



FCC PART 15 B TEST REPORT

For

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FCC ID: 2AOMSROCKY2168

Report Type: Original Report	Product Type: Rugged Smartphone
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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).

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GENERAL INFORMATION

Product Description for Equipment Under Test (EUT)

EUT Name:		Rugged Smartphone
EUT Model:		Rocky 2
Multiple Model		R2, AC50SAX, PY-002
FCC ID:		2AOMSROCKY2168
Rated Input Voltage:		DC3.8V from Battery or DC 5V from adapter
Adapter Information	Model:	TPA-46050200UU
	Input:	100-240V~ 50/60Hz 0.3A
	Output:	5.0V , 2000mA
The Highest Operation Frequency		2690MHz
External Dimension:		Length (146.6 mm)*Width (76 mm)*High (12.7 mm)
Serial Number:		171207003
EUT Received Date:		2017.12.07

Note: The series product, models R2, AC50SAX, PY-002 are electrically identical with the model Rocky 2, the differences between them is the model name, we selected Rocky 2 for fully testing .The difference between them was explained in the attached declaration letter.

Objective

This test report is prepared on behalf of *Shenzhen Phonemax Technology Co., Ltd.* 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: 2AOMSROCKY2168.
FCC Part 15C DTS submissions with FCC ID: 2AOMSROCKY2168.
FCC Part 22H, 24E, 27 PCE submissions with FCC ID: 2AOMSROCKY2168.

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	±1℃
Humidity	±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 “Withrax” was used during test.

Equipment Modifications

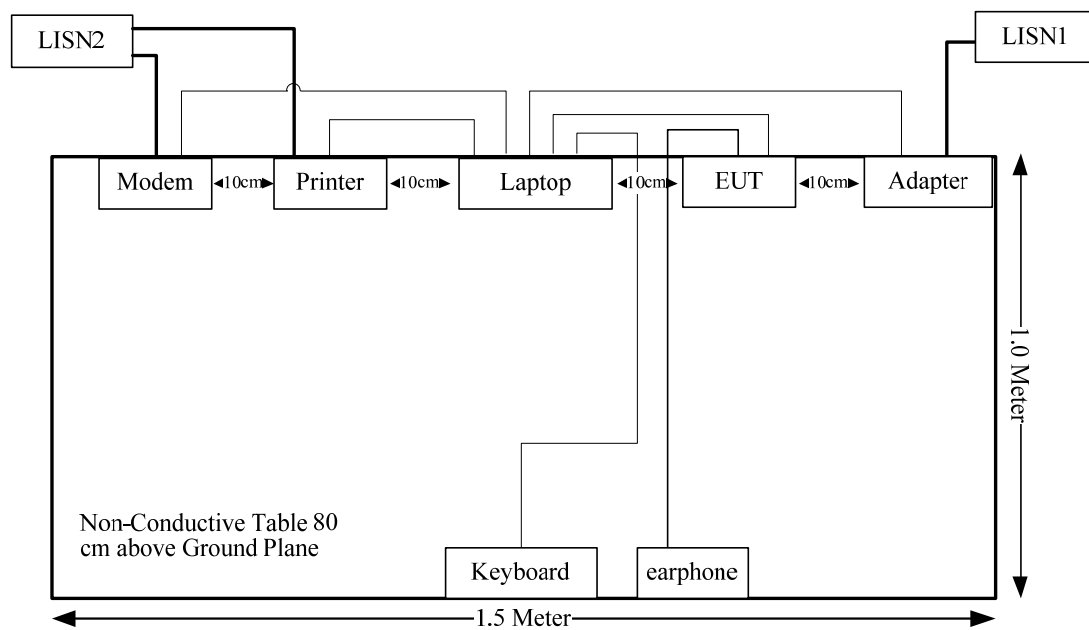
No modification was made to the EUT tested.

