FCC TEST REPORT

For Shen Zhen Simagic Technology Co.,Limited Direct drive force-feedback simwheel Test Model: M10-SR Additional Model No.: Please Refer to Page 6

Prepared for	:	Shen Zhen Simagic Technology Co.,Limited
		No.302, building 7, DCC cultural and creative park, No. 95,
Address	:	Pingxin North Road, shangmugu community, Pinghu street,
		Longgang District, Shenzhen
Prepared by	:	Shenzhen LCS Compliance Testing Laboratory Ltd.
Address	:	101, 201 Bldg A & 301 Bldg C, Juji Industrial Park Shajing Street, Baoan District, Shenzhen, China
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Web	:	www.LCS-cert.com
Mail	:	webmaster@LCS-cert.com
Date of receipt of test sample	:	May 27, 2020
Number of tested samples	:	1
Serial number	:	Prototype
Date of Test	:	May 27, 2020 ~ June 03, 2020
Date of Report	:	June 05, 2020

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IENZHEN LCS COMPLIANCE TESTING LA		eport No.: LCS200509061AE
	FCC TEST REPORT FCC CFR 47 PART 18	
Report Reference No	. : LCS200509061AEB	
Date Of Issue	. : June 05, 2020	
Testing Laboratory Name	. : Shenzhen LCS Compliance Testing Lab	oratory Ltd.
Address	. 101, 201 Bldg A & 301 Bldg C, Juji Industri Baoan District, Shenzhen, China	al Park Shajing Street,
	Full application of Harmonised standards	
Testing Location/ Procedure	Partial application of Harmonised standard	S 🗆
	Other standard testing method \square	
Applicant's Name	: Shen Zhen Simagic Technology Co.,Lim	lited
Address	No.302, building 7, DCC cultural and creationPingxin North Road, shangmugu communit Longgang District, Shenzhen	
Test Specification		
Standard	: FCC CFR 47 PART 18	
Test Report Form No	: LCSEMC-1.0	
TRF Originator	. : Shenzhen LCS Compliance Testing Labora	atory Ltd.
Master TRF	. : Dated 2011-03	
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Test Item Description	. : Direct drive force-feedback simwheel	
Trade Mark	. : N/A	
Test Model		
Power Supply	. : Input: AC 100-240V, 50-60Hz, 240W Output : DC 24V, 10A	
Result	. : Positive	
Compiled by:	Supervised by:	Approved by:
Jangaber 2 hus	Jin Wang	Juino Limog

Jayden Zhuo/ Administrators

Jin Wang/ Technique principal

Gavin Liang/ Manager

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FCC ID: 2AWJ8-M10-SR Report No.: LCS200509061AEB

FCC TEST REPORT

Test Report No. :	LCS200509061AEB
-------------------	-----------------

June 05, 2020 Date of issue

Test Model	: M10-SR
EUT	: Direct drive force-feedback simwheel
Applicant	: Shen Zhen Simagic Technology Co.,Limited
Address	No.302, building 7, DCC cultural and creative park, No. 95,Pingxin North Road, shangmugu community, Pinghu street, Longgang District, Shenzhen
Telephone	:/
Fax	:/
Manufacturer	: Shen Zhen Simagic Technology Co.,Limited
	No.302, building 7, DCC cultural and creative park, No. 95,
Address	 Pingxin North Road, shangmugu community, Pinghu street, Longgang District, Shenzhen
Telephone	:/
Fax	: /
Factory	: Shen Zhen Simagic Technology Co.,Limited No.302, building 7, DCC cultural and creative park, No. 95,
Address	5
Telephone	
Fax	

	Test Result	Positive
--	-------------	----------

The test report merely corresponds to the test sample.

It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

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Revision History

Revision	Issue Date	Revisions	Revised By
000	June 05, 2020	Initial Issue	Gavin Liang

