



FCC Part 15, Subpart B, Class A

ComNavTechnologyLtd.

Motor

Test Model: MT01

Prepared for : ComNavTechnologyLtd.
Address : Building 2, No.618 Chengliu Middle Rd. Malu town,
Shanghai,China

Prepared by : Shenzhen LCS Compliance Testing Laboratory Ltd.
Address : 101, 201 Bldg A & 301 Bldg C, Juji Industrial Park
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Date of receipt of test sample : April 28, 2024
Number of tested samples : 2
Sample No. : A230914038-1, A230914038-2
Serial number : Prototype
Date of Test : April 28, 2024 ~ May 11, 2024
Date of Report : June 03, 2024





FCC Part 15, Subpart B, Class A
FCC 47 CFR Part 15 Subpart B, Class A, ANSI C63.4 -2014

Report Reference No. : **LCSA05144165EA**

Date Of Issue..... : June 03, 2024

Testing Laboratory Name..... : **Shenzhen LCS Compliance Testing Laboratory Ltd.**

Address..... : 101, 201 Bldg A & 301 Bldg C, Juji Industrial Park
Yabianxueziwei, Shajing Street, Baoan District, Shenzhen,
518000, China

Testing Location/ Procedure.... : Full application of Harmonised standards ■
Partial application of Harmonised standards □
Other standard testing method □

Applicant's Name..... : **ComNavTechnologyLtd.**

Address..... : Building 2, No.618 Chengliu Middle Rd. Malu town,
Shanghai,China

Test Specification

Standard..... : FCC 47 CFR Part 15 Subpart B, Class A, ANSI C63.4 -2014

Test Report Form No..... : LCSEMC-1.0

TRF Originator..... : Shenzhen LCS Compliance Testing Laboratory Ltd.

Master TRF..... : Dated 2011-03

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Test Item Description..... : **Motor**

Test Model : MT01

Trade Mark..... : **SinoGNSS®**

Ratings : DC 24V

Result : **Positive**

Compiled by:

Joker Hu

Joker Hu/ Administrator

Supervised by:

Cary Luo

Cary Luo/ Technique principal

Approved by:

Gavin Liang

Gavin Liang/ Manager



Shenzhen LCS Compliance Testing Laboratory Ltd.

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**FCC -- TEST REPORT****Test Report No. : LCSA05144165EA**June 03, 2024

Date of issue

Test Model : MT01

EUT..... : Motor

Applicant..... : ComNavTechnologyLtd.Address..... : Building 2, No.618 Chengliu Middle Rd. Malu town,
Shanghai,China

Telephone..... : /

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Manufacturer..... : ComNavTechnologyLtd.Address..... : Building 2, No.618 Chengliu Middle Rd. Malu town,
Shanghai,China

Telephone..... : /

Fax..... : /

Factory..... : ComNavTechnologyLtd.Address..... : Building 2, No.618 Chengliu Middle Rd. Malu town,
Shanghai,China

Telephone..... : /

Fax..... : /

Test Result according to the standards on page 6: **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

Report Version	Issue Date	Revision Content	Revised By
000	June 03, 2024	Initial Issue	---





TABLE OF CONTENTS

Test Report Description	Page
1. SUMMARY OF STANDARDS AND RESULTS	6
1.1. Description of Standards and Results	6
2. GENERAL INFORMATION	7
2.1. Description of Device (EUT)	7
2.2. Support Equipment List	7
2.3. External I/O	7
2.3. Description of Test Facility	8
2.4. Statement of the Measurement Uncertainty	8
2.5. Measurement Uncertainty	8
3. TEST RESULTS	9
3.1. POWER LINE CONDUCTED EMISSION MEASUREMENT	9
3.2. Radiated emission Measurement	11
4. TEST SETUP PHOTOGRAPHS OF EUT	15
5. EXTERIOR PHOTOGRAPHS OF THE EUT	15
6. INTERIOR PHOTOGRAPHS OF THE EUT	15





1. SUMMARY OF STANDARDS AND RESULTS

1.1. Description of Standards and Results

The EUT have been tested according to the applicable standards as referenced below.

EMISSION			
Description of Test Item	Standard	Limits	Results
Conducted disturbance at mains terminals	FCC 47 CFR Part 15 Subpart B, Class A, ANSI C63.4 -2014	Class A	N/A
Radiated disturbance	FCC 47 CFR Part 15 Subpart B, Class A, ANSI C63.4 -2014	Class A	PASS
N/A is an abbreviation for Not Applicable.			

