MEASUREMENT REPORT
FCC Part 15B

FCC ID:	YZZGVC3200
APPLICANT:	Grandstream Networks, Inc.

Application Type:	Certification
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
Test Procedure(s):	ANSI C63.4: 2009
Test Date:	June 03 ~ 08, 2015

Reviewed By : Robin Wu
(Robin Wu)

Approved By : Marlin Chen
(Marlin Chen)

ACCREDITED
TESTING LABORATORY
CERTIFICATE #3628.01

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 C63.4-2009. Test results reported herein relate only to the item(s) tested.

Revision History

Report No.	Version	Description	Issue Date
1505RSU01906	Rev. 01	Initial report	06-09-2015

CONTENTS

Description Page

§2.1033 General Information

Applicant:	Grandstream Networks, Inc.
Applicant Address:	5F, Bldg #1, No.2 Kefa Rd., Science & Technology Park, Shenzhen, China
Manufacturer:	Grandstream Networks, Inc.
Manufacturer Address:	5F, Bldg #1, No.2 Kefa Rd., Science & Technology Park, Shenzhen, China
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
FCC ID:	YZZGVC3200
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.**

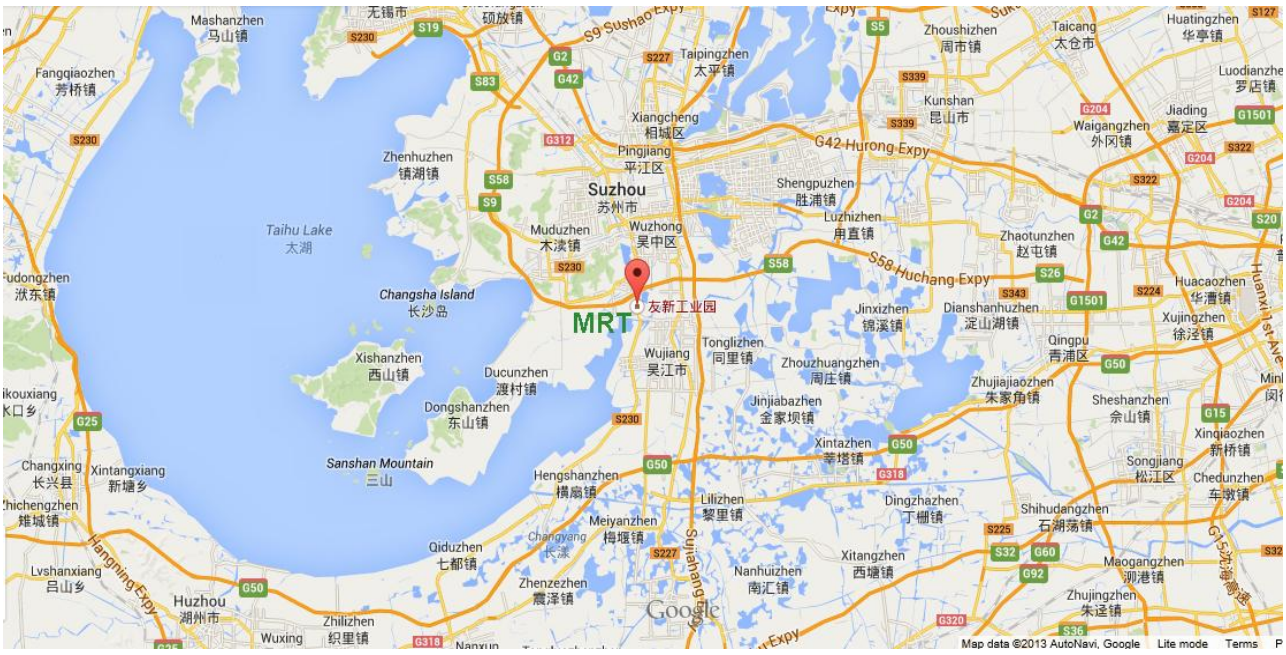
1. INTRODUCTION

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

2.1.1. Test Mode

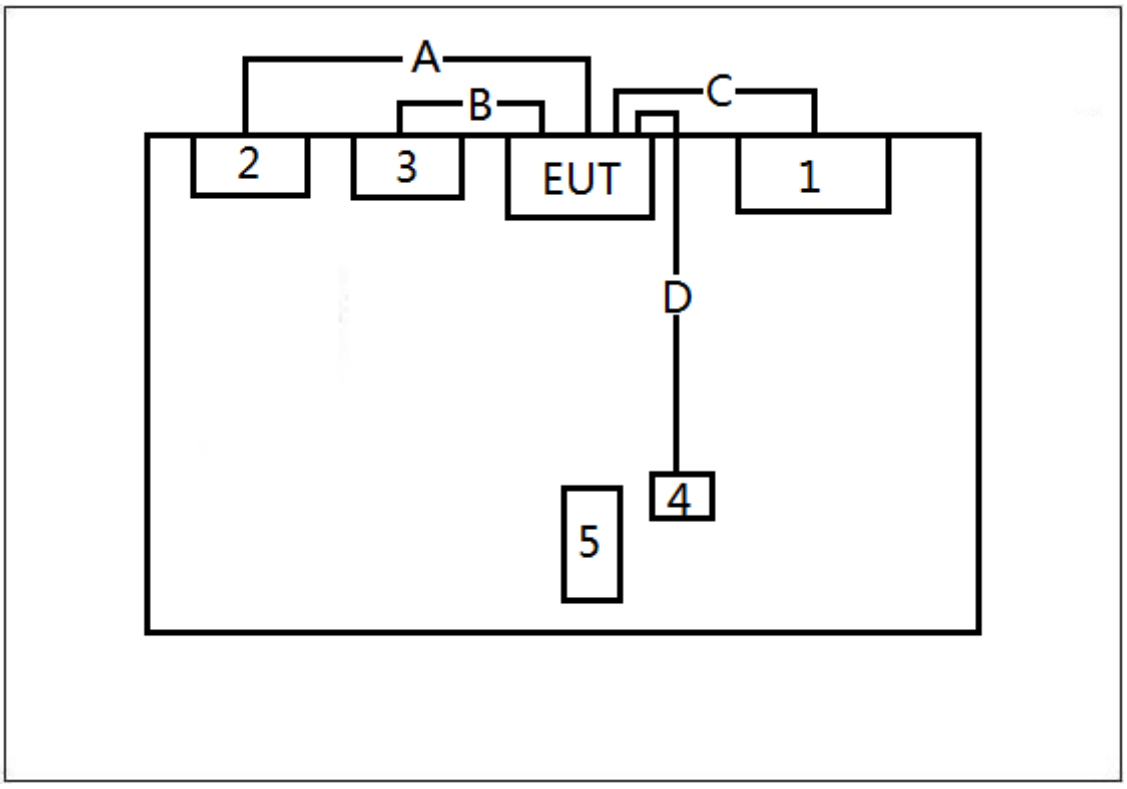
Pre-Test Mode	Mode 1: HDMI 1 Output Mode Mode 2: HDMI 2 Output Mode Mode 3: HDMI 3 Output Mode Mode 4: HDMI In Mode Mode 5: VGA In Mode
Final Test Mode	Mode 5: VGA In Mode

Note: This report has assessed five pre-test modes, and showed the worst test mode.

2.2. Test Configuration

The EUT was tested per the guidance FCC Part 15 Subpart B: 2014 and ANSI C63.4: 2009 was used to reference the appropriate EUT setup for radiated spurious emissions testing and AC line conducted testing.

