



NanoCam 4K™/Go™

USER GUIDE
Models: N4K/NCG
Ver. 12.23 (En)

DATE OF ISSUE:

12-12-2023

DESIGNS FOR VISION, INC. NANOCAM 4K™/NANOCAM GO™

The Designs for Vision NanoCam 4K™ and NanoCam Go™ Cameras provide portable high definition and resolution for medical procedures. They are designed to be comfortable yet functional. They can be used with most of Designs for Vision headlight systems.

INDICATIONS FOR USE

The Designs for Vision NanoCam 4K™ and NanoCam Go™ are video recording devices used to aid in visualization for medical professionals. It is intended to document various tissues and/or body parts. This device is intended to be used by medical professionals, requiring no specific training other than what is contained in this manual.

CONTRAINDICATIONS

None known

WARNINGS



Save these instructions. This manual contains important safety and operating instructions



Always examine the unit and accessories for damage before commencing use. Damaged accessories must not be used and must be replaced. Use original Designs for Vision, Inc. parts and accessories only. The use of unapproved parts may void the warranty.

To reduce the risk of battery explosion, follow these instructions and those marked on the battery

Do not Autoclave

For indoor use only

If the equipment is used in a manner not specified by Designs for Vision, Inc., the protection provided by the equipment may be impaired



This equipment and accessories do not contain serviceable parts. All repairs need to be conducted by Designs for Vision, Inc. service personnel

Do not let liquids enter openings or ports. Do not immerse parts in solutions. Allowing

liquids to enter openings or ports may void warranty.

Equipment not suitable for use in the presence of a flammable anesthetic mixture with air or in an oxygen rich environment

Care must be taken when operating this equipment around other equipment to avoid reciprocal interference. Potential electromagnetic or other interference could occur to this or to the other equipment. Try to minimize this interference by not using other equipment in conjunction with this device

No modification of this equipment is allowed. Performing unauthorized modification on the equipment, accessories or the product labelling may void the warranty

Never make changes or modifications to the cameras/footpedal

Do not short circuit

Do not expose to fire

When replacing battery, be careful to not crimp or crush wires inside of footpedal

Protect footpedal from fluids and damp environments



Waste of electrical and electronic equipment must not be disposed as unsorted municipal waste. It must be collected separately, and must be disposed as per local regulations



Do not use within 8 inches of electrocautery devices to maintain proper function



Always use a cloth to clean/disinfect products



Any serious incident that has occurred in relation to the device should be reported to the manufacturer and the competent authority of the Member State in which the user and/or patient is established.

SPECIFICATIONS

NanoCam 4K™	
Weight w/o headlight	31g
Weight w/headlight (UltraMini)	51 g
Camera Dimensions	1.015" L x .986" W x .822" H
Camera Dimensions w/brackets	1.625" L x .986" W x 1.33" H
Resolution	4K, 1080P
Megapixels	13
Lens Magnification	16mm: 2.0X/25mm: 3.0X
Software	DBR Software Version: 1.1.3
Headlight	Panoramic UltraMini
Cable	Removable USB Micro to USB
Footpedal	Bluetooth Enabled Wireless
Footpedal Dimensions	10.3" L x 7.3" W
Footpedal Weight	1484 g


NanoCam Go™	
Weight w/o headlight	14g
Weight w/headlight (UltraMini)	34g
Camera Dimensions	.812" L x .757" W x .616" H
Camera Dimensions w/brackets	1.38" L x .757" W x 1.01" H
Resolution	1080P, 720P
Megapixels	3.4
Lens Magnification	16mm: 2.0X/25mm: 3.0X
Software	DBR Software Version: 1.3.1
Headlight	Panoramic UltraMini
Cable	Removable USB Micro to USB
Compliance	EUMDR Approved, IEC 60601
Footpedal	Bluetooth Enabled Wireless
Footpedal Dimensions	10.3" L x 7.3" W
Footpedal Weight	1484 g

