

EMI TEST REPORT

On Model Name: IP Phone

Model Number: GXP1405

Brand Name: Grandstream

Prepared for Grandstream Networks, Inc.

FCC ID Number: YZZGXP1400

According to FCC 47 CFR Part 15, Subpart B

Test Report #: SHE-1409-11236-FCC

Tested by: Daomen ECMG
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 October 10th, 2014
Swall Zhang Date

Test Location

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

Test Site Location:

Galanz

*No.25, South Ronggui Avenue,
Shunde District, Foshan City,
Guangdong Province, China*

Tel:

(86)-757-28886389

Fax:

(86)-757-28889628

Accreditation Bodies

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>YZZGXP1400_Test report.pdf</i>
<i>Operation Description</i>	<i>Technical Description</i>	<i>YZZGXP1400_operation description.pdf</i>
<i>External Photos</i>	<i>External Photos</i>	<i>YZZGXP1400_External Photos</i>
<i>Internal Photos</i>	<i>Internal Photos</i>	<i>YZZGXP1400_Internal Photos</i>
<i>Block Diagram</i>	<i>Block Diagram</i>	<i>YZZGXP1400_Block Diagram.pdf</i>
<i>Schematics</i>	<i>Circuit Diagram</i>	<i>YZZGXP1400_Schematics.pdf</i>
<i>ID Label/Location</i>	<i>Label and Location</i>	<i>YZZGXP1400_Label & Location.pdf</i>
<i>User Manual</i>	<i>User Manual</i>	<i>YZZGXP1400_User Manual.pdf</i>
<i>Test set-up photos</i>	<i>Test set-up photos</i>	<i>YZZGXP1400_Test Set-up Photos</i>

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Reproduction Clause

Any reproduction of this document must be done in full. No single part of this document may be reproduced without permission from ECMG Electronic Technical Testing Corp (Shenzhen).

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 : *GXP1405*

Model Tested : *GXP1405*

Receipt Date : *Sep. 24th, 2014*

Date Tested : *Sep.30th, 2014 to October 10th, 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 GXP1405 (referred to as the EUT in this report) is an IP Phone.

Technical specifications of the EUT are as follows:

Parameter		Range
Basic parameters	Rated voltage	5VDC
	Rated Current	0.8A
I/O Ports	LAN Port	RJ-45 port for LAN (uplink) connection. Supports PoE (802.3af).
	PC Port	RJ-45 ports for PC (downlink) connection
	Power Jack	5V DC power port; UL Certified
	Headset Jack	RJ-9
Power Adapter #1	Input	100-240VAC 50/60Hz 0.15A
	Output	5VDC, 800mA
	Model	SCF0500080A1BA
	Brand name	Mass power
Power Adapter #2	Input	100-240VAC 50/60Hz 0.2A
	Output	5VDC, 800mA
	Model	AK00G-0500080UW
	Brand name	All-Key
Power Adapter #3	Input	100-240VAC 50/60Hz 0.2A
	Output	5VDC, 800mA
	Model	SWN006S050080U1
	Brand name	SWTEC

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

Test Summary

The Electromagnetic Compatibility requirements on model GXP1405 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
<i>FCC Part 15.107 ANSI C63.4:2009</i>	<i>Conducted Emission</i>	<i>Passed</i>	<i>AC Input Port</i>	<i>Attachment 1</i>
<i>FCC Part 15.109 ANSI C63.4:2009</i>	<i>Radiated Emission</i>	<i>Passed</i>	<i>Enclosure</i>	<i>Attachment 2</i>

Test Mode Justification

Pre-Scan has been conducted to determine the worst-case from all possible combination between available operation mode .Following mode(s) was (were) selected for the final test as listed below:

Pre-Test Mode	
<i>EMI Test Mode</i>	<i>Mode 1: Communication with PC&Phone + Mass Power</i>
	<i>Mode 2: Communication with PC&Phone + All-Key Power</i>
	<i>Mode 3: Communication with PC&Phone + SWTEC Power</i>
	<i>Mode 4: PoE mode</i>
Final Test Mode	
<i>EMI Test Mode</i>	<i>Mode 1: Communication with PC&Phone + Mass Power</i>
	<i>Mode 2: Communication with PC&Phone + All-Key Power</i>
	<i>Mode 3: Communication with PC&Phone + SWTEC Power</i>
	<i>Mode 4: PoE mode</i>
<i>EMS Test Mode</i>	<i>Not Applicable</i>

EUT Exercise Software

No exercise software support this test.

Equipment Modification

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

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

§15.33 Frequency range of radiated measurements

(b) For unintentional radiators:

(1) Except as otherwise indicated in paragraphs (b)(2) or (b)(3) of this section, for an unintentional radiator, including a digital device, the spectrum shall be investigated from the lowest radio frequency signal generated or used in the device, without going below the lowest frequency for which a radiated emission limit is specified, up to the frequency shown in the following table:

<i>Highest frequency generated or used in the device or on which the device operates or tunes (MHz)</i>	<i>Upper frequency of measurement range (MHz)</i>
<i>Below 1.705</i>	<i>30.</i>
<i>1.705-108</i>	<i>1000.</i>
<i>108-500</i>	<i>2000.</i>
<i>500-1000</i>	<i>5000.</i>
<i>Above 1000</i>	<i>5th harmonic of the highest frequency or 40 GHz, whichever is lower.</i>

Note: As the highest frequency operated of the EUT is 208MHz, so upper frequency of radiated emission test is up to 2GHz as per §15.33(b)(1).

