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BACL Bay Area Compliance Labs Corp.

FCC PART 15B, CLASS B

TEST REPORT

For

JM Manufacturing Limited

Justen Centre, 1-3/F, 46-52 Wai Ching Street, Jordan Road, Kowloon, Hong Kong

FCC ID: 2AHGJJMSYJ-21349

Report Type:	**Product Type:**
Original Report	4CH R/C MINI HYPE

Report Number: RSZ180102834-00

Report Date: 2018-01-09

Reviewed By: Rocky Kang, RF Engineer

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The *JM Manufacturing Limited'* s product, model number: *JMSYJ-213 (FCC ID: 2AHGJJMSYJ-21349, UPC Number: 400029514401)* or the "EUT" in this report is a *4CH R/C MINI HYPE*, which measures approximately: 8.7 cm (L) x 7.2 cm (W) x 3.8 cm (H), rated input voltage: DC 4.5V from battery. The highest operating frequency is 49MHz.

** All measurement and test data in this report was gathered from production sample serial number: 20180102 (Assigned by BACL, Shenzhen). The EUT supplied by the applicant was received on 2018-01-02.*

Objective

This test report is prepared on behalf of *JM Manufacturing Limited* 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 the compliance of the EUT with FCC Part 15 B.

Related Submittal(s)/Grant(s)

FCC PART 15.235 DXX submissions with FCC ID: 2AHGJJMSYJ-213491.

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

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 CISPR 16-4-2:2011, the expended combined standard uncertainty of test at Bay Area Compliance Laboratories Corp. (Shenzhen) is shown as below. And the uncertainty will be taken into consideration for the test data recorded in the report

Item			Expanded Measurement uncertainty
Radiated emission	30MHz~200MHz	Horizontal	4.58 dB (k=2, 95% level of confidence)
		Vertical	4.59 dB (k=2, 95% level of confidence)
	200MHz~1 GHz	Horizontal	4.83 dB (k=2, 95% level of confidence)
		Vertical	5.85 dB (k=2, 95% level of confidence)

Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (Shenzhen) to collect test data is located on the 6/F., West Wing, Third Phase of Wanli Industrial Building, Shihua Road, Futian Free Trade Zone, Shenzhen, 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. : 382179,the FCC Designation No. : CN5001.

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

SYSTEM TEST CONFIGURATION

Description of Test Configuration

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

EUT Exercise Software

No exercise software was used.

Special Accessories

No special accessory.

Equipment Modifications

No modification was made to the EUT tested.

Support Equipment List and Details

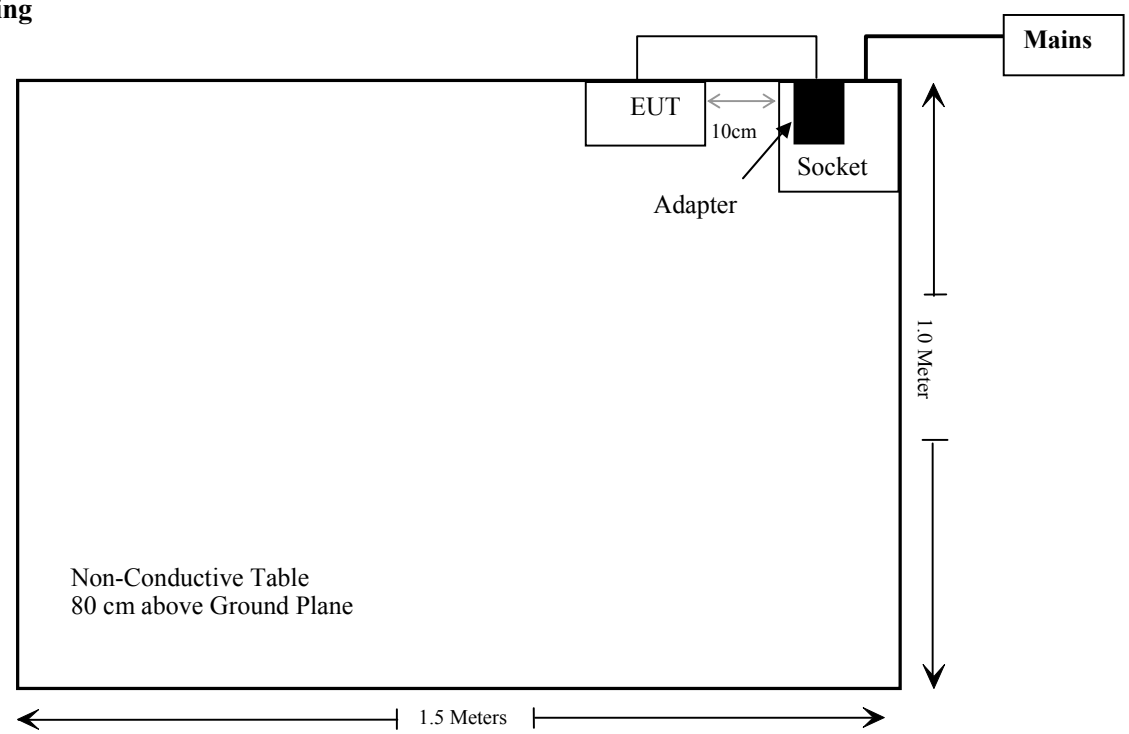
Manufacturer	Description	Model	Serial Number
BLU	Adapter	US-ZC1000	N/A
N/A	Socket	N/A	N/A
JM	Remote Control	JMSYJ-213	20180102