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TABLE OF CONTENTS

1. GENERAL INFORMATION	6
1.1 Description of Device (EUT)	6
1.2 Support equipment List	
1.3 External I/O Cable	
1.4 Description of Test Facility	
1.5 Statement of the Measurement Uncertainty	
1.6 Measurement Uncertainty 1.7 Description of Test Modes	/
2. TEST METHODOLOGY	
2.1 EUT Configuration	
2.2 EUT Exercise	
2.3 General Test Procedures	
2.3.1 Conducted Emissions	
2.3.2 Radiated Emissions	
3. SYSTEM TEST CONFIGURATION	10
3.1 Justification	10
3.2 EUT Exercise Software	
3.3 Special Accessories	
3.4 Block Diagram/Schematics	
3.5 Equipment Modifications	
3.6 Test Setup	
4. SUMMARY OF TEST EQUIPMENT	
5. SUMMARY OF TEST RESULT	
6. POWER LINE CONDUCTED MEASUREMENT	13
7. RADIATED EMISSION MEASUREMENT	16
7.1. Block Diagram of Test Setup	16
7.2. Radiated Emission Limit	
7.3. EUT Configuration on Measurement	
7.4. Operating Condition of EUT	
7.5. Measuring Setting	
7.6. Test Procedure 7.7. Test Results	
8. PHOTOGRAPHS OF TEST SETUP	
9. EXTERNAL PHOTOGRAPHS OF THE EUT	
10. INTERNAL PHOTOGRAPHS OF THE EUT	23

This report shall not be reproduced except in full, without the written approval of Shenzhen LCS Compliance Testing Laboratory Ltd. Page 5 of 23

SHENZHEN LCS COMPLIANCE TESTING LABORATORY LTD. FCC ID: 2AWJ8-M10-SR Report No.: LCS200509061AEB

1. GENERAL INFORMATION

1.1	.1 Description of Device (EUT)				
	EUT	: Direct drive force-feedback simwheel			
	Test Model	: M10-SR			
	Additional Model No	: M10-SDC, M10-GT4, M10-GT4C, M10			
	Model Declaration	. PCB board, structure and internal of these model(s) are the same, . So no additional models were tested			
	Power Supply	: Input: AC 100-240V, 50-60Hz, 240W Output : DC 24V, 10A			
	Hardware Version	: V1.1			
	Software Version	: 4031			
	2.4G Emission:				
	Frequency Range	: 2402MHz-2480MHz			
	Channel Number	: 40			
	Modulation Type	: GFSK			
	Antenna Description	: PCB Antenna, 0dBi			
	2.4G Receive:				
	Frequency Range	: 2402MHz-2480MHz			
	Channel Number	: 40			
	Modulation Type	: GFSK			
	Antenna Description	: PCB Antenna, 0dBi			
	Wireless Charging	:			
	Operating Frequency	: 110.0~205.0KHz			
	Modulation Type	: Continuous Wave			
	Antenna Type	: Coil Antenna, 0dBi			

1.2 Support equipment List

Manufacturer	Description	Model	Serial Number	Certificate	

1.3 External I/O Cable

I/O Port Description	Quantity	Cable	

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FCC ID: 2AWJ8-M10-SR Report No.: LCS200509061AEB

1.4 Description of Test Facility

FCC Registration Number is 254912.

Industry Canada Registration Number is 9642A.

EMSD Registration Number is ARCB0108.

UL Registration Number is 100571-492.

TUV SUD Registration Number is SCN1081.

TUV RH Registration Number is UA 50296516-001.

NVLAP Accreditation Code is 600167-0.

FCC Designation Number is CN5024.

CAB identifier: CN0071

The 3m-Semi anechoic test site fulfils CISPR 16-1-4 according to ANSI C63.4:2014 and CISPR 16-1-4:2010 SVSWR requirement for radiated emission above 1GHz.

1.5 Statement of the Measurement Uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. To CISPR 16 - 4 "Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements" and is documented in the LCS quality system acc. To DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Test Item		Frequency Range	Uncertainty	Note
		9KHz~30MHz	3.10dB	(1)
		30MHz~200MHz	2.96dB	(1)
Radiation Uncertainty	:	200MHz~1000MHz	3.10dB	(1)
-		1GHz~26.5GHz	3.80dB	(1)
		26.5GHz~40GHz	3.90dB	(1)
Conduction Uncertainty	:	150kHz~30MHz	1.63dB	(1)
Power disturbance	•	30MHz~300MHz	1.60dB	(1)

1.6 Measurement Uncertainty

(1). This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

FCC ID: 2AWJ8-M10-SR Report No.: LCS200509061AEB

1.7 Description of Test Modes

Equipment under test was operated during the measurement under the following conditions:

 \boxtimes Charging and communication mode

Modulation Type: CW (Continuous Wave)

