

**FCC PART 15B**  
**MEASUREMENT AND TEST REPORT**

For

**Grandstream Networks, Inc.**

5F, Bldg. #1, No. 2 Kefa Road, Science & Technology Park,  
Shenzhen, Guangdong, China

**FCC ID: YZZGXV3500**

<b>Report Type:</b> Original Report	<b>Product Type:</b> IP Video Codec
<b>Test Engineer:</b> Grace Xi	<i>Grace Xi</i>
<b>Report Number:</b> RSZ11030802	
<b>Report Date:</b> 2011-05-16	
<b>Reviewed By:</b> Lisa Zhu EMC Engineer	<i>[Signature]</i>
<b>Prepared By:</b>	Bay Area Compliance Laboratories Corp. (Shenzhen) 6/F, the 3rd Phase of WanLi Industrial Building, ShiHua Road, FuTian Free Trade Zone Shenzhen, Guangdong, China Tel: +86-755-33320018 Fax: +86-755-33320008

**Note:** This test report is prepared for the customer shown above and for the device described herein. It may not be duplicated or used in part without prior written consent from Bay Area Compliance Laboratories Corp. This report **must not** be used by the customer to claim product certification, approval, or endorsement by NVLAP\*, or any agency of the Federal Government.

\* This report contains data that are not covered by the NVLAP accreditation and are marked with an asterisk "★" (Rev.2)

## **TABLE OF CONTENTS**

<b>GENERAL INFORMATION.....</b>	<b>3</b>
PRODUCT DESCRIPTION FOR EQUIPMENT UNDER TEST (EUT) .....	3
OBJECTIVE .....	3
RELATED SUBMITTAL(S)/GRANT(S).....	3
TEST METHODOLOGY .....	3
TEST FACILITY .....	3
<b>SYSTEM TEST CONFIGURATION.....</b>	<b>5</b>
JUSTIFICATION .....	5
EUT EXERCISE SOFTWARE .....	5
EQUIPMENT MODIFICATIONS .....	5
LOCAL SUPPORT EQUIPMENT LIST AND DETAILS .....	5
EXTERNAL I/O CABLE.....	5
CONFIGURATION OF TEST SETUP .....	6
BLOCK DIAGRAM OF TEST SETUP .....	7
<b>SUMMARY OF TEST RESULTS.....</b>	<b>9</b>
<b>FCC §15.107 – AC LINE CONDUCTED EMISSIONS.....</b>	<b>10</b>
MEASUREMENT UNCERTAINTY .....	10
EUT SETUP .....	10
EMI TEST RECEIVER SETUP.....	10
TEST PROCEDURE .....	11
TEST EQUIPMENT LIST AND DETAILS.....	11
TEST RESULTS SUMMARY .....	11
TEST DATA .....	11
<b>FCC §15.109 - RADIATED SPURIOUS EMISSIONS .....</b>	<b>16</b>
MEASUREMENT UNCERTAINTY .....	16
EUT SETUP .....	16
EMI TEST RECEIVER SETUP.....	17
TEST PROCEDURE .....	17
CORRECTED AMPLITUDE & MARGIN CALCULATION .....	17
TEST EQUIPMENT LIST AND DETAILS.....	18
TEST RESULTS SUMMARY .....	18
TEST DATA .....	18

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## GENERAL INFORMATION

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### Product Description for Equipment under Test (EUT)

The *Grandstream Networks, Inc.*'s product, model number: GXV3500 (FCC ID: YZZGXV3500) or the "EUT" as referred to in this report is a IPVvideo Codec, which measures approximately: 10.0 cm (L) x 6.9 cm (W) x 3.1 cm (H), rated input voltage: DC 12V, the highest operating frequency is 216 MHz.

AC/DC Adapter information:

Model: EGTSA-120050WUY;

Input: 100-240 VAC 50/60 Hz 190 mA

Output: DC 12.0 V 500 mA

*All measurement and test data in this report was gathered from production sample serial number: 1102124 (Assigned by BACL, Shenzhen). The EUT was received on 2011-03-08*

### Objective

This Type approval report is prepared on behalf of *Grandstream Networks, Inc.* in accordance with Part 2, Subpart J, Part 15, Subparts A and B of the Federal Communication Commissions rules.

The objective of the manufacturer is to determine compliance with FCC Part 15B, Class B.

### Related Submittal(s)/Grant(s)

No related submittal(s).

### Test Methodology

All measurements contained in this report were conducted with ANSI C63.4-2009. American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz.

All emissions measurement was performed and Bay Area Compliance Laboratories Corp. (Shenzhen). The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

### Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (Shenzhen) to collect test data is located in the 6/F, the 3rd Phase of WanLi Industrial Building, ShiHua Road, FuTian Free Trade Zone Shenzhen, Guangdong, China.

Test site at Bay Area Compliance Laboratories Corp. (Shenzhen) has been fully described in reports submitted to the Federal Communication Commission (FCC). The details of these reports have been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on December 06, 2010. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2009.

The Federal Communications Commission has the reports on file and is listed under FCC Registration No.: 382179. The test site has been approved by the FCC for public use and is listed in the FCC Public Access Link (PAL) database.

Additionally, Bay Area Compliance Laboratories Corp. (Shenzhen) is an ISO/IEC 17025 guide accredited laboratory, and is accredited by National Voluntary Laboratory Accredited Program (Lab Code 200707-0).



The current scope of accreditations can be found at <http://ts.nist.gov/Standards/scopes/2007070.htm>

## SYSTEM TEST CONFIGURATION

### Justification

The system was configured for testing in a manufacturer testing fashion.

### EUT Exercise Software

N/A

### Equipment Modifications

No modification was made to the unit tested.