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

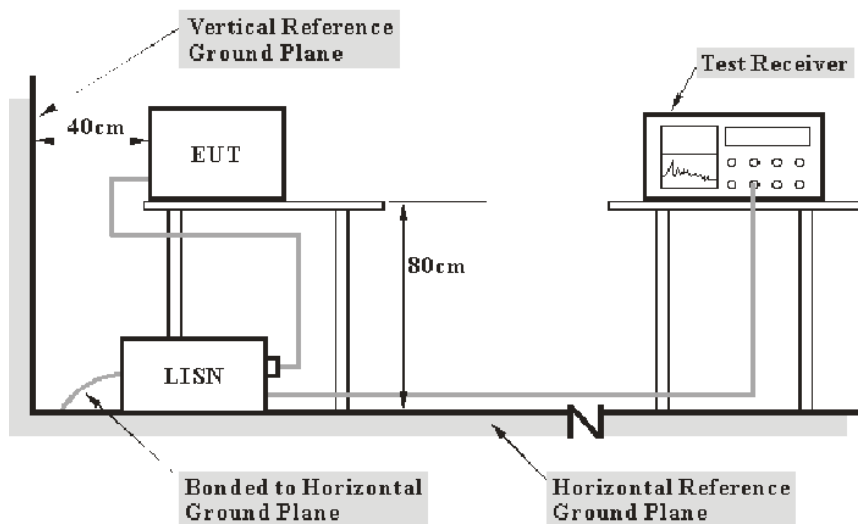
Configuration of Test Setup

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	L.I.S.N	ESH2-Z5	892107/021	2017-09-25	2018-09-25
R&S	Two-line V-network	ENV 216	3560.6550.12	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
R&S	EMI Test Receiver	ESCS 30	830245/006	2017-12-08	2018-12-08

* **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.

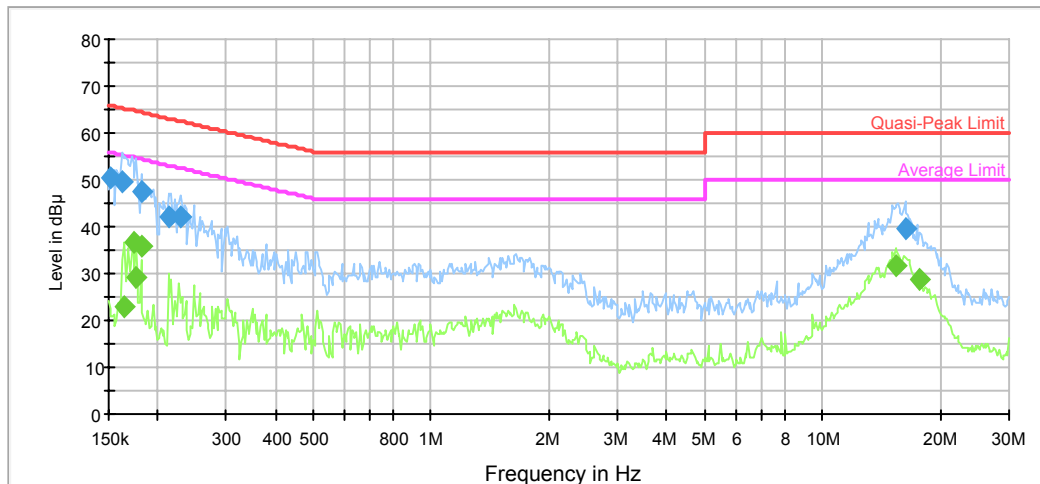
Test Data**Environmental Conditions**

Temperature:	25.1°C
Relative Humidity:	35 %
ATM Pressure:	101.2 kPa

The testing was performed by Alex You on 2017-12-13.

