HEALTH TEST REPORT

For

KHADAS TECHNOLOGY CO., LTD

VIM4

Test Model: VIM4

Prepared for	:	KHADAS TECHNOLOGY CO., LTD
Address	:	2709 QIANCHENG CENTER, HAICHENG ROAD, XIXIANG STREET, BAO'AN DISTRICT, SHENZHEN, CHINA. 518101
Prepared by	:	Shenzhen LCS Compliance Testing Laboratory Ltd.
Address	:	Room 101, 201, Building A and Room 301, Building C, Juji Industrial Park, Yabianxueziwei, Shajing Street, Bao'an District, Shenzhen, Guangdong, China
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Web	:	www.LCS-cert.com
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Date of receipt of test sample	:	March 09, 2022
Number of tested samples	:	2
Serial number	:	Prototype
Date of Test	:	March 09, 2022 ~ April 16, 2022
Date of Report	:	April 19, 2022

HEALTH TEST REPORT
EN IEC 62311: 2020
Assessment of electronic and electrical equipment related to human exposure restrictions for electromagnetic fields (0 Hz - 300 GHz)

Report Reference No.	:	**LCS220304068AEG**
Date of Issue.....	:	April 19, 2022
Testing Laboratory Name.....	:	**Shenzhen LCS Compliance Testing Laboratory Ltd.**
Address.....	:	Room 101, 201, Building A and Room 301, Building C, Juji Industrial Park, Yabianxueziwei, Shajing Street, Bao'an District, Shenzhen, Guangdong, China
Testing Location/ Procedure...	:	Full application of Harmonised standards ■ Partial application of Harmonised standards □ Other standard testing method □
Applicant's Name.....	:	**KHADAS TECHNOLOGY CO., LTD**
Address.....	:	2709 QIANCHENG CENTER, HAICHENG ROAD, XIXIANG STREET, BAO'AN DISTRICT, SHENZHEN, CHINA. 518101
Test Specification		
Standard	:	EN IEC 62311: 2020
Test Report Form No.	:	LCSEMC-1.0
TRF Originator	:	Shenzhen LCS Compliance Testing Laboratory Ltd.
Master TRF.....	:	Dated 2011-03

Test Item Description.	:	VIM4
Trade Mark	:	Khadas
Test Model.....	:	VIM4
Ratings	:	Input: 5V⎓3A, 9V⎓2.67A, 12V⎓2A USB1 Output: 5V⎓1300mA USB2 Output: 5V⎓1500mA
Result	:	**Positive**

Compiled by:	**Supervised by:**	**Approved by:**
Cherry Chen	Jin Wang	
Cherry Chen/ Administrator	Jin Wang/ Technique principal	Gavin Liang/ Manager

HEALTH --TEST REPORT

Test Report No. : LCS220304068AEG	April 19, 2022 Date of issue

Test Model	:	VIM4
EUT.....	:	VIM4
Applicant.....	:	**KHADAS TECHNOLOGY CO., LTD**
Address.....	:	2709 QIANCHENG CENTER, HAICHENG ROAD, XIXIANG STREET, BAO'AN DISTRICT, SHENZHEN, CHINA. 518101
Telephone.....	:	/
Fax.....	:	/
Manufacturer.....	:	**KHADAS TECHNOLOGY CO., LTD**
Address.....	:	2709 QIANCHENG CENTER, HAICHENG ROAD, XIXIANG STREET, BAO'AN DISTRICT, SHENZHEN, CHINA. 518101
Telephone.....	:	/
Fax.....	:	/
Factory.....	:	**KHADAS TECHNOLOGY CO., LTD**
Address.....	:	2709 QIANCHENG CENTER, HAICHENG ROAD, XIXIANG STREET, BAO'AN DISTRICT, SHENZHEN, CHINA. 518101
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.

