

## EMI TEST REPORT

Model Name: HIGH AVAILABILITY UCM  
CONNECTOR

Model Number: HA100

Brand Name: Grandstream

Prepared for Grandstream Networks, Inc.

FCC ID: YZZHA100

Classification: Part 15 Class B Computing Device  
Peripheral(JBP)

According to FCC 47 CFR Part 15, Subpart B  
Test Procedure: ANSI C63.4:2014

Test Report #: SHE-1705-11711-FCC

Prepared by: Nancy Han ECMG  
Nancy Han /Assistant Company Name

Reviewed by: Jawen Yin ECMG  
Jawen Yin / Senior Engineer Company Name

QC Manager: Swall Zhang ECMG  
Swall Zhang / QC Manager Company Name

Test Report Released by: Swall Zhang June 6<sup>th</sup>, 2017  
Swall Zhang Date



## **Verdict**

<b>Test Result :</b>	<b>Pass*</b>
----------------------	--------------

\*:In the configuration, the EUT complied with the standard specified above.

## **Revision History**

<b>Rev.</b>	<b>Issue date</b>	<b>Revision</b>	<b>Revised by</b>
01	6/6/2017	Initial review	Jawen Yin
/	/	/	/

### **Test Location**

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

**Test Site Location:** NTEK Testing Technology Co., Ltd.  
1/F, Building E, Fenda Science Park,  
Sanwei Community, Xixiang Street,  
Baoan District, Shenzhen Guangdong,  
china

**Tel:** (86)-755- 61156588

**Fax:** (86)-755- 61156599

### **Accreditation Bodies**

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

**FCC-Registration No.: 238937**

*NTEK EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 238937*

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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>YZZHA100 _Test Report.pdf</i>
<i>Operation Description</i>	<i>Technical Description</i>	<i>YZZHA100 _Operation description.pdf</i>
<i>External Photos</i>	<i>External Photos</i>	<i>YZZHA100 _External Photos</i>
<i>Internal Photos</i>	<i>Internal Photos</i>	<i>YZZHA100 _Internal Photos</i>
<i>Block Diagram</i>	<i>Block Diagram</i>	<i>YZZHA100 _Block Diagram.pdf</i>
<i>Schematics</i>	<i>Circuit Diagram</i>	<i>YZZHA100 _Schematics.pdf</i>
<i>ID Label/Location</i>	<i>Label and Location</i>	<i>YZZHA100 _Label &amp; Location.pdf</i>
<i>User Manual</i>	<i>User Manual</i>	<i>YZZHA100 _User Manual.pdf</i>
<i>Test setup photos</i>	<i>Test set-up photos</i>	<i>YZZHA100 _Test Set-up Photos</i>

### **Government Disclaimer Notice**

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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* : HIGH AVAILABILITY UCM CONNECTOR  
*Model Numbers* : HA100  
*Model Tested* : HA100  
*Date of Receipt* : May 25<sup>th</sup>, 2017  
*Date Tested* : May 27<sup>th</sup>, 2017  
*Applicant* : Grandstream Networks, Inc.  
*Address* : 126 Brookline Ave, 3<sup>rd</sup> Floor Boston,  
MA 02215, USA  
*Telephone* : (617)-566-9300  
*Fax* : (617)-249-1987  
*Manufacturer* : Grandstream Networks, Inc.  
*Address* : 126 Brookline Ave, 3<sup>rd</sup> Floor Boston,  
MA 02215, USA  
*Telephone* : (617)-566-9300  
*Fax* : (617)-249-1987  
*Factory* : Grandstream Networks, Inc.  
*Address* : 126 Brookline Ave, 3<sup>rd</sup> Floor Boston,  
MA 02215, USA  
*Telephone* : (617)-566-9300  
*Fax* : (617)-249-1987

## EUT Description

Grandstream Networks, Inc. Model Tested HA100 (referred to as the EUT in this report) is an HIGH AVAILABILITY UCM CONNECTOR.

**Rating(s) of EUT:** DC 12V, 1.5A

The EUT has two Manufacturer's Power Adapters which detailed information are as below:

**Power Adapter 1:**

Model: F18W8-120150SPAU

Input: 100~240V~ 50/60Hz

Output: DC12V 1.5A

Manufacturer: FRECOM

**Power Adapter 2:**

Model: H18US1200150B

Input: 100~240V~ 50/60Hz

Output: DC12V 1.5A

Manufacturer: SUNLIGHT

For other informations & features please refer to user's manual of EUT.

## 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:

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

**Note:** Since the highest frequency operated of the EUT is 48MHz, so upper frequency of radiated emission test is up to 1000MHz as per §15.33(b)(1).



## Test Summary

The Electromagnetic Compatibility requirements on model HA100 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 -2014	Conducted Emission	Passed	AC Input Port	Attachment 1
FCC Part 15.109 ANSI C63.4 -2014	Radiated Emission	Passed	Enclosure	Attachment 2

## 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	
EMI Test Mode	Mode 1: Communication with Notebook PC and Phone + Power Adapter 1
	Mode 2: Communication with Notebook PC and Phone + Power Adapter 2
	/
Final Test Mode: Mode 1,2	

## 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).

**EUT Exterior View**

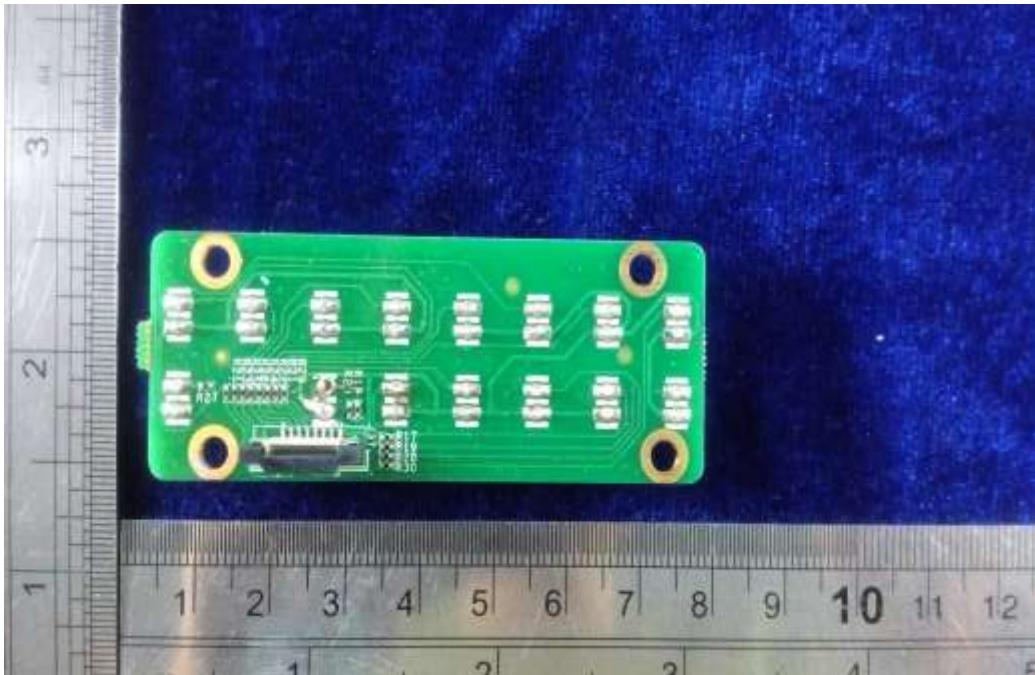
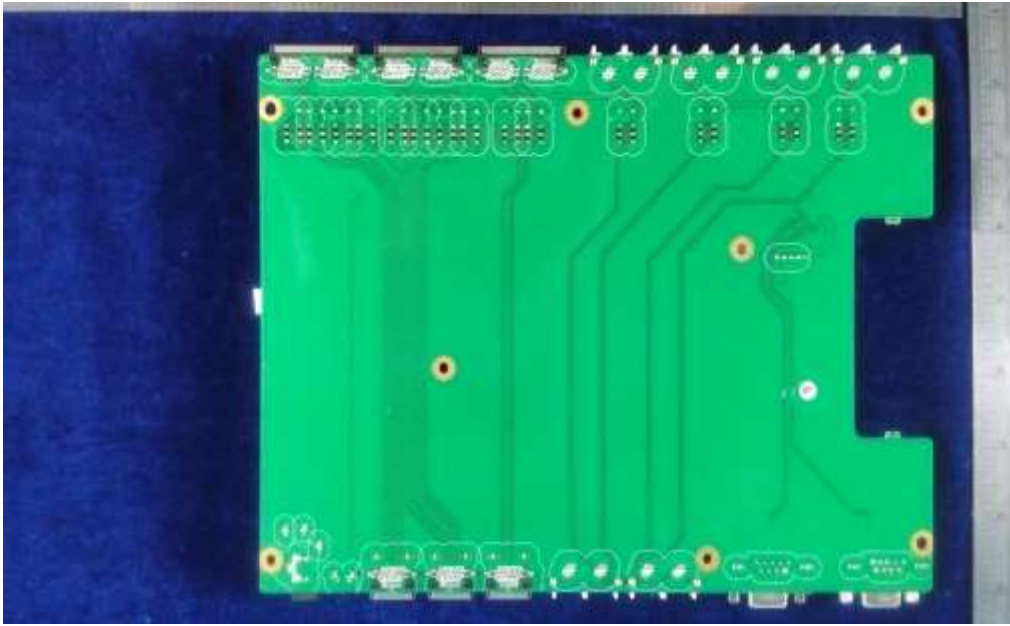


