



TESTING LABORATORY
CERTIFICATE #4820.01



FCC PART 15 B

TEST REPORT

For

CLC HONG KONG LIMITED

1011A, 10/F., Harbour Centre Tower 1, No.1 Hok Cheung St., Hung Hom, Kowloon, Hong Kong

FCC ID: 2AG4WZ712

Report Type:	Product Type:
Original Report	Optimax 12
Report Number:	RDG180319005-00A
Report Date:	2018-04-04
Reviewed By:	Jerry Zhang EMC Manager
Test Laboratory:	Bay Area Compliance Laboratories Corp. (Dongguan) No.69 Pulongcun, Puxinhu Industry Area, Tangxia, Dongguan, Guangdong, China Tel: +86-769-86858888 Fax: +86-769-86858891 www.baclcorp.com.cn

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. (Dongguan). This report must not be used by the customer to claim product certification, approval, or endorsement by A2LA* or any agency of the Federal Government. * This report may contain data that are not covered by the A2LA accreditation and are marked with an asterisk “*”.

TABLE OF CONTENTS

GENERAL INFORMATION.....	3
PRODUCT DESCRIPTION FOR EQUIPMENT UNDER TEST (EUT)	3
OBJECTIVE	3
RELATED SUBMITTAL(S)/GRANT(S).....	3
TEST METHODOLOGY	3
MEASUREMENT UNCERTAINTY.....	4
TEST FACILITY	4
SYSTEM TEST CONFIGURATION.....	5
DESCRIPTION OF TEST CONFIGURATION	5
EUT EXERCISE SOFTWARE	5
EQUIPMENT MODIFICATIONS	5
LOCAL SUPPORT EQUIPMENT LIST AND DETAILS	5
SUPPORT CABLE LIST AND DETAILS	5
CONFIGURATION OF TEST SETUP	6
SUMMARY OF TEST RESULTS	7
FCC§15.107 - CONDUCTED EMISSIONS.....	8
EUT SETUP.....	8
EMI TEST RECEIVER SETUP.....	8
TEST EQUIPMENT LIST AND DETAILS.....	9
TEST PROCEDURE	9
CORRECTED AMPLITUDE & MARGIN CALCULATION	9
TEST RESULTS SUMMARY	10
TEST DATA	10
FCC §15.109 - RADIATED SPURIOUS EMISSIONS	13
EUT SETUP.....	13
EMI TEST RECEIVER SETUP.....	14
TEST PROCEDURE	14
TEST EQUIPMENT LIST AND DETAILS.....	14
CORRECTED AMPLITUDE & MARGIN CALCULATION	15
TEST DATA	15

GENERAL INFORMATION

Product Description for Equipment Under Test (EUT)

EUT Name:		Optimax 12
EUT Model:		Z712
FCC ID:		2AG4WZ712
Rated Input Voltage:		DC3.7V from Battery or DC5V from adapter
Adapter Information	Model Name:	PMC44
	Input:	100-240V~, 50/60Hz 0.2A
	Output:	DC5V, 1.5A
External Dimension:		Length (188 mm)*Width (107.5 mm)*High (10.3 mm)
Highest Operation Frequency:		2480 MHz
Serial Number:		180319005
EUT Received Date:		2018.03.19

Objective

This test report is prepared on behalf of *CLC HONG KONG LIMITED* in accordance with Part 2, Subpart J, and Part 15-Subparts A and B of the Federal Communications Commission's rules.

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

Related Submittal(s)/Grant(s)

FCC Part 15C DSS submissions with FCC ID: 2AG4WZ712.

FCC Part 15C DTS submissions with FCC ID: 2AG4WZ712.

FCC Part 22H, 24E PCE submissions with FCC ID: 2AG4WZ712.

Test Methodology

All measurements contained in this report were conducted with ANSI C63.4-2014, 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 radiated and conducted emissions measurement was performed at Bay Area Compliance Laboratories Corp. (Dongguan).