Revision History

Report Version	Issue Date	Revision Content	Revised By
000	April 19, 2022	Initial Issue	---

1. GENERAL INFORMATION

1.1. Product Description for Equipment Under Test (EUT)

EUT	:	VIM4
Test Model	:	VIM4
Power Supply	:	Input: 5V⎓3A, 9V⎓2.67A, 12V⎓2A USB1 Output: 5V⎓1300mA USB2 Output: 5V⎓1500mA
Hardware Version	:	V12
Software Version	:	OOWOW
Bluetooth	:	
Frequency Range	:	2402MHz ~ 2480MHz
Channel Number	:	79 channels for Bluetooth V5.1 (BDR/EDR) 40 channels for Bluetooth V5.1 (BT LE/ BT 2LE)
Channel Spacing	:	1MHz for Bluetooth V5.1 (BDR/EDR) 2MHz for Bluetooth V5.1 (BT LE/ BT 2LE)
Modulation Type	:	GFSK, π/4-DQPSK, 8-DPSK for Bluetooth V5.1 (BDR/EDR) GFSK for Bluetooth V5.1 (BT LE/ BT 2LE)
Bluetooth Version	:	V5.1
Antenna Description	:	FPC Antenna A, 3.45dBi(Max.)
WIFI(2.4G Band)	:	
Frequency Range	:	2412MHz ~ 2472MHz
Channel Spacing	:	5MHz
Channel Number	:	13 Channel for 20MHz bandwidth(2412~2472MHz)
Modulation Type	:	802.11b: DSSS; 802.11g/n/ax: OFDM
Antenna Description	:	FPC Antenna A, 3.45dBi(Max.)
WIFI(5.2G Band)	:	
Frequency Range	:	5180MHz ~ 5240MHz
Channel Number	:	4 channels for 20MHz bandwidth(5180~5240MHz) 2 channels for 40MHz bandwidth(5190~5230MHz)
Modulation Type	:	802.11a/n/ac/ax: OFDM (256QAM, 64QAM, 16QAM, QPSK, BPSK)
Antenna Description	:	FPC Antenna B, 1.87dBi(Max.)
WIFI(5.8G Band)	:	

Frequency Range	:	5745MHz ~ 5825MHz
Channel Number	:	5 channels for 20MHz bandwidth(5745~5825MHz) 2 channels for 40MHz bandwidth(5755~5795MHz)
Modulation Type	:	802.11a/n/ac/ax: OFDM (256QAM, 64QAM, 16QAM, QPSK, BPSK)
Antenna Description	:	FPC Antenna B, 1.87dBi(Max.)

1.2. Objective

According to its specifications, the EUT must comply with the requirements of the following standards:
EN IEC 62311: 2020 –Assessment of electronic and electrical equipment related to human exposure restrictions for electromagnetic fields (0 Hz - 300 GHz)

1.3. Test Methodology

All measurements contained in this report were conducted with EN IEC 62311: 2020.

1.4. Facilities

All measurement facilities used to collect the measurement data are located at Room 101, 201, Building A and Room 301, Building C, Juji Industrial Park, Yabianxueziwei, Shajing Street, Bao'an District, Shenzhen, Guangdong, China

The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 and CISPR Publication 32.

1.5. Host System Configuration List and Details

Manufacturer	Description	Model	Serial Number	Certificate
SHENZHEN K-TECH TECHNOLOGY CO.,LTD	ADAPTER	GW30W-120 200VH	--	CE

Note: The Adapter is supplied by lab and only use tested.

1.6. External I/O Cable

I/O Port Description	Quantity	Cable
USB Port	3	N/A
Type-C USB Port	1	N/A

1.7. Equipment

Radiated emissions are measured with one or more of the following types of linearly polarized antennas: tuned dipole, bi-conical, log periodic, bi-log, and/or ridged waveguide, horn. Spectrum analyzers with pre-selectors and quasi-peak detectors are used to perform radiated measurements. Conducted emissions are measured with Line Impedance Stabilization Networks and EMI Test Receivers.

Calibrated wideband preamplifiers, coaxial cables, and coaxial attenuators are also used for making measurements.
All receiving equipment conforms to CISPR Publication 16-1, “Radio Interference Measuring Apparatus and Measurement Methods.”