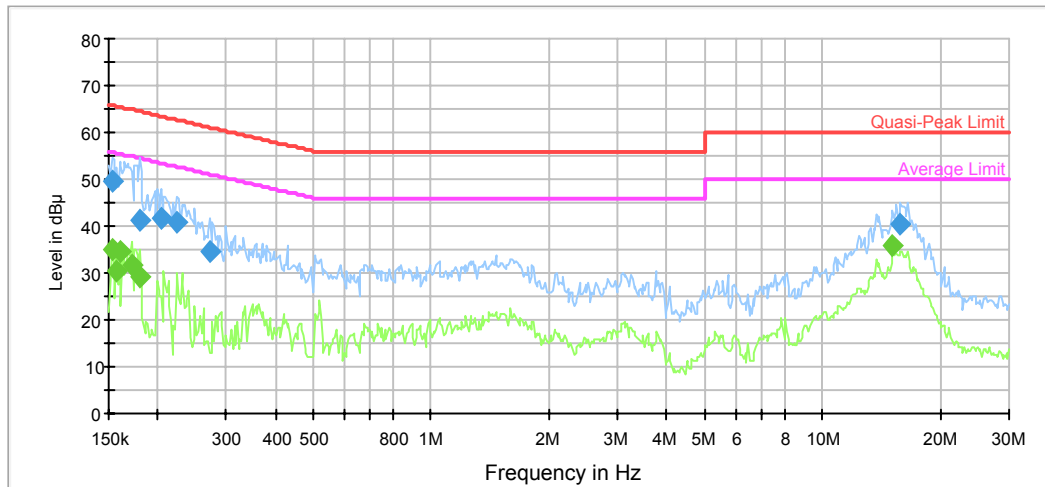
Test Mode: Downloading

AC120V, 60Hz, Line:



Frequency (MHz)	QuasiPeak (dBμV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.152410	50.3	9.000	L1	11.2	15.6	65.9	Compliance
0.162441	49.7	9.000	L1	11.0	15.6	65.3	Compliance
0.181612	47.5	9.000	L1	10.8	16.9	64.4	Compliance
0.212988	42.3	9.000	L1	10.5	20.8	63.1	Compliance
0.228823	42.2	9.000	L1	10.4	20.3	62.5	Compliance
16.251162	39.5	9.000	L1	10.0	20.5	60.0	Compliance

Frequency (MHz)	Average (dBμV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.165051	22.7	9.000	L1	11.0	32.5	55.2	Compliance
0.173134	36.6	9.000	L1	10.9	18.2	54.8	Compliance
0.175915	29.0	9.000	L1	10.9	25.7	54.7	Compliance
0.181612	35.6	9.000	L1	10.8	18.8	54.4	Compliance
15.369534	31.6	9.000	L1	10.0	18.4	50.0	Compliance
17.739864	28.7	9.000	L1	10.0	21.3	50.0	Compliance

AC120V, 60Hz, Neutral:

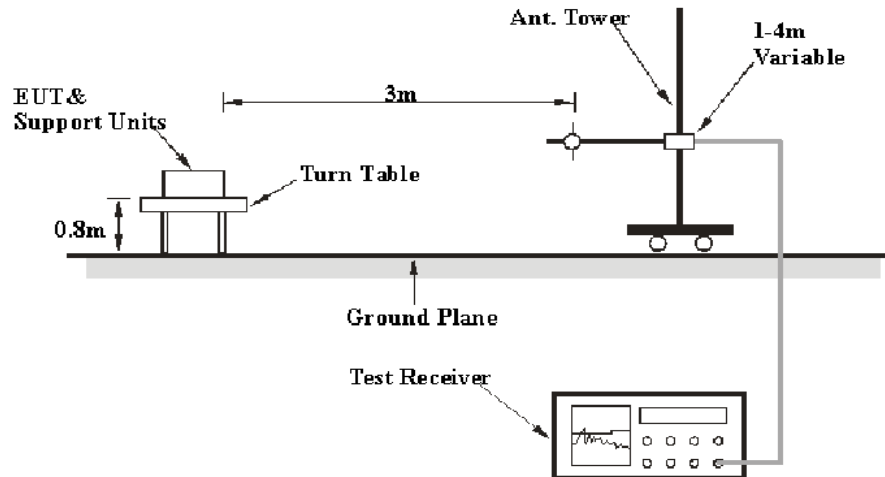
Frequency (MHz)	QuasiPeak (dB μ V)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dB μ V)	Comment
0.153629	49.7	9.000	N	11.1	16.1	65.8	Compliance
0.180171	41.3	9.000	N	10.8	23.2	64.5	Compliance
0.204669	41.7	9.000	N	10.6	21.7	63.4	Compliance
0.225205	41.0	9.000	N	10.5	21.6	62.6	Compliance
0.272666	34.5	9.000	N	10.2	26.5	61.0	Compliance
15.867293	40.4	9.000	N	10.0	19.6	60.0	Compliance