External I/O Cable

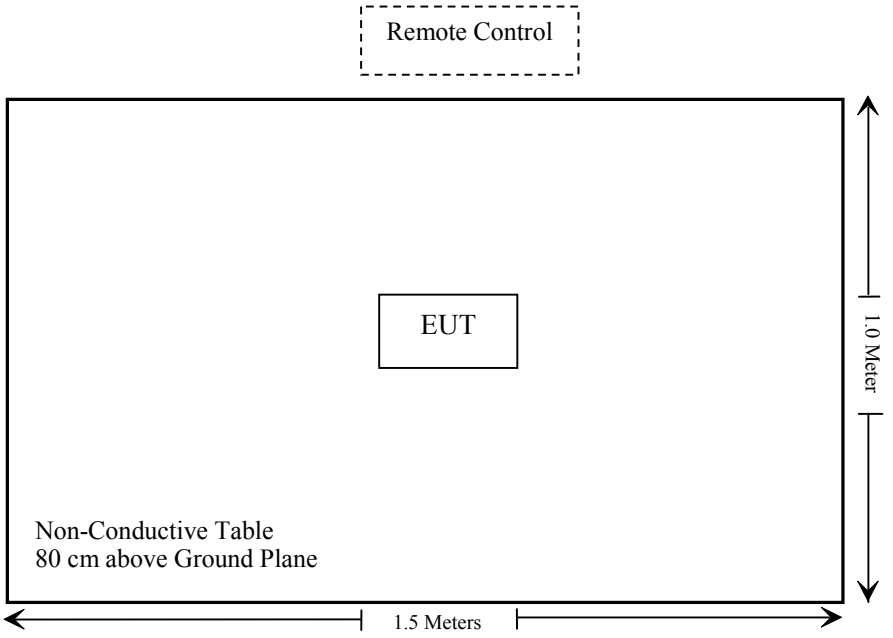
Cable Description	Length (m)	From/Port	To
Un-shielded Un-detachable AC Cable	0.5	Mains	Socket

Block Diagram of Test Setup

Charging



Receiving



SUMMARY OF TEST RESULTS

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

TEST EQUIPMENT LIST

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
AC Line Conducted Emission Test					
Rohde & Schwarz	EMI Test Receiver	ESCS30	100176	2017-08-04	2018-08-04
Rohde & Schwarz	LISN	ENV216	3560.6650.12-101613-Yb	2017-12-07	2018-12-07
Rohde & Schwarz	Transient Limiter	ESH3Z2	DE25985	2017-11-19	2018-05-21
Rohde & Schwarz	CE Test software	EMC 32	V8.53.0	NCR	NCR
N/A	Conducted Emission Cable	N/A	UF A210B-1-0720-504504	2017-11-12	2018-05-12
Radiated Emission Test					
Sunol Sciences	Bi-log Antenna	JB1	A040904-2	2017-12-17	2020-12-16
Mini	Pre-amplifier	ZVA-183-S+	5969001149	2017-05-21	2018-05-21
HP	Amplifier	HP8447E	1937A01046	2017-11-19	2018-05-21
Rohde & Schwarz	EMI Test Receiver	ESCI	101120	2017-12-07	2018-12-07
Ducommun technologies	RF Cable	RG-214	1	2017-11-19	2018-05-21
Ducommun technologies	RF Cable	RG-214	2	2017-11-22	2018-05-22