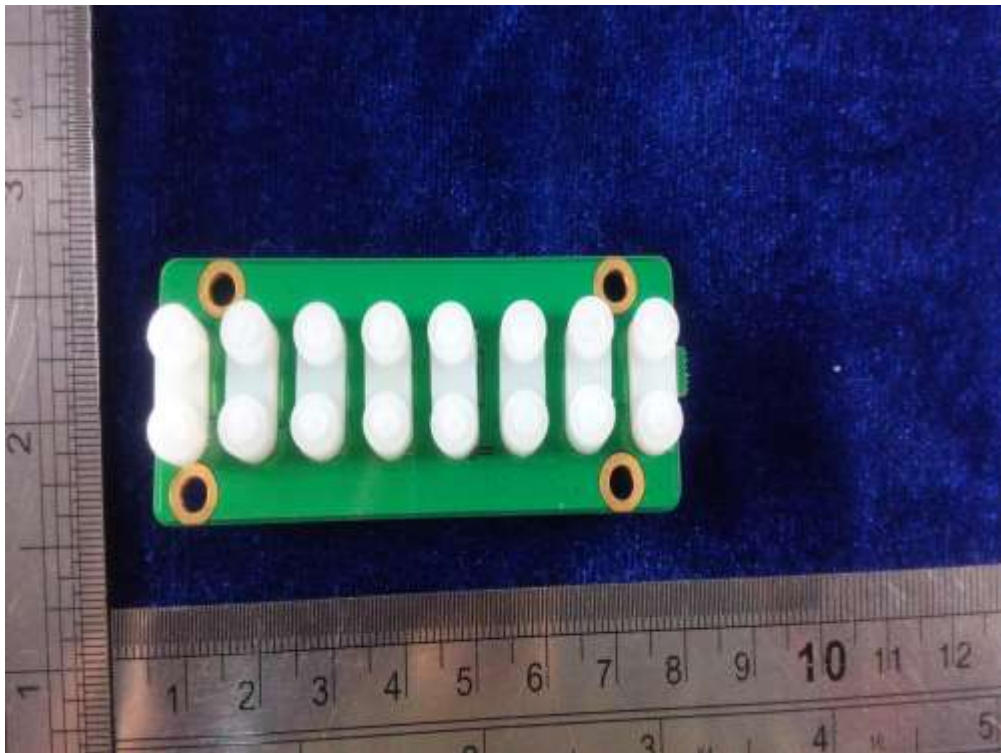




***EUT Internal View***







## Test System Details

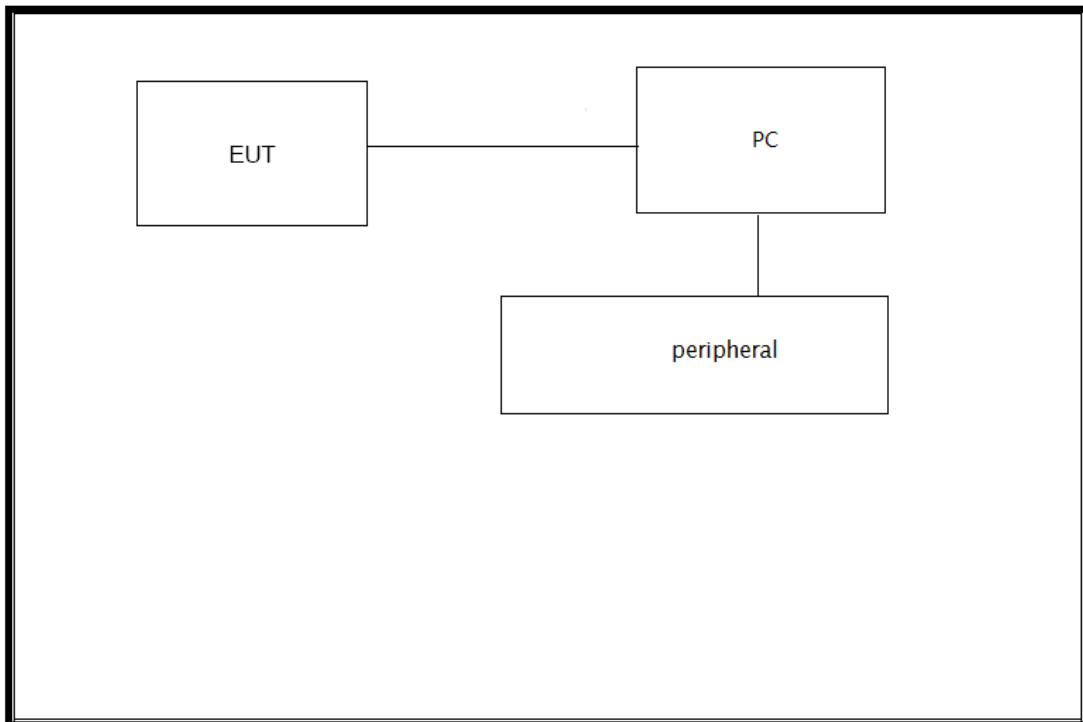
<b>EUT</b>				
<i>Model Number:</i>	HA100			
<i>Description:</i>	HIGH AVAILABILITY UCM CONNECTOR			
<i>Manufacturer:</i>	Grandstream Networks, Inc.			
<i>Input Voltage:</i>	DC12V			
<b>Support Equipment</b>				
<i>Description</i>	<i>Model Number</i>	<i>Serial Number</i>	<i>FCC Certificate</i>	<i>Manufacturer</i>
<i>Notebook PC</i>	R720-15IKBN	PFOG38DB	DoC	Lenovo
<i>IP Phone</i>	GXV3275	/	YZZGXV3275	Grandstream
<i>Phone</i>	HCD757P	39824X41NPPTY 8N	VOC	TCL
<i>Router</i>	DIR-600NW	PK2V2B5007964	DOC	D-LINK
<i>Printer</i>	LBP2900	/	DoC	Canon
<i>Mouse</i>	N889	44AC107	DoC	DELL

