AngelEye Controller
AngelEye B01
User Manual

NextVPU

NextVPU (Shanghai) Co., Ltd.

Please read with assistants

Content

1.AngelEye Overview

AngelEye smart glasses (hereinafter referred to as AngelEye), developed by NextVPU (Shanghai) Co,. Ltd., is the world's first smart glasses to assist blind and visually impaired people to perceive the world, which is based on the most advanced computer vision and artificial intelligence technology.

AngelEye smart glasses consists of the principal part, bone-conduction headphone, buttons, USB 2.0 OTG cable, lens, and nose pad etc.
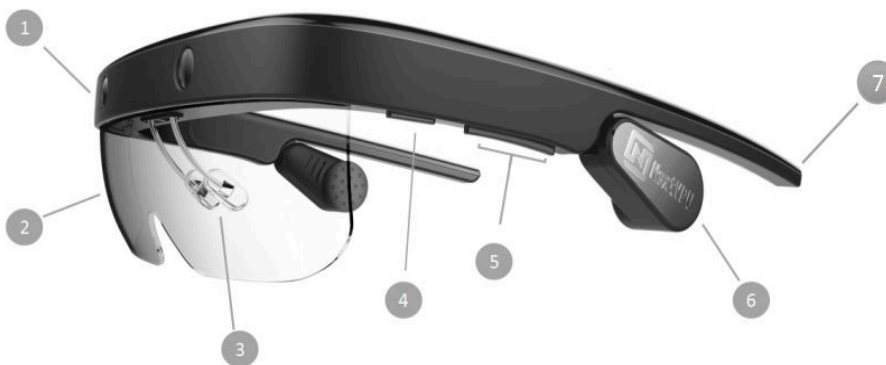
① Main body: The main body includes a stereo camera and a data transmission board.
② Lens: Accessory equipment
③ Nose Pad: Accessory equipment
④ Power Button: Switch wake/sleep model and recognition
⑤ Volume Button: Volume control and location reporting
⑥ Bone-conduction Headphone: Output auditory information
⑦ Cable: Transmit data by connecting the glasses and smartphone.

AngelEye smart glasses button guide
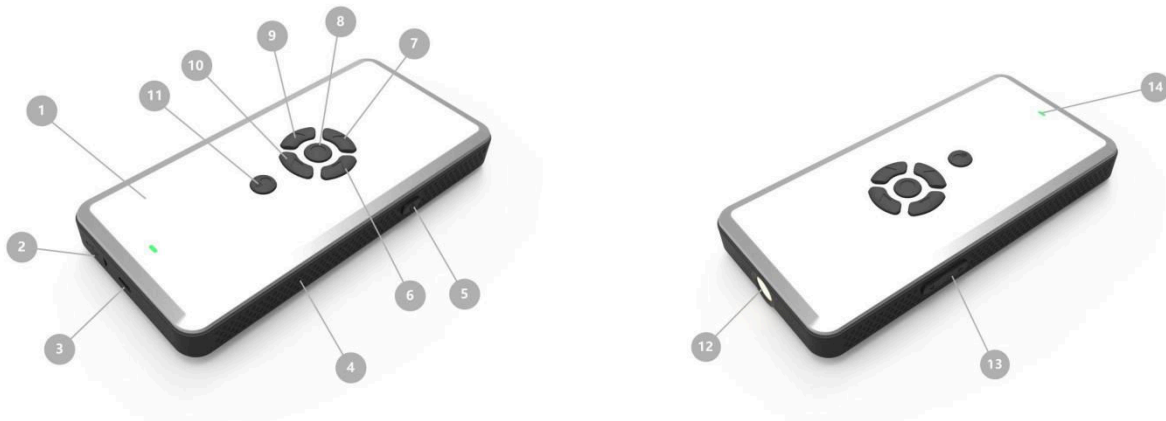
Power button	Volume up	Volume down	Function
Press and hold (2.5 seconds)	-	-	Wake/Sleep
Press	-	-	Recognition
Double presses			Switch recognition type
-	Press	-	Volume up

-	-	Press	Volume down
-	-	Press and hold	My location

2. Specialized controller

AngelEye could work with the specialized controller directly without connecting with smartphone.

1)	Metal Shell	8)	Enter Key
2)	USB port for battery charging	9)	Left Key
3)	USB port for AngelEye smart glasses	10)	Bottom Key
4)	Plastic Case	11)	Control Key
5)	Power Button	12)	LED Light
6)	Right Key	13)	Volume Control
7)	Upper Key	14)	LED Indicator

Specialized controller button guide

(More functions will be extended by software updating)

Quick Guide:

① Connect AngelEye smart glasses with the controller.

