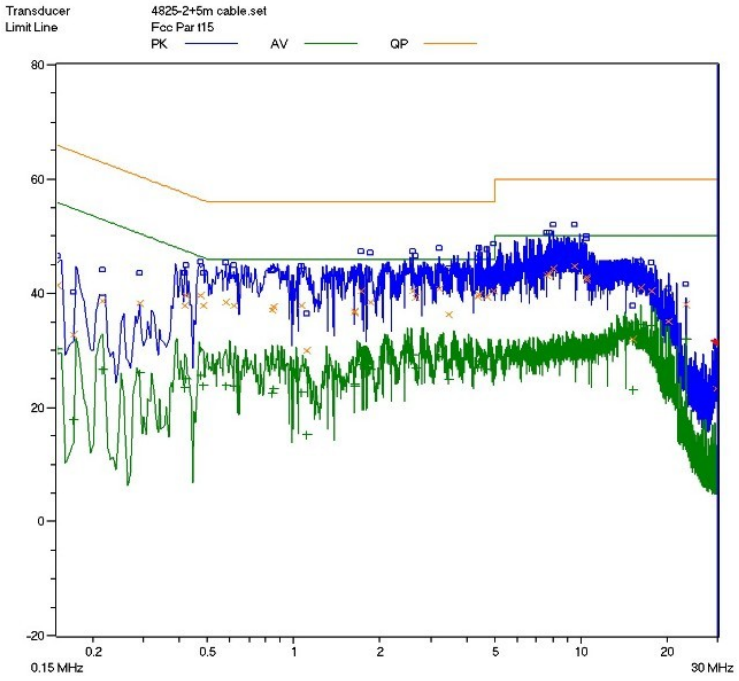
ATTACHMENT 1 - CONDUCTED EMISSION TEST RESULTS

CLIENT:	Grandstream Networks, INC	**TEST STANDERD:**	FCC Part 15, Subpart B, Section 15.107
MODEL NUMBERS:	GXP2124	**PRODUCT:**	IP Phone
MODEL TESTED:	GXP2124	**EUT DESIGNATION:**	Home or Office
TEMPERATURE:	23°C	**HUMIDITY:**	51%
ATM PRESSURE:	103kPa	**GROUNDING:**	None
TESTED BY:	Sewen Guo	**DATE OF TEST:**	September 5th, 2012
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 Call mode		
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. $\pm$ $2x10^{-7}$ x Center Freq., Amp $\pm$ 2.6 dB		

IP Call 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)*
IP Call Mode								
L	*0.185*	*43.7*	*64.2*	*-20.5*	*0.185*	*32.3*	*54.2*	*-21.9*
L	*6.950*	*43.9*	*60*	*-16.1*	*6.950*	*30.9*	*50*	*-19.1*
L	*9.075*	*45.4*	*60*	*-14.6*	*9.075*	*31.7*	*50*	*-18.3*
N	*0.150*	*41.4*	*65.9*	*-24.5*	*0.150*	*30.2*	*55.9*	*-25.7*
N	*1.715*	*40.4*	*56*	*-15.6*	*1.715*	*27.4*	*46*	*-18.6*
N	*2.585*	*40.7*	*56*	*-15.3*	*2.585*	*29.3*	*46*	*-16.7*

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	*4825/2*	*ETS*	*1161*	*2012.07.08*	*2013.07.08*
Note: All testing were performed using internationally recognized standards. All test instruments were calibrated.					