Test mode:

Mode1	Working	Record
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2. GENERAL INFORMATION

2.1. Description of Device (EUT)

EUT : Motor

Trade Mark : **SinoGNSS®**

Test Model : MT01

Power Supply : DC 24V

Highest internal frequency (Fx) : $F_x \leq 108 \text{ MHz}$

Highest internal frequency (Fx)	Highest measured frequency
$F_x \leq 108 \text{ MHz}$	1 GHz
$108 \text{ MHz} < F_x \leq 500 \text{ MHz}$	2 GHz
$500 \text{ MHz} < F_x \leq 1 \text{ GHz}$	5 GHz
$F_x > 1 \text{ GHz}$	$5 \times F_x$ up to a maximum of 6 GHz

NOTE 1 For FM and TV broadcast receivers, F_x is determined from the highest frequency generated or used excluding the local oscillator and tuned frequencies.
Where F_x is unknown, the radiated emission measurements shall be performed up to 6 GHz.

2.2. Support Equipment List

Manufacturer	Description	Model	Serial Number	Certificate
---	---	---	---	---

2.3. External I/O

I/O Port Description	Quantity	Cable
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2.3. Description of Test Facility

Site Description EMC Lab.

: NVLAP Accreditation Code is 600167-0.
FCC Designation Number is CN5024.
CAB identifier is CN0071.
CNAS Registration Number is L4595.
FCC Test Firm Registration Number: 254912

2.4. 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.

2.5. Measurement Uncertainty

Test	Parameters	Expanded Uncertainty (U _{lab})	Expanded Uncertainty (U _{cispr})
Conducted Emission	Level accuracy (9kHz to 150kHz) (150kHz to 30MHz)	± 2.63 dB ± 2.35 dB	± 3.8 dB ± 3.4 dB
Radiated Emission	Level accuracy (30MHz to 1000MHz)	± 3.48 dB	± 5.3 dB
Radiated Emission	Level accuracy (above 1000MHz)	± 3.90 dB	± 5.2 dB

(1) Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus.

(2) The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor of $k=2$, which for a normal distribution corresponds to a coverage probability of approximately 95%.





3. TEST RESULTS

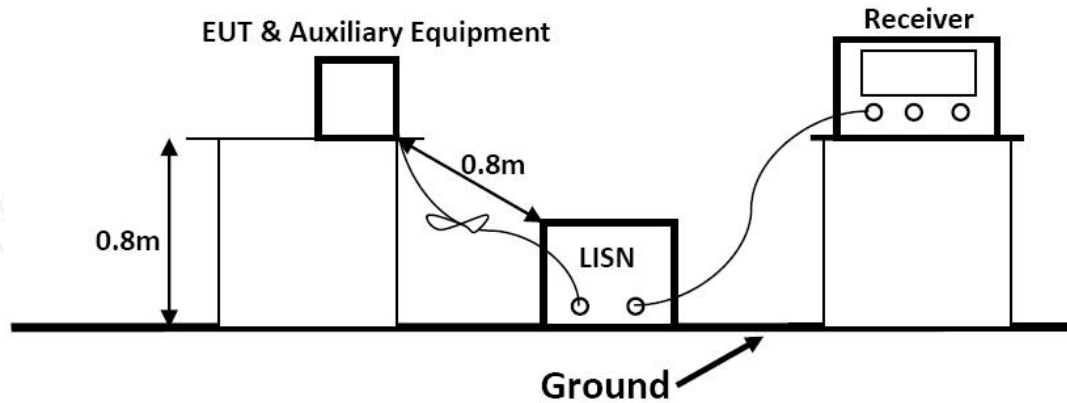
3.1. POWER LINE CONDUCTED EMISSION MEASUREMENT

3.1.1. Test Equipment

The following test equipments are used during the power line conducted measurement:

Item	Equipment	Manufacturer	Model No.	Serial No.	Cal Date	Due Date
1	EMI Test Software	Farad	EZ	/	N/A	N/A
2	EMI Test Receiver	R&S	ESR3	102312	2024-03-01	2025-03-02
3	Artificial Mains	R&S	ENV216	101288	2023-06-09	2024-06-08
4	Pulse Limiter	R&S	ESH3-Z2	102750-NB	2023-08-15	2024-08-14
5	Impedance Stabilization Network	TESEQ	ISN T800	45130	2023-10-18	2024-10-17

3.1.2. Block Diagram of Test Setup



3.1.3. Test Standard

Power Line Conducted Emission Limits (Class A)

Frequency (MHz)			Limit (dB μ V)	
			Quasi-peak Level	Average Level
0.15	~	0.50	79	66
0.50	~	30.00	73	60

NOTE1-The lower limit shall apply at the transition frequencies.