② Press and hold for 3 seconds, and wait about 5 seconds, when the system is switched on successfully, User could hear "AngelEye smart glasses has been connected" with controller vibration. LED light now is turning to "Green" automatically. (If the controller could NOT switch on successfully, please try again after the controller is fully charged).

③ The controller will report that the bluetooth is disconnected, please download AngelEye App for advanced setting. (The controller could work separately, so users could ignore this part)

Users could download the "AngelEye" APP through Google Play or Apple AppStore. Please register when the Internet is available and the smartphone is fully charged.

Turn on AngelEye App "My" -> "My Controller", the App will connect with controller by bluetooth automatically, then users have ability to set basic data by preference. If Wi-Fi is available, users are entitled to enter Wi-Fi password in order to allow controller access the Internet (Navigation, positioning and software updates are only available when Internet is connecting.

Button	Function
Power button	Power on/Power off
Upper Key	Switch recognition mode
Bottom Key	Switch recognition mode
Left Key	Press：Report current location Press and hold 2 seconds：Height setting
Right Key	Press：Report current height and Internet status
Enter Key	Press：Recognition Press and hold 2 seconds：Wake/Sleep Obstacle Avoidance function
Control Key	Press：Turn on/off LED Light Press and hold 2 seconds：Automated speech recognition

④ If users do NOT conduct App setting in Section ③, please setting user's height through controller

directly.

⑤ Now Enjoy!

3. Key functions

3.1 Perception mode

Perception mode will include 3 main functions: Obstacle avoidance, Navigation and steps notification.

After controller start working, the obstacle avoidance function is automatically turned on. Obstacles will be reported through bell and drum sound, or human voice.

Press and hold Enter Key are able to switch on/off obstacle avoidance function.

Bell Only

When the obstacles are on the left, right, or front side, AngelEye smart glasses would notice the user by voice. Slow frequency of the notification means the obstacle is far, otherwise the frequency would be quicker. There are two different warning tones. The sound of bell (dual-channel stereo) represents the obstacle in the front, the sound of drum represents the obstacle on the left (left channel) or right (right channel) respectively. Two syllables report together each time. The first syllable stands for the obstacle in the front (No notification when there is no obstacle). The second syllable stands for the obstacle on the left or right (No notification means there is no obstacle). Users could create a victual map of these obstacles in their mind, based on these warning tones.

Bell + Voice

All obstacles would be reported by both sound of bell and human voice. The bell notification is as same as the information above, and the voice notification would notice users when there are obstacles, such as gaps and stairs.

Voice Only

All obstacles would be reported by human voice only.

Navigation function (Still developing): Press and hold Enter Key, users are entitled to input destination by speech, such as "I would like to go to Trafalgar Square", After set the destination, it will schedule a walking route automatically. Thenavigation is based on the direction of the phone held by the user. During the navigation, it will report point of interests, such as Park, Post Office, Bank, and Supermarket.

AngelEye supports to recognize steps and stairs while using perception mode.

3.2 Recognition mode

Recognition mode includes5 different type of recognition: "General", "Cash note", "Color", "Illumination", "OCR". (The object categories that are currently supported in general recognition mode are: zebra crossing, pole, handrail, bicycle, motorcycle, car, monitor, sofa, bed, desk, chair, cup, person, mobile phone, trashcan, door and stairs. More object categories would be added later).

Users are entitled to choose different recognition type by pressing Upper Key and Bottom Key, then press Enter Key to conduct recognition.

3.3 Lighting Function

Press Control Key to turn on or switch the level of LED light, which could support better recognition and obstacle avoidance in the night time.

3.4 APP Setting

AngelEye APP has the ability to set the controller.

Choose "My Controller" in "My" Section. APP are able to connect the controller around automatically, users are entitled to customize basic information as below:

Height: Users are required to fill in the correct height information, due to this information effects the height of the camera sight and the accuracy of victual cane. Users could also modify the height anytime they prefer.

> ***Note:***user＇s height information is linked with his/her account. Even the user changes to another mobile phone and login with the same account, there＇s no need to re-type height information.

Current Battery: Show percentage of battery remaining

Speaking rate: Set the speaking rate by preference.

Prompt category of perception: Choose the notification type by preference.