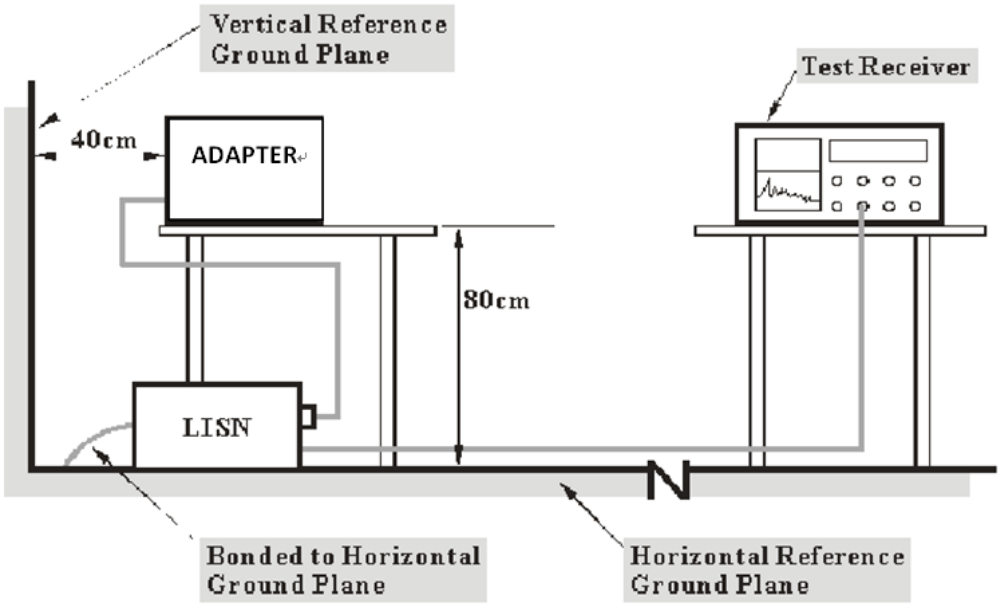
*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

FCC §15.107 – AC LINE CONDUCTED EMISSIONS

Applicable Standard

According to FCC §15.107

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 measurement procedure of EUT setup is according with per ANSI C63.4-2014. The related limit was specified in FCC Part 15.107 Class B.

The spacing between the peripherals was 10 cm.

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 host PC was connected to the first LISN and the other relevant equipments were conncected to 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 Factor & Margin Calculation

The Corrected factor is calculated by adding LISN/ISN VDF (Voltage Division Factor), Cable Loss and Transient Limiter Attenuation. The basic equation is as follows:

Correction Factor = LISN VDF + Cable Loss + Transient Limiter Attenuation

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 recorded data in following table, the EUT complied with the FCC Part 15.107,

Refer to CISPR16-4-2:2011 and CISPR 16-4-1:2009, the measured level is in compliance with the limit if

$$L_m + U_{(Lm)} \leq L_{lim} + U_{cispr}$$

In BACL., $U_{(Lm)}$ is less than U_{cispr}, if L_m is less than L_{lim}, it implies that the EUT complies with the limit.

