Lab Code: 200707-0

FCC PART 15B, CLASS B

TEST REPORT

For

SPX Service Solutions

655 Eisenhower Drive, Owatonna, MN 55060, USA

FCC ID: Z2NJ-50079-6

Report Type:	Product Type:
Original Report	Wireless Inspection Receiver

Test Engineer:	Jimmy Xiao
Report Number:	RSZ110909004-00
Report Date:	2011-09-21
Reviewed By:	Merry Zhao EMC Engineer
Test Laboratory:	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 www.baclcorp.com.cn

TABLE OF CONTENTS

GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The *SPX Service Solutions's* product, model number: J-50079-6, FCC ID: Z2NJ-50079-6 or the "EUT" in this report was a *Wireless Inspection Camera and RECEIVER*, which was measured approximately: 10.0 cm (L) x 7.0 cm (W) x 2.5 cm (H), rated input voltage: DC 3.7V battery or DC 5 V from adapter. The highest operating frequency is less than 108 MHz.

Adapter information:
Model: GP301U-050-100
Input: AC 100-240V, 50/60 Hz, 0.3A
Output: DC 5V, 1A

**All measurement and test data in this report was gathered from production sample serial number: 1109036 (Assigned by BACL, Shenzhen). The EUT was received on 2011-09-09.*

Objective

This Type approval report is prepared on behalf of *SPX Service Solutions* 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 15 B.

Related Submittal(s)/Grant(s)

N/A

Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (Shenzhen) to collect test data is located on 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 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

Description of Test Configuration

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

Test mode 1: Charging & Downloading mode
Test mode 2: Charging & Receiving mode
Test mode 3: Charging & AV output mode

EUT Exercise Software

Winthrax

Equipment Modifications

No modification was made to the unit tested.

Local Support Equipment List and Details

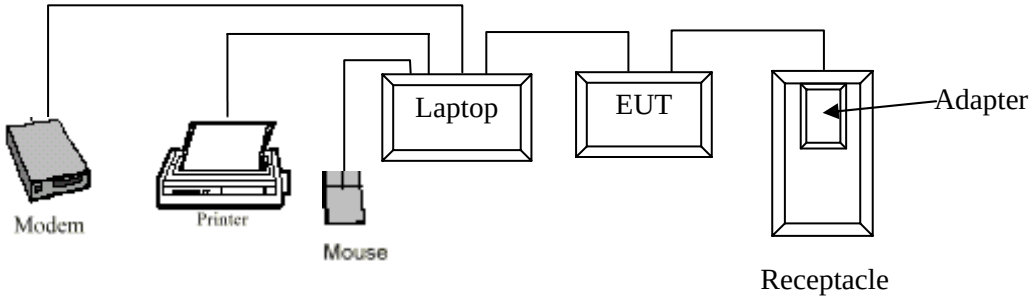
Manufacturer	Device Name	Model	Serial Number
DELL	Laptop	PP05L	N/A
SAST	Modem	AEM-2100	6588D51200013
HP	Laser Jet5L	C3941A	JPTVOB2337
DELL	Mouse	MOC5UO	G1B0096D
SAMSUNG	Color TV PG	225MS	CR22HVZP401073M

External I/O Cable

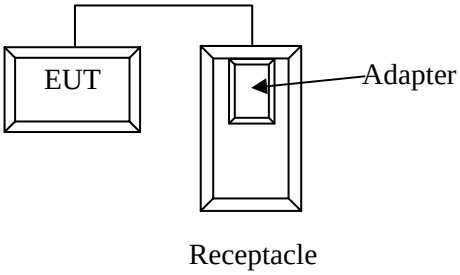
Cable Description	Length (m)	From/Port	To
Shielded Detachable Printer Cable	1.8	Parallel Port	Printer
Shielded Detachable Serial Cable	1.8	Serial Port	Modem
Shielded Detachable USB Cable With Core	1.0	USB Port	Laptop
Unshielded Detachable Video Cable	1.1	Video Output Port	LCD monitor
Unshielded Undetachable power Cable	1.8	Power Jack	Adapter

Configuration of Test Setup

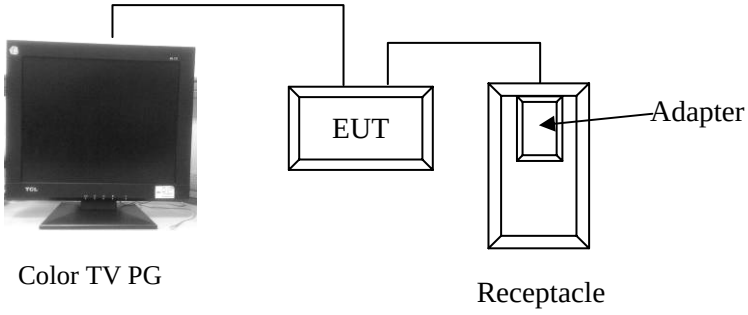
For Test mode 1:



For Test mode 2:

