Certificate Number: 5055.02

TEST REPORT

Report No.:	SRTC2024-9003(F)-0030
Product Name	InVehicle Gateway
Model Name:	VG710-NRQ5
Brand Name:	inhand
Applicant:	Beijing InHand Networks Technology Co., Ltd.
Manufacturer:	Beijing InHand Networks Technology Co., Ltd.
Specification:	FCC Part15B (Certification) (2023 edition) ANSI C63.4-2014
FCC ID:	2AANY-VG710NRQ5

The State Radio_monitoring_center Testing Center (SRTC)

15th Building, No.30 Shixing Street, Shijingshan District,

Beijing, China

Tel: 86-10-57996183 Fax: 86-10-57996388

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1. General information

1.1 Notes of the test report

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The test results relate only to individual items of the samples which have been tested.

1.2 Information about the testing laboratory

Company:	The State Radio_monitoring_center Testing Center (SRTC)
Test Site 1:	15th Building, No.30 Shixing Street, Shijingshan District
Test Site 2:	No.80, Zhaojiachang, Beizang, Daxing District
City:	Beijing
Country or Region:	P.R.China
Contacted person:	Liu Jia
Tel:	+86 10 57996183
Fax:	+86 10 57996388
Email:	liujiaf@srtc.org.cn
Designation Number:	CN1267
Registration number:	239125

1.3 Applicant’s details

Company:	Inhand Jiaxing Communication Technology Co., Ltd.
Address:	318 Ruifeng Street, Gaozhao Street, Xiuzhou District, Jiaxing City, Zhejiang Province

1.4 Manufacturer’s details

Company:	Inhand Jiaxing Communication Technology Co., Ltd.
Address:	318 Ruifeng Street, Gaozhao Street, Xiuzhou District, Jiaxing City, Zhejiang Province

1.5 Application details

Date of reception of test sample: 7th May 2024
Date of test: 7th May 2024 to 16th May 2024

1.6 Reference specification

FCC Part 15B, 2023 (Certification)

1.7 Information of EUT

1.7.1 General information

Model Name of EUT	VG710-NRQ5
Frequency Range	WiFi: 2.4~2.4835GHz 5.15-5.25GHz 5.725-5.85GHz 5G NR n48+LTE B48
Nominal Voltage	DC 12V
Power Supply	DC power
Extreme Voltage	Minimum: DC 36V Maximum: DC 9V
HW Version	V1.1
SW Version	V1.2

1.7.2 EUT details

No.	Model Name	IMEI	HW Version	SW Version
EUT	VG710-NRQ5	/	V1.1	V1.2

1.7.3 Auxiliary equipment details

AE (Auxiliary Equipment) 1#: DC power

Manufacturer	Agilent
Model Number	E3645A

Note1: AE1# DC power was selected by testing laboratory and was only cooperated with this test, not for sale.

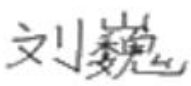
1.7.4 Test mode

Mode No.	Description of test mode
Mode 1	Charging Mode+ WLAN /5GNR / LTE/ receiver

2. Test information

2.1 Summary of the test results

No.	Test case	FCC reference	Verdict
1	Conducted emissions	15.107	Pass
2	Radiated emissions	15.109	Pass

Approved By: Mr. Liu Wei Director of the test department 	Checked By Mr. Guo Yu Vice director of the test department 
Tested by: Mr. Wen Jianlong Test engineer 	Issued date: 2024.5.23

.2 Test result

2.2.1 Conducted Emissions-FCC Part15.107

Ambient condition:

Temperature	Relative humidity	Pressure
22.3°C	36.2%	100.8kPa

Test Setup:

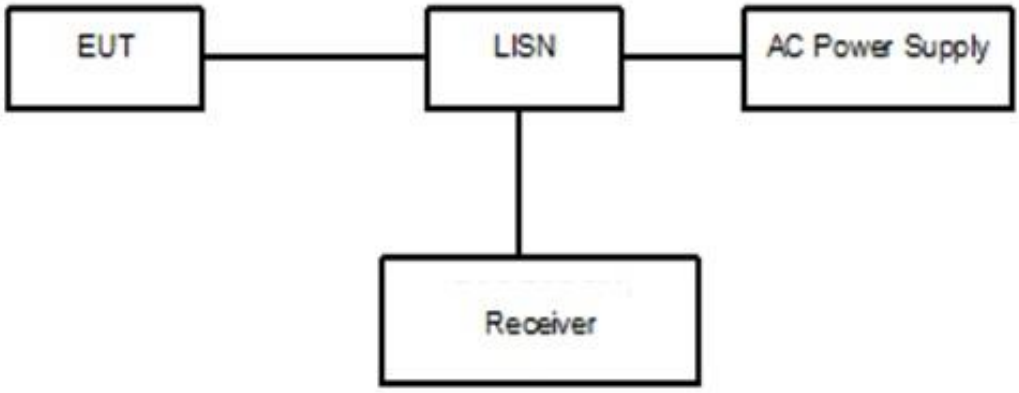


Figure 1

Test Procedure:

The EUT is placed on a non-matellic table 0.8m above the horizontal metal reference ground plane. The EUT is connected with LISN via the DC power. The LISN is connected to the reference ground.The test set-up and the test methods are performed according to ANSI C63.4:2014.
Then start the test software EMC32. Sweep the whole frequency band through the range from 150 KHz to 30 MHz with RBW 9kHz, VBW 30kHz.The measurement should be done for both L line and N line. During pre-test, the receiver uses both peak detector and average detector. And the final test, the receiver uses both average detector and Quasi-peak detector.
The data of cable loss has been calibrated in full testing frequency range before the testing.

A “reference path loss” Corr.(dB) is established and the L_{cable}+ATT+VDF is the attenuation of ”reference path loss”, and including the cable loss, the attenuation of the attenuator, the voltage division factor of AMN.
The measurement results are obtained as described below:

$P_{result}=P_{mea}+Corr.(dB)$

Sample calculation: (18.26 dBμV) = (-11.44 dBμV) + (29.7 dB), the corresponding frequency is 0.17132MHz.

Frequency (MHz)	QuasiPeak (dBμV)	Average (dBμV)	Limit (dBμV)	Margin (dB)	Line	Corr. (dB)	P_{mea} QuasiPeak (dBμV)	P_{mea} Average (dBμV)
0.17132	---	18.26	54.9	36.64	N	29.7	---	-11.44

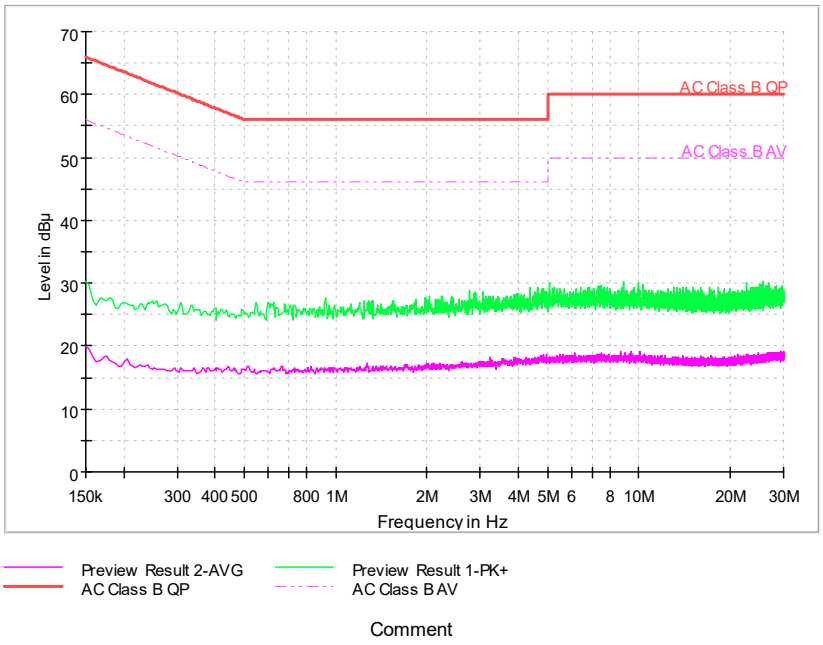
Limit:

Frequency of Emission(MHz)	Limits(dBμV)	
	Quasi-peak	Average
0.15～0.5	66 to 56*	56 to 46*
0.5～5	56	46
5～30	60	50

Note: * Decreases with the logarithm of the frequency

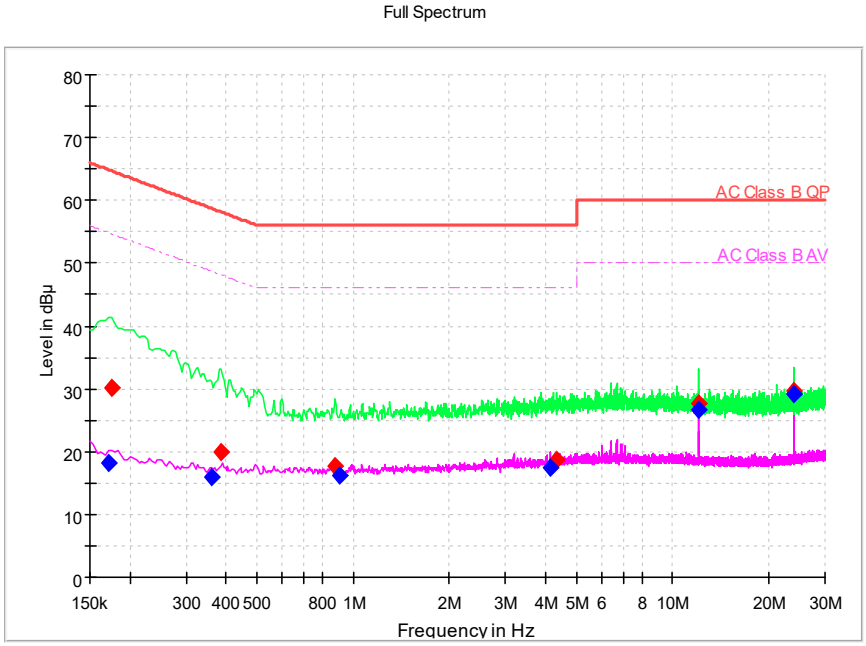
Test result:

Noise Level of the Measuring Instrument



Pic1.Conducted emission L and N Line

EUT + AE#1: DC power:



Pic2. Conducted emission L&N Line

Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Corr. (dB)	P_{mea} QuasiPeak (dBµV)	P_{mea} Average (dBµV)
0.17132	---	18.26	54.9	36.64	N	29.7	---	-11.44
0.17559	30.23	---	64.69	34.46	N	29.7	0.53	---
0.35895	---	16.04	48.75	32.71	L1	29.8	---	-13.76
0.38454	19.98	---	58.18	38.2	N	29.7	-9.72	---
0.87919	17.66	---	56	38.34	L1	29.8	-12.14	---
0.90478	---	16.22	46	29.78	L1	29.8	---	-13.58
4.14564	---	17.38	46	28.62	L1	29.8	---	-12.42
4.35032	18.66	---	56	37.34	L1	29.8	-11.14	---
12.0388	---	26.61	50	23.39	L1	29.9	---	-3.29
12.0388	27.75	---	60	32.25	L1	29.9	-2.15	---
24.0812	---	29.27	50	20.73	N	30.1	---	-0.83
24.0812	29.67	---	60	30.33	N	30.1	-0.43	---

2.2.2 Radiated Emissions-FCC Part15.109

Ambient condition:

Temperature	Relative humidity	Pressure
22.3°C	36.2%	100.8kPa

Test Setup:

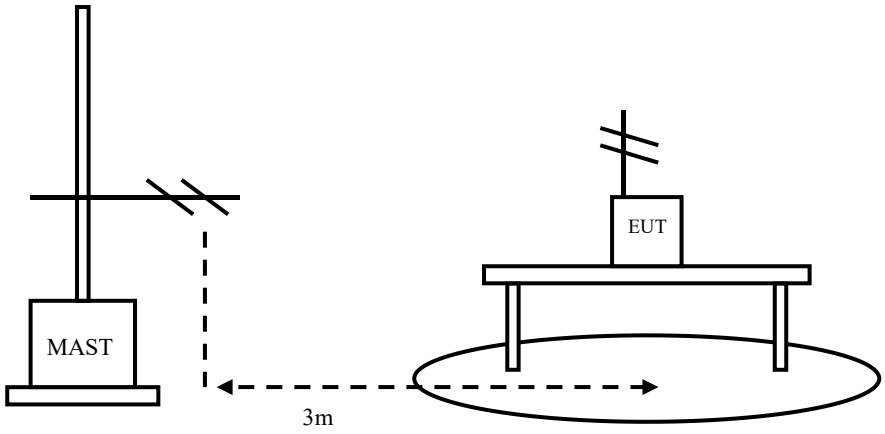


Figure 2

Test Procedure:

The EUT should be placed on a non-metallic table 80cm above the ground plane. The receive antennas shall be moved from 1 to 4 meters. The distance between EUT and receive antenna should be 3 meters.

The EUT should work in power supply mode. The test set-up and the test methods are performed according to ANSI C63.4:2014.

Then start the test software EMC32. Sweep the whole frequency band through the range from 30MHz to 1GHz, using receive log period antenna VULB 9163.

During the test, the height of receive antenna shall be moved from 1 to4 meters, and the antenna shall be performed under horizontal and vertical polarization. The turn table shall be rotated from 0 to 360 degrees for detecting the maximum of radiated spurious signal level. The measurements shall be repeated with orthogonal polarization of the test antenna. The EUT is laid in two modes as follow: 1. put the EUT in horizontal direction; 2. put the EUT in vertical direction.

The data of cable loss and antenna factor have been calibrated in full testing frequency range before the testing. All test results are performed with max hold at the horizontal and vertical polarity.

RBW=120kHz, VBW=300kHz, when the test frequency: 30MHz<f<1GHz

RBW=1MHz, VBW=3MHz, when the test frequency: f>1GHz

A “reference path loss” is established and the A_{Rpl} is the attenuation of “reference path loss”, and including the gain of receive antenna, the gain of the preamplifier, the cable loss.
The measurement results are obtained as described below:
Result= P_{mea} + A_{Rpl}
Sample calculation: (17.29 dBμV/m) = (36.69 dBμV) + (-19.4dB/m), the corresponding frequency is 38.245MHz.

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	Pmea (dBuV/m)	Polarity	Limit (dBuV/m)	Margin (dB)
38.245	17.29	-19.4	36.69	Vertical	40	22.71

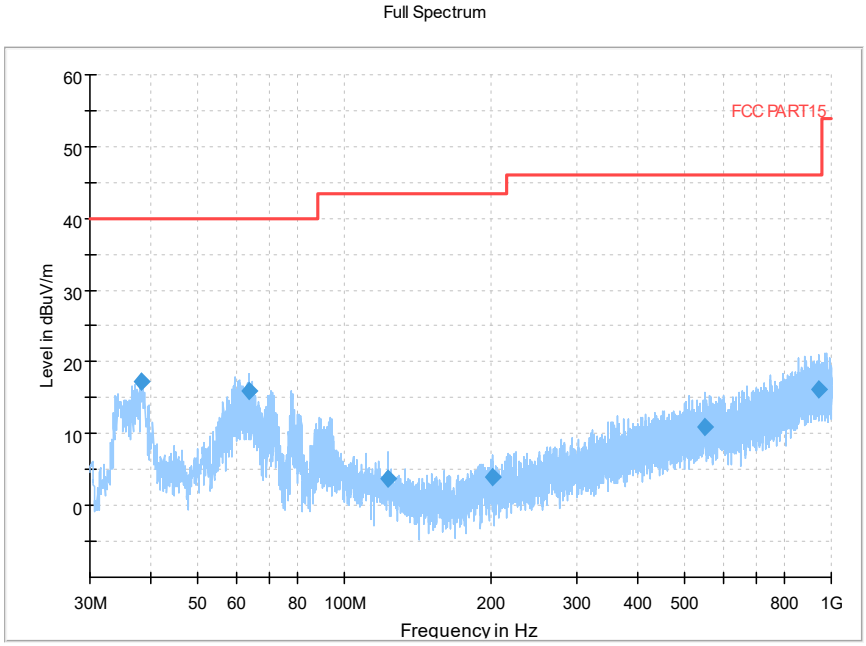
Limit:

Frequency of Emission(MHz)	Limits	
	Detector	Unit (dBμV/m)
30～88	Quasi-peak	40
88～216	Quasi-peak	43.5
216～960	Quasi-peak	46
960～1000	Quasi-peak	54
1000～5th harmonic of the highest frequency or 40GHz, whichever is lower	Average Peak	54 74

Test result:
EUT + AE#1: DC power:

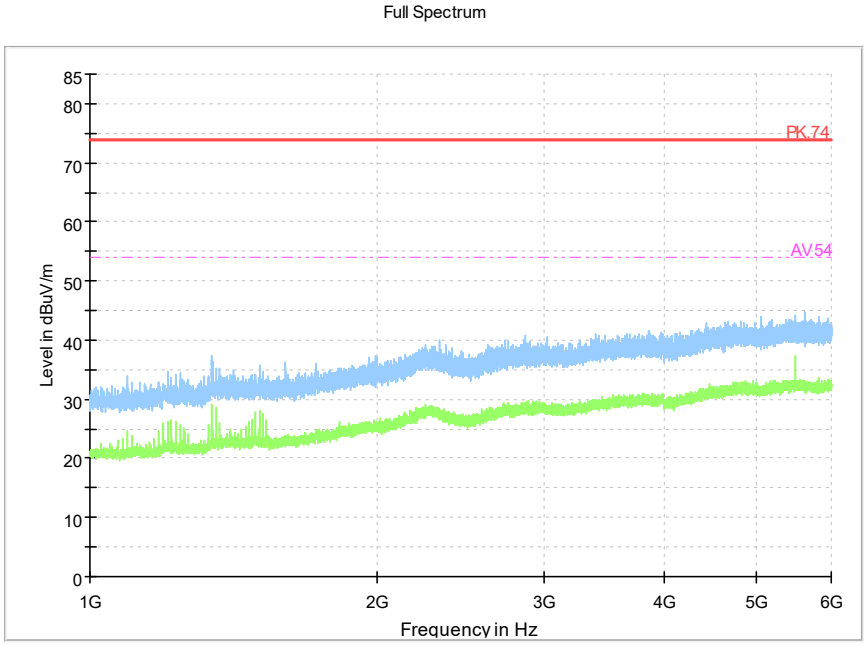
Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	Pmea (dBuV/m)	Polarity	Limit (dBuV/m)	Margin (dB)
38.245	17.29	-19.4	36.69	Vertical	40	22.71
63.756	16.06	-20.8	36.86	Vertical	40	23.94
122.926	3.84	-20.8	24.64	Vertical	43.5	39.66
201.981	3.89	-19.9	23.79	Vertical	43.5	39.61
550.5505	10.97	-11.1	22.07	Vertical	46	35.03
940.248	16.09	-5.1	21.19	Vertical	46	29.91

EUT + AE#1: DC power:



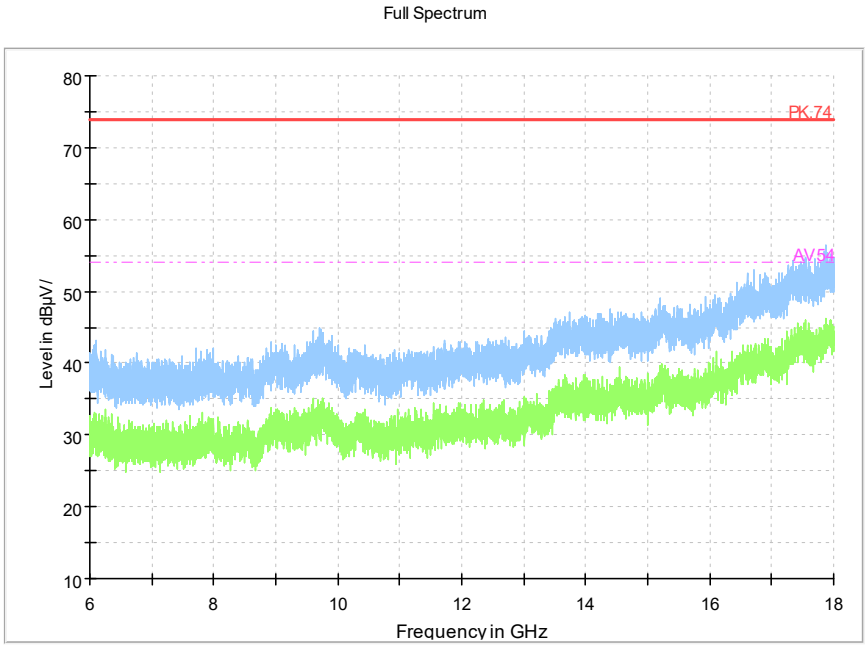
Pic3. Radiated emission (30MHz – 1GHz)