Connection Diagram (Mode 5)



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

2.3. 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.	Power Cord
1	HDMI Monitor	DELL	U2713Hb	Non-Shielding, 1.8m
2	Notebook	Lenovo	E430c	Non-Shielding, 1.8m
3	Thunder	InFocus	INA-TH150	Non-Shielding, 1.8m
4	USB Mouse	DELL	MS111-T	N/A
5	Remote Control	Grandstream	GVC3200RMT	N/A

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 C63.4-2009) was used in the measurement of the Equipment under test.

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, Full HD Video Conferencing Systemled, 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

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
EMI Test Receiver	R&S	ESR7	MRTSUE06001	1 year	2015/11/08
Two-Line V-Network	R&S	ENV216	MRTSUE06002	1 year	2015/11/08
Two-Line V-Network	R&S	ENV216	MRTSUE06003	1 year	2015/11/08
Temperature/ Meter Humidity	Anymetre	TH101B	MRTSUE06047	1 year	2015/11/15

Radiated Emission

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
EMI Test Receiver	R&S	ESR7	MRTSUE06001	1 year	2015/11/08
Spectrum Analyzer	Agilent	E4447A	MRTSUE06028	1 year	2015/10/09
TRILOG Antenna	Schwarzbeck	VULB9162	MRTSUE06022	1 year	2015/11/08
Preamplifier	Agilent	83017A	MRTSUE06020	1 year	2015/12/13
Temperature/Humidity Meter	Anymetre	TH101B	MRTSUE06046	1 year	2015/11/15

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=2Uc(y)): 150kHz~30MHz: 3.5dB
Radiated Emission Measurement
Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): 9kHz ~ 1GHz: 4.18dB 1GHz ~ 18GHz: 4.76dB