### Local Support Equipment List and Details

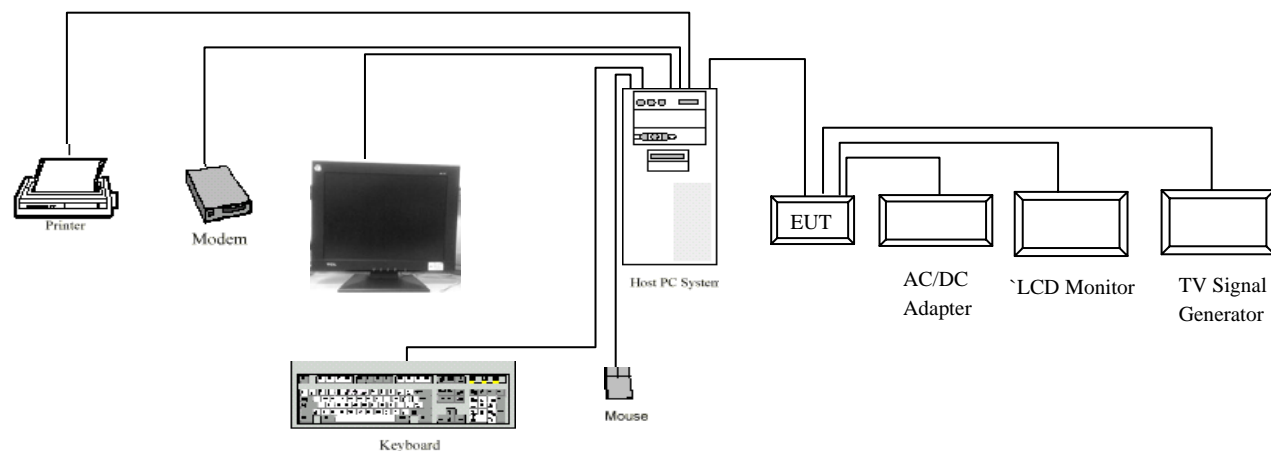
Manufacturer	Description	Model	Serial Number
DELL	System PC	1#	N/A
DELL	Mouse	MOC5UO	G1B0096D
DELL	Keyboard	L100	CNORH656658907BL04TY
SAST	Modem	AEM-2100	0293
FUJITSU	Printer	S510	N/A
YI ZHENG	TV Signal Generator	YDC-868-4	N/A
SUMSUNG	LCD Monitor	225MS	N/A
Popbridge	Single Port PoE Hub	BE3011	PD-6070G300

### External I/O Cable

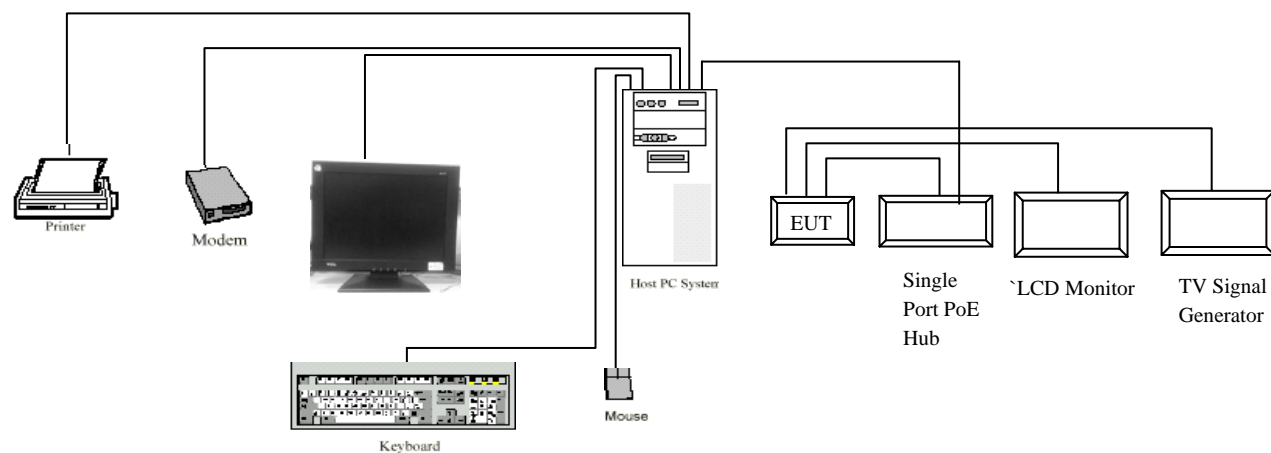
Cable Description	Length (m)	From/Port	To
Shielded Detachable K/B Cable	1.5	K/B Port/Host	K/B
Shielded Detachable Mouse Cable	1.5	Mouse Port/Host	Mouse
Shielded Detachable Printer Cable	1.2	Printer Port/Host	Printer
Shielded Detachable Serial Cable	1.2	Serial Port/Host	Modem
Shielded Detachable VGA Cable	1.5	VAG Port/Host	Monitor
Shielded Detachable RJ45 Cable	1.5	PC/Single Port PoE Hub/ISN	EUT
Unshielded Detachable AV Cable	1.2	TV Signal Generator/LCD Monitor	EUT
Unshielded Undetachable AC Cable	1.7	AC/DC Adapter	LISN 1
Unshielded Detachable AC Cable	1.8	Printer/Modem/PC/LCD Monitor/TV Signal Generator	LISN 2