COMPUTER(PC) REQUIREMENTS

Minimum Requirements	NanoCam 4K™	NanoCam Go™
@720p CPU Rating over 3000	●	●
@720p Screen Res 1024 x 768 pix	●	●
@1080p Intel i5 or i7 Processor	●	●
@1080p Intel Graphics Card	●	●
@1080p 8GB Ram	●	●
@1080p CPU Rating 4000 or higher	●	●
@1080p Screen Res 1920 x 1080 pix	●	●
@720p/1080p Windows 7 or higher		●
@2160p Windows 10	●	
@2160p CPU Rating 6000	●	
@2160p Screen Res 3840 x 2160 pix	●	
@2160p 4K resolution screen	●	
Recommended Requirements	NanoCam 4K™	NanoCam Go™
Intel i5 or i7 Processor	●	●
8GB Ram		●
16 GB Ram	●	
Windows 10	●	●
CPU Rating over 10,000	●	
1920 x 1080 Screen Res	●	●

MAC REQUIREMENTS

Minimum Requirements	NanoCam 4K™	NanoCam Go™
@720p MacBook Air/Pro, iMac, Mac-Mini 2015 or later	•	•
@1080p MacBook Air/Pro, iMac, Mac-Mini 2017 or later	•	•
@1080p Intel i5/i7 Processor	•	•
8GB RAM	•	•
OS X Version 10.13(High Sierra)	•	•
MacBook Air/Pro 2013	•	•
2 USB ports	•	•
Recommended Requirements	NanoCam 4K™	NanoCam Go™
MacBook Air/Pro, iMac, Mac-Mini 2018 or later	•	
16GB Ram	•	
i7 Processor	•	

TRANSPORT & STORAGE	
TEMPERATURE:	-40°C to 70°C
RELATIVE HUMIDITY:	10% to 100% including condensation
ATMOSPHERIC PRESSURE:	500 to 1060 hPa
ENVIRONMENTAL OPERATING CONDITIONS	
TEMPERATURE:	10°C to 40°C
RELATIVE HUMIDITY:	30% to 75%
ATMOSPHERIC PRESSURE:	700 to 1060 hPa
APPROVALS	
IEC 60601-1, IEC 60601-1-2, Class A, CISPR 11, IEC 62133, IEC 62366-1	
EQUIPMENT CLASS:	 Class II
INGRESS OF WATER NanoCam FOOT PEDAL <i>ONLY</i> :	IP65
MODE OF OPERATION:	Continuous
PROTECTION FROM SHOCK:	NO APPLIED PARTS
METHODS OF STERILIZATION:	Not Intended to be Sterilized
OXYGEN RICH ENVIRONMENT:	Not Intended for Oxygen Rich Environments
PATENTS:	REVEAL 11,099,376 B1

A) Dimensions and weight measured without the micro-video lens or locking ring

CONTENTS

Device Description.....	12
Directions for Use.....	13
Using the NanoCam 4K/Go.....	13
Inspection and Preventative Maintenance	24
Description of Symbols.....	25
Replacement Parts	26
Electromagnetic Information	26
Warranty	34

DEVICE DESCRIPTION

The NanoCam 4K™ and NanoCam Go™ are video recording devices that are meant to be used in conjunction with Designs for Vision headlights. Both cameras offer high definition recording and image taking capability in two different magnifications 2.0X and 3.0X. They can be used for fluorescent guided applications as well (*if equipped*). They are operated using a bluetooth footpedal that allows for hands free operation for taking video and still images.

