



MRT Technology (Suzhou) Co., Ltd
Phone: +86-512-66308358
Fax: +86-512-66308368
Web: www.mrt-cert.com

Report No.: 1601RSU00905
Report Version: V01
Issue Date: 01-21-2016

MEASUREMENT REPORT

FCC Part 15B

FCC ID: YZZGVC3200
APPLICANT: Grandstream Networks, Inc.

Product: Full HD Video Conferencing System
Model No.: GVC3200
Brand Name: Grandstream
FCC Classification: FCC Class B Digital Device (JBP)
FCC Rule Part(s): FCC Part 15 Subpart B: 2014
Test Procedure(s): ANSI C63.4: 2014
Test Date: January 12 ~ 20, 2016

Reviewed By : Robin Wu
(Robin Wu)
Approved By : Marlin Chen
(Marlin Chen)



The test results relate only to the samples tested.

This equipment has been shown to be capable of compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in ANSI C63.4-2014. Test results reported herein relate only to the item(s) tested.

The test report shall not be reproduced except in full without the written approval of MRT Technology (Suzhou) Co., Ltd.

Revision History

Report No.	Version	Description	Issue Date
1601RSU00905	Rev. 01	Initial report	01-21-2016

Note: The EUT has been got the FCC certificate (FCC ID: YZZGVC3200). The EUT adds one new adapter now and we have shown the conducted emission data and radiated emission data (below 1GHz) in the JBP report.

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§2.1033 General Information

Applicant:	Grandstream Networks, Inc.
Applicant Address:	4th Floor, Rainbow Technology Building #16 New West Rd, Nanshan Science & Technology Park (North District), Shenzhen, China 518057
Manufacturer:	Grandstream Networks, Inc.
Manufacturer Address:	4th Floor, Rainbow Technology Building #16 New West Rd, Nanshan Science & Technology Park (North District), Shenzhen, China 518057
Test Site:	MRT Technology (Suzhou) Co., Ltd
Test Site Address:	D8 Building, Youxin Industrial Park, No.2 Tian'edang Rd., Wuzhong Economic Development Zone, Suzhou, China
MRT FCC Registration No.:	809388
Model No.:	GVC3200
Test Device Serial No.:	N/A ☐ Production ☒ Pre-Production ☐ Engineering

Test Facility / Accreditations

Measurements were performed at MRT Laboratory located in Tian'edang Rd., Suzhou, China.

- MRT facility is a FCC registered (MRT Reg. No. 809388) test facility with the site description report on file and has met all the requirements specified in Section 2.948 of the FCC Rules.
- MRT facility is an IC registered (MRT Reg. No. 11384A-1) test laboratory with the site description on file at Industry Canada.
- MRT facility is a VCCI registered (R-4179, G-814, C-4664, T-2206) test laboratory with the site description on file at VCCI Council.
- MRT Lab is accredited to ISO 17025 by the American Association for Laboratory Accreditation (A2LA) under the American Association for Laboratory Accreditation Program (A2LA Cert. No. 3628.01) in EMC, Telecommunications and Radio testing for FCC, Industry Canada, EU and TELEC Rules.



1. INTRODUCTION

1.1. Scope

Measurement and determination of electromagnetic emissions (EMC) of radio frequency devices including intentional and/or unintentional radiators for compliance with the technical rules and regulations of the Federal Communications Commission and the Industry Canada Certification and Engineering Bureau.

1.2. MRT Test Location

The map below shows the location of the MRT LABORATORY, its proximity to the Taihu Lake. These measurement tests were conducted at the MRT Technology (Suzhou) Co., Ltd. Facility located at D8 Building, Youxin Industrial Park, No.2 Tian'edang Rd., Wuzhong Economic Development Zone, Suzhou, China. The detailed description of the measurement facility was found to be in compliance with the requirements of § 2.948 according to ANSI C63.4-2009 on September 30, 2013.