## Configuration of Test Setup

For AC/DC adapter power supply

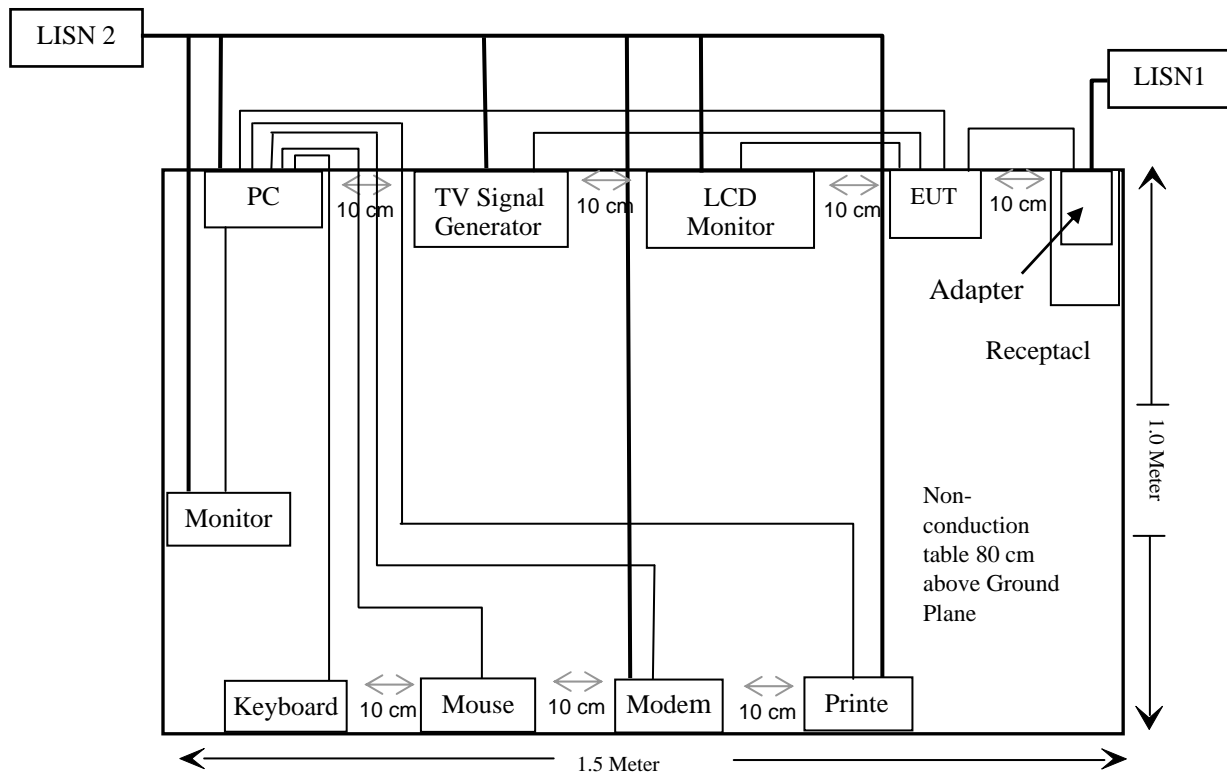


For PoE power supply

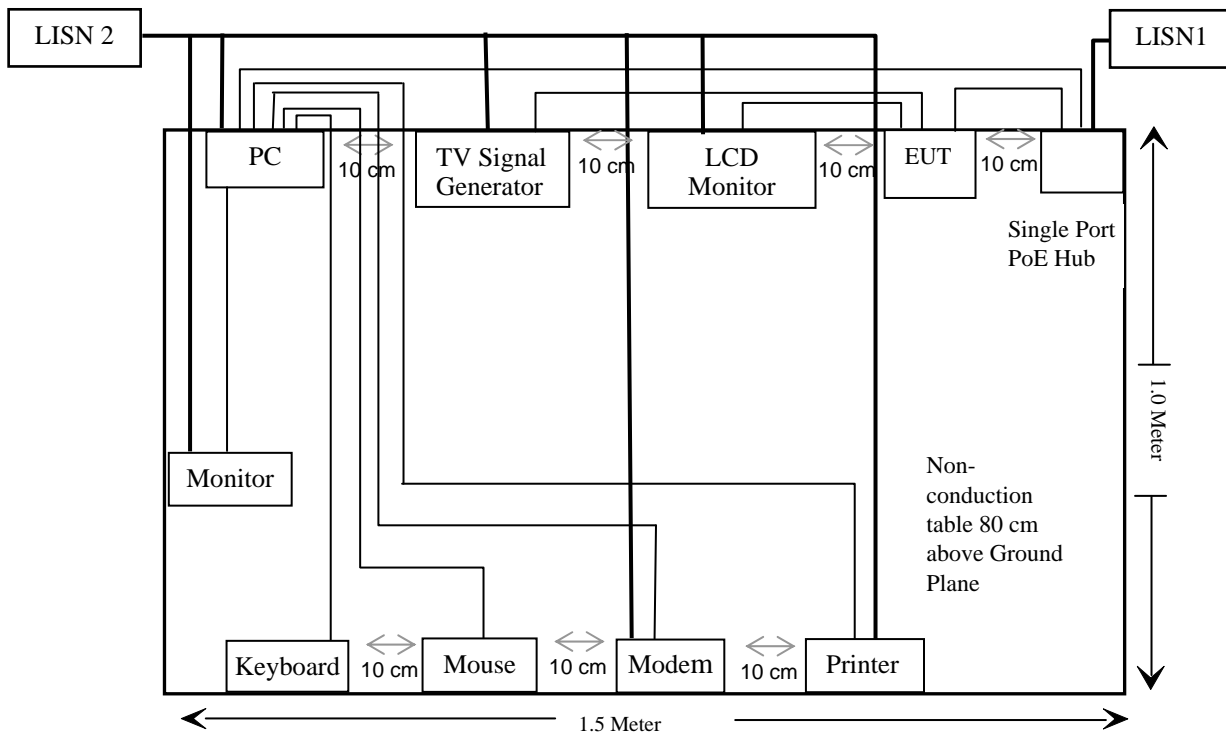


**Block Diagram of Test Setup**

For AC/DC adapter power supply



For PoE power supply





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**SUMMARY OF TEST RESULTS**

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FCC Rules	Description of Test	Results
§15.107	AC Line Conducted Emissions	Compliance
§15.109	Radiated Spurious Emissions	Compliance

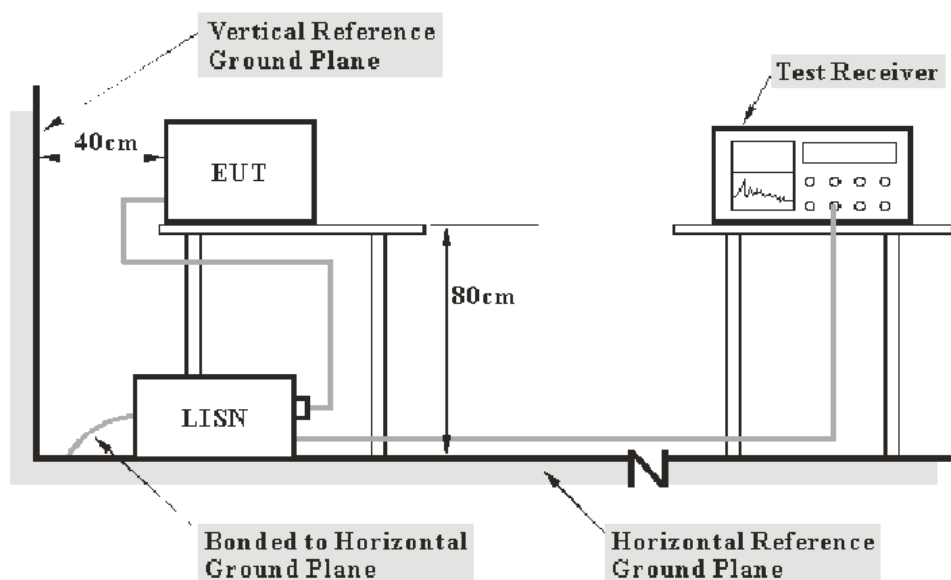
## FCC §15.107 – AC LINE CONDUCTED EMISSIONS

### Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, and LISN.