NOTE2-The limit decreases linearly with the logarithm of the frequency in the range 0.15MHz to 0.50MHz.



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3.1.4.EUT Configuration on Test

The following equipments are installed on Power Line Conducted Emission Measurement to meet the commission requirement and operating regulations in a manner, which tends to maximize its emission characteristics in a normal application.

3.1.5.Operating Condition of EUT

3.1.5.1.Setup the EUT as shown on Section 3.1.2

3.1.5.2.Turn on the power of all equipments.

3.1.5.3.Let the EUT work in measuring Lighting and measure it.

3.1.6.Test Procedure

The EUT system is connected to the power mains through a line impedance stabilization network (L.I.S.N.). This provides 50ohm coupling impedance for the EUT system. Please refer the block diagram of the test setup and photographs. Both sides of AC line are checked to find out the maximum conducted emission. In order to find the maximum emission levels, the relative positions of equipment and all of the interface cables shall be changed according to FCC/ANSI C63.4-2014 on Conducted Emission Measurement.

The bandwidth of the test receiver is set at 9kHz.

The frequency range from 150kHz to 30MHz is investigated

3.1.7.Test Results

Not applicable.





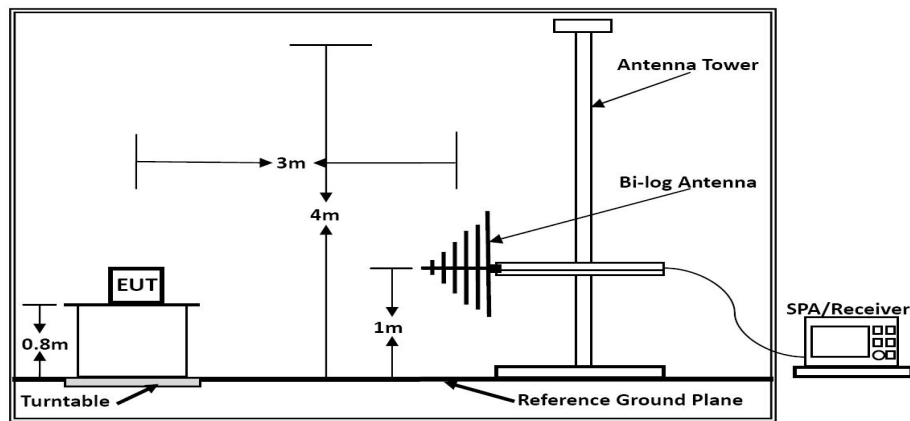
3.2. Radiated emission Measurement

3.2.1. Test Equipment

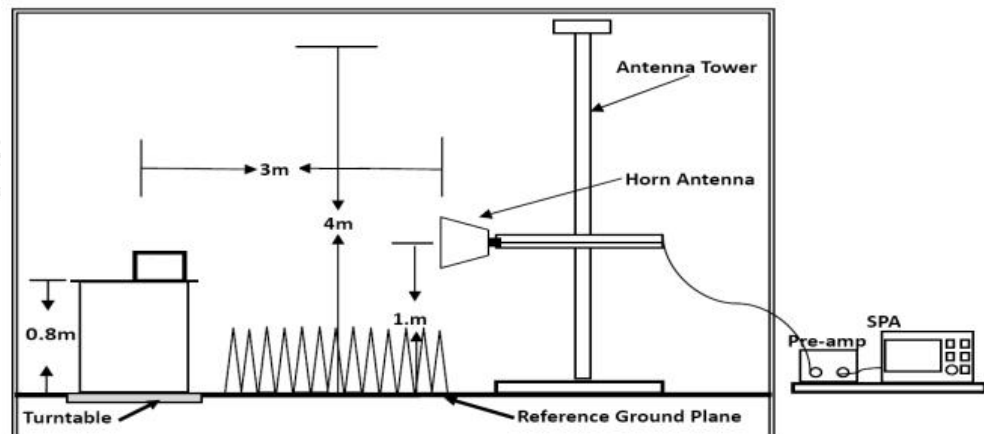
The following test equipments are used during the radiated emission measurement:

Item	Equipment	Manufacturer	Model No.	Serial No.	Cal Date	Due Date
1	EMI Test Software	AUDIX	E3	/	N/A	N/A
2	By-log Antenna	SCHWARZBECK	VULB9163	9163-470	2021-09-12	2024-09-11
3	Horn Antenna	SCHWARZBECK	BBHA 9120D	9120D-1925	2021-09-05	2024-09-04
4	EMI Test Receiver	R&S	ESPI	101940	2023-08-15	2024-08-14
5	Broadband Preamplifier	/	BP-01M18G	P190501	2023-06-09	2024-06-08
6	EMI Test Software	Farad	EZ	/	N/A	N/A
7	MXA Signal Analyzer	Agilent	N9020A	MY50510140	2023-10-25	2024-10-24
8	EMI Test Receiver	R&S	ESPI	101940	2023-08-15	2024-08-14

3.2.2. Block Diagram of Test Setup



Below 1GHz



Above 1GHz





3.2.3. Radiated Emission Limit (Class A)

Limits for Radiated Disturbance Below 1GHz

FREQUENCY MHz	DISTANCE Meters	FIELD STRENGTHS LIMIT	
		$\mu\text{V}/\text{m}$	$\text{dB}(\mu\text{V})/\text{m}$
30 ~ 88	3	300	49.5
88 ~ 216	3	500	54.0
216 ~ 960	3	700	56.9
Above 960	3	1000	60.0
Remark: (1) Emission level $(\text{dB})\mu\text{V} = 20 \log \text{Emission level } \mu\text{V}/\text{m}$ (2) The smaller limit shall apply at the cross point between two frequency bands. (3) Distance is the distance in meters between the measuring instrument, antenna and the closest point of any part of the device or system.			

3.2.4. 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.

3.2.5. Operating Condition of EUT

3.2.5.1. Setup the EUT as shown in Section 3.2.2.

3.2.5.2. Let the EUT work in test Lighting and measure it.

3.2.6. Test Procedure

EUT and its simulators are placed on a turntable, which is 0.8 meter high above ground. The turntable can rotate 360 degrees to determine the position of the maximum emission level. EUT is set 3.0 meters away from the receiving antenna, which is mounted on a antenna tower. The antenna can be moved up and down between 1.0 meter and 4 meters to find out the maximum emission level. Broadband antenna (calibrated by-log antenna) is used as receiving antenna. Both horizontal and vertical polarization of the antenna is set on measurement. In order to find the maximum emission levels, all of the interface cables must be manipulated according to ANSI C63.4-2014 on radiated emission measurement.

The bandwidth of the EMI test receiver is set at 120kHz, 300kHz.

The frequency range from 30MHz to 1000MHz is checked.

3.2.7. Radiated Emission Noise Measurement Result

PASS.

The scanning waveforms please refer to the next page.



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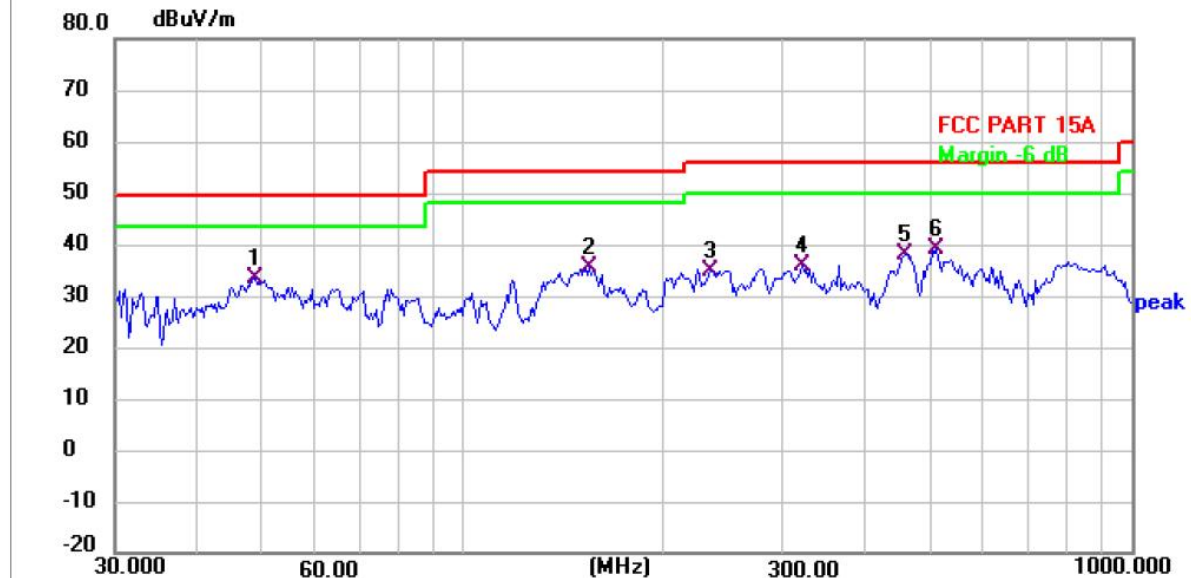
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Test Model	MT01	Test Mode	Mode1
Environmental Conditions	23.8℃, 52.3% RH	Detector Function	Quasi-peak
Pol	Vertical	Distance	3m
Test Engineer	James Peng	Test Voltage	DC 24V