Accessories include:

- Hex Drivers
- Cable Wrap Kit
- Operation Manual
- Registration Card
- Carrying Case
- USB Extension Cables
- 16mm/25mm Video Lens System)
- Bluetooth Enabled Footpedal
- Bluetooth USB Plug-In Module
- USB Drive w/Camera Software
- Focusing Card
- REVEAL Filter Cap(if equipped)*



Note:

For all instructions referring to the headlights and power pack options that are available for use with these cameras please refer to their specific instruction manual for proper use

DIRECTIONS FOR USE

USING THE NANO CAM 4K/GO™ _____

NOTE: Before proceeding, plug the USB flash drive that came with your NanoCam 4K/Go™ into an available PC and run the setup file. Prior to your first use, you will need to perform the following steps to properly align and setup the camera, light (if equipped) and micro-video lens system of your NanoCam 4K/Go

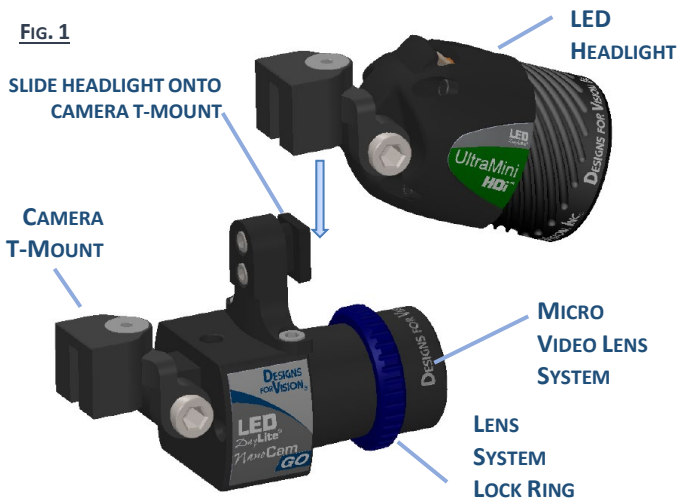
1. MOUNTING NANO CAM 4K/GO™ AND INSERTING CABLES
2. ALIGNING NANO CAM 4K/GO™ WITH YOUR FIELD OF VIEW
3. FOCUSING YOUR NANO CAM 4K/GO™
4. ALIGNING THE HEADLIGHT WITH YOUR NANO CAM 4K/GO™

1. MOUNTING NANO CAM 4K/GO AND INSERTING CABLES

Mount the camera/s to your frames or headset using the supplied T-Mount. Attach the Headlight (*Fig. 1*) to the camera as shown. Plug the small connector of the headlight cable into the top of the headlight. Plug the large connector of the cable into the headlight connector on the power pack.

Double click on the camera software icon and wait for the program to start. You can now plug the USB connector from

FIG. 1



the camera into an available USB port on your PC. Once the camera connects, you should see live video on your monitor.

2. ALIGNING NANOCAM 4K/GO™ WITH YOUR FIELD OF VIEW

While wearing the camera on your frame/headset, look through your surgical telescopes (loupes) at the provided focusing card. *NOTE: It is helpful to have the card placed on a flat surface with the video monitor directly in front of you.* The card should be placed in the center of your field of view.

Grasp the camera and move either up or down until the video image on your monitor is centered with your vision through your surgical telescopes (loupes). *NOTE: Make sure to keep your head still when shifting your view from the surgical telescopes (loupes) to the video monitor.* Carefully remove your frame making sure to not shift the camera. Get the blue cap hex screwdriver included with your NanoCam 4K/Go™. Place the driver into the opening for the locking shaft and turn clockwise to tighten. This will lock the camera with your telescopes. Place the camera back on your face. *NOTE: Gently*

Pull up and down on your camera to confirm that it is locked in place.

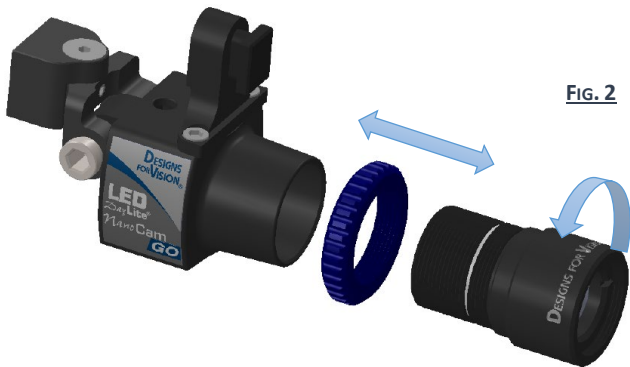
3. FOCUSING YOUR NANOCAM 4K/GO™

Next, you will need to focus the micro-video lens system. Your NANOCAM 4K/GO™ comes with two magnifications of micro-video lens systems 2.0X (16mm) and 3.0X (25mm). If you wish to change the magnification, carefully unscrew the micro-video lens system and replace it with one of the other magnification lens systems (*Fig. 2*).