R/L obstacle prompt: Choose to turn on or turn off the notification of the obstacles on the both right and left side by user's preference.

Perception range: Set the perception range by preference, the obstacles which are further than the maximum range will be not reported.

Current storage: Show the controller storage remaining.

Current Internet: Show current Wi-Fi Status

Current Edition: Show current controller software edition.

4. Obstacle avoidance Guide

Obstacles are reported by the sounds of bell and drum. Hence, it is better to have a basic understanding of the warning tones prior to the usage of the AngelEye smart glasses.

Under the obstacle-avoidance mode, AngelEye smart glasses would scan the obstacle and reflect the result to users by different warning tones. The sound of bell means that the obstacle is in the front, and the sound of drum means that the obstacle is on the both sides. Slow frequency of the notification would be occurred when you are approaching to obstacle, and the frequency would be increased with the closer to the obstacle.

Common scene assumptions are as following:

1. An obstacle placed in the front of the user which is 2 meters away, and no other obstacle lied on either the left hand side or right hand side, the user could clearly hear the sound of bell from both sides of the headphone, and the frequency of the sound would be increased with the closer to the obstacle.

2. An obstacle placed on the left hand side of the user which is 2 meters away, and no other obstacle placed in the front or on the right hand side, the user could clearly hear the sound of drum from the left-headphone, and the frequency of the sound would be increased with the closer to the obstacle.

3. An obstacle placed on the right hand side of the user which is 2 meters away, and no other obstacle placed in the front or on the left hand side, the user could clearly hear the sound of drum from the right-headphone, and the frequency of the sound would be increased with the closer to the obstacle.

4. A succession of obstructions on the left hand side, and also an obstacle in the front of the user which is 2 meters away, the user can clearly hear the sound of bell from both sides of the headphone and sound of drum from the left-headphone at the same time. With the closer to the obstacles, the frequency of bell-sound would be faster, and the frequency of drum-sound would be stable. In this case, the user need turn to other sides in order to avoid these obstacles based on these warning tones

5. A succession of obstructions on the right hand side, and also an obstacle in the front of the user which is 2 meters away, the user can clearly hear the sound of bell from both sides of the headphone and the sound of drum from the right-headphone at the same time. With the closer to the obstacles, the frequency of bell-sound would be faster, and the frequency of drum-sound would be stable. In this case, the user need turn to other side in order to avoid this obstacle based on these warning tones.

6. Some obstacles on both sides but no obstruction in the front, the user can clearly hear the sound of drum from both side of the headphones. Based on the notification from these drum-sounds, the user could easily find the way and pass.

7. Some irregular obstacles in the front, the user could go ahead without the impedance of these obstacles by virtues of drum-or-bell sounds with different frequency.

Note: Obstacles must be translucent objects, 15cm higher than the ground and lower than the height of user himself, or concave surface, 15cm lower than the ground or more.

5. Q&A

Q: How does AngelEye smart glasses convert visual pattern into auditory signal?

A: The stereo camera of AngelEye smart glasses detects and analyses the pavement and obstruction, and outputs these analysis results by auditory information consequently. The sound of bell means that the obstacle is in the front, and the sound of drum means that the obstacle is on the left hand side or right hand side. Slow frequency of the notification will be occurred when you are approaching to obstacle, and the frequency will be increased with the closer to the obstacle.

Q: How long does it take to learn to use AngelEye smart glasses?

A: AngelEye smart glasses converts visual recognition of the surrounding to auditory signal, so the users are required to understand the meaning of warning tone in order to create the virtual map in their mind. Therefore, it is important to concentrate on warning tone learning. The learning time depends on users' ability, and generally our participants need to take roughly two hours to learn to use AngelEye smart glasses during the internal test.

Q: Does AngelEye smart glasses work in indoor environment?

A: AngleEye Smart glasses could behave well in the bright environment, but the effective scope is the center of 50-degree sector from user height to the ground. When the user looks straight ahead (when the eye view is parallel with the ground, maybe the most comfortable posture for neck), the areas ranged from 0.4 to 3 meters farther way could be detected, except for 2 meters road from feet. As for the indoor of narrow areas, some areas, which is outside of glasses' scope, could also be detected as long as user turns around the head properly in order to sample the nearby signal by the device. For example, lowering your head a little bit could get the road information within 2 meters.

Q： Does AngelEye smart glasses apply to hearing impairment?