Measurement Uncertainty

Parameter	Measurement Uncertainty
Unwanted Emissions, radiated	30M~200MHz: 4.58 dB for Horizontal, 4.59 dB for Vertical 200M~1GHz: 4.83 dB for Horizontal, 5.85 dB for Vertical 1G~6GHz: 4.45 dB, 6G~26.5GHz: 5.23 dB
Temperature	$\pm 1^{\circ}\text{C}$
Humidity	$\pm 5\%$
AC Power Lines Conducted Emission	3.12 dB (150 kHz to 30 MHz)

Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (Dongguan) to collect test data is located on the No.69 Pulongcun, Puxihu Industry Area, Tangxia, Dongguan, Guangdong, China

The test site has been approved by the FCC under the KDB 974614 D01 and is listed in the FCC Public Access Link (PAL) database, FCC Registration No. : 897218, the FCC Designation No. : CN1220.

The test site has been registered with ISED Canada under ISED Canada Registration Number 3062D.

SYSTEM TEST CONFIGURATION

Description of Test Configuration

The system was configured for testing in operating and downloading mode.

EUT Exercise Software

The software “Winthrax.exe” was used during test.

Equipment Modifications

No modification was made to the EUT tested.

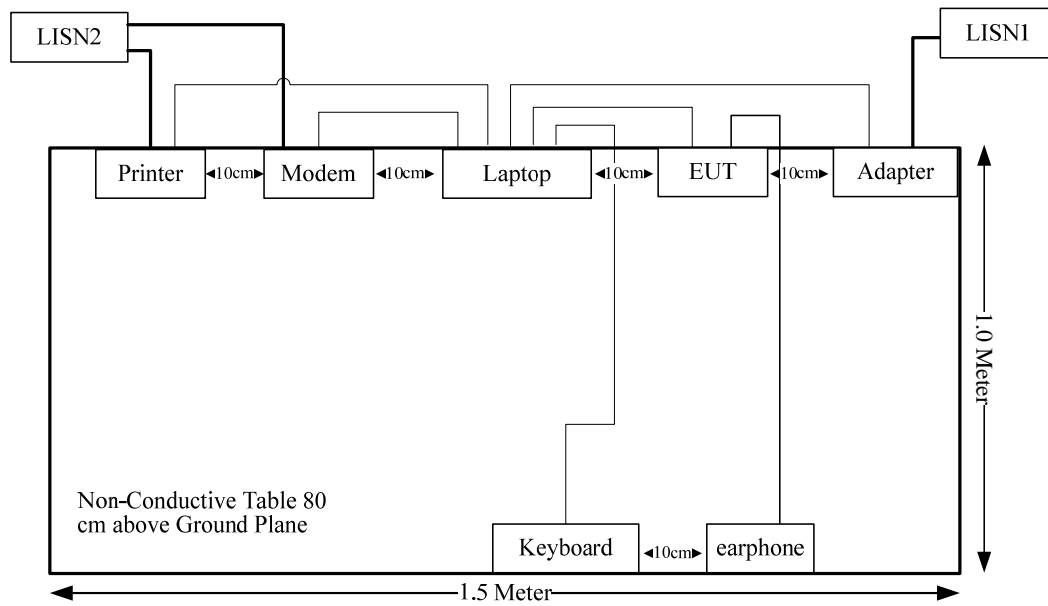
Local Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
DELL	Laptop	PP11L	QDS-BRCM1017
HP	Printer	C3941A	JPTVOB2337
DELL	Keyboard	L100	CNORH656658907BL05DC
SAST	Modem	AEM-2100	0293

Support Cable List and Details

Cable Description	Shielding Type	Ferrite Core	Length (m)	From Port	To
Serial Cable	yes	No	1.2	Serial Port of Laptop	Modem
Parallel Cable	yes	No	1.2	Parallel Port of Laptop	Printer
Keyboard Cable	yes	No	1.8	USB Port of Laptop	Keyboard
USB Cable	yes	No	1.0	USB Port of Laptop	EUT
Earphone Cable	No	No	1.2	EUT	Earphone

