

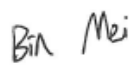
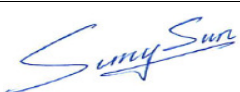
# FCC PART 15B, CLASS B TEST REPORT

For

## JM Manufacturing Limited

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

**FCC ID: 2AHGJJMSHW8883-149**

|                                                                                                                                                                                                                                                                                                                 |                                           |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|
| <b>Report Type:</b><br>Original Report                                                                                                                                                                                                                                                                          | <b>Product Type:</b><br>R/C OFF ROAD JEEP |
| <b>Test Engineer:</b> <u>Bin Mei</u>                                                                                                                                                                                       |                                           |
| <b>Report Number:</b> <u>RSZ160613833-00</u>                                                                                                                                                                                                                                                                    |                                           |
| <b>Report Date:</b> <u>2016-06-22</u>                                                                                                                                                                                                                                                                           |                                           |
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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.

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## GENERAL INFORMATION

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

The *JM Manufacturing Limited's* product, model number: *JMSHW8883-1(FCC ID: 2AHGJJMSHW8883-149)* or the "EUT" in this report was a receiver of *R/C OFF ROAD JEEP*, which was measured approximately: 195mm (L) x 82mm (W) x 83 mm (H), rated with input voltage: DC 1.5V x 4 AA batteries. The highest operating frequency is 49.86 MHz.

*\* All measurement and test data in this report was gathered from production sample serial number: 20160615. (Assigned by BACL, Shenzhen). The EUT supplied by the applicant was received on 2016-06-13.*

### 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: 2AHGJJMSHW8883-1491.

### 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 October 31, 2013. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2014.

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.

## SYSTEM TEST CONFIGURATION

### Description of Test Configuration

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

EUT operation mode: Receiving

### EUT Exercise Software

No exercise software was used.

### Special Accessories

No special accessory.

### Equipment Modifications

No modification was made to the EUT tested.

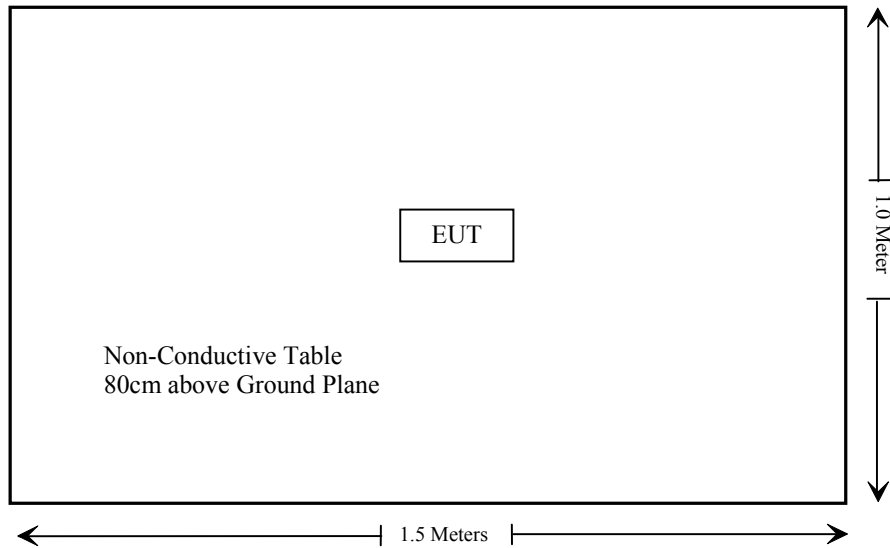
### Support Equipment List and Details

| Manufacturer | Description | Model | Serial Number |
|--------------|-------------|-------|---------------|
| Nanfu        | battery     | N/A   | N/A           |

### External I/O Cable

| Cable Description | Length (m) | From/Port | To |
|-------------------|------------|-----------|----|
| /                 | /          | /         | /  |

## Block Diagram of Test Setup



**SUMMARY OF TEST RESULTS**

| FCC Rules | Description of Test         | Results         |
|-----------|-----------------------------|-----------------|
| §15.107   | AC Line Conducted Emissions | Not Applicable* |
| §15.109   | Radiated Spurious Emissions | Compliance      |

\*Note: The EUT is powered by batteries.