A： The principle of AngelEye smart glasses is to convert visual recognition of the surrounding into auditory signal, hence AngelEye smart glasses is not applicable for hearing impaired or hearing disorder people.

Q: Is AngelEye smart glasses applicable in any condition? Could it totally take place of the white cane or guide dog?

A： AngelEye is an assistive device which simulates the functionality of human eyes and correspondingly has the similar requirement of luminance. Strong light or darkness would reduce the performance of the device, so it might need to decline or add the light exposure manually. Therefore, NextVPU does not commit that AngelEye smart glasses can totally replace the white cane or guide dog, users need to estimate it on their own.

Q： Is AngelEye smart glasses able to detect moving object?

A: AngelEye smart glasses could detect the object multiple times a second. Based on the difference between the first frame and the last one, users could estimate the direction and the speed of moving object. It needs to be noticed that due to the speed of warning tone is self-defined, so the notification speed of moving object might be different.

Q： How can I purchase AngelEye smart glasses?

A： AngelEye smart glasses could be purchased directly from NextVPU official website.

Q： Is it free to update the latest software after I purchased AngelEye smart glasses?

A： If the smart glasses is purchased from NextVPU or its authorized local dealer, users are entitled to update the latest software for free (If the hardware does not need to be modified) .

Q： Does AngelEye smart glasses have an effect on other voice hearing while I am using?

A： The warning tone outputs information through bone-conduction headphone. Users could hear sounds through the vibration of the bones of their face (jaw bones and cheek bones). So, their ears are available to hearing other voice, and users could control the volume by preference.

Q： Does AngelEye smart glasses effect my hearing?

A： Users hear sound through the vibration of the bones of their faces (jaw bones and cheek bones). The sound waves are bypassing the outer and middle ear (where the eardrum is located) and directly stimulating the inner ear (hearing organ). So, comparing with general headphone, the influence of hearing is less.

6. Copyright notice and Disclaimer

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Once you start using this product, it would be seen as you have read, understood, and agreed the entire content of the product's User Manual, Disclaimer and Safety Information. It is acknowledged that you will be responsible for all the consequences, to use this product with a legitimate reason, and to agree this terms, all policies and regulations which are formulated by NextVPU (Shanghai) Co,.Ltd.

All copyrights and intellectual properties of AngelEye smart glasses and its related information (including but not limited to the appearance of AngelEye smart glasses, AngelEye APP and Teaching Video & Audio includes pictures, frames, animation, video audio, music and text) belong to the developer. Users could not be allowed to copy or modify this information.

Users could download, install, copy and share the application with non-commercial purpose. In involvement with commercial sale, copy, rent, spread and software obligation, such as pre-installing software and binding, obtaining permission from software author is necessary.

Since the application could download and spread through internet, in terms of any resource that is subject to virus, disguised Trojan invasion because of the availability from non-official formal channel, NextVPU would NOT be responsible for the direct and indirect damage.

When you enjoy the product, please ensure that you strictly follow our requirements, including but not limited to the User Manual and Important Safety Information. Concerning any personal injury, accident, property damage, legal dispute or other adverse conflict of interest, caused by using behavior that violates the Important Safety Information or force majeure, users have to take responsible for all the related consequences and damages, not for NextVPU.

NextVPU would NOT be responsible for any direct and indirect behavior against the form of statute when user enjoys this product.

7. Important safety information

Warning: Failure to follow these safety instructions could result in fire, electric shock, injury, or damage to AngelEye smart glasses or other property. Read all the safety information before using AngelEye smart glasses.

Use Condition: AngelEye smart glasses is an assistive technology which supports travel and recognition. It must operate with a smartphone or a specialized controller. When using the functions of AngelEye smart glasses, the accuracy of warning tone is based on the normal walking speed, which do not apply to the speed of motor vehicle and non-motor vehicle.

Warning: AngelEye smart glasses does not apply to hearing impaired people.

Use Condition: The obstacle avoidance function convert the visual information into auditory. Before using the AngelEye smart glasses, it is important to study the warning tone from the audio tutorials which

are provided by NextVPU. User should measure study results by themselves, for the consideration of safety, please using the function of obstacle avoidance with the white cane.

Warning: AngelEye smart glasses is not a replacement of the white cane.