SIGNED BY: _____ ***REVIEWED BY:*** _____

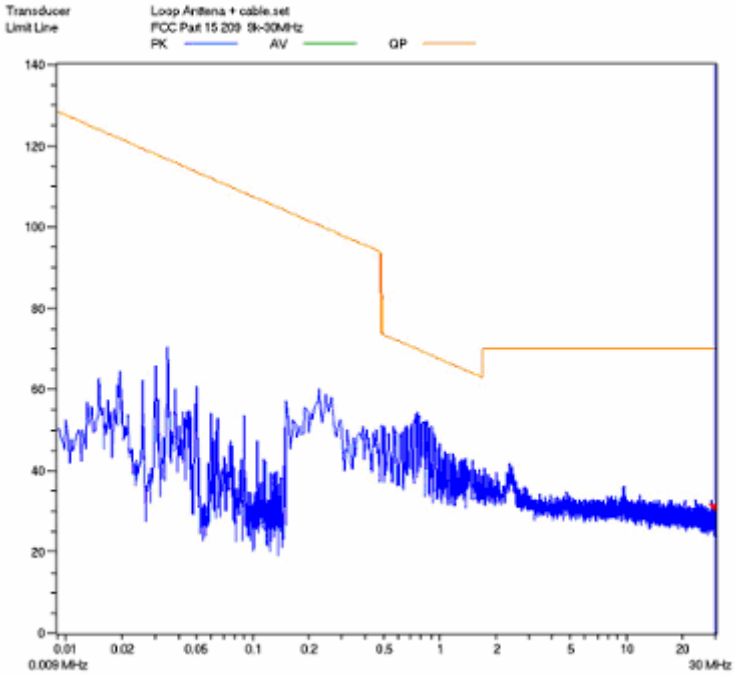
ENGINEER ***SENIOR ENGINEER***

Conducted Emission Test Set-up:

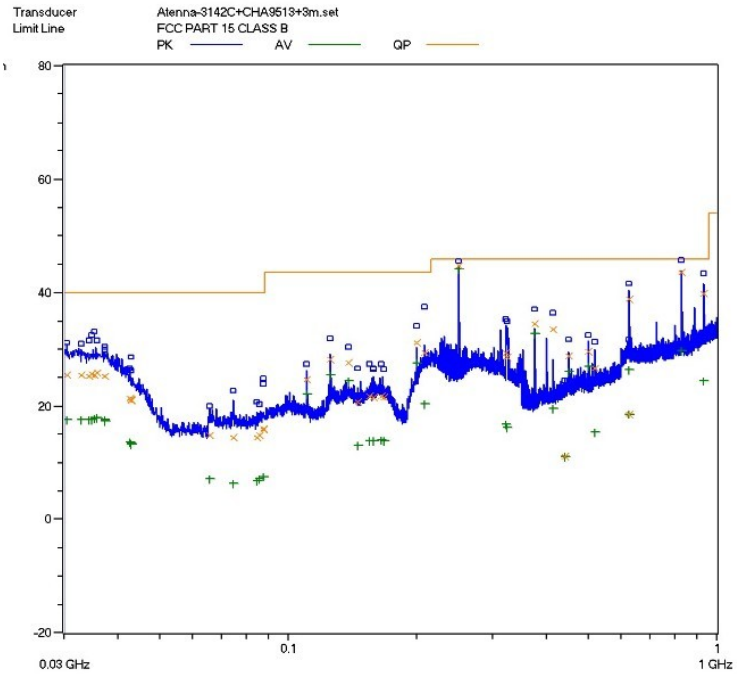
ATTACHMENT 2 – RADIATED EMISSION MEASUREMENT

CLIENT:	Grandstream Networks, INC	**TEST STANDERD:**	FCC Part 15,Subpart B, Section 15.109
MODEL NUMBERS:	GXP2124	**PRODUCT:**	IP Phone
EUT MODEL:	GXP2124	**EUT DESIGNATION:**	Home or Office
TEMPERATURE:	23°C	**HUMIDITY:**	49%RH
ATM PRESSURE:	103.0kPa	**GROUNDING:**	None
TESTED BY:	Sewen Guo	**DATE OF TEST:**	September 5th, 2012
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 3GHz 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 Call mode and PoE mode		
TESTED RANGE:	9K-30MHz and 30MHz 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 $\pm$ 2.6 dB		

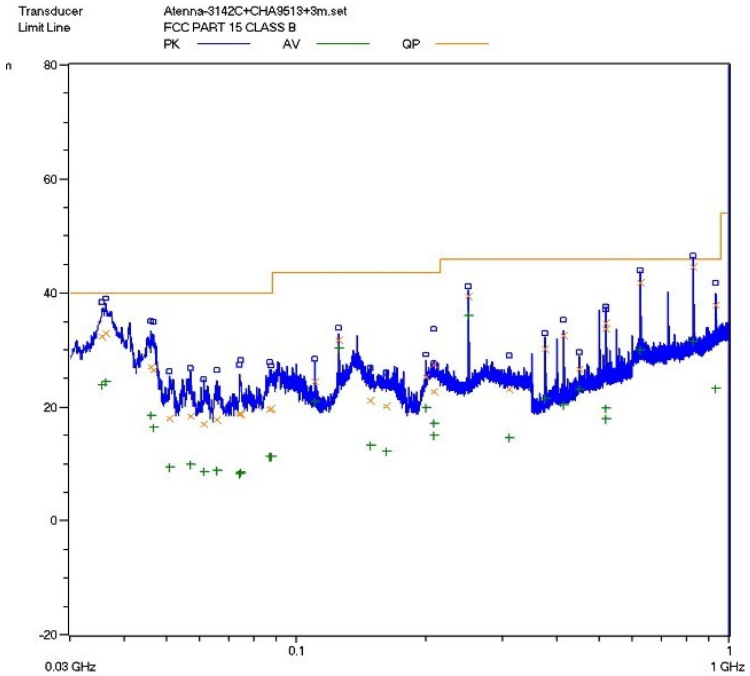
For IP Call Mode:



Radiated Filed Strength Emission Test Plot(9KHz-30MHz)

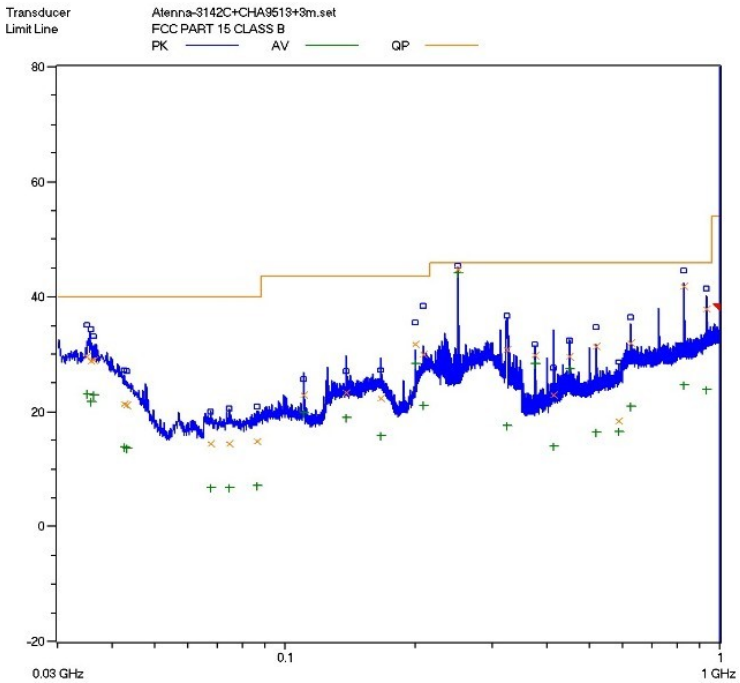


Horizontal:Radiated Emission Test Plot(30MHz-1000MHz)

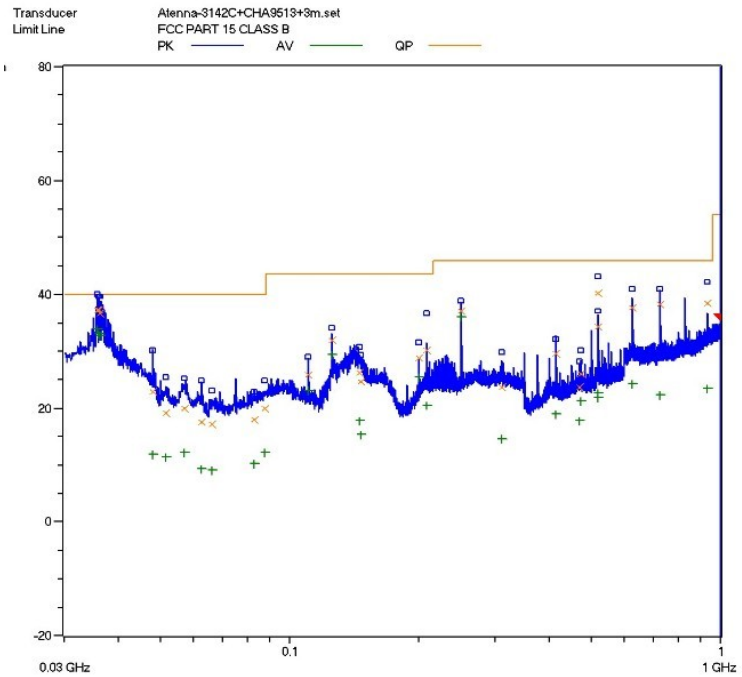


Vertical:Radiated Emission Test Plot(30MHz-1000MHz)

For PoE Mode:



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



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

Test Data:

IP Call mode/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:

a) 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.

b) 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.

c) All emission levels in the frequency range of 9KHz to 30MHz are 20dB below the official limits that are not reported.