Configuration of Test Setup

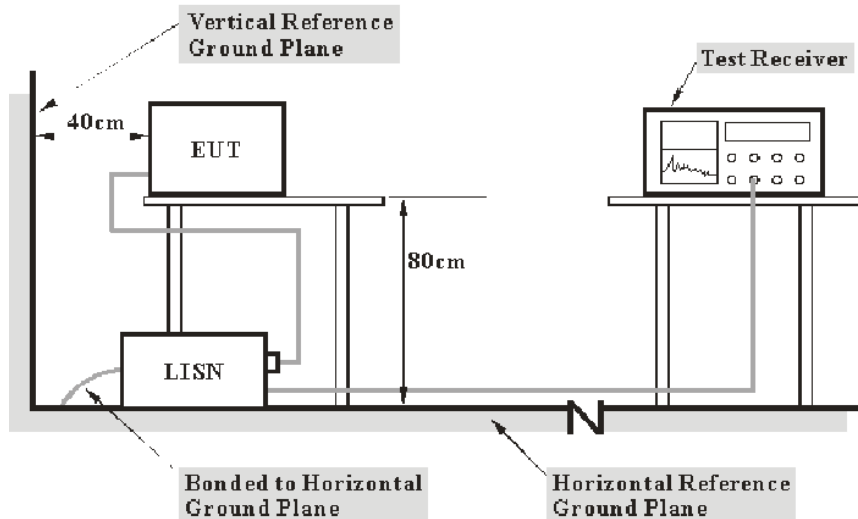


SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Results
§15.107	Conducted Emissions	Compliant
§15.109	Radiated Emissions	Compliant

FCC§15.107 - CONDUCTED EMISSIONS

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 C63.4-2014 measurement procedure. The specification used was with the FCC Part 15 B 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 adapter was connected to the Main LISN with 120V/60Hz AC 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 Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	EMI Test Receiver	ESCS 30	830245/006	2017-12-11	2018-12-11
R&S	L.I.S.N	ESH2-Z5	892107/021	2017-09-25	2018-09-25
R&S	Two-line V-network	ENV 216	101614	2017-12-08	2018-12-08
R&S	Test Software	EMC32	Version8.53.0	N/A	N/A
N/A	Coaxial Cable	C-NJNJ-50	C-0200-01	2017-09-05	2018-09-05

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed traceable to National Primary Standards and International System of Units (SI).

Test Procedure

During the conducted emission test, the adapter of laptop was connected to the outlet of the first LISN and the other support equipments were connected to the outlet of the second 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.

Corrected Amplitude & Margin Calculation

The basic equation is as follows:

$$V_C = V_R + A_C + VDF$$

Herein,

V_C : corrected voltage amplitude

V_R : reading voltage amplitude

A_C : attenuation caused by cable loss

VDF : voltage division factor of AMN or ISN

The “**Margin**” column of the following data tables indicates the degree of compliance within 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 Results Summary

According to the recorded data in following table, the EUT complied with the FCC Part 15 B Class B.

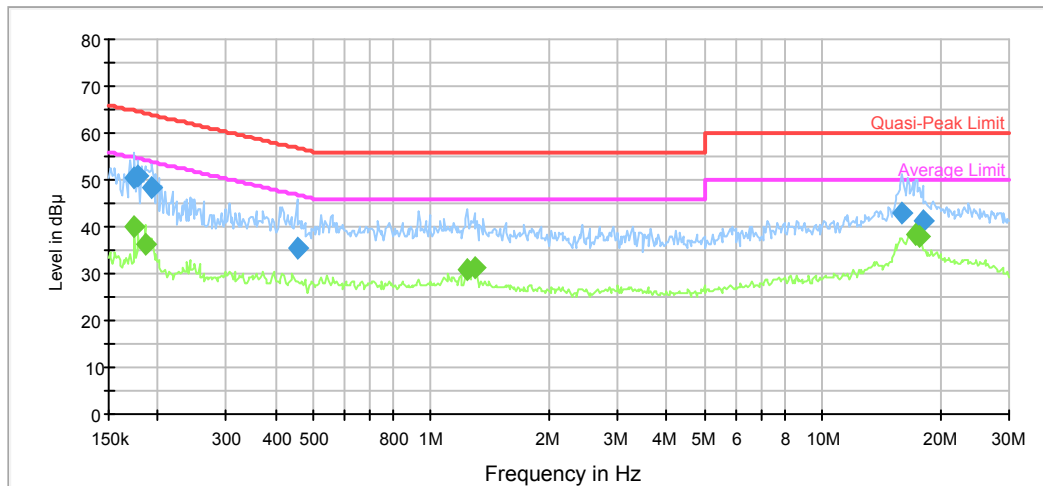
Test Data**Environmental Conditions**

Temperature:	25.1 °C
Relative Humidity:	40 %
ATM Pressure:	101.4 kPa

The testing was performed by Jim Zhang on 2018-03-26.

