VELAINSTRUMENTS

PEGASUS LIBS

PORTABLE LIBS ANALYZER FOR CARBON

VELA INSTRUMENTS LLC

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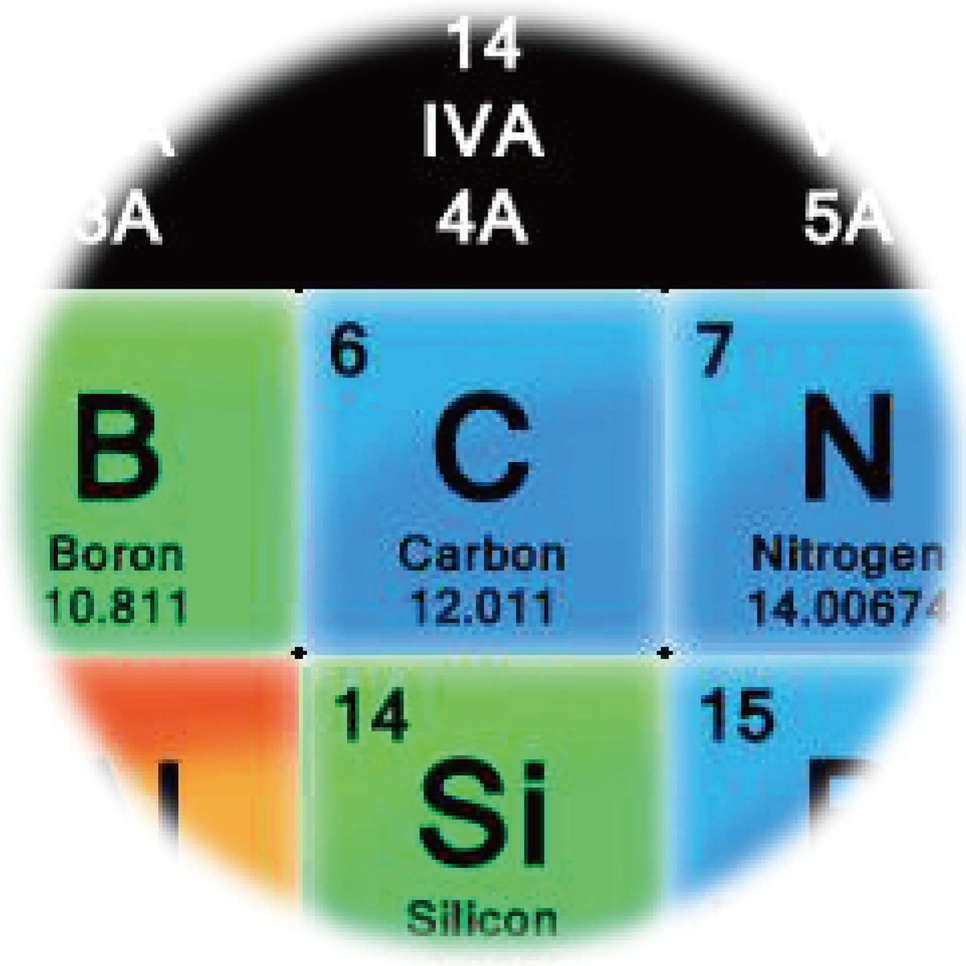
CARBON APPLICATION

Pegasus LIBS analyzer for carbon is dedicated for measuring carbon content in various steels. It fulfills a long-awaited, on-the-spot carbon analysis requirement for various alloy processing and manufacturing applications, such as material quality control, positive material identification, and sorting. For example, it is capable to measure low carbon content in L-grade stainless steel as well as alloy steels and carbon steels.



DESIGN

Pegasus libs uses a compact probe with a long, flexible steel tube attached to the main frame. The probe itself is much smaller and lighter than handheld LIBS analyzer on the market. It is much easier to use in tight, small spaces such as pipes, valves, or inside of a reactor etc.

COMPANY PROFILE

Vela Instruments LLC is a dedicated LIBS company focused on advancing Laser Induced Breakdown Spectroscopy (LIBS) technology and its commercialization. We conduct original research and development in this area and own many intellectual property rights. Our first-generation, Vela handheld LIBS analyzer was launched in 2018. Our second-generation, Pegasus portable LIBS analyzer for carbon was launched in 2021.