2. PRODUCT INFORMATION

2.1. Equipment Description

Product Name	Full HD Video Conferencing System
Model No.	GVC3200
Brand Name	Grandstream
802.11a/b/g/n	802.11a/b/g/n
v3.0 + HS, v4.0	v3.0 + HS, v4.0
Antenna Type	PCB Antenna
Antenna Gain	2.12dBi for 2.4GHz; 1.14dBi for 5GHz
Components	
Adapter	M/N: NBS65A120500M3 Input: AC 100-240V ~ 50/60Hz, 1.5A OUTPUT: 12Vdc, 5.0A

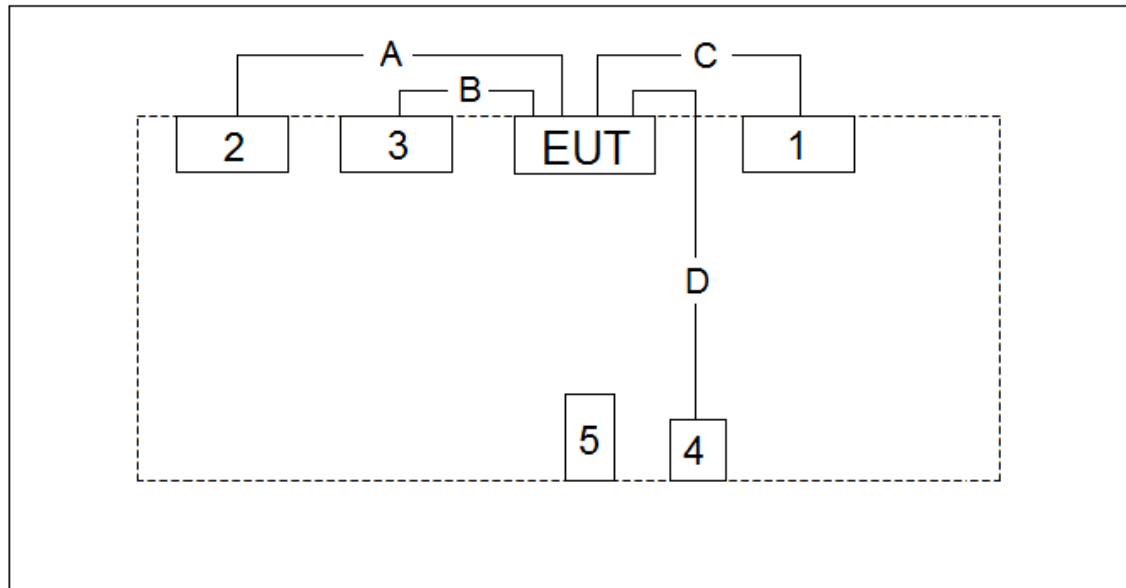
2.2. Test Mode

Pre - Test Mode	
EMI Mode	Mode 1: HDMI 1 Output Mode Mode 2: HDMI 2 Output Mode Mode 3: HDMI 2 Output Mode Mode 4: HDMI In Mode Mode 5: VGA In Mode
Final Test Mode	
EMI Mode	Mode 5: VGA In Mode

2.3. Test Configuration

The EUT was tested per the guidance FCC Part 15 Subpart B: 2014 and ANSI C63.4: 2014 was used to reference the appropriate EUT setup for radiated spurious emissions testing and AC line conducted testing.

Connection Diagram (Mode 1, 2)



Signal Cable Type		Signal Cable Description
A	LAN Cable	Non-Shielding, 2m
B	USB Cable	Shielding, 2m
C	VGA Cable	Shielding, 1.5m
D	USB Cable	Shielding, 1.8m

2.4. Test System Details

The types for all equipments, plus descriptions of all cables used in the tested system (including inserted cards) are:

Product		Manufacturer	Model No.	Serial No.	Power Cord
1	HDMI Monitor	DELL	U2713Hb	N/A	Non-Shielding, 1.8m
2	Notebook	Lenovo	X201	3626AM3	Non-Shielded, 1.8m
3	Thunder	InFocus	INA-TH150	N/A	Non-Shielding, 1.8m
4	USB Mouse	DELL	MS111-T	N/A	N/A
5	Remote Control	Grandstream	GVC3200RMT	N/A	N/A

Remark: The auxiliary equipment was authorized by FCC Declaration of Confirmation.

2.5. Test Software

1	Setup the EUT and simulators as shown on above.
2	(1), Make the EUT set-up as shown above. (2), Power on the EUT and works in "VGA In Mode". (3), Start to test.

2.6. EMI Suppression Device(s)/Modifications

No EMI suppression device(s) were added and/or no modifications were made during testing.

3. DESCRIPTION OF TEST

3.1. Evaluation Procedure

The measurement procedures described in the American National Standard for Methods of Measurement of Radio-Noise Emission from Low-Voltage Electrical Equipment in the Range of 9kHz to 40GHz (ANSI C63.4-2014) was used in the measurement of the **Full HD Video Conferencing System**

Deviation from measurement procedure.....None

3.2. AC Line Conducted Emissions

The line-conducted facility is located inside an 8'x4'x4' shielded enclosure. A 1m x 2m wooden table 80cm high is placed 40cm away from the vertical wall and 80cm away from the sidewall of the shielded room. Two 10kHz-30MHz, 50Ω/50uH Line-Impedance Stabilization Networks (LISNs) are bonded to the shielded room floor. Power to the LISNs is filtered by external high-current high-insertion loss power line filters. These filters attenuate ambient signal noise from entering the measurement lines. These filters are also bonded to the shielded enclosure.