NOTE: Be careful not to allow any dust or contaminants to enter the open camera body.

NOTE: Make sure to re-install the lens system lock ring when changing the lens system.

Rotate the micro-video lens system until the video image on your monitor is in focus. *NOTE: Rotating the micro-video lens system clockwise decreases the focal length of the camera. Rotating the micro-video lens system counter-clockwise increases the focal length of the camera.*



While holding the micro-video lens system with one hand, use your other hand to turn the lens system lock ring counter-clockwise until it locks the micro-video lens system into place. The micro-video lens systems have been optically matched with your surgical telescopes (loupes). When properly focused, the camera will have the same magnification and depth of field as what you see through your surgical telescopes (loupes).

4. ALIGNING THE HEADLIGHT WITH YOUR NANOCAM 4K/Go™

The final adjustment is the headlight. Get the hex screwdriver included with your camera. Gently pull up and down on the headlight to place the spot of light in the center of what you see through your surgical telescopes (loupes). Shift your view from the surgical telescopes to the video monitor to confirm that the light properly fills the video image. Carefully remove your frame making sure to not shift the headlight. Place the driver into the opening for the locking shaft of the headlight and turn clockwise to tighten. This will lock the headlight with your camera.

Your NanoCam 4K/Go™ should now be fully aligned and focused to your frame mounted telescopes. The image on your video monitor should look like the next picture (*Fig. 3*). The settings will stay locked in place for future uses.



FIG. 3

5. FOOT PEDAL OPERATION

Your NanoCam 4K/Go™ are available with a USB Bluetooth enabled foot pedal to allow for



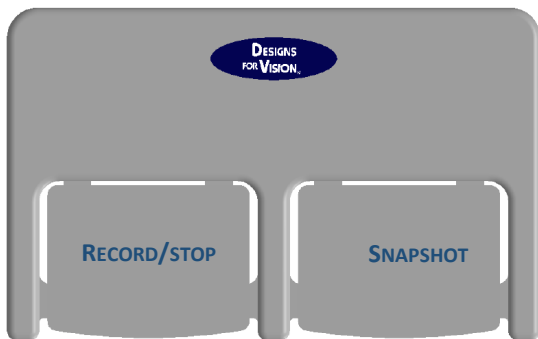
FIG. 4

hands free operation. You must connect the USB Bluetooth Receiver to your device at all times to operate the footpedal. Once connected to a PC with the Designs for Vision, Inc.®

software already installed, the foot pedal will help to control the camera functions.

Note: The USB Bluetooth Receiver is paired to one footpedal, the footpedal will not work with another receiver. They both have the same serial number printed on them to identify the pair

FIG. 5



NOTE: For foot pedal to function, NanoCam HDi™ software has to be the active screen on your PC. The default settings for the foot pedal are Record Start/Stop, and Snapshot (Fig. 4). When you press Record Start/Stop, you will also hear an audible alert. Video will be recording at full resolution and

frame rate. Pressing Record Start/Stop again will stop the recording. When you press the Snapshot button, you will hear an audible sound. This indicates that a photo/bookmark has been made. A bookmark is created when the snapshot pedal is pressed during a recording.