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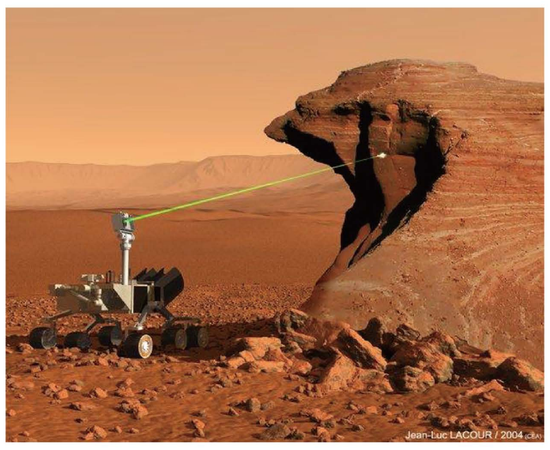
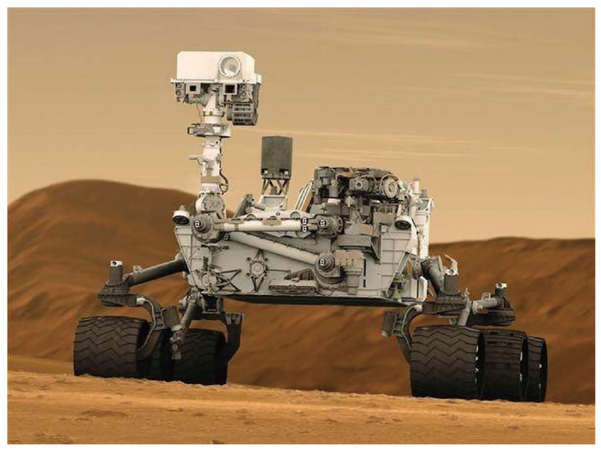
LIBS TECHNOLOGY INTRODUCTION

LIBS spectrometer is very similar to atomic emission spectroscopy. It is used for qualitative and quantitative spectroscopic analysis of elements. When a high-power, pulsed laser is focused on the surface of a test sample, a small amount of material will be ablated and excited to generate a plasma plume. At the end of the laser pulse, the plasma rapidly diffuses and cools. During this time, the atoms and ions in the excited state migrate back from the high-energy state to the low-energy state, and emit characteristic light radiation with a specific wavelength. Use a sensitive spectrometer to analyze the emission spectrum, the types and corresponding contents of the elements in the material can be obtained. LIBS technology is known as the "star of future chemical analysis" because it does not require sample preparation, is nearly non-destructive, fast, and safe multi-element analysis, especially for light elements detection such as carbon, lithium, and silicon etc.

The well-known application of LIBS technology:
The ChemCam on Curiosity Mars rover and the Super Cam on Ingenuity Mars rover





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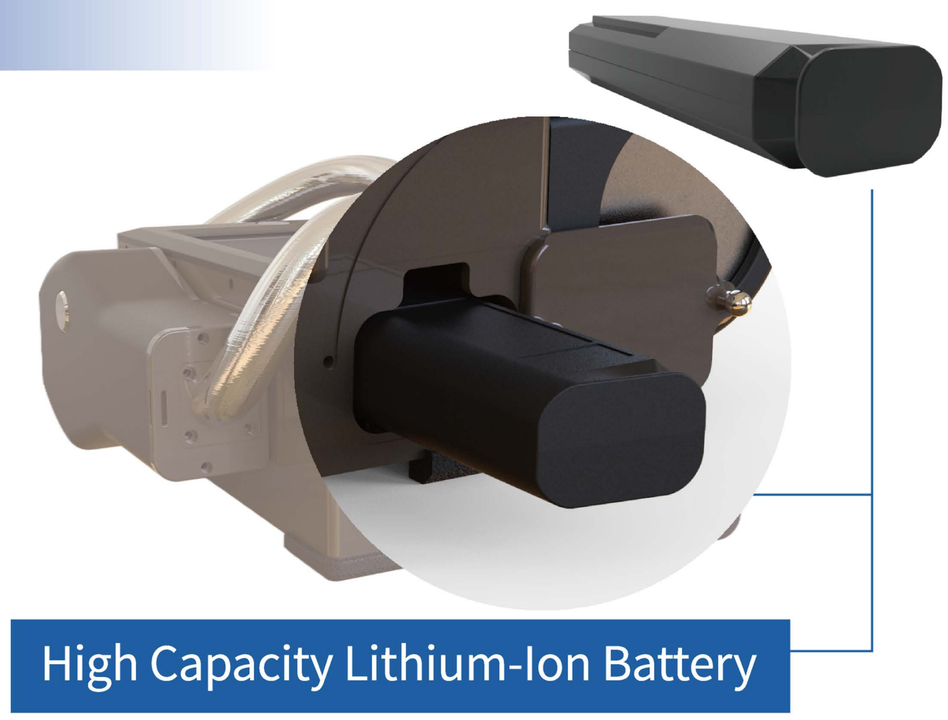
HIGH CAPACITY LITHIUM-ION BATTERY AND DC POWER ADAPTOR