EUT Sample Photos for model GXP1405



EUT- Front View



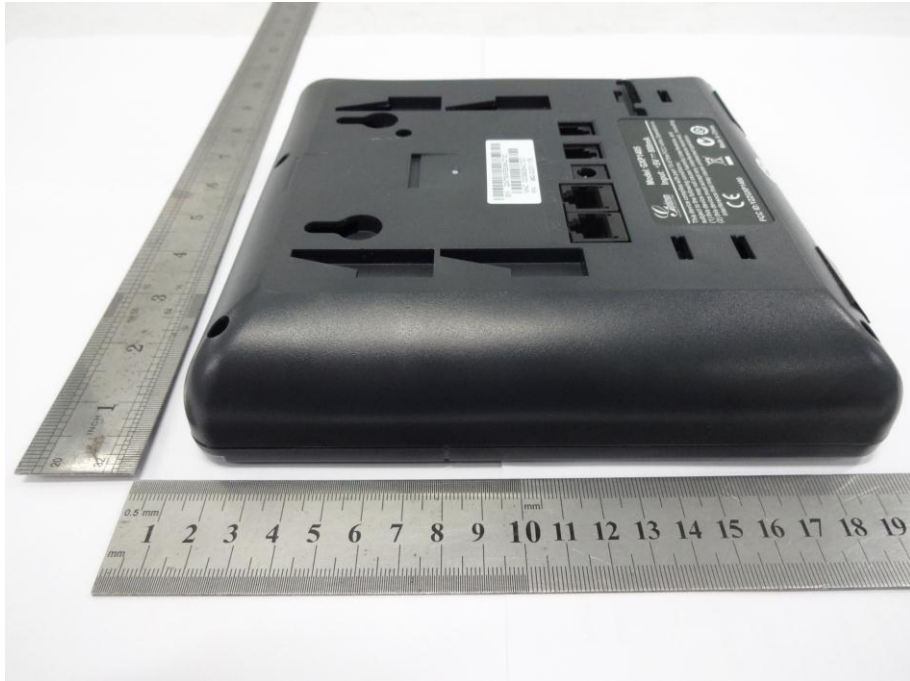
EUT- Rear View



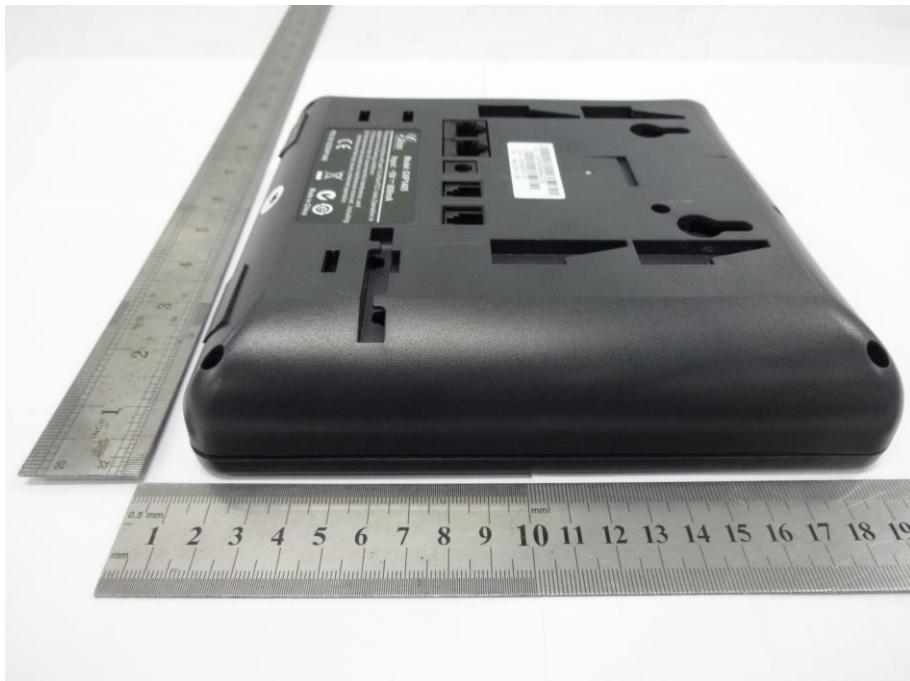
EUT- Top View



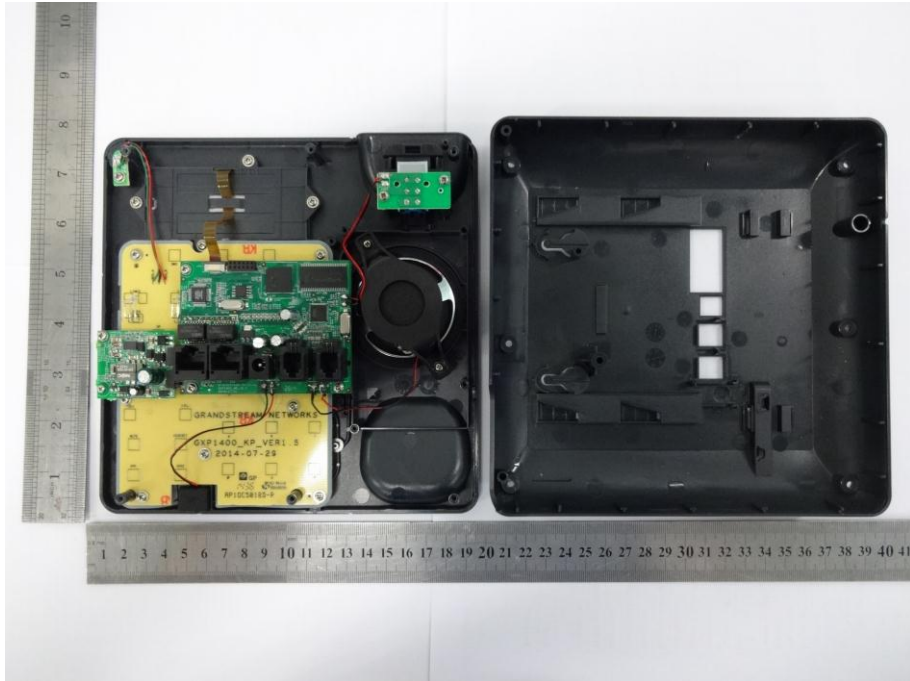
EUT- Bottom View



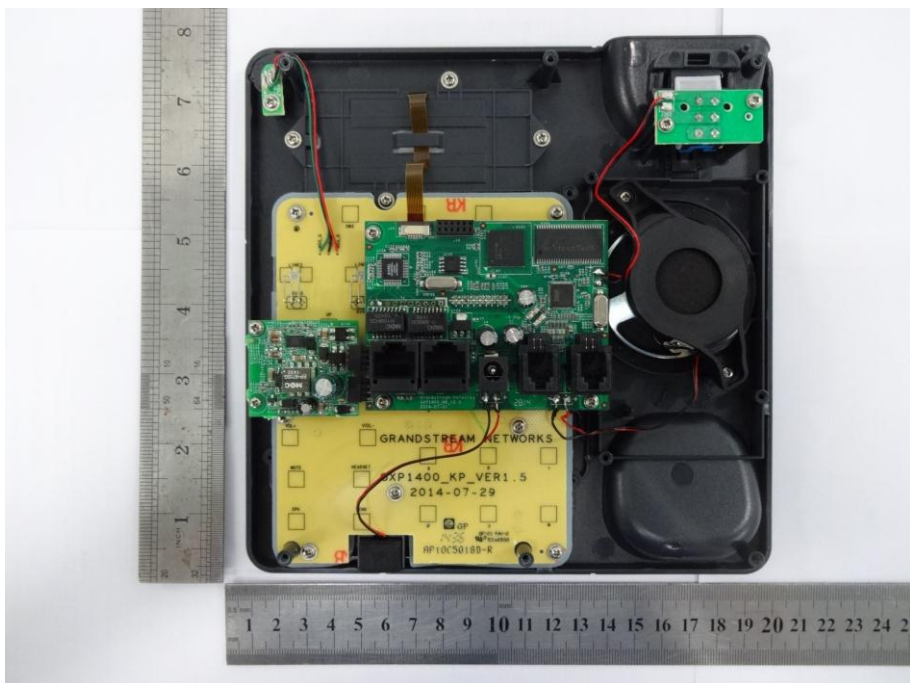
EUT- Right Side View



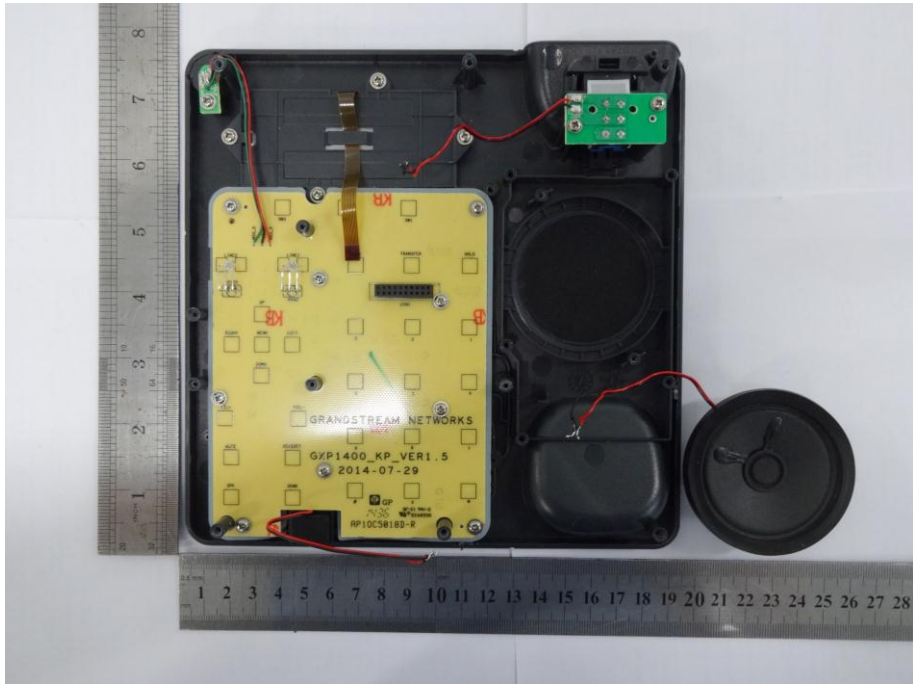
EUT- Left Side View



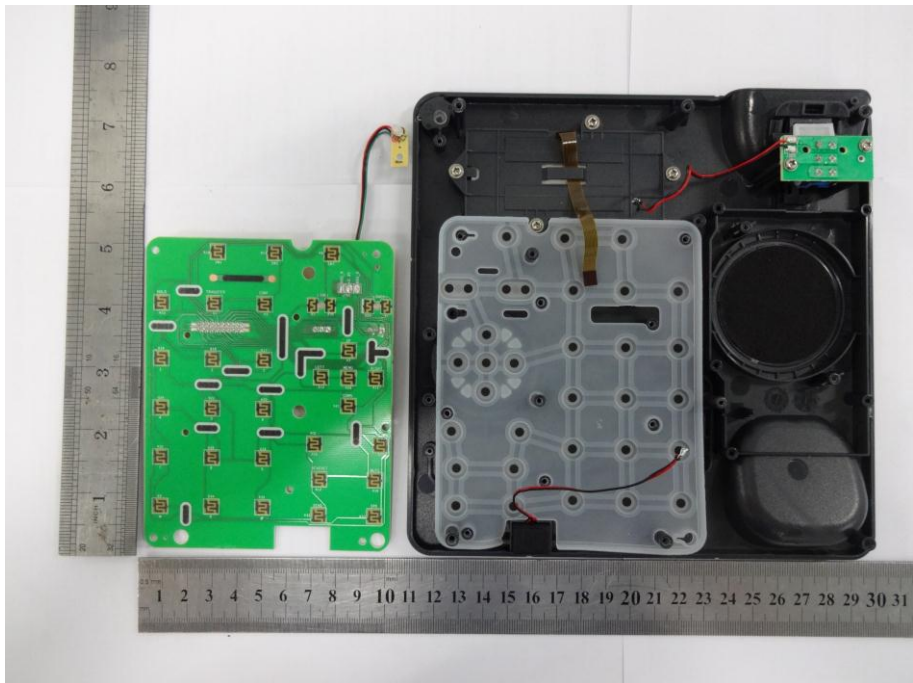
EUT-Uncovered View #1



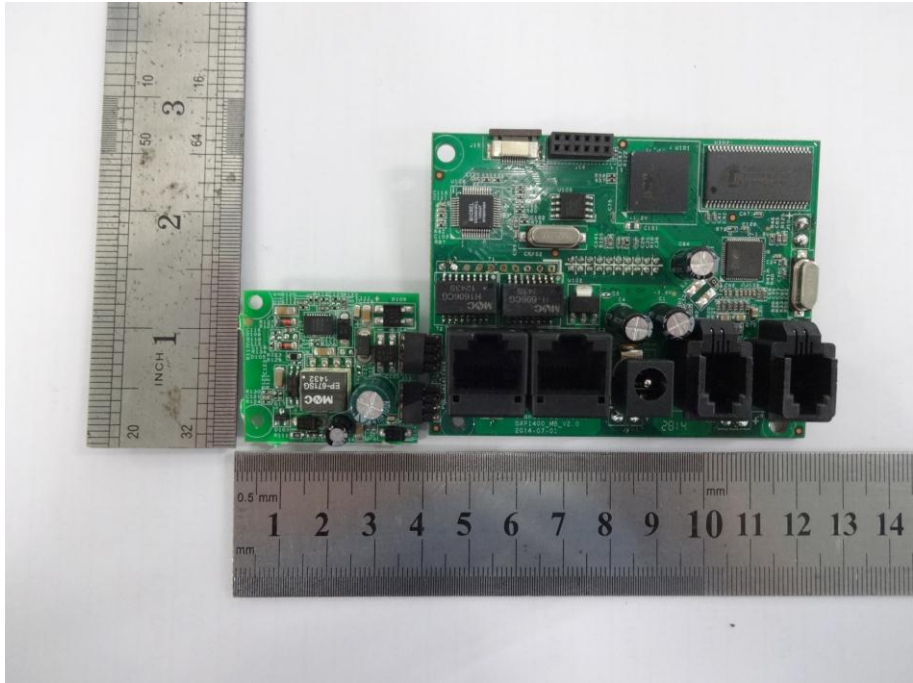
EUT-Uncovered View #2



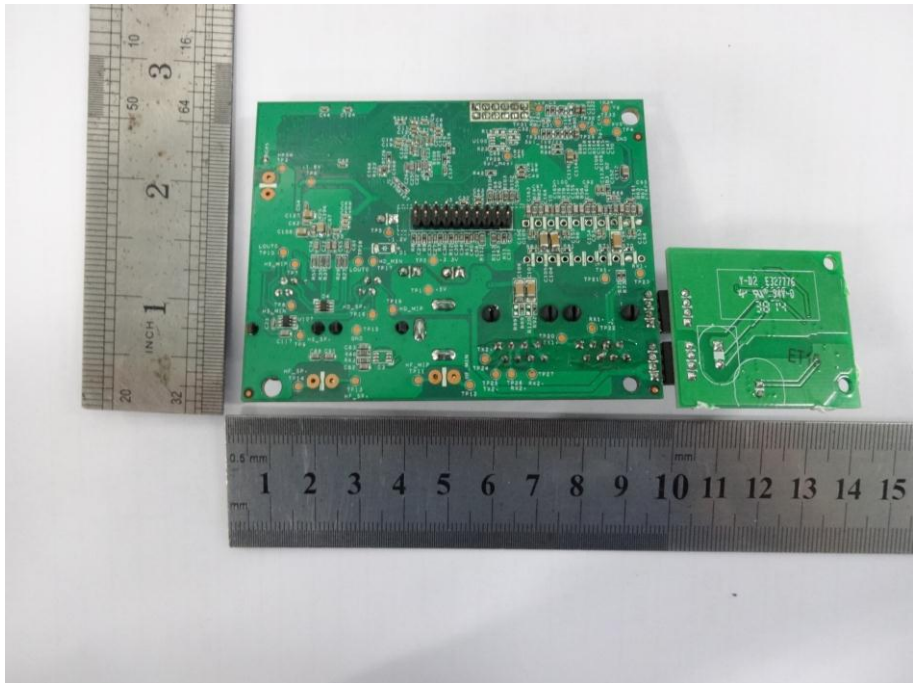
EUT-Uncovered View #3



EUT-Uncovered View #4



Main board- Top View



Main board- Bottom View



Power Adaptor #1 View(Manufacturer: Mass Power)



Power Adaptor #2 View(Manufacturer: All-Key)



Power Adaptor #3 View(Manufacturer: SWTEC)

Test System Details

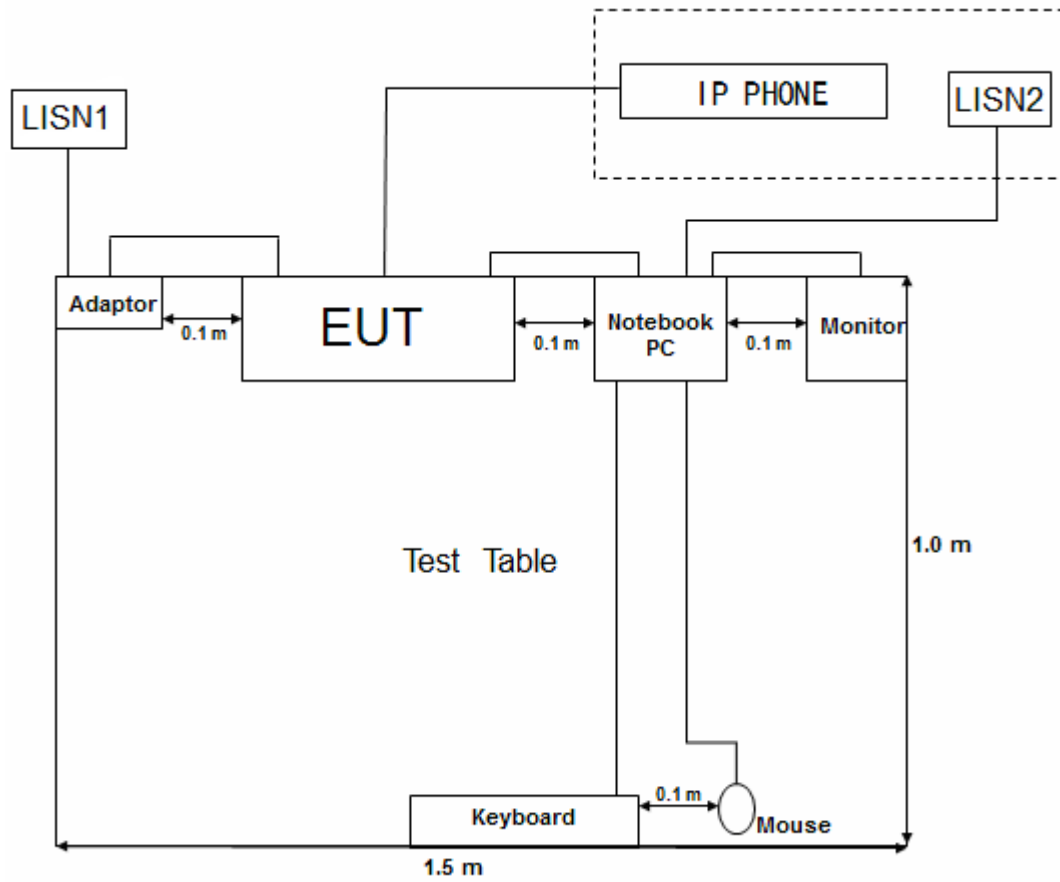
<i>EUT</i>			
Model Number:	GXP1405		
Model Tested:	GXP1405		
Description:	IP Phone		
Input:	AC 120V/60Hz		
Manufacturer:	Grandstream Networks, Inc.		
<i>Support Equipment</i>			
<i>Description</i>	<i>Model Number</i>	<i>Serial Number</i>	<i>Manufacturer</i>
<i>Notebook Computer</i>	<i>NV57H03C-2412G64Mnc2s</i>	<i>LXWZ401001125109201601</i>	<i>Gateway</i>
<i>Mouse</i>	<i>MO32B0</i>	<i>23-033131</i>	<i>IBM</i>