The EUT is powered from one LISN and the support equipment is powered from the second LISN. If the EUT is a DC-powered device, power will be derived from the source power supply it normally will be powered from and this supply line(s) will be connected to the second LISN. All interconnecting cables more than 1 meter were shortened to a 1 meter length by non-inductive bundling (serpentine fashion) and draped over the back edge of the test table. All cables were at least 40cm above the horizontal reference ground-plane. Power cables for support equipment were routed down to the second LISN while ensuring that that cables were not draped over the second LISN.

Sufficient time for the EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition. The RF output of the LISN was connected to the receiver and exploratory measurements were made to determine the frequencies producing the maximum emission from the EUT. The receiver was scanned from 150 kHz to 30 MHz. The detector function was set to peak mode for exploratory measurements while the bandwidth of the analyzer was set to 9 kHz. The EUT, support equipment, and interconnecting cables were arranged and manipulated to maximize each emission. Each emission was also maximized by varying: power lines, the mode of operation or resolution, clock or data exchange speed, scrolling H pattern to the EUT and/or support equipment whichever determined the worst-case emission. Once the worst case emissions have been identified, the one EUT cable configuration/arrangement and mode of operation that produced these emissions are used for final measurements on the same test site. Line conducted emissions test results are shown in Section 6.2.

3.3. Radiated Emissions

The radiated test facilities consisted of an indoor 3 meter semi-anechoic chamber used for final measurements and exploratory measurements, when necessary. The measurement area is contained within the semi-anechoic chamber which is shielded from any ambient interference. For measurements above 1GHz absorbers are arranged on the floor between the turn table and the antenna mast in such a way so as to maximize the reduction of reflections. For measurements below 1GHz, the absorbers are removed. An MF Model 210SS turntable is used for radiated measurement. It is a continuously rotatable, remote controlled, metallic turntable and 2 meters (6.56 ft.) in diameter. The turn table is flush with the raised floor of the chamber in order to maintain its function as a ground plane. An 80cm high PVC support structure is placed on top of the turntable.

For all measurements, the spectrum was scanned through all EUT azimuths and from 1 to 4 meter receive antenna height using a broadband antenna from 30 MHz up to the upper frequency shown in 15.33(b)(1) depending on the highest frequency generated or used in the device or on which the device operates or tunes. For frequencies above 1GHz, linearly polarized double ridge horn antennas were used. For frequencies below 30 MHz, a calibrated loop antenna was used. When exploratory measurements were necessary, they were performed at 1 meter test distance inside the semi-anechoic chamber using broadband antennas, broadband amplifiers, and spectrum analyzers to determine the frequencies and modes producing the maximum emissions. Sufficient time for the EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition. The test set-up was placed on top of the 0.8 meter high, 1 x 1.5 meter table. The EUT, support equipment, and interconnecting cables were arranged and manipulated to maximize each emission. Appropriate precaution was taken to ensure that all emissions from the EUT were maximized and investigated. The system configuration, mode of operation, if applicable, turntable azimuth, and receive antenna height was noted for each frequency found.

Final measurements were made in the semi-anechoic chamber using calibrated, linearly polarized broadband and horn antennas. The test setup was configured to the setup that produced the worst case emissions. The spectrum analyzer was set to investigate all frequencies required for testing to compare the highest radiated disturbances with respect to the specified limits. The turntable containing the EUT was rotated through 360 degrees and the height of the receive antenna was varied 1 to 4 meters and stopped at the azimuth and height producing the maximum emission. Each emission was maximized by changing the orientation of the EUT through three orthogonal planes and changing the polarity of the receive antenna, whichever produced the worst-case emissions. According to 3dB beam-width of horn antenna, the horn antenna should be always directed to the EUT when rising height.