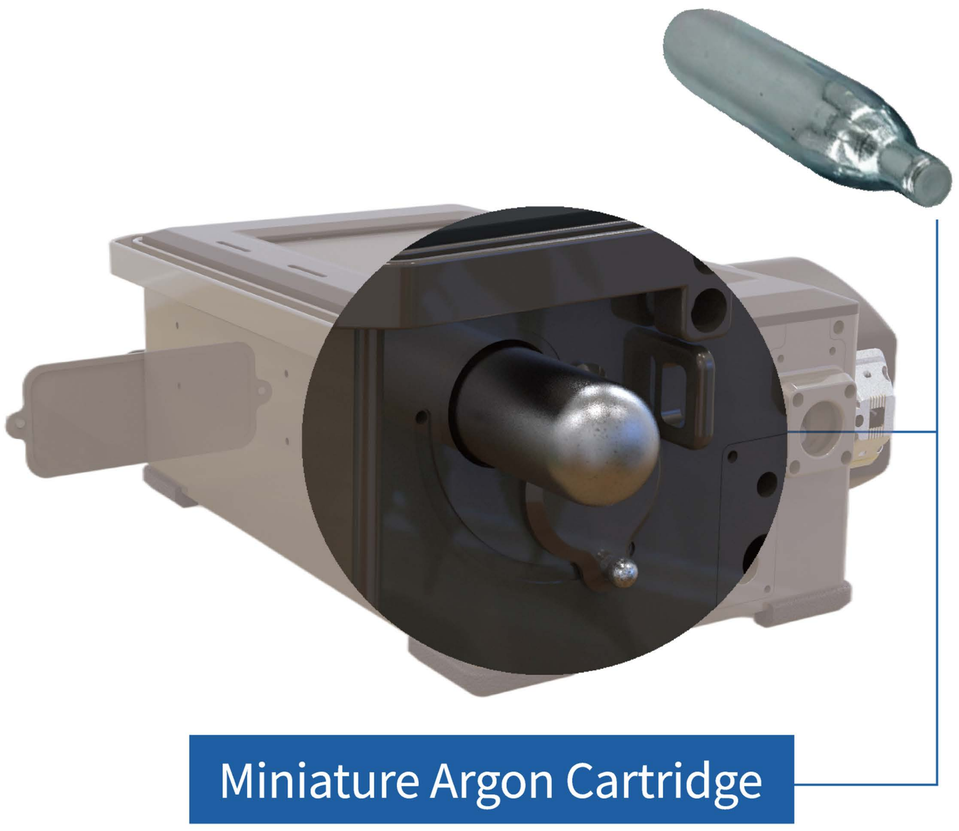
Pegasus comes with a universal DC power adapter for power supply for uninterrupted operations. It also comes with three high-capacity lithium-ion batteries, each can provide up to 3 hours of battery life. Together, they ensure a full-day continuous operation.



MINIATURE ARGON CARTRIDGE

In the application of carbon measurement, argon is one of the most important consumables. Pegasus is equipped with a miniature, disposable Argon cartridge, which can last bout 200 measurements.

If permitted, Pegasus can also use a 250mL, refillable Argon cylinder with a dedicated holder attached to the main frame. This 250mL cylinder can last up to 3000 measurements.

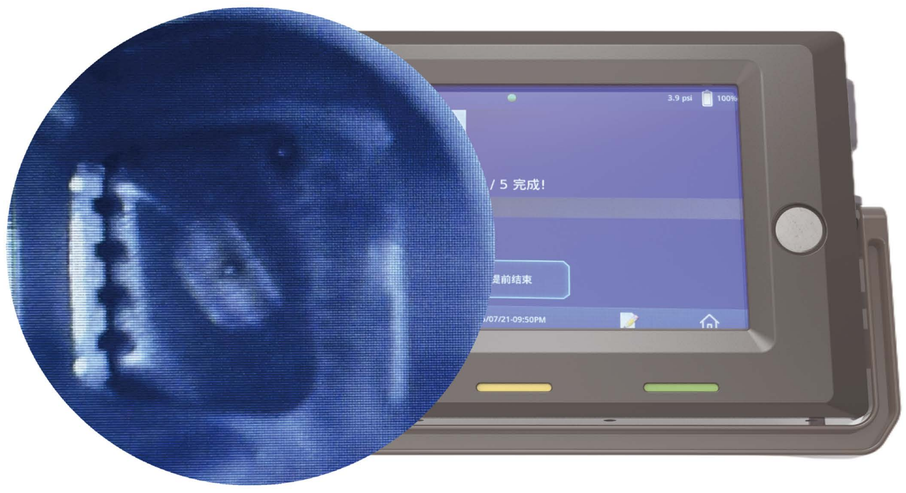


LARGE TOUCH SCREEN DISPLAY

The main frame is equipped with a 7-inch, high-definition capacitive touch screen, EMI resistant, suitable for industrial applications.