6. USING YOUR NANOcam 4K/Go™ IN FGS PROCEDURES

Your NanoCam 4K/Go™ can be used with Designs for Vision REVEAL product line. In order to capture your FGS procedures, you must install the wavelength specific filter cap that matches the wavelength of your REVEAL Loupes

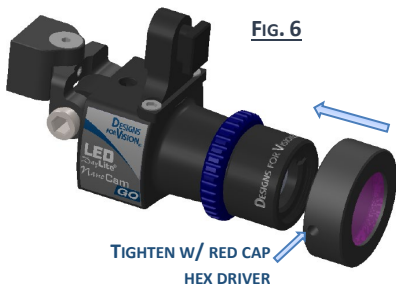


FIG. 6

Install the filter by sliding it over the front of the video lens and tightening the set screw onto the lens, using the red capped hex driver. Designs for Vision currently offers a 430nm filter. *(Note the filter in Figure 5 is shown in pink for clarity purposes only).*

7. USING YOUR NANOCAM 4K/GO™ WITH THE TRIBEAM

The NanoCam 4K/Go™ can be attached to the TriBeam or TriBeam Plus. This can be done using an adapter that attaches to the TriBeam. The TriBeam comes with a cap installed in front of the articulating arm on the headlight seen in Figure 7. To install the adapter, remove the small cap near the adjusting arm of the TriBeam.



FIG. 7

Step 1: Using a hex key, remove the screw as seen in Figure 8 and remove the cap. The screw will be used in the next step.

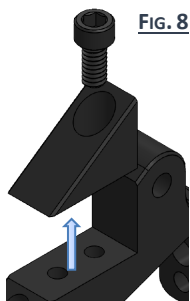


FIG. 8

Step 2: Place the NanoCam Adapter onto the TriBeam by aligning the holes mounting holes with the adapter. In the adapter kit there will be an extra socket head screw. Use this screw and the screw you removed in Step 1 to secure it with the screw that was removed and an additional screw as seen in Figure 9. Use the provided allen key to tighten the screws. Make sure to not overtighten the screws. Once the adapter is in place, slide the camera onto the t-mount on the adapter. Align the camera the same way as described in this manual.




FIG. 9





INSPECTION AND PREVENTATIVE

- Clean lenses with a standard glass cleaner and a soft, lint-free cloth, making sure not to scratch the surface.
- Not intended to be sterilized. It is recommended for disinfection that all the exposed plastic sections of the headlight, power pack and accessories be wiped with Lysol IC or Clorox VersaSure surface disinfectant/cleaner or an equivalent plastic-safe cleaner. *Note: Do not use alcohol, phenol, ammonia, or iodine complex solutions*
- Wipe the sections rather than spraying onto plastic parts. *Note: Do not let liquids enter openings or ports. Do not immerse parts in solutions. Using solutions other than recommended may void warranty. Allowing liquids to enter openings or ports may void warranty.*
- Wipe cables with plastic-safe cleaners, if necessary. Do not allow cleaners to get onto the cable connectors as it

may cause the electrical terminals to corrode

-  The Footpedal requires a 3V Lithium CR2450 560mAh battery and should be serviced every 5 years or sooner depending on use. Always discard batteries according to regional regulations. The battery can be changed on the footpedal by removing the bottom screws.

DESCRIPTION OF SYMBOLS

	<i>ATTENTION / CAUTION</i>
	<i>INDICATES CONFORMITY WITH MDR 2017/745</i>
	<i>READ ACCOMPANYING DOCUMENTS</i>
	<i>WASTE ELECTRICAL AND ELECTRONIC EQUIPMENT (WEEE) DIRECTIVE SYMBOL</i>

REPLACEMENT PARTS

DESCRIPTION	PART NUMBER
NanoCam 4K™	4003-3004-0004
NanoCam Go™	4003-3080-0004
Footpedal	4003-0000-0048
16mm MicroVideo Lens	4003-0700-0016
25mm Micro Video Lens	4003-0700-1025
NanoCam 4K USB Cable	4003-0001-0020
REVEAL 430nm Filter Cap(<i>if equipped</i>)	4003-3000-0016
USB Extension Cable	4002-0001-0020-
TriBeam NanoCam Adapter Kit	4908-0022-1000