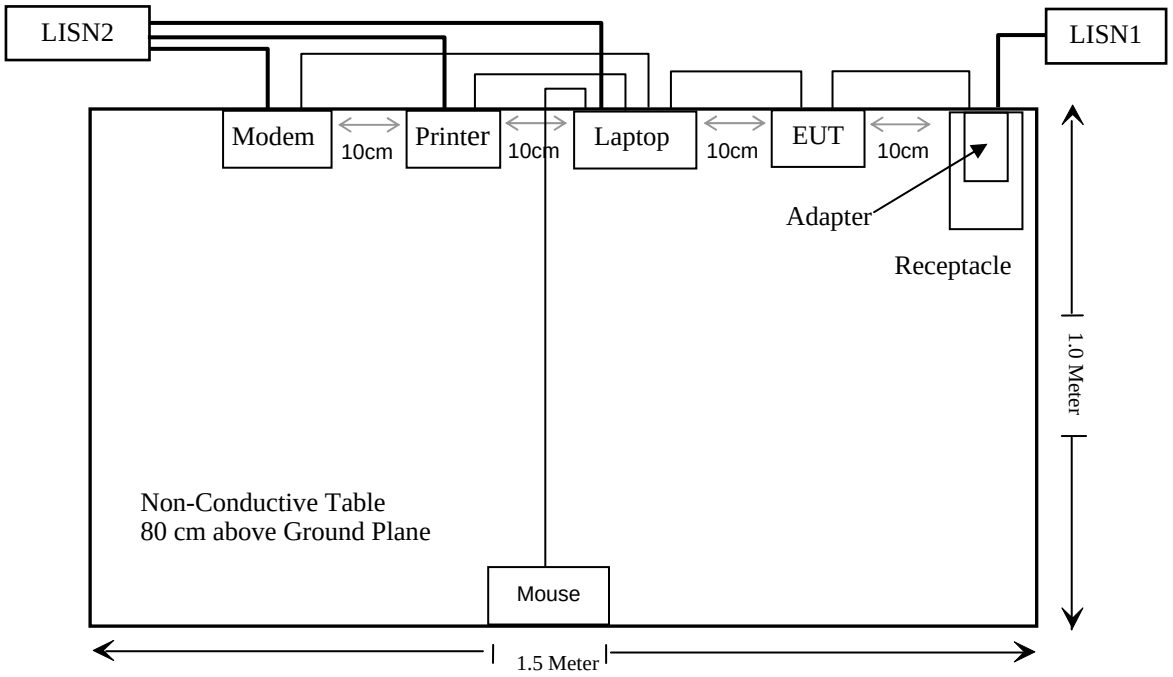


For Test mode 3:

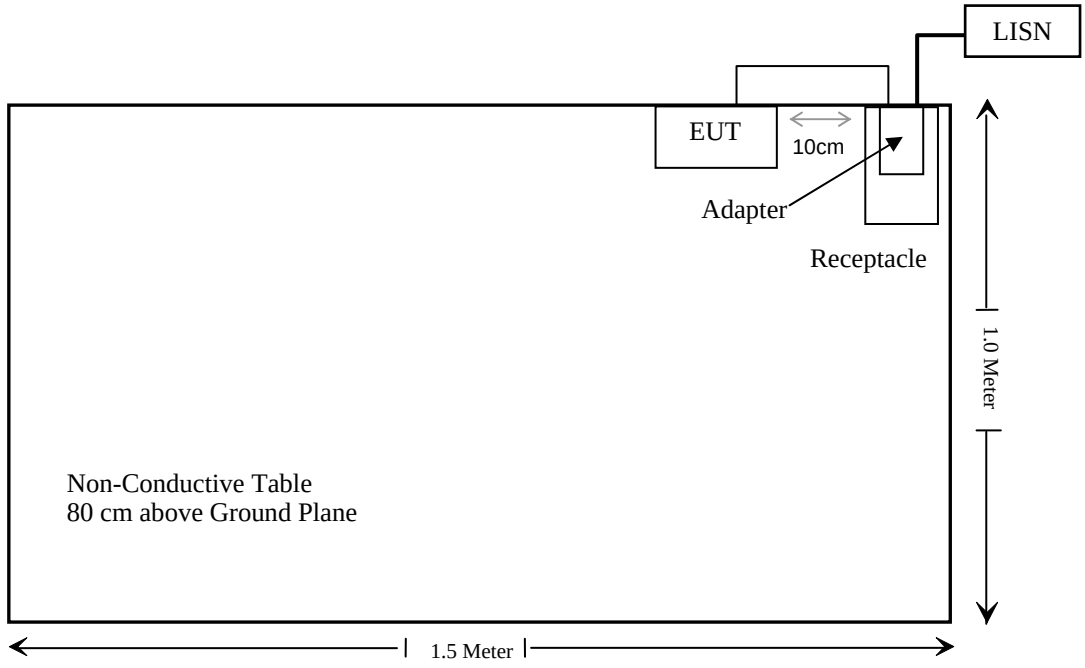


Block Diagram of Test Setup

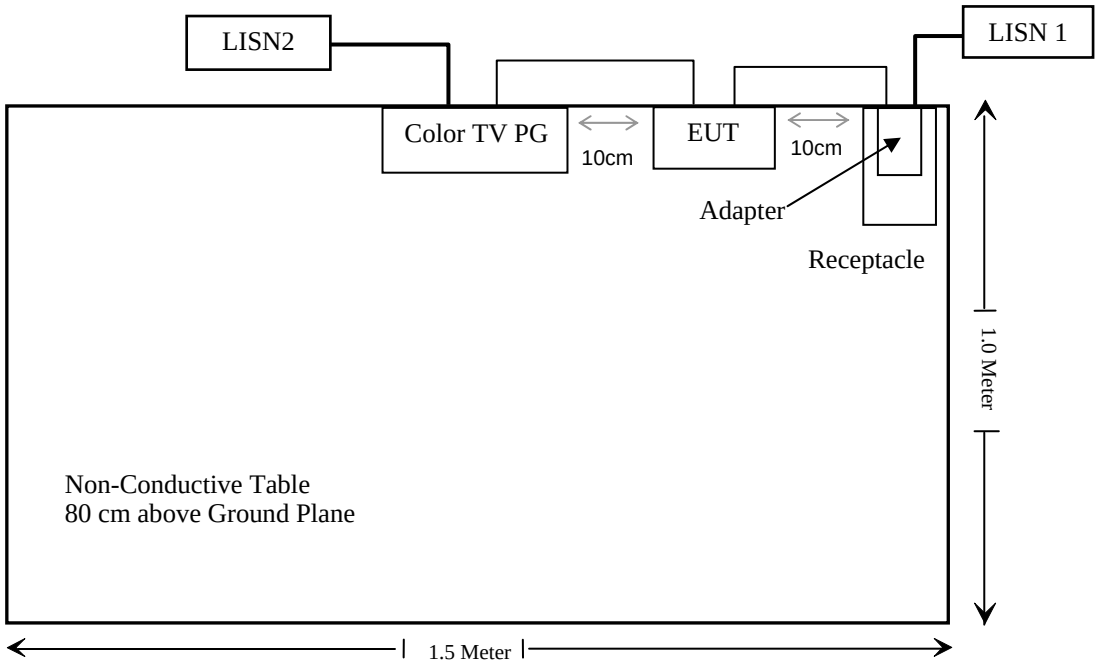
For Test mode 1:



For Test mode 2:



For Test mode 3:



SUMMARY OF TEST RESULTS

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

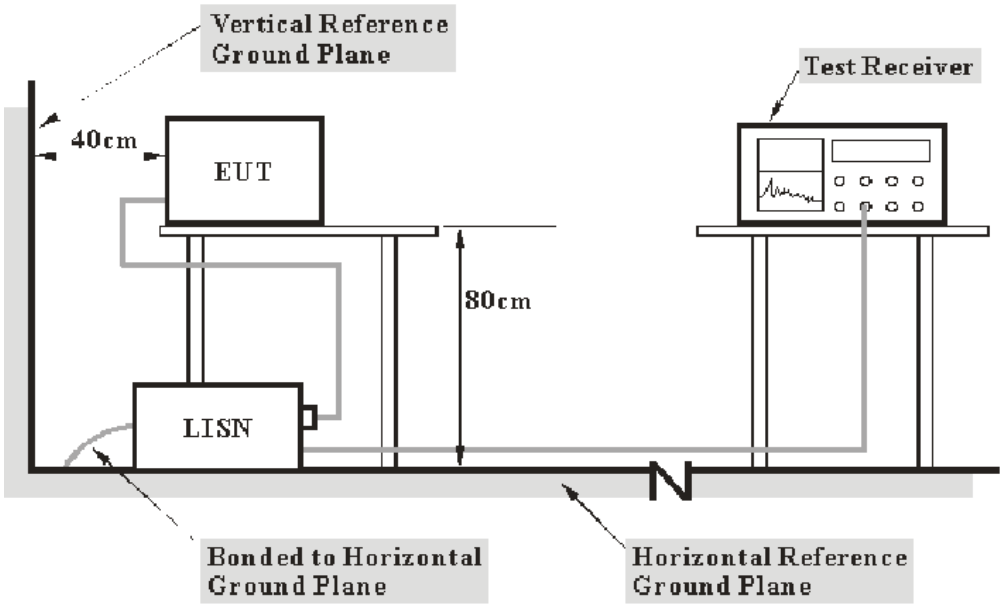
FCC §15.107 – AC LINE CONDUCTED EMISSIONS

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 ±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.

The adapter was connected to an AC 120V/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:

Frequency Range	***IF B/W***
150 kHz – 30 MHz	9 kHz

Test Procedure

During the conducted emission test, the adapter was connected to the outlet of the LISN.

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, with the worst margin reading of:

6.99 dB at **0.610 MHz** in the **Neutral** conducted mode for test mode 1

Test Data

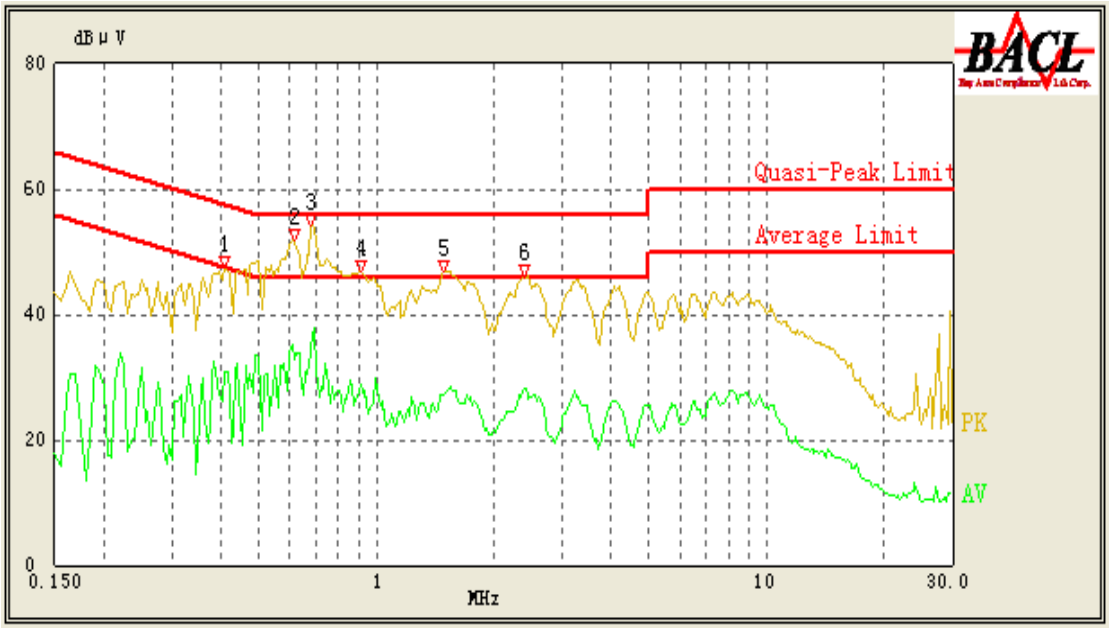
Environmental Conditions

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

The testing was performed by Jimmy Xiao on 2011-09-11.