4. TEST EQUIPMENT CALIBRATION DATE

Conducted Emissions - SR2

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
EMI Test Receiver	R&S	ESR7	MRTSUE06001	1 year	2016/11/03
Two-Line V-Network	R&S	ENV216	MRTSUE06002	1 year	2016/11/03
Two-Line V-Network	R&S	ENV216	MRTSUE06003	1 year	2016/11/03
Temperature/ Meter Humidity	Yuhuaze	N/A	MRTSUE06180	1 year	2016/12/20

Radiated Emission - AC2

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
Spectrum Analyzer	Agilent	N9010A	MRTSUE06124	1 year	2016/06/23
EMI Test Receiver	R&S	ESR7	MRTSUE06001	1 year	2016/11/03
Microwave System Amplifier	Agilent	83017A	MRTSUE06076	1 year	2016/03/29
TRILOG Antenna	Schwarzbeck	VULB9168	MRTSUE06172	1 year	2016/12/10
Temperature/ Meter Humidity	Mingao	ETH529	MRTSUE06170	1 year	2016/11/29

Software	Version	Function
e3	V8.3.5	EMI Test Software

5. MEASUREMENT UNCERTAINTY

Where relevant, the following test uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k = 2$.

AC Conducted Emission Measurement
Measuring Uncertainty for a Level of Confidence of 95% ($U=2U_c(y)$): 150kHz~30MHz: 3.5dB
Radiated Emission Measurement
Measuring Uncertainty for a Level of Confidence of 95% ($U=2U_c(y)$): Horizontal: 30MHz~1GHz: 4.07dB Vertical: 30MHz~1GHz: 4.18 dB

6. TEST RESULT

6.1. Summary

Company Name: Grandstream Networks, Inc.

Test Mode: VGA In Mode

FCC Part Section(s)	Test Description	Test Result
15.107	Conducted Emissions	Pass
15.109	Radiated Emissions	Pass

6.2. Conducted Emission Measurement

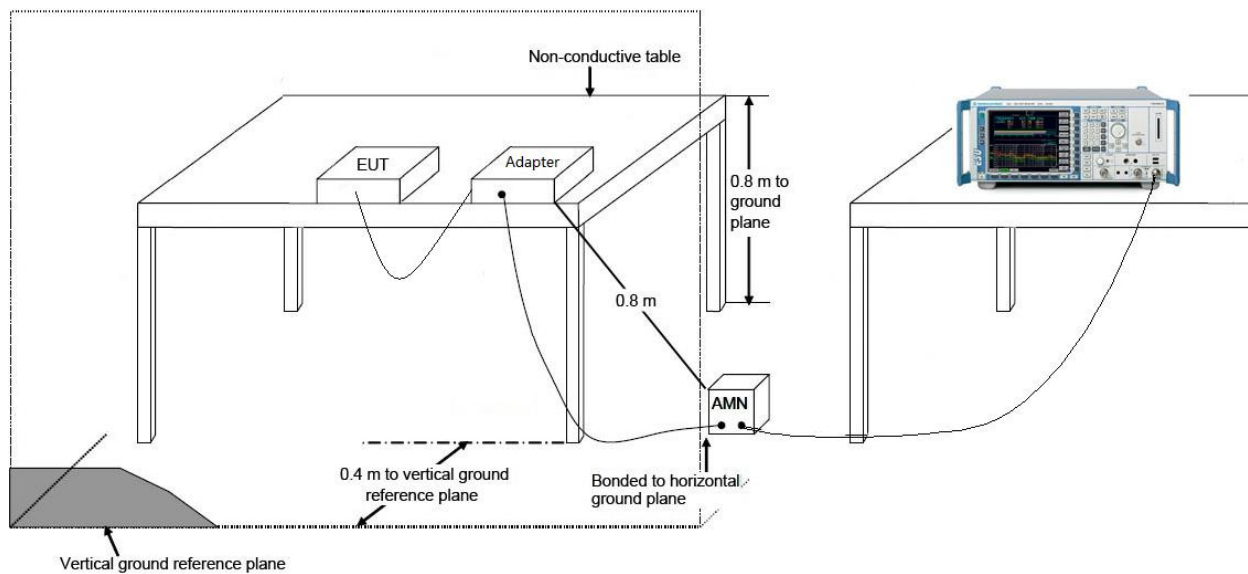
6.2.1. Test Limit

FCC Part 15.107 Limits		
Frequency (MHz)	QP (dB μ V)	AV (dB μ V)
0.15 - 0.50	66 - 56	56 - 46
0.50 - 5.0	56	46
5.0 - 30	60	50