<i>Keyboard</i>	<i>SK-1788</i>	<i>/</i>	<i>Lenovo</i>
<i>Monitor</i>	<i>TFT1780PS</i>	<i>B8879HA021638</i>	<i>AOC</i>
<i>IP PHONE</i>	<i>GXP2130</i>	<i>/</i>	<i>Grandstream</i>

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Cable Description					
Description	From	To	Length (Meters)	Shielded (Y/N)	Ferrite (Y/N)
<i>Power Cord Of Notebook Computer</i>	<i>AC Plug</i>	<i>Notebook Computer</i>	<i>2.4</i>	<i>N</i>	<i>Y</i>
<i>Mouse cord</i>	<i>Mouse</i>	<i>Notebook Computer</i>	<i>1.2</i>	<i>N</i>	<i>Y</i>
<i>Keyboard cord</i>	<i>Keyboard</i>	<i>Notebook Computer</i>	<i>1.2</i>	<i>N</i>	<i>Y</i>
<i>VGA Cord</i>	<i>Monitor</i>	<i>Notebook Computer</i>	<i>1.2</i>	<i>Y</i>	<i>Y</i>
<i>RJ-45 Cord 1</i>	<i>EUT</i>	<i>Notebook Computer</i>	<i>1.5</i>	<i>N</i>	<i>N</i>
<i>RJ-45 Cord 2</i>	<i>EUT</i>	<i>IP PHONE</i>	<i>3.0</i>	<i>N</i>	<i>N</i>
<i>Power cord of power Power Adapter #1 (Mass power)</i>	<i>EUT</i>	<i>Plug</i>	<i>1.8</i>	<i>N</i>	<i>N</i>
<i>Power cord of power Power Adapter #2 (All-Key)</i>	<i>EUT</i>	<i>Plug</i>	<i>1.8</i>	<i>N</i>	<i>N</i>
<i>Power cord of power Power Adapter #3 (SWTEC)</i>	<i>EUT</i>	<i>Plug</i>	<i>1.8</i>	<i>N</i>	<i>N</i>
<i>Note: The "EUT" means "IP PHONE".</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.