Test Data:

IP Call 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							
250.000	*0.12*	*11.8*	*/*	*32.88*	*44.8*	*46*	*-1.2*
374.960	*0.16*	*13.7*	*/*	*20.64*	*34.5*	*46*	*-11.5*
414.720	*0.2*	*15.2*	*/*	*18.2*	*33.6*	*46*	*-12.4*
622.000	*0.36*	*20.2*	*/*	*18.24*	*38.8*	*46*	*-7.2*
829.360	*0.42*	*22.4*	*/*	*20.68*	*43.5*	*46*	*-2.5*
933.040	*0.44*	*23.8*	*/*	*15.66*	*39.9*	*46*	*-6.1*
Vertical							
36.160	*0.02*	*18.4*	*/*	*14.58*	*33.0*	*40*	*-7.0*
250.000	*0.12*	*11.8*	*/*	*27.48*	*39.4*	*46*	*-6.6*
518.400	*0.3*	*18.4*	*/*	*16.1*	*34.8*	*46*	*-11.2*
622.000	*0.36*	*20.2*	*/*	*21.24*	*41.8*	*46*	*-4.2*
829.360	*0.42*	*22.4*	*/*	*21.78*	*44.6*	*46*	*-1.4*
933.040	*0.44*	*23.8*	*/*	*13.76*	*38.0*	*46*	*-8.0*

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.*

IP Call 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								
1.673	1.76	26.7	-33.5	-12.24	49.72	74	-24.28	H
2.127	2.1	28.6	-33	-13.34	50.36	74	-23.64	H
2.664	2.3	29.8	-33	-9.83	55.27	74	-18.73	H
1.655	1.76	26.5	-33.5	-12.4	49.36	74	-24.64	V
1.986	2.00	28	-33	-10.88	52.12	74	-21.88	V
2.127	2.1	28.6	-33	-14.43	49.27	74	-24.73	V
Average Measurement								
1.665	1.76	26.5	-33.5	-29.15	32.61	54	-21.39	H
1.673	1.76	26.7	-33.5	-28.77	33.19	54	-20.81	H
2.127	2.1	28.6	-33	-32.63	31.07	54	-22.93	H
1.655	1.76	26.5	-33.5	-31.99	29.77	54	-24.23	V
1.665	1.76	26.5	-33.5	-29.18	32.58	54	-21.42	V
1.658	1.76	26.5	-33.5	-26.07	35.69	54	-18.31	V

Note:

1. *The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows: Emission Level =Reading Level + Antenna Factor + Cable Loss –Preamplifier Factor.*
2. *The limits shown are based on Peak value and Average value detector above 1GHz,the bandwidth of Test Receiver was set at 1MHz above 1GHz.*
3. *The other emission levels are 20dB below the official limits that are not reported.*

PoE Mode /Below 1GHz:

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB)	Preamp Factor (dB)	Reading Level QP (dBuV/m)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
Horizontal							
250.000	0.12	11.8	/	32.78	44.7	46	-1.3
324.640	0.16	13.5	/	17.04	30.7	46	-15.3
518.400	0.3	18.4	/	12.7	31.4	46	-14.6
622.000	0.36	20.2	/	11.34	31.9	46	-14.1
829.360	0.42	22.4	/	19.08	41.9	46	-4.1
933.040	0.44	23.8	/	13.56	37.8	46	-8.2
Vertical							
36.080	0.02	18.4	/	18.88	37.3	40	-2.7
250.000	0.12	11.8	/	25.18	37.1	46	-8.9
518.400	0.3	18.4	/	21.5	40.2	46	-5.8
622.000	0.36	20.2	/	17.04	37.6	46	-8.4
725.680	0.39	20.5	/	17.31	38.2	46	-7.8
933.040	0.44	23.8	/	14.26	38.5	46	-7.5