6. TEST RESULT

6.1. Summary

Company Name: **Grandstream Networks, Inc.**

FCC ID: **YZZGVC3200**

Test Mode: **VGA Output Mode**

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

6.2. Conducted Emission Measurement

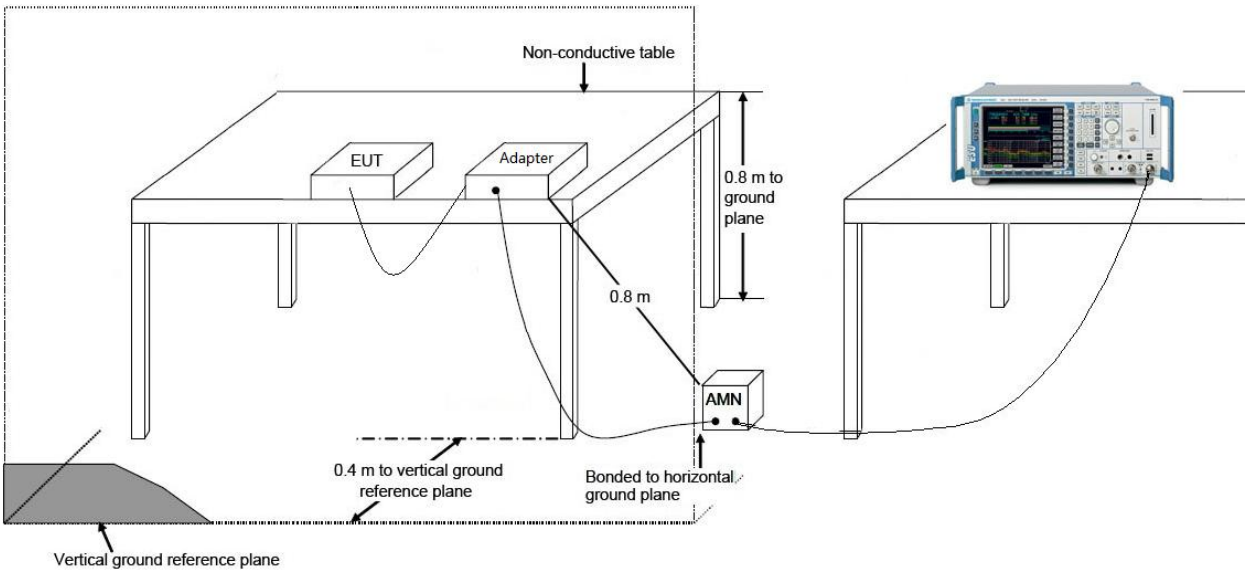
6.2.1. Test Limit

FCC Part 15.107 Limits		
Frequency (MHz)	QP (dBμV)	AV (dBμV)
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.

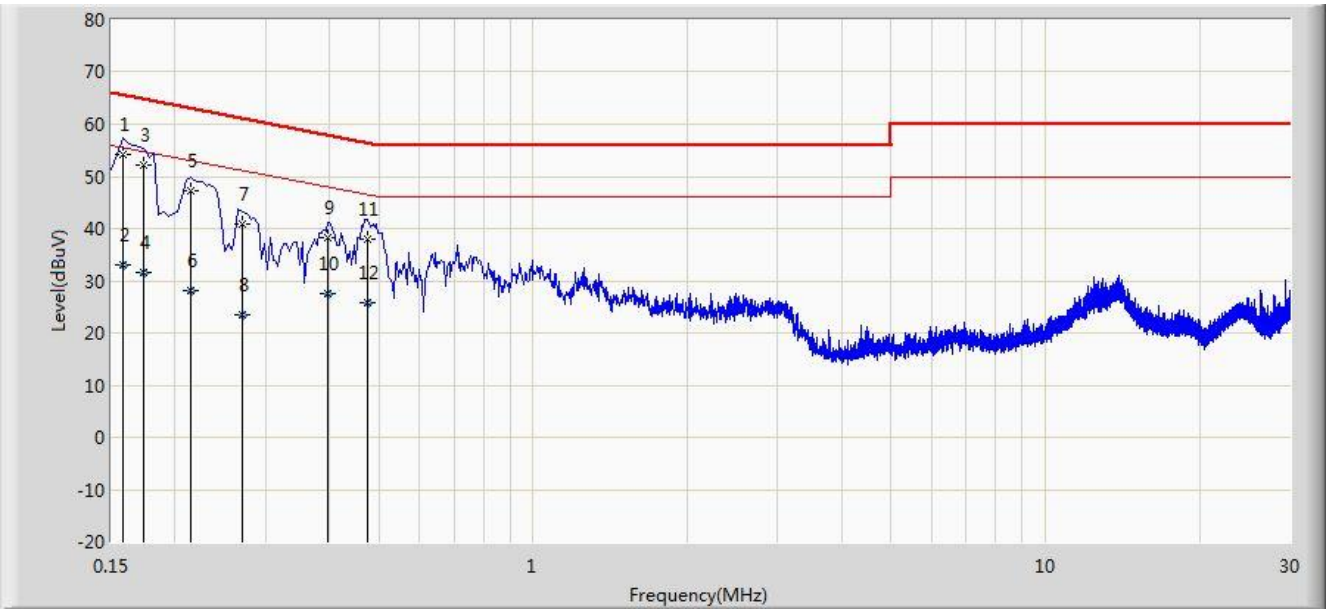
Note 2: The limit decreases linearly with the logarithm of the frequency in the range 0.15MHz to 0.5MHz.