<b>Cable Description</b>						
<i>Cable No.</i>	<i>Type of Cable</i>	<i>From</i>	<i>To</i>	<i>Length (Meters)</i>	<i>Shielded (Y/N)</i>	<i>Ferrite (Y/N)</i>
1	Network Cable	EUT	Notebook PC	1.5	N	N
2	Power cable	EUT	Plug	1.8	N	N
3	Printer Cable	EUT	Printer	1.2	Y	Y
4	RJ 11 Cable	EUT	Phone	1.2	N	Y
5	Mouse Cable	Mouse	Notebook PC	1.2	N	Y

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



## Configuration of Tested System

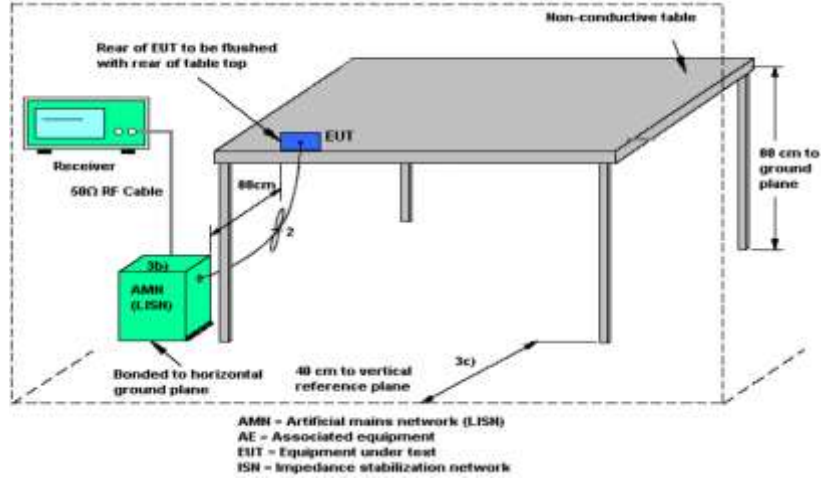


## ATTACHMENT 1 - CONDUCTED EMISSION TEST RESULTS

<b>CLIENT:</b>	Grandstream Networks, Inc.	<b>TEST STANDERD:</b>	Section 15.107
<b>MODEL NUMBERS:</b>	HA100	<b>PRODUCT:</b>	HIGH AVAILABILITY UCM CONNECTOR
<b>MODEL TESTED:</b>	HA100	<b>EUT DESIGNATION:</b>	Home or Office
<b>TEMPERATURE:</b>	22°C	<b>HUMIDITY:</b>	48%
<b>ATM PRESSURE:</b>	103kPa	<b>GROUNDING:</b>	None
<b>TESTED BY:</b>	Alex Yu	<b>DATE OF TEST:</b>	May 27 <sup>th</sup> , 2017
<b>TEST REFERENCE:</b>	ANSI C63.4- 2014		
<b>TEST PROCEDURE:</b>	<p>The EUT was set up according to the guidelines of ANSI C63.4: 2014 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.</p> <p>The frequency range investigated was from 150KHz to 30MHz.</p> <p>Corrected Amplitude &amp; Over Limit Calculation.          The basic equation as follow:  <math>VC = VR + AC + VDF</math>;          Herein,          VC: corrected voltage amplitude          VR: reading voltage amplitude          AC: attenuation caused by cable loss          VDF: voltage division factor of AMN or ISN.          The "Over Limit" column of the following data tables indicates the degree of compliance within the applicable limit. For example, a Over Limit of 7dB means the emission is 7dB below the maximum limit.          The equation for Over Limit calculation is as follows:  <math>Over\ Limit = Limit - Corrected\ Amplitude</math>.</p>		
<b>TEST MODE:</b>	Mode 1, Model 2		
<b>TESTED RANGE:</b>	150kHz to 30MHz		
<b>TEST VOLTAGE:</b>	AC 120V/60Hz		
<b>RESULTS:</b>	The EUT meets the requirements of test reference for Conducted Emissions. The test results relate only to the equipment under test provided by client.		
<b>CHANGES OR MODIFICATIONS:</b>	There were no modifications installed by ECMG Electronic Technical Testing Corp(Shenzhen) test personnel.		
<b>M. UNCERTAINTY:</b>	The maximum measurement uncertainty is evaluated as: 150KHz~30MHz: 3.2dB. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=1.96.		