Note：The test data in the graph includes two polarizations: horizontal and vertical



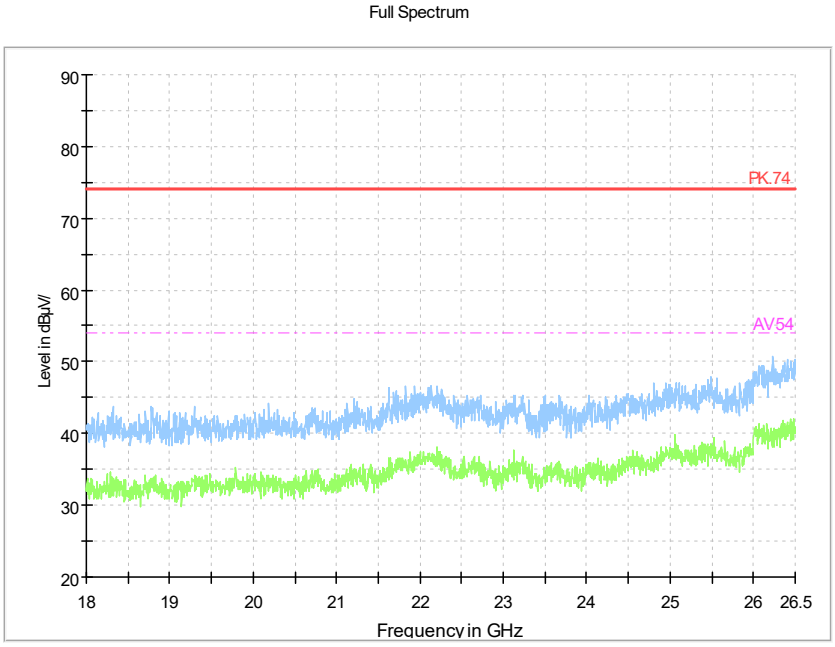
Pic4. Radiated emission (1GHz –6GHz)

Note：The test data in the graph includes two polarizations: horizontal and vertical



Pic5. Radiated emission (6GHz –18GHz)

Note：The test data in the graph includes two polarizations: horizontal and vertical



Pic6. Radiated emission (18GHz –26.5GHz)

Note：The test data in the graph includes two polarizations: horizontal and vertical

2.3. List of test equipments

No.	Name/Model	Manufacturer	S/N	Calibration Due Date	Calibration Date
1	23.18m×16.88m×9.60mSemi-AnechoicChamber	FRANKONIA	-----	2028.09.05	2023.09.05
2	ESW EMI test receiver	R&S	101574	2025.03.05	2024.03.05
3	ESR3 EMI test receiver	R&S	102361	2025.03.05	2024.03.05
4	9.080m×5.255m×3.525m Shielding room	FRANKONIA	-----	2027.03.25	2022.03.25
5	VULB 9163 Ultra log test antenna	schwarzbeck	727	2025.05.28	2023.05.28
6	HF 907 Double-Ridged Waveguide Horn Antenna	R&S	100512	2025.07.20	2023.07.20
7	SAS-574 Horn Antenna	schwarzbeck	535	2025.05.12	2023.05.12
8	ENV216 AMN	R&S	101881	2024.06.21	2023.06.21
9	EMC32EMI test software	R&S	V10	-----	-----

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