BUILT-IN HD CAMERA

The built-in, high-definition camera can help locate the ideal test spot. Many surface needs preparation prior to the test. With the built-in camera, the user only needs to grind a small spot, the size of a Penny, and still easily locate it, saving time and effort.

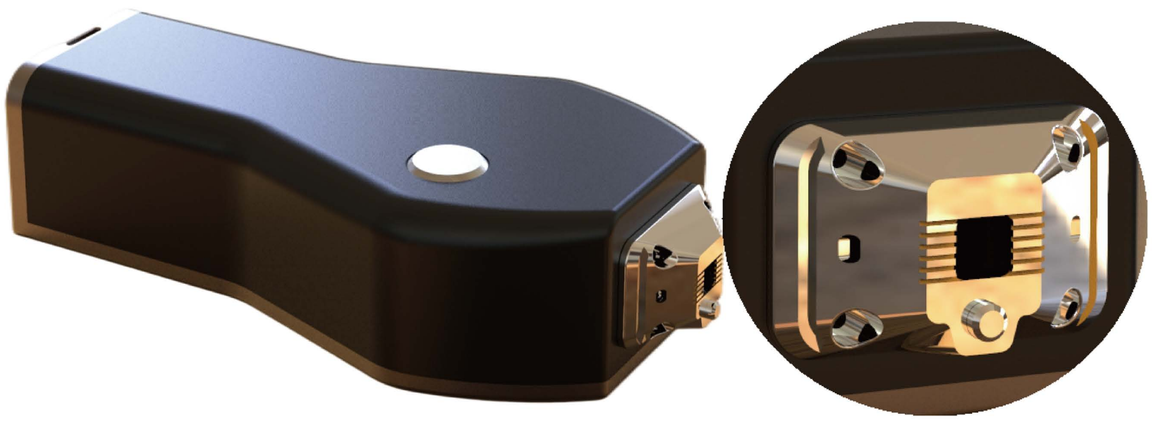


PORTABLE BLUETOOTH PRINTER

The portable Bluetooth printer is a useful accessory and is very unique to Pegasus. It can directly print the test results within seconds. The thermal printing paper with adhesive back is be placed on the tested material as a permanent record.