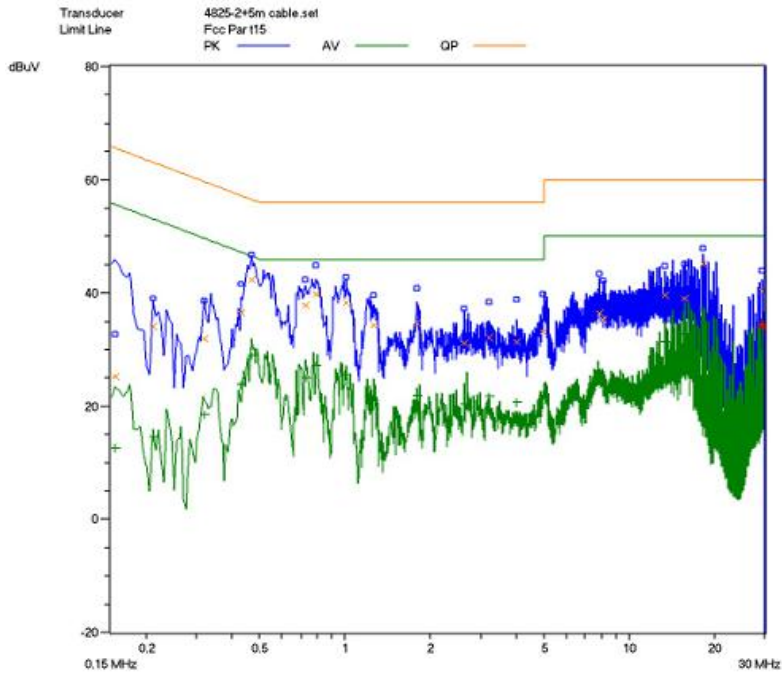
Configuration of Tested System



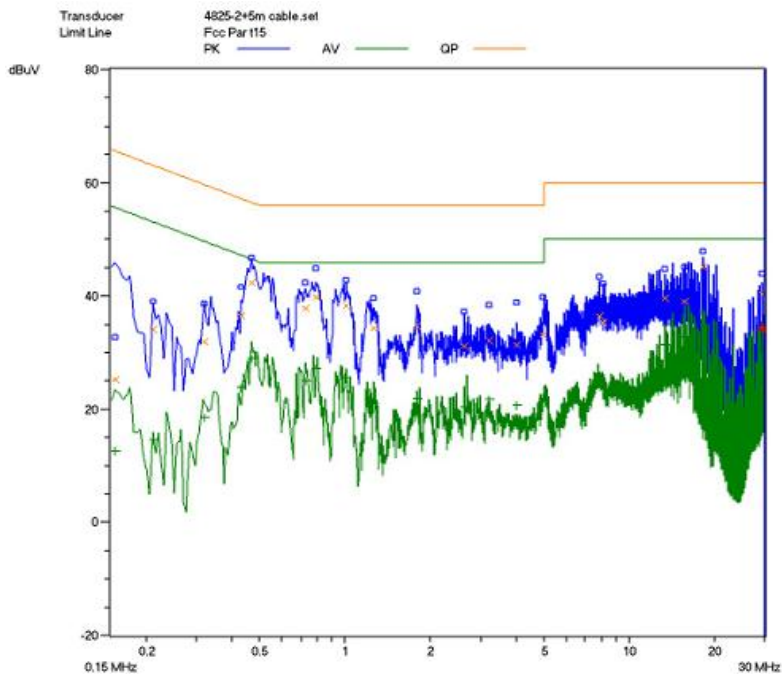
ATTACHMENT 1 - CONDUCTED EMISSION TEST RESULTS

CLIENT:	Grandstream Networks, Inc.	TEST STANDERD:	FCC Part 15, Subpart B, Section 15.107
MODEL NUMBERS:	GXP1405	PRODUCT:	IP Phone
MODEL TESTED:	GXP1405	EUT DESIGNATION:	Home or Office
TEMPERATURE:	23 °C	HUMIDITY:	51%
ATM PRESSURE:	103kPa	GROUNDING:	None
TESTED BY:	Daomen	DATE OF TEST:	October 8 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 an 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.		
TEST MODE:	Mode 1, Mode 2, Mode 3		
TEST SET UP:	<p>AMN = Artificial mains network (LISH) AE = Associated equipment EUT = Equipment under test ISN = Impedance stabilization network</p>		
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. $\pm 2 \times 10^{-7}$ x Center Freq., Amp ± 2.6 dB		

Mode 1:

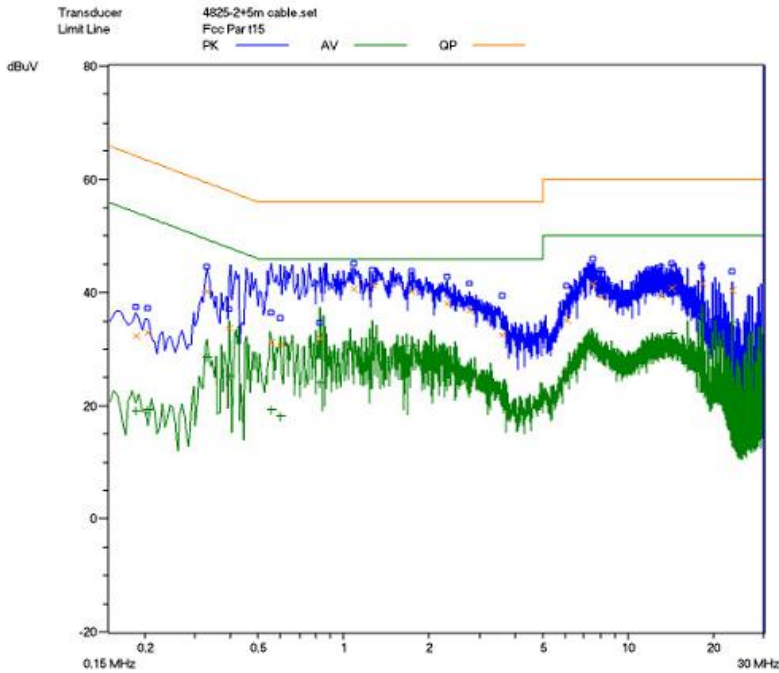


Line L Conducted Emission Graph

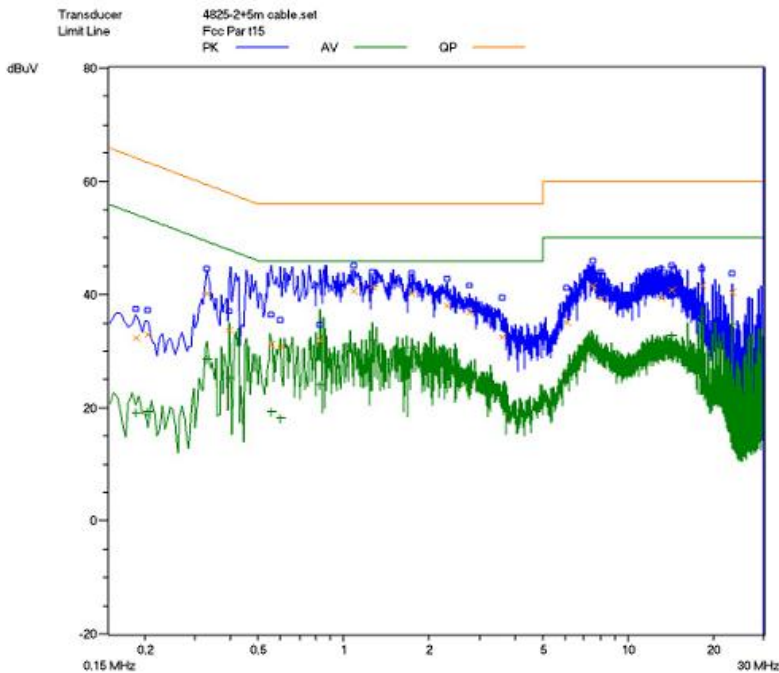


Line N Conducted Emission Graph

Mode 2:

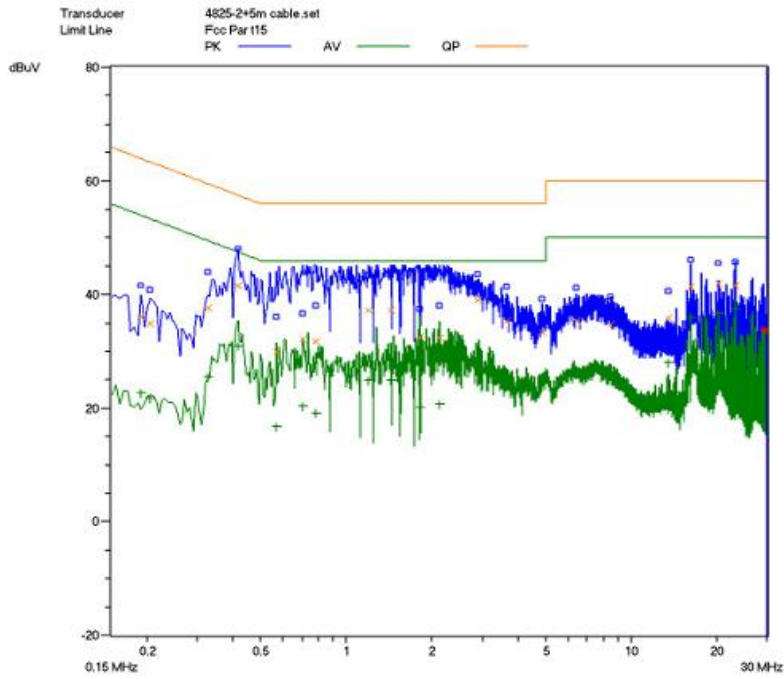


Line L Conducted Emission Graph

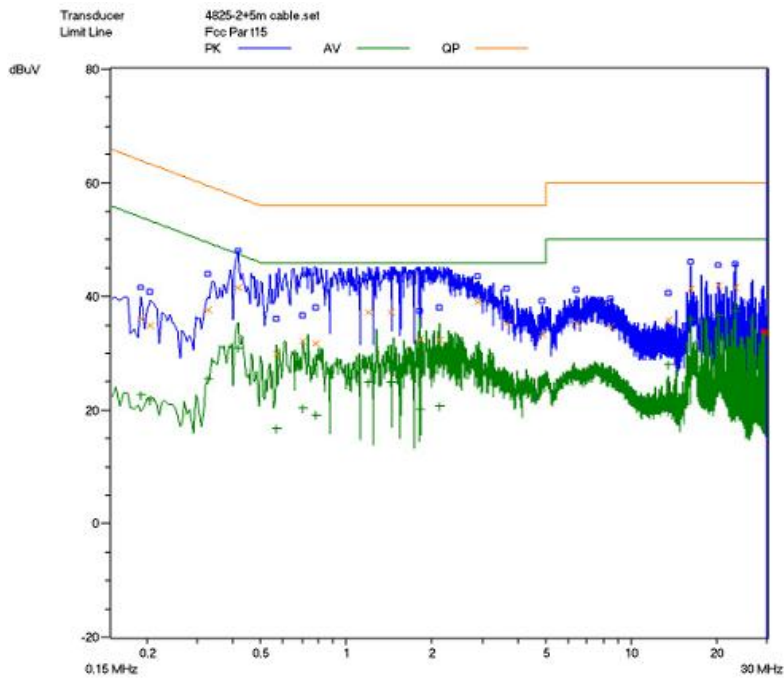


Line N Conducted Emission Graph

Mode 3:



Line L Conducted Emission Graph



Line N Conducted Emission Graph

Test Data:

Mode 1:

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	0.4800	42.0	56.3	-14.3	0.4800	28.7	46.3	-17.6
L	0.7950	39.7	56.0	-16.3	0.7950	27.4	46.0	-18.6
L	18.3050	43.7	56.0	-12.3	18.3050	35.4	46.0	-10.6
N	0.4800	42.1	56.3	-14.2	0.4800	28.9	46.3	-17.4
N	0.7950	39.5	56.0	-16.5	0.7950	27.3	46.0	-18.7
N	18.3050	43.0	56.0	-13.0	18.3050	35.1	46.0	-18.9

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.