Based on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of any conducted emissions measurement at Bay Area Compliance Laboratories Corp (Shenzhen) is  $\pm 2.4$  dB. (k=2, 95% level of confidence)

### EUT Setup



- Note: 1. Support units were connected to second LISN.  
 2. Both of LISNs (AMN) 80 cm from EUT and at the least 80 cm from other units and other metal planes support units.

The setup of EUT is according with per ANSI C63.4-2009 measurement procedure. The specification used was with the FCC Part 15.107 Class B limits.

The spacing between the peripherals was 10 cm.

For AC/DC adapter power supply, the AC/DC adapter was connected to a 120 VAC/60 Hz power source.

For PoE power supply, the single port PoE hub was connected to a 120 VAC/60 Hz power source.

### EMI Test Receiver Setup

The EMI test receiver was set to investigate the spectrum from 150 kHz to 30 MHz.

During the conducted emission test, the EMI test receiver was set with the following configurations:

<u>Frequency Range</u>	<u>IF B/W</u>
150 kHz – 30 MHz	9 kHz

## Test Procedure

During the conducted emission test,

The AC/DC adapter was connected to the outlet of the first LISN; the other support equipments were connected to second LISN for AC/DC adapter power supply.

EUT and host PC were connected to single port PoE hub. The single port PoE hub was connected to the first LISN; all the other relevant support equipments were connected to the second LISN for PoE power supply.

Maximizing procedure was performed on the six (6) highest emissions of the EUT.

All data was recorded in the Quasi-peak and average detection mode.

## Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCS30	830245/006	2011-03-03	2012-03-02
Rohde & Schwarz	L.I.S.N.	ESH2-Z5	892107/021	2011-03-09	2012-03-08

\* **Statement of Traceability:** Bay Area Compliance Laboratory Corp. attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

## Test Results Summary

According to the recorded data in following table, the EUT complied with the FCC Part 15.107, Class B, with the worst margin reading of:

### For AC/DC adapter Power Supply:

**3.25 dB at 21.205 MHz** in the **Neutral** conductor mode, Ave.

### For PoE Power Supply:

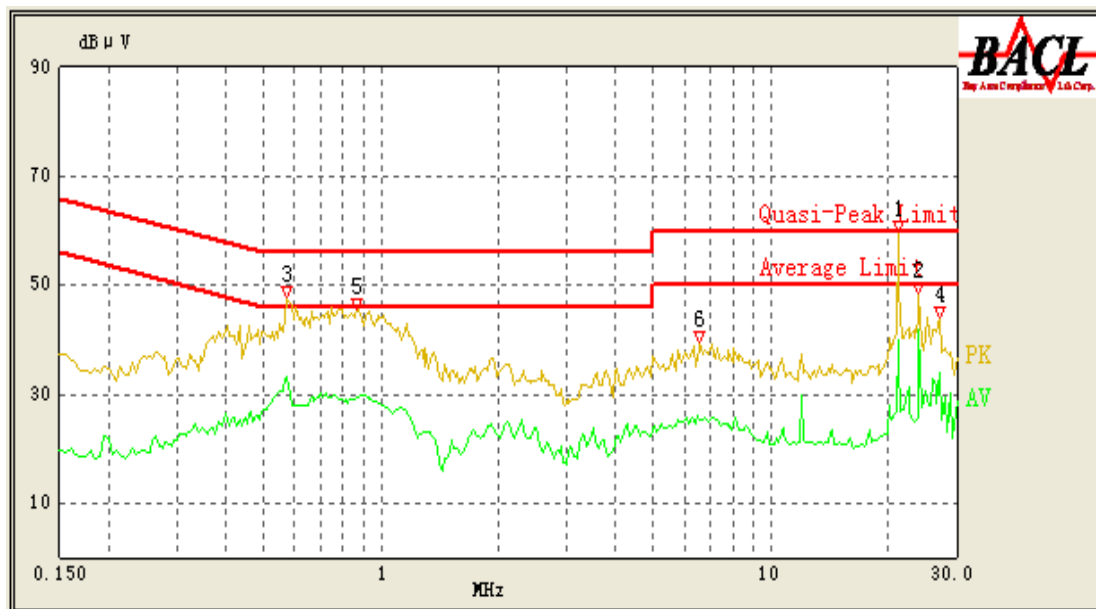
**4.07 dB at 3.595 MHz** in the **Neutral** conductor mode, Ave.