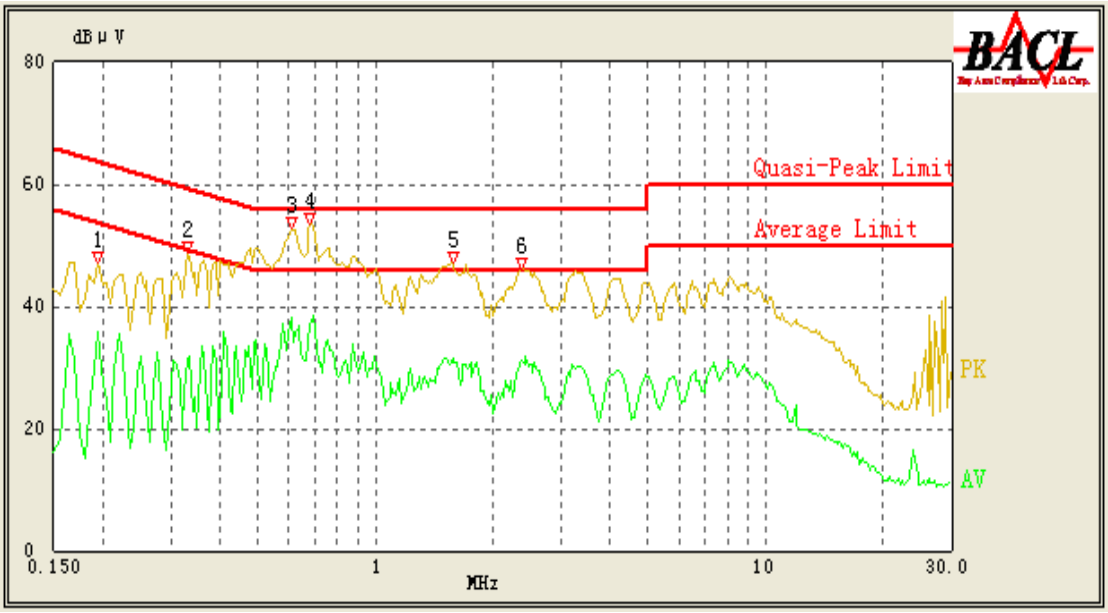
Test Mode 1:

AC 120V/60 Hz, Line



Conducted Emissions			FCC Part 15.107, Class B		
Frequency (MHz)	**Corrected Amplitude (dBµV)**	**Correction Factor (dB)**	**Limit (dBµV)**	**Margin (dB)**	**Detector (PK/Ave./QP)**
0.680	48.06	10.10	56.00	7.94	QP
0.685	36.84	10.10	46.00	9.16	Ave.
0.615	46.00	10.10	56.00	10.00	QP
0.615	32.73	10.10	46.00	13.27	Ave.
0.915	41.80	10.10	56.00	14.20	QP
1.495	41.29	10.10	56.00	14.71	QP
0.410	43.05	10.10	58.57	15.52	QP
2.390	40.11	10.10	56.00	15.89	QP
0.910	28.73	10.10	46.00	17.27	Ave.
0.410	30.97	10.10	48.57	17.60	Ave.
2.410	28.15	10.10	46.00	17.85	Ave.
1.485	27.07	10.10	46.00	18.93	Ave.

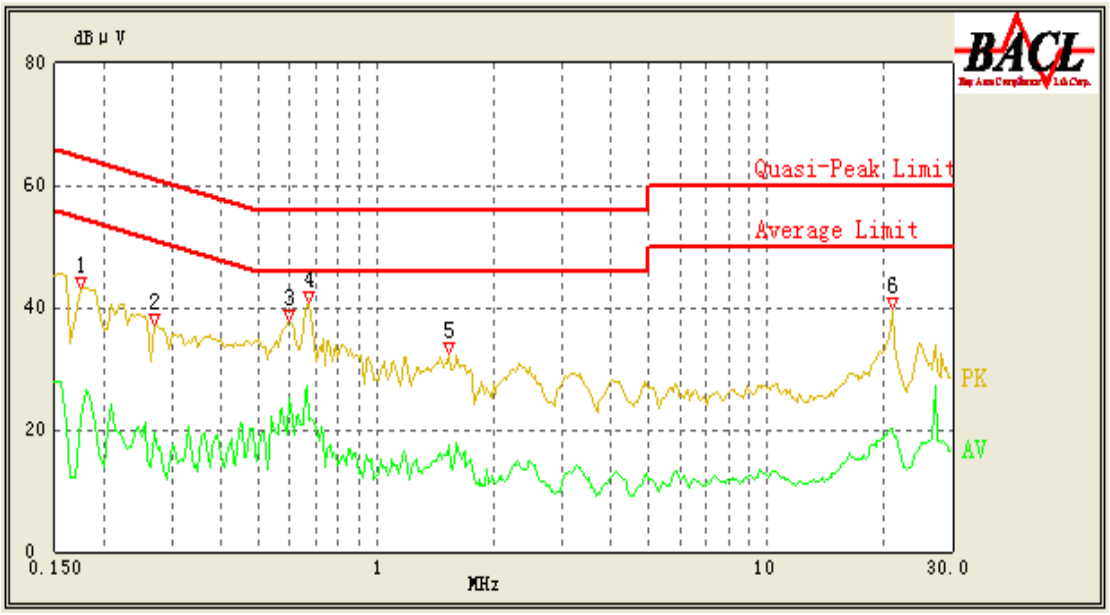
AC 120V/60 Hz, Neutral



Conducted Emissions			FCC Part 15.107, Class B		
Frequency (MHz)	Corrected Amplitude (dBµV)	Correction Factor (dB)	Limit (dBµV)	Margin (dB)	Detector (PK/Ave./QP)
0.610	49.01	10.10	56.00	6.99	QP
0.680	48.76	10.10	56.00	7.24	QP
0.610	38.01	10.10	46.00	7.99	Ave.
0.680	36.78	10.10	46.00	9.22	Ave.
1.580	42.13	10.10	56.00	13.87	QP
1.580	31.46	10.10	46.00	14.54	Ave.
2.380	41.45	10.10	56.00	14.55	QP
2.375	31.29	10.10	46.00	14.71	Ave.
0.195	35.80	10.10	54.71	18.91	Ave.
0.330	41.37	10.10	60.86	19.49	QP
0.330	31.14	10.10	50.86	19.72	Ave.
0.195	42.81	10.10	64.71	21.90	QP