1.8. Laboratory Accreditations And Listings

Site Description		
EMC Lab.	:	NVLAP Accreditation Code is 600167-0. FCC Designation Number is CN5024. CAB identifier is CN0071. CNAS Registration Number is L4595.
Name of Firm	:	Shenzhen LCS Compliance Testing Laboratory Ltd.
Site Location	:	Room 101, 201, Building A and Room 301, Building C, Juji Industrial Park, Yabianxueziwei, Shajing Street, Bao’an District, Shenzhen, Guangdong, China

1.9. Measurement Uncertainty

Test Item		Uncertainty
Radio Frequency	:	0.9×10^{-4}
Total RF Power, Conducted	:	1.0 dB
RF Power Density, Conducted	:	1.8 dB
Spurious Emissions, Conducted	:	1.8 dB
All Emissions, Radiated	:	3.1 dB
Temperature	:	0.5°C
Humidity	:	1 %
DC And Low Frequency Voltages	:	1 %

2. HUMAN EXPOSURE TO THE ELECTROMAGNETIC FIELDS

2.1 Basic Restrictions Reference levels

Council Recommendation 1999/519/EC Annex II

Basic restrictions for electric, magnetic and electromagnetic fields (0Hz to 300GHz)

Frequency range	Magnetic flux density (mT)	Current density (Ma/m2) (rms)	Whole body average SAR (W/kg)	Localised SAR (head and trunk) (W/kg)	Localised SAR (limbs) (W/kg)	Power density (W/m2)
0Hz	40	-	-	-	-	-
>0-1Hz	-	8	-	-	-	-
1-4Hz	-	8/f	-	-	-	-
4-1000Hz	-	2	-	-	-	-
1000Hz-100kHz	-	f/500	-	-	-	-
100kHz-10MHz	-	f/500	0.08	2	4	-
10MHz-10GHz	-	-	0.08	2	4	-
10-300GHz	-	-	-	-	-	10

Note:

1. f is the frequency in Hz.
2. The basic restriction on the current density is intended to protect against acute exposure effects on central nervous system tissues in the head and trunk of the body and includes a safety factor. The basic restrictions for ELF fields are based on established adverse effects on the central nervous system. Such acute effects are essentially instantaneous and there is no scientific justification to modify the basic restrictions for exposure of short duration. However, since the basic restriction refers to adverse effects on the central nervous system, this basic restriction may permit higher current densities in body tissues other than the central nervous system under the same exposure conditions.
3. Because of electrical inhomogeneity of the body, current densities should be averaged over a cross section of 1cm2 perpendicular to the current direction.
4. For frequencies up to 100 kHz, peak current density values can be obtained by multiplying the rms value by √2(=1.414). For pulses of duration tp the equivalent frequency to apply in the basic restrictions should be calculated as=1/(2tp)
5. For frequencies up to 100kHz and for pulsed magnetic fields, the maximum current density associated with the pulses can be calculated from the rise/fall times and the maximum rate of change of magnetic flux density. The induced current density can then be compared with the appropriate basic restriction.
6. All SAR values are to be averaged over any six-minute period.
7. Localised SAR averaging mass is any 10g of contiguous tissue; the maximum SAR so obtained should be the value used for the estimation of exposure. These 10g of tissue are intended to be a mass of contiguous tissue with nearly homogeneous electrical properties. In specifying a contiguous mass of tissue, it is recognised that this concept can be used in computational dosimetry but may present difficulties for direct physical measurements. A simple geometry such as cubic tissue mass can be used provided that the calculated dosimetric quantities have conservation values relative to the exposure guidelines.

8. For pulses of duration tp the equivalent frequency to apply in the basic restrictions should be calculated as=1/(2tp). Additionally, for pulsed exposures, in the frequency range 0,3 to 10GHz and for localised exposure of the head, in order to limit and avoid auditory effects caused by thermoelastic expansion, an additional basic restriction is recommended. This is that SA should not exceed 2mJ kg-1 averaged over 10g of tissue.