Frequency (MHz)	Average (dB μ V)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dB μ V)	Comment
0.153629	35.2	9.000	N	11.1	20.6	55.8	Compliance
0.157346	30.4	9.000	N	11.1	25.2	55.6	Compliance
0.159873	34.8	9.000	N	11.0	20.7	55.5	Compliance
0.171759	31.6	9.000	N	10.9	23.3	54.9	Compliance
0.180171	29.2	9.000	N	10.8	25.3	54.5	Compliance
15.126541	35.8	9.000	N	9.9	14.2	50.0	Compliance

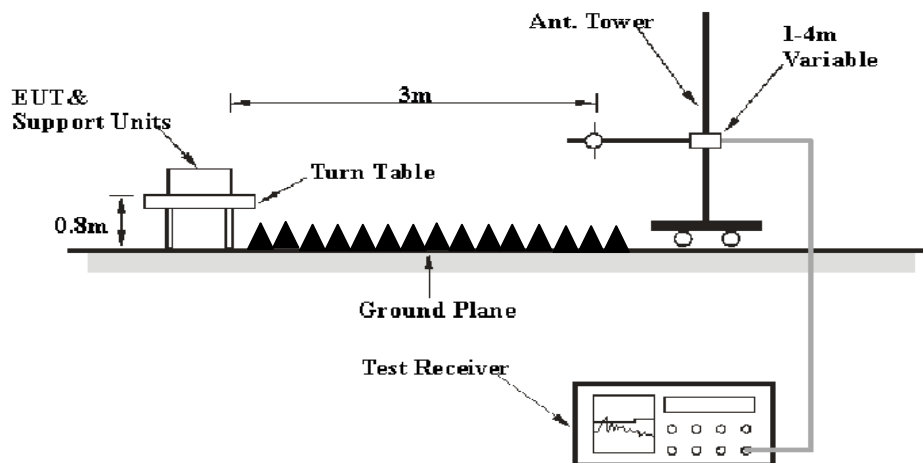
FCC §15.109 - RADIATED SPURIOUS EMISSIONS

EUT Setup

Below 1GHz:



Above 1GHz:



The radiated emission tests were performed in the 3 meters chamber test site for the range 30MHz to 1GHz and the 3 meters chamber test site 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 14 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	2017-09-01	2018-08-31
Sunol Sciences	Antenna	JB3	A060611-2	2017-08-25	2020-08-25
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:	23.4~25.8°C
Relative Humidity:	29.8~41 %
ATM Pressure:	101.2~101.3 kPa