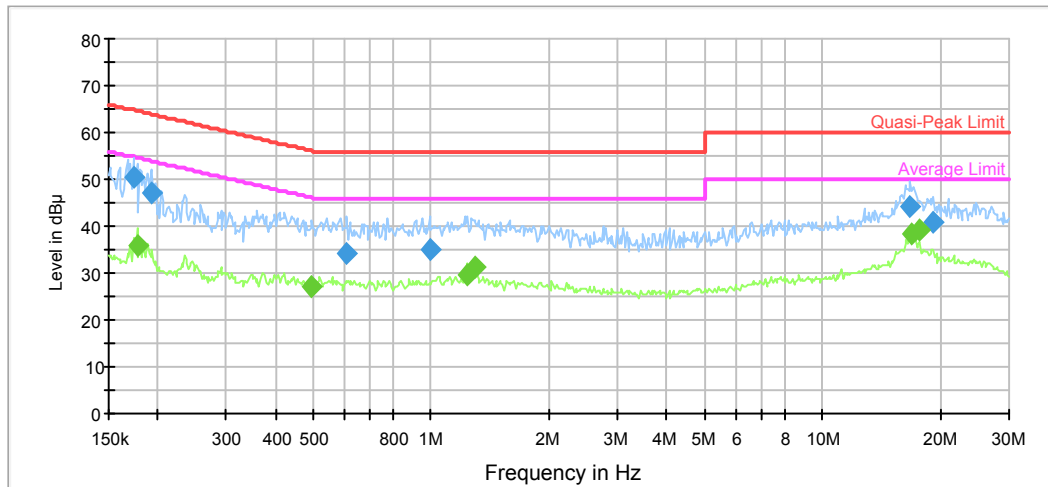
Test Mode: Downloading

AC120V, 60Hz, Line:



Frequency (MHz)	QuasiPeak (dBμV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.174519	50.2	9.000	L1	10.9	14.5	64.7	Compliance
0.178741	51.0	9.000	L1	10.8	13.5	64.5	Compliance
0.193566	48.5	9.000	L1	10.7	15.4	63.9	Compliance
0.454052	35.2	9.000	L1	9.9	21.6	56.8	Compliance
15.994231	42.8	9.000	L1	10.0	17.2	60.0	Compliance
18.024837	41.4	9.000	L1	10.0	18.6	60.0	Compliance

Frequency (MHz)	Average (dBμV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.174519	40.2	9.000	L1	10.9	14.5	54.7	Compliance
0.186006	36.4	9.000	L1	10.8	17.8	54.2	Compliance
1.239175	30.8	9.000	L1	9.8	15.2	46.0	Compliance
1.289541	31.3	9.000	L1	9.8	14.7	46.0	Compliance
17.320829	38.3	9.000	L1	10.0	11.7	50.0	Compliance
17.739864	37.8	9.000	L1	10.0	12.2	50.0	Compliance

AC120V, 60Hz, Neutral:

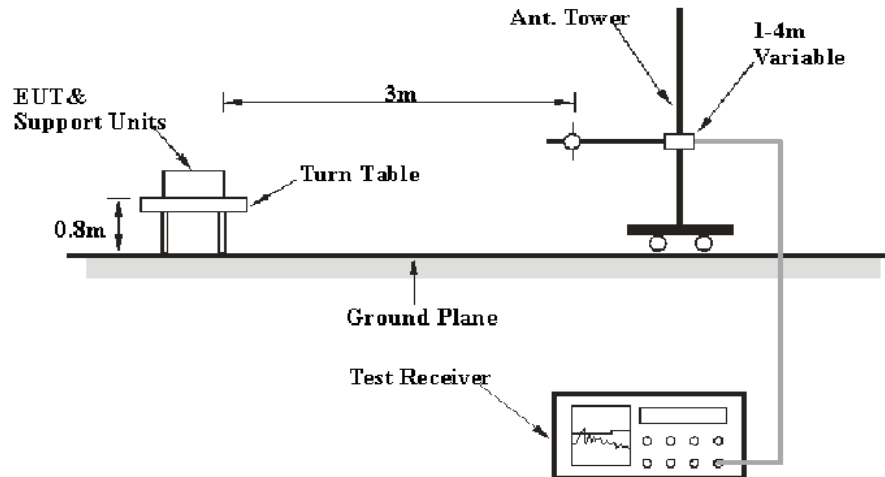
Frequency (MHz)	QuasiPeak (dB μ V)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dB μ V)	Comment
0.173134	50.6	9.000	N	10.9	14.2	64.8	Compliance
0.192030	47.2	9.000	N	10.7	16.7	63.9	Compliance
0.609741	34.2	9.000	N	9.8	21.8	56.0	Compliance
0.991374	35.1	9.000	N	9.8	20.9	56.0	Compliance
16.777473	44.2	9.000	N	10.0	15.8	60.0	Compliance
19.211249	40.8	9.000	N	10.0	19.2	60.0	Compliance