Test Data

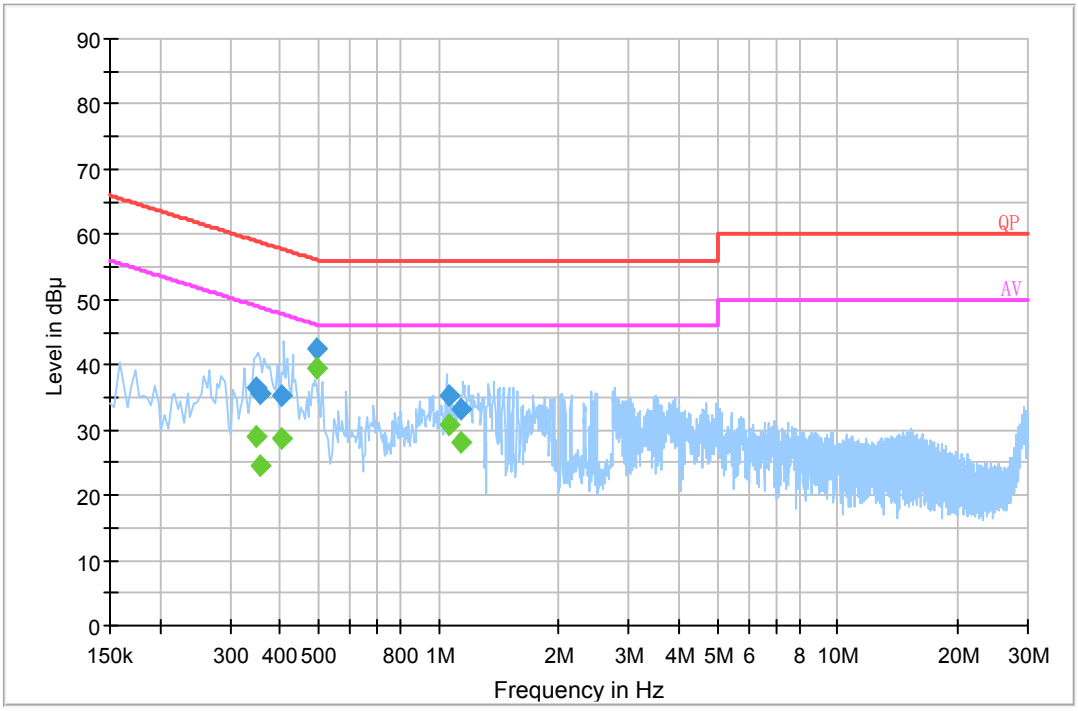
Environmental Conditions

Temperature:	25 ℃
Relative Humidity:	56 %
ATM Pressure:	101.0 kPa

The testing was performed by Hill He on 2018-01-08.