6.2.2. Test Setup



6.2.3. Test Result of Conducted Emissions

Site: SR2	Time: 2015/06/08 - 21:39
Limit: FCC_Part15.107_CE_AC Power_ClassB	Engineer: Roy Cheng
Probe: ENV216_101683_Filter On	Polarity: Line
EUT: Full HD Video Conferencing System	Power: AC 120V/60Hz
Note: Mode 5	

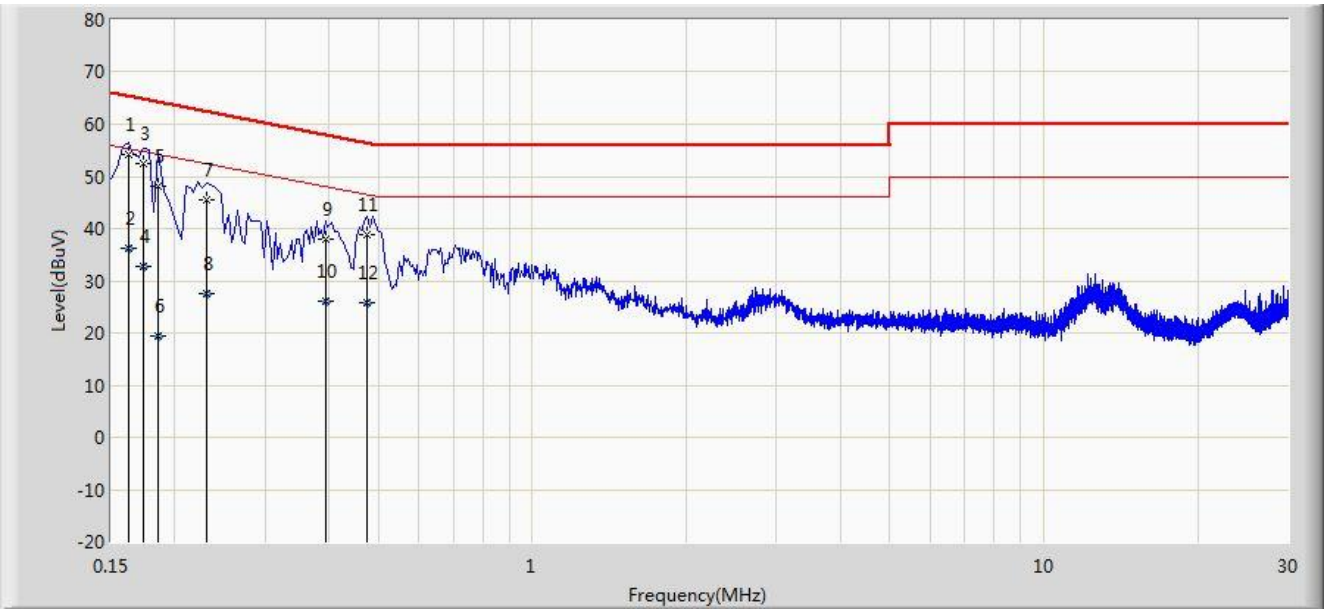


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV)	Factor (dB)	Type
1		*	0.158	54.272	43.961	-11.296	65.568	10.311	QP
2			0.158	33.088	22.777	-22.480	55.568	10.311	AV
3			0.174	52.043	41.975	-12.724	64.767	10.068	QP
4			0.174	31.663	21.595	-23.105	54.767	10.068	AV
5			0.214	47.155	37.198	-15.894	63.049	9.957	QP
6			0.214	28.249	18.293	-24.799	53.049	9.957	AV
7			0.270	40.933	30.953	-20.185	61.118	9.980	QP
8			0.270	23.380	13.400	-27.738	51.118	9.980	AV
9			0.398	38.388	28.304	-19.507	57.895	10.084	QP
10			0.398	27.434	17.351	-20.461	47.895	10.084	AV
11			0.474	37.995	27.849	-18.449	56.444	10.145	QP
12			0.474	25.824	15.678	-20.620	46.444	10.145	AV