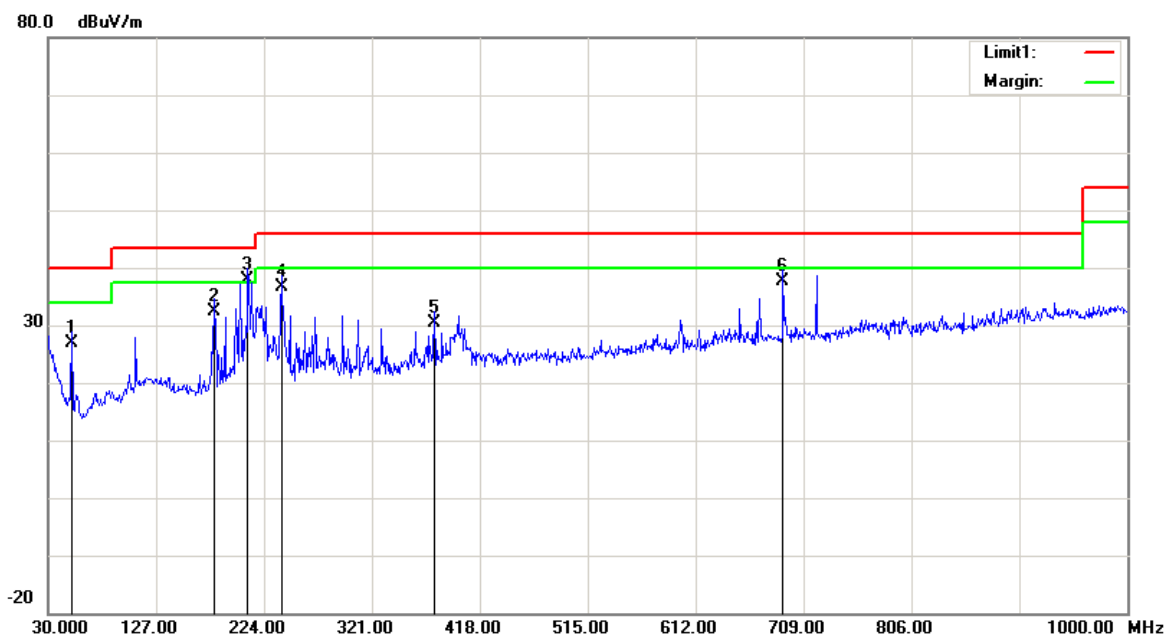
** The testing was performed by Sunny Cen and Steven Zuo from 2017-12-13 to 2017-12-14.*

Test Result: Compliance

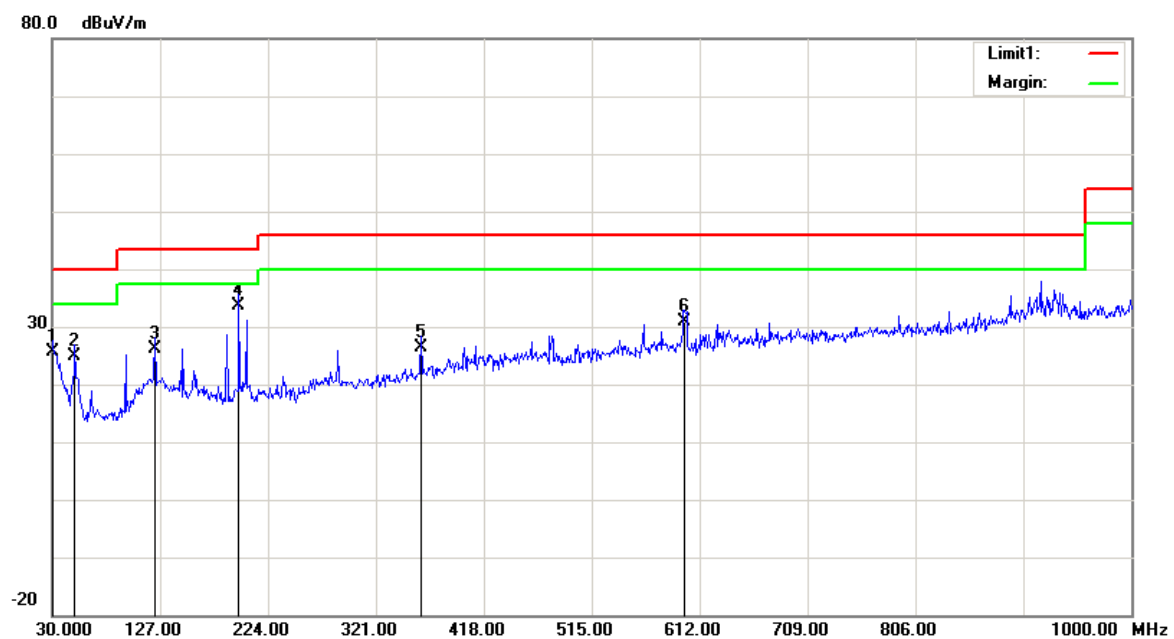
Test Mode: Downloading

1) Below 1GHz:

Horizontal



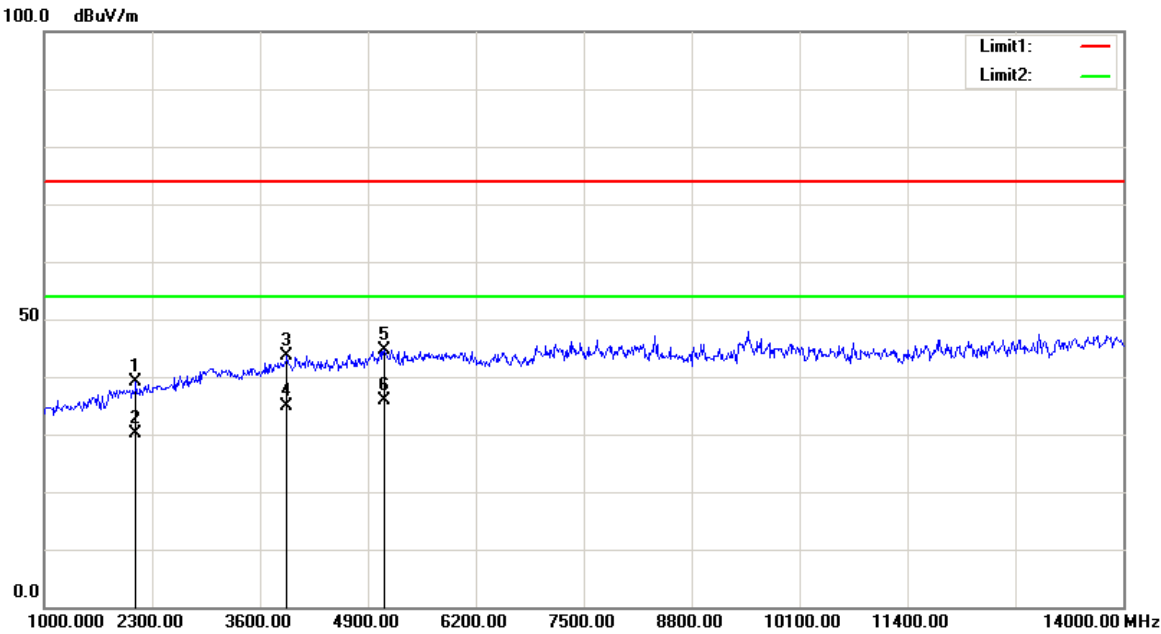
Frequency (MHz)	Receiver Reading (dBμV)	Detector	Correction Factor (dB/m)	Cord. Amp. (dBμV/m)	Limit (dBμV/m)	Margin (dB)
51.3400	38.79	QP	-11.89	26.90	40.00	13.10
179.3800	40.34	QP	-7.84	32.50	43.50	11.00
209.4500	45.35	QP	-7.45	37.90	43.50	5.60
239.5200	42.92	QP	-6.22	36.70	46.00	9.30
377.2600	33.22	QP	-2.72	30.50	46.00	15.50
690.5700	35.41	QP	2.19	37.60	46.00	8.40