Test Mo	Test Modes			
Mode 1	AC/DC Adapter (5V/2.4A) + EUT+ Mobile Phone (Battery Status: <1%)	Record		
Mode 2	AC/DC Adapter (5V/2.4A) + EUT+ Mobile Phone (Battery Status: <50%)	Pre-tested		
Mode 3	AC/DC Adapter (5V/2.4A) + EUT+ Mobile Phone (Battery Status: 100%)	Pre-tested		
Mode 4	PC Charger + EUT+ Mobile Phone (Battery Status: <1%)	Pre-tested		
Mode 5	PC Charger + EUT+ Mobile Phone (Battery Status: <50%)	Pre-tested		
Mode 6	PC Charger + EUT+ Mobile Phone (Battery Status: 100%)	Pre-tested		
Noto: All test modes were pro tested, but we only recorded the worst case in this report				

Note: All test modes were pre-tested, but we only recorded the worst case in this report.

For AC conducted emission, pre-test at both AC 120V/60Hz and AC 240V/50Hz, recorded worst case; For AC conducted emission, pre-test at both AC charge from power adapter modes, recorded worst case.

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with MP-5, and FCC CFR PART 18.

2.1 EUT Configuration

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner that intends to maximize its emission characteristics in a continuous normal application.

2.2 EUT Exercise

The EUT was operated in the charging and compunction mode to fix the TX frequency that was for the purpose of the measurements.

According to its specifications, the EUT must comply with the requirements of the Section 18.305 and 18.307 under the FCC Rules Part 18.

2.3 General Test Procedures

2.3.1 Conducted Emissions

The EUT is placed on the turntable, which is 0.8 m above ground plane. According to the requirements in FCC MP-5 for Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using Quasi-peak and average detector modes.

2.3.2 Radiated Emissions

The EUT is placed on a turn table, which is 0.8 m above ground plane. The turntable shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna, which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the maximum emissions, exploratory radiated emission measurements were made according to the requirements in FCC MP-5 for radiated emission.

FCC ID: 2AWJ8-M10-SR Report No.: LCS200509061AEB

3. SYSTEM TEST CONFIGURATION

3.1 Justification

The system was configured for testing in a normal condition.

3.2 EUT Exercise Software

N/A.

3.3 Special Accessories

N/A.

3.4 Block Diagram/Schematics

Please refer to the related document.

3.5 Equipment Modifications

Shenzhen LCS Compliance Testing Laboratory Ltd. has not done any modification on the EUT.

3.6 Test Setup

Please refer to the test setup photo.

4. SUMMARY OF TEST EQUIPMENT

Item	Equipment	Manufacturer	Model No.	Serial No.	Cal Date	Due Date
1	MXA Signal Analyzer	Agilent	N9020A	MY49100040	2019-06-11	2020-06-10
2	SPECTRUM ANALYZER	R&S	FSP40	100503	2019-11-14	2020-11-13
3	3m Semi Anechoic Chamber	SIDT FRANKONIA	SAC-3M	03CH03-HY	2019-06-12	2020-06-11
4	Positioning Controller	MF	MF-7082	/	2019-06-12	2020-06-11
5	EMI Test Software	EZ	EZ-EMC	/	N/A	N/A
6	EMI Test Receiver	R&S	ESR 7	101181	2019-06-12	2020-06-11
7	Active Loop Antenna	SCHWARZBECK	FMZB 1519B	00005	2018-07-26	2021-07-25
8	By-log Antenna	SCHWARZBECK	VULB9163	9163-470	2018-07-26	2021-07-25
9	Horn Antenna	SCHWARZBECK	BBHA 9120D	9120D-1925	2018-07-02	2021-07-01
10	RF Cable-R03m	Jye Bao	RG142	CB021	2019-06-12	2020-06-11
11	RF Cable-HIGH	SUHNER	SUCOFLEX 106	03CH03-HY	2019-06-12	2020-06-11
12	EMI Test Receiver	R&S	ESPI	101840	2019-06-11	2020-06-10
13	Artificial Mains	R&S	ENV216	101288	2019-06-12	2020-06-11
14	10dB Attenuator	SCHWARZBECK	MTS-IMP-136	261115-001-0032	2019-06-11	2020-06-10
Note: A	Note: All equipment is calibrated through CHINA CEPREI LABORATORY and GUANGZHOU LISAI CALIBRATION AND TEST CO., LTD.					