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

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

Site: SR2	Time: 2015/06/08 - 22:23
Limit: FCC_Part15.107_CE_AC Power_ClassB	Engineer: Roy Cheng
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		*	0.162	54.058	43.980	-11.303	65.361	10.078	QP
2			0.162	36.306	26.228	-19.054	55.361	10.078	AV
3			0.174	52.427	42.370	-12.340	64.767	10.057	QP
4			0.174	32.710	22.653	-22.057	54.767	10.057	AV
5			0.186	48.219	38.184	-15.994	64.213	10.035	QP
6			0.186	19.491	9.456	-34.722	54.213	10.035	AV
7			0.230	45.508	35.522	-16.942	62.450	9.985	QP
8			0.230	27.409	17.423	-25.041	52.450	9.985	AV
9			0.394	37.850	27.743	-20.128	57.979	10.108	QP
10			0.394	26.141	16.033	-21.838	47.979	10.108	AV
11			0.474	38.829	28.662	-17.614	56.444	10.167	QP
12			0.474	25.941	15.773	-20.503	46.444	10.167	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)

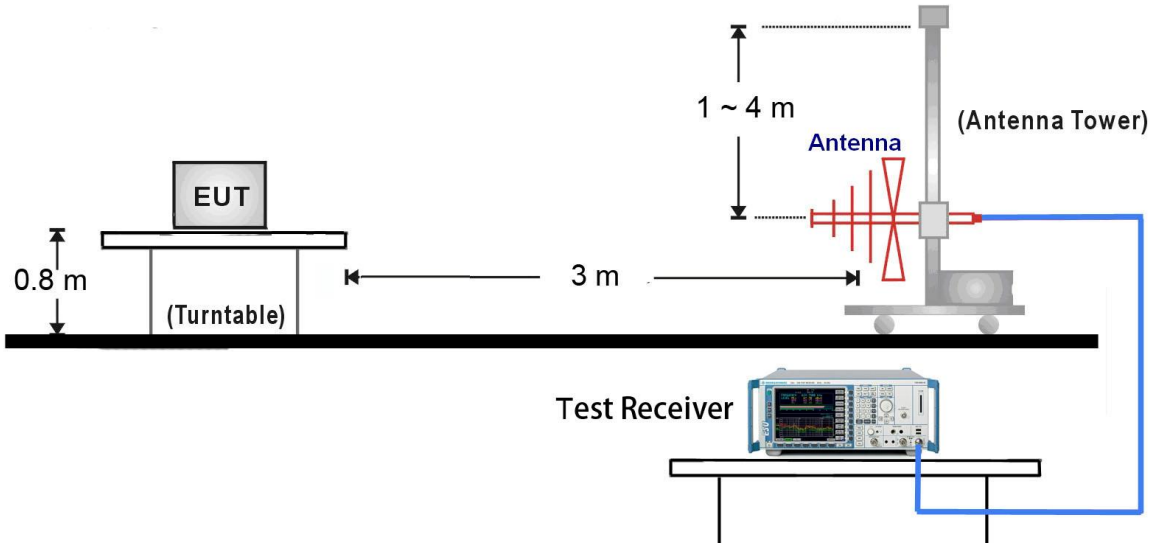
6.3.2. Test Frequency selected

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:

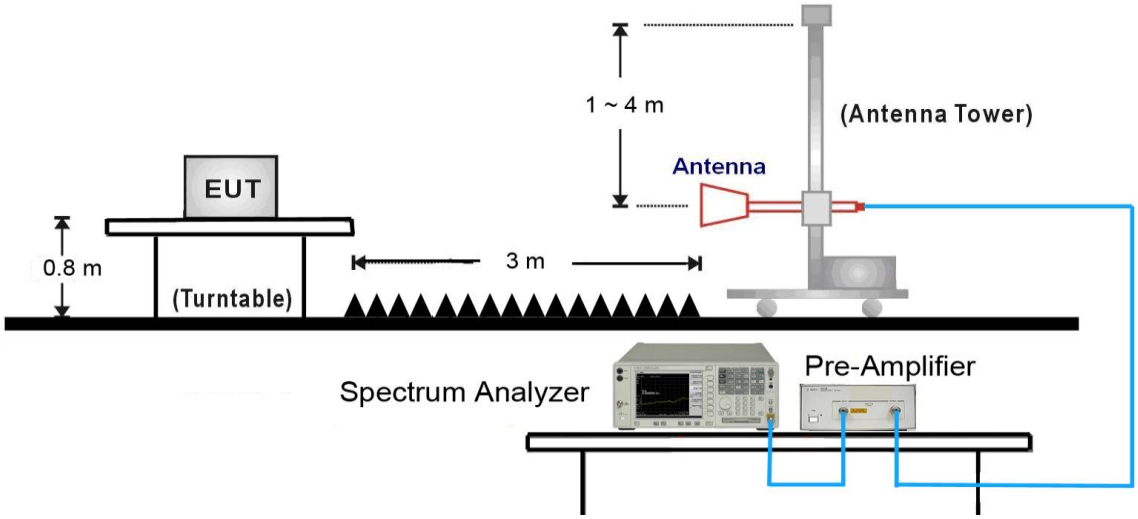
Highest frequency generated or used in the device or on which the device operates or tunes (MHz)	Upper frequency of measurement range (MHz)
Below 1.705	30
1.705 - 108	1000
108 - 500	2000
500 - 1000	5000
Above 1000	5th harmonic of the highest frequency or 40 GHz, whichever is lower