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**TEST SET UP:**



**EMI Receiver Set-up:**

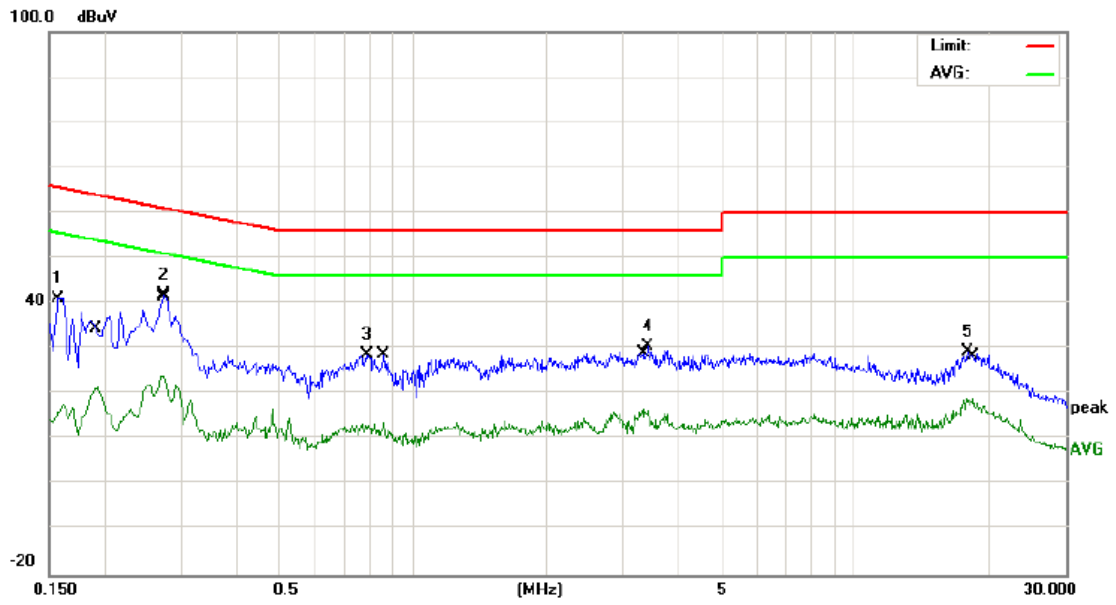
Frequency [MHz]	IF B/W
0.15 - 30	9KHz

**Conducted Emission Limit:**

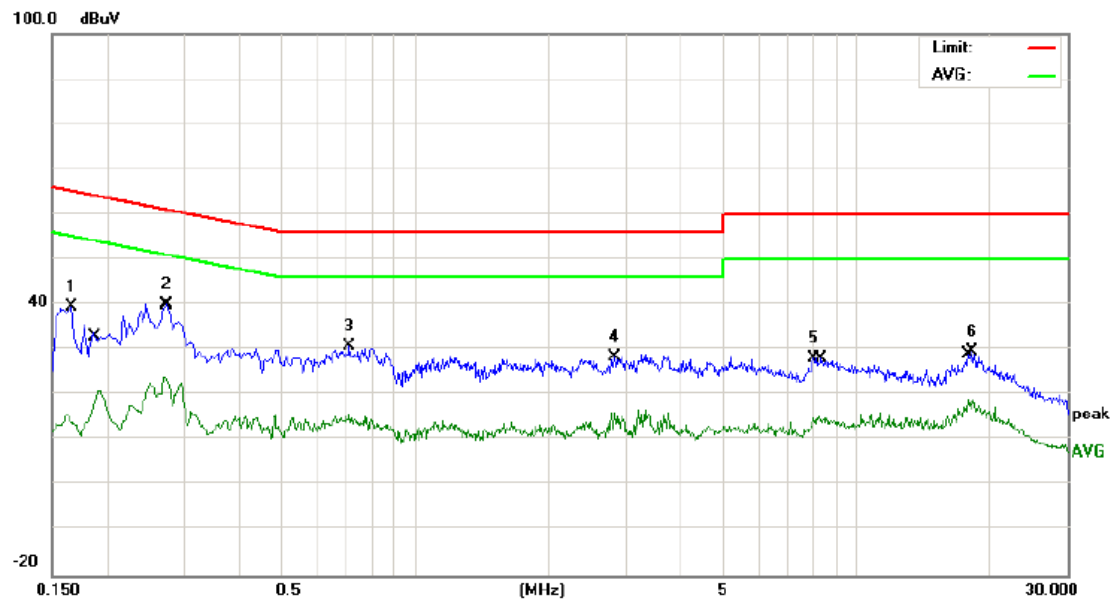
Frequency [MHz]	Field strength [dBuV]	
	Ouasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

*\*Decreases with the logarithm of the frequency.*

**Mode 1:**

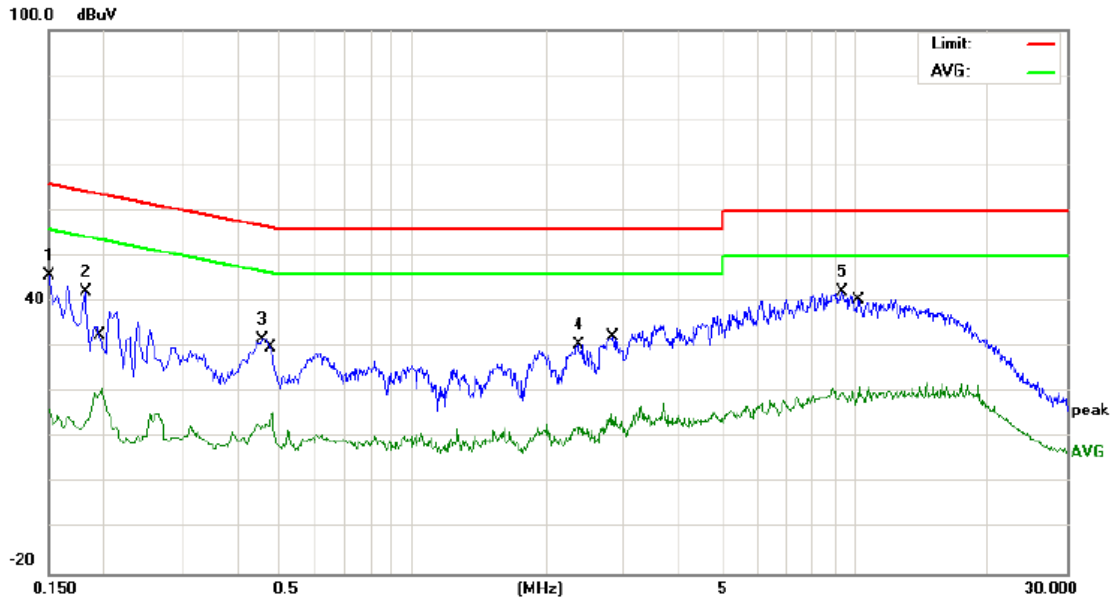


**Line L Conducted Emission Graph**

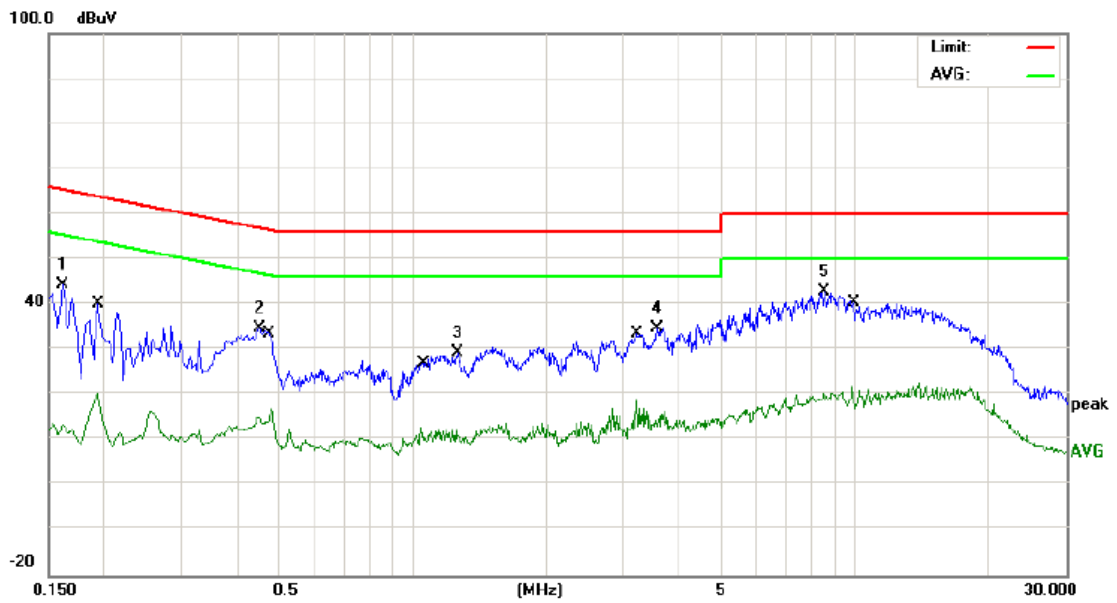


**Line N Conducted Emission Graph**

**Mode 2:**



**Line L Conducted Emission Graph**



**Line N Conducted Emission Graph**

**Test Data  
Mode 1:**

Lines	Frequency (MHz)	Corrected QP Level (dBuV)	Limits QP (dBuV)	Over Limit QP (dB)	Frequency (MHz)	Corrected AVE Level (dBuV)	Limits AVE (dBuV)	Over Limit AVE (dB)
L	0.158	41.14	65.56	-24.42	0.194	21.50	53.86	-32.36
L	0.274	42.01	60.99	-18.98	0.270	23.95	51.12	-27.17
L	0.790	28.79	56.00	-27.21	0.858	13.81	46.00	-32.19
L	/	/	/	/	/	/	/	/
N	0.166	39.54	65.15	-15.61	0.190	20.88	54.03	-33.15
N	0.274	40.22	60.99	-20.77	0.270	23.94	51.12	-27.18
N	0.710	30.78	56.00	-25.22	0.710	15.83	46.00	-30.17
N	/	/	/	/	/	/	/	/