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

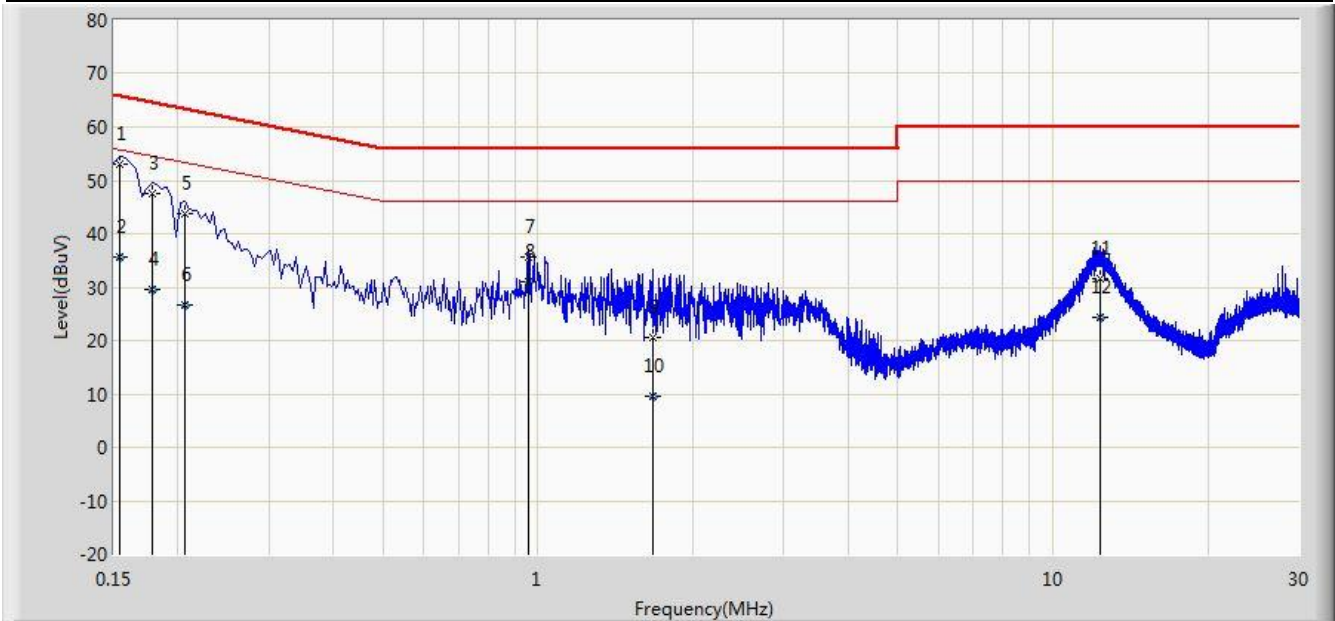
Note 2: The limit decreases linearly with the logarithm of the frequency in the range 0.15MHz to 0.5MHz.

6.2.2. Test Setup



6.2.3. Test Result of Conducted Emissions

Site: SR2	Time: 2016/01/12 - 20:41
Limit: FCC_Part15.107_CE_AC Power_Class B	Engineer: Vince Yu
Probe: ENV216_101683_Filter On	Polarity: Line
EUT: Full HD Video Conferencing System	Power: AC 120V/60Hz
Note: Mode 5	