Frequency (MHz)	Average (dB μ V)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dB μ V)	Comment
0.177322	35.9	9.000	N	10.8	18.7	54.6	Compliance
0.495646	27.0	9.000	N	9.9	19.1	46.1	Compliance
1.239175	29.6	9.000	N	9.8	16.4	46.0	Compliance
1.289541	31.4	9.000	N	9.8	14.6	46.0	Compliance
16.911693	38.2	9.000	N	10.0	11.8	50.0	Compliance
17.739864	39.1	9.000	N	10.0	10.9	50.0	Compliance

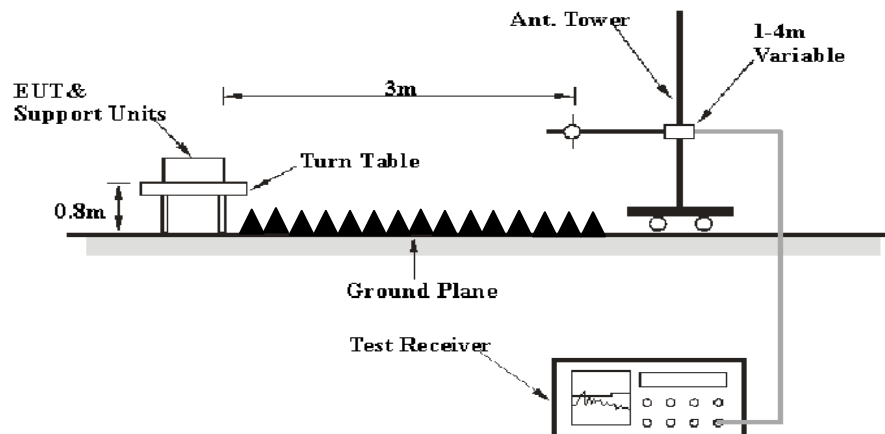
FCC §15.109 - RADIATED SPURIOUS EMISSIONS

EUT Setup

Below 1GHz:



Above 1GHz:



The radiated emission tests were performed in the 3 meters chamber test site A for the range 30MHz to 1GHz and the 3 meters chamber test site B for above 1GHz, using the setup accordance with the ANSI C63.4-2014. The specification used was the FCC Part 15.109 Class B limits.

EMI Test Receiver Setup

The system was investigated from 30 MHz to 13.0 GHz.

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

Frequency Range	RBW	Video B/W	IF B/W	Measurement
30 MHz – 1000 MHz	120 kHz	300 kHz	120 kHz	QP
Above 1 GHz	1 MHz	3 MHz	/	Peak
	1 MHz	10 Hz	/	AVG

Test Procedure

During the radiated emissions, the adapter of laptop was connected to the first AC floor outlet and the other support equipments were connected to the second AC floor outlet.

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

The data was recorded in the Quasi-peak detection mode for below 1 GHz, peak and average detection mode above 1 GHz.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	EMI Test Receiver	ESCI	100224	2017-12-11	2018-12-11
Sunol Sciences	Antenna	JB3	A060611-1	2017-11-10	2020-11-10
HP	Amplifier	8447D	2727A05902	2017-09-05	2018-09-05
Agilent	Spectrum Analyzer	E4440A	SG43360054	2017-12-08	2018-12-08
ETS-Lindgren	Horn Antenna	3115	000 527 35	2016-01-05	2019-01-04
MITEQ	Amplifier	AFS42-00101800-2 5-S-42	2001271	2017-09-05	2018-09-05
N/A	Coaxial Cable	C-NJNJ-50	C-0400-01	2017-09-05	2018-09-05
N/A	Coaxial Cable	C-NJNJ-50	C-0075-01	2017-09-05	2018-09-05
N/A	Coaxial Cable	C-NJNJ-50	C-1000-01	2017-09-05	2018-09-05
N/A	Coaxial Cable	C-SJSJ-50	C-0800-01	2017-09-05	2018-09-05
Farad	Test Software	EZ-EMC	V1.1.4.2	N/A	N/A