Vertical

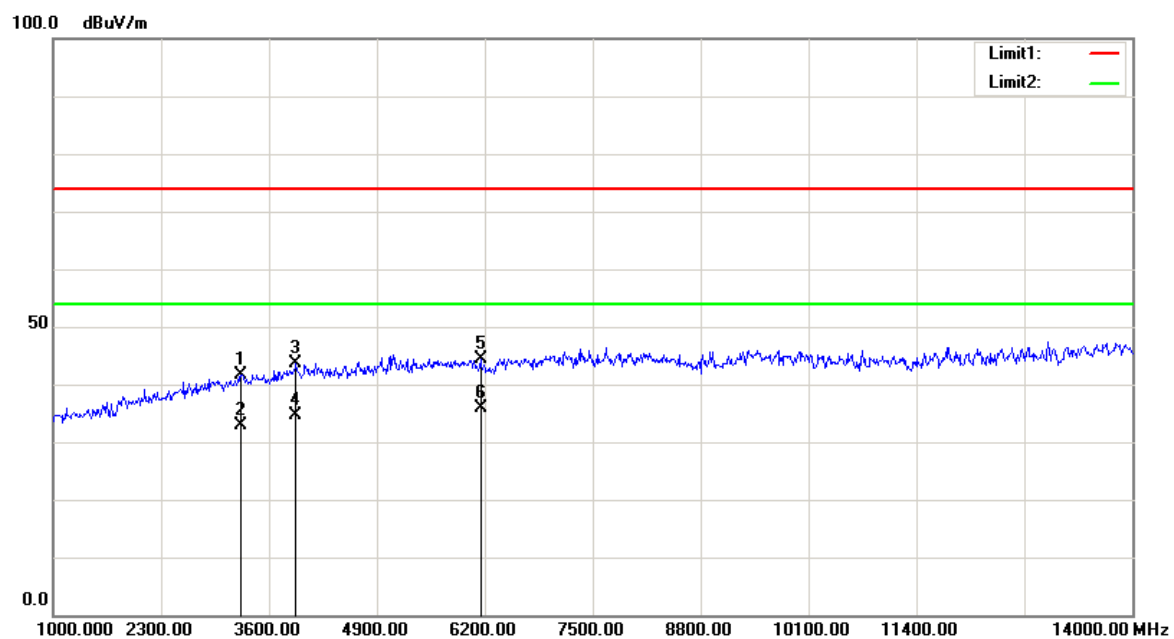
Frequency (MHz)	Receiver Reading (dBμV)	Detector	Correction Factor (dB/m)	Cord. Amp. (dBμV/m)	Limit (dBμV/m)	Margin (dB)
30.0000	24.62	QP	1.08	25.70	40.00	14.30
50.3700	36.41	QP	-11.61	24.80	40.00	15.20
122.1500	30.89	QP	-4.79	26.10	43.50	17.40
197.8100	40.24	QP	-6.64	33.60	43.50	9.90
361.7400	29.30	QP	-2.90	26.40	46.00	19.60
598.4200	30.70	QP	0.20	30.90	46.00	15.10

2) Above 1GHz:

Horizontal



Frequency (MHz)	Receiver Reading (dBμV)	Detector	Correction Factor (dB/m)	Cord. Amp. (dBμV/m)	Limit (dBμV/m)	Margin (dB)
2111.500	46.01	peak	-6.99	39.02	74.00	34.98
2111.500	37.12	AVG	-6.99	30.13	54.00	23.87
3925.000	45.84	peak	-2.12	43.72	74.00	30.28
3925.000	36.95	AVG	-2.12	34.83	54.00	19.17
5101.500	45.08	peak	-0.36	44.72	74.00	29.28
5101.500	36.35	AVG	-0.36	35.99	54.00	18.01

Vertical

Frequency (MHz)	Receiver Reading (dB μ V)	Detector	Correction Factor (dB/m)	Cord. Amp. (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
3268.500	45.74	peak	-4.02	41.72	74.00	32.28
3268.500	36.82	AVG	-4.02	32.80	54.00	21.20
3925.000	45.84	peak	-2.12	43.72	74.00	30.28
3925.000	36.77	AVG	-2.12	34.65	54.00	19.35
6148.000	43.30	peak	1.12	44.42	74.00	29.58
6148.000	34.86	AVG	1.12	35.98	54.00	18.02

****END OF REPORT****