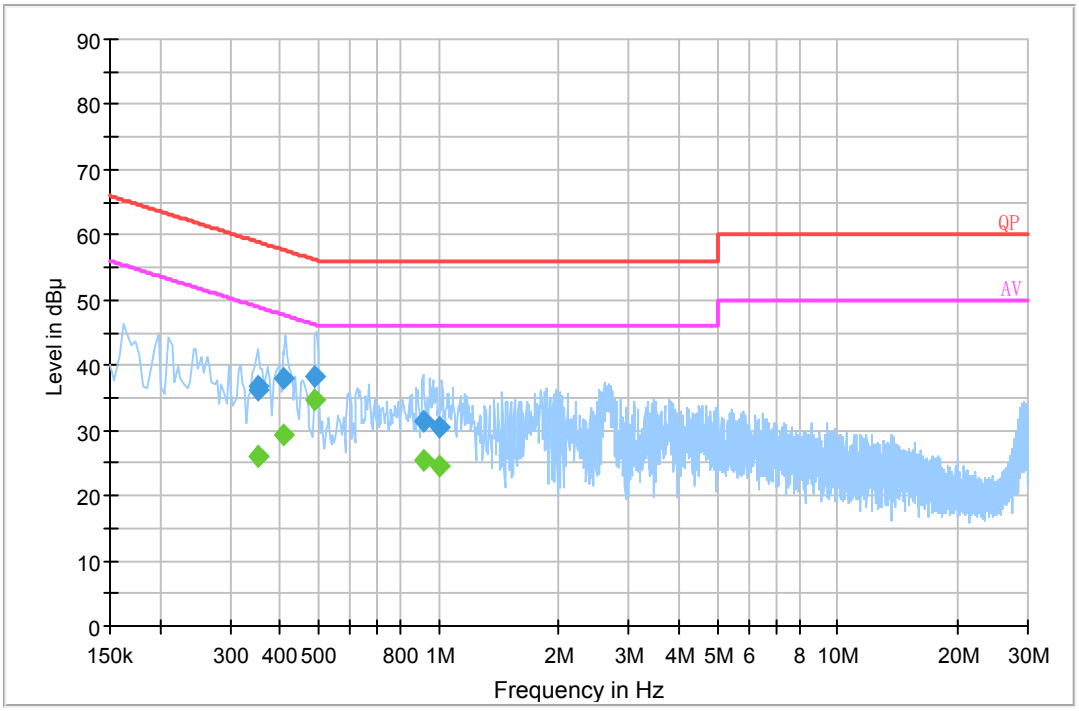
EUT Operation Mode: Charging

AC 120V/60 Hz, Line



Frequency (MHz)	Corrected Amplitude (dBµV)	Correction Factor (dB)	Limit (dBµV)	Margin (dB)	Detector (PK/Ave./QP)
0.348690	36.6	20.2	59.0	22.4	QP
0.355250	35.5	20.2	58.8	23.3	QP
0.403850	35.4	20.2	57.8	22.4	QP
0.494650	42.4	20.2	56.1	13.7	QP
1.061690	35.3	20.1	56.0	20.7	QP
1.132750	33.3	20.1	56.0	22.7	QP
0.348690	29.0	20.2	49.0	20.0	Ave.
0.355250	24.6	20.2	48.8	24.2	Ave.
0.403850	28.7	20.2	47.8	19.1	Ave.
0.494650	39.4	20.2	46.1	6.7	Ave.
1.061690	30.8	20.1	46.0	15.2	Ave.
1.132750	28.2	20.1	46.0	17.8	Ave.

AC 120V/60 Hz, Neutral



Frequency (MHz)	Corrected Amplitude (dBµV)	Correction Factor (dB)	Limit (dBµV)	Margin (dB)	Detector (PK/Ave./QP)
0.352690	36.8	20.2	58.9	22.1	QP
0.352750	36.1	20.2	58.9	22.8	QP
0.407790	38.0	20.2	57.7	19.7	QP
0.490590	38.3	20.2	56.2	17.9	QP
0.920290	31.3	20.1	56.0	24.7	QP
1.002730	30.4	20.1	56.0	25.6	QP
0.352690	26.1	20.2	48.9	22.8	Ave.
0.352750	26.0	20.2	48.9	22.9	Ave.
0.407790	29.3	20.2	47.7	18.4	Ave.
0.490590	34.6	20.2	46.2	11.6	Ave.
0.920290	25.4	20.1	46.0	20.6	Ave.
1.002730	24.4	20.1	46.0	21.6	Ave.

Note:
1) Correction Factor =LISN VDF (Voltage Division Factor) + Cable Loss + Transient Limiter Attenuation
2) Corrected Amplitude = Reading + Correction Factor
3) Margin = Limit – Corrected Amplitude

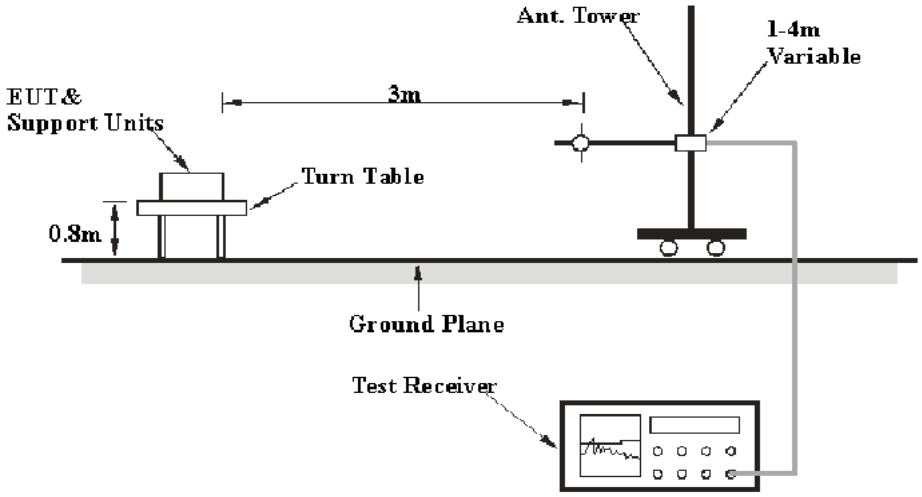
FCC §15.109 - RADIATED SPURIOUS EMISSIONS

Applicable Standard

FCC §15.109

EUT Setup

Below 1GHz:



The radiated emission tests were performed in the 3 meters chamber test site, using the setup accordance with the ANSI C63.4-2014. 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.