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

**Mode 2:**


Lines	Frequency (MHz)	Corrected QP Level (dBuV)	Limits QP (dBuV)	Over Limit QP (dB)	Frequency (MHz)	Corrected AVE Level (dBuV)	Limits AVE (dBuV)	Over Limit AVE (dB)
L	0.150	45.95	65.99	-20.04	0.198	20.92	53.69	-32.77
L	0.182	42.21	64.39	-22.08	0.482	15.46	46.30	-30.84
L	0.458	31.87	56.73	-24.86	2.822	15.18	46.00	-30.82
L	/	/	/	/	/	/	/	/
N	0.162	44.31	65.36	-21.05	0.194	20.32	53.86	-33.54
N	0.450	34.65	56.87	-22.22	0.478	16.96	46.37	-29.41
N	1.266	29.32	56.00	-26.68	1.046	12.73	46.00	-33.27
N	/	/	/	/	/	/	/	/


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

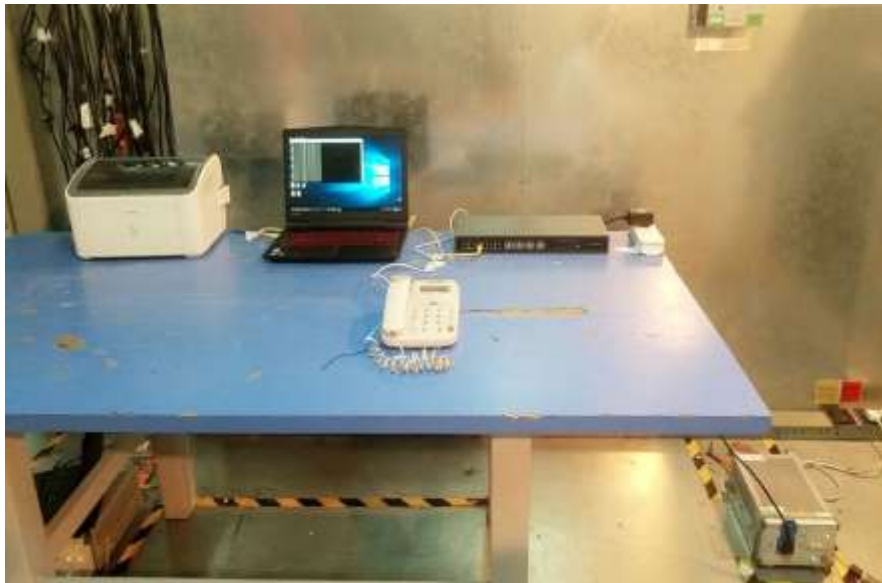
### **Test Equipment List:**

<b>Test Equipment</b>	<b>Model No.</b>	<b>Manufacturer</b>	<b>Serial No.</b>	<b>Last Cal.</b>	<b>Cal. Interval</b>
EMI Test Receiver	ECSI	R&S	100920	2017.01.05	2018.01.04
Line impedance stabilization network	ENV216	R&S	101112	2017.01.05	2018.01.04

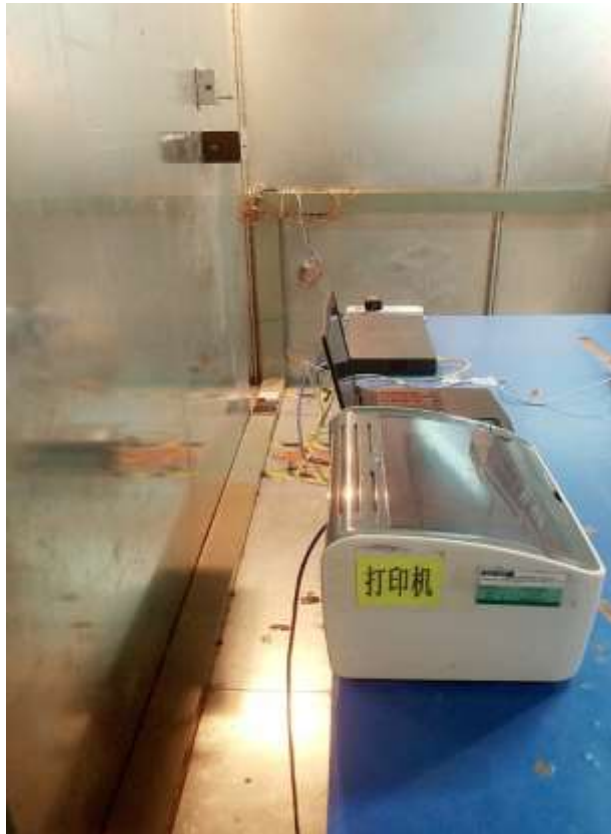
Note: All testing were performed using internationally recognized standards. All test instruments were calibrated.

TESTED BY:   
ENGINEER

REVIEWED BY:   
SENIOR ENGINEER



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



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



## ATTACHMENT 2 – RADIATED EMISSION MEASUREMENT

<b>CLIENT:</b>	Grandstream Networks, Inc.	<b>TEST STANDERD:</b>	Section 15.109
<b>MODEL NUMBERS:</b>	HA100	<b>PRODUCT:</b>	HIGH AVAILABILITY UCM CONNECTOR
<b>EUT MODEL:</b>	HA100	<b>EUT DESIGNATION:</b>	Home or Office
<b>TEMPERATURE:</b>	22°C	<b>HUMIDITY:</b>	47%RH
<b>ATM PRESSURE:</b>	103.0kPa	<b>GROUNDING:</b>	None
<b>TESTED BY:</b>	Alex Yu	<b>DATE OF TEST:</b>	May 27 <sup>th</sup> ,2017
<b>TEST REFERENCE:</b>	ANSI C63.4: 2014		
<b>TEST PROCEDURE:</b>	<p>The EUT was set up according to the guidelines of ANSI C63.4: 2014 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 average and peak in the frequency range of 9KHz to 30MHz at an anechoic chamber,quasi-peaked in the frequency range of 30 MHz to 1GHz and average and peak in the frequency range of 1GHz to 5GHz at an anechoic chamber.</p> <p>The following data lists the significant emission frequencies, measured levels, correction factors (including cable and antenna correction factors), and the corrected readings against the limits. Explanation of the Correction Factor are given as follows:</p> <p>FS= RA + AF + CF - AG</p> <p>Where: FS = Field Strength</p> <p>RA = Receiver Amplitude</p> <p>AF = Antenna Factor</p> <p>CF = Cable Attenuation Factor</p> <p>AG = Amplifier Gain</p>		
<b>TEST MODE:</b>	Mode 1,Mode 2		
<b>TESTED RANGE:</b>	30~1000MHz (Please see page 4 )		
<b>TEST VOLTAGE:</b>	120VAC/60Hz		
<b>RESULTS:</b>	The EUT meet the requirements of test reference for radiated emissions.The test results relate only to the equipment under test provided by client.		
<b>CHANGES OR MODIFICATIONS:</b>	There were no modifications installed by ECMG Electronic Technical Testing Corp (Shenzhen). Test personnel.		
<b>M. UNCERTAINTY:</b>	<p>The maximum measurement uncertainty is evaluated as :</p> <p>30~1000MHz: 4.7dB;1~2GHz: 4.5dB.</p> <p>This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=1.96.</p>		

Continue on to next page...