6.3.3. Test Setup

30MHz ~ 1GHz Test Setup:

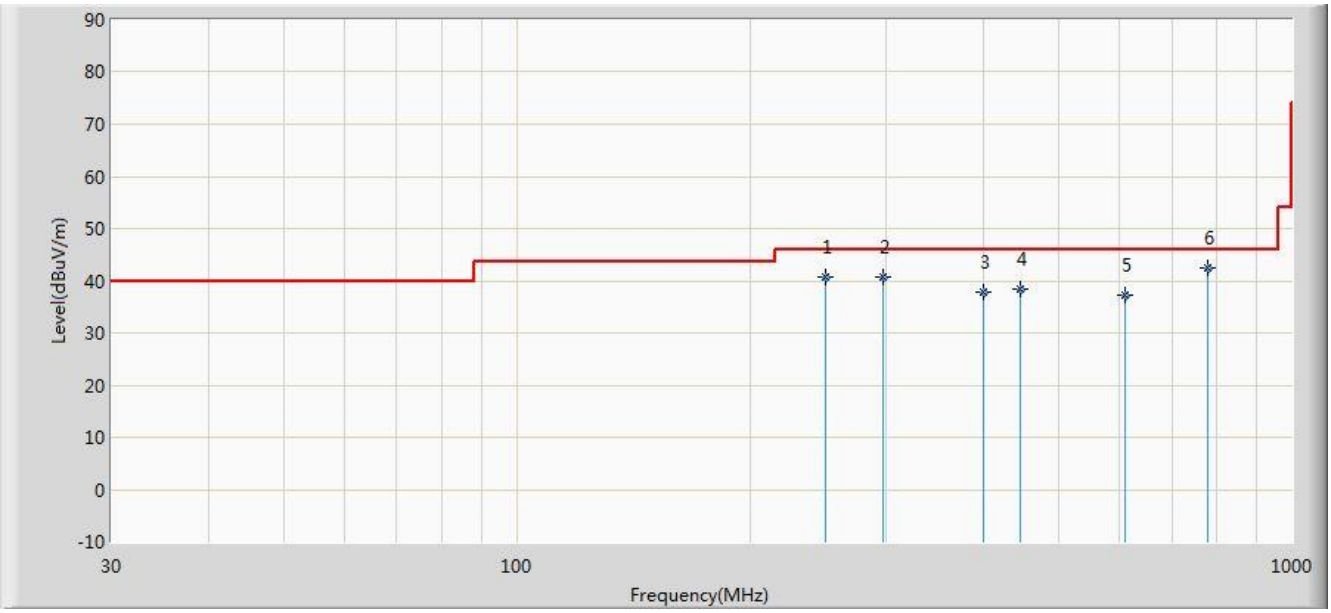


1GHz ~18GHz Test Setup:



6.3.4. Test Result of Radiated Emissions

Site: AC1	Time: 2015/06/08 - 21:10
Limit: FCC_Part15.109_RE(3m)	Engineer: Roy Cheng
Probe: VULB9162_0.03-8GHz	Polarity: Horizontal
EUT: Full HD Video Conferencing System	Power: AC 120V/60Hz
Note: Mode 5	