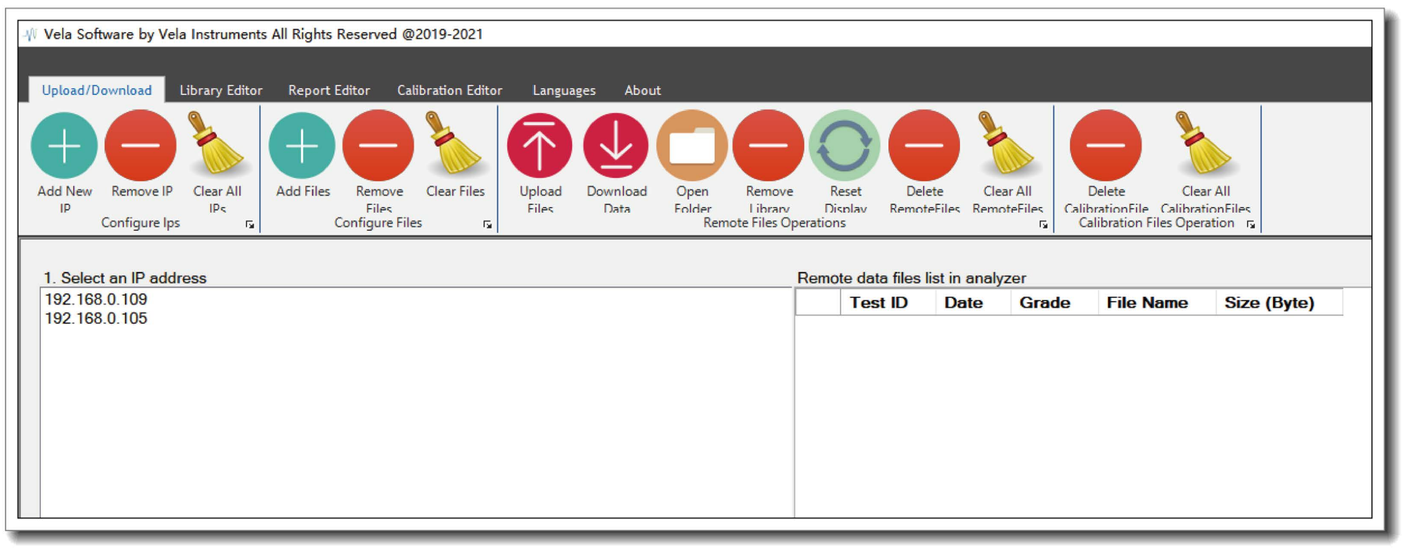
LIGHTWEIGHT TEST PROBE

The test probe weighs only 500g and is very attractive for long-duration, handheld operation. Its compact size allows to test welds, welding rods, metal bars, pipe fittings and even the inner wall of pipes.



VELA SOFTWARE

Pegasus comes with free Vela Software, which provides powerful tools for downloading test data, editing grade library, generating test reports, and compiling calibration files. For power users, it provides very useful added functionalities to meet their professional requirements.



PRODUCT CERTIFICATIONS

Pegasus has certified by CE, RoHS, EMC and Chinese safety and quality certification bodies.

HTT TECHNOLOGY

Certificate of Conformity

Certificate No. : HTT202102038R
Applicant : Vela Optoelectronics (SuZhou) Co., Ltd.
Applicant Address : 312# Building B, Advanced Laser (Equipment) Industrial Park Xinchuang Road, Daxin Zhen Zhangjiagang, Suzhou Jiangsu province, China
Manufacturer : Vela Optoelectronics (SuZhou) Co., Ltd.
Manufacturer Address : 312# Building B, Advanced Laser (Equipment) Industrial Park Xinchuang Road, Daxin Zhen Zhangjiagang, Suzhou Jiangsu province, China
Product : Pegasus LIBS Carbon Analyzer
Model No. : P-2
Trademark : 派格斯 / PEGASUSLIBS

This is to certify that, on the basis of the tests undertaken as per Report No.: HTT202102038CH, the submitted sample of the above item complies with:

IEC 62321-4:2013+A1:2017
IEC 62321-5:2013
IEC 62321-6:2015
IEC 62321-7-1:2015
IEC 62321-7-2:2017
IEC 62321-8:2017

And fulfills testing requirement of the RoHS directive 2011/65/EU Annex II amending Annex (EU)2015/863 and amending Annex (EU)2017/2102.

RoHS

KevinYang/Senior Manager

Date of Issue: Feb.25,2021

Shenzhen HTT Technology Co.,Ltd. Web: www.httprc.com
TEL: 0755-23595200 FAX: 0755-23595201 Hotline: 400-6655-351 Mail: info@httprc.com
1F, B Building, Huafeng International Robotics Industrial Park, Gushu, Xixiang Street, Bao'an District, Shenzhen, China

Report No.: HTT202102038H Page 1 of 5

TEST REPORT
EN50663:2017

Report Reference No.: HTT202102038H
Compiled by (position+printed name+signature): Jack Chen
Supervised by (position+printed name+signature): Owen Hu
Approved by (position+printed name+signature): Kevin Yang
Date of issue: Feb.25,2021
Testing Laboratory Name: Shenzhen HTT Technology Co., Ltd.
Address: 1F, B Building, Huafeng International Robotics Industrial Park, Gushu, Xixiang Street, Bao'an District, Shenzhen
Applicant's name: Vela Optoelectronics (SuZhou) Co., Ltd.
Address: 312# Building B, Advanced Laser (Equipment) Industrial Park Xinchuang Road, Daxin Zhen Zhangjiagang, Suzhou Jiangsu province, China
Test specification
Standard: EN50663:2017
Test item description: Pegasus LIBS Carbon Analyzer
Trade Mark: 派格斯 / PEGASUSLIBS
Manufacturer: Vela Optoelectronics (SuZhou) Co., Ltd. 312# Building B, Advanced Laser (Equipment) Industrial Park Xinchuang Road, Daxin Zhen Zhangjiagang, Suzhou Jiangsu province, China
Model/Type reference: P-2
Serial Model: N/A
Ratings: DC 16.8V, 3A, 50W; Li-ion Battery 14.8V, 2350mAh; Adapter Input: 100-265V, 47-63Hz; Output: DC 16.8V, 4A Max
Result: PASS