**EMI Receiver Set-up:**

Frequency [MHz]	RBW	VBW	Detector
0.009-0.015	200Hz	1KHz	Quasi-peak
0.015-30	9KHz	30kHz	Quasi-peak
30-1000	120KHz	300KHz	Quasi-peak
Above 1GHz	1MHz	3MHz	Peak
	1MHz	10Hz	PK detector is for AV

Note 1: In the emission table above, the tighter limit applies at the band edges.

Note 2: (d) The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz.

Radiated emission limits in these three bands are based on measurements employing an average detector.

**Radiated Emission Limit:**

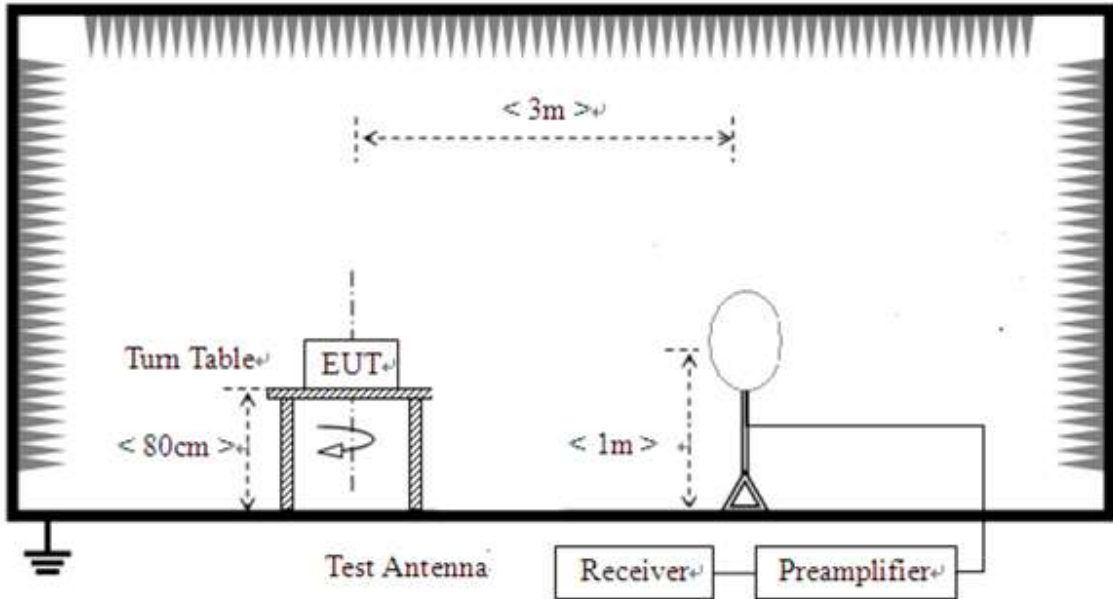
FCC Part 15 Subpart B&C Paragraph 15.109&15.209			
Frequency [MHz]	Field strength [uV/m]	Limit@3m (dBuV/m)	Distance [Meters]
0.009-0.490	2400/F(KHz)	128.5~93.8	300
0.490-1.705	24000/F(KHz)	73.8~63.0	30
1.705-30	30	69.5	30
30-88	100	40	3
88-216	150	43.5	3
216-960	200	46	3
Above 960	500	54	3

Note 1: The lower limit shall apply at the transition frequency.

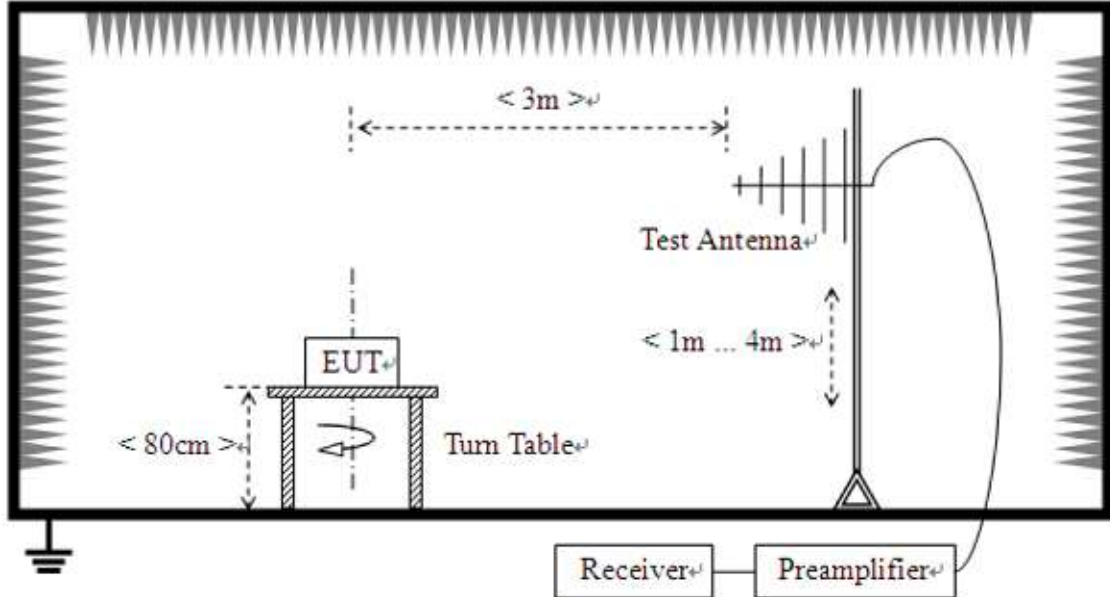
Note 2: Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.

Note 3:  $E$  field strength (dBuV/m) = 20 log  $E$  field strength (uV/m)

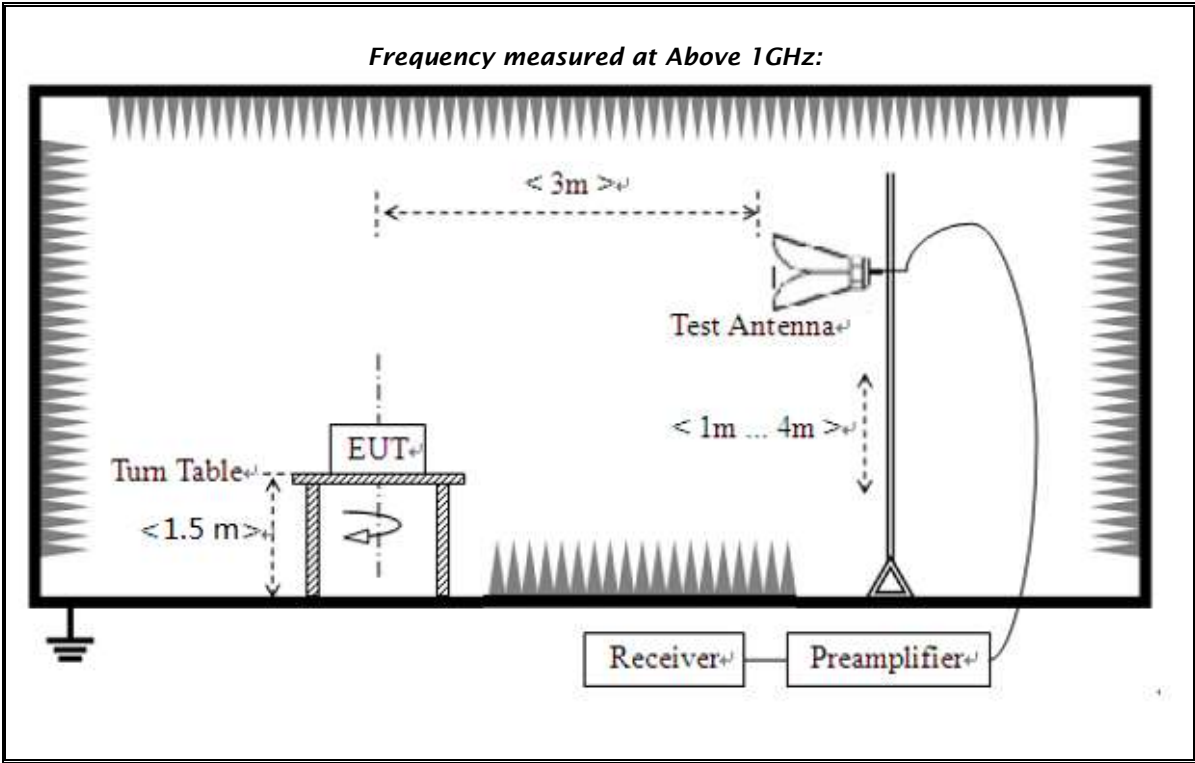
Frequency measured at 9KHz to 30MHz:



Frequency measured at 30MHz to 1000MHz:



Continue on to next page...



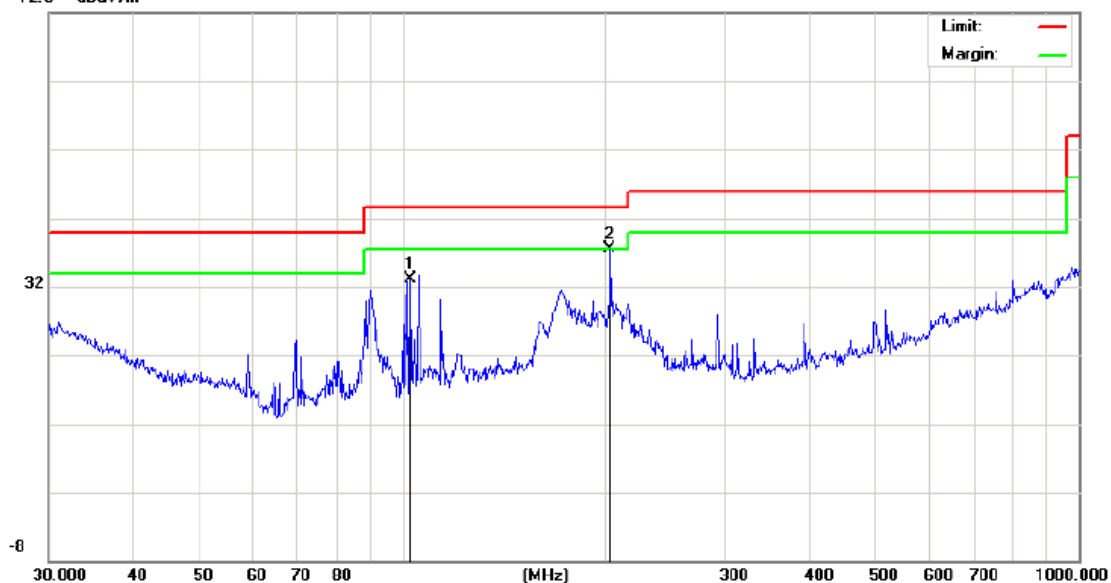
### 30-1000MHz: Mode 1:

File :RE0527  
72.0 dBuV/m

Data :#2

Date: 2017-5-27

Time: 13:58:06



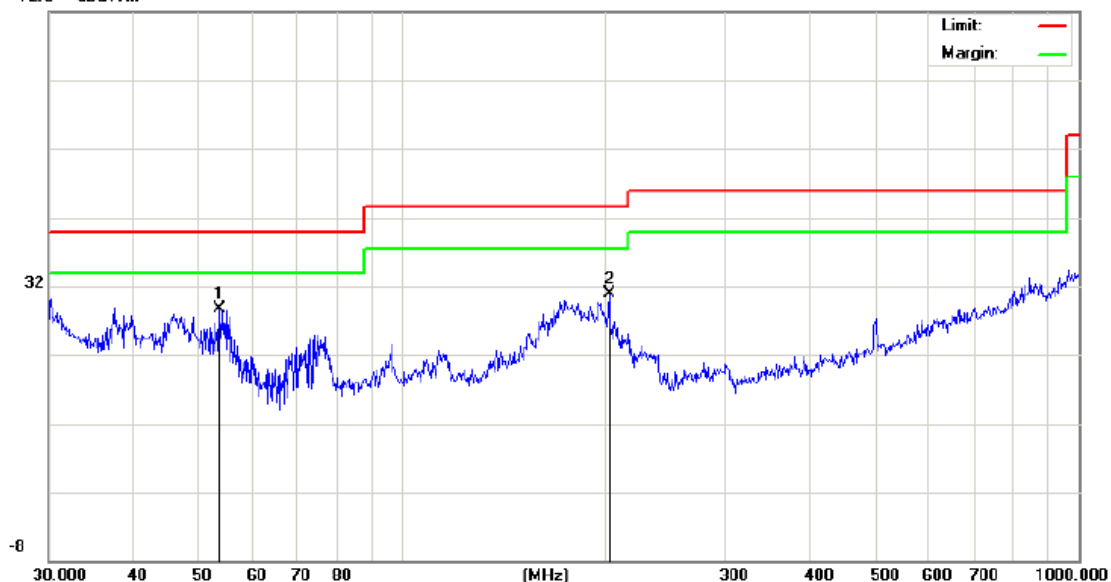
**Horizontal: Radiated Emission Test Plot**