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 /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								
1.673	1.76	26.7	-33.5	-11.74	50.22	74	-23.78	H
2.127	2.1	28.6	-33	-13.94	49.76	74	-24.24	H
2.664	2.3	29.8	-33	-13.91	51.19	74	-22.81	H
1.655	1.76	26.5	-33.5	-10.9	50.86	74	-23.14	V
1.986	2.00	28	-33	-10.86	52.14	74	-21.86	V
2.127	2.1	28.6	-33	-9.93	53.77	74	-20.23	V
Average Measurement								
1.665	1.76	26.5	-33.5	-28.5	33.26	54	-20.74	H
1.673	1.76	26.7	-33.5	-29.24	32.72	54	-21.28	H
2.127	2.1	28.6	-33	-30.01	33.69	54	-20.31	H
1.655	1.76	26.5	-33.5	-30.63	31.13	54	-22.87	V
1.665	1.76	26.5	-33.5	-33.91	27.85	54	-26.15	V
1.658	1.76	26.5	-33.5	-24.47	37.29	54	-16.71	V

Note:

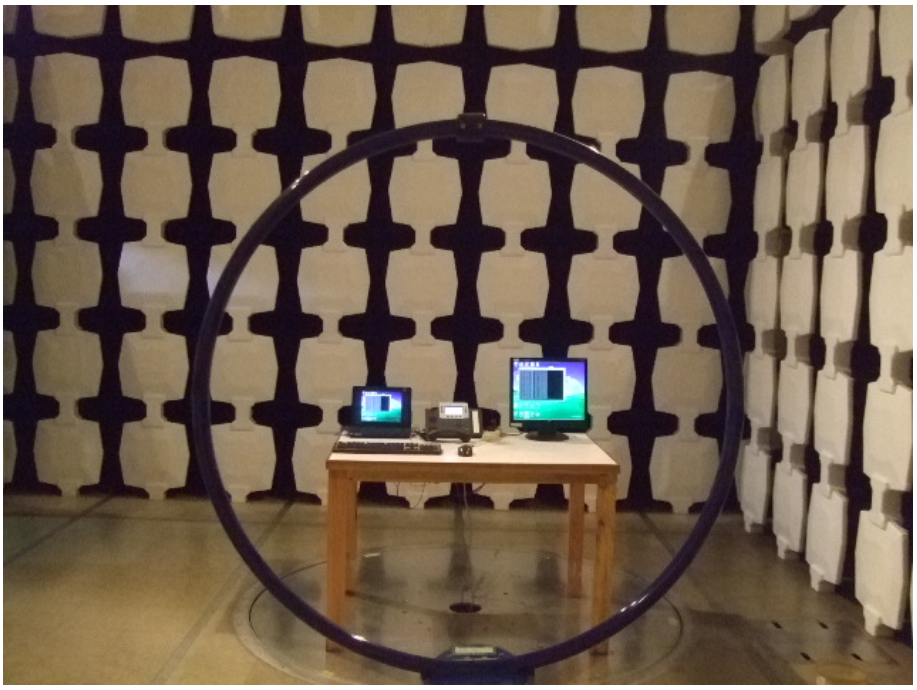
1. *The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows: Emission Level =Reading Level + Antenna Factor + Cable Loss –Preamplifier Factor.*
2. *The limits shown are based on Peak value and Average value detector above 1GHz,the bandwidth of Test Receiver was set at 1MHz above 1GHz.*
3. *The other emission levels are 20dB below the official limits that are not reported.*

Test Equipment List:

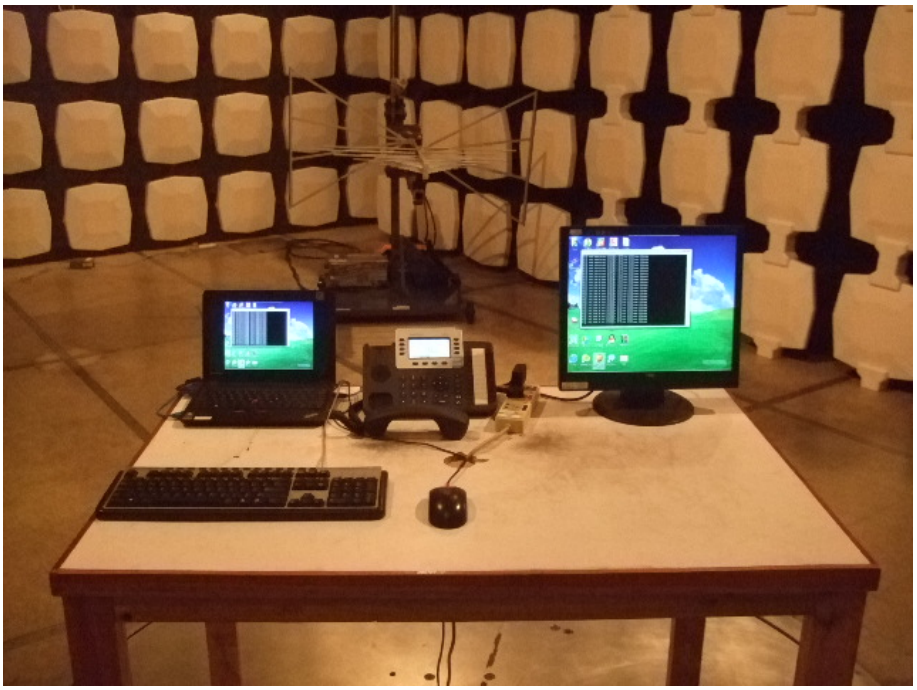
Test Equipment	*Model No.*	*Manufacturer*	*Serial No.*	*Last Cal.*	*Cal. Due*
Receiver	*SMR4503*	*SCHAFFNER*	*11725*	*2012.07.08*	*2013.07.07*
HF Loop Antenna	*HLA6120*	*TESEQ*	*26348*	*2011.09.27*	*2012.09.26*
Double-ridged Wave guide horn	*3115*	*ETS*	*6587*	*2012.08.02*	*2013.08.01*
Microwave system amplifier	*83017A*	*Agilent*	*MY39500438*	*2012.07.11*	*2013.07.10*
Biconilog Antenna	*3142C*	*ETS*	*00042672*	*2011.09.28*	*2012.09.27*
Band-pass Filter	*BRM50702*	*Micro-Tronic*	*S/N-030*	*2011.11.30*	*2012.11.29*
Spectrum Analyzer	*FSP30*	*R&S*	*100755*	*2011.11.30*	*2012.11.29*
Note: All testing were performed using internationally recognized standards. All test instruments were calibrated.					

SIGNED BY: _____ ***REVIEWED BY:*** _____

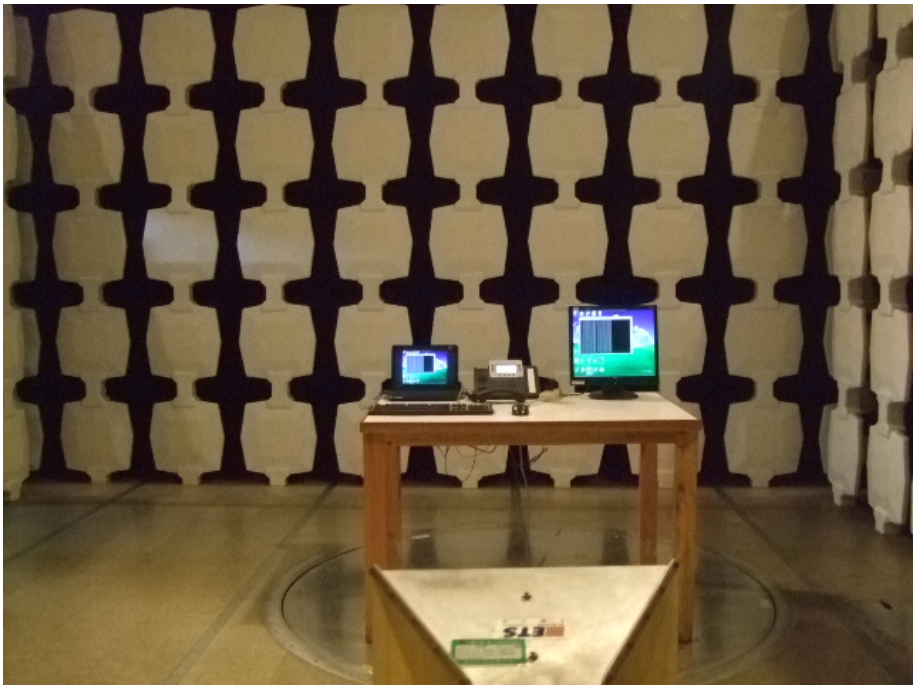
ENGINEER ***SENIOR ENGINEER***



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



Radiated Emission Test Set-up(Below 1GHz)



Radiated Emission Test Set-up(Above 1GHz)