ELECTROMAGNETIC INFORMATION

This equipment is designed to comply with IEC 60601-1-2. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with instructions, may cause harmful interference to other devices in the vicinity. However, there is no guarantee that interference will not occur in a particular installation. Harmful interference to other devices can be determined by turning this equipment ON and OFF. Try to correct the interference using one or more of the following:

- Reorient or relocate the receiving device
- Increase the separation between the equipment
- Consult Designs for Vision, Inc. for help

Table 201 – Guidance and Manufacturer’s Declaration – Emissions
All Equipment and Systems

Guidance and Manufacturer’s Declaration – Emissions
The NanoCam 4K/Go™ are intended for use in the electromagnetic environment specified below. The customer or user of the NanoCam 4K/Go should insure that it is used in such an environment.

Emissions Test	Compliance	Electromagnetic Environment- Guidance
RF Emissions CISPR 11	Group 1, Class A	NanoCam 4K/Go use RF energy only for its internal function. Therefore, its RF emissions are very low and are not likely to cause any interference in nearby electronic equipment.
Harmonics IEC 61000-3-2	Class A	The NanoCam 4K/Go are suitable for use in all establishments (not including domestic) and those directly connected to the public low-voltage power supply network that supplies buildings used for domestic purposes.
Flicker IEC 61000-3-3	Complies	

**Table 202 – Guidance and Manufacturer’s Declaration – Immunity
All Equipment and Systems**

Guidance and Manufacturer’s Declaration – Immunity			
The NanoCam 4K/Go™ are intended for use in the electromagnetic environment specified below. The customer or user of the NanoCam 4K/Go should ensure that it is used in such an environment.			

Immunity Test	IEC 60601 Test Level	Compliance Level	Electromagnetic Environment – Guidance
ESD IEC 61000-4-2	±8kV Contact ±2kV, ±4kV, ±8kV, ±15kV Air	±8kV Contact ±15kV Air	Floor should be wood, concrete or ceramic tile. If floors are synthetic, the r/h should be at least 30%.
EFT Burst Immunity Test IEC 61000-4-4	±.5kV 100kHz , ±1kV 100kHz Repetition frequency	±.5kV/±1kV 100kHz Repetition frequency	Mains power quality should be that of a typical commercial or hospital environment.
Surge IEC 61000-4-5	±0.5kV, ±1kV Line-to-line ±0.5kV, ±1kV, ±2kV Line-to-ground	±1kV Line-to-line ±2kV Line-to-ground With client modifications	Mains power quality should be that of a typical commercial or hospital environment.

Power Frequency 50Hz or 60 Hz Magnetic Field IEC 61000-4-8	30 A/m	30 A/m	Power frequency magnetic fields should be that of a typical commercial or hospital environment.
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**Table 204 – Guidance and Manufacturer’s Declaration – Emissions
Equipment and Systems that are NOT Life-Supporting**

Guidance and Manufacturer’s Declaration – Emissions
The NanoCam 4K/Go™ are intended for use in the electromagnetic environment specified below. The customer or user of the NanoCam 4K/Go should ensure that it is used in such an environment.

Immunity Test	IEC 60601 Test Level	Compliance Level	Electromagnetic Environment - Guidance
Conducted Disturbances induced by RF Fields IEC 61000-4-6	3 V 0.15 MHz-80 MHz 6 V in ISM bands between 0.15MHz and 80MHz 80% AM at	3 V 0.15 MHz to 80 MHz 6 V in ISM bands between 0.15MHz and 80MHz 80% AM at	Interference may occur in the vicinity of equipment containing a transmitter.