Handling: Handle AngelEye smart glasses with care. It is made of metal, glass, and plastic and has sensitive electronic components inside. AngelEye smart glasses can be damaged if dropped, burned, punctured, or crushed, or if it comes in contact with liquid. If you suspect AngelEye smart glasses is damaged, please discontinue use of AngelEye smart glasses, as it may cause overheating or injury. Don't use AngelEye smart glasses with a cracked shell, as it may cause injury. If you're concerned about scratching the surface of AngelEye smart glasses, consider using the container box.

Repairing: Don't open AngelEye smart glasses and don't attempt to repair AngelEye smart glasses yourself. Disassembling AngelEye smart glasses may damage it, result in loss of splash and water resistance, or cause injury to you. If AngelEye smart glasses is damaged or malfunctions, contact NextVPU or an NextVPU Authorized Service Provider.

Distraction: Using AngelEye smart glasses in some circumstances may distract you and might cause a dangerous situation. Observe rules that prohibit or restrict the use of mobile devices or headphone.

Navigation: Maps depend on data services. These data services are subject to change and may not be available in all areas, resulting in maps and location-based information that may be unavailable, inaccurate, or incomplete. Compare the information provided in Maps to your surroundings. Use common sense when navigation. Always observe current road conditions and posted signs to resolve any discrepancies.

Power Supply: The power of AngelEye smart glasses is supplied by your smartphone or the specialized controller, please connecting the AngelEye smart glasses with your smartphone or the controller by the USB cable. Before using the AngelEye smart glasses, please make sure the USB cable is fully inserted into your smartphone or the controller.

Using damaged cables, or supply the power when moisture is present, can cause fire, electric shock, injury, or damage to AngelEye smart glasses and other property.

Prolonged hear exposure AngelEye smart glasses complies with applicable surface temperature standards and limits. However, even within these limits, contact with warm surfaces for long periods of time may cause discomfort or injury. Use common sense to avoid situations where your skin is in contact with a device.

Hearing loss: Listening to sound at high volumes may damage your hearing. Background noise, as well as continued exposure to high volume levels, can make sounds seem quieter than they actually are. For more information about hearing loss, go to the Sound and Hearing website.

WARNING: To prevent possible hearing damage, do not listen at high volume levels for long periods.

Not a medical device: AngelEye smart glasses is not designed or intended for use in the diagnosis of disease or other conditions, or in the cure, mitigation, treatment, or prevention of disease.

Medical conditions: If you have any medical condition that you believe could be affected by AngelEye smart glasses (for example, seizures, blackouts or headaches), consult with your physician prior to using AngelEye smart glasses.

Explosive atmospheres: Using AngelEye smart glasses in any area with a potentially explosive atmosphere, such as areas where the air contains high levels of flammable chemicals, vapors, or particles (such as grain, dust, or metal powders), may be hazardous. Obey all signs and instructions.

Repetitive motion: When you perform repetitive activities, you may experience discomfort in your hands, arms, wrists, shoulders, neck, or other parts of your body. If you experience discomfort, stop using AngelEye smart glasses and consult a physician.

High-consequence activities: This device is not intended for use where the failure of the device could lead to death, personal injury, or severe environmental damage.

Choking hazard: Some AngelEye smart glasses accessories may present a choking hazard to children. Keep these accessories away from children.

Product Warranty

NextVPU (Shanghai) Co., Ltd.

Dear customers,

We highly appreciate your purchasing AngleEye Smart Glasses from NextVPU.

To receive better services from us and to better protect your rights and interests, please carefully read the following warranty:

Explanation of the Warranty:

This product warranty is a voluntary manufacturer's warranty, in application of AngelEye Smart Glasses, which you purchased for your own use rather than for resale. It provides rights in addition to statutory rights provided by relevant consumer protection law and product quality law in your country, including but not limited to those related to non-conforming products.

After purchasing the product from NextVPU or its authorized distributors, customers could receive free repair service during the warranty period.
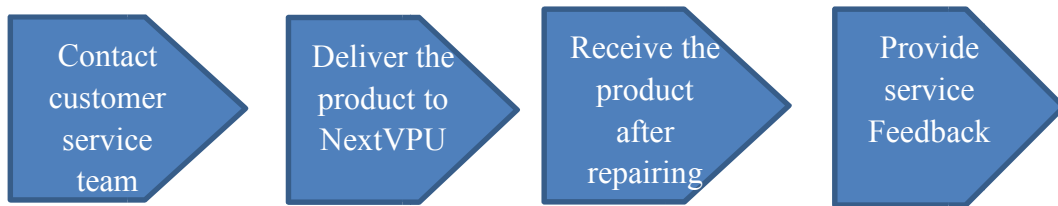
Part I ----- General Term