HTT TECHNOLOGY

EC-RED CERTIFICATE

Opinion Number: HTT202102038

Applicant:	Vela Optoelectronics (SuZhou) Co., Ltd.
Address:	312# Building B, Advanced Laser (Equipment) Industrial Park Xinchuang Road, Daxin Zhen Zhangjiagang, Suzhou Jiangsu province, China
Manufacturer:	Vela Optoelectronics (SuZhou) Co., Ltd.
Address:	312# Building B, Advanced Laser (Equipment) Industrial Park Xinchuang Road, Daxin Zhen Zhangjiagang, Suzhou Jiangsu province, China
Product:	Pegasus LIBS Carbon Analyzer
Model:	P-2
Trade Mark:	派格斯 / PEGASUSLIBS
Test Lab:	Shenzhen HTT Technology Co., Ltd.
Date of Issue:	Feb.25,2021

Essential Requirements	Specifications / Standards	Report Number	Result
Health and Safety, Article 3.1 a)	EN50663:2017	HTT202102038H	Compliant
	EN 62368-1:2014+A11: 2017	HTT202102038S	
EMC, Article 3.1 b)	ETSI EN 301 489-1 V2.2.3 (2019-11) ETSI EN 301 489-17 V3.2.4 (2020-09)	HTT202102038E-1	Compliant
Radio Spectrum, Article 3.2	ETSI EN 300 328 V2.2.2 (2019-07)	HTT202102038E-2	Compliant
		HTT202102038E-3	

Our opinion in accordance with directive 2014/53/EU(RED) on radio equipment and telecommunications equipment and the mutual recognition of their conformity is that the apparatus identified above complies with the requirements of that directive stated above.
Marking: It is recommended that the product bear the CE mark, the notified body number(s) as depicted to the right, only when all the essential requirements have been met, and has been filed with the European Commission.

Authorized by: Kevin Yang, Technical Expert

CE

Shenzhen HTT Technology Co.,Ltd. Web: www.httprc.com
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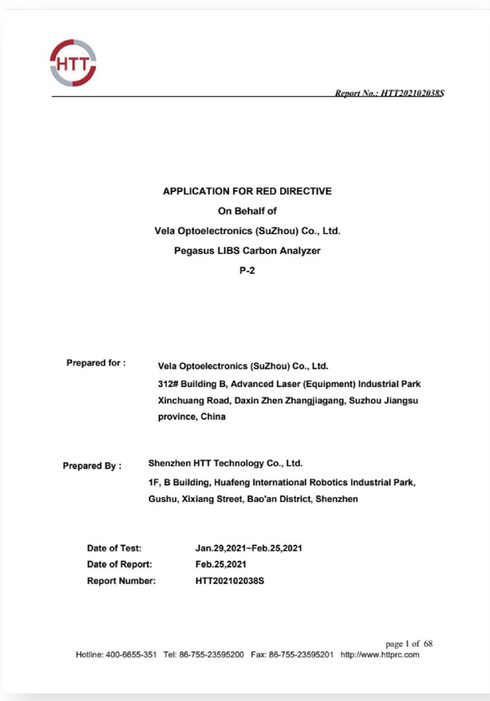

Report No.: HTT202102038S

APPLICATION FOR RED DIRECTIVE
On Behalf of
Vela Optoelectronics (SuZhou) Co., Ltd.
Pegasus LIBS Carbon Analyzer
P-2

Prepared for : Vela Optoelectronics (SuZhou) Co., Ltd.
312# Building B, Advanced Laser (Equipment) Industrial Park Xinchuang Road, Daxin Zhen Zhangjiagang, Suzhou Jiangsu province, China

Prepared By : Shenzhen HTT Technology Co., Ltd.
1F, B Building, Huafeng International Robotics Industrial Park, Gushu, Xixiang Street, Bao'an District, Shenzhen

Date of Test: Jan.29,2021~Feb.25,2021
Date of Report: Feb.25,2021
Report Number: HTT202102038S