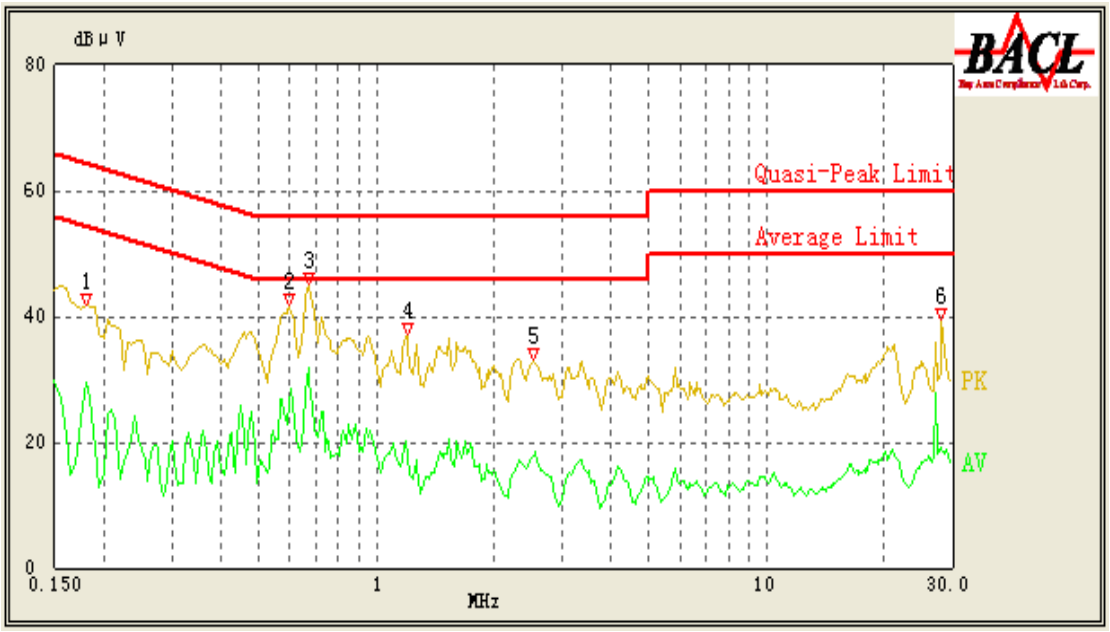
Test Mode 2:

AC 120V/60 Hz, Line



Conducted Emissions			FCC Part 15.107, Class B		
Frequency (MHz)	**Corrected Amplitude (dBµV)**	**Correction Factor (dB)**	**Limit (dBµV)**	**Margin (dB)**	**Detector (PK/Ave./QP)**
0.670	38.58	10.10	56.00	17.42	QP
0.665	27.27	10.10	46.00	18.73	Ave.
0.600	25.03	10.10	46.00	20.97	Ave.
0.600	34.95	10.10	56.00	21.05	QP
0.175	40.40	10.10	65.29	24.89	QP
1.530	28.12	10.10	56.00	27.88	QP
1.530	17.66	10.10	46.00	28.34	Ave.
0.270	34.06	10.10	62.57	28.51	QP
21.015	20.13	10.10	50.00	29.87	Ave.
20.980	27.44	10.10	60.00	32.56	QP
0.270	19.55	10.10	52.57	33.02	Ave.
0.175	21.81	10.10	55.29	33.48	Ave.

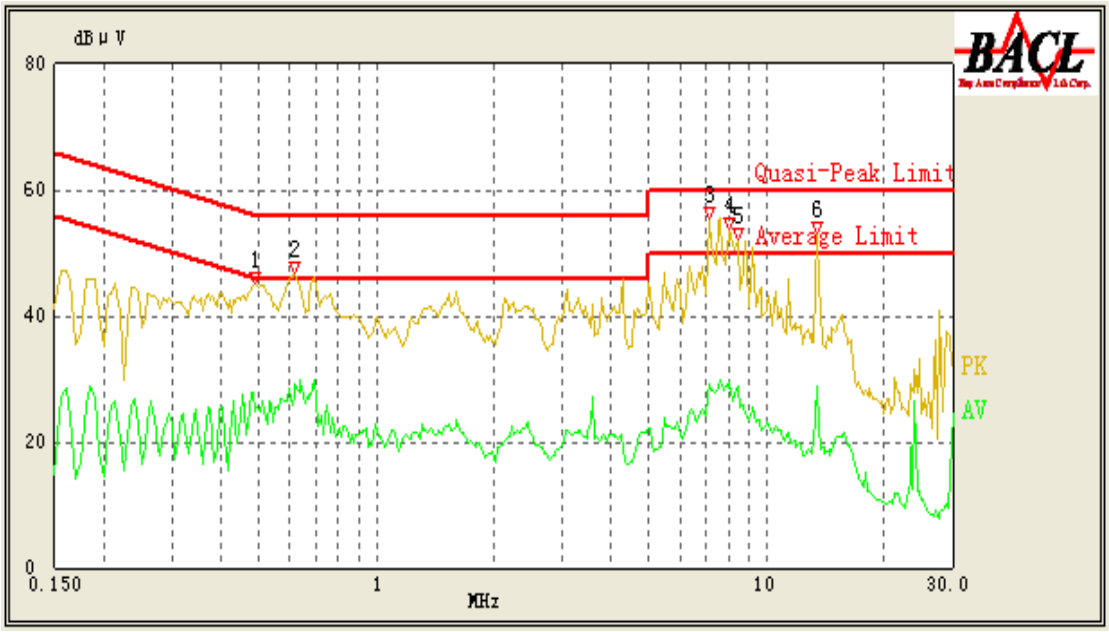
AC 120V/60 Hz, Neutral



Conducted Emissions			FCC Part 15.107, Class B		
Frequency (MHz)	**Corrected Amplitude (dBµV)**	**Correction Factor (dB)**	**Limit (dBµV)**	**Margin (dB)**	**Detector (PK/Ave./QP)**
0.670	31.73	10.10	46.00	14.27	Ave.
0.670	41.46	10.10	56.00	14.54	QP
0.595	38.52	10.10	56.00	17.48	QP
0.595	26.17	10.10	46.00	19.83	Ave.
1.200	31.76	10.10	56.00	24.24	QP
0.180	39.51	10.10	65.14	25.63	QP
0.180	29.42	10.10	55.14	25.72	Ave.
1.195	20.23	10.10	46.00	25.77	Ave.
2.520	28.36	10.10	56.00	27.64	QP
2.550	17.68	10.10	46.00	28.32	Ave.
28.095	18.97	10.10	50.00	31.03	Ave.
28.140	24.94	10.10	60.00	35.06	QP