5. SUMMARY OF TEST RESULT

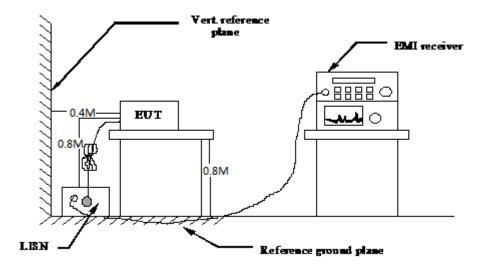
Test Item	FCC Rule No.	Temperature conditions	Power source conditions	С	NC	NA	NP	Remark
Radiated Emission	§18.305 (b)	Nominal	Nominal	\boxtimes				-/-
AC conducted emission	§18.307 (a)	Nominal	Nominal	\boxtimes				-/-

Remark: The measurement uncertainty is not included in the test result. N/A – Not Applicable!!!

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 SHENZHEN LCS COMPLIANCE TESTING LABORATORY LTD.
 FCC ID: 2AWJ8-M10-SR
 Report No.: LCS200509061AEB

6. POWER LINE CONDUCTED MEASUREMENT

6.1. Block Diagram of Test Setup



6.2. Standard Applicable

According to §18.307 (b): For all other part 18 consumer devices which is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed 250 microvolts (The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz). The limits at specific frequency range are listed as follows:

Frequency Range	Limits (dBµV)		
(MHz)	Quasi-peak	Average	
0.15 to 0.50	66 to 56	56 to 46	
0.50 to 5	56	46	
5 to 30	60	50	

* Decreasing linearly with the logarithm of the frequency

6.3 Test Results

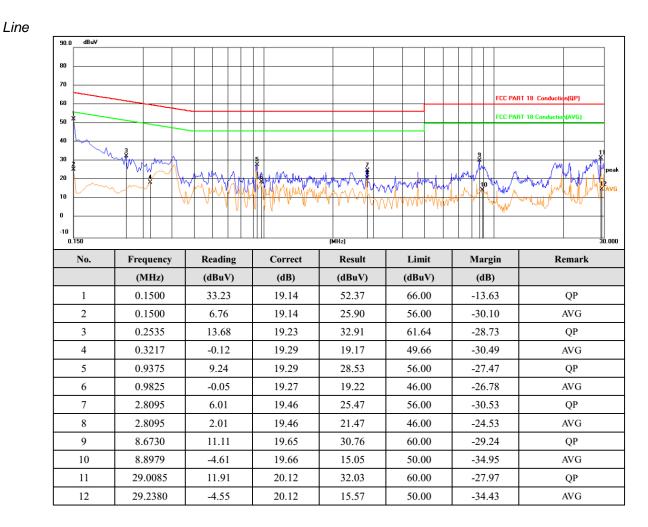
PASS

The test data please refer to following page.

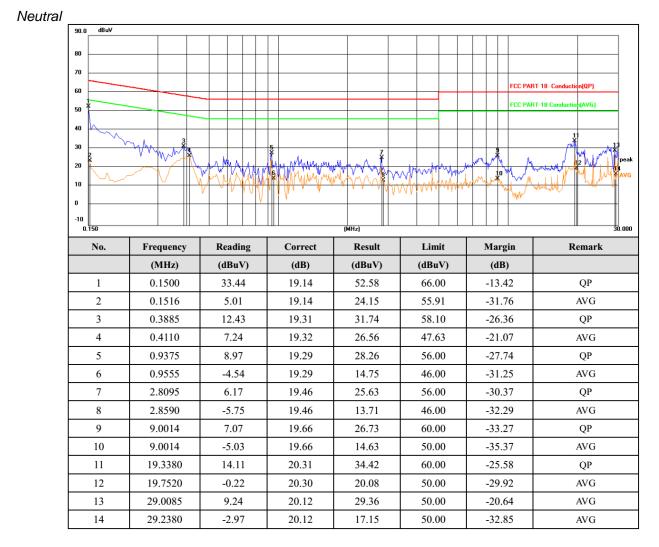
Temperature	23.3°C	Humidity	53.7%			
Test Engineer	Qu Xin	Configurations	Transmit			

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FCC ID: 2AWJ8-M10-SR Report No.: LCS200509061AEB



AC Power Line Conducted Emission (Power input to adapter @ AC 120V/60Hz (Worst Case))