EMI Test Receiver Setup

The system was investigated from 30 MHz to 1 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	Detector
30 MHz – 1000 MHz	100 kHz	300 kHz	120 kHz	QP

Test Procedure

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 detector mode from 30 MHz to 1 GHz.

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:

Corrected Amplitude = Meter Reading + Antenna Factor + 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,

Refer to CISPR16-4-2:2011 and CISPR 16-4-1:2009, the measured level is in compliance with the limit if

$$L_m + U_{(Lm)} \leq L_{lim} + U_{cispr}$$

In BACL, $U_{(Lm)}$ is less than U_{cispr}, if L_m is less than L_{lim}, it implies that the EUT complies with the limit.

Test Data

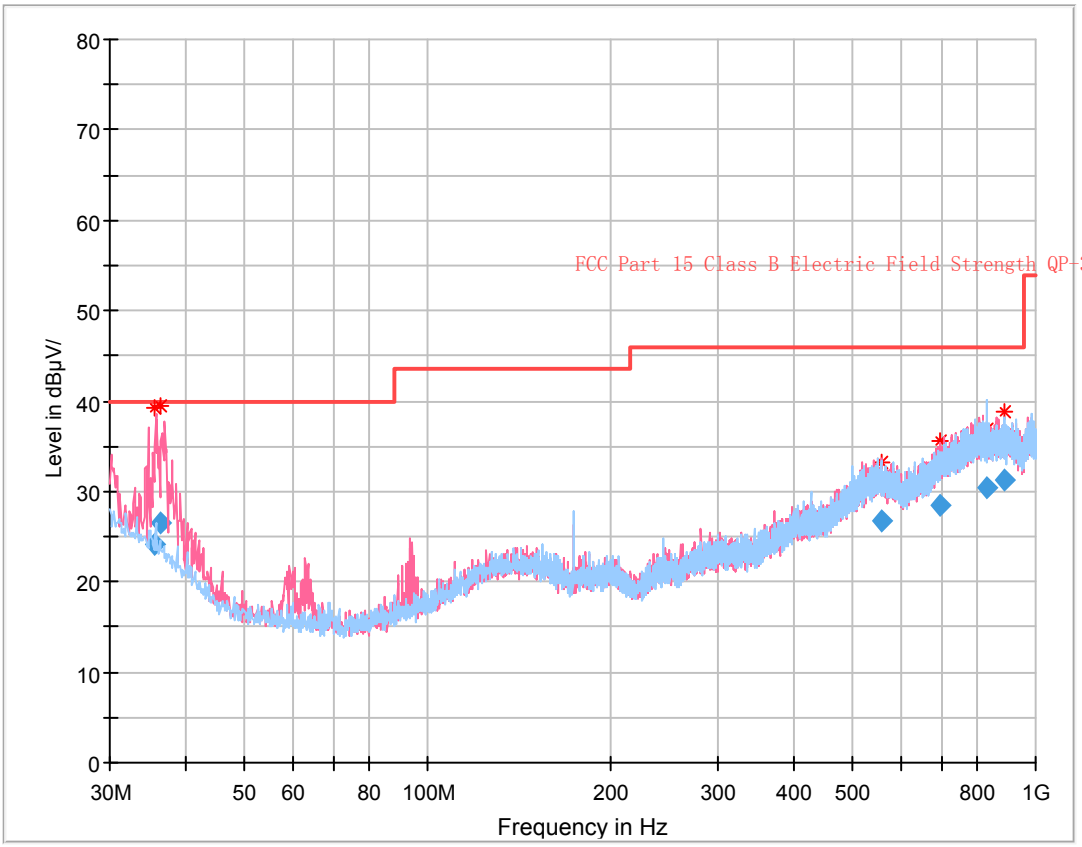
Environmental Conditions

Temperature:	25 ℃
Relative Humidity:	52 %
ATM Pressure:	101.0 kPa

The testing was performed by Hill He on 2018-01-08.

