TEST REPORT

REPORT NUMBER: I23W00008-MPE

ON

Type of Equipment:	Multimedia Control System
Type of Designation:	IN9.0-OS
Manufacturer:	NOBO AUTOMOTIVE TECHNOLOGIES CO., LTD.
Brand Name:	HAVAL NOBO
FCC ID:	2A7V5-IN90-OS-1

ACCORDING TO

FCC CFR 47 Part 2.1091《Radiofrequency radiation exposure evaluation: mobile devices》

Chongqing Academy of Information and Communication Technology

Month date, year

Mar. 23rd, 2023

Signature

Xiang Luoyong

Director

Note:

The test results in this test report relate only to the devices specified in this report. This report shall not be reproduced except in full without the written approval of Chongqing Academy of Information and Communications Technology.

Revision Version

Report Number	Revision	Date	Memo
I23W00008-MPE	00	2023-3-23	Initial creation of test report

CONTENTS

1. Test Laboratory

1.1. Testing Location

Company Name:	Chongqing Academy of Information and Communications Technology
Address:	Building C, Technology Innovation Center, No.8, Yuma Road, Chayuan New Area, Nan'an District, Chongqing, People's Republic of China
Postal Code:	401336
Telephone:	0086-23-88069965
Fax:	0086-23-88608777

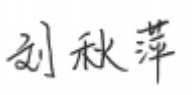
1.2. Testing Environment

Normal Temperature:	21.3℃
Relative Humidity:	65.0%

1.3. Project Data

Testing Start Date:	NA
Testing End Date:	NA

1.4. Signature



2023-3-23

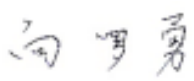
Liu Qiuping
(Prepared this test report)

Date

2023-3-23

Yu Chun
(Reviewed this test report)

Date



2023-3-23

Xiang Luoyong
Director of the laboratory
(Approved this test report)

Date

2. Client Information

2.1. Applicant Information

Company Name:	NOBO AUTOMOTIVE TECHNOLOGIES CO., LTD.
Address /Post:	No. 668, Caihong Road, Zhangjiagang Economic and Technological Development Zone, Suzhou , Jiangsu, P.R. China
Country:	China
Telephone:	0512-80616208
Fax:	--
Email:	douwenjuan@noboauto.com
Contact Person:	Dou Wenjuan

2.2. Manufacturer Information

Company Name:	NOBO AUTOMOTIVE TECHNOLOGIES CO., LTD.
Address /Post:	No. 668, Caihong Road, Zhangjiagang Economic and Technological Development Zone, Suzhou , Jiangsu, P.R. China
Country:	China
Telephone:	0512-80616208
Fax:	--
Email:	douwenjuan@noboauto.com
Contact Person:	Dou Wenjuan

3. Equipment Under Test (EUT) and Ancillary Equipment (AE)

3.1. About EUT

EUT Description:	Multimedia Control System
Model name:	IN9.0-OS
Wi-Fi Frequency Band:	Wi-Fi2.4G,Wi-Fi 5G U-NII-1/ U-NII-3
BT Frequency Band:	BR,EDR,BLE
HW Version	AA
SW Version	AA
Note：Photographs of EUT are shown in ANNEX A of this test report.	

3.2. Internal Identification of EUT used during the test

EUT ID*	SN or IMEI	HW Version	SW Version	Date of receipt
NA	NA	NA	NA	NA

*EUT ID: is used to identify the test sample in the lab internally.

3.3. Internal Identification of AE used during the test

EUT ID*	SN	Description
NA	NA	NA

*AE ID: is used to identify the test sample in the lab internally.

4. Reference Documents

4.1. Applicable Standards

The MPE report was carried out on a sample equipment to demonstrate limited compliance with FCC CFR 47 Part 2.1091.

FCC CFR 47 Part 2.1091: Radiofrequency radiation exposure evaluation: mobile devices

4.2. Test Limits

Systems operating under the provisions of this section shall be operated in a mannerthat ensures that the public is not exposed to radio frequency energy level in excesslimit for maximum permissible exposure. In accordance with 47 CFR FCC Part 2Subpart J, section 2.1091 this device has been defined as a mobile device whereby adistance of 0.2m normally can be maintained between the user and the device.