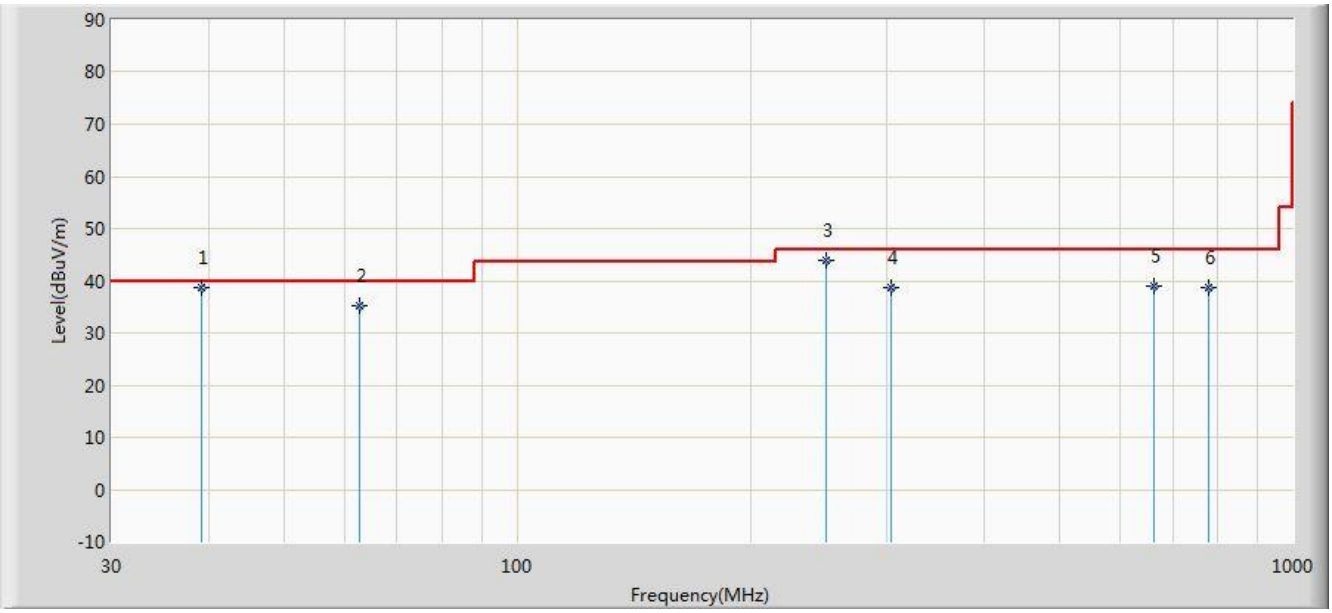


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			36.548	20.810	7.612	-19.190	40.000	13.198	QP
2			47.460	26.789	11.843	-13.211	40.000	14.946	QP
3			315.180	23.054	8.162	-22.946	46.000	14.892	QP
4			399.934	29.806	13.154	-16.194	46.000	16.652	QP
5			599.633	24.859	4.902	-21.141	46.000	19.957	QP
6		*	799.937	40.141	17.422	-5.859	46.000	22.719	QP

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

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

Site: AC1	Time: 2015/06/08 - 21:10
Limit: FCC_Part15.109_RE(3m)	Engineer: Roy Cheng
Probe: VULB9162_0.03-8GHz	Polarity: Vertical
EUT: Full HD Video Conferencing System	Power: AC 120V/60Hz
Note: Mode 5	

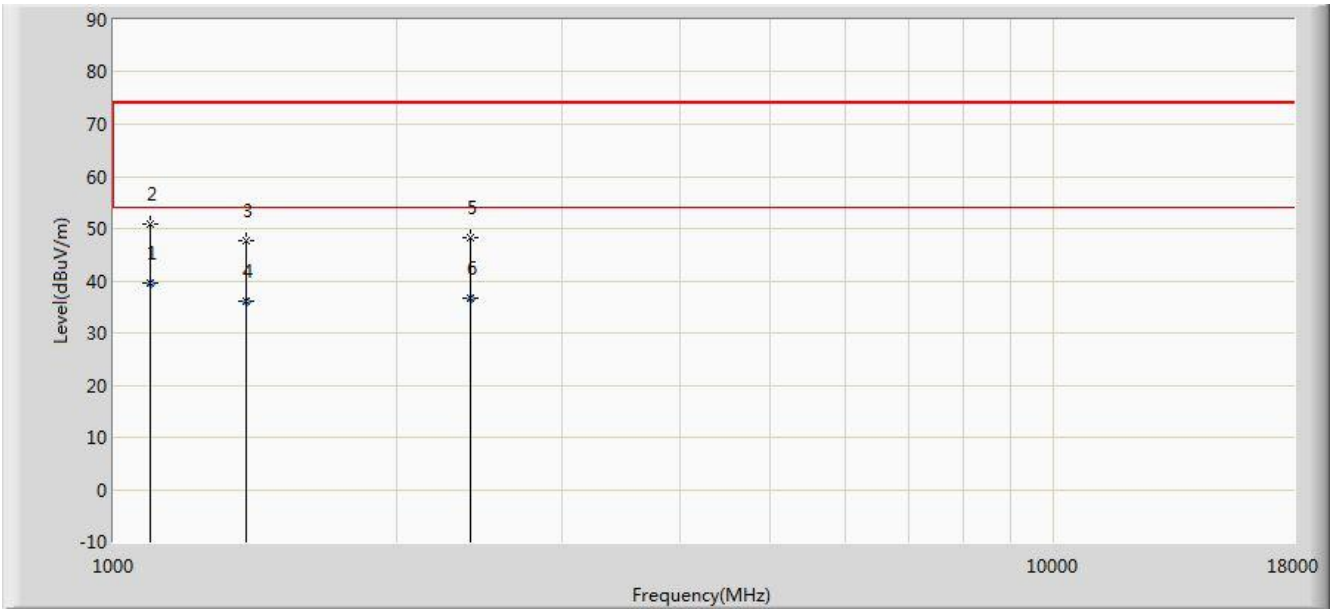


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		*	39.135	38.779	25.100	-1.221	40.000	13.679	QP
2			62.750	35.360	22.100	-4.640	40.000	13.260	QP
3			250.027	43.828	30.200	-2.172	46.000	13.628	QP
4			303.240	38.783	24.200	-7.217	46.000	14.583	QP
5			662.486	39.001	18.200	-6.999	46.000	20.801	QP
6			780.012	38.770	16.300	-7.230	46.000	22.469	QP