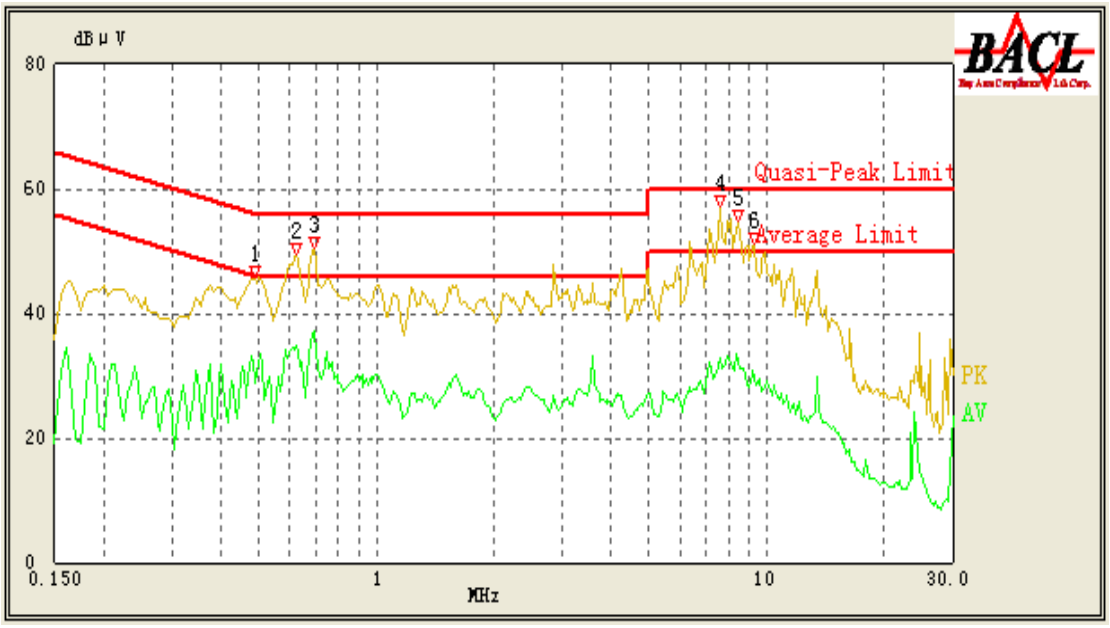
Test Mode 3:

AC 120V/60 Hz, Line



Conducted Emissions			FCC Part 15.107, Class B		
Frequency (MHz)	**Corrected Amplitude (dBµV)**	**Correction Factor (dB)**	**Limit (dBµV)**	**Margin (dB)**	**Detector (PK/Ave./QP)**
0.615	43.72	10.10	56.00	12.28	QP
8.055	45.35	10.10	60.00	14.65	QP
0.490	41.13	10.10	56.29	15.16	QP
7.125	42.09	10.10	60.00	17.91	QP
0.615	27.12	10.10	46.00	18.88	Ave.
13.500	40.94	10.10	60.00	19.06	QP
8.465	40.62	10.10	60.00	19.38	QP
8.025	29.57	10.10	50.00	20.43	Ave.
7.130	29.13	10.10	50.00	20.87	Ave.
8.465	28.87	10.10	50.00	21.13	Ave.
13.500	28.78	10.10	50.00	21.22	Ave.
0.490	24.68	10.10	46.29	21.61	Ave.

AC 120V/60 Hz, Neutral



Conducted Emissions			FCC Part 15.107, Class B		
Frequency (MHz)	**Corrected Amplitude (dBµV)**	**Correction Factor (dB)**	**Limit (dBµV)**	**Margin (dB)**	**Detector (PK/Ave./QP)**
0.690	37.17	10.10	46.00	8.83	Ave.
0.690	46.11	10.10	56.00	9.89	QP
0.625	45.96	10.10	56.00	10.04	QP
0.625	34.82	10.10	46.00	11.18	Ave.
0.490	43.38	10.10	56.29	12.91	QP
8.430	44.37	10.10	60.00	15.63	QP
7.615	43.75	10.10	60.00	16.25	QP
9.255	43.05	10.10	60.00	16.95	QP
7.585	33.00	10.10	50.00	17.00	Ave.
0.490	28.98	10.10	46.29	17.31	Ave.
8.435	32.45	10.10	50.00	17.55	Ave.
9.240	30.82	10.10	50.00	19.18	Ave.