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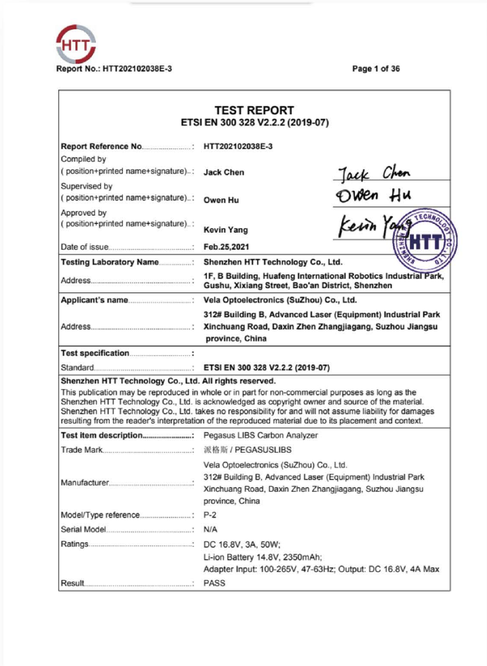
Hotline: 400-6655-351 Tel: 86-755-23595200 Fax: 86-755-23595201 http://www.httprc.com

Report No.: HTT202102038E-2 Page 1 of 40

TEST REPORT
ETSI EN 300 328 V2.2.2 (2019-07)

Report Reference No.: HTT202102038E-2
Compiled by (position+printed name+signature): Jack Chen
Supervised by (position+printed name+signature): Owen Hu
Approved by (position+printed name+signature): Kevin Yang
Date of issue: Feb.25,2021
Testing Laboratory Name: Shenzhen HTT Technology Co., Ltd.
Address: 1F, B Building, Huafeng International Robotics Industrial Park, Gushu, Xixiang Street, Bao'an District, Shenzhen
Applicant's name: Vela Optoelectronics (SuZhou) Co., Ltd.
Address: 312# Building B, Advanced Laser (Equipment) Industrial Park Xinchuang Road, Daxin Zhen Zhangjiagang, Suzhou Jiangsu province, China
Test specification
Standard: ETSI EN 300 328 V2.2.2 (2019-07)
Test item description: Pegasus LIBS Carbon Analyzer
Trade Mark: 派格斯 / PEGASUSLIBS
Manufacturer: Vela Optoelectronics (SuZhou) Co., Ltd. 312# Building B, Advanced Laser (Equipment) Industrial Park Xinchuang Road, Daxin Zhen Zhangjiagang, Suzhou Jiangsu province, China
Model/Type reference: P-2
List Model: N/A
Operation Frequency: From 2412MHz to 2472MHz
Ratings: DC 16.8V, 3A, 50W; Li-ion Battery 14.8V, 2350mAh; Adapter Input: 100-265V, 47-63Hz; Output: DC 16.8V, 4A Max
Result: PASS



Report No.: HTT202102038E-3 Page 1 of 36

TEST REPORT
ETSI EN 300 328 V2.2.2 (2019-07)

Report Reference No.: HTT202102038E-3
Compiled by (position+printed name+signature): Jack Chen
Supervised by (position+printed name+signature): Owen Hu
Approved by (position+printed name+signature): Kevin Yang
Date of issue: Feb.25,2021
Testing Laboratory Name: Shenzhen HTT Technology Co., Ltd.
Address: 1F, B Building, Huafeng International Robotics Industrial Park, Gushu, Xixiang Street, Bao'an District, Shenzhen
Applicant's name: Vela Optoelectronics (SuZhou) Co., Ltd.
Address: 312# Building B, Advanced Laser (Equipment) Industrial Park Xinchuang Road, Daxin Zhen Zhangjiagang, Suzhou Jiangsu province, China
Test specification
Standard: ETSI EN 300 328 V2.2.2 (2019-07)

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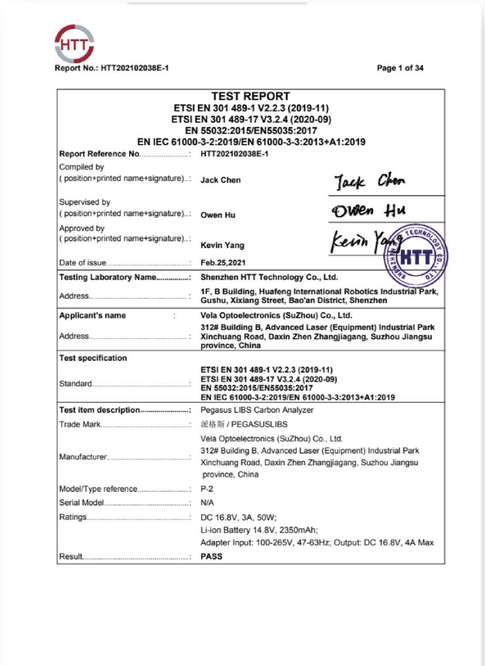
Test item description: Pegasus LIBS Carbon Analyzer
Trade Mark: 派格斯 / PEGASUSLIBS
Manufacturer: Vela Optoelectronics (SuZhou) Co., Ltd. 312# Building B, Advanced Laser (Equipment) Industrial Park Xinchuang Road, Daxin Zhen Zhangjiagang, Suzhou Jiangsu province, China
Model/Type reference: P-2
Serial Model: N/A
Ratings: DC 16.8V, 3A, 50W; Li-ion Battery 14.8V, 2350mAh; Adapter Input: 100-265V, 47-63Hz; Output: DC 16.8V, 4A Max
Result: PASS