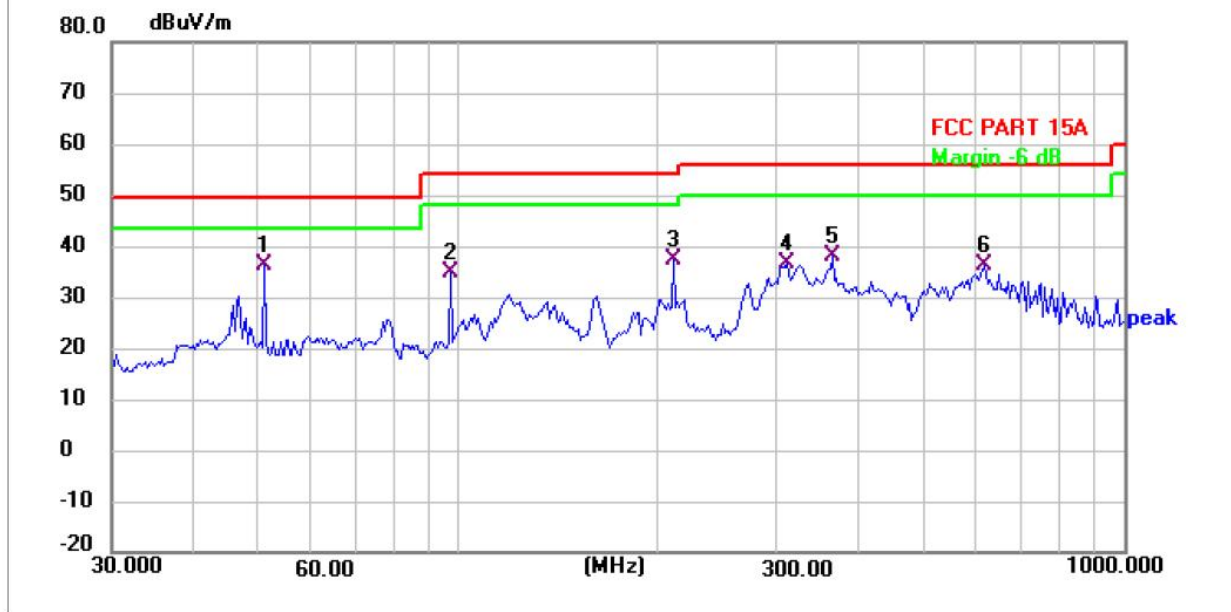


No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1 *	48.7190	50.45	-16.99	33.46	49.50	-16.04	QP			P	
2	154.2427	58.05	-22.53	35.52	54.00	-18.48	QP			P	
3	233.4880	53.24	-18.26	34.98	56.00	-21.02	QP			P	
4	320.3306	52.05	-16.24	35.81	56.00	-20.19	QP			P	
5	458.3987	51.63	-13.46	38.17	56.00	-17.83	QP			P	
6	509.3557	51.40	-12.33	39.07	56.00	-16.93	QP			P	





Test Model	MT01	Test Mode	Mode1
Environmental Conditions	23.8℃, 52.3% RH	Detector Function	Quasi-peak
Pol	Horizontal	Distance	3m
Test Engineer	James Peng	Test Voltage	DC 24V



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1 *	50.8171	53.35	-17.12	36.23	49.50	-13.27	QP			P	
2	97.0023	54.81	-19.96	34.85	54.00	-19.15	QP			P	
3	210.1293	56.40	-18.91	37.49	54.00	-16.51	QP			P	
4	311.4520	52.95	-16.42	36.53	56.00	-19.47	QP			P	
5	363.5230	53.51	-15.44	38.07	56.00	-17.93	QP			P	
6	615.7743	46.63	-10.41	36.22	56.00	-19.78	QP			P	

Note: Margin= Reading Level+Correct Factor – Limit

Correct Factor=Antenna Factor+Cable Factor – Pre-Amplifier Factor



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4. TEST SETUP PHOTOGRAPHS OF EUT

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

5. EXTERIOR PHOTOGRAPHS OF THE EUT

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

6. INTERIOR PHOTOGRAPHS OF THE EUT

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

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