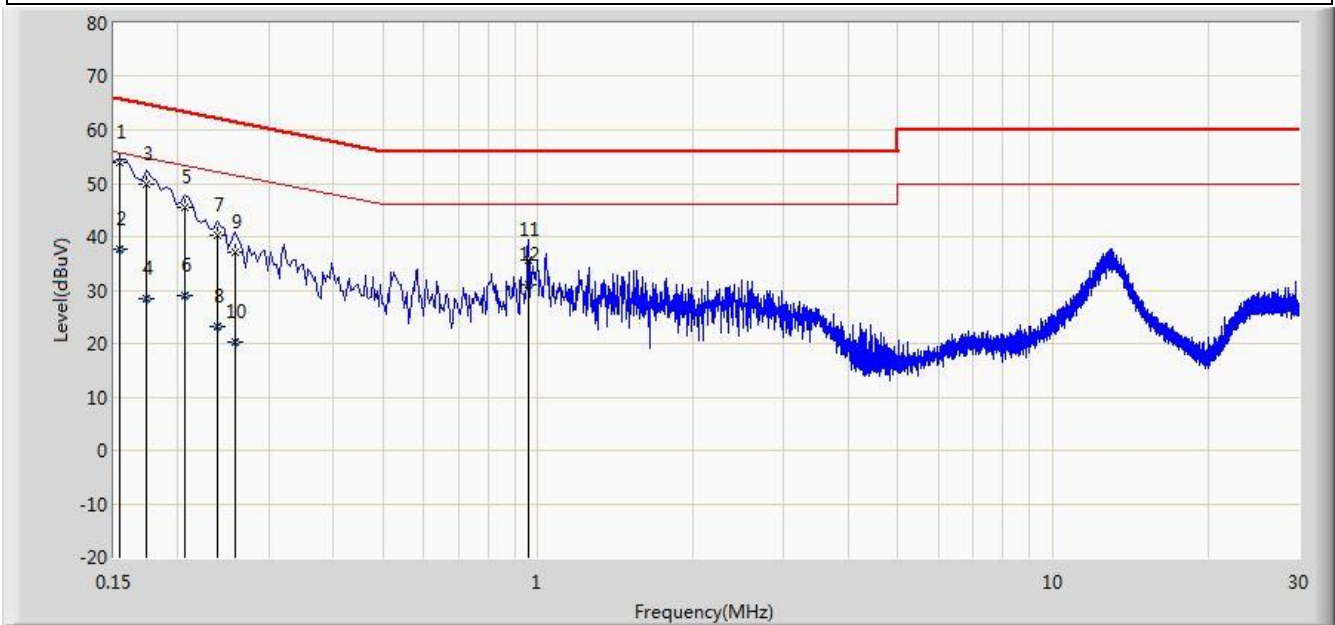


No	Flag	Mark	Frequency (MHz)	Measure Level (dBμV)	Reading Level (dBμV)	Over Limit (dB)	Limit (dBμV)	Factor (dB)	Type
1		*	0.154	52.917	42.177	-12.865	65.781	10.740	QP
2			0.154	35.794	25.055	-19.987	55.781	10.740	AV
3			0.178	47.524	37.466	-17.054	64.578	10.058	QP
4			0.178	29.586	19.528	-24.993	54.578	10.058	AV
5			0.206	43.892	33.911	-19.473	63.365	9.981	QP
6			0.206	26.778	16.798	-26.587	53.365	9.981	AV
7			0.958	35.738	25.808	-20.262	56.000	9.930	QP
8			0.958	31.101	21.172	-14.899	46.000	9.930	AV
9			1.670	20.686	10.803	-35.314	56.000	9.883	QP
10			1.670	9.683	-0.199	-36.317	46.000	9.883	AV
11			12.378	31.720	21.645	-28.280	60.000	10.075	QP
12			12.378	24.433	14.358	-25.567	50.000	10.075	AV

Note: Measure Level (dBμV) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + LISN Factor (dB).

Site: SR2	Time: 2016/01/12 - 20:46
Limit: FCC_Part15.107_CE_AC Power_Class B	Engineer: Vince Yu
Probe: ENV216_101683_Filter On	Polarity: Neutral
EUT: Full HD Video Conferencing System	Power: AC 120V/60Hz
Note: Mode 5	



No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV)	Factor (dB)	Type
1		*	0.154	53.936	43.220	-11.846	65.781	10.716	QP
2			0.154	37.573	26.857	-18.209	55.781	10.716	AV
3			0.174	49.993	39.937	-14.774	64.767	10.057	QP
4			0.174	28.466	18.409	-26.301	54.767	10.057	AV
5			0.206	45.396	35.395	-17.969	63.365	10.001	QP
6			0.206	28.886	18.884	-24.479	53.365	10.001	AV
7			0.238	40.261	30.269	-21.905	62.166	9.992	QP
8			0.238	23.157	13.165	-29.008	52.166	9.992	AV
9			0.258	36.970	26.963	-24.525	61.496	10.007	QP
10			0.258	20.293	10.286	-31.202	51.496	10.007	AV
11			0.958	35.683	25.751	-20.317	56.000	9.932	QP
12			0.958	30.925	20.993	-15.075	46.000	9.932	AV

Note: Measure Level (dBμV) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + LISN Factor (dB).

6.3. Radiated Emission Measurement

6.3.1. Test Limit

FCC Part 15.109 Limits		
Frequency (MHz)	Distance (m)	Level (dBμV/m)
30 - 88	3	40
88 - 216	3	43.5
216 - 960	3	46
Above 960	3	54

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 (dBμV/m) = 20 log E field strength (uV/m)