## Test Data

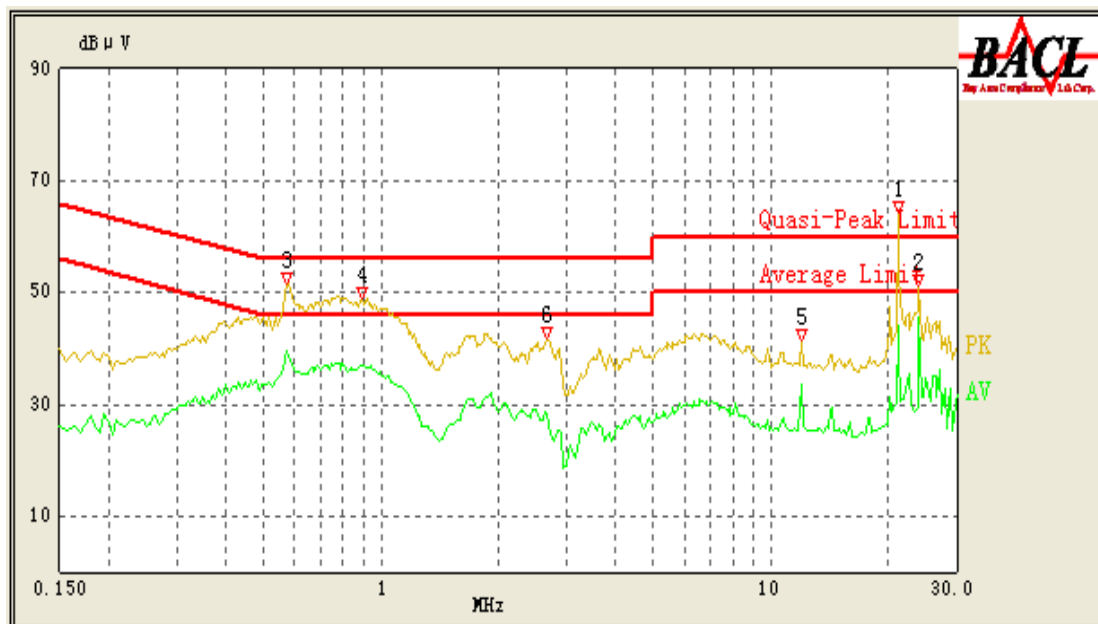
### Environmental Conditions

Temperature:	25 °C
Relative Humidity:	48 %
ATM Pressure:	100.0 kPa

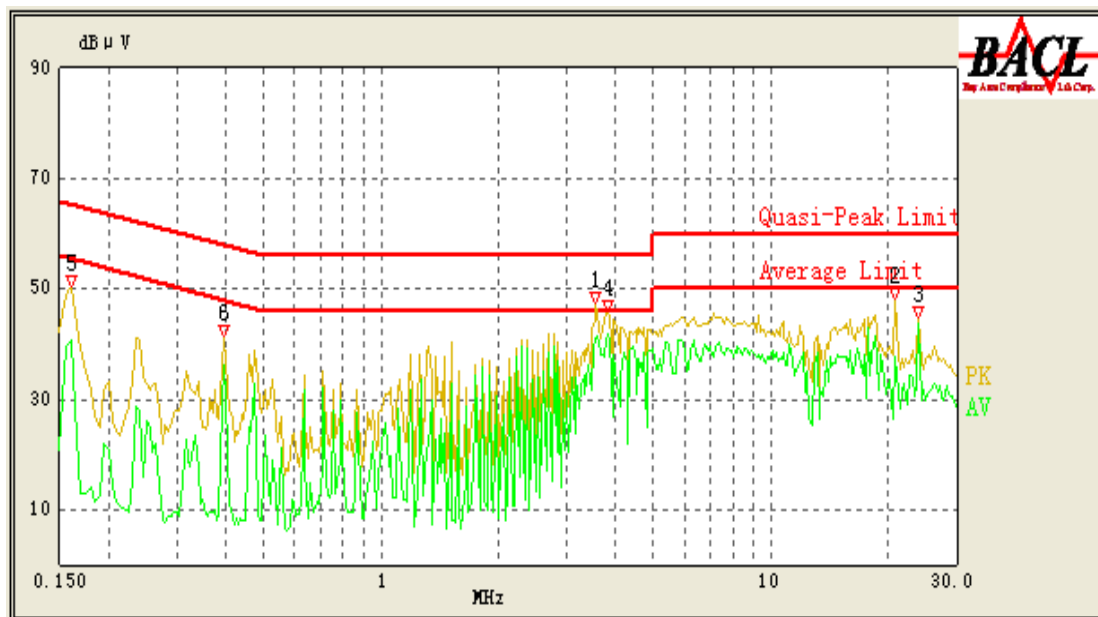
\* The testing was performed by Grace Xi on 2011-05-10

**AC/DC adapter Power Supply****120 V, 60 Hz, Line:**

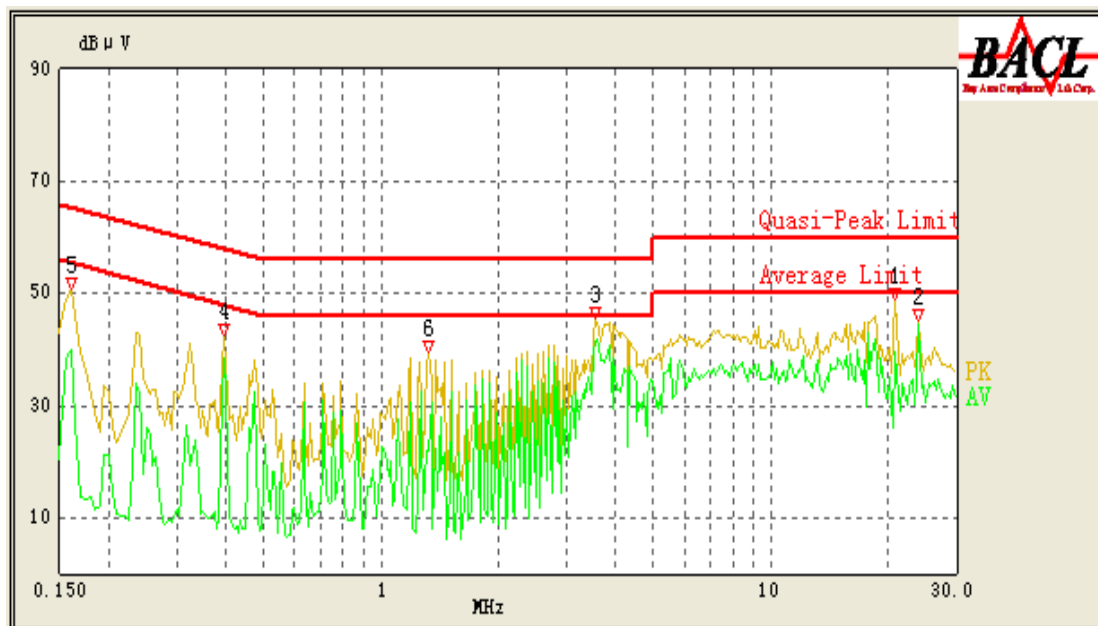
Conducted Emissions			FCC Part 15.107, Class B		
Frequency (MHz)	Correction Factor (dB)	Corrected Result (dBμV)	Limit (dBμV)	Margin (dB)	Remark (PK/QP/Ave.)
21.190	10.19	52.14	60.00	7.86	QP
24.005	10.16	41.98	50.00	8.02	Ave.
21.180	10.19	40.02	50.00	9.98	Ave.
0.575	10.18	33.34	46.00	12.66	Ave.
0.575	10.18	42.14	56.00	13.86	QP
24.005	10.16	44.99	60.00	15.01	QP
27.005	10.13	33.89	50.00	16.11	Ave.
0.870	10.13	29.60	46.00	16.40	Ave.
0.870	10.13	39.21	56.00	16.79	QP
27.000	10.13	39.50	60.00	20.50	QP
6.540	10.10	25.44	50.00	24.56	Ave.
6.565	10.10	32.09	60.00	27.91	QP