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

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

Site: AC1	Time: 2015/06/08 - 21:14
Limit: FCC_Part15.109_RE(3m)	Engineer: Roy Cheng
Probe: BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: Full HD Video Conferencing System	Power: AC 120V/60Hz
Note: Mode 5	

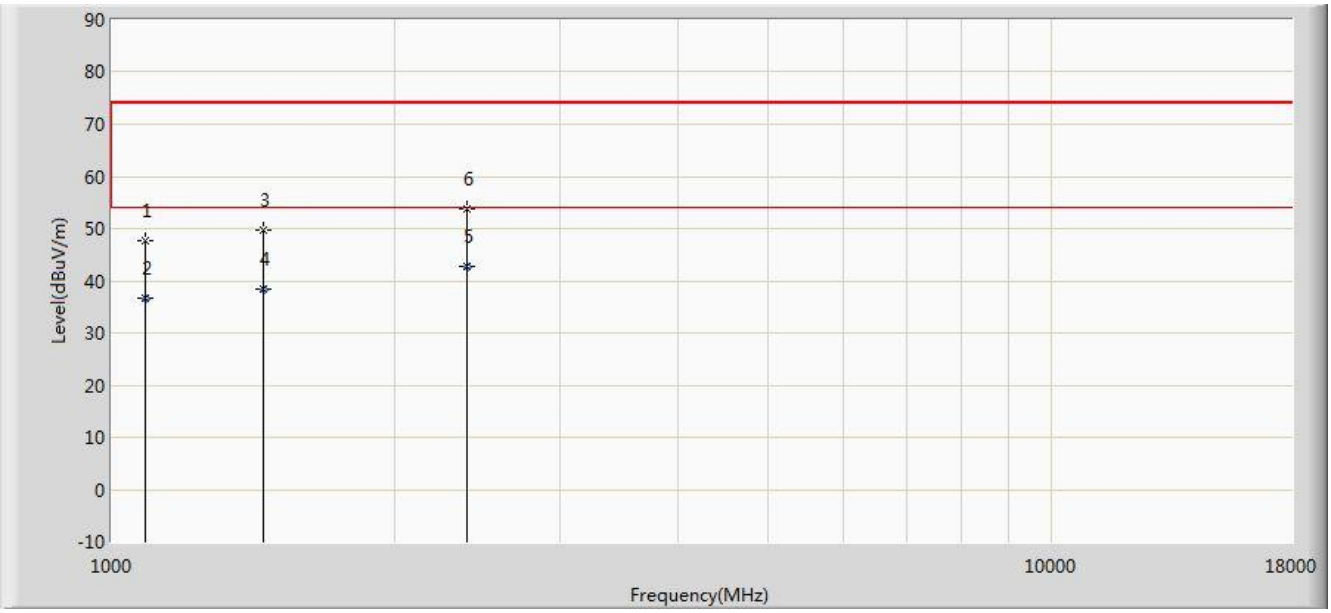


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		*	1093.458	39.683	50.145	-14.317	54.000	-10.463	AV
2			1093.500	50.823	61.285	-23.177	74.000	-10.461	PK
3			1382.500	47.618	55.541	-26.382	74.000	-7.923	PK
4			1382.865	36.021	43.945	-17.979	54.000	-7.924	AV
5			2394.000	48.210	51.960	-25.790	74.000	-3.750	PK
6			2394.253	36.733	40.484	-17.267	54.000	-3.751	AV

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

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) - Pre_Amplifier Gain (dB)

Site: AC1	Time: 2015/06/08 - 21:14
Limit: FCC_Part15.109_RE(3m)	Engineer: Roy Cheng
Probe: BBHA9120D_1-18GHz	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			1085.000	47.574	58.119	-26.426	74.000	-10.545	PK
2			1085.475	36.784	47.324	-17.216	54.000	-10.540	AV
3			1450.500	49.614	57.455	-24.386	74.000	-7.841	PK
4			1450.865	38.413	46.253	-15.587	54.000	-7.840	AV
5		*	2385.489	42.745	46.487	-11.255	54.000	-3.742	AV
6			2385.500	53.799	57.541	-20.201	74.000	-3.742	PK

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

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) - Pre_Amplifier Gain (dB)

7. CONCLUSION

The data collected relate only the item(s) tested and show that the **Full HD Video Conferencing System FCC ID: YZZGVC3200** is in compliance with Part 15B of the FCC Rules.

The End