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Corrected Amplitude & Margin Calculation

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

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

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

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

Test Data

Environmental Conditions

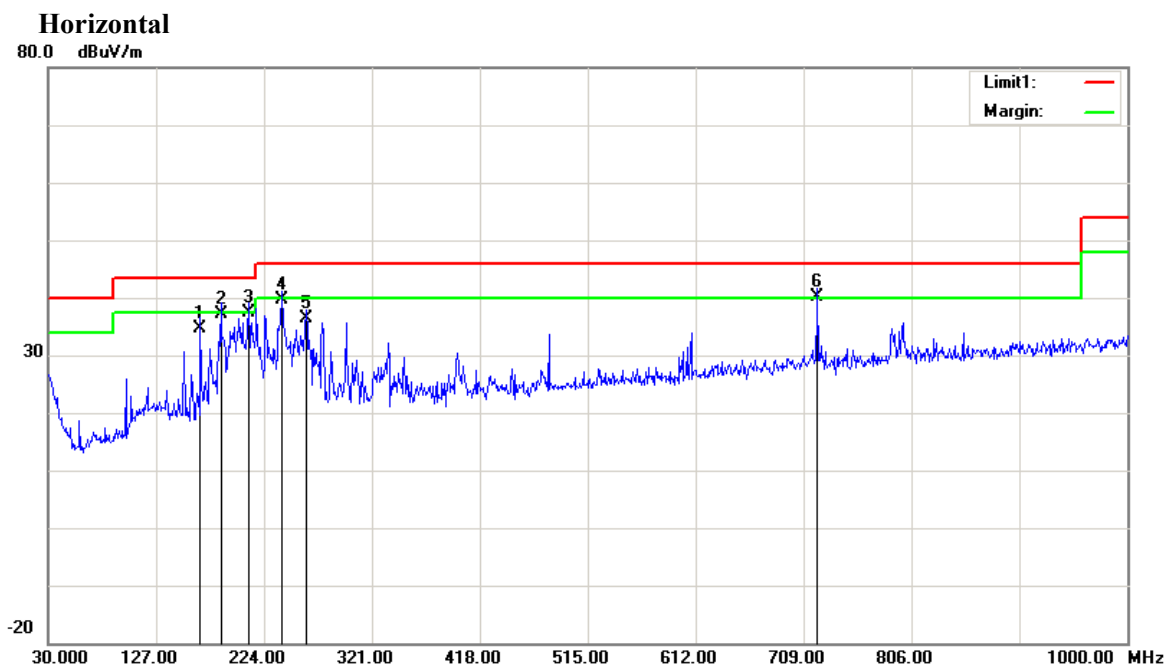
Temperature:	24.9 °C
Relative Humidity:	55 %
ATM Pressure:	101.4 kPa