## FCC §15.109 - RADIATED SPURIOUS EMISSIONS

### Applicable Standard

FCC §15.109

### Measurement Uncertainty

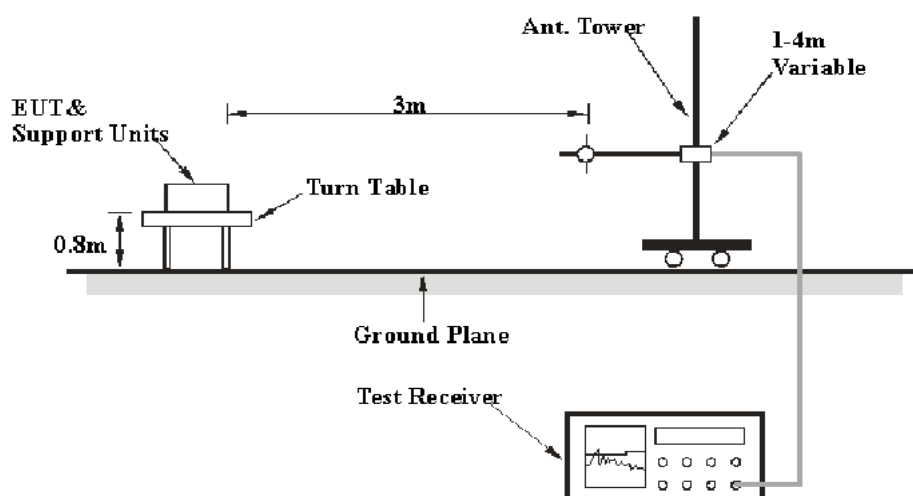
All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase center variation, antenna factor frequency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

Based on CISPR 16-4-2:2011, the expanded combined standard uncertainty of radiation emissions at Bay Area Compliance Laboratories Corp. (Shenzhen) is 5.81 dB for 30MHz-1GHz and 4.88 dB for above 1GHz, 1.95dB for conducted measurement at antenna port. And the uncertainty will not be taken into consideration for the test data recorded in the report

| Frequency      | Polarity            | Measurement uncertainty                |
|----------------|---------------------|----------------------------------------|
| 30 MHz~200 MHz | Horizontal          | 4.04 dB (k=2, 95% level of confidence) |
|                | Vertical            | 4.52 dB (k=2, 95% level of confidence) |
| 200 MHz~1 GHz  | Horizontal          | 4.72 dB (k=2, 95% level of confidence) |
|                | Vertical            | 5.81 dB (k=2, 95% level of confidence) |
| 1 GHz~6 GHz    | Horizontal/Vertical | 4.64 dB (k=2, 95% level of confidence) |
| Above 6 GHz    | Horizontal/Vertical | 4.88 dB (k=2, 95% level of confidence) |

### 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.

### Test Equipment List and Details

| Manufacturer          | Description        | Model                 | Serial Number          | Calibration Date | Calibration Due Date |
|-----------------------|--------------------|-----------------------|------------------------|------------------|----------------------|
| Rohde & Schwarz       | EMI Test Receiver  | ESCI                  | 101120                 | 2015-11-03       | 2016-11-03           |
| Sunol Sciences        | Bi-log Antenna     | JB1                   | A040904-2              | 2014-12-07       | 2017-12-06           |
| HP                    | Amplifier          | HP8447E               | 1937A01046             | 2016-05-06       | 2017-05-06           |
| TDK                   | Chamber            | Chamber A             | 2#                     | 2015-10-15       | 2018-10-15           |
| R&S                   | Auto test Software | EMC32                 | V9.10                  | NCR              | NCR                  |
| Ducommun technologies | RF Cable           | UFA210A-1-4724-30050U | MFR64369<br>223410-001 | 2016-06-15       | 2017-06-15           |
| Ducommun technologies | RF Cable           | 104PEA                | 218124002              | 2016-06-15       | 2017-06-15           |
| Ducommun technologies | RF Cable           | RG-214                | 1                      | 2016-06-15       | 2017-06-15           |
| Ducommun technologies | RF Cable           | RG-214                | 2                      | 2016-06-15       | 2017-06-15           |

\* **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).