**120V, 60 Hz, Neutral:**

Conducted Emissions			FCC Part 15.107, Class B		
Frequency (MHz)	Correction Factor (dB)	Corrected Result (dBμV)	Limit (dBμV)	Margin (dB)	Remark (PK/QP/Ave.)
21.205	10.19	56.75	60.00	3.25	QP
24.005	10.16	45.67	50.00	4.33	Ave.
21.205	10.19	43.98	50.00	6.02	Ave.
0.575	10.18	39.61	46.00	6.39	Ave.
0.575	10.18	48.48	56.00	7.52	QP
0.890	10.12	36.82	46.00	9.18	Ave.
24.005	10.16	49.33	60.00	10.67	QP
0.890	10.12	44.93	56.00	11.07	QP
12.000	10.12	33.69	50.00	16.31	Ave.
2.675	10.17	28.42	46.00	17.58	Ave.
2.665	10.17	36.14	56.00	19.86	QP
12.000	10.12	39.59	60.00	20.41	QP

**PoE Power Supply****120 V, 60 Hz, Line:**

Conducted Emissions			FCC Part 15.107, Class B		
Frequency (MHz)	Correction Factor (dB)	Corrected Result (dBμV)	Limit (dBμV)	Margin (dB)	Remark (PK/QP/Ave.)
3.800	10.11	41.66	46.00	4.34	Ave.
3.595	10.12	41.32	46.00	4.68	Ave.
24.005	10.16	43.84	50.00	6.16	Ave.
20.730	10.19	37.86	50.00	12.14	Ave.
3.800	10.11	43.70	56.00	12.30	QP
3.565	10.12	43.44	56.00	12.56	QP
0.395	10.10	36.16	49.00	12.84	Ave.
0.160	10.09	40.75	55.71	14.96	Ave.
24.005	10.16	44.35	60.00	15.65	QP
0.160	10.09	49.49	65.71	16.22	QP
20.735	10.19	43.75	60.00	16.25	QP
0.395	10.10	39.69	59.00	19.31	QP

**120V, 60 Hz, Neutral:**

Conducted Emissions			FCC Part 15.107, Class B		
Frequency (MHz)	Correction Factor (dB)	Corrected Result (dBμV)	Limit (dBμV)	Margin (dB)	Remark (PK/QP/Ave.)
3.595	10.12	41.93	46.00	4.07	AV
24.005	10.16	44.26	50.00	5.74	AV
0.395	10.10	38.62	49.00	10.38	AV
20.765	10.19	39.59	50.00	10.41	AV
3.565	10.12	43.82	56.00	12.18	QP
24.005	10.16	45.49	60.00	14.51	QP
0.160	10.09	40.02	55.71	15.69	AV
20.765	10.19	43.95	60.00	16.05	QP
0.160	10.09	49.39	65.71	16.32	QP
0.395	10.10	40.73	59.00	18.27	QP
1.320	10.13	21.78	46.00	24.22	AV
1.320	10.13	29.96	56.00	26.04	QP

## FCC §15.109 - RADIATED SPURIOUS EMISSIONS

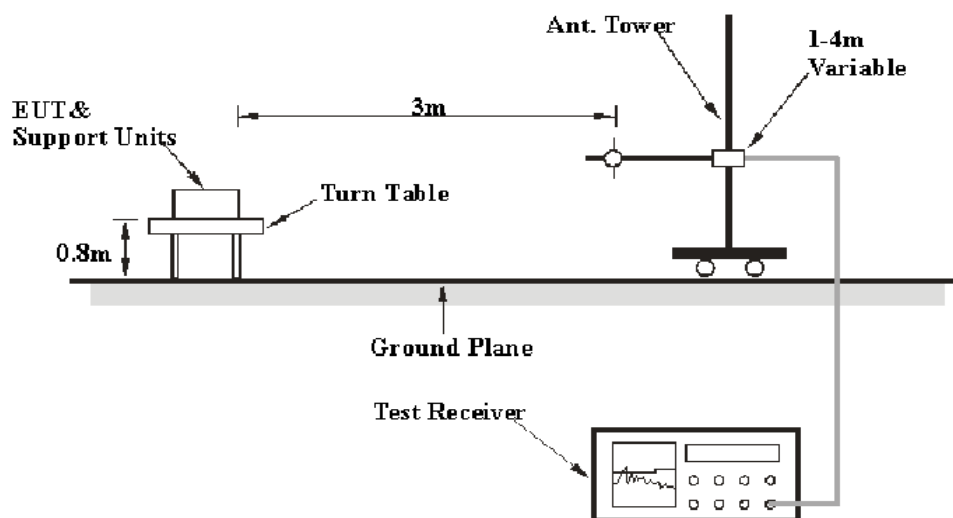
### Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase center variation, antenna factor frequency interpolation, measurement distance variation, site imperfections, mismatch (average), and system repeatability.