Report No.: HTT202102038E-1 Page 1 of 34

TEST REPORT
ETSI EN 301 489-1 V2.2.3 (2019-11)
ETSI EN 301 489-17 V3.2.4 (2020-09)
EN 55032:2015/EN55035:2017
EN IEC 61000-3-2:2019/EN 61000-3-3:2013+A1:2019

Report Reference No.: HTT202102038E-1
Compiled by (position+printed name+signature): Jack Chen
Supervised by (position+printed name+signature): Owen Hu
Approved by (position+printed name+signature): Kevin Yang
Date of issue: Feb.25,2021
Testing Laboratory Name: Shenzhen HTT Technology Co., Ltd.
Address: 1F, B Building, Huafeng International Robotics Industrial Park, Gushu, Xixiang Street, Bao'an District, Shenzhen
Applicant's name: Vela Optoelectronics (SuZhou) Co., Ltd.
Address: 312# Building B, Advanced Laser (Equipment) Industrial Park Xinchuang Road, Daxin Zhen Zhangjiagang, Suzhou Jiangsu province, China
Test specification
Standard: ETSI EN 301 489-1 V2.2.3 (2019-11) ETSI EN 301 489-17 V3.2.4 (2020-09) EN 55032:2015/EN55035:2017 EN IEC 61000-3-2:2019/EN 61000-3-3:2013+A1:2019
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Model/Type reference: P-2
Serial Model: N/A
Ratings: DC 16.8V, 3A, 50W; Li-ion Battery 14.8V, 2350mAh; Adapter Input: 100-265V, 47-63Hz; Output: DC 16.8V, 4A Max
Result: PASS

PEGASUS LIBS FOR CARBON

Element	Min (%)	Max (%)
C	**0**	**1.5**
Al	**0**	**1.5**
Cr	**0**	**30**
Cu	**0**	**4.0**
Mn	**0**	**15**
Mo	**0**	**5.0**
Ni	**0**	**25**
Si	**0**	**4.0**
Ti	**0**	**1.5**
Fe	**balance**	**balance**

FIELD TESTING A 35CRMO STEEL PLATE

FIELD TESTING A 65MN STEEL PLATE

VELA PORTABLE LIBS CARBON ANALYZER SPECIFICATIONS

Technology	Laser based, no ionizing radiation hazard
Analyzer (L*W*H)	~3.6*9.0*5.1inch (90*230*130mm)
Probe(L*W*H)	~1.6*0.7*3.4inch (40*17.5*85mm)
Cable （L）	40inch (1000mm)
Analyzer Weight	7.7lbs (3.5Kg)
Probe Weight	1.1lbs (0.5Kg)
DC Adapter	16.8V, 3A
Battery	Li-Ion based,16.8V, 3250mAh, 48Wh
Argon	Purity: 99.99% or greater, Pressure: < 500 psi
WIFI	2.4GHz 802.11n/b wireless
Bluetooth	Bluetooth 4.1 , Bluetooth Low Energy
Display	7.0inch capacitive touch screen, 800*480 pixels
Internal Storage	16G
Laser	Class 3B, 1064nm Passive Q-switch solid state laser
Spectrometer	< 0.1nm resolution
Single Test Time	~4 seconds
Multi-Test Mode	Improve precision by averaging multiple single shots
Alloy Base	Alloy Steel, Carbon Steel
Element Capability	Al, C, Co, Cr, Cu, Fe, Mn, Mo, Ni, Si, Ti, W
Sample Form	block, sheet, foil (~0.1mm), large chips (no powders)
Detection Limit	Varies with elements
Library	Including more than 50 most common grades, highly customizable through Vela Software
Working Temperatures	32~100 ℉ (0~40°C) 40~95 ℉ (5~35°C) recommended
Software	Vela Software (app update, data download, and library, report calibration editing etc)
Safety	Physical laser interlock button Safety harness strap on probe
Warranty	One year factory warranty on all parts
Extended Warranty	Available through purchase
Preventive Maintenance (Done by customer)	Sample chamber cleaning using cotton Q-tips Spot check using provided CRMs Spot calibration using CRMs to improve accuracy

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