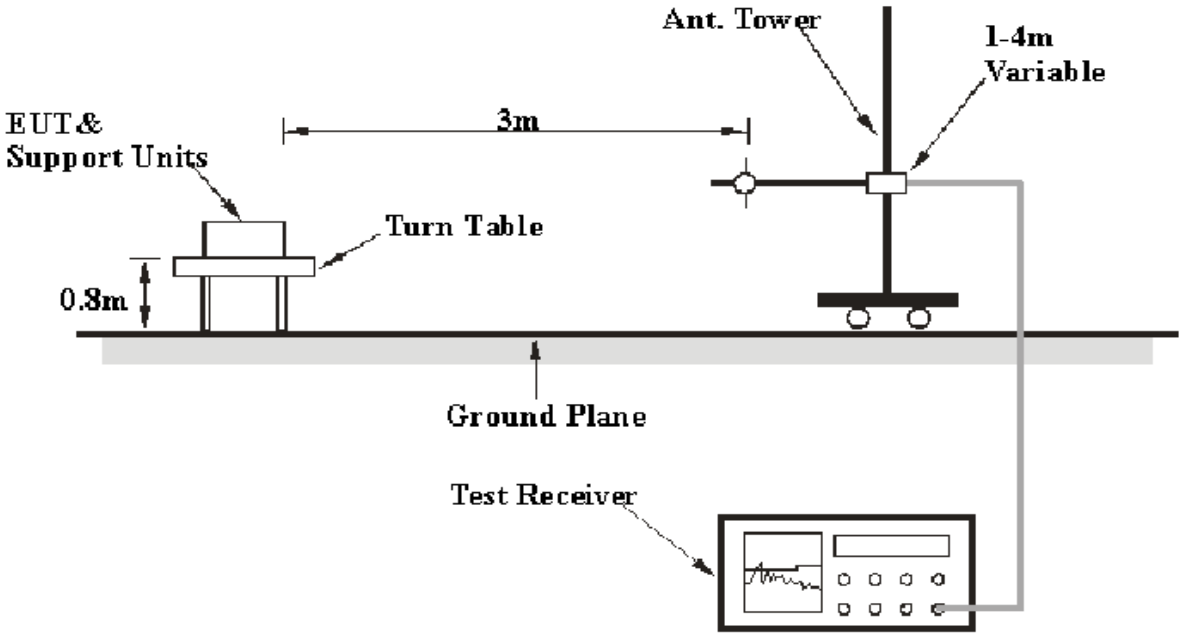
FCC §15.109 - RADIATED SPURIOUS EMISSIONS

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 estimation of the uncertainty of radiation emissions measurement at Bay Area Compliance Laboratories Corp. (Shenzhen) is ±4.0 dB. (k=2, 95% level of confidence)

EUT Setup



The radiated emission tests were performed in the 3 meters chamber B test site, using the setup accordance with the ANSI C63.4-2009. The specification used was the FCC Part 15.109 Class B 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.

The adapter was connected to a 120 VAC/60 Hz power source.

EMI Test Receiver Setup

The system was investigated from 30 MHz to 1000 MHz.

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

Frequency	***RB/W***	***VB/W***	***IF B/W***	***Detection***
30 MHz-1 GHz	100 kHz	300 kHz	120 kHz	Quasi-peak

Test Procedure

For the radiated emissions test, the adapter was connected to the AC floor outlet.

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

All the data was recorded in the Quasi-peak detection mode from 30 MHz to 1 GHz.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
HP	Amplifier	HP8447E	1937A01046	2011-08-02	2012-08-02
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2010-11-11	2011-11-10
Sunol Sciences	Broadband Antenna	JB1	A040904-1	2011-07-05	2012-07-04

*** 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.

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:

Corrected Amplitude = Meter Reading + Antenna Loss + Cable Loss - Amplifier Gain

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

Margin = Limit – Corrected Amplitude

Test Results Summary

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

2.9 dB at **53.976250 MHz** in the **Vertical** polarization for test mode 3

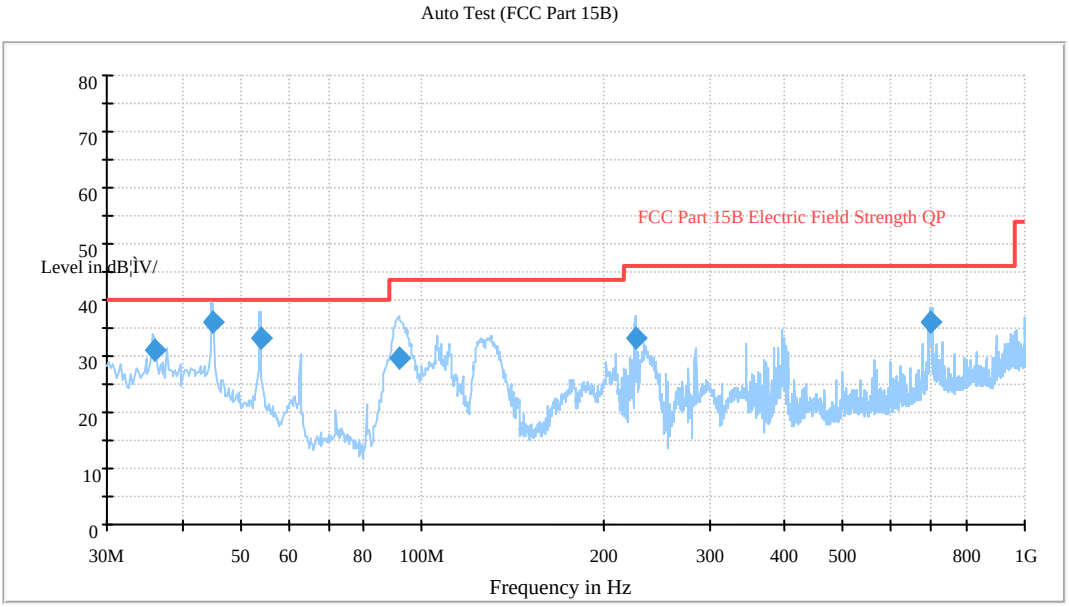
Test Data

Environmental Conditions

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

The testing was performed by Jimmy Xiao on 2011-09-11.