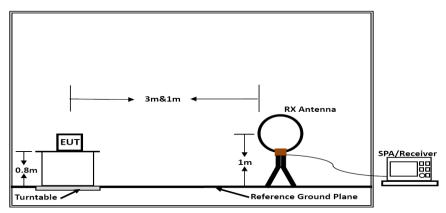


***Note: Pre-scan all modes and recorded the worst case results in this report.

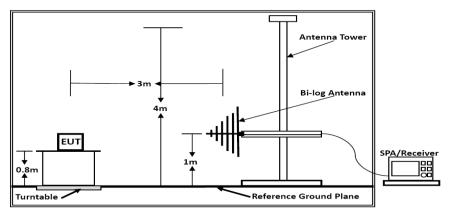
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7. RADIATED EMISSION MEASUREMENT

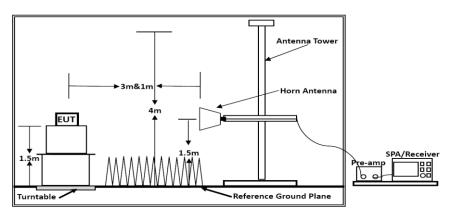
7.1. Block Diagram of Test Setup



Below 30MHz



Below 1GHz



Above 1GHz

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7.2. Radiated Emission Limit

Except as provided elsewhere in this Subpart 18.305 (b), the field strength levels of emissions which lie outside the bands specified in §18.301, unless otherwise indicated, shall not exceed the following table:

Frequency	Distance	Field Stre	ngths Limit	
MHz	MHz Meters		Remark	
0.009~30MHz	3	103.5	Quasi-peak	
30~88	3	40.0	Quasi-peak	
88~216	3	43.5	Quasi-peak	
216~960	3	46.0	Quasi-peak	
960~1000	3	54.0	Quasi-peak	

Remark:

(1) Emission level dB μ V/m for 0.009~30MHz = 20log (25) + 40log (300/3) dB μ V/m;

(2) Calculated according FCC 18.305.

(3) The smaller limit shall apply at the cross point between two frequency bands.

(4) Distance is the distance in meters between the measuring instrument, antenna and the closest point of any part of the device or system.

7.3. EUT Configuration on Measurement

The following equipment are installed on Radiated Emission Measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

7.4. Operating Condition of EUT

(1) Setup the EUT as shown in Section 4.1.

(2) Let the EUT work in worst test mode (Mode 1) and measure it.

7.5. Measuring Setting

The following table is the setting of spectrum analyzer and receiver.

Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RB 200Hz for QP/Average
Start ~ Stop Frequency	150kHz~30MHz / RB 9kHz for QP/Average
Start ~ Stop Frequency	30MHz~1000MHz / RB 100kHz for QP

7.6. Test Procedure

1) Sequence of testing 9 kHz to 30 MHz

Setup:

--- The equipment was set up to simulate a typical usage like described in the user manual or described by manufacturer.

- --- If the EUT is a tabletop system, a rotatable table with 0.8 m height is used.
- --- If the EUT is a floor standing device, it is placed on the ground.
- --- Auxiliary equipment and cables were positioned to simulate normal operation conditions.
- --- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.
- --- The measurement distance is 3 meter.
- --- The EUT was set into operation.

Premeasurement:

--- The turntable rotates from 0° to 315° using 45° steps.

--- The antenna height is 0.8 meter.

--- At each turntable position the analyzer sweeps with peak detection to find the maximum of all emissions

Final measurement:

--- Identified emissions during the premeasurement the software maximizes by rotating the turntable position (0° to 360°) and by rotating the elevation axes (0° to 360°).

--- The final measurement will be done in the position (turntable and elevation) causing the highest emissions with QPK detector.

--- The final levels, frequency, measuring time, bandwidth, turntable position, correction factor, margin to the limit and limit will be recorded. Also a plot with the graph of the premeasurement and the limit will be stored.

2) Sequence of testing 30 MHz to 1 GHz

Setup:

--- The equipment was set up to simulate a typical usage like described in the user manual or described by manufacturer.

--- If the EUT is a tabletop system, a table with 0.8 m height is used, which is placed on the ground plane.

- --- If the EUT is a floor standing device, it is placed on the ground plane with insulation between both.
- --- Auxiliary equipment and cables were positioned to simulate normal operation conditions
- --- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.
- --- The measurement distance is 3 meter.

--- The EUT was set into operation.

Premeasurement:

- --- The turntable rotates from 0° to 315° using 45° steps.
- --- The antenna is polarized vertical and horizontal.
- --- The antenna height changes from 1 to 3 meter.