** The testing was performed by Steven Zuo on 2018-03-26.*

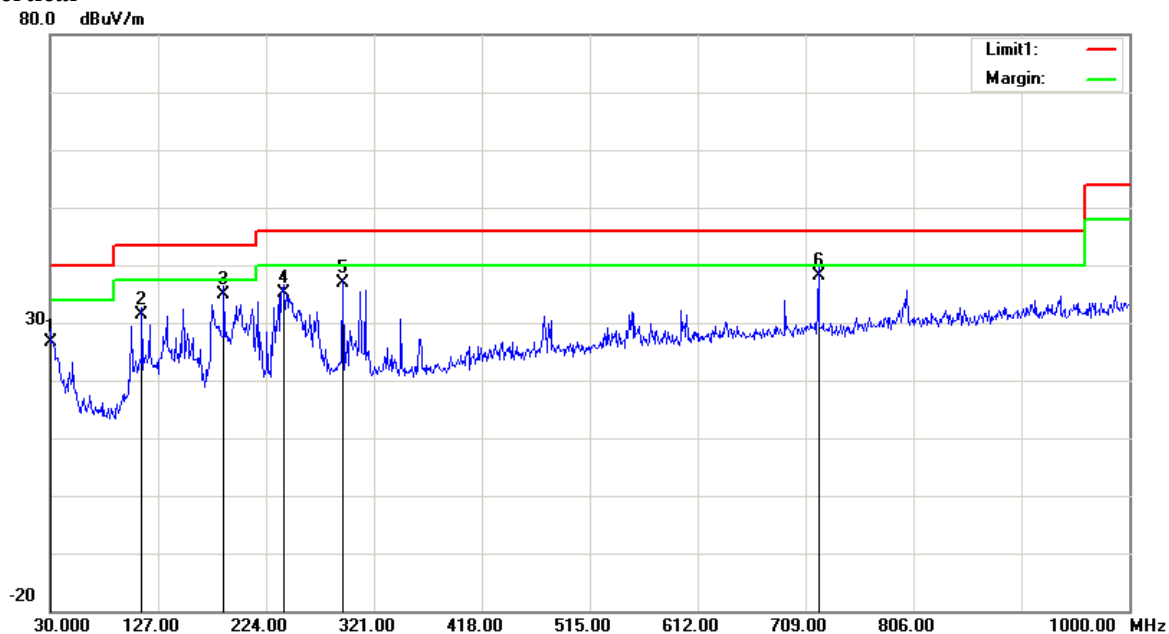
Test Result: Compliance

Test Mode: Downloading

1) Below 1GHz:

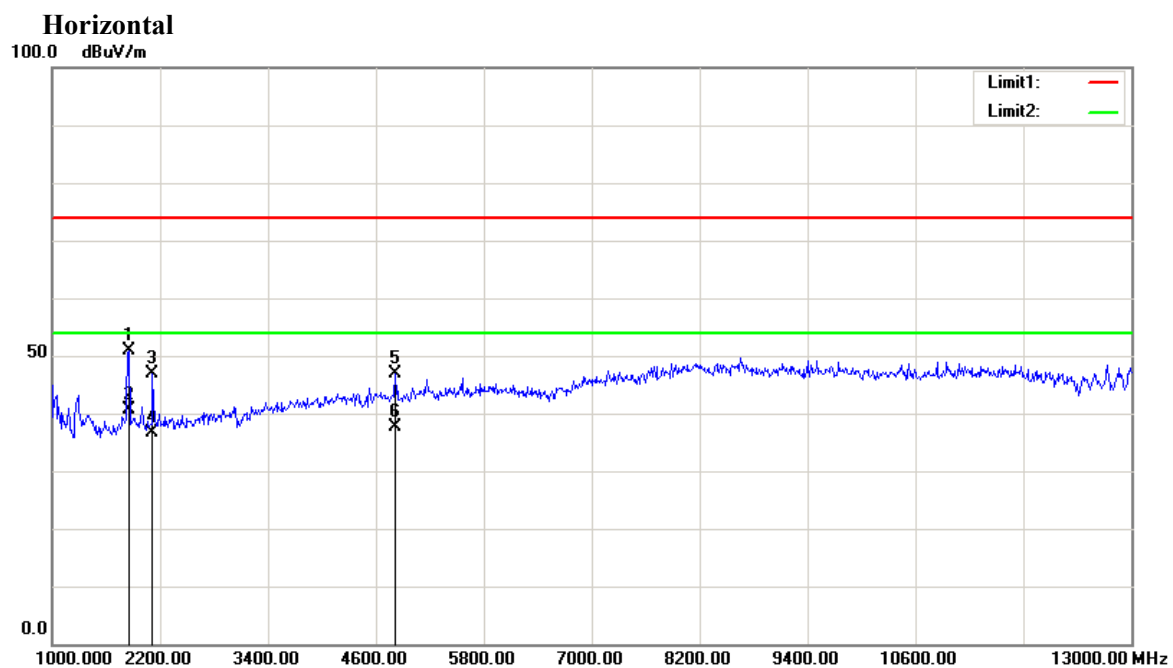


Frequency (MHz)	Receiver Reading (dBμV)	Detector	Correction Factor (dB/m)	Cord. Amp. (dBμV/m)	Limit (dBμV/m)	Margin (dB)
166.7700	41.09	QP	-6.49	34.60	43.50	8.90
185.2000	44.68	QP	-7.58	37.10	43.50	6.40
210.4200	44.93	QP	-7.43	37.50	43.50	6.00
240.4900	45.80	QP	-6.10	39.70	46.00	6.30
261.8300	41.23	QP	-4.93	36.30	46.00	9.70
721.6100	36.67	QP	3.43	40.10	46.00	5.90