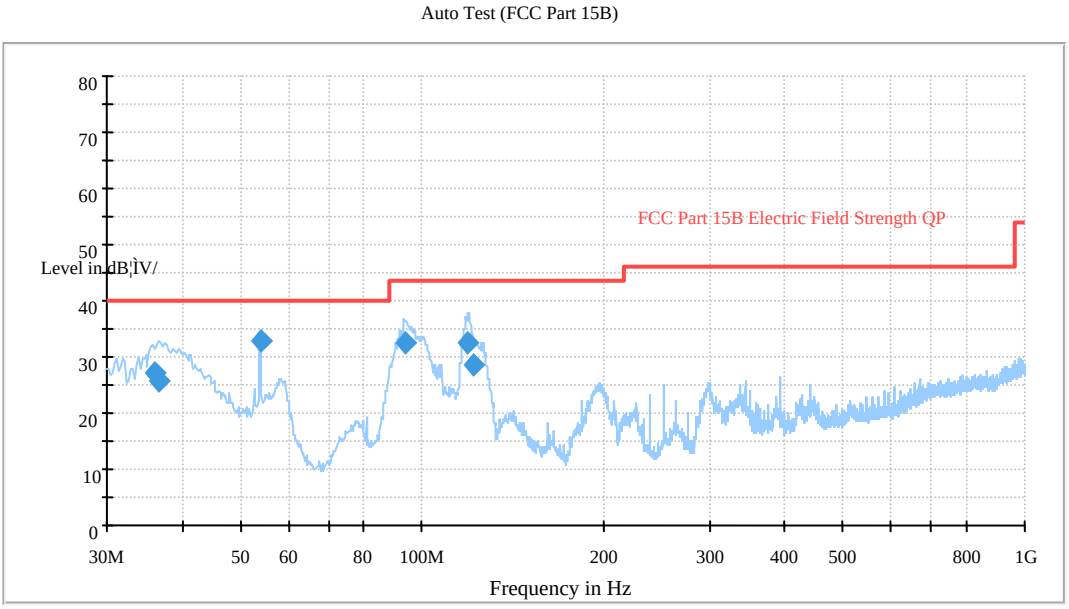
Test Mode 1:



Frequency (MHz)	Corrected Amplitude (dBµV/m)	Antenna		Turntable Position (degree)	Correction Factor (dB)	Limit (dBµV/m)	Margin (dB)
		Height (cm)	Polarity (H/V)				
45.025000	36.2	104.0	V	197.0	-15.1	40.0	3.8*
53.981250	33.1	104.0	V	59.0	-17.9	40.0	6.9
35.976500	31.1	104.0	V	4.0	-9.5	40.0	8.9
698.504000	36.2	104.0	V	56.0	-3.1	46.0	9.8
226.097000	33.3	124.0	H	78.0	-13.9	46.0	12.7
91.644000	29.8	104.0	V	327.0	-17.0	43.5	13.7

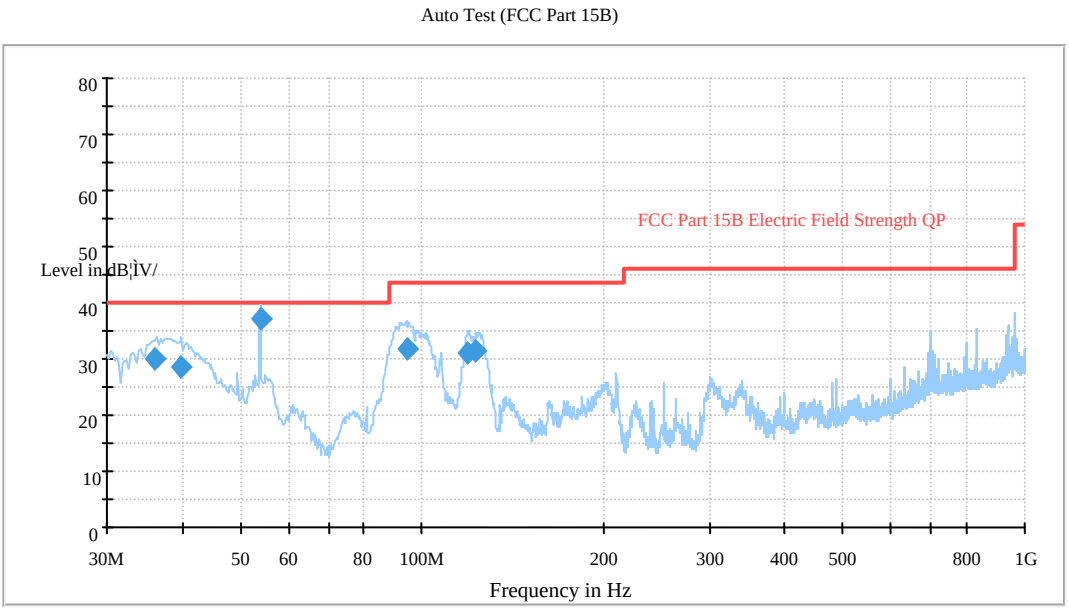
*Within measurement uncertainty!

Test Mode 2:



Frequency (MHz)	Corrected Amplitude (dBµV/m)	Antenna		Turntable Position (degree)	Correction Factor (dB)	Limit (dBµV/m)	Margin (dB)
		Height (cm)	Polarity (H/V)				
54.012000	33.0	104.0	V	242.0	-17.9	40.0	7.0
93.684750	32.6	104.0	V	60.0	-16.4	43.5	10.9
119.178250	32.5	104.0	V	77.0	-12.4	43.5	11.0
35.968000	27.0	104.0	V	309.0	-9.5	40.0	13.0
36.534750	25.8	104.0	V	298.0	-9.9	40.0	14.2
121.671750	28.4	104.0	V	83.0	-12.3	43.5	15.1

Test Mode 3:



Frequency (MHz)	Corrected Amplitude (dBµV/m)	Antenna		Turntable Position (degree)	Correction Factor (dB)	Limit (dBµV/m)	Margin (dB)
		Height (cm)	Polarity (H/V)				
53.976250	37.1	104.0	V	151.0	-17.9	40.0	2.9*
35.988250	29.8	104.0	V	26.0	-9.5	40.0	10.2
39.805000	28.7	104.0	V	290.0	-12.0	40.0	11.3
94.630750	31.8	104.0	V	302.0	-16.1	43.5	11.7
123.192250	31.3	104.0	V	320.0	-12.3	43.5	12.2
119.344500	31.1	104.0	V	337.0	-12.4	43.5	12.4

*Within measurement uncertainty!

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