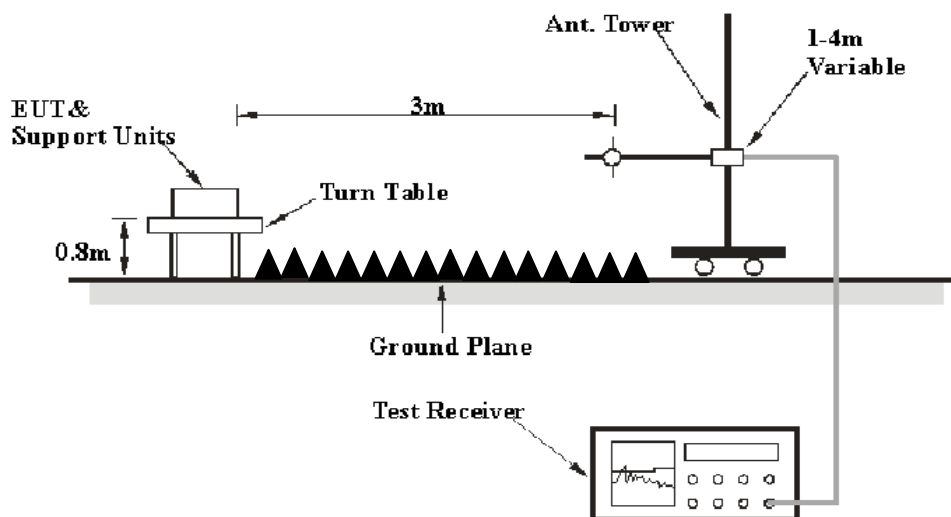
Based on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of a radiation emissions measurement at Bay Area Compliance Laboratories Corp. (Shenzhen) is  $\pm 4.0$  dB. ( $k=2$ , 95% level of confidence)

### EUT Setup

Below 1 GHz:



Above 1 GHz:





The radiated emission tests were performed in the 3 meters chamber test site, using the setup accordance with the ANSI C63.4-2003. The specification used was the FCC Part 15.109 limits.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.

The spacing between the peripherals was 10 cm.

For AC/DC adapter power supply, the AC/DC adapter was connected to a 120 VAC/60 Hz power source.

For PoE power supply, the single port PoE hub was connected to a 120 VAC/60 Hz power source.

### EMI Test Receiver Setup

The system was investigated from 30 MHz to 2 GHz.

During the radiated emission test, the EMI test receiver was set with the following configurations:

<i>Frequency Range</i>	<i>RBW</i>	<i>Video B/W</i>	<i>Detector</i>
30MHz – 1000 MHz	100 kHz	300 kHz	QP
Above 1 GHz	1MHz	3 MHz	Peak
Above 1 GHz	1MHz	10Hz	Average

### Test Procedure

The AC/DC adapter and the relative support equipments were connected to the outlet of AC floor for AC/DC adapter power supply.

EUT and host PC were connected to single port PoE hub. The single port PoE hub and the relative support equipments were connected to the outlet of AC floor for PoE power supply.

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

All data was recorded in the Quasi-peak detection mode from 30 MHz to 1 GHz, Peak and average detection mode above 1 GHz.

### Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Loss and Cable Loss, and subtracting the Amplifier Gain from the Meter Reading. The basic equation is as follows:

$$\text{Corrected Amplitude} = \text{Meter Reading} + \text{Antenna Loss} + \text{Cable Loss} - \text{Amplifier Gain}$$

The “**Margin**” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of 7dB means the emission is 7dB below the limit. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Limit} - \text{Corrected Amplitude}$$

## Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
HP	Pre-Amplifier	HP8447E	1937A01046	2010-08-02	2011-08-02
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2010-11-11	2011-11-10
Sunol Sciences	Broadband Antenna	JB1	A040904-1	2011-03-11	2012-03-10
Rohde & Schwarz	Spectrum Analyzer	FSEM30	849720/019	2010-07-08	2011-07-08
Super Ultra	Pre-Amplifier	ZVA-213+	N/A	2010-09-12	2011-09-11
Sunol Sciences	Horn Antenna	DRH-118	A052604	2011-05-05	2012-05-04

\* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

## Test Results Summary

According to the data in the following table, the EUT complied with the FCC Part 15.109, Class B, with the worst margin reading of:

**For AC/DC adapter power supply:**

**1.1 dB at 43.503 MHz in the Vertical polarization**

**For PoE power supply:**

**0.8 dB at 104.74325 MHz in the Vertical polarization**

## Test Data

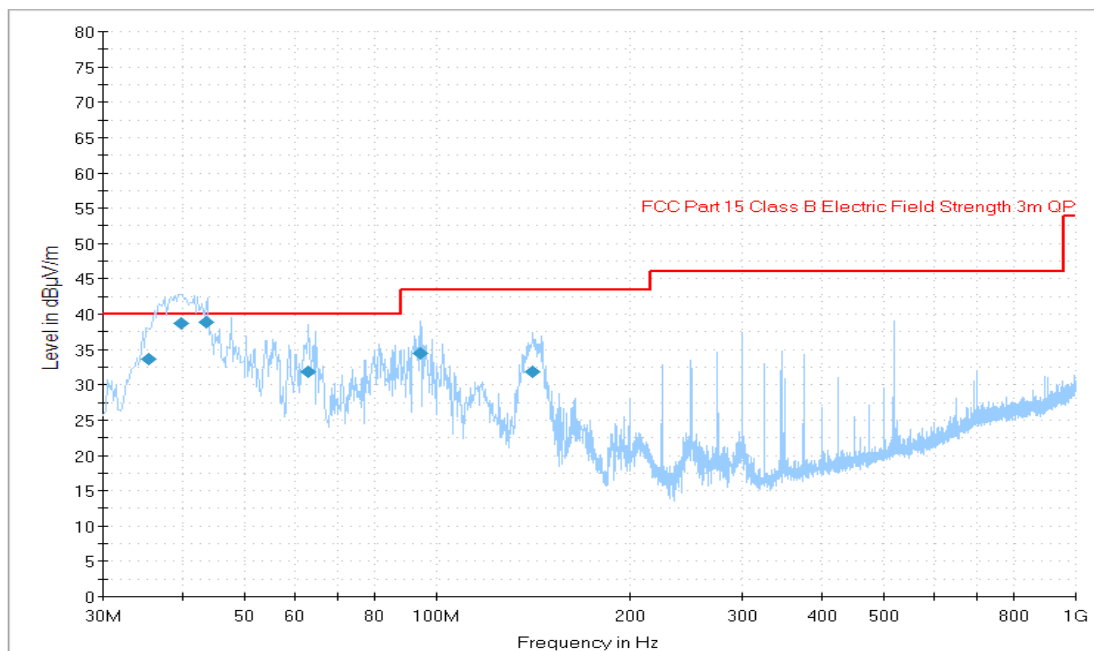
### Environmental Conditions

<b>Temperature:</b>	25 °C
<b>Relative Humidity:</b>	56 %
<b>ATM Pressure:</b>	100.0 kPa

\* The testing was performed by Grace Xi on 2011-05-09.