Mode 2:

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	0.4000	41.3	57.8	-16.5	0.4000	31.0	47.8	-16.8
L	1.3000	41.7	56.0	-14.3	1.3000	31.6	46.0	-14.4
L	18.2450	42.7	60.0	-17.3	18.2450	36.4	50.0	-13.6
N	0.4000	41.0	57.8	-16.8	0.4000	31.0	47.8	-16.8
N	1.3000	41.5	56.0	-14.5	1.3000	31.4	46.0	-14.6
N	18.2450	42.1	60.0	-17.9	18.2450	36.1	50.0	-13.9

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.

Mode 3:

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	0.4050	45.5	57.7	-12.2	0.4050	33.1	47.7	-14.6
L	2.9200	39.0	56.0	-17.0	2.9200	28.1	46.0	-17.9
L	23.1300	44.5	60.0	-15.5	23.1300	39.5	50.0	-10.5
N	0.4050	45.1	57.7	-12.6	0.4050	33.0	47.7	-14.7
N	2.9200	39.0	56.0	-17.0	2.9200	28.0	46.0	-18.0
N	23.1300	44.3	60.0	-15.7	23.1300	39.0	50.0	-11.0

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	4825/2	ETS	1161	2014.07.08	2015.07.07

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

TESTED BY: Daomen ECMG
ENGINEER COMPANY NAME

REVIEWED BY: Jamontia ECMG
SENIOR ENGINEER COMPANY NAME



Conducted Emission Test Set-up

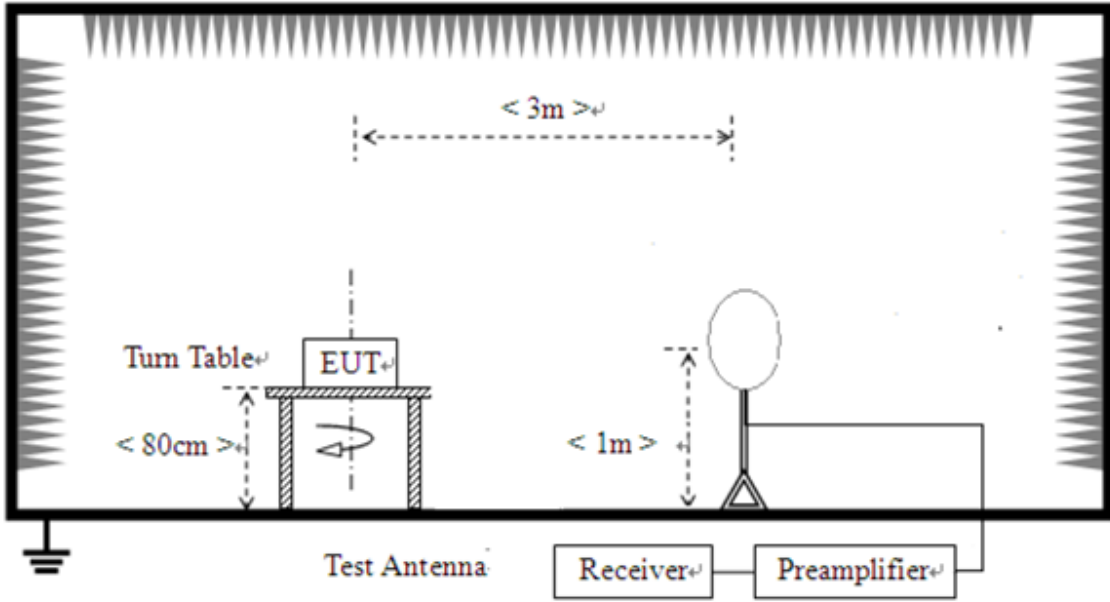
ATTACHMENT 2 – RADIATED EMISSION MEASUREMENT

CLIENT:	Grandstream Networks, Inc.	TEST STANDERD:	FCC Part 15,Subpart B, Section 15.109
MODEL NUMBERS:	GXP1405	PRODUCT:	IP Phone
EUT MODEL:	GXP1405	EUT DESIGNATION:	Home or Office
TEMPERATURE:	23°C	HUMIDITY:	49%RH
ATM PRESSURE:	103.0kPa	GROUNDING:	None
TESTED BY:	Daomen	DATE OF TEST:	October 8 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:	Mode 1, Mode 2, Mode 3, Mode 4		
TESTED RANGE:	9K-30MHz and 30MHz to 2GHz		
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. $\pm 2 \times 10^{-7}$ x Center Freq., Amp ± 3.6 dB		

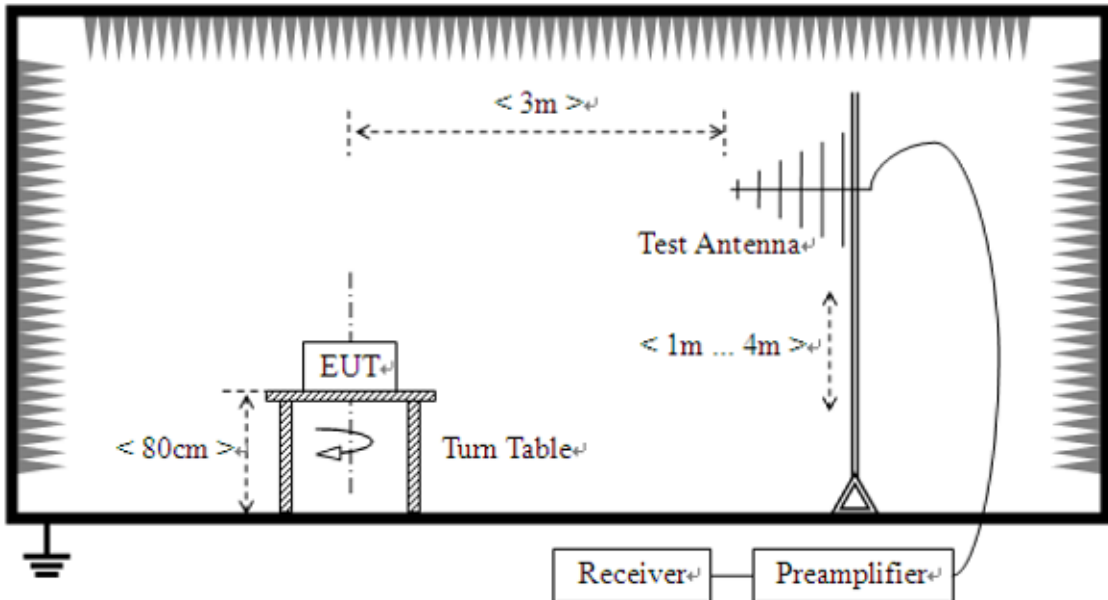
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TEST SET-UP:

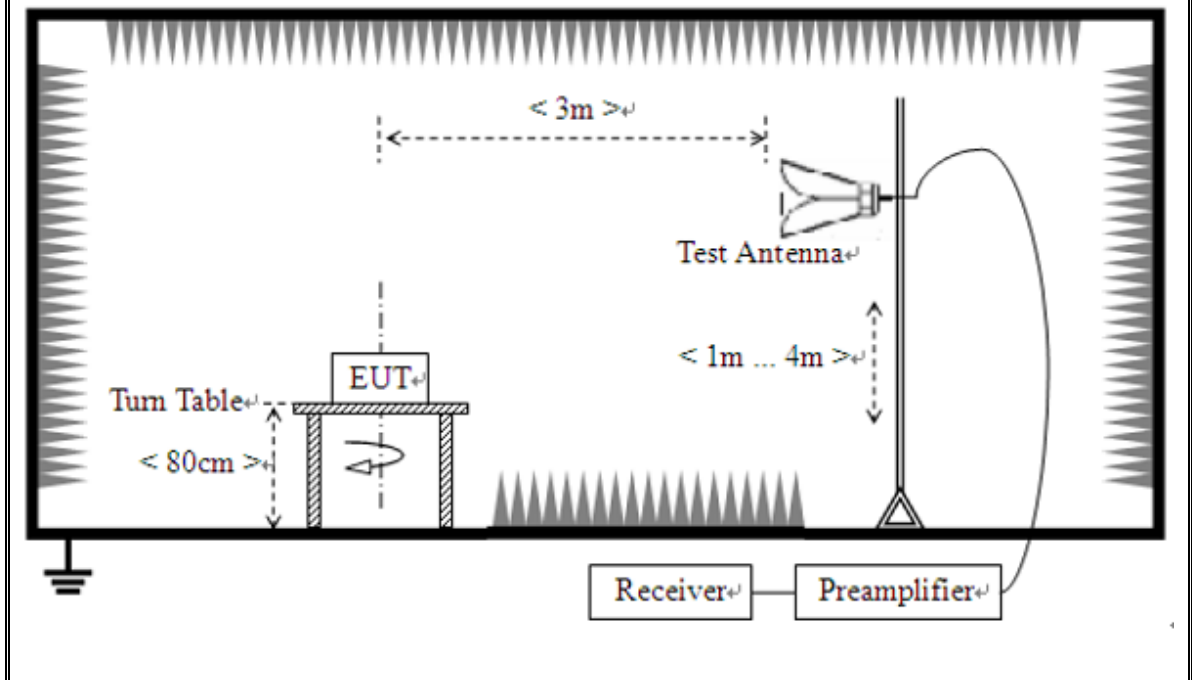
Frequency measured at 9KHz to 30MHz:



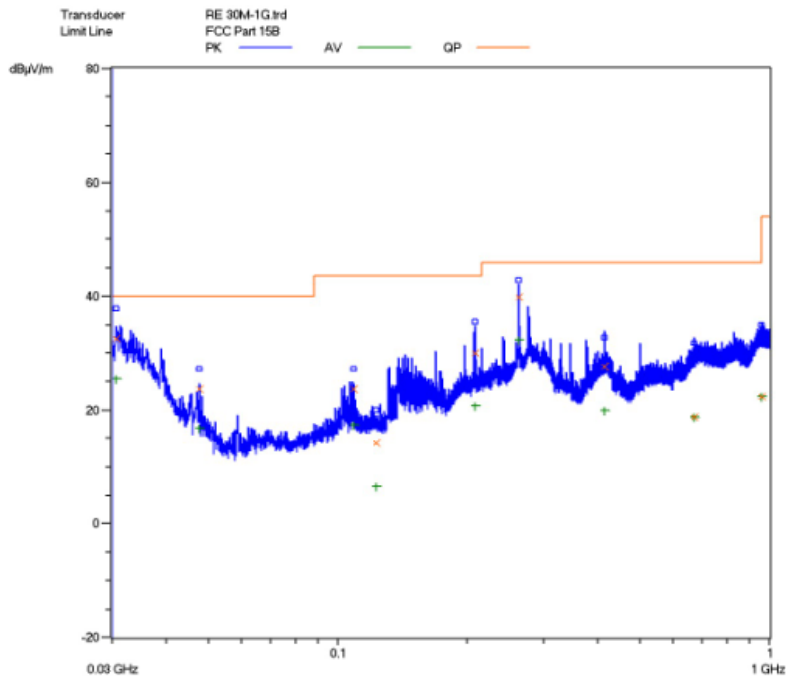
Frequency measured at 30MHz to 1000MHz:



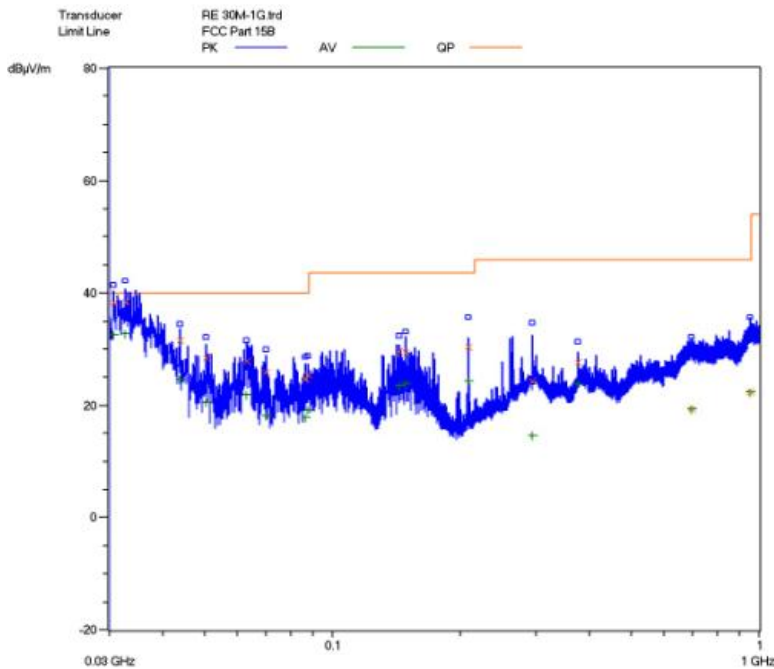
Frequency measured at Above 1GHz:



Mode 1:

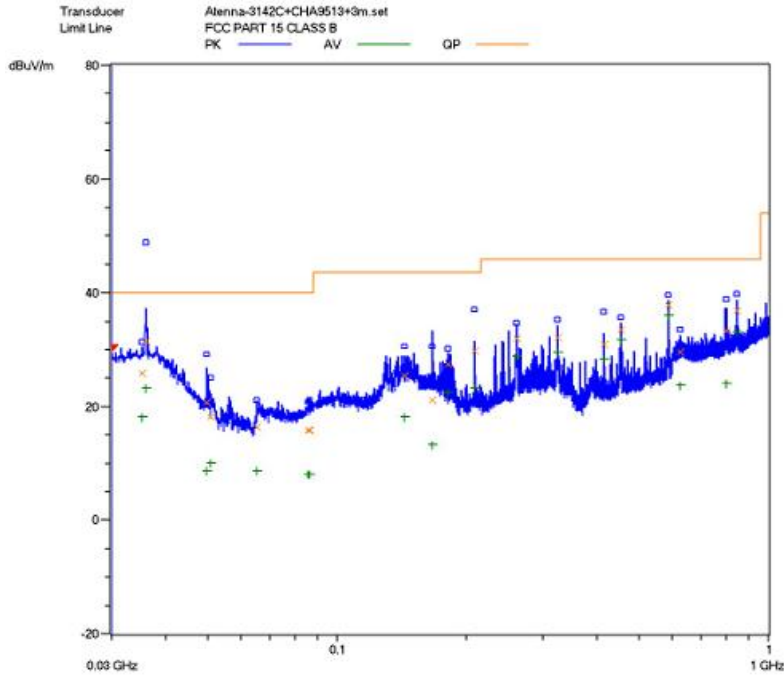


Horizontal: Radiated Emission Test Plot (Peak,maxhold)

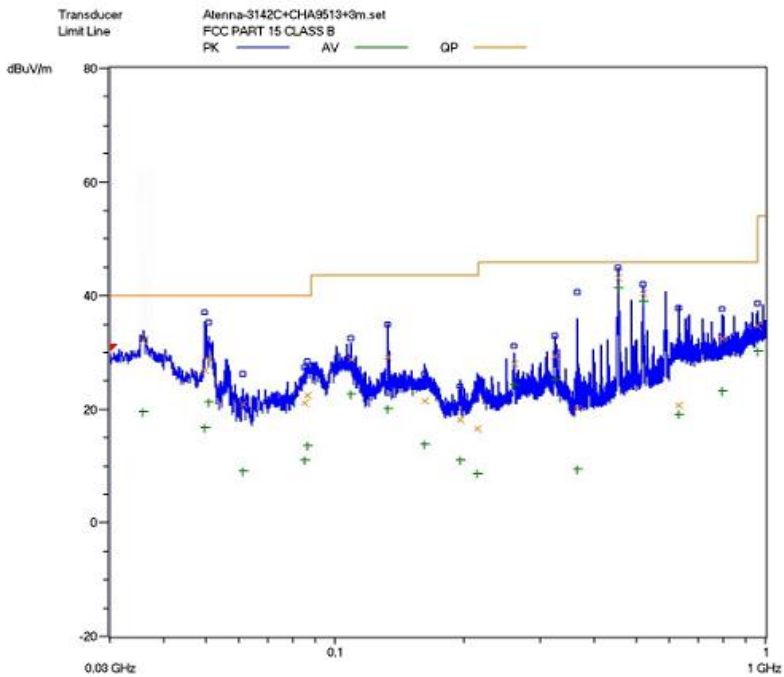


Vertical: Radiated Emission Test Plot (Peak,maxhold)

Mode 2:

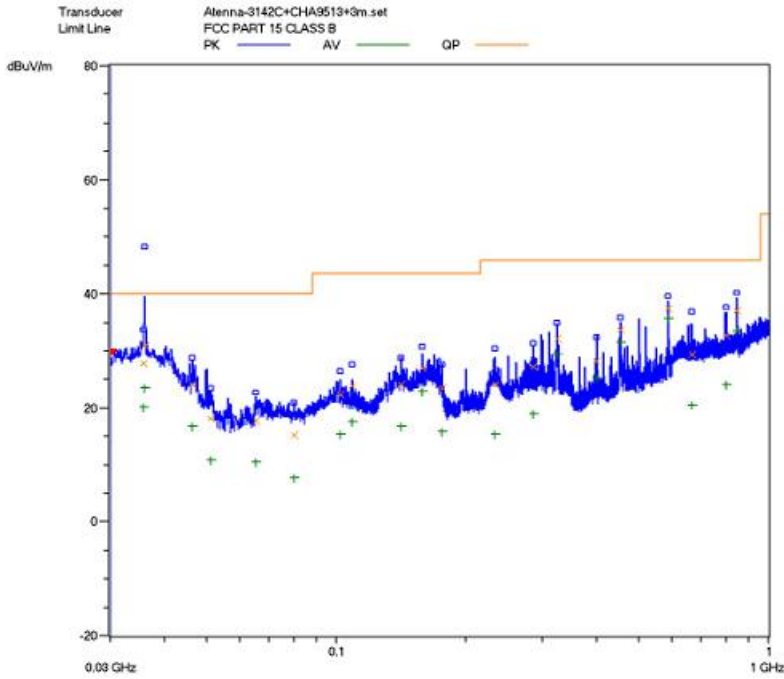


Horizontal:Radiated Emission Test Plot

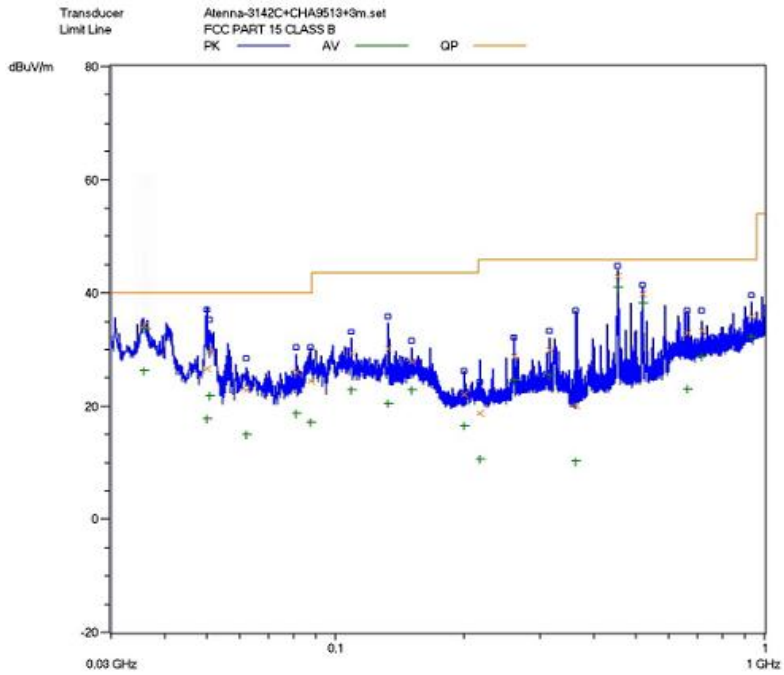


Vertical:Radiated Emission Test Plot

Mode 3:

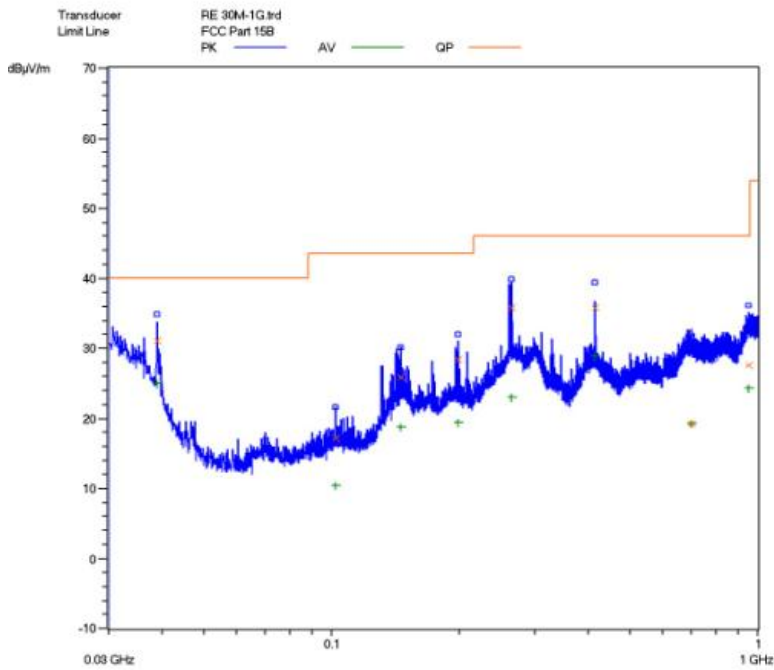


Horizontal:Radiated Emission Test Plot

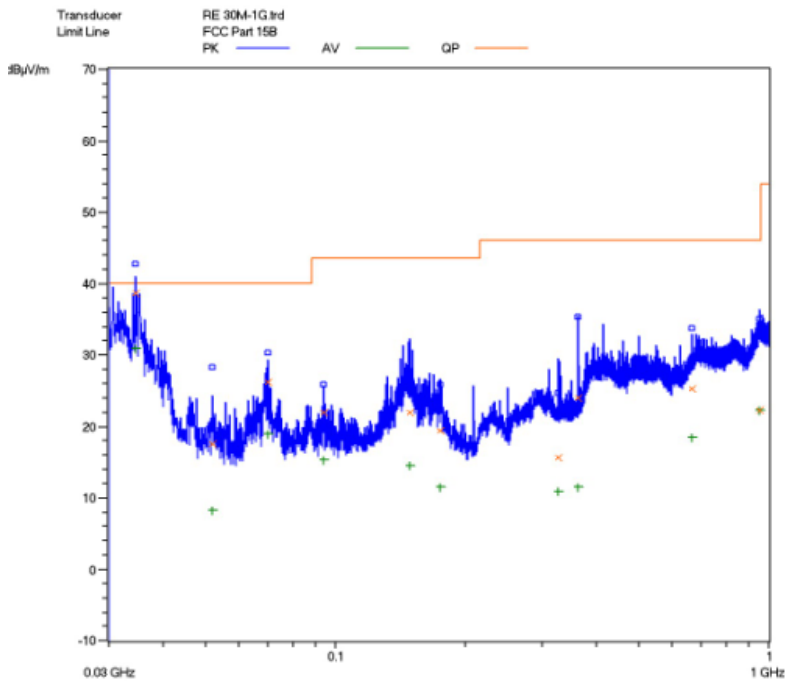


Vertical:Radiated Emission Test Plot

Mode 4:



Horizontal: Radiated Emission Test Plot (Peak,maxhold)



Vertical: Radiated Emission Test Plot (Peak,maxhold)

Radiated Emission From 9KHz to 30MHz:

Pre-scan has been conducted to determine the worst-case from all possible combinations between available operation mode. The worst-case is mode 1 was selected for the final testing.

Mode 1:

Test No.:#	Frequency (MHz)	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 + Factor.*
- 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:
Mode 1&Below 1GHz:**

Frequency (MHz)	Emission Level (dBuV/m)	Reading Level (dBuV/m)	Over Limit (dB)	Limits (dBuV/m)	Factor (dB)	Type
Horizontal						
30.660	32.5	8.77	-7.5	40.0	-23.73	QP
207.720	30	21.82	-13.5	43.5	-8.18	QP
262.680	39	25.33	-7	46.0	-13.67	QP
/	/	/	/	/	/	/
/	/	/	/	/	/	/
/	/	/	/	/	/	/
Vertical						
30.600	38.4	14.67	-1.6	40.0	-23.73	QP
32.580	38.4	15.71	-1.6	40.0	-22.69	QP
43.800	31.6	20.52	-8.4	40.0	-11.08	QP
/	/	/	/	/	/	/
/	/	/	/	/	/	/
/	/	/	/	/	/	/

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 + Factor(Antenna Factor + Cable Loss -Preamplifier Factor).
3. The other emission levels are 20dB below the official limits that are not reported.

Mode 1&Above 1GHz:

Frequency (MHz)	Emission Level (dBuV/m)	Reading Level (dBuV/m)	Over Limit (dB)	Limits (dBuV/m)	Factor (dB)	Type
Horizontal						
1595.000	40.475	41.557	-33.525	74.000	-1.082	PK
1595.000	28.086	29.168	-25.914	54.000	-1.082	AV
1841.500	43.731	43.464	-30.269	74.000	0.267	PK
1841.500	31.012	30.745	-22.988	54.000	0.267	AV
2326.000	44.971	42.046	-29.029	74.000	2.925	PK
2326.000	36.554	33.629	-17.446	54.000	2.925	AV
Vertical						
1833.000	41.730	41.546	-32.270	74.000	0.184	PK
1833.000	34.353	34.169	-19.647	54.000	0.184	AV
2394.000	50.605	47.892	-23.395	74.000	2.713	PK
2394.000	41.969	39.256	-12.031	54.000	2.713	AV
3371.500	43.598	40.429	-30.402	74.000	3.169	PK
3371.500	37.347	34.178	-16.653	54.000	3.169	AV

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 + Factor(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.

Mode 2&Below 1GHz:

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB)	Preamplifier Factor (dB)	Reading Level QP (dBuV/m)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
Horizontal							
35.360	0.02	18.4	/	14.38	32.8	40.0	-7.2
36.000	0.02	18.5	/	14.48	33.0	40.0	-7.0
142.720	0.02	7.8	/	22.38	30.2	43.5	-13.3
207.360	0.12	7.2	/	24.48	31.8	43.5	-11.7
454.800	0.20	16.8	/	21.6	38.6	46.0	-7.4
844.560	0.42	22.6	/	13.78	36.8	46.0	-9.2
Vertical							
35.760	0.02	18.4	/	14.58	33.0	40.0	-7.0
49.840	0.02	8.2	/	25.48	33.7	40.0	-6.3
132.880	0.02	7.4	/	27.18	34.6	43.5	-8.9
454.800	0.12	7.2	/	35.98	43.3	46.0	-2.7
519.760	0.20	16.8	/	23.50	40.5	46.0	-5.5
959.280	0.44	23.9	/	14.96	39.3	46.0	-6.7

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.

Mode 2&Above 1GHz:

Frequency (GHz)	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)
Peak Measurement								
1.056	1.40	23.9	-33.6	-1.28	57.62	74	-16.38	H
1.192	1.45	24.5	-33.6	-0.42	59.13	74	-14.87	H
1.320	1.57	25.1	-33.6	-0.26	60.01	74	-13.99	H
1.360	1.58	25.1	-33.6	-4.35	55.93	74	-17.07	V
1.456	1.65	25.7	-33.6	-4.13	56.82	74	-17.18	V
1.592	1.76	26.7	-33	-0.15	61.31	74	-12.69	V
Average Measurement								
1.056	1.40	23.9	-33.6	-15.63	43.27	54	-10.73	H
1.192	1.45	24.5	-33.6	-19.52	40.03	54	-13.97	H
1.320	1.57	25.1	-33.6	-17.02	43.25	54	-10.75	H
1.360	1.58	25.1	-33.6	-15.18	45.10	54	-10.9	V
1.456	1.65	25.7	-33.6	-16.22	44.73	54	-9.27	V
1.592	1.76	26.7	-33	-18.77	42.69	54	-11.31	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.