--- At each turntable position, antenna polarization and height the analyzer sweeps three times in peak to find the maximum of all emissions.

Final measurement:

--- The final measurement will be performed with minimum the six highest peaks.

--- According to the maximum antenna and turntable positions of premeasurement the software maximize the peaks by changing turntable position (\pm 45°) and antenna movement between 1 and 4 meter.

--- The final measurement will be done with QP detector with an EMI receiver.

--- The final levels, frequency, measuring time, bandwidth, antenna height, antenna polarization, turntable angle, correction factor, margin to the limit and limit will be recorded. Also a plot with the graph of the premeasurement with marked maximum final measurements and the limit will be stored.

7.7. Test Results

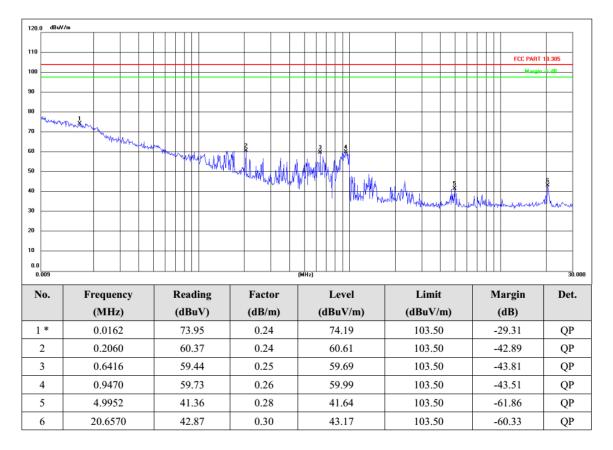
PASS.

Only report the worst test data (Mode 1) in test report;

The test data please refer to following page:

Temperature	24.6°C	Humidity	54.1%
Test Engineer	Qu Xin	Configurations	Transmit

0.009 MHz – 30 MHz



Remark: Measured at antenna position 0 degree and 90 degree, recorded worst case at 0 degree.

Below 1GHz

4

5 *

6

138.3873

170.1948

298.2681

49.89

57.39

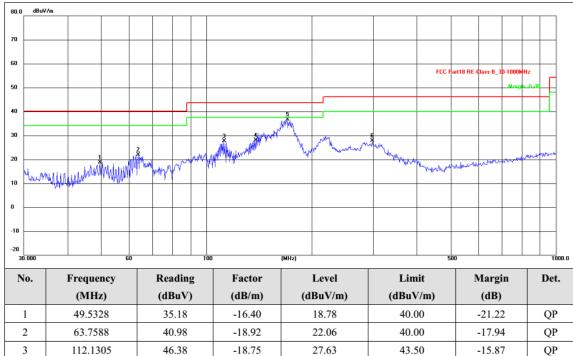
43.48

-21.93

-20.70

-15.69

Horizontal



27.96

36.69

27.79

43.50

43.50

46.00

-15.54

-6.81

-18.21

QP

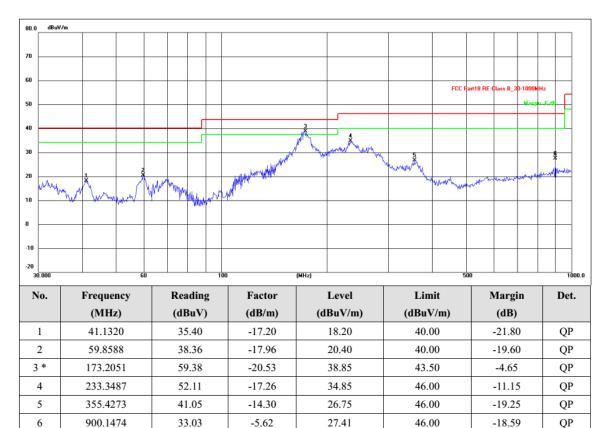
QP

QP

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FCC ID: 2AWJ8-M10-SR Report No.: LCS200509061AEB

Vertical



FCC ID: 2AWJ8-M10-SR Report No.: LCS200509061AEB

8. PHOTOGRAPHS OF TEST SETUP

Please refer to separated files for Test Setup Photos of the EUT.

9. EXTERNAL PHOTOGRAPHS OF THE EUT

Please refer to separated files for External Photos of the EUT.

10. INTERNAL PHOTOGRAPHS OF THE EUT

Please refer to separated files for Internal Photos of the EUT.

-----THE END OF REPORT------