MPE for the upper tier (people in controlled environments)

Frequency Range [MHz]	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm^2)	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposure				
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842/f	4.89/f	($900/f^2$)*	6
30-300	61.4	0.163	1.0	6
300-1500	--	--	f/300	6
1500-100000	--	--	5	6
(B) Limits for General Population/Uncontrolled Exposure				
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	($180/f^2$)*	30
30-300	27.5	0.073	0.2	30
300-1500	--	--	f/1500	30
1500-100000	--	--	1.0	30

Note: f=frequency in MHz; *Plane-wave equivalent power density

For the DUT, the limits for the general public when an RF safety program is unavailable.

5. Test Results

5.1. Tune Up Power

Frequency Band	Highest Averaged Tune Up Power(dBm)	Highest Frame-Averaged Tune Up Power (dBm)	Antenna Gain(dBi)
Antenna 1:Wi-Fi 5G U-NII-1	12.5	12.5	3.90
Antenna 1:Wi-Fi 5G U-NII-3	13.5	13.5	3.07
Antenna 1:BR,EDR	11.0	11.0	2.34
Antenna 1:BLE	3.0	3.0	2.34
Antenna 2:Wi-Fi 2.4G	17.5	17.5	2.34
Antenna 2:Wi-Fi 5G U-NII-1	14.0	14.0	3.90
Antenna 2:Wi-Fi 5G U-NII-3	11.5	11.5	3.07
Notes: 1) Disclaimers: The highest tune up power and antenna gain in the above table are provided by the customer			

5.2. Calculation Information

For conservative evaluation consideration, only maximum power of each frequency band based on the tighter limits respectively are used to calculate the boundary power density.

Based on the FCC KDB 447498 D01 and 47 CFR §2.1091, the DUT is evaluated as a mobile device.

$$S = \frac{PG}{4\pi d^2}$$

Where

P = Power in Watts

G = Numeric antenna gain

d = Distance in meters

S = Power density in milliwatts / square centimeter

5.3. Results for single antenna transmission

Frequency range	Limit(mW/cm^2)	Results(mW/cm^2)	Verdict
Antenna 1:Wi-Fi 5G U-NII-1	1.00	0.009	PASS
Antenna 1:Wi-Fi 5G U-NII-3	1.00	0.009	PASS
Antenna 1:BR,EDR	1.00	0.004	PASS
Antenna 1:BLE	1.00	0.001	PASS
Antenna 2:Wi-Fi 2.4G	1.00	0.019	PASS
Antenna 2:Wi-Fi 5G U-NII-1	1.00	0.012	PASS
Antenna 2:Wi-Fi 5G U-NII-3	1.00	0.006	PASS

5.4. Results for simultaneous transmission

Power density /Limit (mW/cm^2)				Σ(Power density /Limit) of Antenna 1+ Antenna 2 (mW/cm^2)	Verdict
Antenna 1		Antenna 2			
Wi-Fi5G	0.009	Wi-Fi5G	0.012	0.021	PASS
		Wi-Fi2.4G	0.019	0.028	PASS
BR,EDR	0.004	Wi-Fi5G	0.012	0.016	PASS
		Wi-Fi2.4G	0.019	0.023	PASS
BLE	0.001	Wi-Fi5G	0.012	0.013	PASS
		Wi-Fi2.4G	0.019	0.020	PASS

Notes:

1) Σ(Power density /Limit) : This is a summation of [(Power density for each transmitter/antenna included in the simultaneous transmission)/ (corresponding MPE limit)], for Wi-Fi+BT and Wi-Fi MIMO.

2)Considering the BT collocation with the Wi-Fi transmitter and Wi-Fi MIMO of the Highest output power performance listed in the table above, the aggregated (Power density /Limit) is smaller than1, and MPE collocated transmitters is compliant.

5.5. Result of Antenna 1 Wi-Fi 5G U-NII-1

Test Results: MPE Limit Calculation: the EUT'S operating frequencies @ 5180MHz～5240MHz; The maximum conducted is 12.5 dBm. The maximum gain is 3.90 dBi. Therefore, maximum limit for general public RF exposure: 1.00 mW/cm^2.

$$S = \frac{PG}{4\pi d^2}$$

P= input power of the antenna（mW）

G = antenna gain（numeric）

r = distance to the center of radiation of antenna (in meter)=20 cm

S=0.009 mW/cm^2

Therefore, at 20 cm the spectral power density is less than the 1.00 mW/cm^2 limit for uncontrolled exposure.