Mode 3&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							
35.760	0.02	18.4	/	13.58	32.0	40.0	-8.0
36.000	0.02	18.4	/	14.98	33.4	40.0	-6.6
157.520	0.02	9.6	/	27.58	37.2	43.5	-6.3
175.520	0.02	7.8	/	28.28	36.1	43.5	-7.4
454.800	0.20	16.8	/	20.8	37.8	46.0	-8.2
844.560	0.42	22.6	/	14.08	37.1	46.0	-8.9
Vertical							
35.760	0.02	18.4	/	15.88	34.3	40.0	-5.7
51.040	0.02	8.2	/	23.48	31.7	40.0	-8.3
132.960	0.02	7.4	/	24.88	32.3	43.5	-11.2
200.000	0.10	6.8	/	22.9	29.8	43.5	-13.7
454.800	0.20	16.8	/	25.9	42.9	46.0	-3.1
519.760	0.30	18.4	/	21.2	39.9	46.0	-35.3

Note:

1. All readings are quasi-peak unless stated otherwise, using a QPA bandwidth of 120kHz, with a 60 s sweep time. A video filter was not used.
2. The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows: Emission Level = Reading Level + Antenna Factor + Cable Loss - Preamplifier Factor.
3. The other emission levels are 20dB below the official limits that are not reported.

Mode 3&Above 1GHz:

Frequency (GHz)	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)
Peak Measurement								
1.056	1.40	23.9	-33.6	-2.63	56.27	74	-17.73	H
1.192	1.45	24.5	-33.6	-3.99	55.56	74	-18.44	H
1.320	1.57	25.1	-33.6	-1.35	58.92	74	-15.08	H
1.360	1.58	25.1	-33.6	-0.55	59.73	74	-14.27	V
1.456	1.65	25.7	-33.6	-3.82	57.13	74	-16.87	V
1.592	1.76	26.7	-33	-4.47	56.99	74	-17.01	V
Average Measurement								
1.056	1.40	23.9	-33.6	-16.73	42.17	54	-11.83	H
1.192	1.45	24.5	-33.6	-17.93	41.62	54	-12.38	H
1.320	1.57	25.1	-33.6	-14.91	45.36	54	-8.64	H
1.360	1.58	25.1	-33.6	-16.57	43.71	54	-10.29	V
1.456	1.65	25.7	-33.6	-14.94	46.01	54	-7.99	V
1.592	1.76	26.7	-33	-19.53	41.93	54	-12.07	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.

Mode 4&Below 1GHz:

Frequency (MHz)	Emission Level (dBuV/m)	Reading Level (dBuV/m)	Over Limit (dB)	Limits (dBuV/m)	Factor (dB)	Type
Horizontal						
38.960	31.2	12.61	-8.8	40.0	-18.59	QP
263.760	35.8	12.08	-4.2	46.0	-13.72	QP
414.720	35.9	17.25	-4.1	46.0	-18.65	QP
/	/	/	/	/	/	/
/	/	/	/	/	/	/
/	/	/	/	/	/	/
Vertical						
34.640	38.6	17.21	-1.4	40.0	-21.49	QP
69.680	26.2	19.68	-13.8	40.0	-6.52	QP
666.400	25.2	3.11	-20.8	46.0	-22.09	QP
/	/	/	/	/	/	/
/	/	/	/	/	/	/
/	/	/	/	/	/	/

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 + Factor(Antenna Factor + Cable Loss - Preamplifier Factor).
3. The other emission levels are 20dB below the official limits that are not reported.

Mode 4&Above 1GHz:

Frequency (MHz)	Emission Level (dBuV/m)	Reading Level (dBuV/m)	Over Limit (dB)	Limits (dBuV/m)	Factor (dB)	Type
Horizontal						
1595.000	40.475	41.557	-33.525	74.000	-1.082	PK
1595.000	28.086	29.168	-25.914	54.000	-1.082	AV
1841.500	43.731	43.464	-30.269	74.000	0.267	PK
1841.500	31.012	30.745	-22.988	54.000	0.267	AV
2326.000	44.971	42.046	-29.029	74.000	2.925	PK
2326.000	36.554	33.629	-17.446	54.000	2.925	AV
Vertical						
1833.000	41.730	41.546	-32.270	74.000	0.184	PK
1833.000	34.353	34.169	-19.647	54.000	0.184	AV
2394.000	50.605	47.892	-23.395	74.000	2.713	PK
2394.000	41.969	39.256	-12.031	54.000	2.713	AV
3371.500	43.598	40.429	-30.402	74.000	3.169	PK
3371.500	37.347	34.178	-16.653	54.000	3.169	AV

Note:

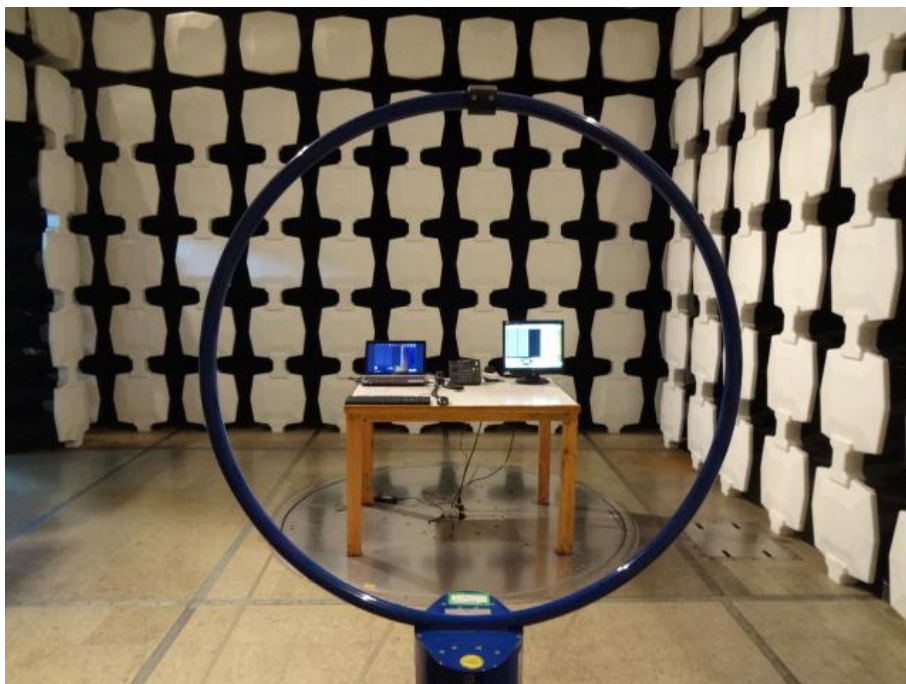
1. The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows: Emission Level = Reading Level + Factor(Antenna Factor + Cable Loss - Preamplifier Factor).
2. The limits shown are based on Peak value and Average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

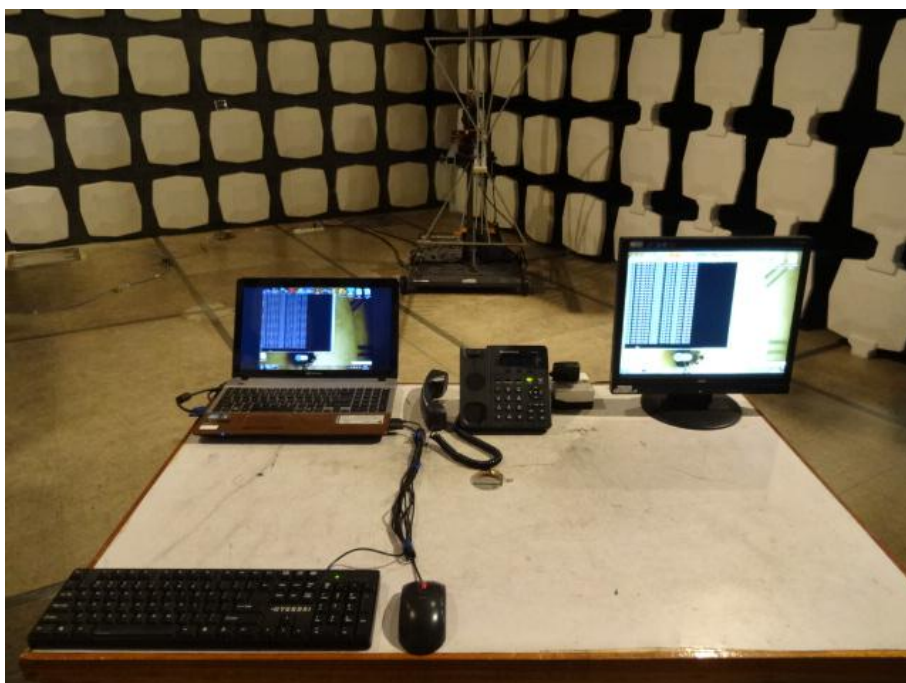
<i>Test Equipment</i>	<i>Manufacturer</i>	<i>Model No.</i>	<i>Serial No.</i>	<i>Last Cal.</i>	<i>Cal. Due</i>
<i>EMI Test Receiver</i>	<i>SMR4503</i>	<i>SCHAFFNER</i>	<i>11725</i>	<i>2014.07.08</i>	<i>2015.07.07</i>
<i>HF Loop Antenna</i>	<i>HLA6120</i>	<i>TESEQ</i>	<i>26348</i>	<i>2014.09.26</i>	<i>2015.09.25</i>
<i>Double-ridged Wave guide horn</i>	<i>3115</i>	<i>ETS</i>	<i>6587</i>	<i>2014.08.02</i>	<i>2015.08.01</i>
<i>Microwave system amplifier</i>	<i>83017A</i>	<i>Agilent</i>	<i>MY39500438</i>	<i>2014.07.11</i>	<i>2015.07.10</i>
<i>Biconilog Antenna</i>	<i>3142C</i>	<i>ETS</i>	<i>00042672</i>	<i>2014.09.28</i>	<i>2015.09.27</i>
<i>Band-pass Filter</i>	<i>BRM50702</i>	<i>Micro-Tronic</i>	<i>S/N-030</i>	<i>2013.11.30</i>	<i>2014.11.29</i>
<i>Spectrum Analyzer</i>	<i>FSP30</i>	<i>R&S</i>	<i>100755</i>	<i>2013.11.30</i>	<i>2014.11.29</i>
<i>Note: All testing were performed using internationally recognized standards. All test instruments were calibrated.</i>					

TESTED BY: *Daomen* ECMG
ENGINEER COMPANY NAME

REVIEWED BY: *Jamertio* 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)

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