EUT Operation Mode: Charging

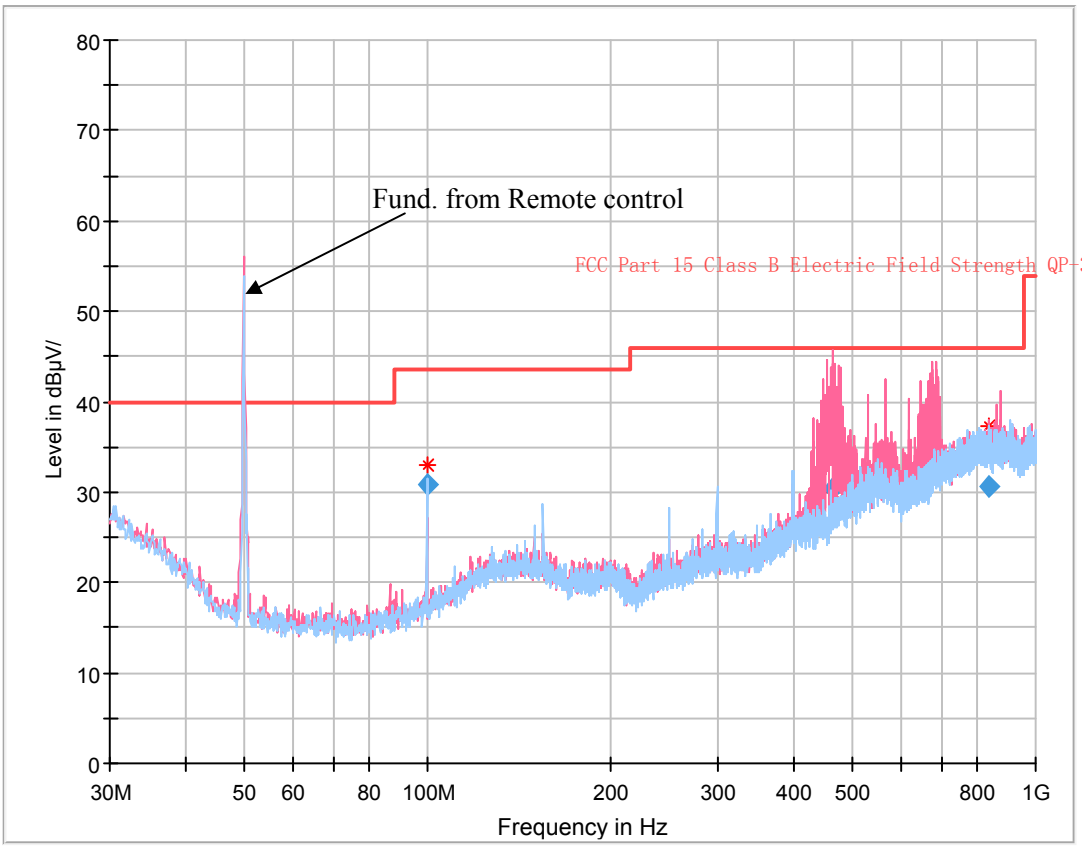
30 MHz – 1GHz:



Frequency (MHz)	Corrected Amplitude (dBµV/m)	Antenna height (cm)	Antenna Polarity	Turntable position (degree)	Correction Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
35.464250	24.16	100.0	V	286.0	-3.2	40.00	15.84
36.253125	26.47	102.0	V	28.0	-3.8	40.00	13.53
559.308000	26.77	396.0	V	0.0	4.6	46.00	19.23
696.421125	28.53	255.0	V	284.0	6.5	46.00	17.47
830.206375	30.45	155.0	H	70.0	9.0	46.00	15.55
889.156625	31.27	340.0	H	318.0	9.6	46.00	14.73

EUT Operation Mode: Receiving

30 MHz – 1GHz:



Frequency (MHz)	Corrected Amplitude (dBµV/m)	Antenna height (cm)	Antenna Polarity	Turntable position (degree)	Correction Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
100.198125	30.94	147.0	H	74.0	-9.3	43.50	12.56
463.950375	30.31	148.0	V	297.0	1.0	46.00	15.69
566.285375	32.61	400.0	V	143.0	4.4	46.00	13.39
687.426000	32.93	358.0	V	34.0	6.1	46.00	13.07
836.340750	30.58	400.0	V	0.0	9.0	46.00	15.42
869.606750	35.97	104.0	H	43.0	9.3	46.00	10.03

Note:
1) Corrected Amplitude = Correction Factor + Reading
2) Corrected Factor=Antenna factor(RX)+cable loss - amplifier factor
3) Margin = Limit - Corrected Amplitude

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