5.6. Result of Antenna 1 Wi-Fi 5G U-NII-3

Test Results: MPE Limit Calculation: the EUT'S operating frequencies @ 5745 MHz～5825MHz; The maximum conducted is 13.5 dBm. The maximum gain is 3.07 dBi. Therefore, maximum limit for general public RF exposure: 1.00 mW/cm^2.

$$S = \frac{PG}{4\pi d^2}$$

P= input power of the antenna（mW）

G = antenna gain（numeric）

r = distance to the center of radiation of antenna (in meter)=20 cm

S=0.009 mW/cm^2

Therefore, at 20 cm the spectral power density is less than the 1.00 mW/cm^2 limit for uncontrolled exposure.

5.7. Result of Antenna 1 BR,EDR

Test Results: MPE Limit Calculation: the EUT'S operating frequencies @ 2402MHz～2480MHz; The maximum conducted is 11.0 dBm. The maximum gain is 2.34 dBi. Therefore, maximum limit for general public RF exposure: 1.00 mW/cm^2.

$$S = \frac{PG}{4\pi d^2}$$

P= input power of the antenna（mW）

G = antenna gain（numeric）

r = distance to the center of radiation of antenna (in meter)=20 cm

S=0.004 mW/cm^2

Therefore, at 20 cm the spectral power density is less than the 1.00 mW/cm^2 limit for uncontrolled exposure.

5.8. Result of Antenna 1 BLE

Test Results: MPE Limit Calculation: the EUT'S operating frequencies @ 2402MHz～2480MHz; The maximum conducted is 3.0 dBm. The maximum gain is 2.34 dBi. Therefore, maximum limit for general public RF exposure: 1.00 mW/cm^2.

$$S = \frac{PG}{4\pi d^2}$$

P= input power of the antenna（mW）

G = antenna gain（numeric）

r = distance to the center of radiation of antenna (in meter)=20 cm

S=0.001 mW/cm^2

Therefore, at 20 cm the spectral power density is less than the 1.00 mW/cm^2 limit for uncontrolled exposure.

5.9. Result of Antenna 2 Wi-Fi 2.4G

Test Results: MPE Limit Calculation: the EUT'S operating frequencies @ 2412MHz～2472MHz; The maximum conducted is 17.5 dBm. The maximum gain is 2.34 dBi. Therefore, maximum limit for general public RF exposure: 1.00 mW/cm^2.

$$S = \frac{PG}{4\pi d^2}$$

P= input power of the antenna（mW）

G = antenna gain（numeric）

r = distance to the center of radiation of antenna (in meter)=20 cm

S=0.019 mW/cm^2

Therefore, at 20 cm the spectral power density is less than the 1.00 mW/cm^2 limit for uncontrolled exposure.

5.10. Result of Antenna 2 Wi-Fi 5G U-NII-1

Test Results: MPE Limit Calculation: the EUT'S operating frequencies @ 5180MHz～5240MHz; The maximum conducted is 14.0 dBm. The maximum gain is 3.90 dBi. Therefore, maximum limit for general public RF exposure: 1.00 mW/cm^2.

$$S = \frac{PG}{4\pi d^2}$$

P= input power of the antenna（mW）

G = antenna gain（numeric）

r = distance to the center of radiation of antenna (in meter)=20 cm

S=0.012 mW/cm^2

Therefore, at 20 cm the spectral power density is less than the 1.00 mW/cm^2 limit for uncontrolled exposure.

5.11. Result of Antenna 1 Wi-Fi 5G U-NII-3

Test Results: MPE Limit Calculation: the EUT'S operating frequencies @ 5745 MHz～5825MHz; The maximum conducted is 11.5 dBm. The maximum gain is 3.07 dBi. Therefore, maximum limit for general public RF exposure: 1.00 mW/cm^2.

$$S = \frac{PG}{4\pi d^2}$$

P= input power of the antenna（mW）

G = antenna gain（numeric）

r = distance to the center of radiation of antenna (in meter)=20 cm

S=0.006 mW/cm^2

Therefore, at 20 cm the spectral power density is less than the 1.00 mW/cm^2 limit for uncontrolled exposure.

ANNEX A: EUT photograph

See the document" Multimedia Control System Photos".

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