## With AC/DC adapter Power Supply

### 1) 30-1000 MHz



Frequency (MHz)	Corrected Amplitude (dBμV/m)	Antenna Height (cm)	Antenna Polarity (H/V)	Turntable Position (Degree)	Correction Factor (dB)	Limit (dBμV/m)	Margin (dB)
43.503000	38.9	104.0	V	107.0	-14.2	40.0	1.1*
39.809500	38.7	104.0	V	18.0	-12.0	40.0	1.3*
94.374500	34.4	126.0	V	74.0	-16.2	40.0	5.6
35.341000	33.6	105.0	V	71.0	-9.0	40.0	6.4
141.218000	31.9	118.0	V	9.0	-13.2	40.0	8.1
62.990000	31.8	128.0	V	227.0	-18.5	40.0	8.2

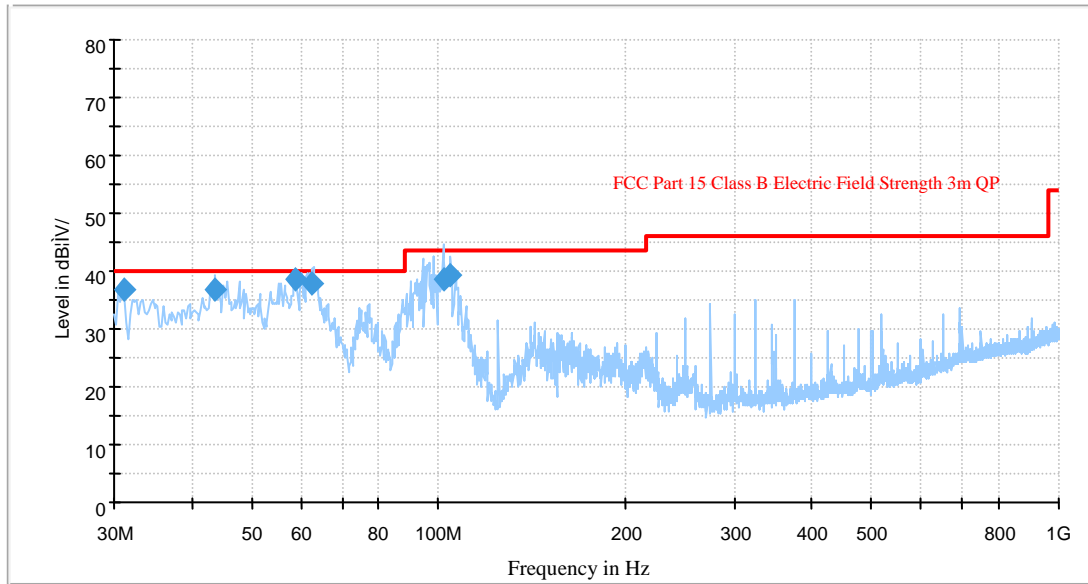
\*within measurement uncertainty

## 2) Above 1 GHz

Frequency (MHz)	S.A. Reading (dB $\mu$ V/m)	Detector (PK/Ave.)	Turntable Direction (Degree)	Test Antenna			Cable Loss (dB)	Pre-Amp. Gain (dB)	Cord. Amp. (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)
				Height (m)	Polar (H/V)	Factor (dB/m)					
1000.14	45.31	Ave.	40°	1.00	V	23.80	1.75	26.85	44.01	54	9.99
1000.14	42.22	Ave.	144°	1.00	H	25.10	1.75	26.85	42.22	54	11.78
1498.32	37.71	Ave.	185°	1.26	H	26.70	1.97	26.83	39.55	54	14.45
1498.32	38.56	Ave.	185°	1.26	V	25.80	1.97	26.83	39.50	54	14.50
1498.32	49.66	PK	185°	1.26	H	26.70	1.97	26.83	51.50	74	22.50
1000.14	50.27	PK	144°	1.00	H	25.10	1.75	26.85	50.27	74	23.73
1498.32	47.47	PK	185°	1.26	V	25.80	1.97	26.83	48.41	74	25.59
1000.14	47.11	PK	40°	1.00	V	23.80	1.75	26.85	45.81	74	28.19

**With PoE**

## 1) 30-1000 MHz



Frequency (MHz)	Corrected Amplitude (dBµV/m)	Antenna Height (cm)	Antenna Polarity (H/V)	Turntable Position (Degree)	Correction Factor (dB)	Limit (dBµV/m)	Margin (dB)
104.743250	39.2	118.0	V	280.0	-14.0	40.0	0.8*
101.882750	38.7	128.0	V	346.0	-14.4	40.0	1.3*
58.715250	38.6	133.0	V	313.0	-18.5	40.0	1.4*
62.781250	37.9	104.0	V	349.0	-18.6	40.0	2.1*
43.776000	37.0	103.0	V	197.0	-14.4	40.0	3.0*
31.085750	36.7	118.0	V	340.0	-6.2	40.0	3.3*

\*within measurement uncertainty

## 2) Above 1 GHz:

Frequency (MHz)	S.A. Reading (dBμV/m)	Detector (PK/Ave.)	Turntable Direction (Degree)	Test Antenna			Cable Loss (dB)	Pre-Amp. Gain (dB)	Cord. Amp. (dBμV/m)	Limit (dBμV/m)	Margin (dB)
				Height (m)	Polar (H/V)	Factor (dB/m)					
1045.39	40.77	Ave.	190°	1.00	V	23.80	1.75	26.85	39.47	54	14.53
1045.39	38.26	Ave.	190°	1.93	H	25.10	1.75	26.85	38.26	54	15.74
1145.76	35.61	Ave.	185°	1.13	H	25.90	1.84	26.83	36.52	54	17.48
1145.76	33.58	Ave.	185°	1.00	V	24.80	1.84	26.83	33.39	54	20.61
1045.39	50.38	PK	190°	1.93	H	25.10	1.75	26.85	50.38	74	23.62
1045.39	51.43	PK	190°	1.00	V	23.80	1.75	26.85	50.13	74	23.87
1145.76	48.35	PK	185°	1.13	H	25.90	1.84	26.83	49.26	74	24.74
1145.76	46.24	PK	185°	1.00	V	24.80	1.84	26.83	46.05	74	27.95

\*\*\*\*\* END OF REPORT \*\*\*\*\*