Radiated RF EM Fields IEC 61000-4-3	1 kHz	1 kHz	
	10 V/m	10 V/m	
	80%MHz- 2.7GHz	80%MHz- 2.7GHz	
	80%AM at 1KHz	80%AM at 1KHz	

Table 206 – Recommended Separation Distances between portable and mobile RF Communications equipment and the NanoCam 4K/Go™ Equipment and Systems that are NOT Life-Supporting

Recommended Separations Distances for the NanoCam 4K/GO
<p>The NanoCam 4K/Go™ are intended for use in the electromagnetic environment in which radiated disturbances are controlled. The customer or user of the NanoCam 4K/Go™ can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF Communications Equipment and the NanoCam 4K/Go as recommended below, according to the maximum output power of the communications equipment.</p>

Test Frequency (MHz)	Band^{a)} (MHz)	Service^{a)}	Modulation^{b)}	Max Power (W)	Distance (m)	Immunity Test Level (V/m)
385	380 - 390	TETRA 400	Pulse Modulation ^{b)} 18 Hz	1,8	0,3	27
450	430 - 470	GMRS 460, FRS 460	FM ^{c)} ±5 kHz deviation	2	0,3	28

			1 kHz sine			
710	704 - 787	LTE Band 13, 17	Pulse Modulation ^{b)} 217 Hz	0,2	0,3	9
745						
780						
810	800 - 960	GSM 800/900 TETRA 800, iDEN 820, CDMA 850, LTE Band 5	Pulse Modulation ^{b)} 18 Hz	2	0,3	28
870						
930						
1720	1700 - 1990	GSM 1800; CDMA 1900; GSM 1900; DECT; LTE Band 1, 3, 4, 25; UMTS	Pulse Modulation ^{b)} 217 Hz	2	0,3	28
1845						
1970						
2450	2400 - 2570	Bluetooth, WLAN, 802.11 b/g/n, RFID 2450, LTE Band 7	Pulse Modulation ^{b)} 217 Hz	2	0,3	28
5240	5100 - 5800	WLAN 802.11 a/n	Pulse Modulation ^{b)} 217 Hz	2	0,3	9
5500						
5785						

NOTE If necessary to achieve the IMMUNITY TEST LEVEL, the distance between the transmitting antenna and the NanoCam 4K/Go™ may be reduced to 1 m. The 1 m test distance is permitted by IEC 61000-4-3.

^{a)} For some services, only the uplink frequencies are included.

^{b)} The carrier shall be modulated using a 50 % duty cycle square wave signal.

^{c)} As an alternative to FM modulation, 50 % pulse modulation at 18 Hz may be used because while it does not represent actual modulation, it would be worst case.

WARNING: Use of this equipment adjacent to or stacked with other equipment should be avoided because it could result in improper operation. If such use is necessary, this equipment and the other equipment should be observed to verify that they are operating normally.

WARNING: Use of accessories, transducers and cables other than those specified or provided by the manufacturer of this equipment could result in increased electromagnetic emissions or decreased electromagnetic immunity of this equipment and result in improper operation.

WARNING: Portable RF communications equipment (including peripherals such as antenna cables and external antennas) should be used no closer than 30 cm (8 inches) to any part of the NanoCam 4K/Go™ including cables specified by Designs for Vision, Inc. Otherwise, degradation of the performance of this equipment could result.

NOTE: The EMISSIONS characteristics of this equipment make it suitable for use in industrial areas and hospitals (CISPR 11 class A). If it is used in a residential environment (for which CISPR 11 class B is normally required) this equipment might not offer adequate protection to radio-frequency communication services. The user might need to take mitigation measures, such as relocating or re-orienting the equipment.

NOTE: NanoCam 4K/Go™ may be adversely affected by EM DISTURBANCES possibly resulting in a loss of video issues.

NOTE: The NanoCam 4K/Go™ is intended to be used during medical procedures. Keep camera cable securely attached to the body using supplied clips. Headlight cable should not come in contact with HF EQUIPMENT/CABLES. If interference occurs, increase separation distance between the NanoCam 4K/Go and the HF EQUIPMENT.

WARRANTY

The NanoCam 4K/Go™ are warranted against imperfections and defects in materials and workmanship for three years. Any damage caused by improper maintenance as described in the manual may not be covered by the warranty.



SEE WHAT'S RIGHT ABOUT
MADE IN AMERICA®

TECHNICAL SUPPORT/CUSTOMER SERVICE

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