What is NOT covered by this warranty:

1) The entire product or the components for which the warranty period is expired;

2) Damages caused by human factors rather than the quality problems of the product;

3) Products not purchased from NextVPU or its authorized distributors;

4) Failures or damages caused by using, repairing, or maintaining the product in a way not conforming to the *User Manual* or *Safety Instruction;*

5) The product could not be identified validly due to obliterating, damaging or deleting of identification labels;

6) No after-sales service card or valid purchase receipt can be presented, or the product model and the series number do not match;

7) Cosmetic damage caused by normal wear and tear, scruffs, crack, scratch loss paint or dents, including but not limited to the shell, buttons, headphone and accessories etc.;

8) Any repair or refit made by anyone who is not authorized by NextVPU;

9) Using the product for profit purposes (e.g., rent) rather than for personal use purpose; and

10) Damages caused by force majeure or other external causes

When the product is damaged as a result of the following accidents, NextVPU will provide repair services by charging reasonable fees:

- Circuitry burnout

- Damage or loss of components

- Breakage of structure or shell

- Damage caused by flooding water, damp, dropping, crash.

Service Flow:

Contact customer service team → Deliver the product to NextVPU → Receive the product after repairing → Provide service Feedback

NextVPU Repair Fee---Global（Excepts Mainland China）

*Note: Call charges and international shipping charges might apply to different locations.

The warranty period is one year. After the warranty period, customers are entitled to extend the warranty for one year. (Extension Fee: AngelEye Smart glasse: $48; AngelEye Controller: $98), during the One-Year warranty, customers are entitled to enjoy the preferential maintenance fee （Table below）.

Product and Model	During Warranty Period	One-Year Warranty extension	Warranty expires
Smart glasses	$0	$140	$310
Controller	$0	$200	$630

NextVPU Product Warranty:

NextVPU will provide to customers one-year product warranty which includes the following: 1) Within one year from the date of purchase, NextVPU provides free repair or replacement services if the product has quality problem.

2) Within two years from the date of purchase, NextVPU provides chargeable warranty extension plan or chargeable repair services, customers could purchase the warranty extension plan.

3) After two years from the date of purchase, NextVPU only provides chargeable repair services.

4) From the date of purchase, NextVPU provides free software update service.

5) During the warranty period for free replacement, if the same product could not be provided due to halt production or other special reasons, NextVPU will provide a new product whose standard is NOT lower than the original one.

6) During the warranty period for free repair, if the product has unrepairable damages or the raw materials are unavailable, NextVPU will provide a new product whose standard is NOT lower than the original one.

For the avoidance of doubt, in terms of item 5) and 6) above, if NextVPU does not have the same standard product thus has to provide a higher standard product; customers shall make up the price difference.

<u>Limited Warranty and Liabilities</u>

1. Customers shall remove all data, including confidential information, proprietary information and personal information from the product before submitting the product to NextVPU for repair. During the repairing process, NextVPU shall NOT be responsible for the loss or disclosure of any data or information which are stored in the product submitted by customers, including any confidential information, proprietary information, or personal information.

2. NextVPU shall not be responsible for any consequential losses (including but not limited to loss of profits, anticipated interests, goodwill, time etc.) caused by defects of product or by our repairing of it. NextVPU's liabilities for the product and repair services are limited to the amount paid by the customer for such product.

3. When repair services involve replacement of a product or the parts, the replaced product or parts shall become NextVPU's property.

4. Any rendered repair service could not be considered as an extension of the warranty.

Part II – Country/Region Specific Terms

This warranty only includes general terms voluntarily offered by NextVPU. If the laws in your country offer additional statutory rights and protections to customers like you in terms of product quality, NextVPU will comply with such statutory requirements. For more detailed information, please contact NextVPU customer service team.

Contact Address: Room 501-07, Section A, Building 1, No. 3000 Longdong Avenue, Pudong New District, Shanghai, P.R. China

Customer Service: 0086 (0) 21 5528 1868

Email: cs@nextvpu.com

FCC Warning:

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

· Reorient or relocate the receiving antenna.
· Increase the separation between the equipment and receiver.
· Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
· Consult the dealer or an experienced radio/TV technician for help.

Caution: Any changes or modifications to this device not explicitly approved by manufacturer could void your authority to operate this equipment.

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

The device has been evaluated to meet general RF exposure requirement. The device can be used in portable exposure condition without restriction.