2.2 Reference Levels

Council Recommendation 1999/519/EC Annex II

Basic restrictions for electric, magnetic and electromagnetic fields (0Hz to 300GHz)

Frequency range	E-field strength (V/m)	H-field strength (A/m)	B-field (μT)	Equivalent plane wave power density Seq (W/m2)
0-1Hz	-	$3,2\times10^4$	4×10^4	-
1-8Hz	1000	$3,2\times10^4/f^2$	$4\times10^4/f^2$	-
8-25Hz	1000	4000/f	5000/f	-
0.025Hz-0,8kHz	250/f	4/f	5/f6,25	-
0,8-3kHz	250/f	5	6,25	-
3-150kHz	87	5	6,25	-
0,15-1MHz	87	0.73/f	0,92/f	-
1-10MHz	$87/f^{1/2}$	0.73/f	0,92/f	-
10-400MHz	28	0.073	0,092	2
400-2000MHz	$1,375\ f^{1/2}$	$0,0037\ f^{1/2}$	$0,0046\ f^{1/2}$	f/200
2-300GHz	61	0,16	0,20	10

Note:

1. f is the frequency in Hz.
2. The basic restriction on the current density is intended to protect against acute exposure effects on central nervous system tissues in the head and trunk of the body and includes a safety factor. The basic restrictions for ELF fields are based on established adverse effects on the central nervous system. Such acute effects are essentially instantaneous and there is no scientific justification to modify the basic restrictions for exposure of short duration. However, since the basic restriction refers to adverse effects on the central nervous system, this basic restriction may permit higher current densities in body tissues other than the central nervous system under the same exposure conditions.
3. Because of electrical inhomogeneity of the body, current densities should be averaged over a cross section of 1cm2 perpendicular to the current direction.
4. For frequencies up to 100 kHz, peak current density values can be obtained by multiplying the rms value by √2(=1.414). For pulses of duration tp the equivalent frequency to apply in the basic restrictions should be calculated as=1/(2tp)
5. For frequencies up to 100kHz and for pulsed magnetic fields, the maximum current density associated with the pulses can be calculated from the rise/fall times and the maximum rate of change of magnetic flux density. The induced current density can then be compared with the appropriate basic restriction.
6. All SAR values are to be averaged over any six-minute period.
7. Localised SAR averaging mass is any 10g of contiguous tissue; the maximum SAR so obtained should be the value used for the estimation of exposure. These 10g of tissue are

intended to be a mass of contiguous tissue with nearly homogeneous electrical properties. In specifying a contiguous mass of tissue, it is recognised that this concept can be used in computational dosimetry but may present difficulties for direct physical measurements. A simple geometry such as cubic tissue mass can be used provided that the calculated dosimetric quantities have conservation values relative to the exposure guidelines.

8. For pulses of duration tp the equivalent frequency to apply in the basic restrictions should be calculated as=1/(2tp). Additionally, for pulsed exposures, in the frequency range 0,3 to 10GHz and for localised exposure of the head, in order to limit and avoid auditory effects caused by thermoelastic expansion, an additional basic restriction is recommended. This is that SA should not exceed 2mJ kg-1 averaged over 10g of tissue.

Classification of the assessment methods
The antenna of the product, under normal use condition is at least 20cm away from the body of the user. Warning statement on the user for keeping 20cm separation distance and the prohibition of operating to a person has been printed on the user manual. So, this product under normal use is located on electromagnetic far field between the human body.
Far Field Calculation Formula
$E = \frac{\sqrt{30 \times G \times TP}}{D}$ *Where* *G: numerical gain of transmitting antenna;* *TP: Transmitted power in watt;* *D: distance from the transmitting antenna in meter.*

2.3. Test Results

According to the radio test report (LCS220304068AEB; LCS220304068AEC; LCS220304068AED; LCS220304068AEE; LCS220304068AEF):

Mode	Output Power To Antenna (dBm)	Antenna Gain (dBi)	Minimum Distance in Meter (m)	E-field Strength (V/m)	E-field Strength Limit (V/m)	Result
BT	3.50	3.45	0.2	1.93	61.00	Pass
BT LE	-1.96	3.45	0.2	1.03	61.00	Pass
2.4G WIFI	16.68	3.45	0.2	8.79	61.00	Pass
5.2G WIFI	11.46	1.1	0.2	3.68	61.00	Pass
5.8G WIFI	11.24	1.54	0.2	3.77	61.00	Pass

Note:

1. Only record worst case data.

2. All other emissions are too low to read.

This proves that the unit complies with the EN IEC 62311 for RF exposure requirement.

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