### 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 Results Summary

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

**2.16 dB at 49.835000 MHz in the Horizontal polarization mode.**

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**

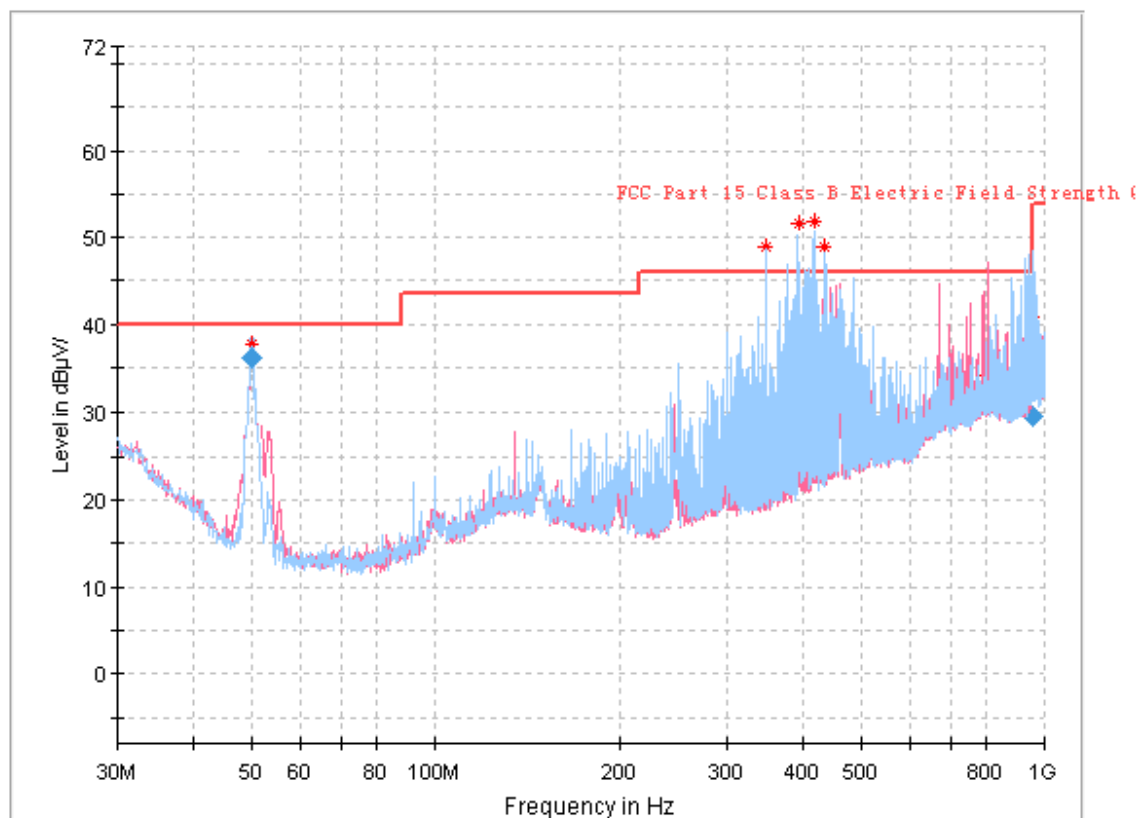
|                    |           |
|--------------------|-----------|
| Temperature:       | 26.3 °C   |
| Relative Humidity: | 65 %      |
| ATM Pressure:      | 101.0 kPa |

The testing was performed by Bin Mei on 2016-06-20.

EUT Operation Mode: Controlling

**30 MHz – 1GHz:**

Full Spectrum



| Frequency<br>(MHz) | Receiver          |                          | Turntable<br>Degree | Rx Antenna    |                | Corrected<br>Factor<br>(dB/m) | Corrected<br>Amplitude<br>(dBμV/m) | FCC Part 15B      |                |
|--------------------|-------------------|--------------------------|---------------------|---------------|----------------|-------------------------------|------------------------------------|-------------------|----------------|
|                    | Reading<br>(dBμV) | Detector<br>(PK/QP/Ave.) |                     | Height<br>(m) | Polar<br>(H/V) |                               |                                    | Limit<br>(dBμV/m) | Margin<br>(dB) |
| 49.835000          | 50.44             | QP                       | 186                 | 1.1           | H              | -12.6                         | 37.84                              | 40.00             | <b>2.16</b>    |
| 346.741000         | 26.98             | QP                       | 278                 | 1.0           | H              | -5.6                          | 21.38                              | 46.00             | 24.62          |
| 393.122500         | 34.82             | QP                       | 302                 | 1.0           | H              | -4.2                          | 30.62                              | 46.00             | 15.38          |
| 418.075125         | 33.06             | QP                       | 293                 | 1.0           | H              | -3.6                          | 29.46                              | 46.00             | 16.54          |
| 435.478000         | 28.68             | QP                       | 149                 | 1.0           | H              | -3.1                          | 25.68                              | 46.00             | 20.32          |
| 959.446000         | 29.67             | QP                       | 103                 | 1.3           | H              | 6.4                           | 35.67                              | 46.00             | 10.33          |

**Note:**

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

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