File :RE0527  
72.0 dBuV/m

Data :#1

Date: 2017-5-27

Time: 13:50:58



**Vertical: Radiated Emission Test Plot**

**Mode 2:**

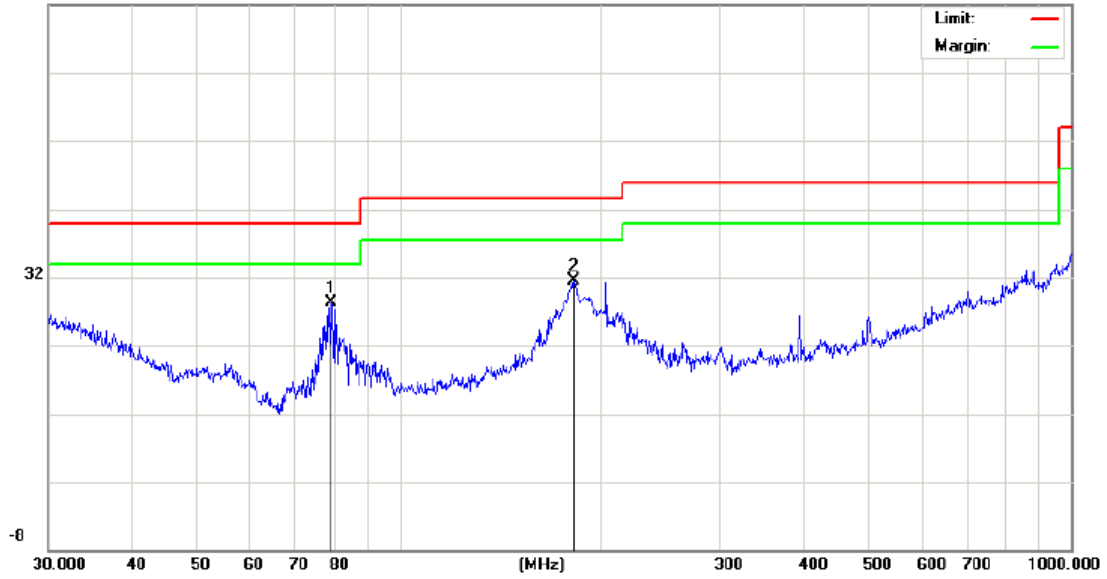
File :RE0527

Data :#10

Date: 2017-5-27

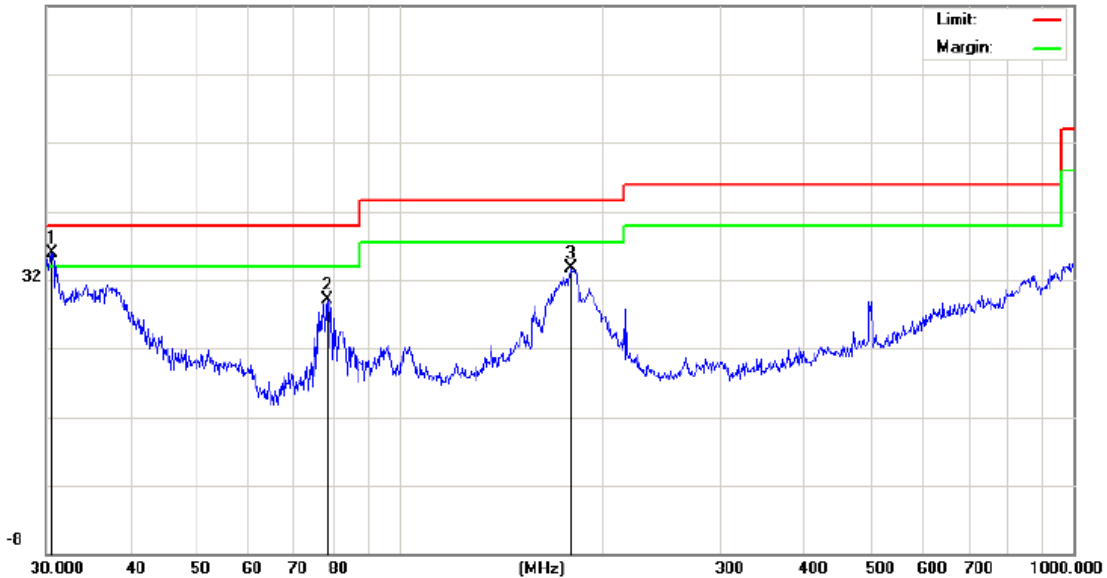
Time: 14:27:26

72.0 dBuV/m



**Horizontal: Radiated Emission Test Plot**

72.0 dBuV/m



**Vertical: Radiated Emission Test Plot**

**Radiated Emission Test Data(30-1000MHz):  
Mode 1:**

Frequency (MHz)	Polarization (H/V)	Factor (dB)	Reading Level QP (dBuV/m)	Emission Level QP (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)
102.719	H	10.33	22.84	33.17	43.50	-10.33
202.810	H	13.84	23.60	37.44	43.50	-6.06
/	/	/	/	/	/	/
/	/	/	/	/	/	/
53.693	V	12.43	16.31	28.74	40.00	-11.26
202.101	V	13.81	17.03	30.84	43.50	-12.66
/	/	/	/	/	/	/
/	/	/	/	/	/	/

**Mode 2**


Frequency (MHz)	Polarization (H/V)	Factor (dB)	Reading Level QP (dBuV/m)	Emission Level QP (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)
78.965	H	11.58	16.65	28.23	40.00	-11.77
181.920	H	12.73	18.83	31.56	43.50	-11.94
/	/	/	/	/	/	/
/	/	/	/	/	/	/
30.638	V	20.93	14.99	35.92	40.00	-4.08
78.413	V	11.56	17.46	29.02	40.00	-10.98
/	/	/	/	/	/	/
/	/	/	/	/	/	/


**Note:**

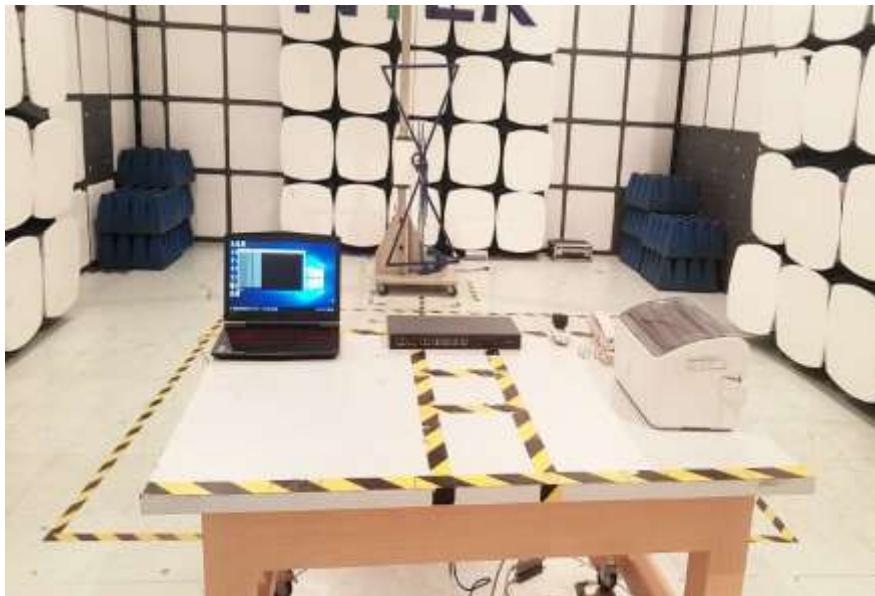
1. All readings are quasi-peak unless stated otherwise, using a QPA bandwidth of 120kHz, with a 60 s sweep time. A video filter was not used.
2. The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows: Emission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

**Test Equipment List:**

<i>Test Equipment</i>	<i>Manufacturer</i>	<i>Model</i>	<i>Cal. Interval</i>	<i>Serial No.</i>	<i>Cal. Due Date</i>
<i>EMI Test Receiver</i>	<i>R&amp;S</i>	<i>ESCI</i>	<i>1 year</i>	<i>100967</i>	<i>2018.01.04</i>
<i>Loop Antenna</i>	<i>Schwarzbeck</i>	<i>FMZB1519</i>	<i>1 year</i>	<i>1519-037</i>	<i>2018.01.04</i>
<i>Bilog Antenna</i>	<i>Schwarzbeck</i>	<i>CBL6141A</i>	<i>1 year</i>	<i>4180</i>	<i>2018.01.04</i>
<i>Horn Antenna</i>	<i>Schwarzbeck</i>	<i>BBHA 9120D</i>	<i>1 year</i>	<i>647</i>	<i>2018.01.04</i>
<i>Low Noise Pre-Amplifier</i>	<i>HP</i>	<i>8447D</i>	<i>1 year</i>	<i>1937A03050</i>	<i>2018.01.04</i>

TESTED BY:   
ENGINEER

REVIEWED BY:   
SENIOR ENGINEER



**Radiated Emission Test Set-up(30-1000MHz)**





***Radiated Emission Test Set-up-Rear View***

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