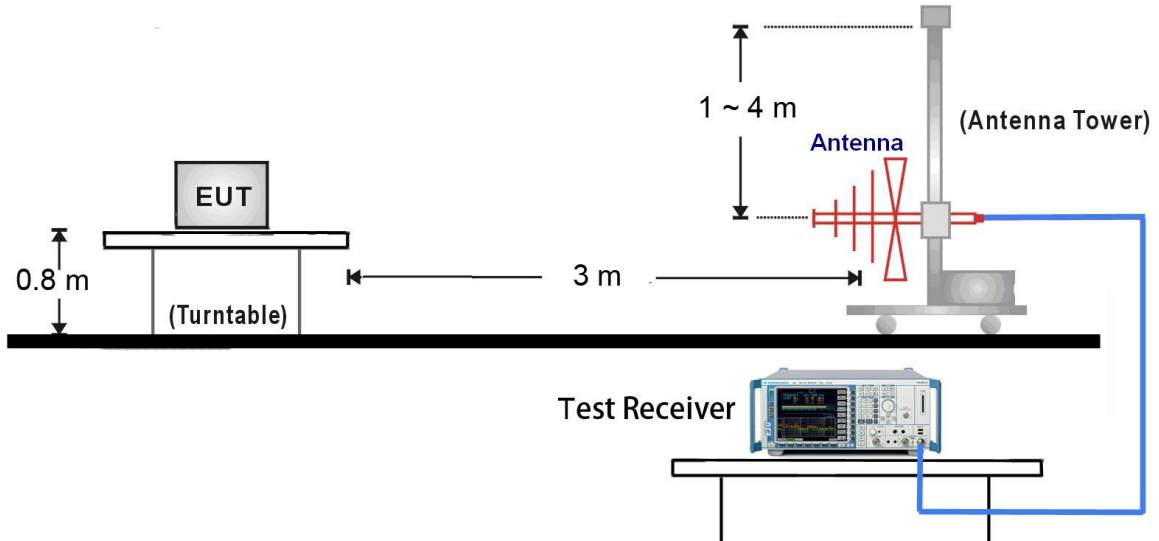
6.3.2. Test Frequency selected

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	5th harmonic of the highest frequency or 40 GHz, whichever is lower

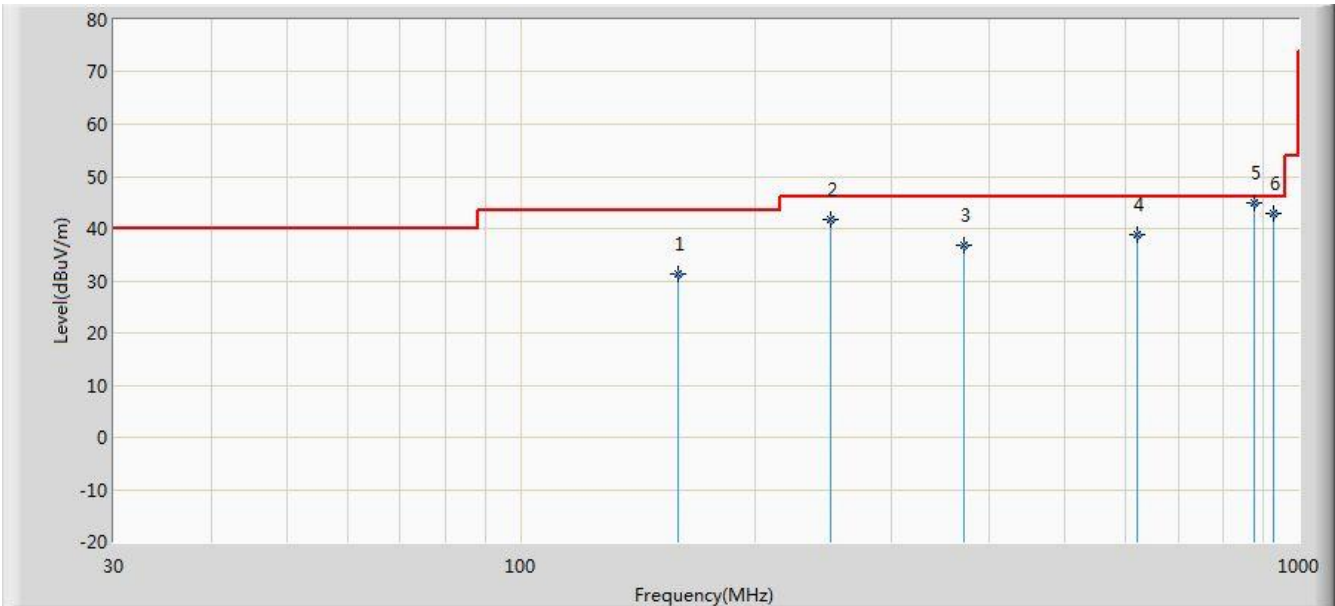
6.3.3. Test Setup

30MHz ~ 1GHz Test Setup:



6.3.4. Test Result of Radiated Emissions

Site: AC2	Time: 2016/01/19 - 17:25
Limit: FCC_Part15.109_RE(3m)_Class B	Engineer: Lewis Huang
Probe: VULB9162_0.03-8GHz	Polarity: Horizontal
EUT: Full HD Video Conferencing System	Power: AC 120V/60Hz
Note: Mode 5	

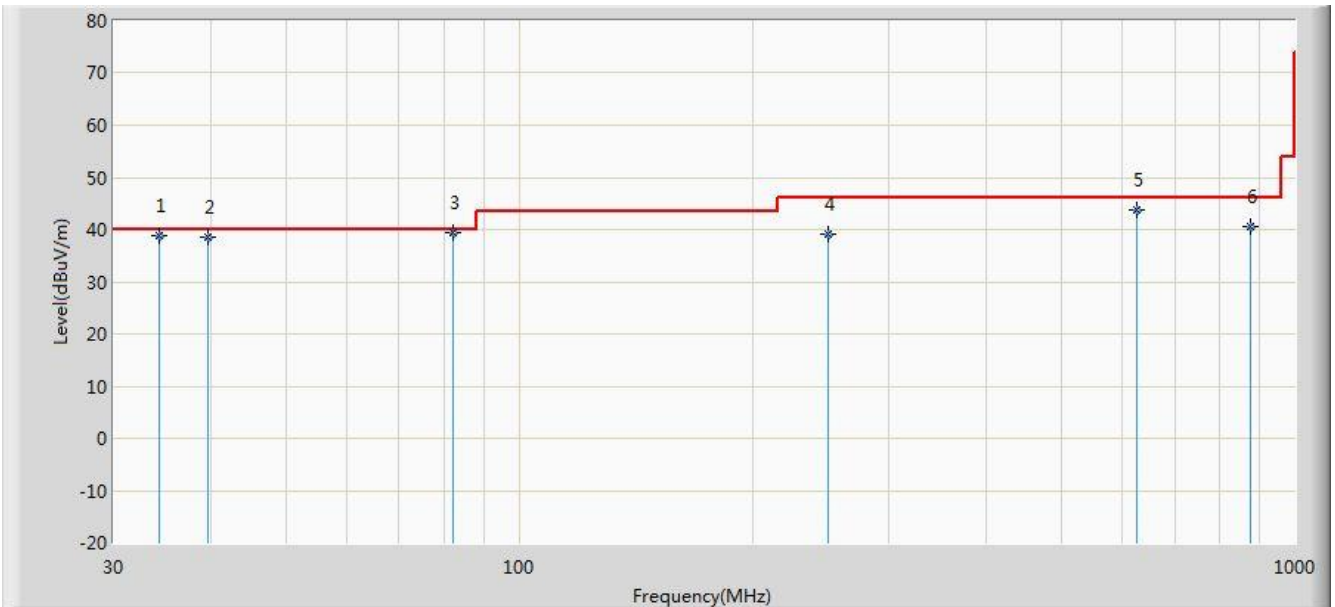


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			159.495	31.164	21.340	-12.336	43.500	9.824	QP
2			250.190	41.666	27.970	-4.334	46.000	13.696	QP
3			371.440	36.820	20.647	-9.180	46.000	16.174	QP
4			619.760	38.966	18.640	-7.034	46.000	20.326	QP
5		*	874.870	44.957	21.020	-1.043	46.000	23.937	QP
6			930.160	42.987	18.640	-3.013	46.000	24.347	QP

Note: Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m).

Site: AC2	Time: 2016/01/19 - 17:25
Limit: FCC_Part15.109_RE(3m)_Class B	Engineer: Lewis Huang
Probe: VULB9162_0.03-8GHz	Polarity: Vertical
EUT: Full HD Video Conferencing System	Power: AC 120V/60Hz
Note: Mode 5	



No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			34.365	38.852	26.020	-1.148	40.000	12.832	QP
2			39.700	38.586	24.780	-1.414	40.000	13.806	QP
3		*	82.380	39.367	29.647	-0.633	40.000	9.720	QP
4			250.190	39.043	25.347	-6.957	46.000	13.696	QP
5			625.095	43.626	23.247	-2.374	46.000	20.379	QP
6			874.870	40.607	16.670	-5.393	46.000	23.937	QP

Note: Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m).

7. CONCLUSION

The data collected relate only the item(s) tested and show that the **Full HD Video Conferencing System FCC ID: YZZGVC3200** has been tested to comply with the requirements specified in §15.107 and §15.109 of the FCC Rules.

_____ The End _____