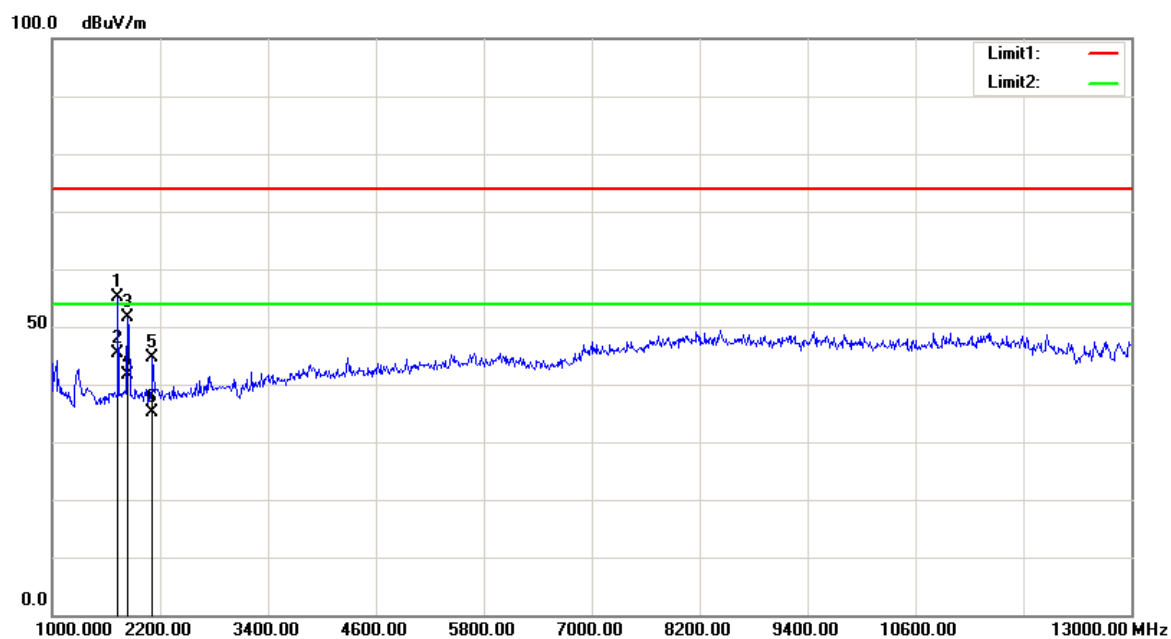
Vertical

Frequency (MHz)	Receiver Reading (dBμV)	Detector	Correction Factor (dB/m)	Cord. Amp. (dBμV/m)	Limit (dBμV/m)	Margin (dB)
30.0000	25.16	QP	1.54	26.70	40.00	13.30
112.4500	37.30	QP	-6.00	31.30	43.50	12.20
186.1700	42.34	QP	-7.54	34.80	43.50	8.70
239.5200	41.30	QP	-6.10	35.20	46.00	10.80
292.8700	40.94	QP	-4.14	36.80	46.00	9.20
720.6400	34.76	QP	3.44	38.20	46.00	7.80

2) Above 1GHz:



Frequency (MHz)	Receiver Reading (dBμV)	Detector	Correction Factor (dB/m)	Cord. Amp. (dBμV/m)	Limit (dBμV/m)	Margin (dB)
1852.000	58.45	peak	-7.65	50.80	74.00	23.20
1852.000	48.32	AVG	-7.65	40.67	54.00	13.33
2122.000	53.74	peak	-6.95	46.79	74.00	27.21
2122.000	43.62	AVG	-6.95	36.67	54.00	17.33
4816.000	47.96	peak	-1.09	46.87	74.00	27.13
4816.000	38.79	AVG	-1.09	37.70	54.00	16.30

Vertical

Frequency (MHz)	Receiver Reading (dBμV)	Detector	Correction Factor (dB/m)	Cord. Amp. (dBμV/m)	Limit (dBμV/m)	Margin (dB)
1738.000	63.37	peak	-8.20	55.17	74.00	18.83
1738.000	53.64	AVG	-8.20	45.44	54.00	8.56
1846.000	59.22	peak	-7.67	51.55	74.00	22.45
1846.000	49.34	AVG	-7.67	41.67	54.00	12.33
2122.000	51.66	peak	-6.95	44.71	74.00	29.29
2122.000	42.15	AVG	-6.95	35.20	54.00	18.80

END OF REPORT